LONGHORN ARMY AMMUNITION PLANT KARNACK, TEXAS

ADMINISTRATIVE RECORD

Volume 5

2018

Bate Stamp Numbers
00839727 - 00841115

Prepared for

Department of the Army
Longhorn Army Ammunition Plant

1976 – 2018

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS
ADMINISTRATIVE RECORD – CHRONOLOGICAL INDEX

VOLUME 5

2018

A. Title: Report (cont'd) - Addendum 1 to the Final Report for the In Situ Microbial Reactor Enhanced Bioremediation Field Test
Author(s): U.S. Army Aberdeen Test Center
Recipient:
Date: August 2015
Bate Stamp: 00839727 – 00840078

B. Title: Letter of Transmittal – Surface Water Data Transmittal - 2016
Author(s): Bhate Environmental & Infrastructure
Recipient: U.S. Army Corps of Engineers
Date: June 6, 2018
Bate Stamp: 00840079 – 00841115

00839727

STATE OF TEXAS PLUGGING REPORT for Tracking #100666

Owner:	**USACE**	Owner Well #:	**32-1**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 41" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/25/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 19 ft to .5 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 19 ft to 10 ft; Sack(s)/type of cement used: 2 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	**ETTL Engineers & Consultants** **1717 East Erwin** **Tyler , TX 75702**

00839728

Plug Installer License Number:	**59385**
Licensed Plug Installer Signature:	**Richard Herman**
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100666**) on your written request.

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P.O. Box 12157
Austin, TX 78711
(512) 463-7880

00839729

STATE OF TEXAS PLUGGING REPORT for Tracking #100667

Owner:	**USACE**	Owner Well #:	**32-2**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 41" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/25/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 26 ft to 10 ft; Sack(s)/type of cement used: 2 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	**ETTL Engineers & Consultants** **1717 East Erwin** **Tyler , TX 75702**

00839730

Plug Installer License Number:	**59385**
Licensed Plug Installer Signature:	**Richard Herman**
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100667**) on your written request.

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

00839731

STATE OF TEXAS PLUGGING REPORT for Tracking #100668

Owner:	**USACE**	Owner Well #:	**32-3**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 41" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/25/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 19 ft to 1.0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 19.0 ft to 10 ft; Sack(s)/type of cement used: 2 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	**ETTL Engineers & Consultants** **1717 East Erwin** **Tyler , TX 75702**

00839732

Plug Installer License Number:	**59385**
Licensed Plug Installer Signature:	**Richard Herman**
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100668**) on your written request.

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Austin, TX 78711
(512) 463-7880

00839733

STATE OF TEXAS PLUGGING REPORT for Tracking #100669

Owner:	**USACE**	Owner Well #:	**32-4**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 41" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/25/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 16 ft to .5 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 16.0 ft to 10 ft; Sack(s)/type of cement used: 1 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	**ETTL Engineers & Consultants** **1717 East Erwin** **Tyler , TX 75702**

00839734

Plug Installer License Number:	**59385**
Licensed Plug Installer Signature:	**Richard Herman**
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100669**) on your written request.

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Austin, TX 78711
(512) 463-7880

00839735

STATE OF TEXAS PLUGGING REPORT for Tracking #100670

Owner:	**USACE**	Owner Well #:	**32-5**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 47" N**
Well County:	**Harrison**	Longitude:	**094° 08' 41" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/25/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 18 ft to .5 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 18.0 ft to 10 ft; Sack(s)/type of cement used: 1 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	**ETTL Engineers & Consultants** **1717 East Erwin** **Tyler , TX 75702**

00839736

Plug Installer License Number:	**59385**
Licensed Plug Installer Signature:	**Richard Herman**
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100670**) on your written request.

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00839737

STATE OF TEXAS PLUGGING REPORT for Tracking #100671

Owner:	**USACE**	Owner Well #:	**32-6**
Address:	**Hwy43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy43** **Karnack , TX 75670**	Latitude:	**32° 40' 47" N**
Well County:	**Harrison**	Longitude:	**094° 08' 41" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/25/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 20 ft to .8 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 20 ft to 10 ft; Sack(s)/type of cement used: 2 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	**ETTL Engineers & Consultants** **1717 East Erwin** **Tyler , TX 75702**

00839738

Plug Installer License Number:	**59385**
Licensed Plug Installer Signature:	**Richard Herman**
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100671**) on your written request.

Texas Department of Licensing & Regulation
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Austin, TX 78711
(512) 463-7880

00839739

STATE OF TEXAS PLUGGING REPORT for Tracking #100672

Owner:	**USACE**	Owner Well #:	**32-7**
Address:	**Hwy43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy43** **Karnack , TX 75670**	Latitude:	**32° 40' 47" N**
Well County:	**Harrison**	Longitude:	**094° 08' 41" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/25/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 21 ft to .5 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 21 ft to 10 ft; Sack(s)/type of cement used: 2 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	**ETTL Engineers & Consultants** **1717 East Erwin** **Tyler , TX 75702**

00839740

Plug Installer License Number:	**59385**
Licensed Plug Installer Signature:	**Richard Herman**
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100672**) on your written request.

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

00839741

STATE OF TEXAS PLUGGING REPORT for Tracking #100673

Owner:	**USACE**	Owner Well #:	**33-1**
Address:	**Hwy 43 Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43 Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 41" W**
		GPS Brand Used:	**No Data**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/25/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 19.0 ft to 1.0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 19.0 ft to 10 ft; Sack(s)/type of cement used: 2 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839742

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100673**) on your written request.

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P.O. Box 12157
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(512) 463-7880

00839743

STATE OF TEXAS PLUGGING REPORT for Tracking #100674

Owner:	**USACE**	Owner Well #:	**33-2**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 47" N**
Well County:	**Harrison**	Longitude:	**094° 08' 41" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/25/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 20.0 ft to 1.5 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 20 ft to 10 ft; Sack(s)/type of cement used: 2 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839744

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100674**) on your written request.

Texas Department of Licensing & Regulation
P.O. Box 12157
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(512) 463-7880

00839745

STATE OF TEXAS PLUGGING REPORT for Tracking #100675

Owner:	**USACE**	Owner Well #:	**33-3**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 40" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/25/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 21.0 ft to .5 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 21 ft to 10 ft; Sack(s)/type of cement used: 2 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839746

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100675**) on your written request.

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

00839747

STATE OF TEXAS PLUGGING REPORT for Tracking #100676

Owner:	**USACE**	Owner Well #:	**33-4**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 47" N**
Well County:	**Harrison**	Longitude:	**094° 08' 41" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/25/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 23.0 ft to .5 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 23 ft to 10 ft; Sack(s)/type of cement used: 2 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839748

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100676**) on your written request.

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

00839749

STATE OF TEXAS PLUGGING REPORT for Tracking #100677

Owner:	**USACE**	Owner Well #:	**33-5**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 47" N**
Well County:	**Harrison**	Longitude:	**094° 08' 41" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/25/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 21.0 ft to .5 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 21 ft to 10 ft; Sack(s)/type of cement used: 2 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839750

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100677**) on your written request.

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

00839751

STATE OF TEXAS PLUGGING REPORT for Tracking #100678

Owner:	**USACE**	Owner Well #:	**33-6**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 47" N**
Well County:	**Harrison**	Longitude:	**094° 08' 41" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/25/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 24.0 ft to .5 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 24 ft to 10 ft; Sack(s)/type of cement used: 2 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839752

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100678**) on your written request.

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00839753

STATE OF TEXAS PLUGGING REPORT for Tracking #100679

Owner:	**USACE**	Owner Well #:	**33-7**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 47" N**
Well County:	**Harrison**	Longitude:	**094° 08' 41" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/25/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 14 ft to .5 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 14 ft to 10 ft; Sack(s)/type of cement used: 1 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839754

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100679**) on your written request.

Texas Department of Licensing & Regulation
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(512) 463-7880

00839755

STATE OF TEXAS PLUGGING REPORT for Tracking #100680

Owner:	**USACE**	Owner Well #:	**34-1**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 41" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/25/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 14 ft to 10 ft; Sack(s)/type of cement used: 1 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839756

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100680**) on your written request.

Texas Department of Licensing & Regulation
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00839757

STATE OF TEXAS PLUGGING REPORT for Tracking #100681

Owner:	**USACE**	Owner Well #:	**34-2**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 41" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/25/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 25 ft to 10 ft; Sack(s)/type of cement used: 2 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839758

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100681**) on your written request.

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00839759

STATE OF TEXAS PLUGGING REPORT for Tracking #100682

Owner:	**USACE**	Owner Well #:	**34-3**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 41" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/25/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 24 ft to 10 ft; Sack(s)/type of cement used: 2 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839760

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100682**) on your written request.

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

00839761

STATE OF TEXAS PLUGGING REPORT for Tracking #100683

Owner:	**USACE**	Owner Well #:	**34-4**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 41" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/26/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 27 ft to 10 ft; Sack(s)/type of cement used: 2 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839762

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100683**) on your written request.

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

00839763

STATE OF TEXAS PLUGGING REPORT for Tracking #100684

Owner:	**USACE**	Owner Well #:	**34-5**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 47" N**
Well County:	**Harrison**	Longitude:	**094° 08' 41" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/26/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 16.0 ft to .5 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 16 ft to 10 ft; Sack(s)/type of cement used: 1 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839764

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100684**) on your written request.

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

00839765

STATE OF TEXAS PLUGGING REPORT for Tracking #100685

Owner:	**USACE**	Owner Well #:	**34-6**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 47" N**
Well County:	**Harrison**	Longitude:	**094° 08' 41" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/26/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 27 ft to 10 ft; Sack(s)/type of cement used: 2 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839766

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100685**) on your written request.

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

00839767

STATE OF TEXAS PLUGGING REPORT for Tracking #100686

Owner:	**USACE**	Owner Well #:	**34-7**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 47" N**
Well County:	**Harrison**	Longitude:	**094° 08' 41" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/26/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 28 ft to 10 ft; Sack(s)/type of cement used: 2 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839768

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100686**) on your written request.

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

00839769

STATE OF TEXAS PLUGGING REPORT for Tracking #100687

Owner:	**USACE**	Owner Well #:	**34-8**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 47" N**
Well County:	**Harrison**	Longitude:	**094° 08' 41" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/26/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 19.0 ft to .5 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 19.0 ft to 10 ft; Sack(s)/type of cement used: 2 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839770

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100687**) on your written request.

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

00839771

STATE OF TEXAS PLUGGING REPORT for Tracking #100688

Owner:	**USACE**	Owner Well #:	**34-9**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 47" N**
Well County:	**Harrison**	Longitude:	**094° 08' 41" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/26/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 20 ft to .5 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 20 ft to 10 ft; Sack(s)/type of cement used: 2 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839772

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100688**) on your written request.

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Austin, TX 78711
(512) 463-7880

00839773

STATE OF TEXAS PLUGGING REPORT for Tracking #100689

Owner:	**USACE**	Owner Well #:	**34-10**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 47" N**
Well County:	**Harrison**	Longitude:	**094° 08' 41" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/26/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 20 ft to .5 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 20 ft to 10 ft; Sack(s)/type of cement used: 2 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839774

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100689**) on your written request.

Texas Department of Licensing & Regulation
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(512) 463-7880

00839775

STATE OF TEXAS PLUGGING REPORT for Tracking #100690

Owner:	**USACE**	Owner Well #:	**34-11**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 47" N**
Well County:	**Harrison**	Longitude:	**094° 08' 41" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/26/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 17.0 ft to .5 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 17.0 ft to 10 ft; Sack(s)/type of cement used: 1 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839776

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100690**) on your written request.

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00839777

STATE OF TEXAS PLUGGING REPORT for Tracking #100692

Owner:	**USACE**	Owner Well #:	**35-1**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 47" N**
Well County:	**Harrison**	Longitude:	**094° 08' 40" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/26/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 28 ft to 10 ft; Sack(s)/type of cement used: 2 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839778

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100692**) on your written request.

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(512) 463-7880

00839779

STATE OF TEXAS PLUGGING REPORT for Tracking #100693

Owner:	**USACE**	Owner Well #:	**35-2**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 47" N**
Well County:	**Harrison**	Longitude:	**094° 08' 41" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/26/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 27 ft to 10 ft; Sack(s)/type of cement used: 2 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839780

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100693**) on your written request.

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00839781

STATE OF TEXAS PLUGGING REPORT for Tracking #100694

Owner:	**USACE**	Owner Well #:	**35-3**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 41" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/26/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 19.0 ft to 1.0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 19 ft to 10 ft; Sack(s)/type of cement used: 2 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839782

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100694**) on your written request.

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00839783

STATE OF TEXAS PLUGGING REPORT for Tracking #100695

Owner:	**USACE**	Owner Well #:	**35-4**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 41" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/26/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 28 ft to 10 ft; Sack(s)/type of cement used: 2 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839784

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100695**) on your written request.

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00839785

STATE OF TEXAS PLUGGING REPORT for Tracking #100696

Owner:	**USACE**	Owner Well #:	**35-5**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 47" N**
Well County:	**Harrison**	Longitude:	**094° 08' 41" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/26/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 26.0 ft to .5 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 26 ft to 10 ft; Sack(s)/type of cement used: 2 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839786

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100696**) on your written request.

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(512) 463-7880

00839787

STATE OF TEXAS PLUGGING REPORT for Tracking #100697

Owner:	**USACE**	Owner Well #:	**35-6**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 47" N**
Well County:	**Harrison**	Longitude:	**094° 08' 41" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/26/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 14 ft to 10 ft; Sack(s)/type of cement used: 1 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839788

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100697**) on your written request.

Texas Department of Licensing & Regulation
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(512) 463-7880

00839789

STATE OF TEXAS PLUGGING REPORT for Tracking #100698

Owner:	**USACE**	Owner Well #:	**35-7**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 47" N**
Well County:	**Harrison**	Longitude:	**094° 08' 41" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/26/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 28 ft to 10 ft; Sack(s)/type of cement used: 2 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839790

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100698**) on your written request.

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

00839791

STATE OF TEXAS PLUGGING REPORT for Tracking #100699

Owner:	**USACE**	Owner Well #:	**35-8**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 47" N**
Well County:	**Harrison**	Longitude:	**094° 08' 41" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/26/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 28 ft to 10 ft; Sack(s)/type of cement used: 2 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839792

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100699**) on your written request.

Texas Department of Licensing & Regulation
P.O. Box 12157
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(512) 463-7880

00839793

STATE OF TEXAS PLUGGING REPORT for Tracking #100700

Owner:	**USACE**	Owner Well #:	**35-9**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 47" N**
Well County:	**Harrison**	Longitude:	**094° 08' 40" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/26/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 28 ft to 10 ft; Sack(s)/type of cement used: 2 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839794

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100700**) on your written request.

Texas Department of Licensing & Regulation
P.O. Box 12157
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(512) 463-7880

00839795

STATE OF TEXAS PLUGGING REPORT for Tracking #100701

Owner:	**USACE**	Owner Well #:	**36-1**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 41" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/26/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 21.0 ft to .5 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 21 ft to 10 ft; Sack(s)/type of cement used: 2 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839796

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100701**) on your written request.

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

00839797

STATE OF TEXAS PLUGGING REPORT for Tracking #100702

Owner:	**USACE**	Owner Well #:	**36-2**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 41" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/26/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 28 ft to 10 ft; Sack(s)/type of cement used: 2 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839798

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100702**) on your written request.

Texas Department of Licensing & Regulation
P.O. Box 12157
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(512) 463-7880

00839799

STATE OF TEXAS PLUGGING REPORT for Tracking #100703

Owner:	**USACE**	Owner Well #:	**36-3**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 41" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/26/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 26 ft to 10 ft; Sack(s)/type of cement used: 2 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839800

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100703**) on your written request.

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P.O. Box 12157
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(512) 463-7880

00839801

STATE OF TEXAS PLUGGING REPORT for Tracking #100704

Owner:	**USACE**	Owner Well #:	**36-4**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 41" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/26/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 27 ft to 10 ft; Sack(s)/type of cement used: 2 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839802

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100704**) on your written request.

Texas Department of Licensing & Regulation
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(512) 463-7880

00839803

STATE OF TEXAS PLUGGING REPORT for Tracking #100705

Owner:	**USACE**	Owner Well #:	**36-5**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 47" N**
Well County:	**Harrison**	Longitude:	**094° 08' 41" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/26/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 20 ft to 10 ft; Sack(s)/type of cement used: 2 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839804

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100705**) on your written request.

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(512) 463-7880

00839805

STATE OF TEXAS PLUGGING REPORT for Tracking #100706

Owner:	**USACE**	Owner Well #:	**36-6**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 47" N**
Well County:	**Harrison**	Longitude:	**094° 08' 41" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/26/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 23 ft to 10 ft; Sack(s)/type of cement used: 2 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839806

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100706**) on your written request.

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(512) 463-7880

00839807

STATE OF TEXAS PLUGGING REPORT for Tracking #100707

Owner:	**USACE**	Owner Well #:	**36-7**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 47" N**
Well County:	**Harrison**	Longitude:	**094° 08' 40" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/26/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 22 ft to 10 ft; Sack(s)/type of cement used: 2 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839808

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100707**) on your written request.

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

00839809

STATE OF TEXAS PLUGGING REPORT for Tracking #100708

Owner:	**USACE**	Owner Well #:	**36-8**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 47" N**
Well County:	**Harrison**	Longitude:	**094° 08' 41" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/26/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 25 ft to 10 ft; Sack(s)/type of cement used: 2 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839810

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100708**) on your written request.

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

00839811

STATE OF TEXAS PLUGGING REPORT for Tracking #100709

Owner:	**USACE**	Owner Well #:	**36-9**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 47" N**
Well County:	**Harrison**	Longitude:	**094° 08' 40" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/26/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 10 ft to 10 ft; Sack(s)/type of cement used: (No Data)** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839812

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100709**) on your written request.

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

00839813

STATE OF TEXAS PLUGGING REPORT for Tracking #100710

Owner:	**USACE**	Owner Well #:	**36-10**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 47" N**
Well County:	**Harrison**	Longitude:	**094° 08' 40" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/26/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 19 ft to 10 ft; Sack(s)/type of cement used: 2 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839814

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100710**) on your written request.

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

00839815

STATE OF TEXAS PLUGGING REPORT for Tracking #100711

Owner:	**USACE**	Owner Well #:	**36-11**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 47" N**
Well County:	**Harrison**	Longitude:	**094° 08' 40" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/26/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 22 ft to 10 ft; Sack(s)/type of cement used: 2 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839816

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100711**) on your written request.

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

00839817

STATE OF TEXAS PLUGGING REPORT for Tracking #100712

Owner:	**USACE**	Owner Well #:	**39-1**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 40" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/28/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 15 ft to 10 ft; Sack(s)/type of cement used: 1 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839818

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100712**) on your written request.

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(512) 463-7880

00839819

STATE OF TEXAS PLUGGING REPORT for Tracking #100713

Owner:	**USACE**	Owner Well #:	**39-2**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 40" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/28/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: (No Data)** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839820

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100713**) on your written request.

Texas Department of Licensing & Regulation
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(512) 463-7880

00839821

STATE OF TEXAS PLUGGING REPORT for Tracking #100714

Owner:	**USACE**	Owner Well #:	**39-3**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 40" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/28/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 20 ft to 10 ft; Sack(s)/type of cement used: 2 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839822

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100714**) on your written request.

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(512) 463-7880

00839823

STATE OF TEXAS PLUGGING REPORT for Tracking #100715

Owner:	**USACE**	Owner Well #:	**39-4**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 40" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/28/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 8 ft to 0 ft; Sack(s)/type of cement used: (No Data)** 2nd Interval: **From 8 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 8 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839824

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100715**) on your written request.

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(512) 463-7880

00839825

STATE OF TEXAS PLUGGING REPORT for Tracking #100716

Owner:	**USACE**	Owner Well #:	**39-5**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 40" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/28/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 14 ft to 10 ft; Sack(s)/type of cement used: 2 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839826

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100716**) on your written request.

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00839827

STATE OF TEXAS PLUGGING REPORT for Tracking #100717

Owner:	**USACE**	Owner Well #:	**39-6**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 40" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/28/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 14 ft to 10 ft; Sack(s)/type of cement used: 2 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839828

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100717**) on your written request.

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00839829

STATE OF TEXAS PLUGGING REPORT for Tracking #100718

Owner:	**USACE**	Owner Well #:	**39-7**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 40" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/28/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 14 ft to 10 ft; Sack(s)/type of cement used: 2 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839830

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100718**) on your written request.

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(512) 463-7880

00839831

STATE OF TEXAS PLUGGING REPORT for Tracking #100720

Owner:	**USACE**	Owner Well #:	**39-8**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 40" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/28/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 12 ft to 10 ft; Sack(s)/type of cement used: 1 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839832

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100720**) on your written request.

Texas Department of Licensing & Regulation
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Austin, TX 78711
(512) 463-7880

00839833

STATE OF TEXAS PLUGGING REPORT for Tracking #100721

Owner:	**USACE**	Owner Well #:	**40-1**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 47" N**
Well County:	**Harrison**	Longitude:	**094° 08' 39" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/29/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 19.0 ft to .8 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 19.0 ft to 10 ft; Sack(s)/type of cement used: 2 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839834

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100721**) on your written request.

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

00839835

STATE OF TEXAS PLUGGING REPORT for Tracking #100722

Owner:	**USACE**	Owner Well #:	**40-2**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 47" N**
Well County:	**Harrison**	Longitude:	**094° 08' 39" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/29/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 16.0 ft to 10 ft; Sack(s)/type of cement used: 1 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839836

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100722**) on your written request.

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(512) 463-7880

00839837

STATE OF TEXAS PLUGGING REPORT for Tracking #100724

Owner:	**USACE**	Owner Well #:	**40-3**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 39" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/29/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 11.0 ft to 10 ft; Sack(s)/type of cement used: 1 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839838

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100724**) on your written request.

Texas Department of Licensing & Regulation
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00839839

STATE OF TEXAS PLUGGING REPORT for Tracking #100725

Owner:	**USACE**	Owner Well #:	**40-4**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 40" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/29/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 18.0 ft to 10 ft; Sack(s)/type of cement used: 1 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839840

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100725**) on your written request.

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00839841

STATE OF TEXAS PLUGGING REPORT for Tracking #100726

Owner:	**USACE**	Owner Well #:	**40-5**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 40" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/29/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 20 ft to 6.0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 20.0 ft to 10 ft; Sack(s)/type of cement used: 2 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839842

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100726**) on your written request.

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(512) 463-7880

00839843

STATE OF TEXAS PLUGGING REPORT for Tracking #100727

Owner:	**USACE**	Owner Well #:	**40-6**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 40" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/29/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 19 ft to 5.0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 19 ft to 10 ft; Sack(s)/type of cement used: 2 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839844

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100727**) on your written request.

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(512) 463-7880

00839845

STATE OF TEXAS PLUGGING REPORT for Tracking #100728

Owner:	**USACE**	Owner Well #:	**40-7**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 40" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/29/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 20 ft to 6.0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 20 ft to 10 ft; Sack(s)/type of cement used: 2 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839846

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100728**) on your written request.

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(512) 463-7880

00839847

STATE OF TEXAS PLUGGING REPORT for Tracking #100729

Owner:	**USACE**	Owner Well #:	**40-8**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 40" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/29/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 20 ft to 6.0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 20 ft to 10 ft; Sack(s)/type of cement used: 2 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839848

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100729**) on your written request.

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00839849

STATE OF TEXAS PLUGGING REPORT for Tracking #100730

Owner:	**USACE**	Owner Well #:	**40-9**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 40" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/29/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 22 ft to 5.0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 22 ft to 10 ft; Sack(s)/type of cement used: 2 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839850

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100730**) on your written request.

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00839851

STATE OF TEXAS PLUGGING REPORT for Tracking #100731

Owner:	**USACE**	Owner Well #:	**40-10**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 40" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/29/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 17 ft to 10.0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 17 ft to 10 ft; Sack(s)/type of cement used: 1 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839852

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100731**) on your written request.

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(512) 463-7880

00839853

STATE OF TEXAS PLUGGING REPORT for Tracking #100732

Owner:	**USACE**	Owner Well #:	**41-1**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 47" N**
Well County:	**Harrison**	Longitude:	**094° 08' 39" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/29/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 11 ft to 10 ft; Sack(s)/type of cement used: 1 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839854

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100732**) on your written request.

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00839855

STATE OF TEXAS PLUGGING REPORT for Tracking #100733

Owner:	**USACE**	Owner Well #:	**41-2**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 47" N**
Well County:	**Harrison**	Longitude:	**094° 08' 39" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/29/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 10 ft to 10 ft; Sack(s)/type of cement used: 1 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839856

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100733**) on your written request.

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(512) 463-7880

00839857

STATE OF TEXAS PLUGGING REPORT for Tracking #100734

Owner:	**USACE**	Owner Well #:	**41-3**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 47" N**
Well County:	**Harrison**	Longitude:	**094° 08' 39" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/29/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 12 ft to 10 ft; Sack(s)/type of cement used: 1 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839858

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100734**) on your written request.

Texas Department of Licensing & Regulation
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00839859

STATE OF TEXAS PLUGGING REPORT for Tracking #100735

Owner:	**USACE**	Owner Well #:	**41-4**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 39" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/29/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 14 ft to 10 ft; Sack(s)/type of cement used: 1 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839860

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100735**) on your written request.

Texas Department of Licensing & Regulation
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Austin, TX 78711
(512) 463-7880

00839861

STATE OF TEXAS PLUGGING REPORT for Tracking #100736

Owner:	**USACE**	Owner Well #:	**41-5**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 39" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/29/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 13 ft to 10 ft; Sack(s)/type of cement used: 1 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839862

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100736**) on your written request.

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(512) 463-7880

00839863

STATE OF TEXAS PLUGGING REPORT for Tracking #100737

Owner:	**USACE**	Owner Well #:	**41-6**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 39" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/29/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 19 ft to 10 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 19 ft to 10 ft; Sack(s)/type of cement used: 2 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839864

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100737**) on your written request.

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(512) 463-7880

00839865

STATE OF TEXAS PLUGGING REPORT for Tracking #100738

Owner:	**USACE**	Owner Well #:	**41-7**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 40" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/29/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 20 ft to 7.0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 20 ft to 10 ft; Sack(s)/type of cement used: 2 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839866

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100738**) on your written request.

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00839867

STATE OF TEXAS PLUGGING REPORT for Tracking #100739

Owner:	**USACE**	Owner Well #:	**41-8**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 40" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/29/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 15 ft to 10 ft; Sack(s)/type of cement used: 1 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839868

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100739**) on your written request.

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00839869

STATE OF TEXAS PLUGGING REPORT for Tracking #100740

Owner:	**USACE**	Owner Well #:	**41-9**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 40" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/29/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 16 ft to 10 ft; Sack(s)/type of cement used: 1 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839870

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100740**) on your written request.

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00839871

STATE OF TEXAS PLUGGING REPORT for Tracking #100741

Owner:	**USACE**	Owner Well #:	**41-10**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 40" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/29/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 16 ft to 10 ft; Sack(s)/type of cement used: 1 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839872

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100741**) on your written request.

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00839873

STATE OF TEXAS PLUGGING REPORT for Tracking #100742

Owner:	**USACE**	Owner Well #:	**41-11**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 40" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/29/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 18 ft to 9 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 18 ft to 10 ft; Sack(s)/type of cement used: 1 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839874

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100742**) on your written request.

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00839875

STATE OF TEXAS PLUGGING REPORT for Tracking #100743

Owner:	**USACE**	Owner Well #:	**41-12**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 40" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/29/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 19 ft to 7.0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 19 ft to 10 ft; Sack(s)/type of cement used: 1 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839876

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100743**) on your written request.

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00839877

STATE OF TEXAS PLUGGING REPORT for Tracking #100744

Owner:	**USACE**	Owner Well #:	**41-13**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43** **Karnack , TX 75670**	Latitude:	**32° 40' 49" N**
Well County:	**Harrison**	Longitude:	**094° 08' 40" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/29/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 19 ft to 10 ft; Sack(s)/type of cement used: 1 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839878

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100744**) on your written request.

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00839879

STATE OF TEXAS PLUGGING REPORT for Tracking #100745

Owner:	**USACE**	Owner Well #:	**41-14**
Address:	**Hwy 43 Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy 43 Karnack , TX 75670**	Latitude:	**32° 40' 49" N**
Well County:	**Harrison**	Longitude:	**094° 08' 40" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/29/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 12 ft to 10 ft; Sack(s)/type of cement used: 1 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	
Plug Installer License	**59385**

00839880

Number:	
Licensed Plug Installer Signature:	
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100745**) on your written request.

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00839881

STATE OF TEXAS PLUGGING REPORT for Tracking #100746

Owner:	**USACE**	Owner Well #:	**42-1**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy43** **Karnack , TX 75670**	Latitude:	**32° 40' 47" N**
Well County:	**Harrison**	Longitude:	**094° 08' 39" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/30/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 16 ft to 10 ft; Sack(s)/type of cement used: 1 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	**ETTL Engineers & Consultants** **1717 East Erwin** **Tyler , TX 75702**

00839882

Plug Installer License Number:	**59385**
Licensed Plug Installer Signature:	**Richard Herman**
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100746**) on your written request.

Texas Department of Licensing & Regulation
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(512) 463-7880

00839883

STATE OF TEXAS PLUGGING REPORT for Tracking #100747

Owner:	**USACE**	Owner Well #:	**42-2**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 39" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/30/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 9 ft to 10 ft; Sack(s)/type of cement used: 1 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	**ETTL Engineers & Consultants** **1717 East Erwin** **Tyler , TX 75702**

00839884

Plug Installer License Number:	**59385**
Licensed Plug Installer Signature:	**Richard Herman**
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100747**) on your written request.

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00839885

STATE OF TEXAS PLUGGING REPORT for Tracking #100748

Owner:	**USACE**	Owner Well #:	**42-3**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 39" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/30/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 14 ft to 10 ft; Sack(s)/type of cement used: 1 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	**ETTL Engineers & Consultants** **1717 East Erwin** **Tyler , TX 75702**

00839886

Plug Installer License Number:	**59385**
Licensed Plug Installer Signature:	**Richard Herman**
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100748**) on your written request.

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00839887

STATE OF TEXAS PLUGGING REPORT for Tracking #100749

Owner:	**USACE**	Owner Well #:	**42-4**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 39" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/30/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 13 ft to 10 ft; Sack(s)/type of cement used: 1 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	**ETTL Engineers & Consultants** **1717 East Erwin** **Tyler , TX 75702**

00839888

Plug Installer License Number:	**59385**
Licensed Plug Installer Signature:	**Richard Herman**
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100749**) on your written request.

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

00839889

STATE OF TEXAS PLUGGING REPORT for Tracking #100750

Owner:	**USACE**	Owner Well #:	**42-5**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 39" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/30/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 12 ft to 8 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 12 ft to 10 ft; Sack(s)/type of cement used: 1 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	**ETTL Engineers & Consultants** **1717 East Erwin** **Tyler , TX 75702**

00839890

Plug Installer License Number:	**59385**
Licensed Plug Installer Signature:	**Richard Herman**
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100750**) on your written request.

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(512) 463-7880

00839891

STATE OF TEXAS PLUGGING REPORT for Tracking #100751

Owner:	**USACE**	Owner Well #:	**42-6**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 39" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/30/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to (No Data) ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 11 ft to 10 ft; Sack(s)/type of cement used: 1 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	**ETTL Engineers & Consultants** **1717 East Erwin** **Tyler , TX 75702**

00839892

Plug Installer License Number:	**59385**
Licensed Plug Installer Signature:	**Richard Herman**
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100751**) on your written request.

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(512) 463-7880

00839893

STATE OF TEXAS PLUGGING REPORT for Tracking #100752

Owner:	**USACE**	Owner Well #:	**42-7**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 39" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/30/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to (No Data) ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 8 ft to 0 ft; Sack(s)/type of cement used: (No Data)** 2nd Interval: **From 8 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 8 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	**ETTL Engineers & Consultants** **1717 East Erwin** **Tyler , TX 75702**

00839894

Plug Installer License Number:	**59385**
Licensed Plug Installer Signature:	**Richard Herman**
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100752**) on your written request.

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00839895

STATE OF TEXAS PLUGGING REPORT for Tracking #100753

Owner:	**USACE**	Owner Well #:	**42-8**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 39" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/30/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to (No Data) ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 15 ft to 10 ft; Sack(s)/type of cement used: 1 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	**ETTL Engineers & Consultants** **1717 East Erwin** **Tyler , TX 75702**

00839896

Plug Installer License Number:	**59385**
Licensed Plug Installer Signature:	**Richard Herman**
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100753**) on your written request.

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00839897

STATE OF TEXAS PLUGGING REPORT for Tracking #100754

Owner:	**USACE**	Owner Well #:	**42-9**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 39" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/30/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to (No Data) ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 14 ft to 10 ft; Sack(s)/type of cement used: 1 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	**ETTL Engineers & Consultants** **1717 East Erwin** **Tyler , TX 75702**

00839898

Plug Installer License Number:	**59385**
Licensed Plug Installer Signature:	**Richard Herman**
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100754**) on your written request.

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00839899

STATE OF TEXAS PLUGGING REPORT for Tracking #100755

Owner:	**USACE**	Owner Well #:	**42-10**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 40" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/30/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to (No Data) ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 3 ft to 0 ft; Sack(s)/type of cement used: (No Data)** 2nd Interval: **From 3 ft to 0 ft; Sack(s)/type of cement used: 1 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	**ETTL Engineers & Consultants** **1717 East Erwin** **Tyler , TX 75702**

00839900

Plug Installer License Number:	**59385**
Licensed Plug Installer Signature:	**Richard Herman**
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100755**) on your written request.

Texas Department of Licensing & Regulation
P.O. Box 12157
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(512) 463-7880

00839901

STATE OF TEXAS PLUGGING REPORT for Tracking #100756

Owner:	**USACE**	Owner Well #:	**42-11**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy43** **Karnack , TX 75670**	Latitude:	**32° 40' 49" N**
Well County:	**Harrison**	Longitude:	**094° 08' 40" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/30/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to (No Data) ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 18 ft to 10 ft; Sack(s)/type of cement used: 1 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	**ETTL Engineers & Consultants** **1717 East Erwin** **Tyler , TX 75702**

00839902

Plug Installer License Number:	**59385**
Licensed Plug Installer Signature:	**Richard Herman**
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100756**) on your written request.

Texas Department of Licensing & Regulation
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00839903

STATE OF TEXAS PLUGGING REPORT for Tracking #100757

Owner:	**USACE**	Owner Well #:	**42-12**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy43** **Karnack , TX 75670**	Latitude:	**32° 40' 49" N**
Well County:	**Harrison**	Longitude:	**094° 08' 40" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/30/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 19 ft to 10 ft; Sack(s)/type of cement used: 1 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	**ETTL Engineers & Consultants** **1717 East Erwin** **Tyler , TX 75702**

00839904

Plug Installer License Number:	**59385**
Licensed Plug Installer Signature:	**Richard Herman**
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100757**) on your written request.

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00839905

STATE OF TEXAS PLUGGING REPORT for Tracking #100758

Owner:	**USACE**	Owner Well #:	**42-13**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy43** **Karnack , TX 75670**	Latitude:	**32° 40' 49" N**
Well County:	**Harrison**	Longitude:	**094° 08' 40" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/30/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **3 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 14 ft to 10 ft; Sack(s)/type of cement used: 1 Sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 2 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	**ETTL Engineers & Consultants** **1717 East Erwin** **Tyler , TX 75702**

00839906

Plug Installer License Number:	**59385**
Licensed Plug Installer Signature:	**Richard Herman**
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100758**) on your written request.

Texas Department of Licensing & Regulation
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Austin, TX 78711
(512) 463-7880

00839907

STATE OF TEXAS PLUGGING REPORT for Tracking #100759

Owner:	**USACE**	Owner Well #:	**mw1-1**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 44" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/30/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **2 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 24 ft to 10 ft; Sack(s)/type of cement used: 2 sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	**ETTL Engineers & Consultants** **1717 East Erwin** **Tyler , TX 75702**

00839908

Plug Installer License Number:	**59385**
Licensed Plug Installer Signature:	**Richard Herman**
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100759**) on your written request.

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00839909

STATE OF TEXAS PLUGGING REPORT for Tracking #100760

Owner:	**USACE**	Owner Well #:	**mw1-2**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 44" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/30/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **2 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 34 ft to 10 ft; Sack(s)/type of cement used: 2 sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	**ETTL Engineers & Consultants** **1717 East Erwin** **Tyler , TX 75702**

00839910

Plug Installer License Number:	**59385**
Licensed Plug Installer Signature:	**Richard Herman**
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100760**) on your written request.

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(512) 463-7880

00839911

STATE OF TEXAS PLUGGING REPORT for Tracking #100761

Owner:	**USACE**	Owner Well #:	**mw1-3**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 43" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/30/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **2 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 33 ft to 10 ft; Sack(s)/type of cement used: 2 sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	**ETTL Engineers & Consultants** **1717 East Erwin** **Tyler , TX 75702**

00839912

Plug Installer License Number:	**59385**
Licensed Plug Installer Signature:	**Richard Herman**
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100761**) on your written request.

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00839913

STATE OF TEXAS PLUGGING REPORT for Tracking #100762

Owner:	**USACE**	Owner Well #:	**mw2-1**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy43** **Karnack , TX 75670**	Latitude:	**32° 40' 49" N**
Well County:	**Harrison**	Longitude:	**094° 08' 42" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/30/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **2 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 34.8 ft to 10 ft; Sack(s)/type of cement used: 2 sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	**ETTL Engineers & Consultants** **1717 East Erwin** **Tyler , TX 75702**

00839914

Plug Installer License Number:	**59385**
Licensed Plug Installer Signature:	**Richard Herman**
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100762**) on your written request.

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00839915

STATE OF TEXAS PLUGGING REPORT for Tracking #100763

Owner:	**USACE**	Owner Well #:	**mw2-2**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 42" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/30/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **2 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 29.7 ft to 10 ft; Sack(s)/type of cement used: 2 sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	**ETTL Engineers & Consultants** **1717 East Erwin** **Tyler , TX 75702**

00839916

Plug Installer License Number:	**59385**
Licensed Plug Installer Signature:	**Richard Herman**
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100763**) on your written request.

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00839917

STATE OF TEXAS PLUGGING REPORT for Tracking #100764

Owner:	**USACE**	Owner Well #:	**mw2-3**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 42" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/30/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **2 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 25.0 ft to 10 ft; Sack(s)/type of cement used: 2 sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	**ETTL Engineers & Consultants** **1717 East Erwin** **Tyler , TX 75702**

00839918

Plug Installer License Number:	**59385**
Licensed Plug Installer Signature:	**Richard Herman**
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100764**) on your written request.

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00839919

STATE OF TEXAS PLUGGING REPORT for Tracking #100765

Owner:	**USACE**	Owner Well #:	**mw3-1**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy43** **Karnack , TX 75670**	Latitude:	**32° 40' 47" N**
Well County:	**Harrison**	Longitude:	**094° 08' 41" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/30/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **2 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 32.5 ft to 10 ft; Sack(s)/type of cement used: 2 sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	**ETTL Engineers & Consultants** **1717 East Erwin** **Tyler , TX 75702**

00839920

Plug Installer License Number:	**59385**
Licensed Plug Installer Signature:	**Richard Herman**
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100765**) on your written request.

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00839921

STATE OF TEXAS PLUGGING REPORT for Tracking #100766

Owner:	**USACE**	Owner Well #:	**mw3-2**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy43** **Karnack , TX 75670**	Latitude:	**32° 40' 47" N**
Well County:	**Harrison**	Longitude:	**094° 08' 41" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/30/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **2 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 27.8 ft to 10 ft; Sack(s)/type of cement used: 2 sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	**ETTL Engineers & Consultants** **1717 East Erwin** **Tyler , TX 75702**

00839922

Plug Installer License Number:	**59385**
Licensed Plug Installer Signature:	**Richard Herman**
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100766**) on your written request.

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00839923

STATE OF TEXAS PLUGGING REPORT for Tracking #100767

Owner:	**USACE**	Owner Well #:	**mw3-3**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy43** **Karnack , TX 75670**	Latitude:	**32° 40' 47" N**
Well County:	**Harrison**	Longitude:	**094° 08' 41" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/30/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **2 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 22.0 ft to 10 ft; Sack(s)/type of cement used: 2 sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	**ETTL Engineers & Consultants** **1717 East Erwin** **Tyler , TX 75702**

00839924

Plug Installer License Number:	**59385**
Licensed Plug Installer Signature:	**Richard Herman**
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100767**) on your written request.

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00839925

STATE OF TEXAS PLUGGING REPORT for Tracking #100768

Owner:	**USACE**	Owner Well #:	**mw4-1**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy43** **Karnack , TX 75670**	Latitude:	**32° 40' 47" N**
Well County:	**Harrison**	Longitude:	**094° 08' 41" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/30/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **2 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 35 ft to 10 ft; Sack(s)/type of cement used: 2 sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	**ETTL Engineers & Consultants** **1717 East Erwin** **Tyler , TX 75702**

00839926

Plug Installer License Number:	**59385**
Licensed Plug Installer Signature:	**Richard Herman**
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100768**) on your written request.

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P.O. Box 12157
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00839927

STATE OF TEXAS PLUGGING REPORT for Tracking #100770

Owner:	**USACE**	Owner Well #:	**mw4-2**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy43** **Karnack , TX 75670**	Latitude:	**32° 40' 47" N**
Well County:	**Harrison**	Longitude:	**094° 08' 41" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/30/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **2 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 29 ft to 10 ft; Sack(s)/type of cement used: 2 sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	**ETTL Engineers & Consultants** **1717 East Erwin** **Tyler , TX 75702**

00839928

Plug Installer License Number:	**59385**
Licensed Plug Installer Signature:	**Richard Herman**
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100770**) on your written request.

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00839929

STATE OF TEXAS PLUGGING REPORT for Tracking #100771

Owner:	**USACE**	Owner Well #:	**mw4-3**
Address:	**Hwy 43** **Karnack , TX 75670**	Grid #:	**35-23-6**
Well Location:	**Hwy43** **Karnack , TX 75670**	Latitude:	**32° 40' 48" N**
Well County:	**Harrison**	Longitude:	**094° 08' 40" W**
		GPS Brand Used:	**Garmin**

Well Type: **Monitor**

HISTORICAL DATA ON WELL TO BE PLUGGED

Original Well Driller:	**No Data**
Driller's License Number of Original Well Driller:	**No Data**
Date Well Drilled:	**No Data**
Well Report Tracking Number:	**No Data**
Diameter of Borehole:	**No Data**
Total Depth of Borehole:	**No Data**

Date Well Plugged:	**1/30/2015**
Person Actually Performing Plugging Operation:	**Richard Herman**
License Number of Plugging Operator:	**59385**
Plugging Method:	**Other plugging method.**
Plugging Variance #:	**No Data**
Casing Left Data:	1st Interval: **2 inches diameter, From 0 ft to 0 ft** 2nd Interval: **No Data** 3rd Interval: **No Data**
Cement/Bentonite Plugs Placed in Well:	1st Interval: **From 22 ft to 10 ft; Sack(s)/type of cement used: 2 sand** 2nd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Bentonite** 3rd Interval: **From 10 ft to 0 ft; Sack(s)/type of cement used: 1 Cement** 4th Interval: **No Data** 5th Interval: **No Data**

Certification Data:	The plug installer certified that the plug installer plugged this well (or the well was plugged under the plug installer's direct supervision) and that each and all of the statements herein are true and correct. The plug installer understood that failure to complete the required items will result in the log(s) being returned for completion and resubmittal.
Company Information:	**ETTL Engineers & Consultants** **1717 East Erwin** **Tyler , TX 75702**

00839930

Plug Installer License Number:	**59385**
Licensed Plug Installer Signature:	**Richard Herman**
Registered Plug Installer Apprentice Signature:	**No Data**
Apprentice Registration Number:	**No Data**
Plugging Method Comments:	**Sand to 10 FT. Then grout**

Please include the plugging report's tracking number (Tracking **#100771**) on your written request.

Texas Department of Licensing & Regulation
P.O. Box 12157
Austin, TX 78711
(512) 463-7880

APPENDIX F. ADVANCED BIOSYSTEMS FINAL REPORT

ABS
Advanced BioSystems

June 10, 2015

Mr. Gene Fabian
US Army
ATTN: TEDY-AT-SL-E
400 Colleran Road
Aberdeen Proving Ground, MD 21005-5059

Subject: Bio Plug Study
Longhorn Army Ammunition Plant Site 35B (37)

Dear Mr. Fabian,

Advanced BioSystems has recently completed the removal of the 409 patented ABS Bio-Plugs installed at the Longhorn Army Ammunition Plant Site in Texan with the effective test period for TCE and PCE began in December of 2012. Two years of operating data is shown in the report submitted with this report and was derived from Data provided by the US Army and the observation and information gathered by TMD and its professionals during the testing period. The results were very successful in most instances. There were issues that were encountered at the site that will be outlined in no particular order here. The most troublesome finding at the site and a finding that was brought to the Army's attention by this writer at the outset of the installation of the bio plugs and that was:

- The "absence of the continuous confining layer across the site, which was discussed in the assessment data provided to ABS at the project outset and was used extensively in the design of the system. While not something we could not overcome (not insurmountable), the system in this short treatment testing period would have worked much quicker if that unit had been present and accounted for as indicated by the assessment data provided.

- The movement of groundwater across the site was extremely slow which made movement of the microorganisms slower than anticipated and the movement of water to and from wells also extremely slow, making the short testing period more challenging than initially anticipated and reactions to issues, such as the lack of the confining unit more difficult to overcome in the short testing period.

- Horizontal movement of groundwater under the site ranged from 14.9 ft. per year in the upper levels to 4.9 ft. per year in the lower levels of the site, making movement of water for treatment and testing over a two year period slow, based on the initial calculations.

- Chlorinated aliphatic degraders reacted as we expected with the continual degradation of the contaminants of concern at the site.

- Hetrotrophic Bacteria continually increased for the entire 17 month treatment period.

- Most importantly, TCE was *aerobically* reduced from *6.08 ug/l to 2.16 ug/l* in the ABS monitoring wells, substantially reducing TCE within the 17 month testing period in all areas as monitored by the ABS plugs, which were installed to monitor the bio plug field.

- PCE was *aerobically* reduced from *14.4 ug/l to an average of 11.86 ug/l* in the ABS monitoring wells, installed to monitor the performance of the ABS bio plug field. This reduction took place over the testing period of 17 months. After evaluating the results of the study, we concluded that an additional degrader, specifically to address PCE in a more aggressive manner should be added to the inocula in future projects.

- The PCE Anaerobic Degradation Breakdown Products that were present because of years of anaerobic activity were reduced very substantially because of the Aerobic System installed by ABS. The percent degradation of each of these Anaerobic Breakdown Compounds is as follows:

  . Cis-1,2 Dichlorethane by 81%
  . 1, 1 – Dichloroehtane by 54%
  . 1, 1 – Dichloroentene by 76%

The TMD Aerobic System, we believe would eliminate these breakdown products over time, as the data indicates.

- Secondary VOC compounds were reduced from 14.38 ug/l to "undetected" by the end of the second year of operations of the ABS system.

- The ORP on the site was changed from an anoxic/anaerobic condition to an aerobic condition during the overall operational period of the ABS bio plug system.

- The bio plugs in the up gradient portion of the site reduced the TCE as it *"entered"* the site from the clearly suspected source area from the site on a continuous basis, acting as a bio barrier to the treated area. You should know that we suspect that the up gradient source will cause a "*rebound*" in TCE concentrations after the bio plugs are removed, which has occurred.

- Four COE monitoring wells within the test site were sampled at the same time as the wells installed by ABS. TCE was reduced by 57% and the PCE was reduced by 24% during the same test period.

Without question, TCE and PCE were reduced significantly during the test period and reduced using the ABS Aerobic Bio Plug System, which in the opinion of our ABS professionals, would reduce the levels of each contaminant in a relatively short period of additional time if that had been the plan and allowed. The secondary VOC's were eliminated in the two year period.

Two issues caused ABS to make changes in our operational approach as we move through the test period. First and foremost, initially when the installation of the bio plugs was in the beginning stages, it was determined that the confining unit that was so prominently discussed in the assessment reports provided to ABS for use in designing the ABS system was absent, I personally discussed this with Army personnel and asked if we stopped and addressed at this early stage or go on with installation and work through it during the testing period. The decision was made and I was directly told to move ahead now. The second issue, the up-gradient source area which was contained off site, continually fed the upper sections of the treatment zone causing slower than anticipated treatment trends because of the continuing source release into the zone of treatment. It would have been nice to go after the source and long term remediation could have occurred.

As stated in the body of the report, the use of the patented ABS bio plugs is highly effective and could have eliminated the TCE and PCE in the treatment area with sufficient time to address. I have used this technique in many areas, including another site in the west where TCE is the primary contaminant and down to a depth of 95 feet below ground surface in a building and the bio plugs are almost at detection limits in two years and well on the way to success. We have used this technology in many sites and each and every one has been successful. At ABS we look forward to working with the Department of the Army on many more sites around the world to address and eliminate your long term liabilities and the range of ABS technologies can do just that. I would like to personally thank you for providing us with this opportunity to address this issue at the Longhorn Site in Texas. Please do not hesitate to call or correspond if questions arise that we can further answer for you.

Sincerely;

TM Chuck Davis, Chairman & CEO
TMD Technologies, LLC



FINAL REPORT

BIO PLUG PILOT STUDY

LONGHORN ARMY AMMUNITION PLANT SITE 35B(37)

June 2015

Prepared By

Advanced Biosystems, LLC
121-B Venture Boulevard
Spartanburg, SC 29306

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Table of Contents

Executive Summary		4
Section 1.0	**Introduction**	
1.1.0	Introduction	7
Section 2.0	**Site Description**	
2.1.0	Site Prior to Beginning the Pilot Study	12
2.2.0	Site Alteration for Installation of Bio Plugs and Equipment	14
2.3.0	Soil Classification	15
2.4.0	Site Hydrogeology	17
Section 3.0	**Treatment Process**	
3.1.0	Overview	33
Section 4.0	**Distribution of Microbial Species**	
4.1.0	Distribution of Chlorinated Aliphatic Degraders	39
4.2.0	Heterotrophic Populations	43
Section 5.0	**Reduction of VOC in the Groundwater**	
5.1.0	Area of Contamination	46
5.2.0	TCE Reduction	46
5.3.0	PCE Reduction	49
5.4.0	Dissolved Oxygen Concentrations	52
5.5.0	Transects	54
5.6.0	PCE and TCE Degradation Pathways	54
5.7.0	Field Testing	54

List of Figures

Figure 1	Site Location	9
Figure 2	Site 35B(37)	10
Figure 3	Extents of Contamination and Soil Information Provided to DOA Prior to Bio Plug Project	11
Figure 4	Test Site Location	28
Figure 5	Site Topography with Grading Contours	29
Figure 6	AECOM Figure 2-2, TCE In Shallow Zone Groundwater	30
Figure 7	Extent of Bio Plug Field	31
Figure 8	Groundwater Elevation Contours	32
Figure 9	Bio Plug Process Schematics	37

Figure 10 Bio Plug Zones Layout 38

List of Tables

Table 1 Base Groundwater Data 19
Table 2 Hydraulic Conductivity by Elevation of the Screens 20
Table 3 Measured Groundwater Elevations 21
Table 4 COE Monitoring Wells Survey Data 22
Table 5 Calculated Hydraulic Gradients 23
Table 6 Horizontal Velocity in the Vicinity of the Well Clusters 24
Table 7 Groundwater Calculated Distance of Horizontal Movement 25
Table 8 Chlorinated Aliphatic Degraders Populations 41
Table 9 Heterotrophic Population in Monitoring Wells 42
Table 10 Total Number of Aliphatic Degraders Measured Within the Test Site 44
Table 11 Total Number of Heterotrophic Bacteria Measured Within The Test Site 45
Table 12 TCE Testing Results Summary (ug/l) 47
Table 13 PCE Testing Results Summary (ug/l) 50
Table 14 Dissolved Oxygen Concentrations (mg/l) 53

Appendix

Appendix A Transect Information
Appendix B Soil Boring Logs
Appendix C VOC Degradation Products and Testing Data
Appendix D Field Measurements
Appendix E Photographs of Bio Plug Field

Executive Summary

The Department of the Army (DOA) entered into a contract with Advanced Biosystems, LLC (ABS) in September, 2011 to install bio plugs in a full scale test to determine if the bio plug treatment process would aerobically reduce groundwater contaminants in a shorter period of time than the time required by the Method of Natural Attenuation (MNA) under anaerobic and anoxic conditions. The site selected for the test was parcel 35B(37) located at the shuttered Longhorn Army Ammunition Plant (LHAAP) in Karnack, Texas. The ground water under the site was contaminated with elevated concentrations of TCE and PCE. Twelve months were allotted for installation of the plugs, new monitoring wells, bio plugs and related equipment. The operating period was for two years after which the bio plugs were to be removed and the results evaluated.

The test site was at the location of the plant laboratory and encompassed approximately 2 acres of bio plugs spaced in staggered rows, 15 feet apart. Four clusters of 2-inch diameter monitoring wells with three wells in each cluster were installed within the test site. The screen lengths were 3 feet per screen placed in ascending elevations. The top elevation of the ground water was 20 feet below the ground surface and the wells were installed into the ground water zone.

A total of four hundred and nine (409), 3 inch diameter bio plugs were installed on the site and were inserted 10 feet into the ground water. A period of 1.5 months was allotted for acclimation of the bio plugs and the effective testing period for TCE and PCE reduction began in December, 2012. For record purposes, however, DOA personnel began quarterly sampling as soon as the on site cluster wells were developed in July, 2012. The samples were tested for physical characteristics, concentrations of volatile organic compounds and microbial population counts.

FINDINGS

1. The findings were based on 2 years of operating data.
2. The soil within the groundwater zone is a combination of clay and silty sands, coarse sands, and fine-grained sands interspersed with thin lenses of lean clays.
3. There is not a continuous confining layer across the site between the upper shallow zone and the lower zone.
4. The hydraulic gradient of the groundwater across the site ranged from 0.0033 ft/ft to 0.0045 ft/ft. The hydraulic conductivity ranged from 2.76 ft/day in the upper levels of the site to 0.81 ft/day in the lower levels of the site.
5. The horizontal movement of groundwater under the site is in the general direction of East Northeast and ranged from 14.9 feet per year in the upper levels to 4.9 feet per year in the lower levels of the site.
6. Chlorinated aliphatic degraders increased in the monitoring wells from 727 cfu/ml in March 2013 to 3,564 cfu/ml in March 2014, decreasing to 2,325 by October, 2014, a period of 17 months.
7. Heterotrophic Bacteria increased in the monitoring wells from 183 cfu/ml in March 2013 to 1,084,967 cfu/ml in October 2014, a period of 17 months.
8. TCE was aerobically reduced from 6.08 ug/l to 2.16 ug/l in the ABS monitoring wells installed for the project in a period of 22 months.
9. PCE was aerobically reduced from 14.4 ug/l to 11.86 ug/l in the ABS monitoring wells installed for the project in a period of 22 months.
10. The following PCE anaerobic degradation compounds were decreased:

    Cis-1,2 Dichloroethane by 81%
    1,1-Dichloroethane by 54%
    1,1-Dichloroentene by 76 %

11. Secondary VOC compounds were reduced from14.38 ug/l to "undetectable" (nd) by the end of the 2-year operating.

12. The ORP of the site was changed from an anoxic/anaerobic condition to an aerobic condition during the operating period.

13. The bio plugs in the up gradient portion of the site reduced TCE as it entered the site, but, the up gradient source will cause a rebound in TCE concentrations after the bio plugs are removed.

14. Four COE monitoring wells within the test site were sampled at the same time as the wells installed by ABS. TCE was reduced by by 57% and PCE was reduced by 24%.

CONCLUSIONS

1. TCE and PCE can be removed aerobically in a very short amount of time using in situ ABS bio plugs when compared with the remediation treatment processes of "natural attenuation" and "pump and treat".

2. Secondary VOC compounds can be eliminated within a two-year period leaving only chlorinated compounds to be removed.

3. The absence of a continuous horizontal confining layer in a clay and silty sand soil formation significantly increases the time it takes to distribute chlorinated aliphatic degraders horizontally through a treatment area.

4 During the operating period, the ABS bio plugs demonstrated the ability to reduce TCE below the 5 ug/l regulatory limit.

5. PCE was more difficult to degrade than TCE. The inocula used for the LHAAP project may need an additional microorganism to improve the PCE removal.

6. The comparative low percentage of PCE reduction appeared to be influenced in part by the low dissolved oxygen concentrations, low hydraulic conductivity in the deeper soil strata, and possible variations in the direction of ground water flow along Goose Prairie Creek.

7. The use of ABS bio plugs are most effective when a thorough hydro geologic evaluation has been performed on the project site in which the source of the contamination has been identified and the elevation and movement of groundwater has been determined. A remediation strategy can be developed using bio plugs in conjunction with other successful techniques such as cut off trenches, recycle of contaminated ground water through the bio plugs, recycle through infiltration galleries, and irrigation.

SECTION 1.0 Introduction

1.1.0 Opening Statement

This is the final report prepared by Advanced Biosystems, LLC (ABS) for the bio plug pilot study conducted for the Department of the Army (DOA) at the Long Horn Army Ammunition Plant (LHAAP) at Karnack, Texas. The location of the pilot study site within the LHAAP complex is designated as 35B(37), which contained a chemical laboratory building and grounds during the time the ammunition plant was in production. The purpose of the pilot study was to evaluate the ability of ABS bio plugs to remediate Trichloroethene (TCE) and Tetrachloroethene (PCE) from groundwater. The pilot study took place over a span of time from 2011 to 2015 that included contracting, installation from October 2011 through October 2012, operation from October 2012 through October 2014, and, demobilization from October 2014 through January 2015.

The study had two goals. The first was to demonstrate the ability of the ABS bio plugs to remove TCE and PCE from the groundwater under aerobic conditions. The second was to demonstrate that bio plugs can remediate groundwater at a faster rate when compared with the projections using the remediation method of "Natural Attenuation".

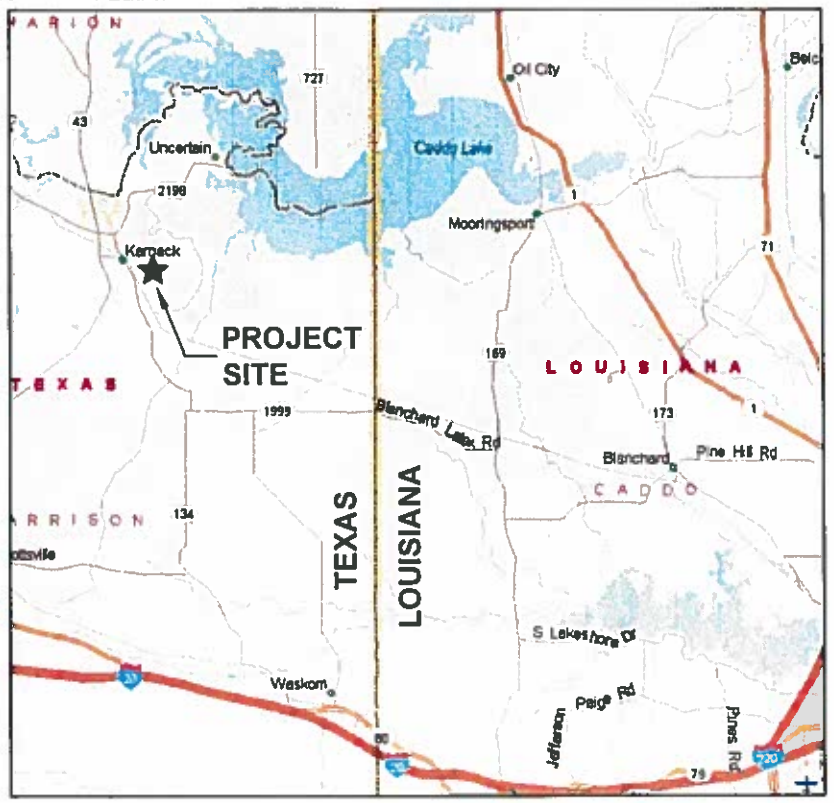
1.2.0 Introduction

Advanced Biosystems, LLC (ABS) entered into a contract to the DOA to demonstrate the effectiveness of using bio plugs to enhance the growth and distribution of chlorinated aliphatic degrading microbe populations in the ground water under a specified test site. The project is a full scale pilot within the LHAAP property adjacent to Karnack, Texas. **Figure 1** shows the location of the test site designated as 35B(37), The test site covers an area of approximately 2 acres within 35B(37). The ground water under the test site is contaminated with TCE, and PCE. During operation of the ammunition plant, the site contained a chemical laboratory and at least one sump used

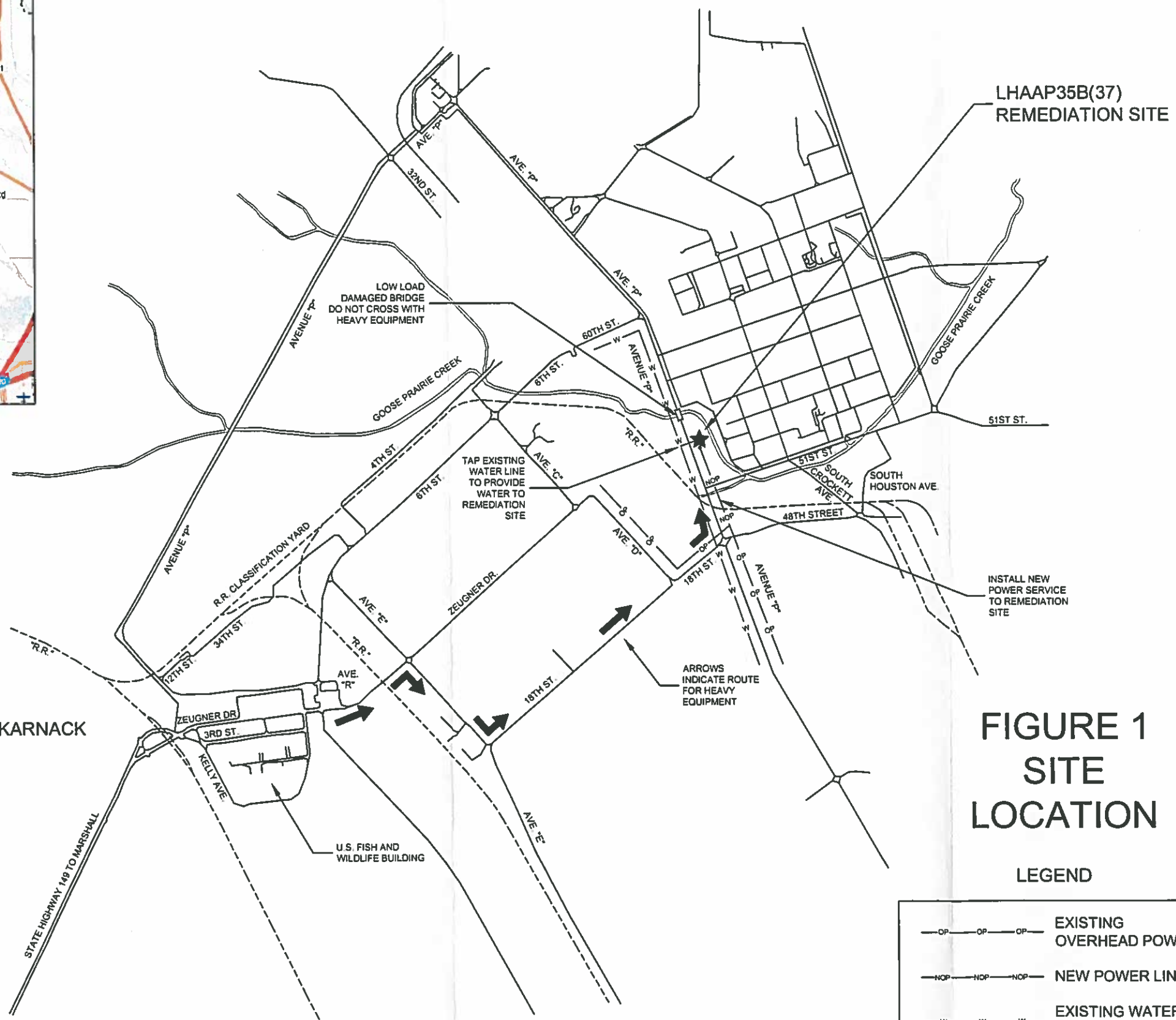
to dispose of chlorinated solvents. A plan was developed by the DOA to remediate the ground water under the site using "Monitored Natural Attenuation" (MNA) that was projected to take between 20 and 39 years depending on the methods used. ABS proposed to use bio plugs containing media inoculated with chlorinated aliphatic degraders to demonstrate a distinct increase in the degrader populations under aerobic conditions within a much shorter period of time than was projected using MNA remediation under anoxic and anaerobic conditions. The project was for a total of three years, including a two year operating period. The microbial degrader populations are grown on site within the ground water saturated zone using screened transfer wells (bio plugs) distributed in grids across the area to be treated.

In the short term (2 years), the rate of distribution of the microbe populations from the bio plugs is dependent on the movement of the groundwater under the site. Data from monitoring wells and previous studies dating from 1998 through 2007 provided the basis for the design and placement of the bio plugs and groundwater monitoring wells. **Figure 2** shows the vicinity of the test site with groundwater contours drawn from measurements taken in 1998, 2002, and 2007, all indexed to mean seal level (msl). Based on the contour information from **Figure 2,** the groundwater levels and gradients under the site have been decreasing since 1998. The groundwater contours crossing the project site decreased from 196 and 194 msl in 1998, 192 and 190 msl in 2000, and 183 and 182 msl in 2007. The ground water elevations measured in July 2012 at the beginning of the pilot project varied from 179 feet to 178 feet msl (+/-). The ground water elevations measured during the operating period did not decrease further.

The extents of the contamination under the test site, as presented by the DOA, before contracting the bio plug project, are shown on **Figure 3.** During the testing period, monitoring wells sampled off-site contained significant concentrations of TCE and PCE. Additional monitoring wells were installed by the US Army Corps of Engineers (COE) in the fall of 2013 (reference **Figure 6**), that expanded the boundary of the contamination area significantly beyond the test area.



VICINITY MAP
(NTS)



N

SCALE IN FEET
800' 400' 0 800' 1600'

FIGURE 1
SITE
LOCATION

LEGEND

- EXISTING OVERHEAD POWER (—OP—OP—OP—)
- NEW POWER LINE (—NOP—NOP—NOP—)
- EXISTING WATER LINE (—W—W—W—)

ABS
ADVANCED
BIOSYSTEMS, LLC
TMD
ENGINEERING, LLC
F-13937
121 VENTURE BLVD. SUITE B
SPARTANBURG, SC 29306
PHONE 864.595.0103
FAX 864.595.1952

STATE OF TEXAS
ROBERT B. WHITAKER
109508
LICENSED
PROFESSIONAL ENGINEER

DATE.

APPROVALS

PROJECT ENG	RSW
DESIGNED BY	WHA
DRAWN BY	BAH
CHECKED BY	RSW
APPROVED	RSW

REVISIONS

NO	DESCRIPTION	DATE	BY
1	AGENCY REVIEW	12-14-11	RSW
2	ISSUED FOR QUOTES	1-17-12	RSW
3	ISSUED FOR CONSTRUCTION	5-09-12	RSW

PROJECT NO.: 381-02

PROJECT TITLE:
LHAAP-35B(37)
BIO PLUG PILOT PROJECT
- FOR -
UNITED STATES
DEPARTMENT OF THE ARMY
TEXAS
HARRISON COUNTY

DATE: 11-11-2011

SCALE: NTS

FIELD BOOK # N/A

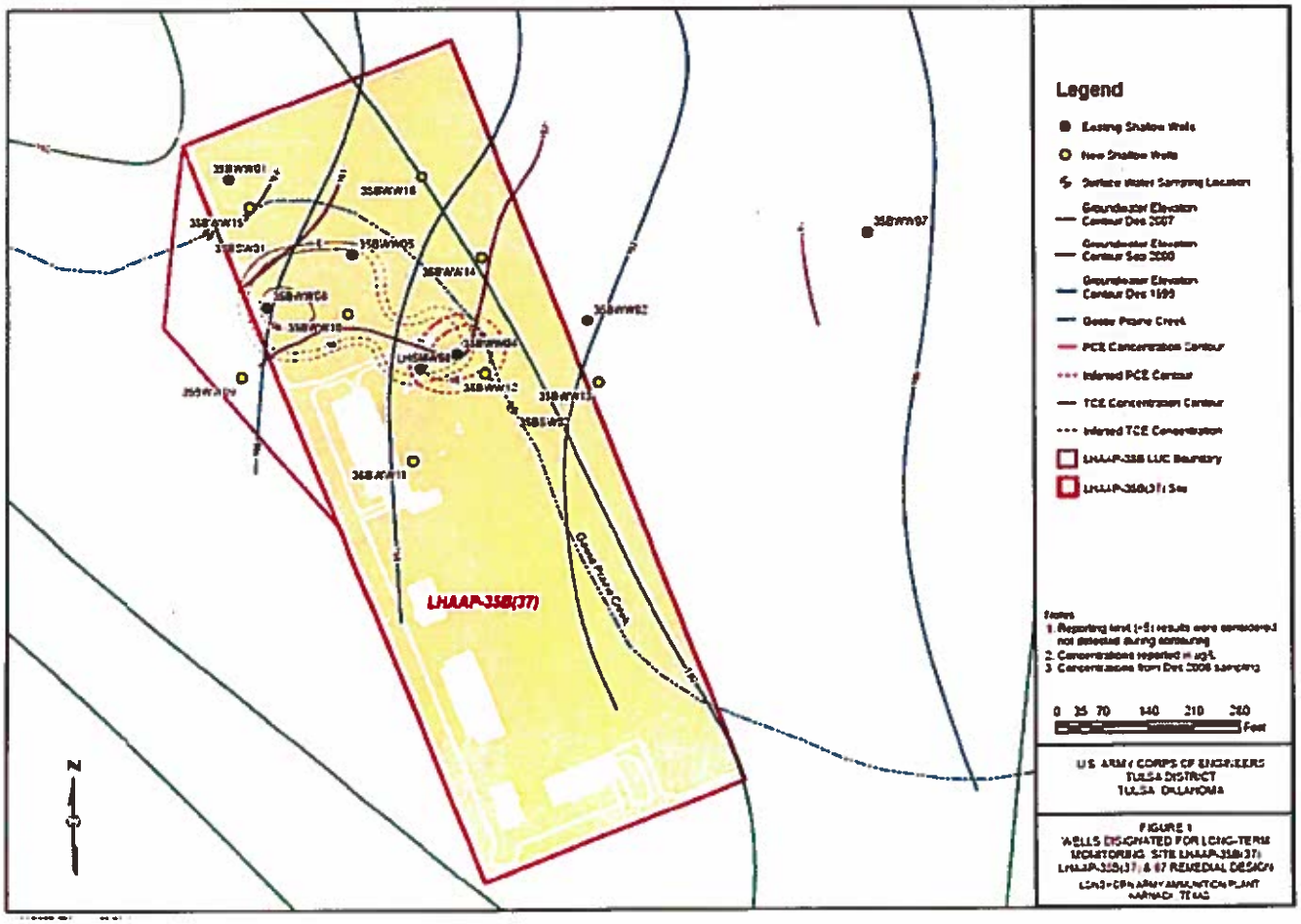
SHEET 2 OF 33

FILE NAME: 381-02-08

00839943

Figure 2

Site 35B(37)



LEGEND

- EXISTING MONITORING WELLS
- GROUNDWATER ELEVATION CONTOUR DEC 2007
- PCE CONCENTRATION CONTOUR
- INFERRED PCE CONTOUR
- TCE CONCENTRATION CONTOUR
- INFERRED TCE CONCENTRATION

MONITORING WELL TABLE OF DEPTH AND GROUND WATER ELEVATION

MONITORING WELL REFERENCE	OFF / ON SITE	TOG ELEVATION (MSL)	ELEVATION AT TOP OF LOWER CONFINING LAYER (MSL)	ELEVATION AT BOTTOM OF UPPER CONFINING LAYER (MSL)	GROUNDWATER ELEVATION YEAR 2007 (MSL)	UPPER SHALLOW ZONE DEPTH ABOVE GROUNDWATER ELEVATION (ft)
35BWW01	OFF	200.0	182.0	191.0	184.3	6.8
35BWW03	ON	201.0	168.0	189.0	181.7	7.3
35BWW04	ON	198.0	170.0	186.0	182.0	4.0
35BWW05	ON	199.5	165.0	192.0	182.7	9.3
35BWW06	ON	199.5	165.0	192.0	182.7	9.3
35BWW08	ON	201.5	172.5	183.0	182.6	0.4
LHSMW58	ON	200.0	168.0	183.0	181.8	1.2
LHSMW59	ON	201.5	172.5	183.0	182.6	0.4

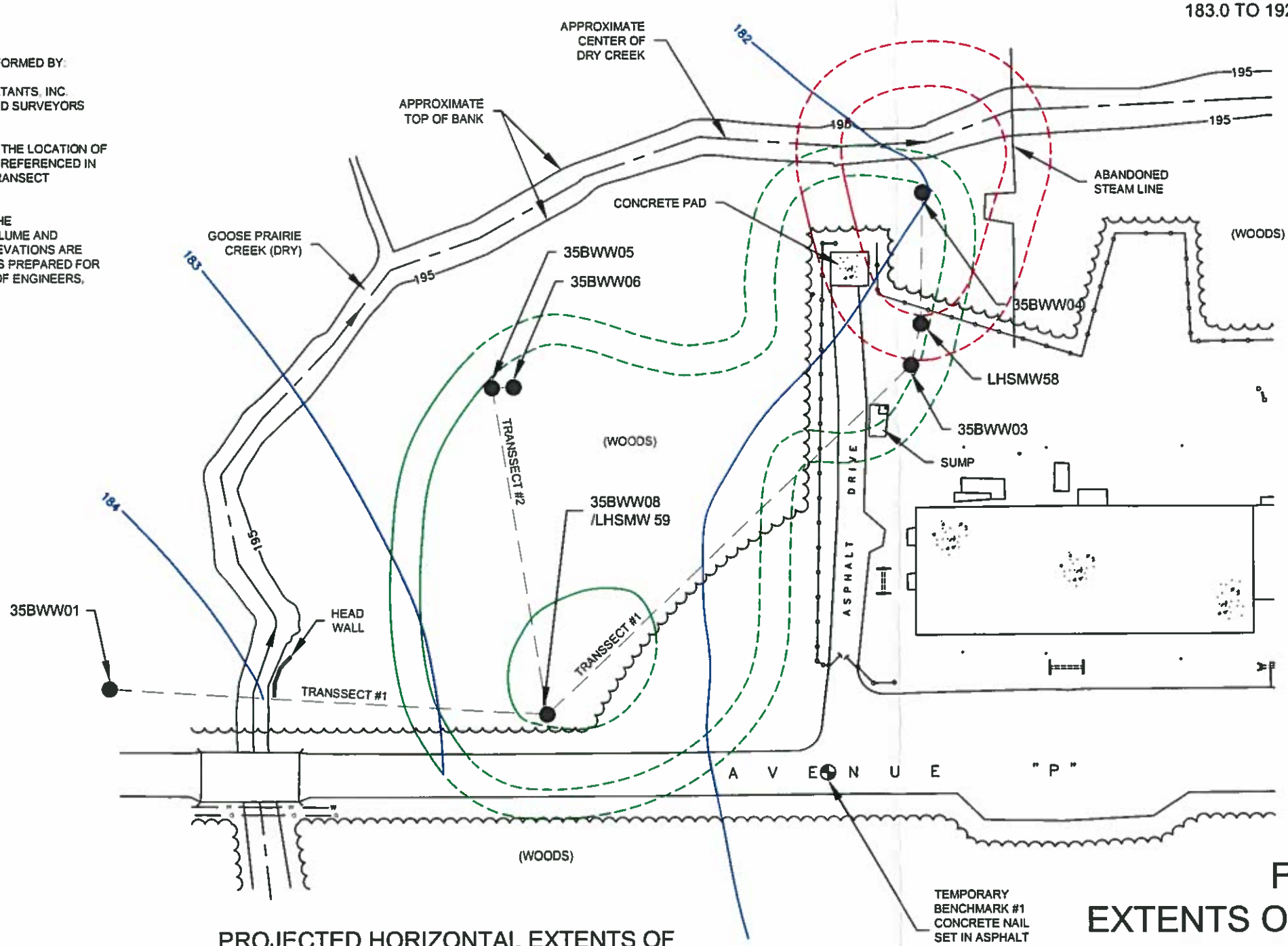
NOTE:

1. TOPOGRAPHY PERFORMED BY:

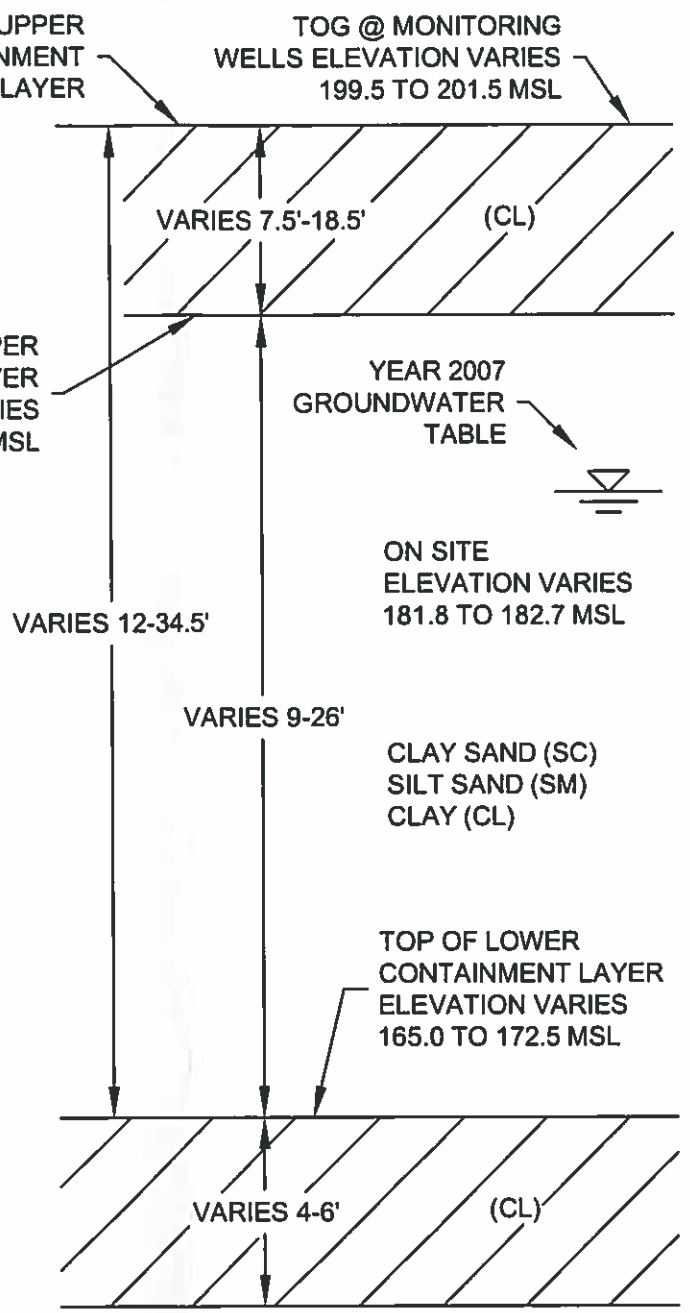
   LANDMARK CONSULTANTS, INC.
   PROFESSIONAL LAND SURVEYORS
   NOVEMBER, 2011

2. MW 35BWW08 IS AT THE LOCATION OF LSHMW59 WHICH IS REFERENCED IN DATA TABLE AND TRANSECT INFORMATION

3. THE EXTENTS OF THE CONCENTRATION PLUME AND GROUNDWATER ELEVATIONS ARE BASED ON REPORTS PREPARED FOR THE ARMY CORPS OF ENGINEERS, TULSA, OKLAHOMA



PROJECTED HORIZONTAL EXTENTS OF GROUNDWATER CONTAMINATION IN UPPER SHALLOW ZONE



ON SITE
PROJECTED VERTICAL EXTENTS OF GROUNDWATER CONTAMINATION IN UPPER SHALLOW ZONE
(NTS)

TEMPORARY BENCHMARK #4 CONCRETE NAIL SET IN ASPHALT WHITE CIRCLE ELEVATION 203.58

FIGURE 3
EXTENTS OF CONTAMINATION AND SOIL INFORMATION PROVIDED TO ABS PRIOR TO BIO PLUG PROJECT

ABS ADVANCED BIOSYSTEMS, LLC
TMD ENGINEERING, LLC F-13937
121 VENTURE BLVD. SUITE B
SPARTANBURG, SC 29306
PHONE: 864.595.0103
FAX: 864.595.1952

STATE OF TEXAS — ROBERT S. WHITAKER — 109508 — LICENSED PROFESSIONAL ENGINEER

DATE

APPROVALS: PROJECT ENG RSW; DESIGNED BY: N/A; DRAWN BY: BAH; CHECKED BY: RSW; APPROVED RSW

REVISIONS

NO	DESCRIPTION	DATE	BY
1	AGENCY REVIEW	12-14-11	RSW
2	ISSUED FOR QUOTES	1-17-12	RSW
3	ISSUED FOR CONSTRUCTION	5-09-12	RSW

PROJECT NO.: 381-02

PROJECT TITLE: LHAAP-35B(37) BIO PLUG PILOT PROJECT - FOR - UNITED STATES DEPARTMENT OF THE ARMY — HARRISON COUNTY TEXAS

DATE: 11-14-2011

SCALE: AS SHOWN

FIELD BOOK #: N/A

SHEET: 8 OF 33

FILE NAME: 381-02-11

00829945

SECTION 2.0 Site Description

2.1.0 Site Prior to Beginning the Pilot Study

The testing site was overgrown with brush and small pine trees typical of east Texas. The site was bordered on the west by Avenue P and was sectioned on the east by Goose Prairie Creek. Mature hardwoods were located along the natural levee of the creek. The site sloped from west to east at a gentle grade ranging from 2% in the upper portions along Avenue P to 3% down gradient from Avenue P to the Creek. **Figure 4** shows the designated location of the test site and **Figure 5** shows the topographic features of the site.

2.1.1 Goose Prairie Creek

Goose Prairie Creek was a dry stream bed at the beginning of the pilot test. The Creek carried storm water runoff but was not a source of continually running water. The groundwater level was approximately 20 feet below the ground surface in the upper parts of the site and 10 feet or more below the bottom of Goose Prairie Creek. While the creek was a major feature of the site, it did not influence the movement or elevation of the ground water. During clearing, at the request of the Wild Life Service, the mature hardwoods and natural levees along the Creek were not disturbed. Bio plugs and monitoring wells were located on both sides of the Creek in an area generally defined by the terms of the contract between ABS and the DOA.

2.1.2 Chemical Laboratory Building

The chemical laboratory building located on the site was demolished - all except concrete floors and walls. Based on prior sampling, the ground water under the building was considered to be uncontaminated with TCE and PCE and no bio plugs were placed through the concrete floor. Prior testing also had indicated that the immediately

adjacent ground sloping from the south end of the building toward Goose Prairie Creek was also uncontaminated (monitoring well 35BWW11). The Laboratory building and the area immediately down gradient from the building were excluded from the bio plug testing. The area was fenced and used for storage of equipment and supplies during installation of the bio plugs.

2.1.3 Old Sump

A sump was located within the test area that consisted of an asphalt-paved drive a concrete flume, a shallow concrete sump and a pipe believed to run from the bottom of the sump to the sandy formation below the ground surface. **Figure 4** shows the location of the sump. The sump was removed during site clearing. Prior to the pilot study, it was believed that PCE contamination within the site came from this sump. The source of TCE appeared to be concentrated up gradient from the sump. Based on the pilot testing results we believe that the primary source of the TCE is located west of Avenue P and the source of PCE is from the vicinity of the sump.

2.1.4 Monitoring Wells

The site contained 6 monitoring wells installed prior to beginning the pilot test. Data from these wells and others off site were used in the initial DOA evaluation of the ground water contamination. The wells eliminated the area under the laboratory building and the area immediately down gradient areas but not enough wells were installed to define the upper boundary of contamination west of Avenue P and east along Goose Prairie Creek. During the fall of 2013, the COE installed additional monitoring wells that better defined the up gradient extent of the contamination west of Avenue P and down gradient east and north beyond Goose Prairie Creek. **Figure 4** shows the location of the on site monitoring wells in place prior to beginning the pilot testing. **Figure 6** is from the COE and shows the location and sampling data from all the wells in the area.

2.2.0 Site Alteration for Installation of Bio Plugs and Equipment

The site had to be cleared of brush and small trees, water and power brought to the site, water storage provided, and office and equipment space set up as part of the installation of the bio plug pilot test.

2.2.1 Site Clearing

The site was cleared of brush and smaller trees on both sides of Goose Prairie Creek within the pilot test area. Silt fencing was installed to minimize transport of silt off site during rain events. Four hundred and nine (409) bio plugs were installed, divided into 8 zones. Four clusters, each with three 2-inch diameter monitoring wells were installed along with 5 zone houses, two 3,000 gallon nutrient make up water storage tanks, an office and equipment room made from a cargo container, 230 volt single phase power to the site with 110 volt underground power distributed to the zone houses, a water tap for the site, and a fenced storage area adjacent to the demolished Laboratory Building. **Figure 7** shows the extent of the bio plug field.

2.2.2 Preservation of Mature Hardwood Trees

The mature hardwoods along Goose Prairie Creek were left in place and the bio plugs in this area were arranged to minimize any damage to the trees and Creek levee. Power, air and nutrient lines were installed above ground to reach the test area east of the Creek.

2.2.3 Sump

The old sump was removed and the area covered to prevent further infiltration through this structure. The asphalt drive to the pit was left in place.

2.2.4 Office and Equipment Trailer

The office and equipment trailer and storage tanks were located adjacent to Avenue P as a convenient means of access.

2.3.0 Soil Classification

The soil within the test area was classified from monitoring well drilling logs.

2.3.1 Report Location of Drilling Logs

Drilling logs that have been received from the COE, DOA, well logs from installation of the cluster monitoring wells, and a key to the classification symbols are included in Appendix B, "Soil Boring Logs".

2.3.2 Cluster Monitoring Well Soil Classifications

The drilling logs furnished by ABS were only for the on-site monitoring well clusters at four locations. **Figure 7** shows the locations of the well clusters in relation to the bio plug field.

Well Cluster Number 1, located in the upper portion of the site and down gradient of Avenue P, indicated CL and SM and CH soil from the ground surface extending 14 feet deep. The soil classifications from 14 feet to a depth of 30 feet were combinations of sandy fat clay with clayey sand layers (CH-SM). A unified CL layer was not encountered at the 30 foot depth and the first monitoring well was drilled to a depth of 45 feet trying to locate a confining layer of soil. The soil continued to be CH-SM type and the drilling was terminated and the over depth of the bore hole was grouted back to a depth of 30 feet for the monitoring well development.

Well Cluster Number 2 located in the upper central portion of the site indicated ML, CL, and CH soil types from the ground surface extending 15 feet deep. The soil classification from 15 feet to 37 feet consisted of soils classified as CH-SM, SC-CH, SM-SC, and ending in a 9 foot layer of poorly graded sand (SP). A unified clay (CL) layer was not encountered prior to terminating the bore hole.

Well Cluster Number 3 located in the central right portion of the site near the old sump indicated ML, CL, CH, soil types to a depth of 16.5 feet below the surface. The soil classifications from 16.5 feet to 33 feet consisted of SM, SC, SP, ending in 9 feet of clayey sand and poorly graded sand. A unified clay (CL) layer was not encountered prior to terminating the bore hole.

Well Cluster Number 4 is located on the east side of Goose Prairie Creek. The soil classification consisted of clayey silt (ML) and generally silty sand (SM) to a depth of 13 feet. The soil classifications from 13 feet to 36 feet consisted of SC, SM, and SC-CH at the bottom of the well. These wells contained more fine grained sand that the previous clusters of wells. A clay (CL) layer was not encountered prior to terminating the deepest bore hole.

2.3.3 US Army Corps of Engineers Boring Logs

The Corps of Engineers (COE) installed new monitoring wells in the fall of 2013 and provided boring logs both within and outside of the test area. The locations of the wells are shown on **Figure 6**. The soil classifications are similar to the Cluster Wells showing fine grained soils in the first 15 feet (+/-) of the ground surface. Below that the logs indicate various formations of sandy clay, sandy silt and multiple thin layers of lean clay (CL). None of the boring logs indicated a unified confining layer at the termination of the borings at depths from 33 to 37 feet below ground surface.

2.3.4 Monitoring Wells 35BWW05 and 35BWW06

The -05 and -06 wells are within 10 feet of each other near Goose Prairie Creek and within the pilot test site. The screen in the -05 well was in the upper shallow zone and the top of the screen in the -06 well was 5 feet lower. The ground water from the -05 well was contaminated with TCE and PCE while the ground water from the -06 well was not contaminated. These two wells demonstrate the possible presence of confining layers within the area at differing depths and a cause of unpredictable movement of the ground water within the testing area.

2.4.0 Site Hydrogeology

Prior to the testing the hydrogeology of the site had not been firmly established. General ground water contours had been published in earlier reports but the movement of groundwater within the site was not well defined. During the testing period additional groundwater elevations were measured and provided information used to establish the movement of ground water as it affected the distribution of microbial populations and reduction of contaminants.

2.4.1 Jacobs Engineering Study

Site 35B (37) was first evaluated by Jacobs Engineering beginning in 1998. Monitoring wells were installed and the hydrogeological features of the site described. The soils were described in "*Final Remedial Investigation Report, Volume1: Report for the Group 4 Sites" This report included the site 35B under "Section 6, Site 35B: Chemical Laboratory"* (Appendix A). A potentiometric surface map was not developed for the site because of its small size. Based on this study, the site was divided between the upper shallow zone and a deeper intermediate zone separated by " an approximately 4 –foot-thick lean clay layer from 28 to 32 feet bgs" Well 35BWW03 was drilled to a depth of 80 feet and screened at an intermediate elevation below the upper shallow layer. The hydraulic conductivities were calculated using well 35BWW02. Two hydraulic

conductivities were measured, 4.3 x 10E-4 cm/sec (1.22 ft/day) and 7.7 x 10E-4 cm/sec (2.18 ft/day). The general direction of ground water flow at that time was believed to be to the East Northeast. This report contained information that turned out to be incorrect and was passed from the DOA to ABS during the planning period for the project.

2.4.2 Measurement of Hydraulic Conductivity

Existing COE monitoring wells were located within the treatment area having screen intervals of 10 feet. As part of the bio plug project, 12 new monitoring wells were installed within the bio plug grid. The wells consisted of 4 clusters of 3 wells each. Each of the wells in a cluster is 6 feet apart and draws water from different levels. **Figure 8** shows the treatment area and the location of all the monitoring wells.

The elevations of the ground water wells were established from mean sea level bench mark monuments within the LHAAP area. The hydraulic conductivity of each of wells was calculated using the Bouwer- Rice procedure. This procedure, also used for the 1998 calculations, is the basis for calculation of the horizontal velocity of movement in the saturated soils surrounding the wells. The cluster wells were identified using the cluster number followed by the number of the well. As an example, the deepest well in Cluster No. 1 is "1-1". The middle depth is "1-2" and the shallowest depth is "1-3". The same numbering system was used for the remaining three clusters, Clusters 2, 3 and 4.

2.4.3 On-Site Cluster Wells

The cluster wells were completed in July of 2012 and the base groundwater elevations were recorded. Based on these measurements, the groundwater elevation had decreased as much as 15 feet since 1998 and the hydraulic gradient had flattened. **Table 1** is a listing of the base ground water elevations and the hydraulic conductivity of each new cluster well. During the installation of the first cluster well (1-1), it was determined there was not a unified thick confining layer of clay (CL) at the depths (28+/- bgs) indicated by the information provided to the DOA prior to the start of the pilot

project. The first well was drilled 45 feet looking for the confining layer. The soils continued to be fine grained, stiff, and moist and contained only limited amounts of clay and silt that would have made up a good confining boundary. A thick unified confining layer was also not found during installation of the monitoring wells in Clusters 1, 2, 3, and 4.

Table 1
Base Groundwater Data
July, 2012

Monitoring Well	Groundwater Elevation (ft msl)	Mean Cluster Ground Water Elevation (ft msl)	Hydraulic Conductivity (ft/day)	Mean hydraulic Conductivity (ft/day)
1-1	179.74	179.71	2.53	2.76
1-2	179.72		3.59	
1-3	179.68		2.16	
2-1	179.31	179.32	0.87	1.73
2-2	179.32		1.16	
2-3	179.34		3.16	
3-1	176.47	179.23	1.71	1.42
3-2	179.2		18.6	
3-3	179.27		1.12	
4-1	179.03	179.05	0.18	0.81
4-2	179.03		2.00	
4-3	179.08		0.254	

Note: Numbers in red are not used in the calculations of mean values

From **Table 1** the water level measured in Well 3-1 is considered inconsistent. Subsequent measurements did not indicate a significant difference between the water

levels in each of the Cluster 3 Wells until June, 2013 in which Well 3-1 recorded elevation was again almost 2 feet below the adjacent wells. The hydraulic conductivity of Well 3-2 was correctly measured but, based on observations during installation, does not indicate the general conductivity of soils in the vicinity of Cluster No 3. For the calculations using this base data, the base groundwater elevation of Well 3-1 and hydraulic conductivity of Well 3-2 are disregarded.

2.4.4 Hydraulic Conductivity Based on Elevation

Table 2 is the distribution of the hydraulic conductivity by elevations that encompasses the screen elevations of the 4 well clusters. The lowest elevations, 163-166 msl encountered the most constriction to flow with an average conductivity of 0.52 ft/day. The elevations above 166 msl ranged from 0.869 ft/day to 1.98 ft/day.

Table 2

Hydraulic Conductivity by Elevation of the Screens

Hydraulic Conductivity Summary For Well Cluster Screen Interval														
Well Identification	1-1 (msl)	1-2 (msl)	1-3 (msl)	2-1 (msl)	2-2 (msl)	2-3 (msl)	3-1 (msl)	3-2 (msl)	3-3 (msl)	4-1 (msl)	4-2 (msl)	4-3 (msl)		
Screen Elevation														
Top	175.87	178.87	181.95	168.57	173.59	178.52	170.43	175.41	180.9	166.69	173.66	180.6		
Bottom	172.87	175.87	178.95	165.57	170.59	175.52	167.43	172.41	177.9	163.69	170.66	177.6		
Hydraulic Conductivity Range of Elevation (msl)	1-1 (ft/day)	1-2 (ft/day)	1-3 (ft/day)	2-1 (ft/day)	2-2 (ft/day)	2-3 (ft/day)	3-1 (ft/day)	3-2* (ft/day)	3-3 (ft/day)	4-1 (ft/day)	4-2 (ft/day)	4-3 (ft/day)	Sum *	Mean (ft/day)
163.0-166.0				0.869						0.178			1.05	0.52
166.0 - 169.0				0.869			1.71						2.58	1.29
169.0-172.0					1.16		1.71				2.00		4.87	1.62
172 - 175.0	2.53				1.16						2.00		5.69	1.90
175.0 - 178.0		2.53				3.16						0.254	5.94	1.98
178.0 - 181.0			2.16						1.12				3.28	1.64
181.0 - 184.4														

Note: * Measured Conductivity is too high and does not corrolate with the conductivity of the other two wells in Cluster 3.
The measured conductivity of 18.6 ft/day is discarded.

2.4.5 Measured Groundwater Elevations for the Cluster Monitoring Wells

The three groundwater elevations measured for each cluster were averaged to establish a mean elevation. The difference in the mean groundwater elevations of each wells in a cluster varied slightly for each sampling event with standard deviations ranging from 0.029 feet to 0.095 feet. The average changes in ground water elevations each quarter from July 2012 through October 2014 between the up gradient cluster (Cluster No 1) and the most down gradient cluster (Cluster No 4) are summarized In **Table 3.**

Table 3
Measured Ground Water Elevation

Measurement Period	Most Up Gradient Cluster No 1 (msl)	Most Down Gradient Cluster No 4 (msl)	Elevation Difference (ft)
July, 2012	179.71	179.05	0.66
September, 2012	179.21	178.41	0.80
December, 2012*	178.99	178.24	0.75
March, 2013*	179.48	178.85	0.63
June, 2013*	179.65	178.95	0.70
September, 2013*	178.52	177.78	0.26
December, 2013*	179.23	178.21	1.02
March, 2014	179.94	179.42	0.50
July, 2014	179.87	179.47	0.40
October, 2014	179.04	178.52	0.52

As seen in this table, the hydraulic gradient varied the most during the December 2013 sampling event. The difference in elevation for the remaining sampling events varied from 0.26 ft to 0.80 ft.

2.4.6 The COE Wells Survey Data

The survey data for the COE wells defines the elevations, screen intervals, and the depth of the screens. **Table 4** is a listing of the survey data. Eleven of the wells were installed prior to beginning the project and the remaining 10 were installed in the fall of 2013. These additional wells were placed both inside the project area and in areas surrounding the project area. The distance intervals, combined with the intervals of the onsite wells gave a better definition of the ground water contours for evaluation of the movement and distribution of the aliphatic degraders.

Table 4
COE Monitoring Wells
Survey Data

Monitoring Well Reference (Figure 3)	Top of Casing (ft msl)	Well Depth (ft)	Top of Ground Elevation (ft msl)	Top of Screen Elevation (ft msl)	Bottom of Screen Elevation (ft msl)
35BWW01	202.88	21.15	200.24	193.88	183.88
35BWW02	203.95	16.97	201.06	194.95	189.95
35BWW03	203.55	87.63	201.34	133.55	123.55
35BWW04	202.1	33.10	199.26	182.10	172.10
35BWW05	202.57	37.93	199.97	176.57	166.57
35BWW06	203.04	53.57	200.01	161.04	156.04
35BWW07	203.53	31.15	200.86	185.53	175.53
35BWW08	204.12	34.2	201.4	184.12	174.12
35BWW09	No data	37.18	202**	177.0**	167.0**
35BWW010*	203.79	36.6	200.79	180.79	170.79
35BWW011	No data	37.70	200.0**	175.0**	165.0**
35BWW012*	201.17	38.34	198.52	180.87	166.17
35BWW013*	203.52	37.83	201.07	183.72	169.02
35BWW014	No data	37.20	199.0**	174.0**	164.0**
35BWW015*	201.75	50.00	200.01	183.95	154.25

35BWW016*	201.20	37.08	198.34	182.4	167.7
35BWW017*	201.00	35.93	198.16	182.7	168.00
35BWW018*	206.72	35.15	203.80	188.92	174.22
35BWW019*	206.66	36.4	204.10	187.86	173.16
35BWW020*	205.23	33.10	202.67	190.13	175.33
LHS-MW-58	203.56	35.23	200.00	178.56	168.56

Note: * indicates monitoring wells installed by the COE in the fall of 2013

** Indicates approximate elevations

2.4.7 Groundwater Elevation Contours.

Figure 8 shows the projected ground water contours and **Table 5** summarizes the groundwater measurements and calculated hydraulic gradients normal to the ground water contours.

Table 5
Calculated Hydraulic Gradients

Monitoring Wells Used for Calculations	Groundwater Contour (ft msl)	Groundwater contour (ft msl)	Distance Between Contours (ft)	Hydraulic Gradient (ft/ft)
Cluster and COE Wells	179.0	178.5	150	0.0033-0.0045
COE Wells	178.5	178.0	140	0.0036
COE Wells	178.0	177.0	208	0.0048
COE Wells	177.0	176.0	185	0.0054

The survey data from the COE wells extended beyond the site and resulted in a more accurate interpolation between measured ground water data. From this data the hydraulic gradients within the treatment site between 179 and 178 feet msl showed some variation between measurements in the COE wells and the measurements in the cluster wells. The range of treatment site gradients is between 0.0033 ft/ft and 0.0045 ft/ft. The elevations between 178 and 176 feet msl are beyond the treatment site.

2.4.8 Horizontal Velocity of the Groundwater

The horizontal velocity of groundwater within the site is calculated based on the hydraulic gradient normal to the ground water contours. **Figure 8** shows the contours derived by interpolating between groundwater elevations from the monitoring wells. The horizontal velocity of the ground water within a saturated zone was calculated by -- multiplying the hydraulic conductivity (**Table 1**), by the hydraulic gradient (**Table 5**), and dividing by the effective porosity of the soil. Based on the type of soil in the saturated zone (fine sands, silts, sandy silts) the textbook effective porosity ranges from 30% to 45%. The value that is locally used for the soils in the vicinity of the test site is 30%. **Table 6** lists the calculated horizontal hydraulic velocity in the Northeast direction across the site in the vicinity of each of the four well clusters. The elevation of the ground water did not change significantly from the period December 2012 to October 2014. The calculated horizontal movement shown in **Table 7** for the entire operating period is based on the daily movement shown in **Table 6**

Table 6
Horizontal Velocity in the Vicinity of the Well Clusters

Period Measured	Cluster 1 Vicinity (ft/day)	Cluster 2 Vicinity (ft/day)	Cluster 3 Vicinity (ft/day)	Cluster 4 Vicinity (ft/day)
Fall, 2013	-	-	0.023	0.013
December, 2013	0.041	0.030	-	-

2.4.9 Horizontal Movement

The horizontal distance the groundwater moved was calculated beginning when water was first transferred from the bio plugs by multiplying the velocity per day times the

number of days between measurements. The bio plugs were installed and started up on October 22, 2012. The horizontal travel distance from October 22, 2012 to October 15, 2014, a period of 723 days, and a yearly projection of 365 days is listed in **Table 7.**

The horizontal movement of groundwater across the site appears to be more dependent on hydraulic conductivity of the soil rather than the hydraulic gradients. The hydraulic gradients varied from 0.0033 ft/ft to 0.0045 ft/ft within the treatment area while the hydraulic conductivity varies from 2.76 ft/day at the up gradient Well Cluster No 1 to 0.81 ft/day at the down gradient Well Cluster No 4.

Table 7
Groundwater
Calculated Distance of Horizontal Movement

Number Of Days	Cluster 1 Vicinity (ft/)	Cluster 2 Vicinity (ft)	Cluster 3 Vicinity (ft)	Cluster 4 Vicinity (ft)
723	29.5	21.6	16.6	9.6
365*	14.9	10.9	8.4	4.9

* Indicates calculated distances per year

While the above calculations are useful in describing the treatment area as a whole, there are silt and clay lenses within the formation that likely prevent straight-line contiguous movement of the ground water. This is most evident in the vicinity of Well Cluster 3, well 35BWW05, and in the lower portions of the site along Goose Prairie Creek in the vicinity of monitoring wells 35BWW 04, 35BWW 12, and Cluster No 4.

A horizontal confining layer is evident in the vicinity of 35BWW05 and 35BWW06. The wells are within 10 feet or each other. Well -05 is screened in the upper shallow zone

and Well -06 is screened 5 feet lower. Well -05 shows contamination and Well -06 does not. The direction of flow from the bio plug field did not appear to intercept Well -05.

Discontinuity in soil character is evident in Well Cluster No 4. The shallow screen appears to have more groundwater movement than the middle and bottom screens. Another area of interest is west of Avenue P. The ground water elevations measured in this area indicates a static condition of little or no groundwater movement. Future measurements need to focus on this area as it relates to the movement of TCE contaminated ground water into the upper portion of the treatment site.

Horizontal movement alone does not account for all the ground water movement. The amount of water transferred through the bio plugs also impacts the distribution of microbial populations transferred from the bio plugs. The site does not appear to have a continuous confining layer that would prohibit water from moving vertically into the deeper intermediate soil strata. Based on the pilot testing we believe that the test area is spotted with smaller horizontal and vertical lenses of semi confining layers that are not physically connected. The direction and velocity of ground water appears to be predictable in the upper portions of the test site below Avenue P but is not as predictable in the lower portions and areas adjacent to Goose Prairie Creek.

2.4.10 Added Nutrient Water

The bio plugs were placed in operation October 22, 2012 transferring a total of 2,054 gallons per day through the bio plugs into the adjacent soil. The screened interval of the bio plugs averaged 10 feet of depth into the groundwater saturated zone. The amount of mobile pore water volume in the 10 ft depth between the ground water elevation and the bottom of the bio plugs (porosity = 30%) is calculated to be 3 cubic feet per square foot of site. With a total area of 2.04 acres (88,862 sf), the volume of mobile pore water within the treatment zone is calculated to be 266,587 cubic feet. The amount of inoculated water transferred into the treatment zone through the bio plugs from October 22, 2012 to October 15, 2014 (723 days) was 197,665 cubic feet. The

total amount of transferred water was 74.2% of the pore volume within the 10 ft deep treatment area.

The predominance of water added through the bio plugs moved vertically downward after leaving the plug. Considering a typical cross section of the test area and using the calculated horizontal movement of the ground water, we estimate that more than 90% of the water added to the bio plugs moved vertically downward rather than horizontally.

The culmination of this vertical movement was the lack of good horizontal distribution of chlorinated aliphatic degraders showing up in the on-site monitoring wells for the first year of the two year test period. The bio plugs were placed in rows 15 feet apart with the bio plugs staggered at 15 feet intervals. Horizontal movement of the ground water was to be used to distribute the microbial populations of aliphatic degraders across the site because of the short time of the operating period. Without the bottom confining layer, the actual horizontal movement was much slower than anticipated and aliphatic degraders did not significantly populate the areas around the monitoring wells for the first year of the two year operating period.

NOTE:

1.TOPOGRAPHY PERFORMED BY:

LANDMARK CONSULTANTS, INC.
PROFESSIONAL LAND SURVEYORS
NOVEMBER, 2011

2.MW 35BWW08 IS AT THE LOCATION OF LSHMW59 WHICH IS REFERENCED IN DATA TABLE AND TRANSECT INFORMATION

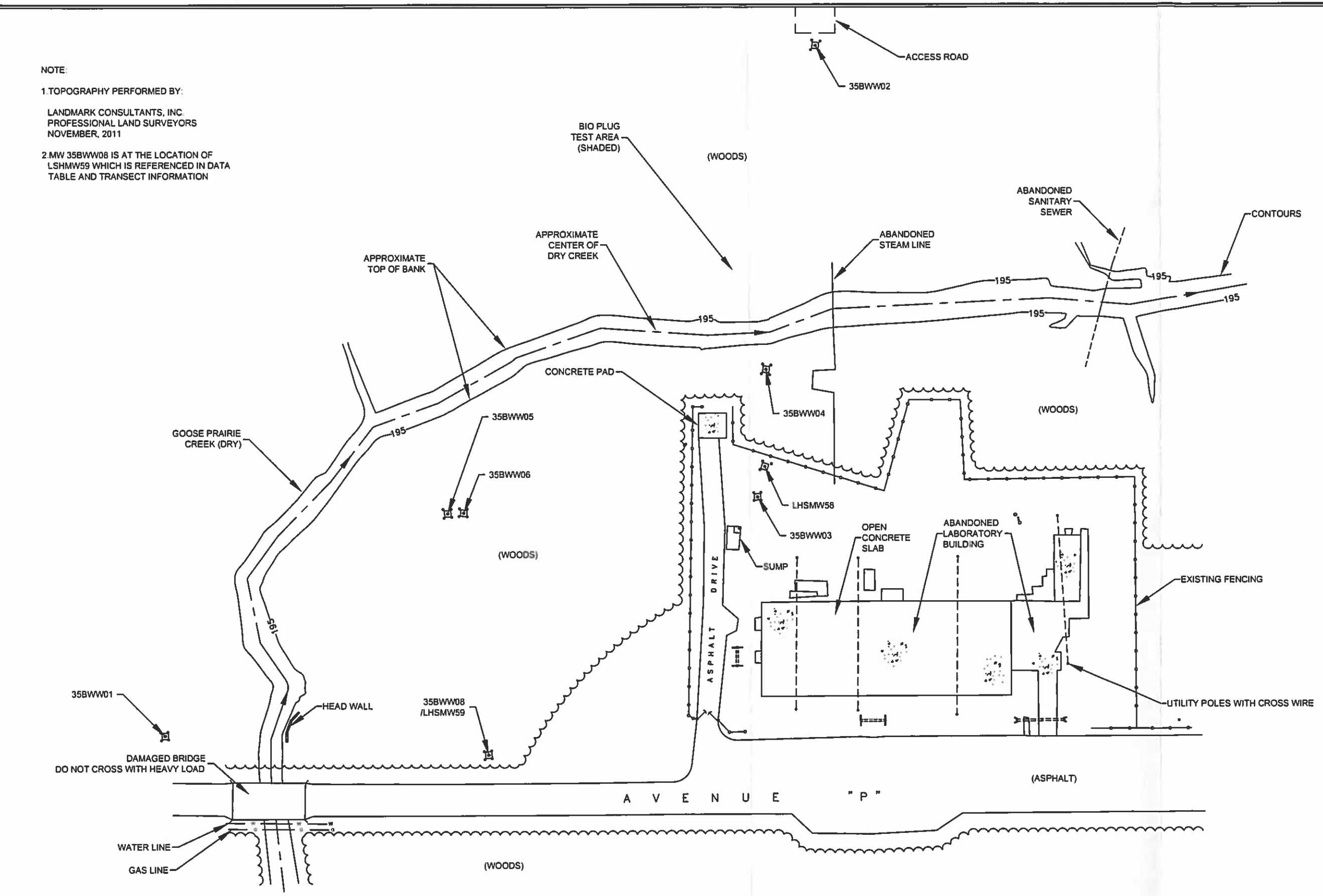


FIGURE 4
TEST SITE LOCATION

ABS
ADVANCED BIOSYSTEMS, LLC
TMD
ENGINEERING, LLC
F-13937
121 VENTURE BLVD. SUITE B
SPARTANBURG, SC 29306
PHONE: 864.595.0103
FAX: 864.595.1952

STATE OF TEXAS
ROBERT S. WHITAKER
109508
LICENSED PROFESSIONAL ENGINEER
DATE

APPROVALS
PROJECT ENG: RSW
DESIGNED BY: N/A
DRAWN BY: BAH
CHECKED BY: RSW
APPROVED: RSW

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	AGENCY REVIEW	12-14-11	RSW
2	ISSUED FOR QUOTES	12-14-11	RSW
3	ISSUED FOR CONSTRUCTION	12-14-11	RSW

PROJECT NO.: 381-02
PROJECT TITLE: LHAAP-35B(37) BIO PLUG PILOT PROJECT - FOR - UNITED STATES DEPARTMENT OF THE ARMY
HARRISON COUNTY TEXAS

SHEET TITLE: EXISTING SITE PLAN
DATE: 11-09-2011
SCALE: AS SHOWN

FIELD BOOK # : N/A
SHEET 3 OF 33
FILE NAME: 381-02-07

00369962

FIGURE 5
SITE TOPOGRAPHY WITH GRADING CONTOURS

LEGEND

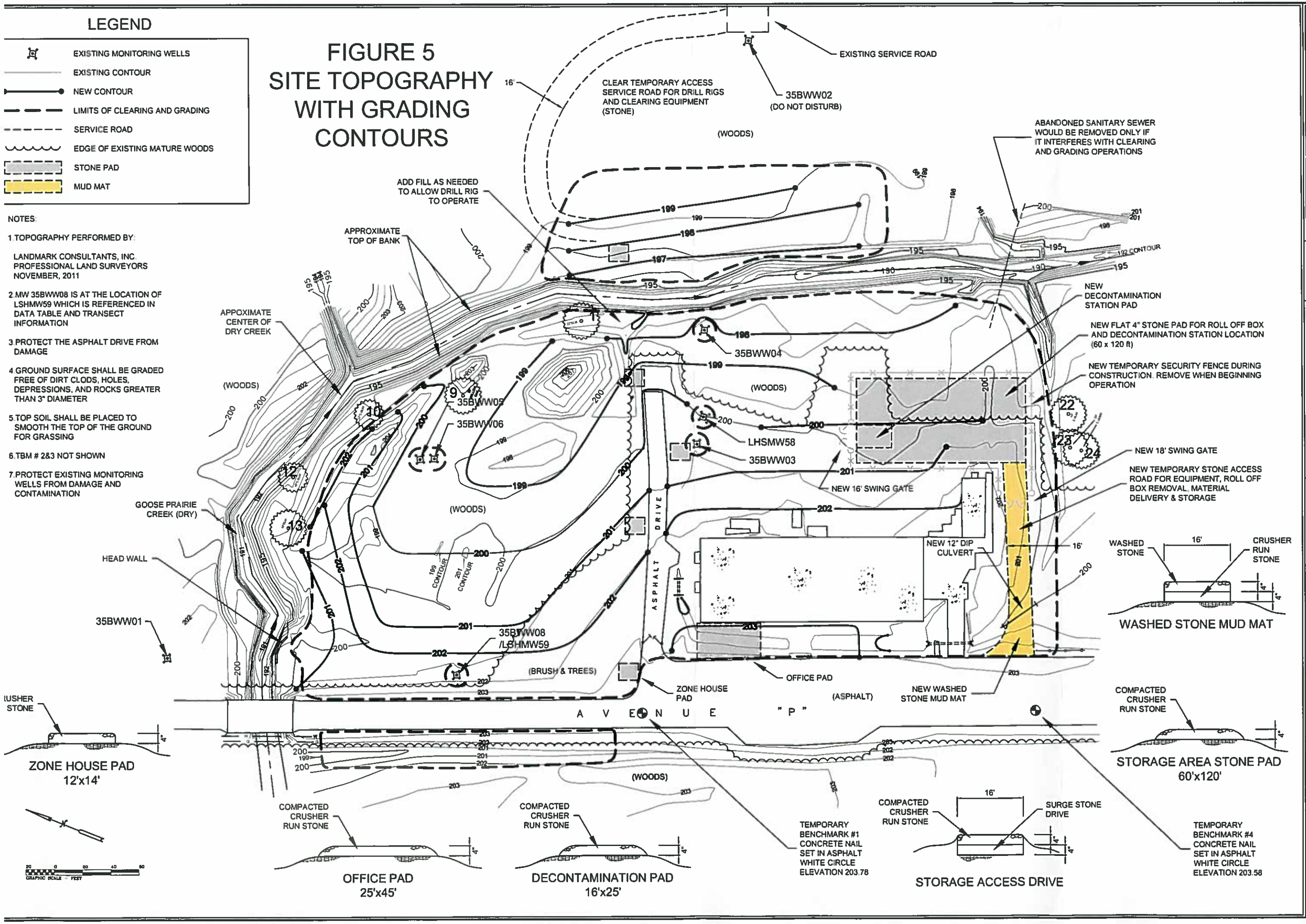
- EXISTING MONITORING WELLS
- EXISTING CONTOUR
- NEW CONTOUR
- LIMITS OF CLEARING AND GRADING
- SERVICE ROAD
- EDGE OF EXISTING MATURE WOODS
- STONE PAD
- MUD MAT

NOTES:

1. TOPOGRAPHY PERFORMED BY:

   LANDMARK CONSULTANTS, INC.
   PROFESSIONAL LAND SURVEYORS
   NOVEMBER, 2011

2. MW 35BWW08 IS AT THE LOCATION OF LSHMW59 WHICH IS REFERENCED IN DATA TABLE AND TRANSECT INFORMATION
3. PROTECT THE ASPHALT DRIVE FROM DAMAGE
4. GROUND SURFACE SHALL BE GRADED FREE OF DIRT CLODS, HOLES, DEPRESSIONS, AND ROCKS GREATER THAN 3" DIAMETER
5. TOP SOIL SHALL BE PLACED TO SMOOTH THE TOP OF THE GROUND FOR GRASSING
6. TBM # 2&3 NOT SHOWN
7. PROTECT EXISTING MONITORING WELLS FROM DAMAGE AND CONTAMINATION



ABS ADVANCED BIOSYSTEMS, LLC

TMD ENGINEERING, LLC F-13937

121 VENTURE BLVD. SUITE B
SPARTANBURG, SC 29306
PHONE: 864.595.0103
FAX: 864.595.1952

STATE OF TEXAS
ROBERT S. WHITAKER
109508
LICENSED PROFESSIONAL ENGINEER

DATE

APPROVALS
PROJECT ENG RSW
DESIGNED BY N/A
DRAWN BY BAH
CHECKED BY RSW
APPROVED RSW

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	AGENCY REVIEW	12-14-11	RSW
2	QUOTES	1-17-12	RSW
3	ISSUED FOR CONSTRUCTION	5-09-12	RSW
4	DRAWN AS CONSTRUCTED	4-26-13	BAH

PROJECT TITLE: LHAAP-35B(37) BIO PLUG PILOT PROJECT - FOR - UNITED STATES DEPARTMENT OF THE ARMY

PROJECT NO.: 381-01

HARRISON COUNTY TEXAS

SHEET TITLE: CLEARING & GRADING PLAN

SCALE: AS SHOWN

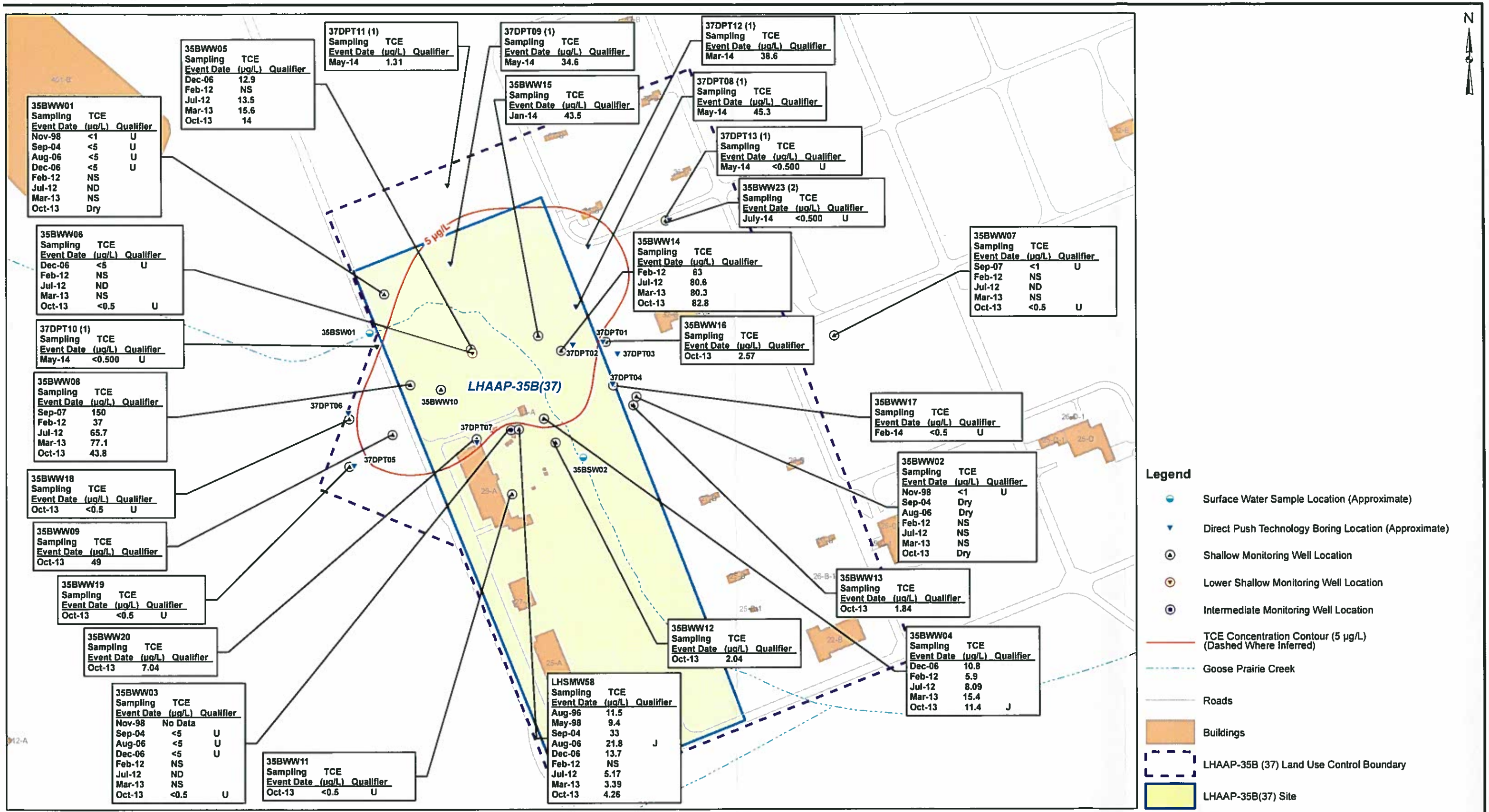
DATE: 11-28-2011

FIELD BOOK #: N/A

SHEET 6 OF 33

FILE NAME: 381-02-15

00839963



Notes:
1. Installed and sampled May 2014.
2. 35BWW23 installed May 2014 and sampled July 2014.
3. "U" results are considered "non-detect" for purposes of concentration contouring.
4. Concentrations reported in micrograms per liter (µg/L).
5. Data from lower shallow zone well 35BWW06 not used for concentration contouring purposes.
6. Data from intermediate zone DPTs 37DPT03 and 37DPT06 not used for concentration contouring purposes.

TCE - Trichloroethene
NS - Not Sampled
ND - Concentration below laboratory reporting limit
J - Estimated Concentration
U - Concentration below laboratory reporting limit

FIGURE 6

AECOM

Figure 2-2
TCE in Shallow Zone Groundwater
October 2013
LHAAP-35B (37) Remedial Action Completion Report
Longhorn Army Ammunition Plant
Karnack, Texas

60256135 August 2014

usgm1vfp001\data\group\E:\Group\IT_GIS\GIS Projects\Longhorn\MXDs\LHAAP-37\RACR\August_2014\Figure 2-2 LHAAP37 TCE in Shallow Zone Groundwater.mxd

00839964

LEGEND

- EXISTING MONITORING WELLS
- BIO PLUG LOCATIONS
- GROUNDWATER ELEVATION CONTOUR DEC 2007
- PCE CONCENTRATION CONTOUR
- INFERRED PCE CONTOUR
- TCE CONCENTRATION CONTOUR
- INFERRED TCE CONCENTRATION
- ACCESS ROAD
- STONE PAD
- MUD MAT
- RECOMMENDED MW CLUSTER LOCATION

6-4-12 SAMPLE MW
COE MW #1
COE MW #3
35BWW08/59
35BWW06
35BWW58
35BWW03

NOTE:

1. TOPOGRAPHY PERFORMED BY: LANDMARK CONSULTANTS, INC. PROFESSIONAL LAND SURVEYORS, NOVEMBER, 2011
2. LOCATIONS OF GROUNDWATER MONITORING WELLS TO BE SELECTED BY DOA PROJECT REPRESENTATIVE
3. ■■■ REPRESENTS RECOMMENDED GROUNDWATER MONITORING WELL CLUSTER LOCATION
4. ⊠ REPRESENTS APPROXIMATE LOCATION OF CORPS GROUNDWATER MONITORING WELL CLUSTERS

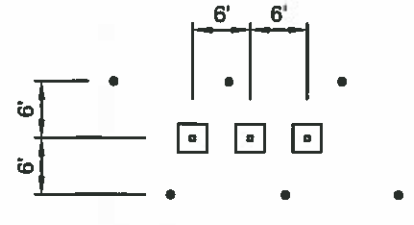
GROUNDWATER MONITORING WELL CLUSTER COORDINATES

CLUSTER	NORTH	EAST
1	3 307887E+06	6 958221E+06
2	3 308001E+06	6 958138E+06
3	3 308126E+06	6 958030E+06
4	3 308226E+06	6 958060E+06

EXISTING SERVICE ROAD
35BWW02
TEMPORARY ACCESS SERVICE ROAD FOR DRILL RIGS AND CLEARING EQUIPMENT (STONE)
(WOODS)
CLUSTER #4
NEW ZONE HOUSE #5
COE MW 35BWW14
NEW WOODS LINE
35BWW04
NEW DECONTAMINATION STATION PAD
BIO PLUG TREATMENT AREA (SHADED GREY)
NEW FLAT 4" STONE PAD FOR ROLL OFF BOX AND DECONTAMINATION STATION LOCATION (60 x 120 ft)
NEW TEMPORARY SECURITY FENCE DURING CONSTRUCTION. REMOVE WHEN BEGINNING OPERATION
GOOSE PRAIRIE CREEK (DRY)
35BWW05
NEW ZONE HOUSE #3
CLUSTER #3
35BWW06
LHSMW58
35BWW03
TOP OF CREEK BANK
NEW 18' SWING GATE
NEW TEMPORARY STONE ACCESS ROAD FOR EQUIPMENT, ROLL OFF BOX REMOVAL, MATERIAL DELIVERY & STORAGE
NEW ZONE HOUSE #2
NEW 16' SWING GATE
COE MW 35BWW11
OPEN CONCRETE SLAB
CLUSTER #1
CLUSTER #2
NEW ZONE HOUSE #4
NEW 12" DIP CULVERT
BIO PLUG (TYPICAL)
ASPHALT DRIVE
NEW WATER STORAGE TANKS
NEW WASHED STONE MUD MAT
35BWW01
HEAD WALL
35BWW08 /LHSMW59
NEW ZONE HOUSE #1
NEW OFFICE & EQUIPMENT ROOM
DAMAGED BRIDGE DO NOT CROSS WITH HEAVY LOAD
NEW OFFICE PAD
NEW ZONE HOUSE PAD
(ASPHALT)
A V E N U E " P "
WATER LINE
GAS LINE
COE MW 35BWW09
NEW WATER CONNECTION
NEW WOODS LINE
(WOODS)

GRAPHIC SCALE - FEET

FIGURE 7
EXTENT OF THE BIO PLUG FIELD



GROUNDWATER MONITORING WELL POSITIONS

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REVISIONS

NO.	DESCRIPTION	DATE	BY
1	AGENCY REVIEW	12-14-11	RSW
2	ISSUED FOR QUOTES	1-17-12	RSW
3	MW LOCATION	2-22-12	RSW
4	ISSUED FOR CONSTRUCTION	5-09-12	RSW

PROJECT NO.: 381-02

PROJECT TITLE: LHAAP-35B(37) BIO PLUG PILOT PROJECT - FOR - UNITED STATES DEPARTMENT OF THE ARMY — TEXAS — HARRISON COUNTY

SHEET TITLE: NEW SHORT TERM GROUNDWATER MONITORING WELL LOCATIONS PLAN

DATE: 12-06-2011

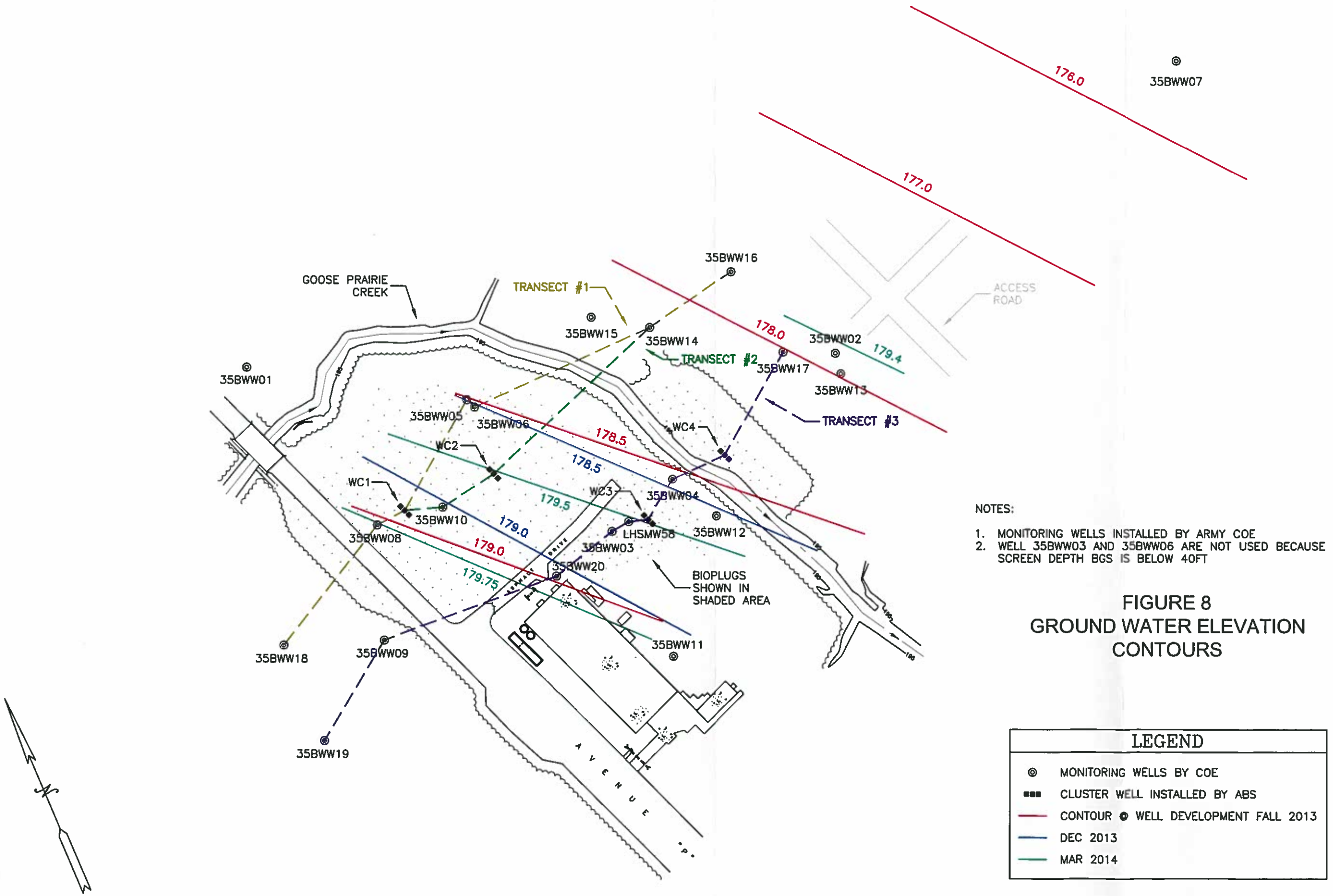
SCALE: AS SHOWN

FIELD BOOK #: N/A

SHEET 11 OF 33

FILE NAME: 381-02-19_AC

0083965



NOTES:

1. MONITORING WELLS INSTALLED BY ARMY COE
2. WELL 35BWW03 AND 35BWW06 ARE NOT USED BECAUSE SCREEN DEPTH BGS IS BELOW 40FT

FIGURE 8
GROUND WATER ELEVATION CONTOURS

LEGEND	
◎	MONITORING WELLS BY COE
■■■	CLUSTER WELL INSTALLED BY ABS
——	CONTOUR @ WELL DEVELOPMENT FALL 2013
——	DEC 2013
——	MAR 2014

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CHECKED BY	RSW
APPROVED	RSW

REVISIONS

NO.	DESCRIPTION	DATE	BY
1			

PROJECT TITLE: LHAAP-35B(37) BIO PLUG PILOT PROJECT - FOR - UNITED STATES DEPARTMENT OF THE ARMY
PROJECT NO.: 381-02
TEXAS
HARRISON COUNTY

SHEET TITLE: TRANSSECTS & GROUND WATER CONTOURS
SCALE: AS SHOWN
DATE: 3-03-2014

FIELD BOOK # N/A

SHEET 1 OF 1

FILE NAME 381-02-35

00833966

3.0 Treatment Process

3.1.0 Overview

The bio plug process flow diagrams are shown in **Figure 9.** The process included the placement of porous bio carrier inoculated with chlorinated aliphatic degraders in bio plugs, which in turn were installed into the contaminated groundwater zone. Each bio plug was fed nutrients and oxygen (air) to grow the degraders that moved from the plug into the groundwater surrounding the plugs. The microbes generated in the bio plug fed on the carbon contained in the nutrient mix within the bio plug and on the chlorinated aliphatic compounds once they moved into the surrounding ground water.

3.1.1 Bio Plugs

The bio plugs consisted of 3-inch diameter PVC well screen filled with a fine porous bio carrier that was inoculated with specific species of microbes that degrade the chlorinated aliphatic compounds under aerobic conditions. The microbes grow in the media within the bio plugs and expand into the surrounding ground water surrounding the bio plugs. **Figure 9** also shows the typical installation of a bio plug.

3.1.2 Zones

The bio plugs were divided into eight zones. Each zone was operated from a zone house that contained control boards regulating the flow rates of air and nutrient water to each bio plug. The zones are established to minimize the amount of piping required for the bio plugs and to provide better control for the even distribution of air and nutrient water to each individual bio plug. **Figure 10** shows the location of the eight zones.

3.1.3 Nutrients

Once the bio plugs are installed, potable water was taken daily from an adjacent water line west of Avenue P and stored in two 3,000 gallon closed topped tanks. The tanks are set up in series with the first tank controlling when the water is drawn from the water line. From the first tank, water flowed into the second tank. Nutrients are pumped into the second tank once per day at a fixed rate determined by the site design.

The nutrients consist of nitrogen, phosphorous, and carbon, required for microbe growth. The nutrients are pumped into the water dilution tanks using peristaltic pumps that operate on a timed pulse. The average amount of nutrients, in their pure form, that were fed to the bio plugs were:

Nitrogen as Ammonia and Urea	0.030 gpd (7.3×10^{-5} gpd/bio plug)
Phosphorous as P_2O_2	0.025 gpd (6.1×10^{-5} gpd/bio plug)
Carbon as Sodium Acetate	0.030 gpd (7.3×10^{-5} gpd/bio plug)

The nutrients were purchased in water solutions of 32% nitrogen, 38% phosphorous, and 15% carbon as sodium acetate. The amount of nutrient solution that was feed each day to the entire bio plug field was 0.09 gpd of nitrogen, 0.06 gpd of phosphorous, and 0.20 gpd of sodium acetate.

The nutrients were added to the water dilution tank and the mixture was pumped to the bio plug field at an average of 2,045 gallons per day. A centrifugal turbine pump was used to pump from the dilution tank through two sets of rotameters to the individual bio plugs. The nutrient water is first pumped to eight separate zones of bio plugs (Zones 1-8). The rate of flow to each zone was by individual zone rotameters located in the Office Building equipment room. The flow rate was dependent on the number of plugs in the zone.

Zone buildings were used to service each zone with rotameters for each individual bio plug. By using rotameters the site operator could view the flow rates to each bio plug and quickly determine if flow to the bio plugs has stopped. Stoppage of flow is an indication that the line feeding the bio plug or rotameter was clogged, and needed to be cleared. The number of plugs needing to be cleared was less than 10 plugs through the 2-year operating period.

The amount of nutrient water fed to each bio plug was designed for 5 gallons per day. The flow rate of the rotameters was set at a rate of 2 gallons per hour. By observation of the individual rotameters feeding the bio plugs, the rate of feed varied slightly but generally stayed at or near the set rate of 2.0 gallons per hour. The nutrient water was dosed one time per day for a 2.5 hour period and then repeated the next day.

3.1.5 Oxygen

Oxygen is required to maintain a sufficient growth of the microbe populations and to maintain aerobic conditions within the ground water. The oxygen was contained in ambient air fed to the bio plugs using a compressor. The amount of oxygen fed per day is based on the ability to maintain an aerobic environment in the bio plugs and transfer fully oxygenated water into the surrounding ground water.

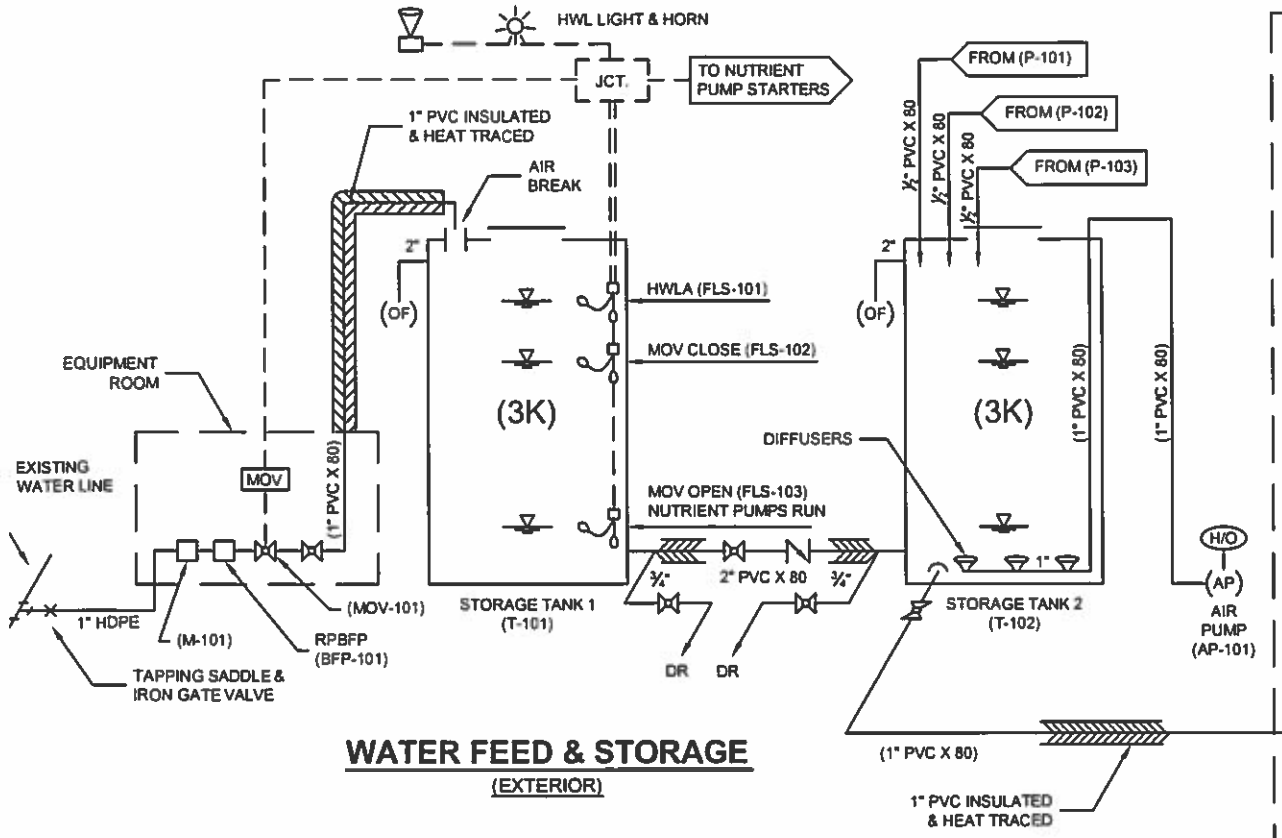
The oxygen was obtained from a scroll compressor feeding air continuously to the bio plug zones. The discharge pressure from the compressor was based on the depth of the plugs in the ground water and the head losses caused by friction within the lines and rotameters serving the bio plugs. The discharge pressure required for the site was approximately 20 psig. The air flow to the bio plugs was set to average 1.0 standard cubic feet of air per hour (scfh) per bio plug. By observation of the individual rotameters in each of the zone houses, the air rate to the bio plugs varied from 0.8 scfh to 1.0 scfh.

3.1.6 Operational Issues

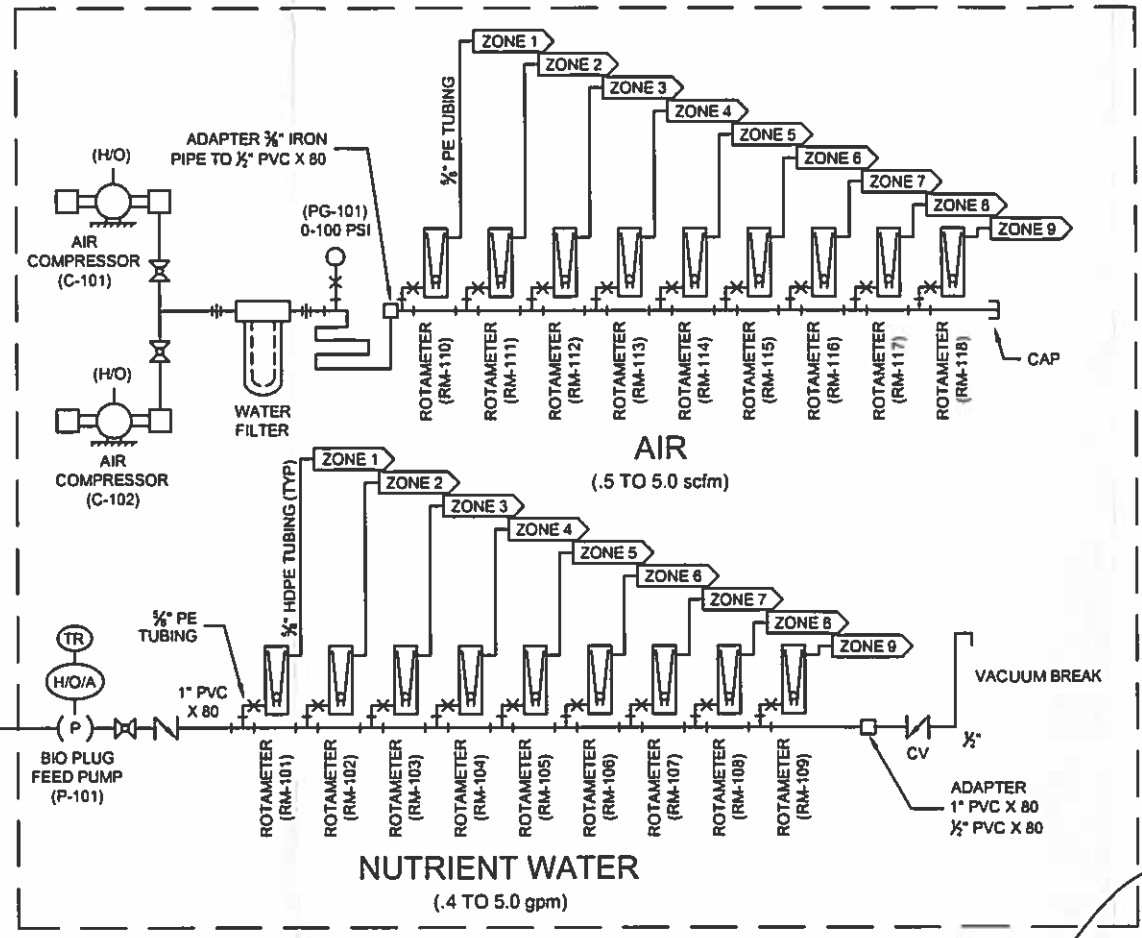
The operation of the system was automatic using timers to turn on pumps, compressors, and water delivery to the storage tanks. The bio plug operation process is not dependent on uninterrupted power to keep the bio plugs aerobic. The microbe populations are facultative and can survive in anaerobic conditions. Many times over the 2 year operating period the site lost power and the equipment had to be restarted. Other issues involved animals gnawing on the exposed portion of the air and nutrient tubes between the ground surface and the exposed top of the bio plugs. Other exposed lines feeding the bio plugs were damaged when mowing the site. These operation issues caused only a minor, if not negligible, impact on the operation of the system.

When the bio plugs were removed and the media from the plugs was recovered we found that sand and a small amount of silt had been pulled into the bio plugs and was mixed with the media. The bio plugs were installed with pea gravel packed around the well screens. The air feed to the bio plugs is continuous and creates lower density water inside the plug than outside. This tends to draw surrounding ground water into the plugs, which is then pushed back into the surrounding ground water when the nutrients are fed to the plugs. This back and forth movement of water is beneficial to the initial operation of the bio plug exposing the media to the contaminant within the plug. The movement of sand into the plugs was not anticipated and a finer pack needs to be placed around the well screens in sandy formations.

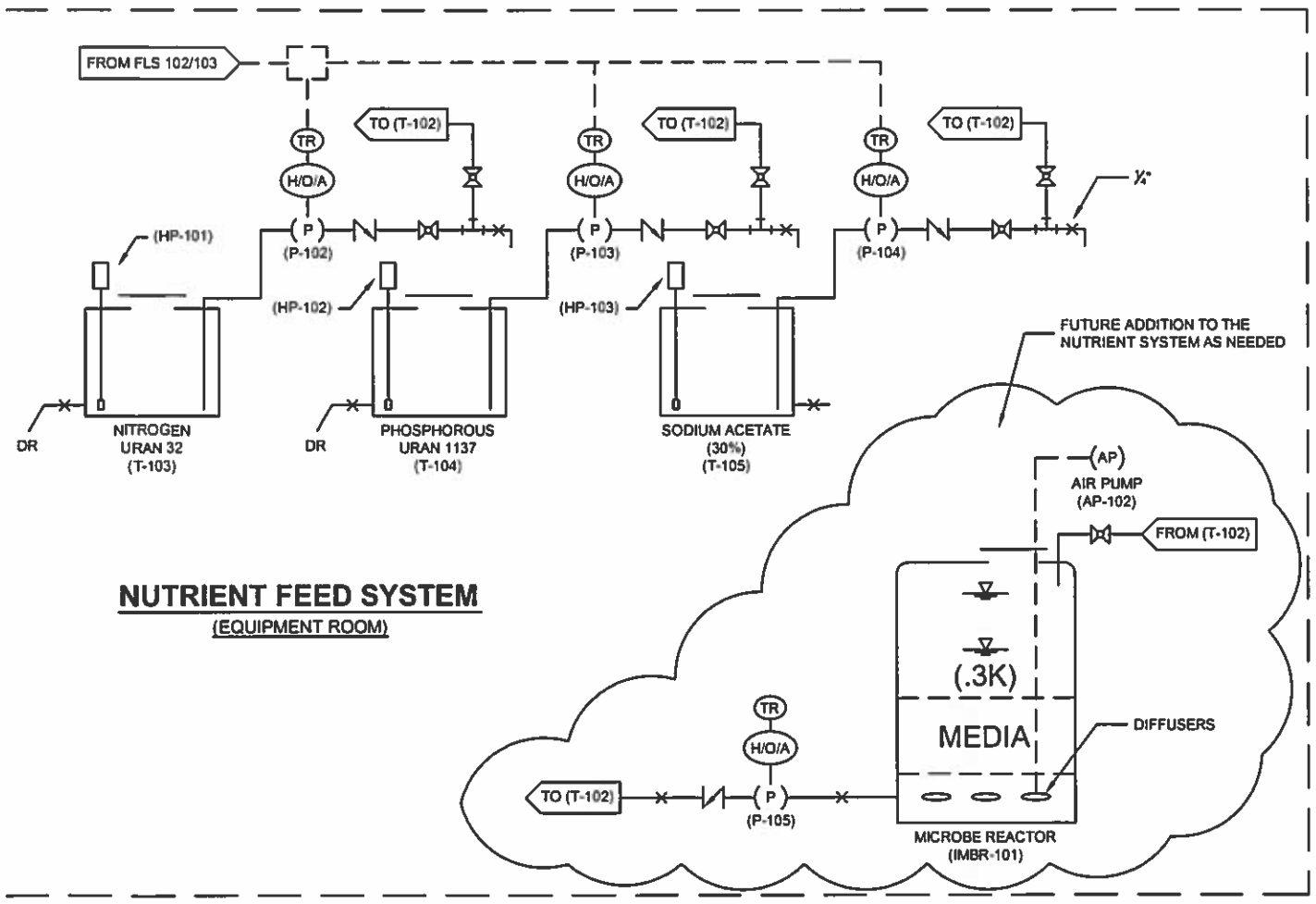
A full time on-site operator of the system was not required. An alarm system was installed to give notice to power outage or malfunction of equipment. The site was checked periodically during the operating period and items of repair were taken care of at those times.



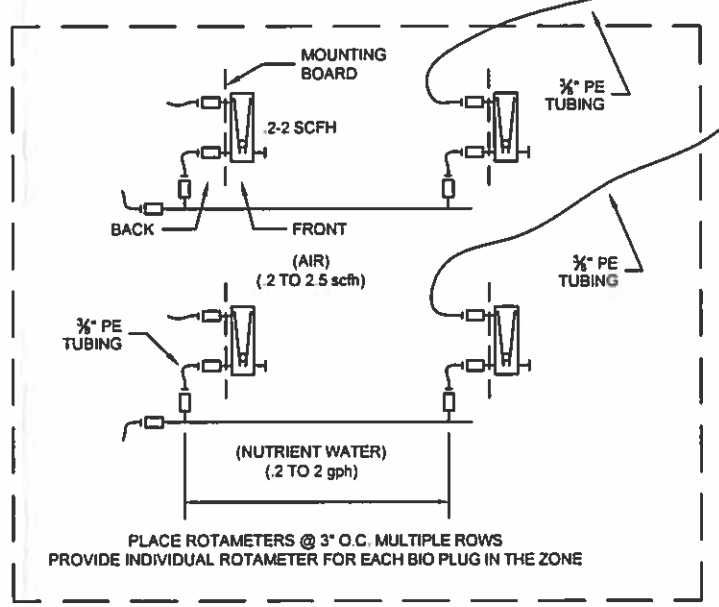
WATER FEED & STORAGE
(EXTERIOR)



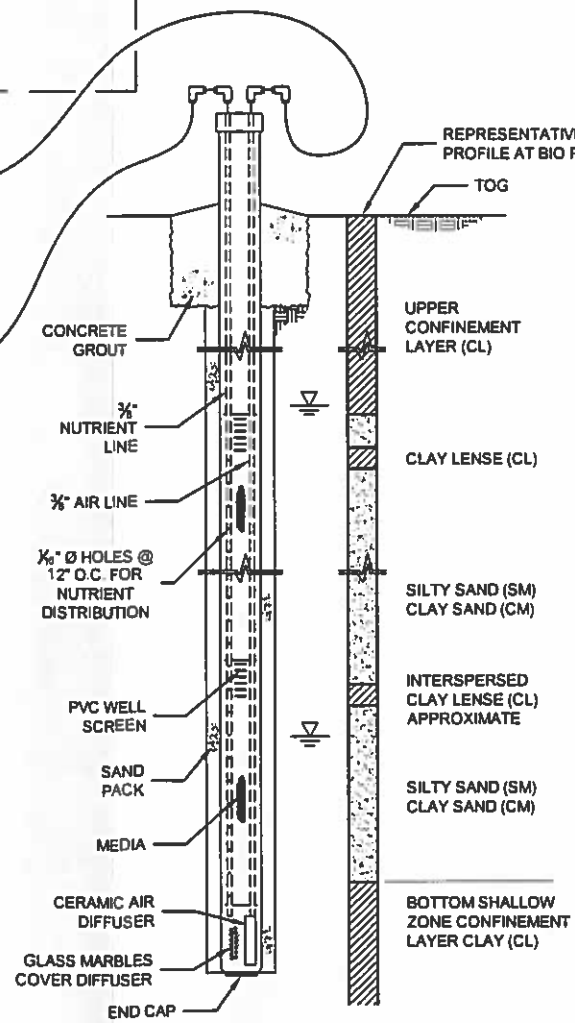
ZONE CONTROL ROTAMETERS
(EQUIPMENT ROOM)



NUTRIENT FEED SYSTEM
(EQUIPMENT ROOM)



ZONE ROTAMETERS
ZONES 1-9
(ZONE HOUSES)



BIO PLUG SECTION
(EXTERIOR)

FIGURE 9
BIO PLUG PROCESS SCHEMATICS

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APPROVED	RSW

REVISIONS

NO.	DESCRIPTION	DATE	BY
1	AGENCY REVIEW	12-14-11	RSW
2	ISSUED FOR QUOTES	1-17-12	RSW
3	ISSUED FOR CONSTRUCTION	5-09-12	RSW

PROJECT NO.: 381-02

PROJECT TITLE: LHAAP-35B(37) BIO PLUG PILOT PROJECT - FOR - UNITED STATES DEPARTMENT OF THE ARMY HARRISON COUNTY TEXAS

SHEET TITLE: BIO PLUG PROCESS FLOW SCHEMATICS

DATE: 10-25-2011

SCALE: NTS

FIELD BOOK # N/A

SHEET 13 OF 33

FILE NAME: 381-02-05

00839971

ROW STAKING PLAN

ZONE	BEGINNING BIO PLUG #	BASE LINE A STATION (ft)	BASE LINE B STATION (ft)	# OF BIO PLUGS IN ROW
1	1-1	1+86	0-24	8
1	2-1	1+20	0-12	17
1	3-1	NONE	NONE	0
1	4-1	1+32	0+12	16
2	5-1	1+26	0+24	15
2	6-1	1+20	0+36	14
2	7-1	1+12.5	0+51	20
2	8-1	1+05	0+66	15
3	9-1	1+12.5	0+81	14
3	10-1	1+05	0+96	15
3	11-1	1+02.5	1+11	16
3	12-1	1+05	1+26	16
4	13-1	1+45	1+41	18
4	14-1	1+50	1+56	25
9	15-1	1+45.5	1+71	17
9	16-1	1+50	1+86	19
5	17-1	1+47.5	2+01	14
5	18-1	1+50	2+16	13
5	19-1	1+57.5	2+31	9
5	20-1	1+50	2+46	6
5	21-1	1+57.5	2+61	5
5	22-1	1+47	2+73	5
6	23-1	0+60	1+26	3
6	24-1	0+40	1+41	5
6	25-1	0+35	1+51	5
6	26-1	0+40	1+61	5
6	27-1	0+35	1+71	5
6	28-1	0+30	1+81	6
6	29-1	0+25	1+91	6
6	30-1	0+20	2+01	7
6	31-1	0+15	2+11	6
6	32-1	0+20	2+21	7
7	33-1	0+95	2+31	9
7	34-1	0+80	2+41	8
7	35-1	0+90	2+46	9
7	36-1	0+94.5	2+61	11
7	37-1	0+90	2+73	9
7	38-1	0+55	2+81	7
8	39-1	1+14	3+09	6
8	40-1	1+08	3+21	8
8	41-1	1+02	3+33	9
8	42-1	0+96	3+45	9
			TOTAL	437

NOTE:

1. TOPOGRAPHY PERFORMED BY: LANDMARK CONSULTANTS, INC. PROFESSIONAL LAND SURVEYORS, NOVEMBER, 2011
2. ALL STAKING TO BE EAST OF BASELINE A AND NORTH OF BASELINE B
3. REFER TO SHEETS 15,16,17,18 FOR STAKING DIMENSIONS WITHIN EACH ZONE

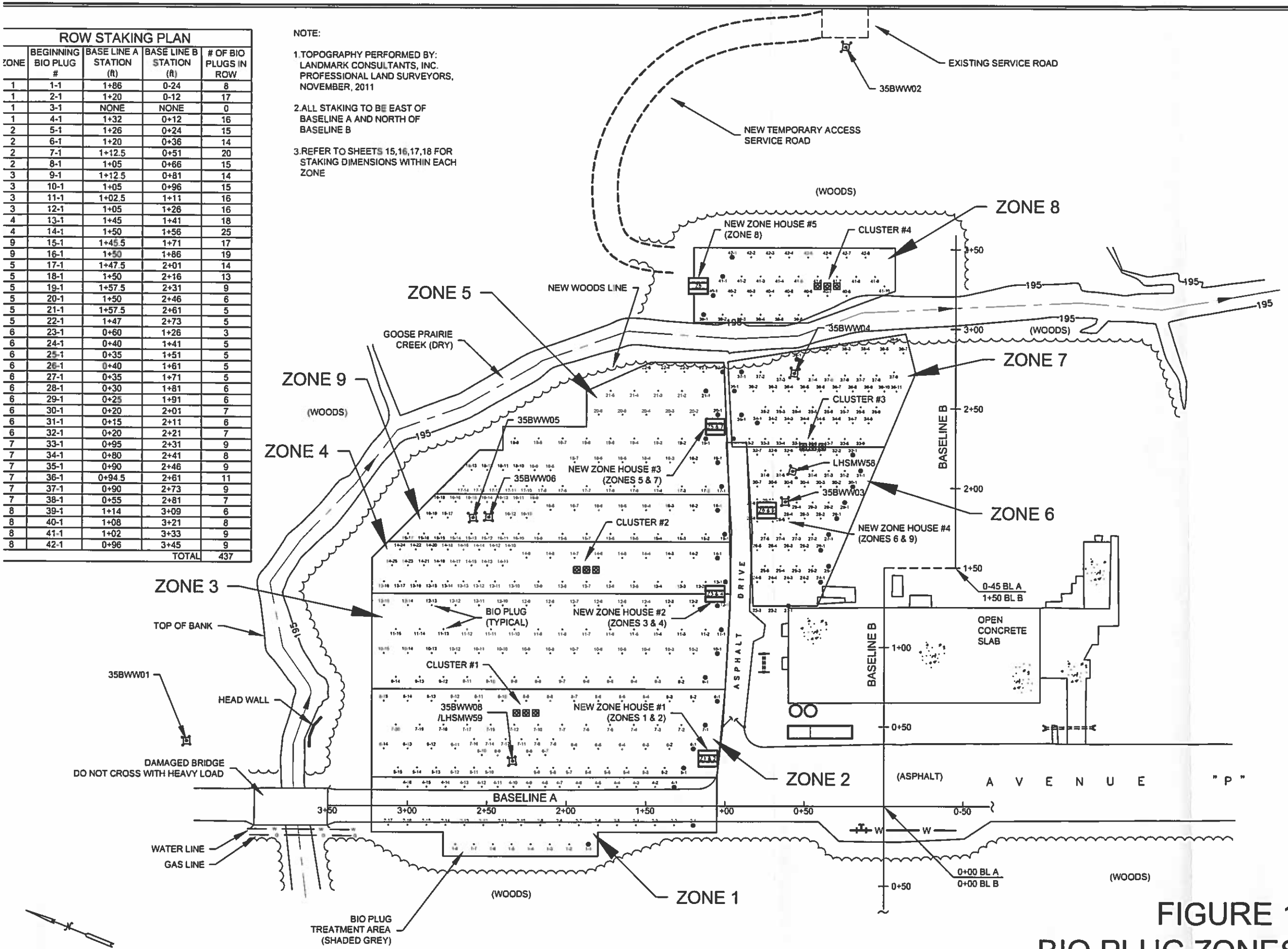

FIGURE 10
BIO PLUG ZONES LAYOUT

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REVISIONS

NO.	DESCRIPTION	DATE	BY
1	AGENCY REVIEW	12-14-11	RSW
2	ISSUED FOR QUOTES	1-17-12	RSW
3	ISSUED FOR CONSTRUCTION	5-09-12	RSW

PROJECT NO.: 381-02

PROJECT TITLE: LHAAP-35B(37) BIO PLUG PILOT PROJECT - FOR - UNITED STATES DEPARTMENT OF THE ARMY — HARRISON COUNTY, TEXAS

SHEET TITLE: BIO PLUG ROWS STAKING PLAN

DATE: 12-07-2011

SCALE: AS SHOWN

FIELD BOOK #: N/A

SHEET 15 OF 33

FILE NAME: 381-02-13

00839972

4.0 Distribution of Microbial Species

4.1.0 Distribution of Chlorinated Aliphatic Degraders

The concentrations of chlorinated aliphatic degrading bacteria and heterotrophic bacteria were measured for each quarterly sampling period from December, 2012 through October, 2014. The samples were taken from the cluster monitoring wells and the COE monitoring wells and sent to LSU for the measurement of microbial population counts by Dr. Ralph Portier. The testing results are summarized in **Table 8** and **Table 9** respectively. The overall purpose of the population counts was to determine if the concentrations and distribution of the bacteria generated from the bio plugs. The secondary purpose of the sampling was to determine the effect that the populations had on the reduction of TCE and PCE in the ground water.

4.1.1 Distribution

The distribution of bacteria depended on the magnitude of the production of bacteria within the bio plugs, the movement of the bacteria from the bio plugs into the surrounding ground water and the movement of the ground water. Samples of water taken from the bio plugs by ABS and measured by Dr. Ralph Portier indicated that the concentrations of bacteria in the bio plugs was high with results listed as "to numerous to count" (TNC). With the introduction of nutrient water into the bio plugs each day the movement of bacteria from the bio plugs into the surrounding ground water was consistent with the design of the bio plug process. The last and most important part of the distribution was the vertical and horizontal movement of the ground water carrying the bacteria away from the vicinity of the bio plugs and across the test site.

Based on sampling and measurement we found that the distribution of the bacteria was not uniform. The horizontal movement of the ground water calculated form the hydraulic gradient and effective porosity varied from 14.9 feet per year in the upper portions of the site, decreasing to 4.9 feet per year in the lower portions along Goose

Prairie Creek. Based on measurements, the vertical distribution was not uniform and is believed to be caused by thin lenses of silt and clay that restricted the distribution in several areas of the test site. The most notable area was in the vicinity of COE monitoring well 35BWW05 in the north portion of the site near Goose Prairie Creek.

4.1.2 Measurement of Chlorinated Aliphatic Degraders

The measurement of aliphatic degraders (reference **Table 8**) was recorded beginning in December 2012, which was 1.5 months after start-up of the bio plug treatment system. The concentrations were not consistent within the cluster wells or within the COE wells. The sampling event in December 2013 was the first indication of a general increase in the degraders in the monitoring wells to include the cluster wells and the COE wells. A trend of increasing concentrations was measured through the July 2014 sampling event when the highest concentrations were measured. The October 2014 sampling event indicated a decrease in the populations within the cluster wells and the COE wells, both within the test site and beyond the limits of the test site. The only exception to the decrease was the deepest well 4-1 along Goose Prairie Creek.

Table 8
Chlorinated Aliphatic Degrader Populations
(cfu/ml)

Well ID	Monitoring Periods							
	Dec-12	Mar-13	Jun-13	Sep-13	Dec-13	Mar-14	July-14	Oct-14
35BWW01	ns	ns	ns	ns	ns	ns	ns	ns
35BWW02	ns	ns	ns	ns	ns	ns	ns	ns
35BWW03	0	ns	11.33	ns	0	3	533	0
35BWW04	ns	7	5	274	78	350	125	112
35BWW05	5	9	32	20	49	117	155	3
35BWW06	0	3	ns	ns	1	6	65	2
35BWW07	ns	ns	ns		ns	ns	ns	ns
35BWW08	14	1	24	2	477	253	4,500	320
35BWW09	ns	1	50	3	1292	129	6,333	5,500
35BWW10	ns	ns	ns	ns	8	147	27	0
35BWW11	ns	ns	ns	39	ns	ns	ns	ns
35BWW12	ns	ns	ns	ns		ns	ns	ns
35BWW14	0	31	17	1	445	ns	ns	253
35BWW17	ns	ns	ns	ns	8	ns	ns	600
35BWW20	ns	ns	ns	ns	1,568	ns	ns	ns
LHS-MW-58	0	28	0	3	77	274	187	9
MW 1-1	233/33	2	1	35	223	532	1	0
MW 1-2	100	342	8	12	27	1	1	0
MW 1-3	ns	ns	ns	ns	ns	507	2	ns
MW 2-1	0	8	1	4	10	92	20	4
MW 2-2	3,333	5	7	67	195	407	173	21
MW 2-3	36	178	15	6	270	9	7	1
MW 3-1	4/0	77	1/.3	1/4	3	0	1	0
MW 3-2	0	28	0	27	242	7	42	0
MW 3-3	0	5	4	52	-	19	1,333	2
MW 4-1	22	3	0	3	232	132	302	0
MW 4-2	3,333	0/1	13	5	25	88	36	350
MW 4-3	0	15	34	194	ns	284	39	1,500

4.1.3 Chlorinated Aliphatic Degraders Site Average

The site was evaluated as a whole to determine the overall trend of distribution. The concentrations measured in the cluster monitoring wells and the COE wells within the test site were totaled for each sampling period in the following **Table 9**

Table 9

Total Number of Aliphatic Degraders Measured Within the Test Site

	December 2012 (cfu/ml)	March, 2013 (cfu/ml)	June, 2013 (cfu/ml)	September 2013 (cfu/ml)	December, 2013 (cfu/ml)	March 2014 (cfu/ml)	July 2014 (cfu/ml)	October 2014 (cfu/ml)
Number	7,067*	727	160	1,630	2,191	3,564	3,499	2,325
Number of Wells Sampled	16	15	16	15	19	19	19	19
Number of wells without any degraders	7	0	2	1	1	1	0	5

* not valid population count

As evident in **Table 9,** the total number of degraders for December 2012 is not consistent with the subsequent measurements and should not be compared with the other sampling events. Each of the two monitoring wells sampled in December 2012 contained population counts of 3,300 cfu/ml, which inflated the total amount of degraders for the site. The March 2013 samples were more in line with expectations when starting up a bio plug system. From March, the populations increased over time culminating in the highest counts and best distribution in July 2014. It is noted here that it took almost a year, from March 2013 to March 2014 for the degrader populations to become significantly higher in the monitoring wells. For this site the expectations for distribution of the degraders was for a shorter time than the actual time for the

populations to become significant in the monitoring wells. We attribute this to the sand layers and the predominance of vertical movement of inoculated water over horizontal movement.

By October 2014 the concentrations of TCE in the upper portion of the test site had been reduced to less than 3 ug/l in many of the cluster wells and the concentration of degraders had declined from the July 2014 sampling.

An example of the existence of isolated lean clay layers within the test site is illustrated with the sampling results of COE wells 35BWW05 and 35BWW06. These two wells are within 10 feet of each other in the vicinity of Goose Prairie Creek. Well -05 is screened in the upper zone and the top of Well -06 considered to be in the lower zone is screened 5 feet lower. The populations of Well -05 are consistently higher than Well -06.

Well 35BWW03 is screened approximately 65 feet below the ground surface making it the deepest well sampled. At the beginning of the test period in December 2013 the well did not have any significant population of chlorinated aliphatic degraders until July 2014 when the population count was 533 cfu/ml. Since there is not a continuous lower confining layer, it is believed that this well is an indication of the unpredictable nature of the vertical flow of nutrient water from the bio plugs populating the lower strata of the site.

4.2.0 Heterotrophic Bacteria Distribution

The distribution of heterotrophic bacteria was more robust than the distribution of the chlorinated aliphatic degraders. From **Table 10** the heterotrophic populations increased at a steady rate from December 2013 to July 2014. The populations increased almost ten-fold from July 2014 to October 2014. The increase in heterotrophs is more consistent than the chlorinated aliphatic degraders and indicates that the carbon nutrient from the bio plugs was having a significant influence on the increase in heterotrophs.

Table 10
Heterotrophic Bacteria Populations
(cfu/ml)

Well ID	Monitoring Periods							
	Dec-12	Mar-13	Jun-13	Sep-13	Dec-13	Mar-14	July-14	Oct-14
35BWW01	ns	ns	ns	ns	ns	ns	ns	ns
35BWW02	ns	ns	ns	ns	ns	ns	ns	ns
35BWW03	0	ns	1	ns	338	530	687	10,1670
35BWW04	ns	16	12	403	125	17,333	1,687	40,000
35BWW05	15	16	210	108	1025	19,333	1,533	23,167
35BWW06	0	0	ns	ns	ns	ns	ns	ns
35BWW07	ns	ns	ns	115	ns	ns	ns	ns
35BWW08	63	78	34	14	927	8,667	4,500	967/5,000
35BWW09	ns	75	167	254	31,500	9,500	14,133	1.65E+10
35BWW10	ns	ns	ns	ns	610	590	240	30,500
35BWW11	ns	ns	ns	59	ns	ns	ns	ns
35BWW12	ns	ns	ns	ns	80	ns	ns	ns
35BWW14	81	80	44	90	2,865	ns	ns	353,333
35BWW17	ns	ns	ns	ns	12	13000	128	13,333
35BWW20	ns	ns	ns	ns	23,333	ns	ns	1.33E+10
LHS-MW-58	7	3	2	4	273	675	39,433	26,667
MW 1-1	19	25	22	76	663	16,833	267	3,500
MW 1-2	9	9	1	230	733	83	2	1,233
MW 1-3	ns	ns	ns	ns	ns	13,833	193	ns
MW 2-1	7	5	2	298	405	26,000	457	126
MW 2-2	3,333	5	7	67	195	407	173	21,667
MW 2-3	1	1	82	79	562	37,167	210	16,667
MW 3-1	2	3	4	2	75	4	347	17,500
MW 3-2	0	28	0	27	242	7	42	0
MW 3-3	1	5	5	200	1,500	16,833	10,633	6,833
MW 4-1	4	4	2	68,000/49,133	673	ns	ns	2.07E+10
MW 4-2	4	4	21	57	1110	170	23,333	303,33
MW 4-3	14	12	41	449	ns	398	ns	ns

4.2.1 Heterotrophic Populations Site Average

The site was evaluated as a whole to determine the overall trend of distribution. The concentrations measured in the cluster monitoring wells and the COE wells within the test site were totaled for each sampling period in **Table 11.**

Table 11

Total Number of Heterotrophic Bacteria Measured Within the Test Site

	December 2013 (cfu/ml)	March, 2013 (cfu/ml)	June, 2013 (cfu/ml)	September 2013 (cfu/ml)	December, 2013 (cfu/ml)	March 2014 (cfu/ml)	July 2014 (cfu/ml)	October 2014 (cfu/ml)
Number	148	183	490	60,819	94,941	193,715	160,870	1,084,967*
Number of Wells Sampled	15	16	16	14	17	19	19	19
Number of wells without any Heterotrophs	3	2	0	0	0	1	0	0

Note. * The total does not include a duplicate for monitoring well 4-1 in which the population count was measured at 2.03 E+8 cfu/ml

5.0 Reduction of TCE and PCE in the Groundwater

5.1.0 Area of Contamination

The area of contamination includes the boundary of the test site and adjacent up gradient and down gradient areas. Previous studies provided to the DOA projected the extent of the contamination plume generally within the test area but did not provide enough information to define the boundaries or all the sources of the contamination. From the testing data using onsite wells and from COE monitoring wells installed in December, 2013, a primary source of TCE was identified west of Avenue P up gradient from the test site. There is no visible structure in this area that could be identified as a sump or other obvious means of transferring the chlorinated solvents into the upper layer. The extent of the TCE contamination is shown on **Figure 6** as the projected 5 ug/l contour line. The contour line encompasses significant areas to the north, east, and west of the test site.

The PCE contamination was limited, or not detectable, in the upper portions of the test site along Avenue P. The lower portion of the test site in the vicinity of the sump contained the highest concentrations of PCE.

5.2.0 TCE Reduction

The testing data from the monitoring wells within and around the site furnished by the DOA during the testing period is listed in **Table 12** for each of the sampling events from July, 2012 to October, 2014. From this table, the averaged data from the cluster wells and COE well LHS-MW 58 shows that the concentrations of TCE was reduced below the regulatory limit of 5 ug/l. For the other on site COE wells the concentrations were reduced during the testing but were above the regulatory limit at the end of the testing period.

Table 12

TCE Testing Results Summary (ug/l)

Well ID	Jul 2012	Dec 2012	Mar 2013	Jun 2013	Sep 2013	Dec 2013	Mar 2014	Jul 2014	Oct 2014
35BWW01	nd	ns	ns	ns	ns	ns	ns	ns	ns
35BWW02	ns	ns	ns	ns	ns	ns	ns	ns	ns
35BWW03	nd	nd	nd	nd	Ns	nd	nd	nd	nd
35BWW04	8.09	ns	15.4	11.4	13.4	9.39	4.53	3.81	5.26
35BWW05	13.5	14.6	15.6	18.8	17.3	13.0	15.1	15.7	15.9
35BWW06	nd	nd	nd	ns	ns	nd	nd	nd	nd
35BWW07	nd	Ns	ns	ns	nd	ns	ns	ns	ns
35BWW08	65.7	62.5	77.1	67.5	49.6	39.7	31.0	27.4	18.4
35BWW09	55.6	ns	45.2	43.9	53.6	54.3	73.3	200.0	181.0
35BWW10	ns	ns	ns	ns	ns	54.4	37.2	39.8	42.1
35BWW11	nd	ns	ns	ns	nd	ns	ns	ns	ns
35BWW12	ns	ns	ns	ns	ns	2.4	ns	ns	ns
35BWW13	ns	ns	ns	ns	ns	ns	ns	ns	ns
35BWW14	80.6	80.5	80.3	90.9	89.7	72.6	ns	ns	78.3
35BWW15	ns	ns	ns	ns	ns	ns	ns	ns	ns
35BWW16	ns	ns	ns	ns	ns	ns	ns	ns	ns
35BWW17	ns	ns	ns	ns	ns	4.53	0.349	nd	nd
35BWW18	ns	ns	ns	ns	ns	ns	ns	ns	ns
35BWW19	ns	ns	ns	ns	ns	ns	ns	ns	ns
35BWW20	ns	ns	ns	ns	ns	7.33	ns	ns	12.1
LHS-MW 58	5.17	6.76	3.39	5.02	4.00	1.57	0.317	1.31	2.93
MW 1-1	16.8	17.6	24.8	22.1	4.83	5.09	2.82	0.937	1.05
MW 1-2	8.66	8.577	8.96	9.13	0.817	nd	nd	0.801	1.39
MW 1-3	2.80	ns	ns	ns	ns	ns	0.426	2.02	ns
MW 2-1	4.59	7.25	4.78	3.35	2.15	1.82	1.37	2.81	3.19
MW 2-2	0.27	0.272	0.312	0.320	nd	nd	nd	nd	nd
MW 2-3	1.44	1.24	0.915	0.840	0.289	nd	0.259	0.460	0.431
MW 3-1	2.42	2.43	2.57	2.02	2.05	1.84	1.86	1.72	1.72
MW 3-2	3.07	1.9	2.14	2.71	3.02	3.42	2.49	4.38	4.79
MW 3-3	5.99	5.79	5.49	7.64	5.5	5.28	2.68	1.59	1.46
MW 4-1	3.63	4.16	4.27	5.32	5.48	4.38	5.13	5.20	5.34
MW 4-2	4.21	4.19	3.77	4.53	6.14	7.21	6.28	4.22	3.09
MW 4-3	13.5	13.5	12.4	4.97	5.53	ns	3.38	1.50	1.33

Monitoring well 35BWW05 and 35BWW06 are in the same vicinity of the site with screens at different levels. The -05 well is shallow and the -06 well is 5 feet deeper. 35BWW05 data did not indicate a decreasing trend and did not measure significant populations of chlorinated aliphatic degraders (please refer to **Table 8**). The wells are

located in the vicinity of Goose Prairie Creek and the direction of groundwater flow in this area is not consistent with the uniform east north east directions noted on **Figure 8.**

The TCE concentrations were the highest in the upper portion of the test site along Avenue P and east of Goose Prairie Creek. The well 35BWW09 appeared to be near the up gradient source of the TCE contamination. TCE concentrations in this well was 55.6 ug/l at the beginning of the testing and spiking to 200 ug/l in July 2014. The TCE concentrations down gradient from the sump within the test area were not as high as the up gradient source ranging from 0.27ug/l in the center of the plug field to 13.5 ug/l near the sump. The down gradient monitoring well that continued to have high concentrations of TCE is 35BWW14 located off site east of Goose Prairie Creek. The concentrations of TCE ranged from 72.6 ug/l to 89.7 ug/l. This monitoring well is too far away from the bio plugs to have had any positive impact from the distribution of the chlorinated aliphatic degraders.

The cluster monitoring wells within the test site all showed a downward trend in the concentration of TCE except for the deepest well in Cluster 4 in which the concentration ranged from 3.63 ug/l at the beginning of the testing to 5.34 ug/l at the end of the testing. This monitoring well had the lowest hydraulic conductivity and lowest distribution of chlorinated aliphatic degraders in the cluster. The concentration of TCE in all the other cluster wells was below 5ug/l at the end of the testing period.

The concentrations of TCE in the COE monitoring wells within the test site did not correlate with the cluster wells. While the wells indicated a downward trend, the concentrations were higher than the concentrations in the cluster wells. Well 35BWW08 is down gradient from the off-site source of TCE and up gradient of well Cluster 1. The concentration of TCE steadily declined from 71.1 ug/l in March, 2013 to 18.4 ug/l in October, 2014 as the bio plugs were reducing the TCE entering the site from the west across Avenue P. At the same time, the TCE concentration in the Cluster 1 wells was declining from an average of 10.2 ug/l to 1.2 ug/l. Monitoring well 35BWW010, placed between well Clusters 1 and 2 in the fall of 2013 indicated a marginal downward trend

from a concentration of 54.4 ug/l in December, 2013 to 42.1 ug/l in October, 2014. At this time there is no reasonable explanation why the COE wells contained TCE concentrations higher than the cluster wells in the same vicinity.

COE well LHS-MW-58 in the vicinity of well Cluster 3 was the best example of the correlation of the COE wells and the cluster wells. The concentration of TCE was reduced from 5.17 ug/l at the beginning of the test period to 2.93 ug/l at the end. The adjacent Well Cluster 3 averaged concentration of TCE was 3.82 ug/l at the beginning of the test period and 2.65 ug/l at the end.

5.3.0 PCE Reduction

PCE was primarily limited to the lower portions of the test site down gradient of the sump. The concentrations were not detectable in the up gradient COE wells and in well Cluster 1. A small amount was found in the lower portion of Well Cluster 2 at concentrations less than 5 ug/l. The highest concentrations were found in the vicinity of Well Cluster 3 in COE well 35BWW20 installed in the fall of 2013, LHS-MW-58 and, down gradient through Well Cluster 4. Well 35BWW20 is located up gradient of the sump in an area adjacent to the bio plug field. The hydraulic gradient of this area is confused and it is reasonable to believe that the contamination likely came from the sump. The testing results for PCE are listed in **Table 13.**

High concentrations PCE were found in 35BWW14 across Goose Prairie Creek, which is within the path of the ground water flow from the sump. The location of well -14 was too far from the bio plug field east of Goose Prairie Creek to be influenced by the outflow from the field within the test period.

Table 13

PCE Testing Results Summary (ug/l)

Well ID	Jul 2012	Dec 2012	Mar 2013	Jun 2013	Sep 2013	Dec 2013	Mar 2014	Jul 2014	Oct 2014
35BWW01	nd	ns	ns	ns	ns	ns	ns	ns	ns
35BWW02	ns	ns	ns	ns	ns	ns	ns	ns	ns
35BWW03	nd	nd	nd	nd	Ns	nd	nd	nd	nd
35BWW04	48.90	ns	45.4	50.6	68.8	57.8	33.1	28.6	45.0
35BWW05	1.09	1.41	1.00	1.23	1.56	1.77	1.95	2.09	2.14
35BWW06	nd	nd	nd	ns	ns	nd	nd	nd	nd
35BWW07	nd	ns	ns	ns	nd	ns	ns	ns	ns
35BWW08	nd	nd	nd	nd	nd	nd	nd	nd	nd
35BWW09	nd	nd	nd	nd	nd	nd	nd	nd	nd
35BWW10	ns	ns	ns	ns	ns	3.61	1.49	0.963	0.732
35BWW11	nd	ns	ns	ns	nd	ns	ns	ns	ns
35BWW12	ns	ns	ns	ns	ns	16.3	ns	ns	ns
35BWW13	ns	ns	ns	ns	ns	ns	ns	ns	ns
35BWW14	21.0	28.0	21.8	24.0	26.8	23.9	ns	ns	26.8
35BWW15	ns	ns	ns	ns	ns	ns	ns	ns	ns
35BWW16	ns	ns	ns	ns	ns	ns	ns	ns	ns
35BWW17	ns	ns	ns	ns	ns	15.3	1.24	nd	nd
35BWW18	ns	ns	ns	ns	ns	ns	ns	ns	ns
35BWW19	ns	ns	ns	ns	ns	ns	ns	ns	ns
35BWW20	ns	ns	ns	ns	ns	20.6	ns	ns	39.2
LHS-MW 58	36.3	40.6	14.8	25.8	29.0	10.3	4.06	8.46	18.6
MW 1-1	nd	nd	nd	nd	nd	nd	nd	nd	nd
MW 1-2	nd	nd	nd	nd	nd	nd	nd	nd	nd
MW 1-3	nd	ns	ns	ns	ns	ns	nd	nd	ns
MW 2-1	2.65	5.95	3.17	2.84	1.67	1.49	1.17	1.87	2.52
MW 2-2	nd	nd	nd	nd	nd	nd	nd	nd	nd
MW 2-3	nd	nd	nd	nd	nd	nd	nd	nd	nd
MW 3-1	30.1	26.2	22.1	18.7	18.7	15.2	11.2	13.9	14.0
MW 3-2	41.8	32.5	27.1	37.9	40.1	40.1	30.0	64.1	71.8
MW 3-3	60.5	49.0	38.0	40.5	36.2	33.9	14.6	12.1	11.0
MW 4-1	20.1	15.7	16.6	24.2	24.9	19.3	24.5	31.8	25.0
MW 4-2	9.6	9.18	7.06	8.25	8.76	10.8	8.48	6.38	3.74
MW 4-3	18.8	20.1	16.9	5.87	6.18	ns	4.05	2.08	1.57

Elevated concentrations of PCE were found in wells 35BWW04 located adjacent to Goose Prairie Creek within the bio plug field and 35BWW 12 located on the outer edge of the field. Reductions in PCE were noted in well -04 but did not show a consistent downward trend. During the time that well-04 was showing an increase in the

population of chlorinated aliphatic degrading bacteria, the concentration of PCE was reduced from 57.8 ug/l in December, 2013 to 28.6 ug/l in July, 2014, but increased to 45.0 ug/l in October, 2014 even though there was a measured population of bacteria in the well. Well -12, located on the outer edge of the bio plug field, was tested one time in December 2013, having a concentration of 16.3 ug/l and a population of chlorinated aliphatic degraders of 22 cfu/ml. Based on the location of well-12, the projected path of outflow from the bio plugs would eventually intercept the well.

Within the test field, down gradient from the sump, the concentration of PCE was reduced below 5 ug/l in Cluster Wells 4-2 and 4-3. The deepest well in the cluster, Well 4-1 did not have a reduction in concentration. Within the vicinity of the sump, Well 3-3 showed a downward trend in PCE concentration going from 49.0 ug/l in December 2012 to 11.9 ug/l in October 2014. Well 3-1 went from a concentration 30.1 ug/l in December 2012 to 14.0 ug/l in October, 2014. The middle well, 3-2 did not show any reduction in PCE during the test period. Referencing **Table 1**, the hydraulic conductivity of well 3-2 was extremely high (18.6 ft/day) indicating an anomaly in the movement of ground water around this well. Overall, the pattern of the distribution of chlorinated aliphatic degraders in this cluster was inconsistent throughout the testing period and was reflected in the overall lack of reduction in the concentration of PCE.

The concentrations of PCE in wells 4-2 and 4-3 were reduced to less than 5 ug/l in October 2014. These are the two shallowest wells in the cluster. The deepest well, 4-1 did not indicate any reduction, increasing from 15.7 ug/l in December 2012 to 25.0 ug/l in October 2014. There were populations of chlorinated aliphatic degraders and significant populations of heterotrophs in well 4-1 beginning in December 2013 indicating a distribution of bacteria under low oxygen conditions without a reduction in the PCE concentration.

5.4.0 Dissolved Oxygen Concentrations

A correlation appears to exist between the concentration of dissolved oxygen and the reduction of PCE. **Table 14** lists the dissolved oxygen concentrations. In the monitoring wells with higher Dissolved Oxygen (DO) concentrations, the trend is a reduction in PCE. The concentration of PCE in well 4-2 did not show a downward trend until the DO concentration began to rise in July and October 2104. The same trend can be found in wells 3-1, 3-2, and 3-3 for the period July 2102 through March 2013 in which the DO concentrations were higher and there was a downward trend in the reduction of PCE. This trend became less obvious as the DO concentrations decreased in the subsequence sampling through October 2014.

The concentration of PCE in LHS-MW-58 in the vicinity of well Cluster No 3 showed a trend of PCE reduction with higher DO concentrations until the last samplings in July and October 2014 in which the concentration of PCE increased. The overall reduction in PCE from December 2012 through October 2014 was 55% (from 40.6 ug/l to 18.6 ug/l). In March 2014, the concentration of PCE in this well had been reduced to 4.06 ug/l until it began to rise in July and October.

The same trend was evident in 35BWW04 in which the DO concentration was higher with a population of chlorinated aliphatic degraders during the period September 2013 to July, 2014 in which the concentration of PCE was reduced from 68.8 ug/l to 28.6 ug/l. In October 2014 the concentration of PCE increased to 45.0 ug/l and the DO concentration dropped from 6.17mg/l to 3.18 mg/l. A similar pattern was indicated from December 2013 to July 2014 in which the PCE concentration was reduced from 57.8 ug/l to 28.6 mg/l with an increase in DO concentration from 1.08 mg/l in December 2013 to 8.93 mg/l in March 2014, to 6.17 mg/l in July 2014.

Table 14

Dissolved Oxygen Concentrations (mg/l)

Well ID	Dec 2012	Mar 2013	Jun 2013	Sep 2013	Dec 2013	Mar 2014	Jul 2014	Oct 2014
35BWW01	ns	ns	ns	ns	ns	ns	ns	ns
35BWW02	ns	ns	ns	ns	ns	ns	ns	ns
35BWW03	6.08	ns	1.06	ns	1.13	1.08	1.24	1.07
35BWW04	ns	5.61	6.13	3.07	1.08	8.93	6.17	3.18
35BWW05	15.18	0.70	1.05	0.22	0.89	1.18	1.03	0.66
35BWW06	16.88	1.18	ns	ns	0.91	1.10	1.88	0.88
35BWW07	ns	ns	ns	1.95	ns	ns	ns	ns
35BWW08	5.00	1.40	1.30	0.27	1.05	1.62	3.04	3.12
35BWW09	ns	2.49	4.13	1.33	0.78	6.30	3.35	0.99
35BWW10	ns	ns	ns	ns	0.86	0.37	0.69	1.80
35BWW11	ns	ns	ns	3.36	ns	ns	ns	ns
35BWW12	ns	ns	ns	ns	1.71	ns	ns	ns
35BWW13	ns	ns	ns	ns	ns	ns	ns	ns
35BWW14	5.67	2.39	2.87	0.79	0.86	ns	ns	0.93
35BWW15	ns	ns	ns	ns	ns	ns	ns	ns
35BWW16	ns	ns	ns	ns	ns	ns	ns	ns
35BWW17	ns	ns	ns	ns	1.23	4.63	9.10	7.04
35BWW18	ns	ns	ns	ns	ns	ns	ns	ns
35BWW19	ns	ns	ns	ns	ns	ns	ns	ns
35BWW20	ns	ns	ns	ns	2.37	ns	ns	1.96
LHS-MW 58	5.02	5.98	4.61	0.66	7.07	10.86	7.73	5.05
MW 1-1	8.56	0.69	1.21	0.38	2.27	5.04	5.60	3.53
MW 1-2	10.12	0.94	1.68	0.46	0.95	0.82	5.76	2.07
MW 1-3	ns	ns	ns	ns	ns	4.30	4.23	ns
MW 2-1	8.14	0.42	0.84	0.66	0.6	1.45	1.02	1.23
MW 2-2	6.79	1.41	1.58	2.02	6.99	8.96	5.71	7.69
MW 2-3	3.98	0.77	1.73	1.70	6.05	8.31	7.27	7.37
MW 3-1	6.01	0.51	0.77	0.61	0.76	3.94	0.59	1.28
MW 3-2	5.43	1.07	0.74	0.74	1.81	1.57	1.72	1.23
MW 3-3	5.98	2.48	3.48	1.43	1.52	3.12	1.10	1.14
MW 4-1	ns	1.28	1.12	1.02	1.04	1.72	1.58	0.84
MW 4-2	ns	0.53	0.79	0.82	0.91	0.98	1.97	5.27
MW 4-3	ns	3.16	7.97	4.71	ns	6.78	9.21	8.33

While the relationship between higher dissolved oxygen (DO) and reduction of PCE is not normal to the accepted anaerobic degradation pathway, the microorganism used to degrade PCE was developed in an aerobic environment with DO concentrations between 1 mg/l and 2 mg/l. No definitive study has been conducted for higher DO concentrations using the same specific species and methodology.

5.5.0 Transects

Transect drawings were produced showing the concentrations of PCE, TCE, and well screen intervals from the first testing in July 2013 to the March 2014 testing period. These transects were established from the off site up gradient wells through the off site down gradient wells. The transect information is in Appendix A. For the cluster wells the concentrations of PCE and TCE were averaged. From these transect figures, a trend of decreasing concentrations of PCE and TCE within the bio plug field is illustrated.

5.6.0 PCE and TCE Degradation Pathways

Degradation pathways of PCE and TCE can be aerobic or anaerobic. Traditionally the remediation efforts use the anaerobic pathway. A technical note from ABS describe describes the two pathways. Appendix C contains the technical note and testing summaries of secondary VOC concentrations, which allows for an evaluation of the aerobic degradation pathway within the bio plug field.

5.6.1 Degradation Products

The principal degradation products of PCE under anaerobic conditions, in order, are TCE, Dichloroethene and its derivatives, vinyl chloride, and the end product ethylene.

The degradation products of PCE under aerobic conditions are toluene, oxylates, acetates, and the end product of carbon dioxide. The chlorine atoms combine with hydrogen to form hydrochloric acid.

5.7.0 Field Testing

Field-testing included measuring the oxidation reduction potential (ORP) of each well. A negative ORP indicated an anaerobic condition and a positive ORP indicates an aerobic

condition. The on site cluster wells were installed and developed in early summer of 2012 and were tested, along with the other existing wells, for ORP in July 2012. Eight of the wells measured as a negative OR and the remaining wells were measured as positive with a maximum ORP of +68.

In October 2014, the measured ORP indicated aerobic conditions in all the upper shallow zone on site wells except for 3-1 which was -43.7Mv and 35BWW05 which was -52.9 Mv. The negative value for well -05 indicates that the ground water flow through the plug field did not reach this well.

The ORP measurements are included in Appendix D, Field Measurements. The other field measurements included pH, dissolved oxygen concentrations, temperature and conductivity. These measurements did not indicate any particular pattern of degradation that could be related to the degradation of PCE and TCE.

Appendix A

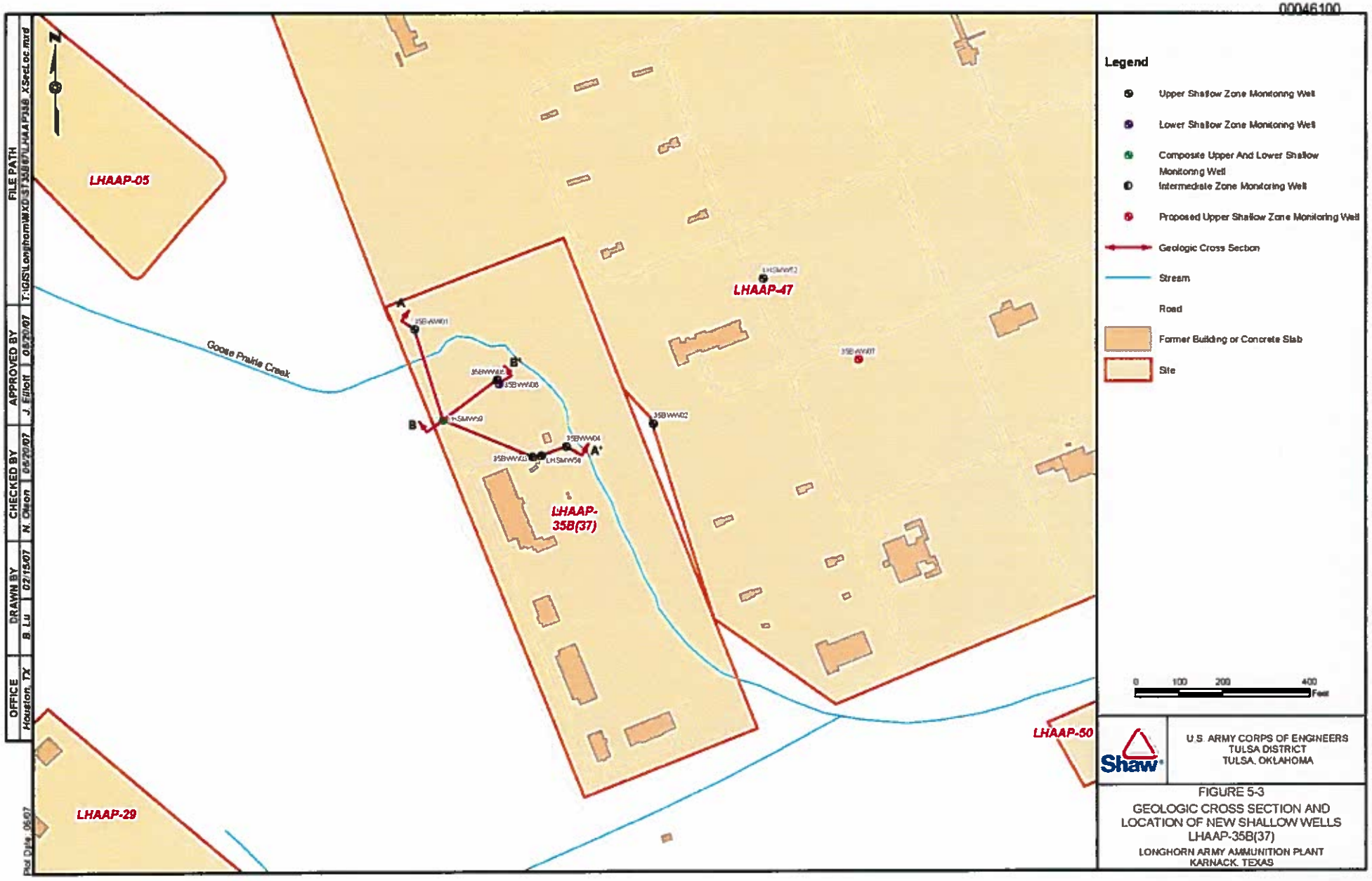
Transect Information

Natural Attenuation Plan
US Army Corps of Engineers Tulsa District

Boring Logs and Transects

LHAAP-35B(37) Drilling Logs and Geologic Cross Sections

00046100

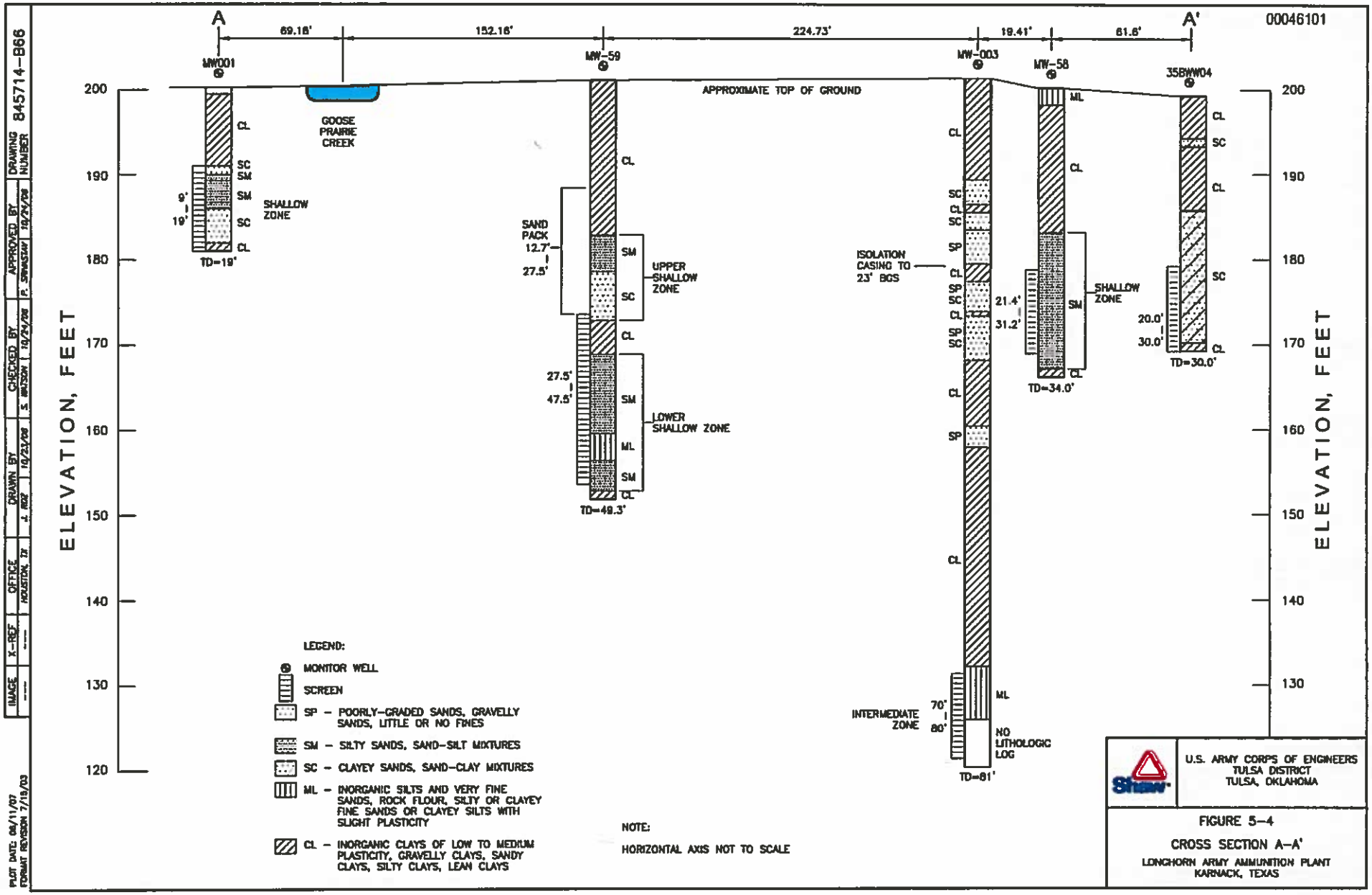


U.S. ARMY CORPS OF ENGINEERS
TULSA DISTRICT
TULSA, OKLAHOMA

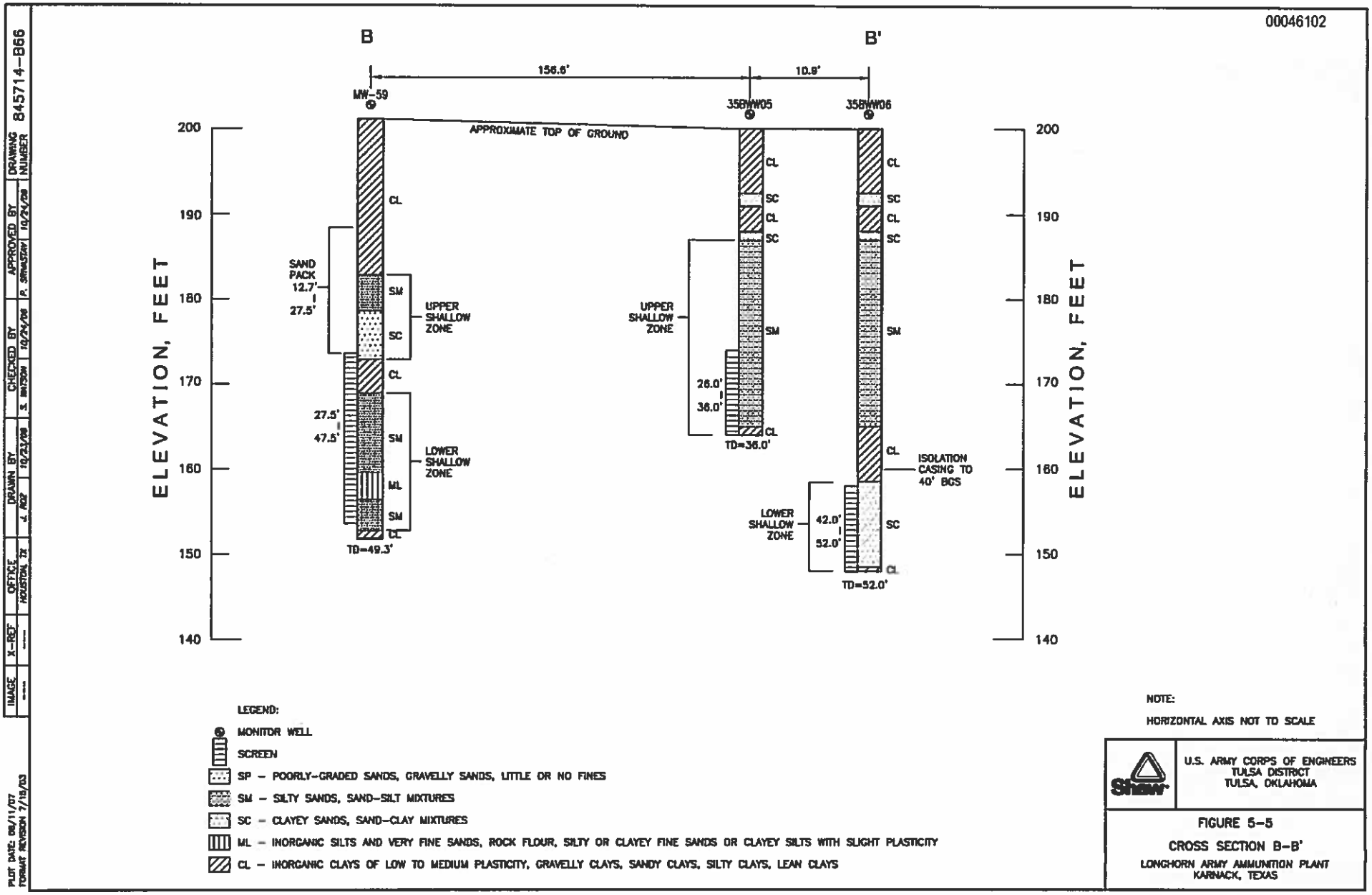
Shaw

FIGURE 5-3
GEOLOGIC CROSS SECTION AND LOCATION OF NEW SHALLOW WELLS LHAAP-35B(37)
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

00839993


A
A'
00046101
69.16'
152.16'
224.73'
19.41'
61.6'
MW001
MW-59
MW-003
MW-58
35BWW04
APPROXIMATE TOP OF GROUND
GOOSE PRAIRIE CREEK
ELEVATION, FEET
200
190
180
170
160
150
140
130
120
CL
SC
SM
ML
SP
9'
19'
SHALLOW ZONE
TD=19'
SAND PACK
12.7'
27.5'
UPPER SHALLOW ZONE
27.5'
47.5'
LOWER SHALLOW ZONE
TD=49.3'
ISOLATION CASING TO 23' BGS
21.4'
31.2'
SHALLOW ZONE
TD=34.0'
20.0'
30.0'
TD=30.0'
INTERMEDIATE ZONE
70'
80'
NO LITHOLOGIC LOG
TD=81'
LEGEND:
MONITOR WELL
SCREEN
SP – POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
SM – SILTY SANDS, SAND-SILT MIXTURES
SC – CLAYEY SANDS, SAND-CLAY MIXTURES
ML – INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
CL – INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
NOTE:
HORIZONTAL AXIS NOT TO SCALE
IMAGE
X-REF
OFFICE
HOUSTON, TX
DRAWN BY
J. ROZ
10/23/06
CHECKED BY
S. WATSON
10/24/06
APPROVED BY
R. SPANGLER
10/24/06
DRAWING NUMBER
845714-B66
PLOT DATE: 04/11/07
FORMAT REVISION 7/19/03
U.S. ARMY CORPS OF ENGINEERS
TULSA DISTRICT
TULSA, OKLAHOMA
FIGURE 5-4
CROSS SECTION A-A'
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

00839994



NOTE:
HORIZONTAL AXIS NOT TO SCALE

U.S. ARMY CORPS OF ENGINEERS
TULSA DISTRICT
TULSA, OKLAHOMA

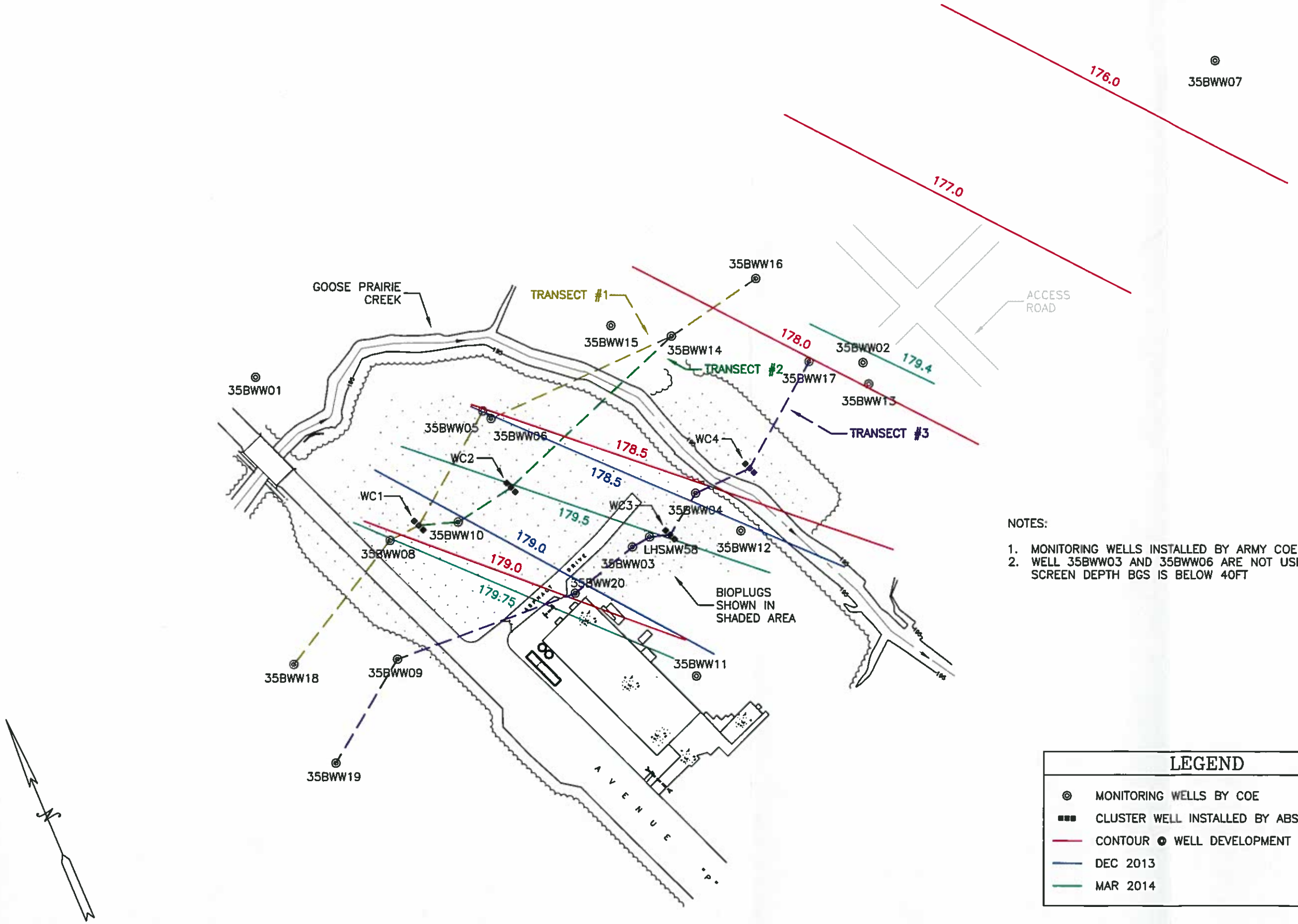
FIGURE 5-5
CROSS SECTION B-B'
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

IMAGE	X-REF	OFFICE	DRAWN BY	CHECKED BY	APPROVED BY	DRAWING NUMBER
---	---	HOUSTON, TX	J. RIZZ 10/23/08	S. WATSON 10/24/08	P. SPRAGAW 10/24/08	845714-B66

PLOT DATE: 09/11/07
FORMAT REVISION 7/15/03

PCE and TCE Reduction Transects

December, 2013 through March, 2014



NOTES:

1. MONITORING WELLS INSTALLED BY ARMY COE
2. WELL 35BWW03 AND 35BWW06 ARE NOT USED BECAUSE SCREEN DEPTH BGS IS BELOW 40FT

LEGEND

- MONITORING WELLS BY COE
- CLUSTER WELL INSTALLED BY ABS
- CONTOUR ⊙ WELL DEVELOPMENT FALL 2013
- DEC 2013
- MAR 2014

ABS
ADVANCED BIOSYSTEMS, LLC
TMD
ENGINEERING, LLC
F-13937
121 VENTURE BLVD. SUITE B
SPARTANBURG, SC 29306
PHONE: 864.595.0103
FAX: 864.595.1952

STATE OF TEXAS
ROBERT S. WHITAKER
109506
LICENSED PROFESSIONAL ENGINEER

DATE:

APPROVALS

PROJECT ENG	RSW
DESIGNED BY	RSW
DRAWN BY:	BAH
CHECKED BY	RSW
APPROVED	RSW

REVISIONS

NO.	DESCRIPTION	DATE	BY
1			

PROJECT TITLE:
PROJECT NO.: 381-02
LHAAP-35B(37)
BIO PLUG PILOT PROJECT
- FOR -
UNITED STATES
DEPARTMENT OF THE ARMY
HARRISON COUNTY
TEXAS

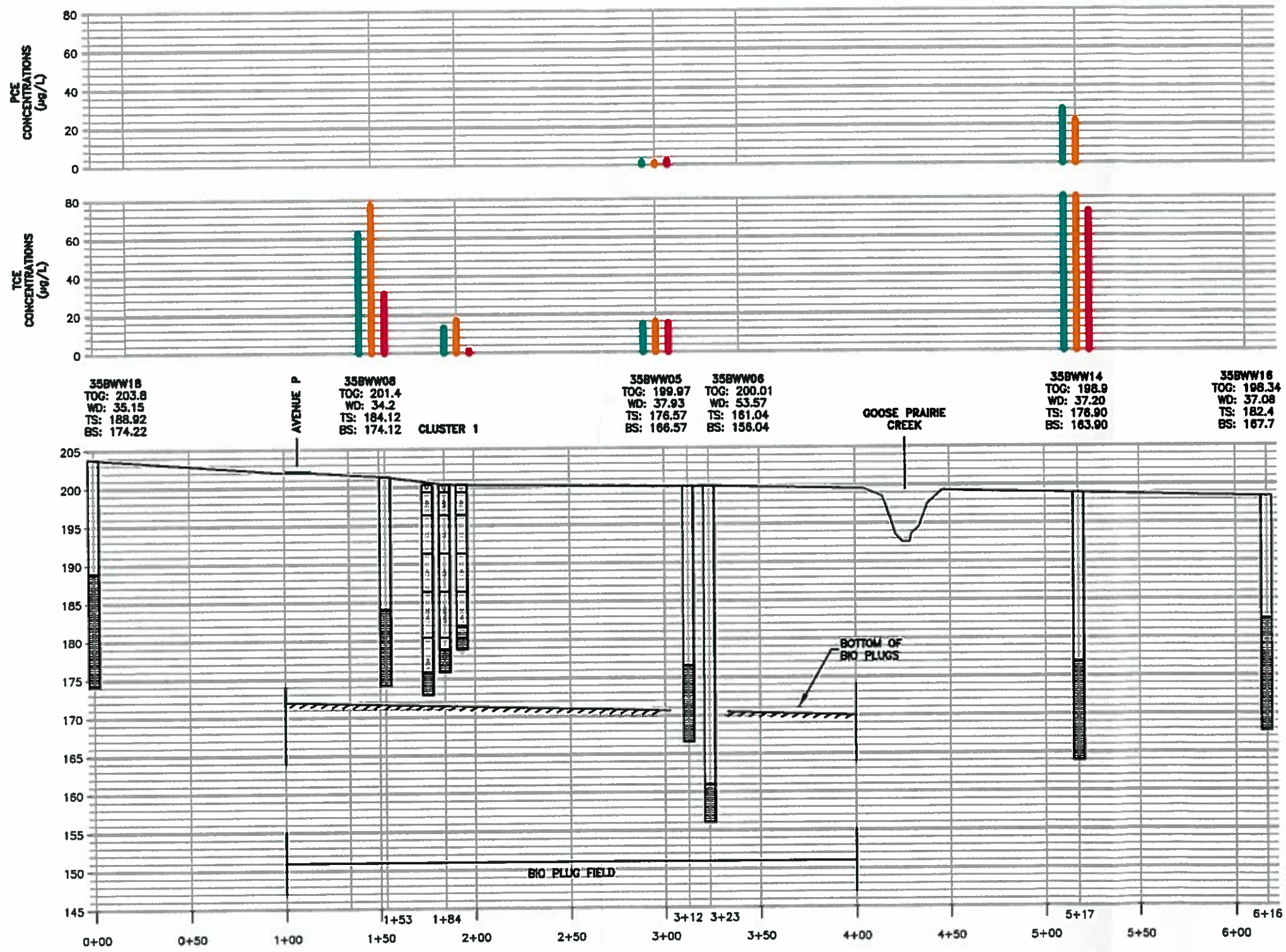
SHEET TITLE:
TRANSSECTS & GROUND WATER CONTOURS
DATE: 3-03-2014
SCALE: AS SHOWN

FIELD BOOK #: N/A

SHEET 1 OF 1

FILE NAME: 381-02-35

00833997



LEGEND

- DECEMBER 2012
- MARCH 2013
- MARCH 2014

TRANSSECT #1

0 60 120
HORIZONTAL SCALE 1"=60'-0"

0 15 30
VERTICAL SCALE 1"=15'-0"

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ROBERT S WHITAKER
109508
LICENSED
PROFESSIONAL ENGINEER
DATE:

APPROVALS
PROJECT ENG RSW
DESIGNED BY RSW
DRAWN BY BAH
CHECKED BY RSW
APPROVED RSW

REVISIONS

NO.	DESCRIPTION	DATE	BY
1			

PROJECT NO. 381-02

PROJECT TITLE:
LHAAP-35B(37)
BIO PLUG PILOT PROJECT
- FOR -
UNITED STATES
DEPARTMENT OF THE ARMY
HARRISON COUNTY TEXAS

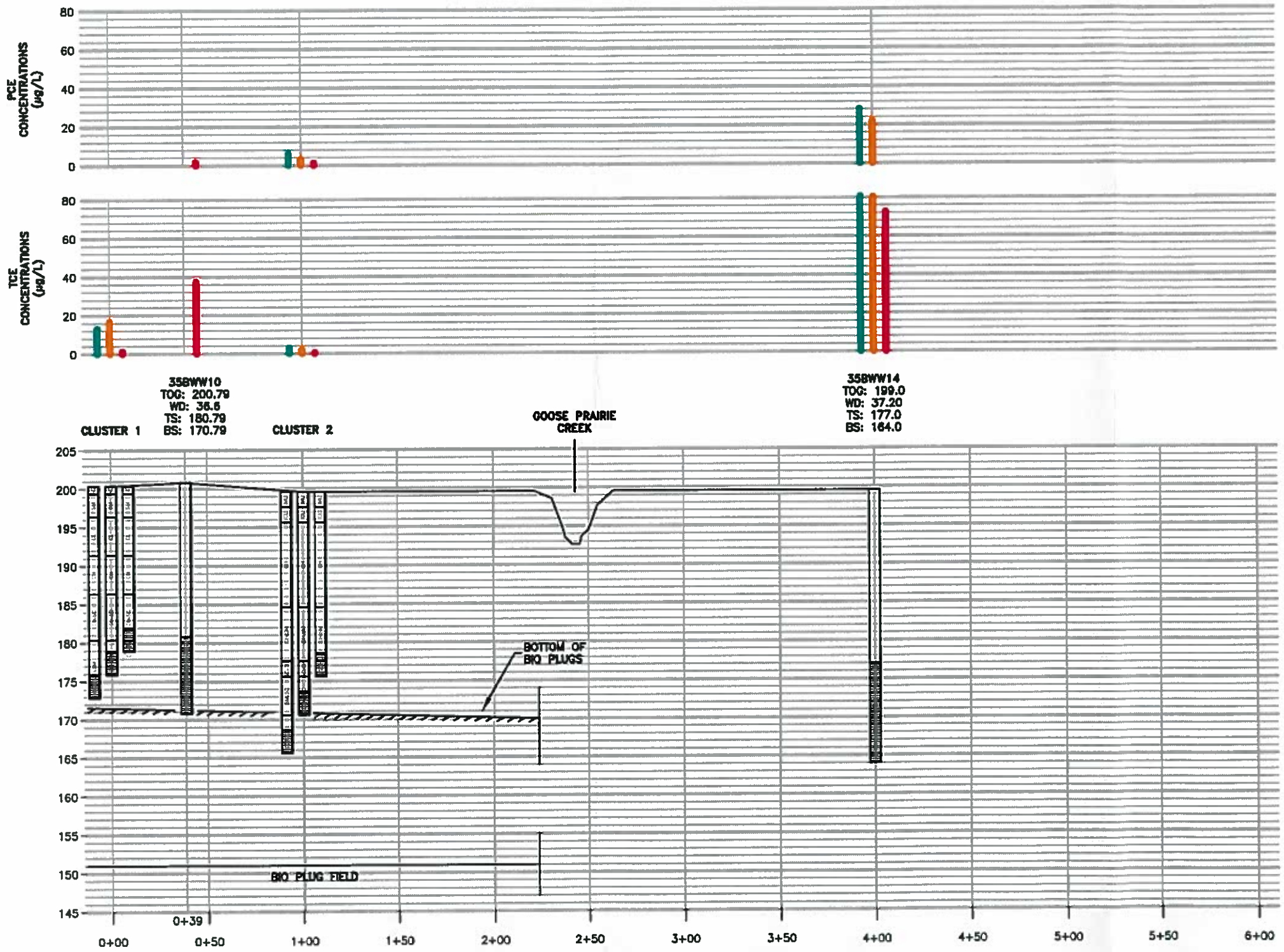
SHEET TITLE:
TRANSSECT#1
MONITORING WELL SOIL
PROFILE & SCREEN
LOCATIONS
SCALE: AS SHOWN
DATE: 05-14-2014

FIELD BOOK # N/A

SHEET 1 OF 3

FILE NAME: 381-02-35

00839998



LEGEND

- DECEMBER 2012
- MARCH 2013
- MARCH 2014

TRANSSECT #2

0 60 120
HORIZONTAL SCALE 1"=60'-0"

0 15 30
VERTICAL SCALE 1"=15'-0"

ABS
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100509
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PROFESSIONAL ENGINEER

DATE:

APPROVALS
PROJECT ENG. RSW
ENGINEER BY RSW
DRAWN BY BAH
CHECKED BY RSW
APPROVED RSW

REVISIONS

NO.	DESCRIPTION	DATE	BY
1			

PROJECT NO.: 381402

PROJECT TITLE:
LHAAP-35B(37)
BIO PLUG PILOT PROJECT
- FOR -
UNITED STATES
DEPARTMENT OF THE ARMY
HARRISON COUNTY TEXAS

SHEET TITLE:
TRANSSECT #2
MONITORING WELL SOIL
PROFILE & SCREEN
LOCATIONS

SCALE: AS SHOWN
DATE: 05-14-2014

FIELD BOOK # N/A

SHEET 2 OF 3

FILE NAME: 381-02-35

00839999



LEGEND

- DECEMBER 2012
- MARCH 2013
- MARCH 2014

HORIZONTAL SCALE 1"=60'-0"

VERTICAL SCALE 1"=15'-0"

TRANSSECT #3

ABS
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STATE OF TEXAS
ROBERT S. WHITAKER
109508
LICENSED PROFESSIONAL ENGINEER
DATE

APPROVALS
PROJECT ENG. RSW
DESIGNED BY RSW
DRAWN BY BAH
CHECKED BY RSW
APPROVED RSW

REVISIONS

NO.	DESCRIPTION	DATE	BY
1			

PROJECT NO.: 381-02

PROJECT TITLE:
LHAAP-35B(37)
BIO PLUG PILOT PROJECT
- FOR -
UNITED STATES
DEPARTMENT OF THE ARMY
HARRISON COUNTY TEXAS

SHEET TITLE:
TRANSSECT #3
MONITORING WELL SOIL
PROFILE & SCREEN
LOCATIONS
SCALE: AS SHOWN
DATE: 05-14-2014

FIELD BOOK # N/A

SHEET 3 OF 3

FILE NAME 381-02-35

00840000

Appendix B

Soil Boring Logs

ENVIRONMENTAL LOG

Client: LHAAP35B(37)

Project No: E2766-12 Phase Task

Well No. MW1-1

Location Karmack (Harrison County), Texas

Surface Elev. 200.37' Page 1 of 2

Dep Feet Sampler	Overburden/Lithologic Description	F.I.D. (ppm)	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
						T.O.C. Elev. 203.80'
0	Ground Surface				0	
	CLAYEY SAND(SC) loose; dark reddish brown (5YR 4/2); moist; roots and leaf litter common; very fine-grained sand; ~30% clay; homogeneous; subrounded sand grains					
	SILTY SAND(SM) loose; dark reddish gray (2.5YR 5/1) ; moist; minor amount of roots @ 1-2'; very fine-grained sand; ~30% silt; homogeneous; subrounded sand grains --yellowish brown (10YR 5/4)					
5	SANDY SILTY LEAN CLAY(CL) very soft; light gray (10YR 7/1) and yellowish brown (10YR 5/8); moist; n=1.75; silt = ~20%; sand =~10%; low plasticity; laminated and stratified				5	
	--stiff; n=2.0					
	--hard; n=4.5+					
10	SILTY FAT CLAY(CH) hard; gray (10YR 6/1) and brownish yellow (10YR 6/8); moist; n=4.5+; silt =10%; high plasticity ; laminated				10	
	--n=4.5					
15	SANDY FAT CLAY WITH CLAYEY SAND LAYERS(CH-SC) very stiff and medium dense; light gray (10YR 7/1) and yellowish brown (10YR 5/6); moist, n=2.25; clayey sand layer up to 6" thick; very fine-grained sand; high plasticity; subrounded sand grains, laminated and stratified				15	
20					20	
	Continued Next Page					

Driller J. Odom/J. Hart	Drilling Method H.S.A.	Bentonite Seal 20.5-22.5/27.5-34'
Logged By Jeanie Odom	Borehole Diameter 8.25"	Filter Pack Qty. 22.5-27.5'
Drilling Started 6/18/12	Well Casing 2.0" Dia. 0.0' to 24.5'	Filter Pack Type 20/40 Sand
Drilling Completed 6/20/12	Casing Type PVC	Static Water Level
Construction Completed	Well Screen 2.0" Dia. 24.5' to 27.5'	Elevation
Development Completed	Screen Type Slotted	Notes: Seepage @ 20' while drilling.
Type of Well Monitor Well	Slot Size 0.010"	
	Grout Type Cement/Bentonite	GPS Coordinates: N32.680083°, W94.1454160°

ENVIRONMENTAL LOG

Client: LHAAP35B(37)

Project No: E2766-12 Phase Task

Well No. MW1-1

Location Karmack (Harrison County), Texas

Surface Elev. 200.37'

Dep Feet	Sampler	Overburden/Lithologic Description	F.I.D. (ppm)	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
		Continued from previous page					
20		SILTY FAT CLAY WITH SILTY SAND LAYERS(CH-SM) stiff to medium dense; light greenish gray (1Gley 7/10), dark yellowish brown (10YR 4/6), yellowish brown (10YR 5/8), and light gray (10YR 7/1), saturated; n=1.25, fine-grained sand; subrounded sand grains; laminated and stratified, silt = ~20%				20	
25		SILTY SAND WITH CLAYEY SAND LAYERS(SM-SC) medium dense; light gray (10YR 7/1) and yellowish brown (10YR 5/8); saturated; fine-grained sand; subrounded sand grains; laminated and stratified; silt =~10%; clay =~10%				25	
30		SILTY SAND(SM) medium dense; brown (10YR 4/3); saturated; homogeneous; fine-grained sand, subrounded sand grains; silt =~15%; minor amount of lignite pieces				30	
		Bottom of Boring @ 34'					
35							
40							
45							

ENVIRONMENTAL LOG

Client: LHAAP35B(37)

Project No: E2766-12 Phase Task

Well No. MW1-2

Location Karmack (Harrison County), Texas

Surface Elev. 200.37' Page 1 of 1

Depth Feet	Sampler	Overburden/Lithologic Description	F.I.D. (ppm)	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
							T.O.C. Elev. 203.96'
0		Ground Surface				0	
		CLAYEY SAND(SC) loose; dark reddish brown (5YR 4/2); moist; roots and leaf litter common; very fine-grained sand; ~30% clay; homogeneous; subrounded sand grains					
		SILTY SAND(SM) loose; dark reddish gray (2.5YR 5/1) ; moist; minor amount of roots @ 1-2'; very fine-grained sand; ~30% silt; homogeneous; subrounded sand grains --yellowish brown (10YR 5/4)					
5		SANDY SILTY LEAN CLAY(CL) very soft; light gray (10YR 7/1) and yellowish brown (10YR 5/8); moist; n=1.75; silt = ~20%; sand =~10%; low plasticity; laminated and stratified				5	
		--stiff; n=2.0					
		--hard; n=4 5+					
10		SILTY FAT CLAY(CH) hard; gray (10YR 6/1) and brownish yellow (10YR 6/8); moist; n=4.5+; silt =10%; high plasticity ; laminated				10	
		--n=4.5					
15		SANDY FAT CLAY WITH CLAYEY SAND LAYERS(CH-SC) very stiff and medium dense; light gray (10YR 7/1) and yellowish brown (10YR 5/6); moist; n=2.25; clayey sand layer up to 6" thick; very fine-grained sand; high plasticity; subrounded sand grains; laminated and stratified				15	
20		SILTY FAT CLAY WITH SILTY SAND LAYERS(CH-SM) stiff to medium dense; light greenish gray (1Gley 7/10), dark yellowish brown (10YR 4/6), yellowish brown (10YR 5/8), and light gray (10YR 7/1); saturated; n=1.25, fine-grained sand; subrounded sand grains; laminated and stratified, silt = ~20%				20	
25		178.96 Bottom of Boring @ 25'				25	

Driller J. Odom/J. Hart

Logged By Jeanie Odom

Drilling Started 6/20/12

Drilling Completed 6/20/12

Construction Completed

Development Completed

Type of Well Monitor Well

Drilling Method H.S.A.

Borehole Diameter 8.25"

Well Casing 2.0" Dia. 0.0' to 21.5'

Casing Type PVC

Well Screen 2.0" Dia. 21.5' to 24.5'

Screen Type Slotted

Slot Size 0.010"

Grout Type Cement/Bentonite

Bentonite Seal 17.5-19.5'

Filter Pack Qty. 19.5-25'

Filter Pack Type 20/40 Sand

Static Water Level

Elevation

Notes: Seepage @ 20' while drilling.

GPS Coordinates: N32.580083°, W94.1454160°

ETTL Engineers & Consultants Inc.

ENVIRONMENTAL LOG

Client: LHAAP35B(37)

Project No: E2766-12 Phase Task

Well No. MW1-3

Location Karmack (Harrison County), Texas

Surface Elev. 200.45' Page 1 of 1

Depth Feet	Sampler	Overburden/Lithologic Description
0		Ground Surface
		CLAYEY SAND(SC) loose; dark reddish brown (5YR 4/2); moist; roots and leaf litter common; very fine-grained sand; ~30% clay; homogeneous; subrounded sand grains
		SILTY SAND(SM) loose; dark reddish gray (2.5YR 5/1) ; moist; minor amount of roots @ 1-2'; very fine-grained sand; ~30% silt; homogeneous; subrounded sand grains
		–yellowish brown (10YR 5/4)
5		SANDY SILTY LEAN CLAY(CL) very soft, light gray (10YR 7/1) and yellowish brown (10YR 5/8); moist; n=1.75, silt = ~20%; sand =~10%; low plasticity; laminated and stratified
		–stiff; n=2.0
		–hard; n=4.5+
10		SILTY FAT CLAY(CH) hard; gray (10YR 6/1) and brownish yellow (10YR 6/8); moist; n=4.5+; silt =10%; high plasticity ; laminated
		–n=4.5
15		SANDY FAT CLAY WITH CLAYEY SAND LAYERS(CH-SC) very stiff and medium dense; light gray (10YR 7/1) and yellowish brown (10YR 5/8); moist; n=2.25; clayey sand layer up to 6" thick; very fine-grained sand, high plasticity; subrounded sand grains; laminated and stratified
20		SILTY FAT CLAY WITH SILTY SAND LAYERS(CH-SM) stiff to medium dense; light greenish gray (1Gley 7/10), dark yellowish brown (10YR 4/6), yellowish brown (10YR 5/8), and light gray (10YR 7/1); saturated; n=1.25; fine-grained sand; subrounded sand grains; laminated and stratified; silt = ~20%
		Bottom of Boring @ 22'

F.I.D. (ppm) | Graphic Log | Well Construction Graphics | Depth Feet | Well Construction Details

T.O.C. Elev. 203.65'

Driller J. Odom/J. Hart

Logged By Jeanie Odom

Drilling Started 6/20/12

Drilling Completed 6/20/12

Construction Completed

Development Completed

Type of Well Monitor Well

Drilling Method H.S.A.

Borehole Diameter 8.25"

Well Casing 2.0" Dia. 0.0' to 18.5'

Casing Type PVC

Well Screen 2.0" Dia. 18.5' to 21.5'

Screen Type Slotted

Slot Size 0.010"

Grout Type Cement/Bentonite

Bentonite Seal 14.5-16.5'

Filter Pack Qty. 16.5-22'

Filter Pack Type 20/40 Sand

Static Water Level

Elevation

Notes: Seepage @ 20' while drilling.

GPS Coordinates: N32 680083°, W94 1454160°

ETTL Engineers & Consultants Inc.

ENVIRONMENTAL LOG

Client: LHAAP35B(37)

Project No: E2766-12 Phase Task

Well No. MW2-1

Location Karmack (Harrison County), Texas

Surface Elev. 199.57' Page 1 of 2

Depth Feet	Sampler	Overburden/Lithologic Description
0		Ground Surface
		CLAYEY SILT(ML) medium dense; brown (10YR 4/3) and grayish brown (10YR 5/2); moist; roots common @ 0-1'; homogeneous; clay =~40%
		SANDY LEAN CLAY(CL) stiff; light gray (10YR 7/2) and yellowish brown (10YR 5/6); moist; homogeneous; very fine-grained sand; n=1.5; low plasticity; subrounded sand grains
5		SILTY FAT CLAY WITH SILTY SAND SEAMS(CH) very stiff; gray (10YR 6/1) and brownish yellow (10YR 6/6); dry; very fine-grained sand; high plasticity; n=2.5; silt =~20%; sand =~5%; homogeneous
		n=3.25
		--light gray (10YR 7/1) and brownish yellow (10YR 6/6)
		--hard; n=4.5+
10		--n=4.5+
		--cuttings off of augers indicate no change
15		--drilling became easier @ 15'
20		SILTY FAT CLAY WITH SILTY SAND LAYERS(CH-SM) stiff to loose; light gray (10YR 7/1) and brownish yellow (10YR 6/6); moist;

Continued Next Page

F.I.D. (ppm)	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
			0	T.O.C. Elev. 202.79'
			5	
			10	
			15	
			20	

Driller J. Odom/J. Hart	Drilling Method H.S.A.	Bentonite Seal 27-29'
Logged By Jeanie Odom	Borehole Diameter 8.25"	Filter Pack Qty. 29-35'
Drilling Started 6/18/12	Well Casing 2.0" Dia. 0.0' to 31.0'	Filter Pack Type 20/40 Sand
Drilling Completed 6/20/12	Casing Type PVC	Static Water Level
Construction Completed	Well Screen 2.0" Dia. 31.0' to 34.0'	Elevation
Development Completed	Screen Type Slotted	Notes: Seepage @ 20' while drilling.
Type of Well Monitor Well	Slot Size 0.010"	
	Grout Type Cement/Bentonite	GPS Coordinates: N32.680111°, W94.145166°

ENVIRONMENTAL LOG

Client: LHAAP35B(37)

Project No: E2766-12 Phase Task

Well No. MW2-1

Location Karmack (Harrison County), Texas

Surface Elev. 199.57' Page 2 of 2

Depth Feet	Sampler	Overburden/Lithologic Description	F.I.D. (ppm)	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
		Continued from previous page					
20		very fine-grained sand; subrounded sand grains; laminated to stratified; high plasticity; n=1.75 --saturated @ 20' --n=1.25				20	
		CLAYEY SAND WITH SILTY FAT CLAY LAYERS(SC-CH) soft to loose; light gray (10YR 7/1) and brownish yellow (10YR 6/6); saturated; very fine-grained sand; subrounded sand grains; laminated to stratified; high plasticity; n=0.75; silt =~10%					
25		SILTY SAND WITH CLAYEY SAND LAYERS(SM-SC) medium dense; light gray (10YR 7/1) and brownish yellow (10YR 6/6); saturated; fine-grained sand; fat clay layers (<3") @ 24-25'; stratified; subrounded sand grains; silt =~10%; clay =~35%				25	
30		POORLY GRADED SAND(SP) loose; grayish brown (10YR 5/2); saturated; medium-grained sand; subrounded sand grains; homogeneous				30	
		--minor amount of gravel @ 34.5-35' (1/8-1/2")					
35		--brown (10YR 5/3), sand inside auger had to over drill to get well to 34' 163.57				35	
		Bottom of Boring @ 36'					
40							
45							

ETTL Engineers & Consultants Inc.

ENVIRONMENTAL LOG

Client: LHAAP35B(37)

Project No: E2766-12 Phase Task

Well No. MW2-2

Location Karnack (Harrison County), Texas

Surface Elev. 199.59' Page 1 of 2

Depth Feet	Sampler	Overburden/Lithologic Description	F.I.D. (ppm)	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
							T.O.C. Elev. 202.92'
0		Ground Surface				0	
		CLAYEY SILT(ML) medium dense; brown (10YR 4/3) and grayish brown (10YR 5/2); moist; roots common @ 0-1'; homogeneous; clay =~40%					
		SANDY LEAN CLAY(CL) stiff; light gray (10YR 7/2) and yellowish brown (10YR 5/6); moist; homogeneous; very fine-grained sand; n=1.5; low plasticity; subrounded sand grains					
5		SILTY FAT CLAY WITH SILTY SAND SEAMS(CH) very stiff; gray (10YR 6/1) and brownish yellow (10YR 6/6); dry; very fine-grained sand; high plasticity; n=2.5; silt =~20%; sand =~5%; homogeneous				5	
		n=3.25					
		--light gray (10YR 7/1) and brownish yellow (10YR 6/6)					
		--hard; n=4.5+					
10		--n=4.5+				10	
		--cuttings off of augers indicate no change					
15		--drilling became easier @ 15'				15	
20		SILTY FAT CLAY WITH SILTY SAND LAYERS(CH-SM) stiff to loose; light gray (10YR 7/1) and brownish yellow (10YR 6/6); moist;				20	

Continued Next Page

Driller J. Odom/J. Hart

Logged By Jeanie Odom

Drilling Started 6/21/12

Drilling Completed 6/21/12

Construction Completed

Development Completed

Type of Well Monitor Well

Drilling Method H.S.A.

Borehole Diameter 8.25"

Well Casing 2.0" Dia. 0.0' to 26.0'

Casing Type PVC

Well Screen 2.0" Dia. 26.0' to 29.0'

Screen Type Slotted

Slot Size 0.010"

Grout Type Cement/Bentonite

Bentonite Seal 22-24'

Filter Pack Qty. 24-30'

Filter Pack Type 20/40 Sand

Static Water Level

Elevation

Notes: Seepage @ 20' while drilling

GPS Coordinates: N32.680111°, W94.145166°

ETTL Engineers & Consultants Inc.

ENVIRONMENTAL LOG

Client: LHAAP35B(37)

Project No: E2766-12 Phase Task

Well No. MW2-2

Location Karmack (Harrison County), Texas

Surface Elev. 199.59' Page 2 of 2

Depth Feet Sampler	Overburden/Lithologic Description	F.I.D. (ppm)	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
	Continued from previous page					
20	very fine-grained sand; subrounded sand grains; laminated to stratified; high plasticity; n=1.75 --saturated @ 20' --n=1.25				20	
	CLAYEY SAND WITH SILTY FAT CLAY LAYERS(SC-CH) soft to loose; light gray (10YR 7/1) and brownish yellow (10YR 6/6); saturated; very fine-grained sand; subrounded sand grains; laminated to stratified; high plasticity; n=0.75; silt =~10%					
25	SILTY SAND WITH CLAYEY SAND LAYERS(SM-SC) medium dense; light gray (10YR 7/1) and brownish yellow (10YR 6/6); saturated; fine-grained sand; fat clay layers (<3") @ 24-25'; stratified; subrounded sand grains; silt =~10%; clay =~35%				25	
30	POORLY GRADED SAND(SP) loose; grayish brown (10YR 5/2); saturated; medium-grained sand; subrounded sand grains; homogeneous				30	
	Bottom of Boring @ 30' 169.59					
35						
40						
45						

ETTL Engineers & Consultants Inc.

ENVIRONMENTAL LOG

Client: LHAAP35B(37)

Project No: E2768-12 Phase Task

Well No. MW2-3

Location Karnack (Harrison County), Texas

Surface Elev. 199.52' Page 1 of 2

Depth Feet	Sampler	Overburden/Lithologic Description	F.I.D. (ppm)	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
							T.O.C. Elev. 202.92'
0		Ground Surface				0	
		CLAYEY SILT(ML) medium dense; brown (10YR 4/3) and grayish brown (10YR 5/2); moist; roots common @ 0-1'; homogeneous; clay =~40%					
		SANDY LEAN CLAY(CL) stiff; light gray (10YR 7/2) and yellowish brown (10YR 5/6); moist; homogeneous; very fine-grained sand; n=1.5; low plasticity; subrounded sand grains					
5		SILTY FAT CLAY WITH SILTY SAND SEAMS(CH) very stiff; gray (10YR 6/1) and brownish yellow (10YR 6/6); dry; very fine-grained sand; high plasticity; n=2.5; silt =~20%; sand =~5%; homogeneous				5	
		n=3.25					
		--light gray (10YR 7/1) and brownish yellow (10YR 6/6)					
		--hard; n=4.5+					
		--n=4.5+					
10						10	
		--cuttings off of augers indicate no change					
15						15	
		Continued Next Page					

Driller J. Odom/J. Hart

Logged By Jeanie Odom

Drilling Started 6/21/12

Drilling Completed 6/21/12

Construction Completed

Development Completed

Type of Well Monitor Well

Drilling Method H.S.A.

Borehole Diameter 8.25"

Well Casing 2.0" Dia. 0.0' to 21.0'

Casing Type PVC

Well Screen 2.0" Dia. 21.0' to 24.0'

Screen Type Slotted

Slot Size 0.010"

Grout Type Cement/Bentonite

Bentonite Seal 17-19'

Filter Pack Qty. 19-25'

Filter Pack Type 20/40 Sand

Static Water Level

Elevation

Notes: Seepage @ 20' while drilling.

GPS Coordinates: N32 680111°, W94 145166°

ETTL Engineers & Consultants Inc.

ENVIRONMENTAL LOG

Client: LHAAP35B(37)

Project No: E2766-12 Phase Task

Well No. MW2-3

Location Karmack (Harrison County), Texas

Surface Elev. 199.52' Page 2 of 2

Dep. Feet Sampler	Overburden/Lithologic Description	F.I.D. (ppm)	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
	Continued from previous page					
15	–drilling became easier @ 15'				15	
20	SILTY FAT CLAY WITH SILTY SAND LAYERS(CH-SM) stiff to loose; light gray (10YR 7/1) and brownish yellow (10YR 6/6), moist; very fine-grained sand; subrounded sand grains; laminated to stratified; high plasticity; n=1.75 –saturated @ 20' –n=1.25				20	▽
	CLAYEY SAND WITH SILTY FAT CLAY LAYERS(SC-CH) soft to loose; light gray (10YR 7/1) and brownish yellow (10YR 6/6); saturated; very fine-grained sand; subrounded sand grains; laminated to stratified; high plasticity; n=0.75; silt =~10%					
25	SILTY SAND WITH CLAYEY SAND LAYERS(SM-SC) medium dense; light gray (10YR 7/1) and brownish yellow (10YR 6/6); saturated; fine-grained sand; fat clay layers (<3") @ 24-25'; stratified; subrounded sand grains; silt =~10%; clay =~35% Bottom of Boring @ 25' 174.52				25	
30						
35						

ETTL Engineers & Consultants Inc.

ENVIRONMENTAL LOG

Client: LHAAP35B(37)

Project No: E2766-12 Phase Task

Well No. MW3-1

Location Karmack (Harrison County), Texas

Surface Elev. 199.43' Page 1 of 1

Dep... Feet	Sampler	Overburden/Lithologic Description
0		Ground Surface
		CLAYEY SILT(ML) loose; brown (7.5YR 4/3); moist; roots abundant; homogeneous; clay =~20%
		SANDY SILTY LEAN CLAY(CL) stiff; brownish yellow (10YR 6/6) and dark red (2.5YR 4/6); moist; homogeneous; n=1.25; sand =~10%; silt =~20%
5		–very stiff; light gray (10YR 7/1) and yellowish brown (10YR 5/8); n=2.25; laminated
		–stiff; n=1.75
		SANDY FAT CLAY(CH) hard; light gray (10YR 7/1) and yellowish brown (10YR 5/8); dry; laminated; sand =~10%; n=4.5+; high plasticity
10		–no recovery @ 11.5-14'; no difference in drilling, except @ 13.5'
		SILTY FAT CLAY(CH) hard; light gray (10YR 7/1) and yellowish red (10YR 5/8); moist; laminated; highly plasticity; n =4.5+; silt =~25%
15		–no recovery @ 16.5-19'; soft to drill @ 16.5'
20		SILTY SAND(SM) medium dense; light gray (10YR 7/1) and yellowish brown (10YR 5/8); saturated; very fine-grained sand; subrounded sand grains; homogeneous, silt =~25%
		CLAYEY SAND(SC) loose; light gray (10YR 7/1) and yellowish brown (10YR 5/8); saturated; very fine-grained sand; homogeneous; subrounded sand grains; clay =~30%
25		POORLY GRADED SAND(SP) loose; yellowish brown (10YR 5/6); saturated; medium-grained sand; subrounded sand grains; homogeneous
30		CLAYEY SAND(SC) medium dense; brownish yellow (10YR 6/6) and light gray (10YR 7/1); saturated; very fine-grained sand; subrounded sand grains; homogeneous; clay =~30%
35		Bottom of Boring @ 33' 166.43

F.I.D. (ppm) | Graphic Log | Well Construction Graphics | Depth Feet | Well Construction Details

T.O.C. Elev. 202.77'

0 5 10 15 20 25 30

Driller J. Odom/J. Hart

Logged By Jeanie Odom

Drilling Started 6/19/12

Drilling Completed 6/20/12

Construction Completed

Development Completed

Type of Well Monitor Well

Drilling Method H.S.A.

Borehole Diameter 8.25"

Well Casing 2.0" Dia. 0.0' to 29.0'

Casing Type PVC

Well Screen 2.0" Dia. 29.0' to 32.0'

Screen Type Slotted

Slot Size 0.010"

Grout Type Cement/Bentonite

Bentonite Seal 24-26.5'

Filter Pack Qty. 26.5-33'

Filter Pack Type 20/40 Sand

Static Water Level

Elevation

Notes: Seepage @ 19' while drilling.

GPS Coordinates: N32.679805° W94.144722°

ETTL Engineers & Consultants Inc.

ENVIRONMENTAL LOG

Client: LHAAP35B(37)

Project No: E2766-12 Phase Task

Well No. MW3-2

Location Karmack (Harrison County), Texas

Surface Elev. 199.41' Page 1 of 1

Depth Feet Sampler	Overburden/Lithologic Description
0	Ground Surface
	CLAYEY SILT(ML) loose; brown (7.5YR 4/3); moist; roots abundant; homogeneous; clay =~20%
	SANDY SILTY LEAN CLAY(CL) stiff; brownish yellow (10YR 6/6) and dark red (2.5YR 4/6); moist; homogeneous; n=1.25, sand =~10%; silt =~20%
5	–very stiff; light gray (10YR 7/1) and yellowish brown (10YR 5/8); n=2.25; laminated
	–stiff; n=1.75
	SANDY FAT CLAY(CH) hard; light gray (10YR 7/1) and yellowish brown (10YR 5/8); dry; laminated; sand =~10%, n=4.5+, high plasticity
10	–no recovery @ 11.5-14'; no difference in drilling, except @ 13.5'
	SILTY FAT CLAY(CH) hard; light gray (10YR 7/1) and yellowish red (10YR 5/8); moist; laminated; highly plasticity; n =4.5+, silt =~25%
15	–no recovery @ 16.5-19'; soft to drill @ 16.5'
	SILTY SAND(SM) medium dense, light gray (10YR 7/1) and yellowish brown (10YR 5/8); saturated, very fine-grained sand, subrounded sand grains; homogeneous, silt =~25%
20	CLAYEY SAND(SC) loose; light gray (10YR 7/1) and yellowish brown (10YR 5/8); saturated; very fine-grained sand, homogeneous; subrounded sand grains; clay =~30%
25	POORLY GRADED SAND(SP) loose; yellowish brown (10YR 5/8); saturated; medium-grained sand, subrounded sand grains; homogeneous
	Bottom of Boring @ 28'
30	

F.I.D. (ppm) | Graphic Log | Well Construction Graphics | Depth Feet | Well Construction Details

T.O.C. Elev. 202.89'

Driller J. Odom/J. Hart

Logged By Jeanie Odom

Drilling Started 6/21/12

Drilling Completed 6/21/12

Construction Completed

Development Completed

Type of Well Monitor Well

Drilling Method H.S.A.

Borehole Diameter 8.25"

Well Casing 2.0" Dia. 0.0' to 24.0'

Casing Type PVC

Well Screen 2.0" Dia. 24.0' to 27.0'

Screen Type Slotted

Slot Size 0.010"

Grout Type Cement/Bentonite

Bentonite Seal 20-22'

Filter Pack Qty. 22-28'

Filter Pack Type 20/40 Sand

Static Water Level

Elevation

Notes: Seepage @ 19' while drilling.

GPS Coordinates: N32.679805', W94.144722'

ETTL Engineers & Consultants Inc.

ENVIRONMENTAL LOG

Client: LHAAP35B(37)

Project No: E2766-12 Phase Task

Well No. MW3-3

Location Karmack (Harrison County), Texas

Surface Elev. 199.40' Page 1 of 1

De, Feet Sampler	Overburden/Lithologic Description	F.I.D. (ppm)	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
						T.O.C. Elev. 202.82'
0	Ground Surface				0	
	CLAYEY SILT(ML) loose; brown (7.5YR 4/3); moist; roots abundant; homogeneous; clay =~20%					
	SANDY SILTY LEAN CLAY(CL) stiff; brownish yellow (10YR 6/8) and dark red (2.5YR 4/6); moist; homogeneous; n=1.25; sand =~10%; silt =~20%					
5	--very stiff; light gray (10YR 7/1) and yellowish brown (10YR 5/8); n=2.25; laminated				5	
	--stiff; n=1.75					
	SANDY FAT CLAY(CH) hard; light gray (10YR 7/1) and yellowish brown (10YR 5/8); dry; laminated; sand =~10%; n=4.5+; high plasticity					
10	--no recovery @ 11.5-14'; no difference in drilling, except @ 13.5'				10	
	SILTY FAT CLAY(CH) hard; light gray (10YR 7/1) and yellowish red (10YR 5/8); moist; laminated; highly plasticity; n =4.5+; silt =~25%					
15	--no recovery @ 16.5-19'; soft to drill @ 16.5'				15	
	SILTY SAND(SM) medium dense, light gray (10YR 7/1) and yellowish brown (10YR 5/8); saturated; very fine-grained sand; subrounded sand grains; homogeneous; silt =~25%					
20	Bottom of Boring @ 22' 177.40				20	

Driller J. Odom/J. Hart	Drilling Method H.S.A.	Bentonite Seal 14.5-16.5'
Logged By Jeanie Odom	Borehole Diameter 8.25"	Filter Pack Qty. 16.5-22'
Drilling Started 6/21/12	Well Casing 2.0" Dia. 0.0' to 18.5'	Filter Pack Type 20/40 Sand
Drilling Completed 6/21/12	Casing Type PVC	Static Water Level
Construction Completed	Well Screen 2.0" Dia. 18.5' to 21.5'	Elevation
Development Completed	Screen Type Slotted	Notes: Seepage @ 19' while drilling.
Type of Well Monitor Well	Slot Size 0.010"	
	Grout Type Cement/Bentonite	GPS Coordinates: N32.879805°, W94.144722°

ETTL Engineers & Consultants Inc.

ENVIRONMENTAL LOG

Client: LHAAP35B(37)

Project No: E2766-12 Phase Task

Well No. MW4-1

Location Karmack (Harrison County), Texas

Surface Elev. 198.69' Page 1 of 2

Depth Feet	Sampler	Overburden/Lithologic Description
0		Ground Surface
		CLAYEY SILT(ML) medium dense; yellowish brown (10YR 5/6) and grayish brown (10YR 5/2); moist; clay =~15%; roots common; homogeneous
		SILTY SAND(SM) medium dense; yellowish brown (10YR 6/4); moist; silt = ~25%; homogeneous; subrounded sand grains, very fine-grained sand; few roots @ 1.5-2.5'
5		
10		SILTY FAT CLAY WITH SILTY SAND LAYERS(CH-SM) hard to very dense; dark grayish brown (10YR 4/2), dark gray (10YR 4/1), and light gray (10YR 7/1); dry; stratified; n =4.5+; silt =~25%; subrounded sand grains; very fine-grained sand; high plasticity
		SILTY SAND(SM) medium dense, light gray (10YR 7/1); dry; homogeneous; very fine-grained sand; subrounded sand grains; silt =~15%
		–light gray (10YR 7/1) and yellowish brown (10YR 5/8)
		CLAYEY SAND(SC) loose, light gray (10YR 7/1) and yellowish brown (10YR 5/8); moist; very fine-grained sand; subrounded sand grains; homogeneous; clay =~15%
15		
		–clay =~25%; moisture content increasing
20		–brownish yellow (10YR 6/6) and light gray (10YR 7/1); saturated @ 19'

Continued Next Page

F.I.D. (ppm) | Graphic Log | Well Construction Graphics | Depth Feet | Well Construction Details

T.O.C. Elev. 201.41'

0 5 10 15 20

Driller J. Odom/J. Hart

Logged By Jeanie Odom

Drilling Started 6/22/12

Drilling Completed 6/22/12

Construction Completed

Development Completed

Type of Well Monitor Well

Drilling Method H.S.A.

Borehole Diameter 8.25"

Well Casing 2.0" Dia. 0.0' to 32.0'

Casing Type PVC

Well Screen 2.0" Dia. 32.0' to 35.0'

Screen Type Slotted

Slot Size 0.010"

Grout Type Cement/Bentonite

Bentonite Seal 28-38'

Filter Pack Qty. 30-36'

Filter Pack Type 20/40 Sand

Static Water Level

Elevation

Notes: Seepage @ 19' while drilling.

GPS Coordinates: N32.679888°, W94.144583°

ENVIRONMENTAL LOG

Client: LHAAP35B(37)

Project No: E2766-12 Phase Task

Well No. MW4-1

Location Karmack (Harrison County), Texas

Surface Elev. 198.69' Page 2 of 2

Depth Feet Sampler	Overburden/Lithologic Description	F.I.D. (ppm)	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
	Continued from previous page					
20					20	
	–fine-grained sand					
25					25	
30	–silty sand layer @ 30-30.2'				30	
	–yellowish brown (10YR 5/6) and light gray (10YR 7/1)					
	SILTY SAND(SM) loose; gray (10YR 6/1); saturated; very fine-grained sand; homogeneous; rounded sand grains; silt =~20%					
35	CLAYEY SAND WITH SILTY FAT CLAY LAYERS(SC-CH) medium stiff to loose; pale red (10YR 6/3); saturated; very fine-grained sand; stratified; n=0.75; subrounded sand grains; high plasticity; clay =~20%				35	
	Bottom of Boring @ 36'					
	162.69					
40						
45						

ETTL Engineers & Consultants Inc.

ENVIRONMENTAL LOG

Client: LHAAP35B(37)

Project No: E2766-12 Phase Task

Well No. MW4-2

Location Karmack (Harrison County), Texas

Surface Elev. 198.66' Page 1 of 2

Dep. Feet Sampler	Overburden/Lithologic Description	F.I.D. (ppm)	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
						T.O.C. Elev. 201.85'
0	Ground Surface				0	
	CLAYEY SILT(ML) medium dense; yellowish brown (10YR 5/6) and grayish brown (10YR 5/2); moist; clay =~15%; roots common; homogeneous					
	SILTY SAND(SM) medium dense; yellowish brown (10YR 6/4); moist; silt = ~25%; homogeneous; subrounded sand grains; very fine-grained sand; few roots @ 1.5-2.5'					
5					5	
	SILTY FAT CLAY WITH SILTY SAND LAYERS(CH-SM) hard to very dense; dark grayish brown (10YR 4/2), dark gray (10YR 4/1), and light gray (10YR 7/1); dry; stratified; n =4.5+; silt =~25%; subrounded sand grains; very fine-grained sand; high plasticity					
10	SILTY SAND(SM) medium dense, light gray (10YR 7/1); dry; homogeneous; very fine-grained sand; subrounded sand grains; silt =~15%				10	
	–light gray (10YR 7/1) and yellowish brown (10YR 5/8)					
	CLAYEY SAND(SC) loose, light gray (10YR 7/1) and yellowish brown (10YR 5/8), moist; very fine-grained sand, subrounded sand grains; homogeneous, clay =~15%					
15					15	
	–clay =~25%, moisture content increasing					
	–brownish yellow (10YR 6/6) and light gray (10YR 7/1); saturated @ 19'					▽
20					20	

Continued Next Page

Driller J. Odom/J. Hart

Logged By Jeanie Odom

Drilling Started 6/25/12

Drilling Completed 6/25/12

Construction Completed

Development Completed

Type of Well Monitor Well

Drilling Method H.S.A.

Borehole Diameter 8.25"

Well Casing 2.0" Dia. 0.0' to 25.0'

Casing Type PVC

Well Screen 2.0" Dia. 25.0' to 28.0'

Screen Type Slotted

Slot Size 0.010"

Grout Type Cement/Bentonite

Bentonite Seal 20.5-22.5'

Filter Pack Qty. 22.5-29'

Filter Pack Type 20/40 Sand

Static Water Level

Elevation

Notes: Seepage @ 19' while drilling

GPS Coordinates: N32.679888°, W94 144583°

ETTL Engineers & Consultants Inc.

ENVIRONMENTAL LOG

Client: LHAAP35B(37)

Project No: E2766-12 Phase Task

Well No. MW4-2

Location Karnack (Harrison County), Texas

Surface Elev. 198.66'

Page 2 of 2

De, Feet Sampler	Overburden/Lithologic Description	F.I.D. (ppm)	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
	Continued from previous page					
20					20	
	–fine-grained sand					
25					25	
	169.66					
	Bottom of Boring @ 29'					
30						
35						
40						
45						

ENVIRONMENTAL LOG

Client: LHAAP35B(37)

Project No: E2768-12 Phase Task

Well No. MW4-3

Location Karnack (Harrison County), Texas

Surface Elev. 198.60' Page 1 of 1

Depth Feet	Sampler	Overburden/Lithologic Description	F.I.D. (ppm)	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
							T.O.C. Elev. 201.91'
0		Ground Surface				0	
		CLAYEY SILT(ML) medium dense; yellowish brown (10YR 5/6) and grayish brown (10YR 5/2); moist; clay =~15%; roots common; homogeneous					
		SILTY SAND(SM) medium dense; yellowish brown (10YR 6/4); moist; silt = ~25%; homogeneous, subrounded sand grains; very fine-grained sand; few roots @ 1.5-2.5'					
5						5	
10		SILTY FAT CLAY WITH SILTY SAND LAYERS(CH-SM) hard to very dense; dark grayish brown (10YR 4/2), dark gray (10YR 4/1), and light gray (10YR 7/1); dry; stratified; n =4.5+; silt =~25%; subrounded sand grains; very fine-grained sand; high plasticity				10	
		SILTY SAND(SM) medium dense; light gray (10YR 7/1); dry; homogeneous; very fine-grained sand; subrounded sand grains; silt =~15%					
		–light gray (10YR 7/1) and yellowish brown (10YR 5/8)					
15		CLAYEY SAND(SC) loose; light gray (10YR 7/1) and yellowish brown (10YR 5/8); moist; very fine-grained sand; subrounded sand grains; homogeneous; clay =~15%				15	
		–clay =~25%; moisture content increasing					
20		–brownish yellow (10YR 6/6) and light gray (10YR 7/1); saturated @ 19'				20	
		Bottom of Boring @ 22' 176.6'					

Driller J. Odom/J. Hart

Logged By Jeanie Odom

Drilling Started 6/25/12

Drilling Completed 6/25/12

Construction Completed

Development Completed

Type of Well Monitor Well

Drilling Method H.S.A.

Borehole Diameter 8.25"

Well Casing 2.0" Dia. 0.0' to 18.0'

Casing Type PVC

Well Screen 2.0" Dia. 18.0' to 21.0'

Screen Type Slotted

Slot Size 0.010"

Grout Type Cement/Bentonite

Bentonite Seal 14-16'

Filter Pack Qty. 16-22'

Filter Pack Type 20/40 Sand

Static Water Level

Elevation

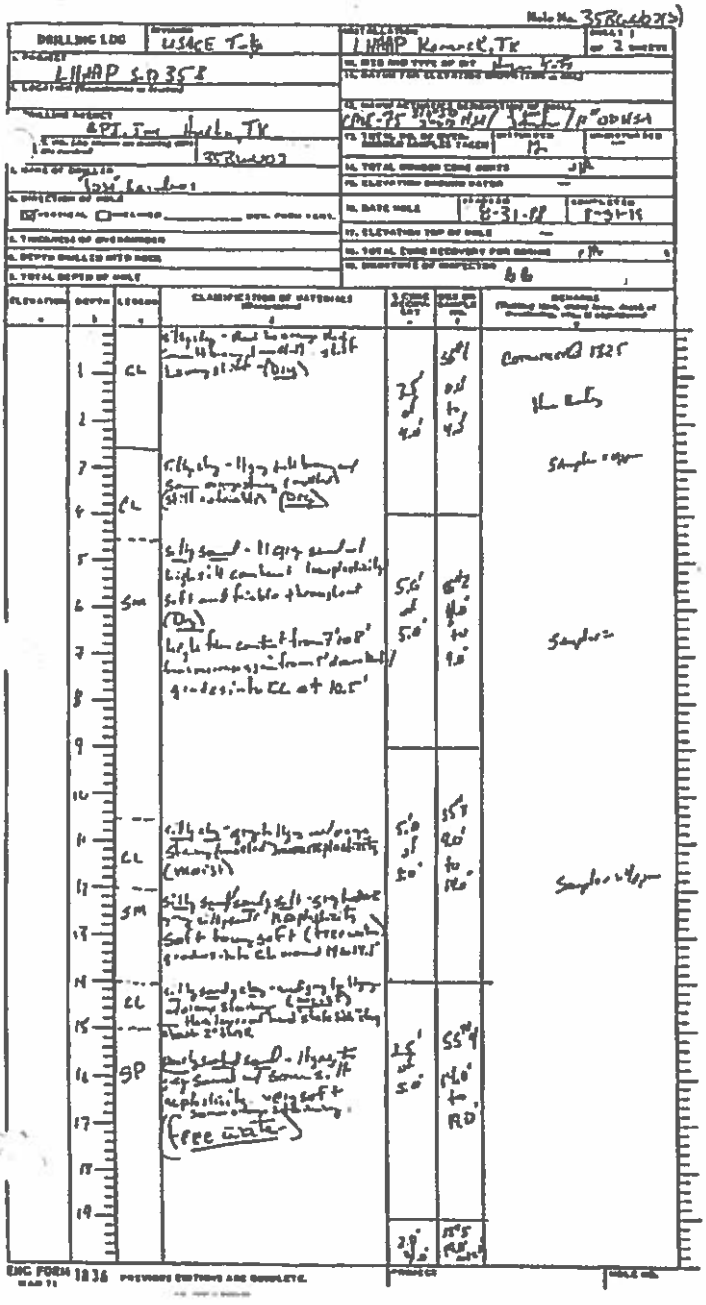
Notes: Seepage @ 19' while drilling.

GPS Coordinates: N32 679888°, W94 141583°

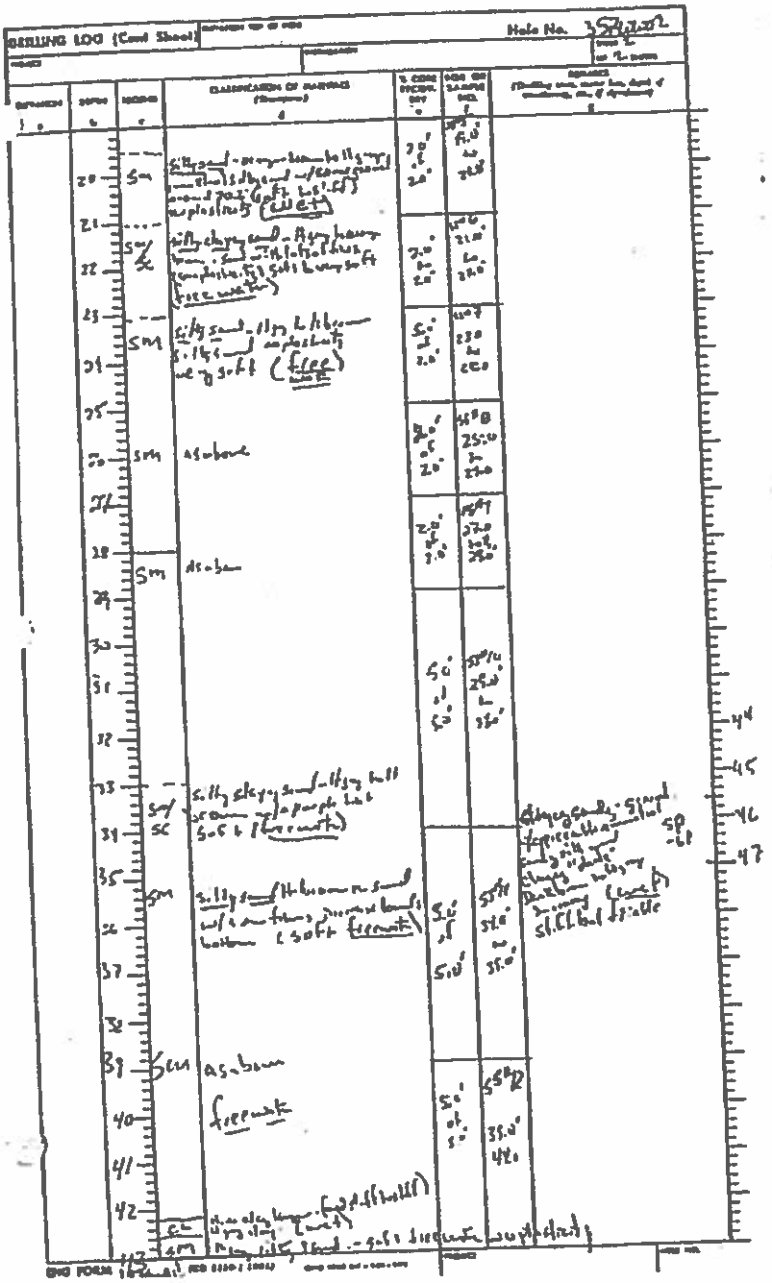
ETTL Engineers & Consultants Inc.

US ARMY CORPS OF ENGINEERS MONITORING WELLS
BORING LOGS

35BWWC02 1 of 2



35BWW02 2 of 2



35BWW07 1 of 2

SITE 35B(37)
HOLE NO. 35BWW07

BORING LOG	DIVISION TERC Houston Federal	INSTALLATION LHAAP	SHEET 1 OF SHEETS
1. PROJECT LHAAP		9. DATUM FOR ELEVATION SHOWN (TBM or MSL) MSL	
2. LOCATION Karnack, Texas		10. MANUFACTURER'S DESIGNATION OF DRILL CME 75	
3. DRILLING AGENCY Wedi Drilling		11. OVERBURDEN SAMPLES DISTURBED YES	UNDISTURBED
4. HOLE NO. (As shown on drawing title and file number) 35BWW07		12. TOTAL NUMBER CORE BOXES NA	
		13. ELEVATION GROUND WATER	
5. NAME OF DRILLER Oscar Garcia		14. DATE HOLE STARTED 9/8/07	COMPLETED 9/8/07
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED 0° DEG. FROM VERT.		15. ELEVATION TOP OF HOLE Not originally recorded, see survey	
7. TOTAL DEPTH OF HOLE 28'		16. TOTAL CORE RECOVERY FOR BORING ____ %	
8. SIZE AND TYPE OF BIT 8" O.D. HSA 2" Split Spoon		17. LOGGED BY A. [illegible]	QC

PID (ppm) a	DEPTH b	USCS c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	SAMPLE f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
0.0		CL	CLAY, SANDY, NO PLASTICITY, STIFF, DRY, BROWN, NO ODOR	100%		
0.0	5			75%		
		SM	SAND, SILTY, ~~[illegible]~~ SLIGHTLY DENSE, MODERATE TO WELL SORTED, GRAY, MOIST, NO ODOR			
0.0		ML	SILT, CLAYEY, DENSE, NO PLASTICITY, POORLY SORTED, MOIST, GRAY, NO ODOR	100%		
0.0	10	CL	CLAY, SANDY, LOW PLASTICITY, SOFT TO STIFF, MOIST, GRAY, NO ODOR	100%		

35B WW07 2 of 2

DRILLING LOG (Cont Sheet) | ELEVATION TOP OF HOLE | Hole No. 35BWW07

PROJECT LHMP-TRC | INSTALLATION LHMP | SHEET 2 OF SHEETS

FIELD CLASSIFICATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc.) (If applicable)
0.0	15	CL	SAME AS ABOVE	100%		
			-BECOMES SILTY, STIFF			
0.0				100%		
0.0		SC		100%		
	20	CL	CLAY; SILTY, LOW PLASTICITY, SOFT, WET, TRACE SAND, GRAVEL			
			-BECOMES FIRM TO STIFF			
0.0			-BECOMES DRY	0.0		
	25		END OF BORING @ 23' BGS			

PROJECT | HOLE NO.

ENG FORM 1836—PREVIOUS EDITIONS ARE OBSOLETE. MAR 71

(Page 2 of 2)

358 W/WOB 1 of 3

SITE 358(37)

HOLE NO. 358WW/68

DRILLING LOG	DIVISION FEDERAL - HOUSTON	INSTALLATION LHAAP	SHEET OF SHEETS
1. PROJECT LHAAP		10. SIZE AND TYPE OF BIT	
2. LOCATION (Coordinates or Station) KARNACK, TEXAS		11. DATUM FOR ELEVATION SHOWN (MSL or USC) MSL	
3. DRILLING AGENCY JERI DRILLING		12. MANUFACTURER'S DESIGNATION OF DRILL CME 75	
4. HOLE NO. (As shown on drawing title and hole number) 358 WW09		13. OVERBURDEN SAMPLES: DISTURBED	UNDISTURBED 125
5. NAME OF DRILLER OSCAR GARCIA		14. TOTAL NUMBER CORE BOXES NA	
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED 0° DEG. FROM VERT.		15. ELEVATION GROUND WATER	
7. THICKNESS OF OVERBURDEN NA		16. DATE HOLE STARTED 9/7/07	COMPLETED 9/7/07
8. DEPTH DRILLED INTO ROCK NA		17. ELEVATION TOP OF HOLE	
9. TOTAL DEPTH OF HOLE 32'		18. TOTAL CORE RECOVERY FOR BORING %	
		INSPECTOR	

ELEVATION PD (a)	DEPTH (b)	LEGEND (c)	CLASSIFICATION OF MATERIALS (Description) (d)	% CORE RECOVERY (e)	BOX OR SAMPLE NO. (f)	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) (g)
0.0	5	CL	CLAY, SANDY, BROWN TO GRAY, DRY, LOW PLASTICITY, SOFT	100%		
0.0			- BECOMES LESS SANDY	95%		
0.0	10			86%		
0.0						

p1 of 3

35BWW08 2 of 3

DRILLING LOG (Cont Sheet)	ELEVATION TOP OF HOLE NR	Hole No. 35BWW08
PROJECT LHAAP-TCRC	INSTALLATION Hwy LHAAP	SHEET OF SHEETS

FLD ELEVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)
			SAME AS ABOVE			
0.0	15	CL		85%		
0.0				95%		
0.0	20					
			SAND, SILTY, DENSE, THRUY-SORTED, DRY, BROWN TO GRAY			
0.0		SM		90%		
0.0	25			100%		
0.0				100%		

ENG FORM 1836—APREVIOUS EDITIONS ARE OBSOLETE. MAR 71

PROJECT | HOLE NO.

35B WW08 3 of 3

DRILLING LOG (Cont Sheet)	ELEVATION TOP OF HOLE NR	Hole No. 35BWW08
PROJECT LHMP- TRBRC	INSTALLATION LHMP	SHEET OF SHEETS

PID EXCAVATION	DEPTH	LEGEND	CLASSIFICATION OF MATERIALS (Description)	% CORE RECOVERY	BOX OR SAMPLE NO.	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant)
0.0	30	CL	~~CLAY, SANDY, BROWN TO GRAY, MOIST, MEDIUM PLASTICITY, STIFF,~~ No odor @ 4/7/07 Same as above	100%		
0.0	32		CLAY, SANDY, MEDIUM PLASTICITY, STIFF, MOIST, No odor, BROWN TO GRAY	100%		
			END OF BORING @ 32' BGS			

ENG FORM 1836—APPROVED EDITIONS ARE OBSOLETE.
MAR 71

PROJECT | HOLE NO.

(Page 3 of 3)

00840028

35B WW09

Texas Department of Licensing and Regulation

Water Well Driller/Pump Installer Section
P O Box 12157 Austin, Texas 78711 (512)463-7880 FAX (512)463-8616
Toll free (800)803-9202
Email address: water.well@license.state.tx.us Web address: www.license.state.tx.us

Attention Owner: Confidentiality Privilege Notice on reverse side of owner's copy.

This form must be completed and filed with the department and owner within 60 days upon completion of the well

WELL REPORT

A. WELL IDENTIFICATION AND LOCATION DATA

1) OWNER

Name:	Address:	City:	State:	Zip:
Corps of Engineers	1645 S. 101st E. Ave.	TULSA	OK	74128

2) WELL LOCATION

Well # or # of wells drilled	County:	Physical Address:	City:
35BWW09	Harrison	Former Army Ammo Plant	Karnack, TX.
	Lat. 32.6798181	Long. 94.1456597	Grid #

3) Type of Work
☒ New Well ☐ Reconditioning ☐ Replacement ☐ Deepening

4) Proposed Use (check) ☒ Monitor ☐ Environmental Soil Boring ☐ Domestic ☐ Extraction ☐ Free ☐ Industrial ☐ Irrigation ☐ Injection ☐ Closed-Loop Geothermal ☐ De-watering ☐ Test well ☐ Rig Supply ☐ Stock ☐ Public Supply – If Public Supply, were plans approved? ☐ Yes ☐ No

5) NT

6) Drilling Date
Started 01/25/12
Completed 01/26/12

Diameter of Hole

Dia. (in)	From (ft)	To (ft)
11"	Surface	35

7) Drilling Method (check)
☐ Driven ☐ Air Rotary ☐ Mud Rotary ☐ Bored ☐ Air Hammer ☐ Cable Tool ☐ Jetted ☒ Hollow Stem Auger ☐ Reverse Circulation ☐ Other

From (ft)	To (ft)	Description and color of formation material
0	5	SC, light brown, sandy clay
5	10	SC, light brown, Hard Sandy clay
10	15	CL, dark brown, Hard tight Clay
15	20	CL, light brown, Hard
20	25	CL, light brown, clay
25	30	SC, light brown, Sandy Clay
30	35	SC, light brown, Sandy Clay

(Use reverse side of Well Owner's copy, if necessary)

8) Borehole Completion ☐ Open Hole ☐ Straight Wall ☐ Under-reamed ☒ Gravel Packed ☐ Other
Gravel packed interval from: 22 ft. to: 35 ft. Size: 20/40

Casing, Blank Pipe, and Well Screen Data

Dia. (in)	New Or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft) From	Setting (ft) To	Gage Casing Screen
4	new	PVC Riser	0	25	sch 40
4	new	PVC 010 Screen	25	35	sch 40

9) Annular Seal Data: i.e. from 0 ft. to 100 ft. #sacks & material 15 cement
from 19 ft. to 22 ft. #sacks & material 3 - Bentonite
from 2 ft. to 19 ft. #sacks & material 6 - Portland
from ____ ft. to ____ ft. #sacks & material ____
Method Used Thru Augers Performed By Driller
Distance to septic field or other concentrated contamination ____ ft.
Distance to Property Line ____ ft.
Method Verified: ____ Approved by Variance # ____

10) Surface Completion (If steel cased, leave blank)
☒ Surface Slab Installed ☐ Surface Sleeve Installed ☐ Pitless Adapter Used ☐ Alternative Procedure Used

11) Water Level
Static level ____ ft. below surface Date: __/__/__
Artesian Flow ____ gpm

12) Packers:

Type	Depth	Type	Depth

13) Plugged ☐ Well plugged within 48 hour
Casing left in well: Cement/Bentonite placed in well:

From (ft)	To (ft)	From (ft)	To (ft)	# Sacks & Material used

14) Type Pump
☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder ☐ Other ____
Depth to pump bowls, cylinder, jet, etc. ____ ft.

15) Water Test
Type test ☐ Pump ☐ Bailer ☐ Jetted ☐ Estimated
Yield: ____ gpm with ____ ft. drawdown after ____ hrs.

16) Water Quality
Type of water ____ Depth of Strata: ____ Was a chemical analysis made? ☐ Yes ☐ No
Did you knowingly penetrate a strata which contains undesirable constituents? ☐ Yes ☐ No If yes, Continue:
Check One: ☐ Naturally poor-quality groundwater – type ____ ☐ Hydrocarbons (i.e. gas, oil, etc.) ☐ Hazardous material/waste contamination encountered ☐ Other (describe) ____

☐ *I certify that while drilling, deepening, or otherwise altering the above described well, undesirable water or constituents was encountered and the landowner was informed that such well must be completed or plugged in such a manner as to avoid injury or pollution.*

By signing this well report, I certify that I drilled or supervised the drilling of this well and that each and all of the statements herein are true and correct.

Company & Individual's Name: (type or print)	Mohawk Drilling, Inc.	Lic. No.:	54689M
Address: 10010 E. 16th Street	City: TULSA	State: OK	Zip 74128
Signature: [signature]	2/16/12	Signature:	

TDLR FORM 001WWD/11-10 TDLR (Original) Landowner (copy) Driller/Pump Installer (copy)

35BWW10 1 of 2

AECOM

Client: US ACE		BORING ID: 35BWW10
Project Number: 60256135		
Site Location: SITE 37		
Coordinates:	Elevation	Sheet 1 of 2
Drilling Method: HSA CME 75		Monitoring Well Installed: Yes
Sample Type(s):	Boring Diameter: 8.25	Screened Interval: 33.0 - 18.23
Weather: Sunny 90's	Logged By: KAW	Date/Time Started: 8/22/13 4:30	Depth of Boring: 33.5
Drilling Contractor: Fugro	Ground Elevation:	Date/Time Finished: 8/22/13 13:45	Water Level: 19'

Depth (ft)	Geologic Sample ID	Sample Depth (ft)	Blows per 6"	Recovery (inches)	Headspace (ppm)	U.S.C.S.	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (if known)	Lab Sample ID	Lab Sample Depth (ft)
						SOIL	woody fragments v. pale Brown		
1						ML			
2				100 %	0.0	CL	Clay yellowish red,		
3							clay, silty w/ gray with reddish mottling		
4							Clay - moist		
5						SM	4.5 Sand, vf - silty pale brown		
6				100 %	0.0	CL	Clay, pale brown w/ yellowish brown mottling		
7									
8						SP	Sand vf - f reddish brown moist		
						CL	clay - lt greenish gray + reddish brown mottled w/ black nodules at top silty Not after that		
9									
10									
11					0.0	ML	10.2-10.4 silt, w/ clay yellowish brown Dry		
12				100 %		CL	Clay yellowish brown and lt gray silty		
13									
14						SM	Sand pale brown vf grained silty		
15						CL	Clay pale moist		
16				90%	0.0	SP	Sand pale brown and yellowish brown vf to fine grained, moist		
17									
18						CL	Clay greenish gray, plastic		
19							wet at 19', silty to sandy (vf)		
20							silty sand stringer		

NOTES:

Date	Time	Depth to groundwater while drilling

Checked by: Date:

35B WW10 2 of 2

AECOM

Client: USACE
Project Number: 60256135
Site Location: SITE 37
Coordinates: Elevation
Drilling Method: HSA CME 75
Sample Type(s): Boring Diameter: 8.25
Weather: Logged By: KAW
Drilling Contractor: Ground Elevation:
Date/Time Started: 3/22/13 9:30
Date/Time Finished: 3/22/13 13:15

BORING ID: 35B WW10
Sheet 2 of 2
Monitoring Well Installed: YES
Screened Interval: 33.0 - 18.25
Depth of Boring: 33.5
Water Level: 19'

Depth (ft)	Geologic Sample ID	Sample Depth (ft)	Blows per 6"	Recovery (inches)	Headspace (ppm)	U.S.C.S.	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (if known)	Lab Sample ID	Lab Sample Depth (ft)
21				70%	0.0	SP/SW	wet ~~Sand~~, wet, pale brown to yellowish brown, fn-med grained, some coarse grains.		
22									
23							clay stringer		
24						SP/SW	Sand, wet, yellowish brown, fn-med, some coarse		
25									
26				60%	0.0	CL	clay, Pale brown, plastic, silty		
27						SP	Sand, lt. brownish gray, vf grained w/some yellowish brown		
28									
29						SP	Sand lt olive brown, fine-med grained		
30						CL	clay stringer, reddish brown, silty		
31				70%	0.0	SP	Sand, lt brownish gray, fine-med		
32							clay stringer, reddish brown, silty		
33						SP	Sand - lt brownish gray, vf-fn		
34				TD 33.5					
35									
36									
37									
38									
39									
40									

10:10
10:55

NOTES:

Date	Time	Depth to groundwater while drilling

Checked by: Date:

00840031

35B WW 11

Attention Owner: Confidentiality Privilege Notice on reverse side of owner's copy.

Texas Department of Licensing and Regulation

Water Well Driller/Pump Installer Section
P.O. Box 12157 Austin, Texas 78711 (512)463-7880 FAX (512)463-8616
Toll free (800)803-9202
Email address: water well@license.state.tx.us Web address: www.license.state.tx.us

This form must be completed and filed with the department and owner within 60 days upon completion of the well.

WELL REPORT

A. WELL IDENTIFICATION AND LOCATION DATA

1) OWNER

Name:	Address:	City:	State:	Zip:
Corps of Engineers	1645 S. 101st E. Ave.	TULSA	OK	74128

2) WELL LOCATION

Well # or # of wells drilled	County:	Physical Address:	City:
35BWW11	Harrison	Former Longhorn Army Ammo Plant	Karnack TX.

Lat. 32.6794312 Long. 94.1448264 Grid #

3) Type of Work
☒ New Well ☐ Reconditioning ☐ Replacement ☐ Deepening

4) Proposed Use (check) ☒ Monitor ☐ Environmental Soil Boring ☐ Domestic ☐ Extraction ☐ Frac ☐ Industrial ☐ Irrigation ☐ Injection ☐ Closed-Loop Geothermal ☐ De-watering ☐ Test well ☐ Rig Supply ☐ Stock ☐ Public Supply – If Public Supply, were plans approved? ☐ Yes ☐ No

5) NT

6) Drilling Date
Started 01/24/12
Completed 01/26/12

Diameter of Hole

Dia (in)	From (ft)	To (ft)
11"	Surface	35'

7) Drilling Method (check)
☐ Driven ☐ Air Rotary ☐ Mud Rotary ☐ Bored ☐ Air Hammer ☐ Cable Tool ☐ Jetted ☒ Hollow Stem Auger ☐ Reverse Circulation ☐ Other

From (ft)	To (ft)	Description and color of formation material
0	5	ML, light brown, clayey silt
5	10	ML, Gray Clay, w/light brown sand
10	15	SC, light brown, Sandy Clay
15	20	SC, light brown, fine sand
20	25	SC, light brown, Clayey Sand
25	30	SC, light brown, Clayey Sand
30	35	SC, light brown, Clayey Sand w/gray clay, mottled

(Use reverse side of Well Owner's copy, if necessary)

8) Borehole Completion ☐ Open Hole ☐ Straight Wall ☐ Under-reamed ☒ Gravel Packed ☐ Other
Gravel packed interval from: 22 ft. to: 35 ft. Size: 20/40

Casing, Blank Pipe, and Well Screen Data

Dia. (in.)	New Or Used	Steel, Plastic, etc Perf., Slotted, etc Screen Mfg., if commercial	Setting (ft) From	Setting (ft) To	Gage Casing Screen
4	new	PVC Riser	0	25	sch 40
4	new	PVC .010 Screen	25	35	sch 40

9) Annular Seal Data: i.e. from 0 ft to 100 ft #sacks & material 11 cement
from 19 ft. to 22 ft. #sacks & material 3-Bentonite
from 2 ft. to 19 ft. #sacks & material 6-Portland
from ft. to ft. #sacks & material
Method Used Thru Augers Performed By Driller
Distance to septic field or other concentrated contamination ft.
Distance to Property Line ft
Method Verified: Approved by Variance #

10) Surface Completion (If steel cased, leave blank)
☒ Surface Slab Installed ☐ Surface Sleeve Installed ☐ Pitless Adapter Used ☐ Alternative Procedure Used

11) Water Level
Static level ft. below surface Date: / /
Artesian Flow gpm

12) Packers:

Type	Depth	Type	Depth

13) Plugged ☐ Well plugged within 48 hour
Casing left in well: Cement/Bentonite placed in well:

From (ft)	To (ft)	From (ft)	To (ft)	# Sacks & Material used

14) Type Pump
☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder
☐ Other
Depth to pump bowls, cylinder, jet etc., ft.

15) Water Test
Type test ☐ Pump ☐ Bailer ☐ Jetted ☐ Estimated
Yield: gpm with ft. drawdown after hrs.

16) Water Quality
Type of water Depth of Strata: Was a chemical analysis made? ☐ Yes ☐ No
Did you knowingly penetrate a strata which contains undesirable constituents? ☐ Yes ☐ No if yes, Continue:
Check One: ☐ Naturally poor-quality groundwater – type ☐ Hydrocarbons (i.e. gas, oil, etc.)
☐ Hazardous material/waste contamination encountered ☐ Other (describe)

☐ *I certify that while drilling, deepening, or otherwise altering the above described well, undesirable water or constituents was encountered and the landowner was informed that such well must be completed or plugged in such a manner as to avoid injury or pollution.*

By signing this well report, I certify that I drilled or supervised the drilling of this well and that each and all of the statements herein are true and correct.

Company & Individual's Name: (type or print)	Mohawk Drilling, Inc.	Lic. No.:	54689M
Address: 10010 E. 16th Street	City: TULSA	State: OK	Zip 74128
Signature: [signature]	2/16/12	Signature:	
Licensed Driller/Pump Installer	Date	Apprentice	Apprentice Reg. Number:

TDLR FORM 001WWD / 11-10 TDLR (Original) Landowner (copy) Driller/Pump Installer (copy)

35B WW12 1 of 2

AECOM

Client: USACE			BORING ID: 35B WW12
Project Number: 60256135			
Site Location: SITE 37			
Coordinates:	Elevation		Sheet 1 of 2
Drilling Method: HSA CME 75			Monitoring Well Installed: yes
Sample Type(s):	Boring Diameter: 8.25		Screened Interval: 35.0 - 20.3
Weather:	Logged By: KAW	Date/Time Started: 8/23/13 10:05	Depth of Boring: ~~35.0~~ 35.5
Drilling Contractor:	Ground Elevation:	Date/Time Finished: 8/23/13 14:25	Water Level: 14'

Depth (ft)	Geologic Sample ID	Sample Depth (ft)	Blows per 6"	Recovery (inches)	Headspace (ppm)	U.S.C.S.	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (if known)	Lab Sample ID	Lab Sample Depth (ft)
1				43"		CL	Clay strong brown silty, dry, w/ yellowish brown mottles abundant roots		
2							- occ black inclusions		
3							- Pale brown sily clay		
4				58"			silty clay - reddish brown with brownish yellow inclusions		
5									
6									
7									
8				62"			Clay - less silt, lt brown w/ yellowish brown inclusions		
9							Clay silty		
10						SC	Clayey sand yellowish brown		
11						SM	silty sand lt brown friable		
12						CL	moist - Clay - silty, lt brown w/ black inclusions (1" or more)		
13							roots moist to wet		
14				60"		SC	Sand, silty w/ clay		
15						SP	sand vf, lt gray moist		
16						SC			
17						CL	Clay lt gray, silty w/ yellowish brown mottles wet		
18									
19						SM	sand, silty, wet, some clay		
20									

NOTES:

Date	Time	Depth to groundwater while drilling

Checked by: Date:

35B WW12 2 of 2

AECOM

Client: USACE
Project Number: 60256135
Site Location: SITE 37
Coordinates: Elevation
Drilling Method: HSA CME 75
Sample Type(s): Boring Diameter: 8.25
Weather: Logged By: KAW
Drilling Contractor: Ground Elevation:

BORING ID: 35B WW12
Sheet 2 of 2
Monitoring Well Installed: Yes
Screened Interval: 35.0-20.3
Depth of Boring: 35.0-35.5
Date/Time Started: 8/13/13 11:08
Date/Time Finished: 8/23/13 14:24
Water Level: 14'

Depth (ft)	Geologic Sample ID	Sample Depth (ft)	Blows per 6"	Recovery (inches)	Headspace (ppm)	U.S.C.S.	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (if known)	Lab Sample ID	Lab Sample Depth (ft)
21									
22				42"		SW	Sand, yellowish brown, fn-med, some coarse to pebbly w/clay beds 1" thick		
23						CL	clay, lt gray, plastic		
24						SP	Sand, yellowish brown, fine grained		
25						SM	Sand, silty, lt gray		
26				60"		SP	Sand, yellowish brown, fine grained		
27						CL	Clay, lt gray, plastic		
28						CL	clay, lt gray, silty to sandy		
29						SW	Sand, well sorted f-med, some coarse		
30						SW	Gravelly sand f-coarse - fine gravel, yellowish brown, no clay		
31				58"		SW	Sand, brownish yellow vf-coarse with clay (lt gray layers about 1" thick		
32						SW	Sand fine to pebbly, yellowish brown w/clay layers		
33						SP	Sand vf-fine, lt yellowish brown		
11:20 34				NR 0.0		No Recovery			
11:47 35				TD 35					
36									
37									
38									
39									
40									

NOTES:

Date	Time	Depth to groundwater while drilling

Checked by: Date:

35 BWW 13 1 of 2

AECOM

Client: USACE		BORING ID: 35BWW13
Project Number: 60256135		
Site Location:		
Coordinates:	Elevation	Sheet 1 of 2
Drilling Method: HSA CME 75		Monitoring Well Installed:
Sample Type(s):	Boring Diameter: 8.25	Screened Interval: 34.5-19.8
Weather: 90's SUNNY w/Sme Clouds	Logged By: KAW	Date/Time Started: 8/23/13 15:35	Depth of Boring: 35.0
Drilling Contractor: Fugro	Ground Elevation:	Date/Time Finished: ~~8/23/13~~ KAW 8/24/13 8:15	Water Level: 19'

Depth (ft)	Geologic Sample ID	Sample Depth (ft)	Blows per 6"	Recovery (inches)	Headspace (ppm)	U.S.C.S.	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (if known)	Lab Sample ID	Lab Sample Depth (ft)
							concretions ~~[illegible]~~ soil dk gray-yellowish Red		
1						CL	clay, silty, yellowish Red		
2							2.3		
3						SM	silt, sand, with some clay mottled light yellowish brown and pale brown. some clay, dry		
4									
5				56"			silty sand, a/a		
6									
7						SM	— hard, pale brown, dry		
8									
9							silty sand, silty-vf, dry		
10						CL	Silty clay grayish brown		
11				61"					
12									
13						CL	Clay, ~~pale brown~~ pinkish gray, w/yellowish brown mottley, less silty, more plastic		
14						SP	Sand, slight gray, vf grained		
15									
16				44"		SM	Silty sand, lt brown, w/yellowish moist brown thin laminations		
17									
18							— Thin clay beds		
19						SC	silty, clayey sand wet		
20									

NOTES: Added catcher at 18'

Date	Time	Depth to groundwater while drilling

Checked by: Date:

35SBWW13 2 of 2

AECOM

Client: USACE
Project Number: 60256135
Site Location:
Coordinates: Elevation
Drilling Method: HSA CME 75
Sample Type(s): Boring Diameter: 8.25
Weather: 70's w/some clouds Logged By: KAW
Drilling Contractor: Fugro Ground Elevation:
Date/Time Started: 8/23/13 15:55 Date/Time Finished: 8/24/13 8:15

BORING ID: 35BWW13
Sheet 2 of 2
Monitoring Well Installed: Yes
Screened Interval: 34.5 - 19.8
Depth of Boring: 35.0
Water Level: 19'

Depth (ft)	Geologic Sample ID	Sample Depth (ft)	Blows per 6"	Recovery (inches)	Headspace (ppm)	U.S.C.S.	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (if known)	Lab Sample ID	Lab Sample Depth (ft)
21				60"		SC	clayey Sand, yellowish brown, w/ lt gray mottling		
22						CL	silty Clay, pale brown, mottled w/ yellowish brown		
23									
24						SM	silty fn Sand, wet, yellowish brown		
25				48"		CL	Clay, lt gray		
26						SM/SP	silty-fn Sand - yellowish brown wet		
27									
28									
29						SP	Sand, brown, vf-fn, some midium wet		
30						?	No recovery		
31				12"					
32									
33						SW	Sand, brown, fn-coarse, occ pebbles wet		
34				24"					
35				TD 35'					
36									
37									
38									
39									
40									

16:55
17:05

NOTES:

Date	Time	Depth to groundwater while drilling

Checked by: Date:

00840036

35BWW 14

Texas Department of Licensing and Regulation

Water Well Driller/Pump Installer Section
P.O. Box 12157 Austin, Texas 78711 (512)463 7880 FAX (512)463 8616
Toll free (800)803-9202
Email address: water.well@license.state.tx.us Web address: www.license.state.tx.us

Attention Owner: Confidentiality Privilege Notice on reverse side of owner's copy.

This form must be completed and filed with the department and owner within 60 days upon completion of the well

WELL REPORT

A. WELL IDENTIFICATION AND LOCATION DATA

1) OWNER

Name:	Address:	City:	State:	Zip:
Corps of Engineers	1645 S. 101ST E. Ave	TULSA	OK	74128

2) WELL LOCATION

Well # or # of wells drilled	County:	Physical Address:	City:
35 BWW 14	Harrison	Former Longhorn Army Ammo Plant	KARNACK, TX.
	Lat. 32.6802813	Long. 94.1444334	Grid #

3) Type of Work
☒ New Well ☐ Reconditioning ☐ Replacement ☐ Deepening

4) Proposed Use (check) ☒ Monitor ☐ Environmental Soil Boring ☐ Domestic ☐ Extraction ☐ Fuel ☐ Industrial ☐ Irrigation ☐ Injection ☐ Closed-Loop Geothermal ☐ De-watering ☐ Test well ☐ Rig Supply ☐ Stock ☐ Public Supply – If Public Supply, were plans approved? ☐ Yes ☐ No

5) NT

6) Drilling Date
Started 01/24/12
Completed 01/26/12

Diameter of Hole

Dia.(in)	From (ft)	To (ft)
11"	Surface	35'

7) Drilling Method (check)
☐ Driven ☐ Air Rotary ☐ Mud Rotary ☐ Bored ☐ Air Hammer ☐ Cable Tool ☐ Jetted ☒ Hollow Stem Auger ☐ Reverse Circulation ☐ Other

From (ft)	To (ft)	Description and color of formation material
0	5	SM, light brown
5	10	SM, light brown
10	15	SM, light brown
15	20	SM, light brown w/trace white sand
20	25	SM, light brown w/trace fine white sand
25	30	SM, light brown
30	35	SM, light brown

(Use reverse side of Well Owner's copy, if necessary)

8) Borehole Completion ☐ Open Hole ☐ Straight Wall ☐ Under-reamed ☒ Gravel Packed ☐ Other
Gravel packed interval from: 22 ft. to: 35 ft. Size: 20/40

Casing, Blank Pipe, and Well Screen Data

Dia. (in.)	New Or Used	Steel, Plastic, etc. Perf, Slotted, etc Screen Mfg., if commercial	Setting (ft) From	Setting (ft) To	Gage Casing Screen
4	new	Plastic Riser	0	25	sch.40
4	new	PVC .010 screen	25	35	sch.40

9) Annular Seal Data: i.e. (from 0 ft to 100 ft #sacks & material (if cement))
from 19 ft. to 22 ft. #sacks & material 3 - Bentonite
from 2 ft. to 19 ft. #sacks & material 6 - Portland
from ____ ft. to ____ ft. #sacks & material ____
Method Used TREMIE Performed By Driller
Distance to septic field or other concentrated contamination ____ ft.
Distance to Property Line ____ ft
Method Verified: ____ Approved by Variance # ____

10) Surface Completion (If steel cased, leave blank)
☒ Surface Slab Installed ☐ Surface Sleeve Installed ☐ Pitless Adapter Used ☐ Alternative Procedure Used

11) Water Level
Static level ____ ft. below surface Date: / /
Artesian Flow ____ gpm

12) Packers:

Type	Depth	Type	Depth

13) Plugged ☐ Well plugged within 48 hour
Casing left in well: Cement/Bentonite placed in well:

From (ft)	To (ft)	From (ft)	To (ft)	# Sacks & Material used

14) Type Pump
☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder ☐ Other ____
Depth to pump bowls, cylinder, jet, etc., ____ ft.

15) Water Test
Type test ☐ Pump ☐ Bailer ☐ Jetted ☐ Estimated
Yield: ____ gpm with ____ ft. drawdown after ____ hrs.

16) Water Quality
Type of water ____ Depth of Strata: ____ Was a chemical analysis made? ☐ Yes ☐ No
Did you knowingly penetrate a strata which contains undesirable constituents? ☐ Yes ☐ No If yes, Explain:
Check One: ☐ Naturally poor quality groundwater – type ____ ☐ Hydrocarbons (i.e. gas, oil, etc.) ____
☐ Hazardous material/waste contamination encountered ☐ Other (describe) ____

☐ *I certify that while drilling, deepening, or otherwise altering the above described well, undesirable water or constituents was encountered and the landowner was informed that such well must be completed or plugged in such a manner as to avoid injury or pollution.*

By signing this well report, I certify that I drilled or supervised the drilling of this well and that each and all of the statements herein are true and correct.

Company & Individual's Name: (type or print)		Lic. No.:
	MOHAWK Drilling, Inc.	54689M
Address: 10010 E. 16th STREET	City: TULSA	State: OK Zip 74128
Signature: [signature] 2/16/12	Signature:	

TDLR FORM 001WWD / 11-10 TDLR (Original) Landowner (copy) Driller/Pump Installer (copy)

35B WW 15 1 of 3

8/6/13

0-44' CME 850
44-50' CME 75

AECOM

Client:	USACE
Project Number:	60256135
Site Location:	Site 37
Coordinates:	Elevation:
Drilling Method:	HSA 4¼ ID CME 850 track
Sample Type(s):	Split Spoon 1.5 ID
Boring Diameter:	8-IN.
Weather:	Hot 95F
Logged By:	M. Hoffman
Date/Time Started:	8/6 850
Date/Time Finished:	8/12/13 1030
Drilling Contractor:	FUGRO
Ground Elevation:	

BORING ID: 35BWW15
Sheet: 1 of 3
Monitoring Well Installed: ✓
Screened Interval: 17.6-47.6
Depth of Boring: 50.1
Water Level:

Depth (ft)	Geologic sample ID	Sample Depth (ft)	Blows per Push	Recovery (inches)	Headspace (ppm)	U.S.C.S.	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known)	Lab Sample ID	Lab Sample Depth (Ft.)
1							Pushed twice; only recovery was 2 in in shoe of spoon		
2							0-8.2		
3			1 0-5	2 Shoe only	0	ML	Fine Sandy SILT, yellowish brown, dry.		
4									
5		13 9 7					same as above except ~~yellowish~~ grayish brown and brownish yellow very stiff -		
6		11 4							
7		8 6	2 4-9	48					
8		7 8			0	SP	8.2-11.5 Fine ~~Poorly Graded~~ SAND, pale brown, dry, medium dense, trace silt		
9		8							
10		10 9 8					No Recovery		
11		15 11	3 9-14	30		SM	11.5-13 SILTY Fine Sand, brownish yellow to gray, stiff Dense, dry		
12		20 23							
13		24 25			0	CL	13-13.5 SILTY SANDY CLAY, mottled brownish yellow & gray, dry		
14		50/4"				SM	13.5-16 SILTY Fine SAND, brownish yellow, dry		
15		9 11							
16		14 14	4 14-19	50		SC	16-17 CLAYEY Fine SAND, mottled brownish yellow and grayish brown, dense, ~~dry~~ moist		
17		16 17				SM	17-21.5 Fine SILTY SAND, yellowish brown to grayish brown, dense, moist		
18		18 17			0		Fine ~~Sand~~ on 18'		
19		19 21							
20		4 4	19-24						

NOTES: Sample by standard split spoons 1-3/8 ID JOINED together - 5' Runs

Date	Time	Depth to groundwater while drilling
8-6-		22 ~~Soil~~ Sampled

Checked by Date

35 B WW 15 2 of 3

AECOM	Client: USACE	BORING ID: 35BWW15
	Project Number:	
	Site Location: Site 37	
	Coordinates: / Elevation:	Sheet: ~~1 of~~ 2 of 3
	Drilling Method: HSA	Monitoring Well Installed:
	Sample Type(s): Split Spoon / Boring Diameter:	Screened Interval:
Weather:	Logged By: M. Hartford / Date/Time Started:	Depth of Boring:
Drilling Contractor: FUGRO	Ground Elevation: / Date/Time Finished:	Water Level:

Depth (ft)	Geologic sample ID	Blow Count / Sample Depth (ft)	~~Blows per 6"~~ Interval	Recovery (inches)	Headspace (ppm)	U.S.C.S	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (If Known)	Lab Sample ID	Lab Sample Depth (Ft.)
21		7 6 6					19-21.5 No Recovery		
22		8 7	5	30		SC	21.5-25 ~~[illegible]~~ CLAYEY SAND, Brownish gray, ~~wet~~ fine wet, medium dense Fine Roots at 22		
23		9							
water 24		8 10			0				
25		6 9 2					25 – 26.4 SILTY CLAY, mottled gray and brownish yellow, ~~wet~~ moist, stiff		
26		4 6	6	48	Stiff	CL	Plastic 1/6" thread, dull ~~[illegible]~~ smear		
27		4 6					26.4-26.6 Clayey Sand, brownish yellow, wet		
28		6 7							
29		9 4			0				
30		4 4					26.6-33.5		
31		7 7	7	60		CL	Same as above – silty Clay, moist		
32		7 4							
33		6 7					33.5 – 34.5		
34		3 2			0	SC	CLAYEY SAND (SC), brownish yellow, wet, Loose		
35		2 6		56		CL / GW	SILTY CLAY, wet 34.5-35.5 Iron oxide angular Gravel 35.5-36 ← very dark brown wet		
water 36		5 6	8	~~[illegible]~~		CL	SILTY CLAY, moist, yellowish brown moist, stiff 36-41		
37		7 8							
38		8 8							
39		7			0				
40		WH WH							

NOTES: Only 0.2ft recovery in 35.5-36 Gravel Zone – Assumed remainder wasted away. May be potential high good yield water zone

Date	Time	Depth to groundwater while drilling

Checked by Date

3SB WW ~~ES~~ 15 3 of 3

AECOM

Client: USACE		BORING ID: 3SBWW15
Project Number:		
Site Location: Site 37		
Coordinates:	Elevation	Sheet 3 of 3
Drilling Method: ~~HA~~ HSA		Monitoring Well Installed:
Sample Type(s): Split-spoon	Boring Diameter:	Screened Interval:
Weather:	Logged By: M. Hartford	Date/Time Started:	Depth of Boring:
Drilling Contractor:	Ground Elevation:	Date/Time Finished:	Water Level:

Depth (ft)	Geologic Sample ID	Run # ~~Sample Depth (ft)~~	Blows per 6"	Recovery (inches)	Headspace (ppm)	U.S.C.S.	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (if known)	Lab Sample ID	Lab Sample Depth (ft)
41		9	WH	41		CL	CLAYEY fine SAND, brownish gray, wet 41-41.5		
						SC			
42			3 4 3 5			CL	SILTY CLAY, yellowish brown, moist, medium stiff 41.5-43.5		
43						~~WW~~			
44					0.0	SM	SILTY fine SAND, gray, loose, wet 43.5-44		
45		10	1 2 7	54		CL	SILTY CLAY, brownish yellow, wet very loose 44-45		
46						SM	SILTY FINE SAND with 3 in iron oxide gravel/coarse sand dark yellowish brown, wet 45-46		
47			NR			CL/ML/SM SP	Silty CLAY, SILTY SILTY Fine Sand, gray, moist to wet, laminated 46-47.5 Fine SAND 47.5-47.7, moist to wet		
48			100/2"		0.0				
49		11	5 9 17 26		0.0	CL	SILTY CLAY with fine sand laminations, gray, moist, hard 47.7 -		
50									
51							Total Depth 50.1 ft		
52									
53									
54									
55									
56									
57									
58									
59									
60									

NOTES: TD 44' on 8/6/13 Rig down 8/7/13 - Resume with a different rig on 8/12/13.

Date	Time	Depth to groundwater while drilling

Checked by: Date:

00840040

35B WW16 1 of 2

AECOM

Client: USACE
Project Number: 60256135
Site Location: SITE 37
Coordinates: Elevation
Drilling Method: HSA CME 75
Sample Type(s): Boring Diameter: 8.25
Weather: Sunny 90's Logged By: KAW Date/Time Started: 8/24/13 8:53
Drilling Contractor: Fugro Ground Elevation: Date/Time Finished: 8/25/13 9:[illegible]

BORING ID: 35B WW16
Sheet 1 of 2
Monitoring Well Installed: Yes
Screened Interval: 33.5 - 18.5
Depth of Boring: 34.0
Water Level: 21

Depth (ft)	Geologic Sample ID	Sample Depth (ft)	Blows per 6"	Recovery (inches)	Headspace (ppm)	U.S.C.S.	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (if known)	Lab Sample ID	Lab Sample Depth (ft)
1				22"		CL	Clay - silty, brown, w/ black inclusions moist 1 ft, roots		
2							Clay grayish brown, plastic, moist roots		
8.5 3							moist		
4				53"		SM	Sand, silty - vf, w/ clay, grayish brown w/ yellowish brown silt-vf sand.		
5									
6									
7						SM	- wet - Silty sand w/ clay (lt gray) and yellowish brown silty - vf sand inclusions		
8									
9							wet		
10				60"		CL	Clay, silty, pale brown		
11						SP	Sand vf-fn yellowish red, moist		
12						SM	moist silt-vf yellowish red, moist		
9.14 13						CL	Clay, silty, lt gray, plastic		
14						SM	silty Sand, lt gray moist		
15						CL	Clay silty, lt gray and yellowish brown		
16				54"		SM	Silty Sand, lt gray w/ yellowish brown		
17									
18						SP	Sand, vf-fn, some med. pale brown moist		
						SM	silty Sand, lt olive brown		
19						CL	Clay yellowish brown + pale brown mottled		
20									

NOTES:

Date	Time	Depth to groundwater while drilling

Checked by: Date:

35BWW16 2 of 2

ACOM

Client: USAMC
Project Number: G0256135
Site Location: SITE 37
Coordinates: Elevation
Drilling Method: HSA CME 75
Sample Type(s): Boring Diameter: 8.25
Weather: Sunny 90's Logged By: KAW Date/Time Started: 9/24/13 2:53
Drilling Contractor: Fugro Ground Elevation: Date/Time Finished: 9/25/13 8:48

BORING ID: 35BWW16
Sheet 2 of 2
Monitoring Well Installed: yes
Screened Interval: 33.5-18.5'
Depth of Boring: 34.0
Water Level: 21

Depth (ft)	Geologic Sample ID	Sample Depth (ft)	Blows per 6"	Recovery (inches)	Headspace (ppm)	U.S.C.S.	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (if known)	Lab Sample ID	Lab Sample Depth (ft)
21				63"		CL	wet silty Sand, f grained, yellowish brown wet		
22						SM			
23						CL	Clay, silty, lt gray moist		
24						SM	silty sand lt gray to yellowish brown wet		
25						CL	clay silty sand, yellowish brown		
26				54"		SM	Clay silty, lt gray w/ yellowish brown mottled		
27						CL			
28						SM	silty sand, dark grayish brown, wet, vf-f		
29						SP	wet sand, lt yellowish brown, vf-med		
30						SM	silty - vf sand, lt yellowish brown		
31				64"		CL	clay, silty lt gray plastic		
32						CL	Clay silty, lt yellowish brown, plastic		
33						CL	silty Clay lt yellowish brown and lt gray		
34				TD 33.5			clay, lt gray and lt yellowish brown, plastic		
35				TD 33.5					
36									
37									
38									
39									
40									

NOTES: pushed bottom cap down so that screen is at 33.5.

Date	Time	Depth to groundwater while drilling

Checked by: Date:

35B WW 17 1 of 2

AECOM

Client: USACE			BORING ID: 35B WW 17
Project Number: 60256135			
Site Location: SITE 37			
Coordinates:		Elevation	Sheet 1 of 2
Drilling Method: HSA CME 75			Monitoring Well Installed: yes
Sample Type(s):		Boring Diameter: 8.25	Screened Interval: 33.0-18.3
Weather: Sunny 90's	Logged By: KAW	Date/Time Started: 9/24/18 8:30	Depth of Boring: 33.5
Drilling Contractor: Fugro	Ground Elevation:	Date/Time Finished: 9/25/18 9:18	Water Level: 20.5

Depth (ft)	Geologic Sample ID	Sample Depth (ft)	Blows per 6"	Recovery ~~(inches)~~ %	Headspace (ppm)	U.S.C.S.	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (if known)	Lab Sample ID	Lab Sample Depth (ft)
1				100		SM	Silty Sand, dark yellowish brown, roots, not plastic, soft dry		
2									
3				100		SP	Sand vf-fn grained, some silt grayish brown		
4									
5									
6							moist		
7									
8						CL	Silty Clay, grayish brown with yellowish brown mottled		
9				100		SM	silty Sand, grayish brown and yellowish brown, moist		
10						SP			
11						SM			
						SP	sand fine grained, dark reddish brown		
12						SM			
						SP			
13						CL			
14				100		SP	Sand, vf-fn grained, and yellowish brown, moist		
15									
16						CL	clay, lt gray, plastic		
17						SP/SM	Sand, vf-silty, brown		
18						CL	clay, silty, yellowish brown, moist		
19						SP	Sand, vf-fn grained, yellowish brown		
20									

NOTES: Boxed Core for this well
0-33 feet

Date	Time	Depth to groundwater while drilling

Checked by: Date:

35B WW 17 2 of 2

AECOM

Client: USACE
Project Number: 60256135
Site Location: SITE 37
Coordinates: Elevation
Drilling Method: HSA CME 75
Sample Type(s): Boring Diameter: 8.25
Weather: Sunny 90s Logged By: KAW
Drilling Contractor: Fugro Ground Elevation:
Date/Time Started: 8/24/13 13:
Date/Time Finished: 8/25/13 8:

BORING ID: 35B WW 17
Sheet 2 of 2
Monitoring Well Installed: Yes
Screened Interval: 33.0 - 18.3
Depth of Boring: 33.5
Water Level: 20.5

Depth (ft)	Geologic Sample ID	Sample Depth (ft)	Blows per 6"	Recovery (inches)	Headspace (ppm)	U.S.C.S.	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (if known)	Lab Sample ID	Lab Sample Depth (ft)
21						CL	Clay lt gray, silty, plastic wet at 20.5		
22				100		SP-CL	Sand, vf-fn, some silt, brown		
23						CL			
24						SP	Wet. Sand, lt brown, vf-fine grained		
25						CL	clay gray silty		
26				100		SP/SM	Sand lt yellowish brown wet silty in part		
27									
28						SP	Sand, vf-f. yellowish brown wet		
29						SP	Sand, vf-f, wet, lt gray		
30				100					
31							Sand vf-f some medium		
32						CL	Clay lt gray, plastic		
33						SC	Sand f-med, some coarse, clayey yellowish brown *		
34			TD	33.5					
35									
36									
37									
38									
39									
40									

NOTES: Boxed Core for this well
0-33 feet

Date	Time	Depth to groundwater while drilling

Checked by: Date:

35B WW 18 1 of 2

AECOM

Client: USACE		BORING ID: 35BWW18
Project Number: 60256135		
Site Location: SITE 37		
Coordinates:	Elevation	Sheet 1 of 2
Drilling Method: HSA CME 75	8,875"	Monitoring Well Installed: yes
Sample Type(s):	Boring Diameter: ~~3.25"~~	Screened Interval: 32.5 - 17.77
Weather: Sunny 90's	Logged By: KAW	Date/Time Started: 8/21/13 13:08
Drilling Contractor: FUGRO	Ground Elevation:	Date/Time Finished: ~~8/21/13~~ 8/21/13
		Depth of Boring: 33.20
		Water Level: 22

Depth (ft)	Geologic Sample ID	Sample Depth (ft)	Blows per 6"	Recovery (inches)	Headspace (ppm)	U.S.C.S.	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (if known)	Lab Sample ID	Lab Sample Depth (ft)
1				70%		ML	silt - pale brown unconsolidated to fim		
2						CL	Clay - lt olive brown w/ red clay inclusions mottled v stiff to hard, silty		
3							roots		
4							Clay-silty, stiff w/roots		
5				100%		SC	4.5 sand, lt gray, clayey to silty, vf grained		
6						ML	silt and clay yellowish brown w/ black inclusions		
7						SC	~~Clay~~ clayey, silty sand vf grained to silty dark yellowish brown and lt gray mott stiff. dry.		
8									
9							Abundant black inclusions, yellowish brown, roots, friable abnt concretions ~~and~~ reddish brown.		
10				100%					
11							Sl moist clay at 11'		
12						CL	Clay lt brownish gray w/ yellowish brown mottling, plastic		
13									
14									
15				100			more yellowish brown, plastic clay		
16									
17									
18							black inclusions, more silty		
19						CL	lt brownish gray w/ yellowish brown inclusions moist		
20									

NOTES:

Date	Time	Depth to groundwater while drilling

Checked by: Date:

35BWW18 2 of 2

AECOM

Client: USACE
Project Number: 60256135
Site Location: SITE 37
Coordinates: Elevation
Drilling Method: HSA CME 75 8.875"
Sample Type(s): Boring Diameter: 8.25"
Weather: Sunny 90's Logged By: KAC
Drilling Contractor: FUGRO Ground Elevation: Date/Time Finished: 8/29/13 9:46

BORING ID: 35BWW18
Sheet 2 of 2
Monitoring Well Installed: yes
Screened Interval: 32.5 - 17.77
Depth of Boring: 33.20
Water Level: 22

Depth (ft)	Geologic Sample ID	Sample Depth (ft)	Blows per 6"	Recovery (inches)	Headspace (ppm)	U.S.C.S.	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (if known)	Lab Sample ID	Lab Sample Depth (ft)
21						CL	c/a		
22				100		SP	sand, ~~saturated~~ vf grained, pale olive to pale yellowish brown ← wet at 22 inclusions (concretions)		
23						CL	clay - pale olive, plastic		
24						SM	silty sand, poorly graded, pale olive		
25						CL + SM/SC	clay - pale olive plastic + silty sand pale olive and yellowish brown clayey moist		
26				100%			26.1-26.9		
27						CL	clay pale olive w/ dark reddish brown		
28						SC	clay sand, vf grained to silty yellowish brown		
29							olive gray yellowish brown		
30				100		CL	CLAY olive gray		
31						SC	30.8 clay sand		
32						CL	clay, dark olive gray, plastic		
33				TD 33'		CL	~SC: c/a dark olive gray, plastic		
34									
35									
36									
37									
38									
39									
40									

14:27
14:45

NOTES:

Date	Time	Depth to groundwater while drilling

Checked by: Date:

35 B WW 19 1 of 2

AECOM

Client: USACE		BORING ID: 35BWW19
Project Number:		
Site Location: SITE 37		Sheet 1 of 2
Coordinates:	Elevation	Monitoring Well Installed: yes
Drilling Method: HSA CME 75		Screened Interval: 33.48-18.75
Sample Type(s):	Boring Diameter: 8.25	Depth of Boring: 34.2
Weather: Sunny 90's	Logged By: KAW	Date/Time Started: 8/21/13 1350
Drilling Contractor:	Ground Elevation:	Date/Time Finished: 8/21/13 11:45
		Water Level: 24

Depth (ft)	Geologic Sample ID	Sample Depth (ft)	Blows per 6"	Recovery (inches)	Headspace (ppm)	U.S.C.S.	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (if known)	Lab Sample ID	Lab Sample Depth (ft)
1						CL	~~Brow~~ Clay Brownish yellow, plastic, Dry Roots		
2				100%	0.0	~~SM~~	Silt ~~[illegible]~~ lt tan friable, Roots		
13:55 3						CL	Clay, silty ~~[illegible]~~ gray w/ orangish brown mottling plastic, Roots		
4									
5				100%	0.0				
6									
7									
14:25 8						SP	7.5' Sand vf-silty, dry, loose, v. pale brown,		
						SC	Clayey sand w/ black dendridick patters, roots		
9						CL	Clay, SILTY, Lt. olive gray, w/ orangish brown mottling.		
10				100%					
11									
12					0.0	CL	Silty, lt. olive gray and orgish brown abundant black vertical inclusions roots		
14:15 13						SM	moist Silty sand silty - vf grained lt olive gray w/ orangish brown mottling, occ black mott.		
14									
15				100%					
16							moist		
17									
14:25 18						CL	silty Clay, ~~[illegible]~~ olive gray, w/ orangish mottling		
19									
20									

NOTES:

Date	Time	Depth to groundwater while drilling

Checked by: Date:

35B WW 19 2 of 2

AECOM

Client: USACE
Project Number: 60256135
Site Location: SITE 37
Coordinates: Elevation
Drilling Method: HSA CME 75
Sample Type(s): Boring Diameter: 8.25

BORING ID: 35B WW 19
Sheet 2 of 2
Monitoring Well Installed: yes
Screened Interval: 33.98 - 18.79

Weather:
Logged By: KAW
Drilling Contractor:
Ground Elevation:
Date/Time Started: 8/21/13 13:5
Date/Time Finished: 8/21/13 17:2
Depth of Boring: 34.2
Water Level: 24'

Depth (ft)	Geologic Sample ID	Sample Depth (ft)	Blows per 6"	Recovery (inches)	Headspace (ppm)	U.S.C.S.	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (if known)	Lab Sample ID	Lab Sample Depth (ft)
21						CL	Clay, silty, olive gray with yellowish brown mottling - Black concretion moist		
22				100%					
14:35 23							silty Clay, olive gray, moist-wet		
24									
25									
26				100%	0.0		25.5 Color change Light Olive Brown Silty Clay moist to wet, plastic		
27						CL and SM	Clay, silty, olive, plastic interbedded with silty, Sand, vf grained, olive w/ yellowish orange mottling, black staining. Interbeds are 1"-2" thick		
following 28									
29									
30									
31				100%		CL	Clay, olive, stiff		
32						SP	Sand, olive, vf grained		
33						CL	Clay, olive, firm-stiff, sity dry at TD		
145 34									
35				TD 34.2'					
36									
37									
38									
39									
40									

NOTES:

Date	Time	Depth to groundwater while drilling

Checked by: Date:

35B WW 20 1 of 2

AECOM

Client: USACE
Project Number: 60256135
Site Location: SITE 37
Coordinates: Elevation
Drilling Method: HSA CME 75
Sample Type(s): Boring Diameter: 8.25

BORING ID: 35B WW 20
Sheet 1 of 2
Monitoring Well Installed: yes
Screened Interval: 29.9 - 15.1
Depth of Boring: 30.4
Water Level: 9' ?

Weather:
Drilling Contractor:
Logged By: KAW
Ground Elevation:
Date/Time Started: 8/22/13 14:45
Date/Time Finished: 8/23/13 17:15

Depth (ft)	Geologic Sample ID	Sample Depth (ft)	Blows per 6"	Recovery (inches)	Headspace (ppm)	U.S.C.S.	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (if known)	Lab Sample ID	Lab Sample Depth (ft)
1						CL	Clay dark yellowish brown moist, silty w/ occ black, inclusions (wood)		
2				100 %					
3									
4						CL	Clay, plastic light greenish gray w/ reddish yellow mottling		
5									
6				100 %					
7							-T.4 Clay silty colors as above blocky texture moist		
8									
9							Wet at 9'		
10						SM	Sand, reddish yellow, vf grained, wet		
11				100 %		CL	Clay, reddish yellow and lt. greenish gray mottled, moist to wet soft, plastic		
12				61"					
13							-Clay, silty		
14				70%		SC	Sand, clayey, vf-f grained gray & reddish yellow mottled wet		
15						CL	Clay-		
16				44"		SM	sand silty w/ minor clay moist wet wet		
17						SP	Sand, vf-fn, lt gray-greenish gray		
18						SC	Sand, clayey, V F		
19						SC			
20						SP	Sand, vf-fn grained, pale brown wet		
							Sand brownish-yellow, vf-fn grained		

NOTES:

Date	Time	Depth to groundwater while drilling

Checked by: Date:

35BWW20 2 of 2

AECOM

Client: USACE			BORING ID: 35B WW 20
Project Number: 60256135			Sheet 2 of 2
Site Location: SITE 37			Monitoring Well Installed: yes
Coordinates:	Elevation		Screened Interval: 29.9 - 15.1
Drilling Method: HSA CME 75	Boring Diameter: 8.25		Depth of Boring: 30.4
Sample Type(s):	Date/Time Started: 8/22/13 1415		Water Level: 9'?
Weather:	Logged By: KAW	Date/Time Finished: 8/22/13 1715	
Drilling Contractor:	Ground Elevation:		

Depth (ft)	Geologic Sample ID	Sample Depth (ft)	Blows per 6"	Recovery (inches)	Headspace (ppm)	U.S.C.S.	MATERIALS: Color, size, range, MAIN COMPONENT, minor component(s), moisture content, structure, angularity, maximum grain size, odor, and Geologic Unit (if known)	Lab Sample ID	Lab Sample Depth (ft)
21				58"		SP	wet at 20' Sand lt gray, vf-fn grained		
22							- Sand yellowish brown and lt gray, vf-fn grained wet		
23									
24							- Color changed to olive brown		
25				36"					
26				60%		SP/SW	Sand vf-med, olive brown, wet		
27									
28									
29				14"			29'		
30				TD 30'		SW	Sand vf-med, some coarse some pebbles wet, lt olive brown		
31									
32									
33									
34									
35									
36									
37									
38									
39									
40									

15:22

NOTES:

Date	Time	Depth to groundwater while drilling

Checked by: Date:

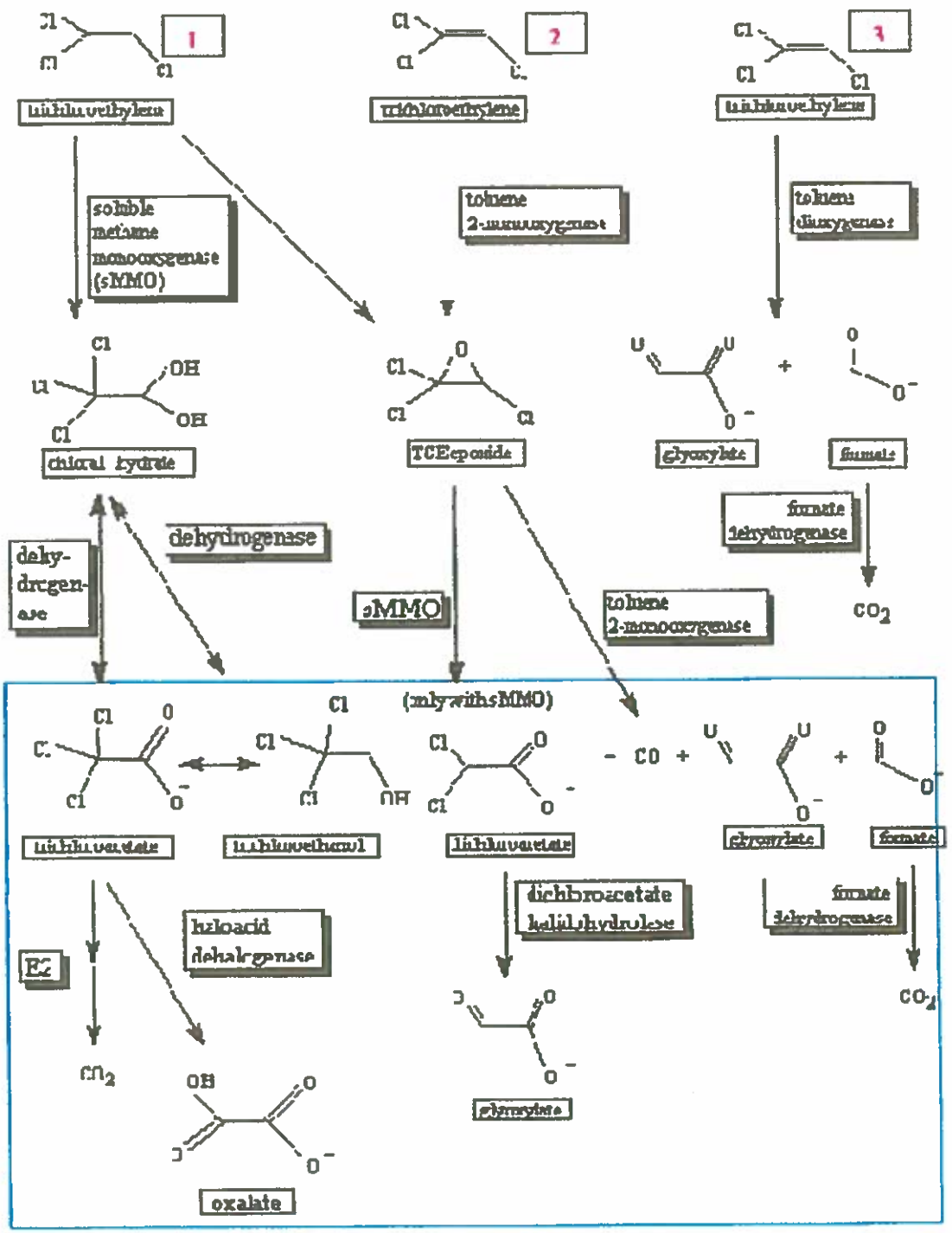
Appendix C

VOC Degradation Products and Testing Data

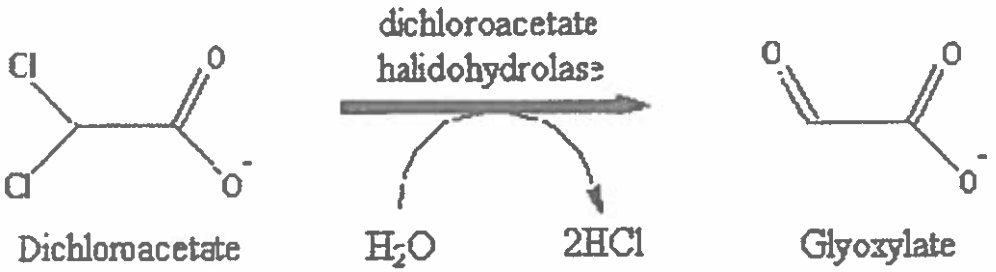
ABS Tech Note: Dechlorination

5-16-01

Aerobic Degradation. Dehalogenation of chlorinated compounds can occur both anaerobically and aerobically. In aerobic pathways dehalogenation can occur in a single event (3) or via several steps (1,2) depending upon the bacterial enzymatic pathway utilized.

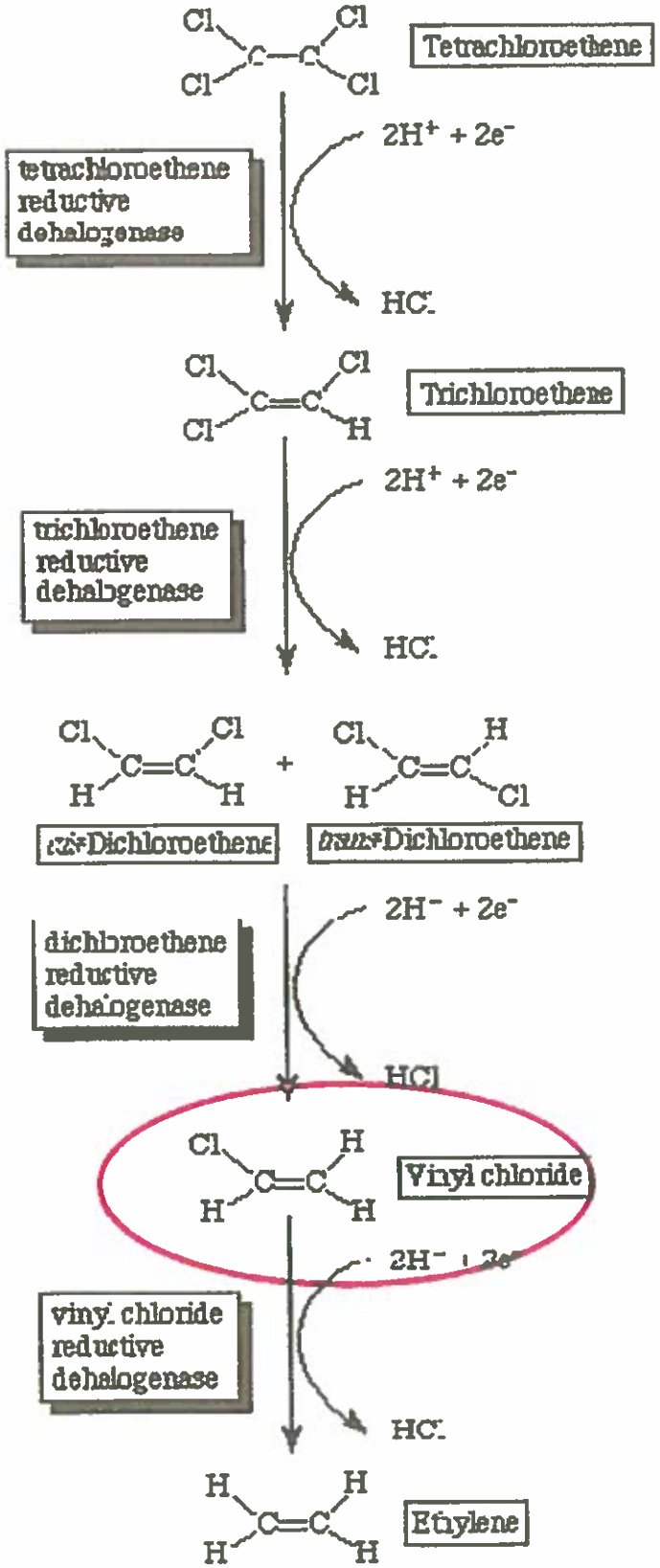


Chlorine atoms are replaced with oxygen instead of hydrogen, which occurs during anaerobic dechlorination. The remaining hydrogen of a water molecule interacts with the free chlorine atom to make trace amounts of hydrochloric acid.



The remaining metabolites are then utilized by microbes as intermediates in energy generation pathways within the organism. In aerobic dechlorination and degradation vinyl chloride is not created.

Anaerobic Degradation. Anaerobic conditions do produce vinyl chloride near the end of the dechlorination step. Hydrogen is used to replace the chlorine atoms instead of oxygen. Hydrochloric acid is still made in this pathway, but the vinyl chloride intermediate makes anaerobic degradation undesirable.



PCE Testing Summary

Well ID	Quarterly Sampling Dates								
	Jul-12	Dec-12	Mar-13	Jun-13	Sep-13	Dec-13	Mar-14	Jul-14	Oct-14
Tetrachloroethene (µg/L)									
35BWW01	ND	NS	NS	NS	NS	NS	NS	NS	NS
35BWW02	NS	NS	NS	NS	NS	NS	NS	NS	NS
35BWW03	ND	ND	NS	ND	NS	ND	ND	ND	ND
35BWW04	48.90	NS	45.4	50.6	68.8	57.8	33.1	28.6	45.0
35BWW05	1.09	1.41	1.00	1.23	1.56	1.77	1.95	2.09	2.14
35BWW06	ND	ND	ND	NS	NS	ND	ND	ND	ND
35BWW07	ND	NS	NS	NS	ND	NS	NS	NS	NS
35BWW08	ND	ND	ND	ND	ND	ND	ND	ND	ND
35BWW09	ND	NS	ND	ND	ND	ND	ND	ND	ND
35BWW10						3.61	1.49	0.963	0.732
35BWW11	ND	NS	NS	NS	ND	NS	NS	NS	NS
35BWW12						16.3	NS	NS	NS
35BWW14	21.0	28.0	21.8	24.0	26.8	23.9	NS	NS	26.8
35BWW17						15.3	1.24	ND	ND
35BWW20						20.6	NS	NS	39.2
LHS-MW-58	36.3	40.6	14.8	25.8	29.0	10.3	4.06	8.46	18.6
MW 1-1	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW 1-2	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW 1-3	ND	NS	NS	NS	NS	NS	ND	ND	NS
MW 2-1	2.65	5.95	3.17	2.84	1.67	1.49	1.17	1.87	2.52
MW 2-2	ND	ND	ND	ND	ND	ND	ND	ND	ND
MW 2-3	ND	0.256	ND	ND	ND	ND	ND	ND	ND
MW 3-1	30.1	26.2	22.1	18.7	18.7	15.2	11.2	13.9	14.0
MW 3-2	41.8	32.5	27.1	37.9	40.1	40.1	30.0	64.1	71.8
MW 3-3	60.5	49.0	38.0	40.5	36.2	33.9	14.6	12.1	11.9
MW 4-1	20.1	15.7	16.6	24.2	24.9	19.3	24.5	31.8	25.0
MW 4-2	9.6	9.18	7.06	8.25	8.76	10.8	8.48	6.38	3.74
MW 4-3	18.8	20.1	16.9	5.87	6.18	NS	4.05	2.08	1.57

Note Fill Color indicates sampling points within the test site

00840054

TCE Testing Summary

Well ID	Quarterly Sampling Dates								
	Jul-12	Dec-12	Mar-13	Jun-13	Sep-13	Dec-13	Mar-14	Jul-14	Oct-14
Trichloroethene (µg/L)									
35BWW01	ND	NS	NS	NS	NS	NS	NS	NS	NS
35BWW02	NS	NS	NS	NS	NS	NS	NS	NS	NS
35BWW03	ND	ND	NS	ND	NS	ND	ND	ND	ND
35BWW04	8.09	NS	15.4	11.4	13.4	9.39	4.53	3.81	5.26
35BWW05	13.5	14.6	15.6	18.8	17.3	13.0	15.1	15.7	15.9
35BWW06	ND	ND	ND	NS	NS	ND	ND	ND	ND
35BWW07	ND	NS	NS	NS	ND	NS	NS	NS	NS
35BWW08	65.7	62.5	77.1	67.5	49.6	39.7	31	27.4	18.4
35BWW09	55.6	NS	45.2	43.9	53.6	54.3	73.3	200	181
35BWW10						54.4	37.2	39.8	42.1
35BWW11	ND	NS	NS	NS	ND	NS	NS	NS	NS
35BWW12						2.40	NS	NS	NS
35BWW14	80.6	80.5	80.3	90.9	89.7	72.6	NS	NS	78.3
35BWW17						4.53	0.349	ND	ND
35BWW20						7.33	NS	NS	12.1
LHS-MW-58	5.17	6.76	3.39	5.02	4.99	1.57	0.312	1.31	2.93
MW 1-1	16.8	17.6	24.8	22.1	4.83	5.09	2.82	0.937	1.05
MW 1-2	8.66	8.57	8.96	9.13	0.817	ND	ND	0.801	1.39
MW 1-3	2.80	NS	NS	NS	NS	NS	0.426	2.02	NS
MW 2-1	4.59	7.25	4.78	3.35	2.15	1.82	1.37	2.81	3.19
MW 2-2	0.27	0.272	0.312	0.320	ND	ND	ND	ND	ND
MW 2-3	1.44	1.24	0.915	0.840	0.289	ND	0.259	0.460	0.431
MW 3-1	2.42	2.43	2.57	2.02	2.05	1.84	1.86	1.72	1.72
MW 3-2	3.07	1.90	2.14	2.71	3.02	3.42	2.49	4.38	4.79
MW 3-3	5.99	5.79	5.49	7.64	5.50	5.28	2.68	1.59	1.46
MW 4-1	3.63	4.16	4.27	5.32	5.48	4.38	5.13	5.20	5.34
MW 4-2	4.21	4.19	3.77	4.53	6.14	7.21	6.28	4.22	3.09
MW 4-3	13.5	13.5	12.4	4.97	5.53	NS	3.38	1.50	1.33

Note Fill Color Indicates sampling points within the test site

00840055

VOC Sampling December, 2012

Chemical	COE MW 003 (ug/l) s	COE MW 004 (ug/l) ns	COE MW 005 (ug/l) s	COE MW 006 (ug/l) s	COE MW008 (MW59) (ug/l) s	COE MW 14 (ug/l) s	COE MW58 (ug/l) s	MW 1-1 (ug/l) s	MW 1-2 (ug/l) s	MW 1-3 (ug/l) s	MW 2-1 (ug/l) s	MW 2-2 (ug/l) s	MW 2-3 (ug/l) s	MW 3-1 (ug/l) s	MW 3-2 (ug/l) s	MW 3-3 (ug/l) s	MW 4-1 (ug/l) s	MW 4-2 (ug/l) s	MW 4-3 (ug/l) s
1,1-Dichloroethene						50.20	0.81								0.537	0.86	1.15	1.81	6.76
1,1-Dichloroethane							0.306									0.425	0.278	0.27	0.901
cis-1,2-Dichloroethene					0.300		0.267										0.599	0.534	1.18
Benzene						0.216													
Chloroform						0.148													
trans-1,2-Dichloroethene						0.404													
Vinyl Chloride						4.42											0.316		0.565
Carbon Disulfide											0.509			0.522			5.64	2.11	0.891
Acetone														3.26					
p-Isopropyltoluene														0.34					
1,2-Dichloroethane						0.271									0.158				
Chlorobenzene						0.137											0.203	0.133	0.229

Notes

s = sampled

ns = not sampled

Blank cells mean "u" below detectable limit of the test

14.38

00840056

VOC Testing March, 2013

Chemical	COE MW 003 (ug/l) ns	COE WW 004 (ug/l) s	COE MW 005 (ug/l) s	COE MW 006 (ug/l) s	COE MW008 (MW59) (ug/l) s	COE WW09 (ug/l) s	COE MW 14 (ug/l) s	COE MW58 (ug/l) s	MW 1-1 (ug/l) s	MW 1-2 (Ug/l) s	MW 1-3 (ug/l) s	MW 2-1 (ug/l) s	MW 2-2 (ug/l) s	MW 2-3 (ug/l) s	MW 3-1 (ug/l) s	MW 3-2 (ug/l) s	MW 3-3 (ug/l) s	MW 4-1 (ug/l) s	MW 4-2 (ug/l) s	MW 4-3 (ug/l) s
1,1-Dichloroethene		2.96													0.65	0.71		1.36	3.85	0.188
Tetra Chloroethane																		0.155		
1,1-Dichloroethane																			0.604	
cis-1,2-Dichloroethene		1.05	0.255		0.354	0.431	12.8											0.54	0.464	1.03
Trans 1,2 Dichloroethene			0.998				0.415													
1,2 Trichloroethene																				
Benzene							0.242													
Chloroform							0.153													
trans-1,2-Dichloroethene																			0.254	
Vinyl Chloride																		0.974		
Carbon Disulfide																	2.71			
Acetone																				
p-Isopropyltoluene							0.285													
1,2-Dichloroethane		0.299					0.153											0.155	0.13	0.158
Chlorobenzene		0.169																		

Notes

s = sampled

ns = not sampled

Blank cells mean "u" below detectable limit of the test

00840057

VOC Testing December, 2013

Chemical	COE MW 003 (ug/l) s	COE WW 004 (ug/l) s	COE MW 005 (ug/l) s	COE MW 006 (ug/l) s	COE MW008 (MW59) (ug/l) s	COE WW09 (ug/l) s	COE MW 14 (ug/l) s	COE MW58 (ug/l) s	MW 1-1 (ug/l) s	MW 1-2 (ug/l) s	MW 1-3 (ug/l) ns	MW 2-1 (ug/l) s	MW 2-2 (ug/l) s	MW 2-3 (ug/l) s	MW 3-1 (ug/l) s	MW 3-2 (ug/l) s	MW 3-3 (ug/l) s	MW 4-1 (ug/l) s	MW 4-2 (ug/l) s	MW 4-3 (ug/l) ns
1,1-Dichloroethene		2.31					49.80											0.872		
Tetra Chloroethane																	0.161	0.246		
1,1-Dichloroethane							2.58										0.356		0.901	
cis-1,2-Dichloroethene		0.726	0.367				13.2											0.517		
Trans 1,2 Dichloroethene							0.514													
1,2 Trichloroethene																				
Benzene		0.131					0.207								0.843					
Chloroform		0.143					0.166													
trans-1,2-Dichloroethene																				
Vinyl Chloride							3.81													
Carbon Disulfide															14.2					
Acetone																				
p-Isopropyltoluene																				
1,2-Dichloroethane		0.334					0.325											0.163	0.21	
Chlorobenzene							0.239													

Notes

s = sampled

ns = not sampled

Blank cells mean "u" below detectable limit of the test

00840058

VOC Sampling, March 2014

Chemical	COE MW 003 (ug/l) s	COE WW 004 (ug/l) s	COE MW 005 (ug/l) s	COE MW 006 (ug/l) s	COE MW008 (MW59) (ug/l) s	COE WW09 (ug/l) s	COE MW 14 (ug/l) ns	COE MW58 (ug/l) s	MW 1-1 (ug/l) s	MW 1-2 (ug/l) s	MW 1-3 (ug/l) s	MW 2-1 (ug/l) s	MW 2-2 (ug/l) s	MW 2-3 (ug/l) s	MW 3-1 (ug/l) s	MW 3-2 (ug/l) s	MW 3-3 (ug/l) s	MW 4-1 (ug/l) s	MW 4-2 (ug/l) s	MW 4-3 (ug/l) s
1,1-Dichloroethene		0.689																0.897	2.93	0.30
Tetra Chloroethane		0.42																0.254		
1,1-Dichloroethane																		0.494	0.693	0.332
cis-1,2-Dichloroethene		0.277	0.346			0.654														
Trans 1,2 Dichloroethene																				
1,2 Trichloroethene															0.565					
Benzene																				
Chloroform																				
trans-1,2-Dichloroethene																				
Vinyl Chloride																				
Carbon Disulfide										2.65	5.35				5.4		19.0			5.44
Acetone															0.449					
p-Isopropyltoluene																			0.457	1.1
1,2-Dichloroethane																			0.178	
Chlorobenzene																				

Notes

s = sampled

ns = not sampled

Blank cells mean "u" below detectable limit of the test

00840059

VOC Testing October, 2014

Chemical	COE MW 003 (ug/l) s	COE WW 004 (ug/l) s	COE MW 005 (ug/l) s	COE MW 006 (ug/l) s	COE MW008 (MW59) (ug/l) s	COE WW09 (ug/l) s	COE MW 14 (ug/l) s	COE MW58 (ug/l) s	MW 1-1 (ug/l) s	MW 1-2 (ug/l) s	MW 1-3 (ug/l) ns	MW 2-1 (ug/l) s	MW 2-2 (ug/l) s	MW 2-3 (ug/l) s	MW 3-1 (ug/l) s	MW 3-2 (ug/l) s	MW 3-3 (ug/l) s	MW 4-1 (ug/l) s	MW 4-2 (ug/l) s	MW 4-3 (ug/l) s
1,1-Dichloroethene		0.762				0.663	40.10									0.928		0.811	1.07	
Tetra Chloroethane																				
1,1-Dichloroethane		0.398				1.31	4.17									0.445		0.241	0.22	0.135
cis-1,2-Dichloroethene		0.316	0.32			10.400										0.309		0.387	0.297	
Trans 1,2 Dichloroethene						0.339														
1,2 Trichloroethene																				
Benzene						0.156														
Chloroform						0.171														
trans-1,2-Dichloroethene																				
Vinyl Chloride						3.06														
Carbon Disulfide																				
Acetone																				
p-Isopropyltoluene																				
1,2-Dichloroethane						0.357														
Chlorobenzene						0.336														

Notes

s = sampled

ns = not sampled

Blank cells mean "u" below detectable limit of the test

00840060

Appendix D

Field Measurements

Well ID	Conductivity (mS/cm)									
	Jul-12	Sep-12	Dec-12	Mar-13	Jun-13	Sep-13	Dec-13	Mar-14	Jul-14	Oct-14
35BWW01	0.172	NS	NS	NS	NS	NS	NS	NS	NS	NS
35BWW02	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
35BWW03	0.825	0.748	0.748	NS	0.692	NS	0.737	0.773	0.815	0.737
35BWW04	0.390	0.362	NS	0.350	0.336	0.335	0.319	0.327	0.338	0.273
35BWW05	0.361	0.305	0.348	0.326	0.384	0.366	0.395	0.404	0.429	0.355
35BWW06	1.360	1.390	1.460	1.103	NS	NS	1.284	1.225	1.257	1.061
35BWW07	1.060	1.200	NS	NS	NS	1.13	NS	NS	NS	NS
35BWW08	1.010	0.940	0.935	0.892	0.862	0.820	0.776	0.767	0.758	0.651/ 0.631
35BWW09	1.590	1.510	NS	1.346	1.313	1.316	1.288	1.090	0.952	0.904
35BWW10							0.409	0.420	0.463	0.422
35BWW11	1.690	1.600	NS	NS	NS	0.782	NS	NS	NS	NS
35BWW12							0.398	NS	NS	NS
35BWW14	0.576	0.509	0.524	0.455	0.471	0.462	0.485	NS	NS	0.445
35BWW17							0.395	0.111	0.089	0.069
35BWW20							1.092	NS	NS	0.359
LHS-MW-58	0.327	0.270	0.295	0.428	0.334	0.281	0.419	0.301	0.343	0.311
MW 1-1	0.569	0.542	0.606	0.650	0.618	0.554	0.588	0.509	0.498	0.416
MW 1-2	0.570	0.519	0.555	0.472	0.549	0.561	0.544	0.559	0.585	0.505
MW 1-3	0.475	NS	NS	NS	NS	NS	NS	0.518	0.450	NS
MW 2-1	0.370	0.217	0.221	0.183	0.189	0.190	0.195	0.191	0.187	0.157
MW 2-2	0.313	0.252	0.197	0.154	0.145	0.114	0.102	0.107	0.152	0.147
MW 2-3	0.156	0.160	0.172	0.151	0.140	0.109	0.127	0.206	0.167	0.120
MW 3-1	0.719	0.549	0.593	0.494	0.519	0.488	0.528	1.507	0.473	0.398
MW 3-2	0.356	0.242	0.233	0.194	0.194	0.190	0.188	0.299	0.313	0.259
MW 3-3	0.547	0.291	0.322	0.302	0.343	0.282	0.305	0.354	0.374	0.292
MW 4-1	1.210	1.510	1.620	0.926	0.710	0.634	0.618	0.563	0.576	0.499
MW 4-2	0.479	0.482	0.493	0.434	0.434	0.454	0.479	0.479	0.447	0.384
MW 4-3	0.484	0.468	0.462	0.392	0.408	0.402	NS	0.393	0.394	0.367

00840062

Well ID	ORP (mV)									
	Jul-12	Sep-12	Dec-12	Mar-13	Jun-13	Sep-13	Dec-13	Mar-14	Jul-14	Oct-14
35BWW01	84	NS	NS	NS	NS	NS	NS	NS	NS	NS
35BWW02	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
35BWW03	-78	NM	19	NS	139.3	NS	-155.2	-199.7	-333.9	-40.3
35BWW04	41	NM	NS	81.3	130.7	198.4	130.8	-202.3	-325.7	245.0
35BWW05	-101	NM	-51	-69.7	-39.0	-54.6	-73.6	-177.1	-291.1	-52.9
35BWW06	7	NM	-38	-61.1	NS	NS	-66.2	-185.0	-284.0	-62.3
35BWW07	13	NM	NS	NS	NS	228	NS	NS	NS	NS
35BWW08	10	NM	155	101.3	192.3	212.8	99.5	-223.1	-283.6	170.1
35BWW09	14	NM	NS	-10.6	127.5	144.5	-44.7	-219.6	-284.7	11.8
35BWW10							137.5	-225.2	-344.7	224.6
35BWW11	-114	NM	NS	NS	NS	41.5	NS	NS	NS	NS
35BWW12							127.7	NS	NS	NS
35BWW14	-145	NM	50	76.1	74.6	157.9	-64.3	NS	NS	38.0
35BWW17							135.1	-173.7	-286.4	344.6
35BWW20							132.2	NS	NS	181.0
LHS-MW-58	23	NM	163	67.1	159.4	165.8	136.3	-199.8	-321.0	264.6
MW 1-1	31	NM	78	60.8	177.4	243.6	102.8	-224.2	-279.4	173.3
MW 1-2	13	NM	122	78.8	115.6	289.2	174.0	-221.3	-282.0	199.7
MW 1-3	8	NS	NS	NS	NS	NS	NS	-173.4	-254.6	NS
MW 2-1	-103	NM	-9	38.8	146.3	170.9	105.5	-208.4	-336.3	205.5
MW 2-2	26	NM	107	116.2	174.7	278.4	187.8	-190.6	-325.5	266.3
MW 2-3	68	NM	102	90.1	174.1	275.9	127.1	-209.3	-322.0	296.8
MW 3-1	-87	NM	-30	-64.1	140.8	197.1	-138.5	-216.7	-326.4	-43.7
MW 3-2	66	NM	108	116.8	145.1	273.1	144.6	-216.7	-324.1	207.0
MW 3-3	-164	NM	-68	15.9	126.6	283.0	159.4	-206.0	-331.2	235.7
MW 4-1	-46	NM	-49	12.2	45.8	8.7	-99.1	-195.6	-297.5	27.0
MW 4-2	-43	NM	25 A	29.3	131.7	74.8	-12.5	-193.1	-294.9	203.4
MW 4-3	NM	NM	140	177.7	160.2	237.2	NS	-177.0	-248.5	295.9

A = ORP failed to stabilize. Value is last measurement taken prior to sampling.
NM = not measured

00840063

Well ID	Ph									
	Jul-12	Sep-12	Dec-12	Mar-13	Jun-13	Sep-13	Dec-13	Mar-14	Jul-14	Oct-14
35BWW01	3.60	NS	NS	NS	NS	NS	NS	NS	NS	NS
35BWW02	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
35BWW03	7.58	10.42	10.71	NS	9.04	NS	9.29	9.18	8.84	8.84
35BWW04	4.28	6.48	NS	6.51	6.46	6.56	6.44	6.86	7.04	6.43
35BWW05	6.95	6.91	7.13	6.96	6.83	7.08	6.91	6.88	6.54	6.88
35BWW06	5.54	7.15	7.22	6.81	NS	NS	6.83	6.88	6.60	6.88
35BWW07	5.86	6.72	NS	NS	NS	6.86	NS	NS	NS	NS
35BWW08	5.45	6.99	6.94	6.86	6.74	6.86	6.73	6.89	6.60	7.29/ 6.92
35BWW09	5.38	6.89	NS	6.98	6.95	7.13	6.83	7.29	6.90	6.84
35BWW10							7.02	7.27	6.77	7.10
35BWW11	6.57	6.06	NS	NS	NS	6.26	NS	NS	NS	NS
35BWW12							6.42	NS	NS	NS
35BWW14	8.01	6.78	6.93	6.88	6.69	6.57	6.57	NS	NS	6.69
35BWW17							5.53	5.22	4.70	4.83
35BWW20							7.45	NS	NS	6.79
LHS-MW-58	6.08	6.34	6.54	6.84	6.24	6.47	7.07	7.45	7.04	6.63
MW 1-1	5.15	7.25	7.22	6.96	6.75	6.97	6.92	6.88	6.90	7.06
MW 1-2	5.39	7.23	7.76	7.55	6.99	7.01	7.98	10.23	9.74	7.89
MW 1-3	5.53	NS	NS	NS	NS	NS	NS	7.66	6.83	NS
MW 2-1	6.38	6.45	6.39	5.98	5.76	5.99	5.84	5.84	5.55	5.81
MW 2-2	4.50	5.86	5.95	5.56	5.16	5.23	5.55	5.32	5.09	5.66
MW 2-3	3.86	5.3	5.67	5.26	4.91	5.36	5.56	6.07	5.50	5.53
MW 3-1	7.65	7.88	8.85	9.30	8.43	8.76	10.36	12.12	10.63	9.60
MW 3-2	5.09	6.23	5.98	6.11	5.87	5.65	6.22	7.00	7.12	7.02
MW 3-3	8.76	6.48	6.47	6.30	6.40	5.71	6.27	6.34	6.78	7.26
MW 4-1	7.22	6.81	6.62	6.53	6.35	6.57	6.40	6.55	6.38	6.45
MW 4-2	6.79	6.32	6.32	6.17	5.88	6.27	6.17	6.18	5.98	6.33
MW 4-3	6.00	5.71	5.42	5.23	5.23	5.35	NS	5.40	5.15	5.40

00840064

Appendix E

Photographs of Bio Plug Field



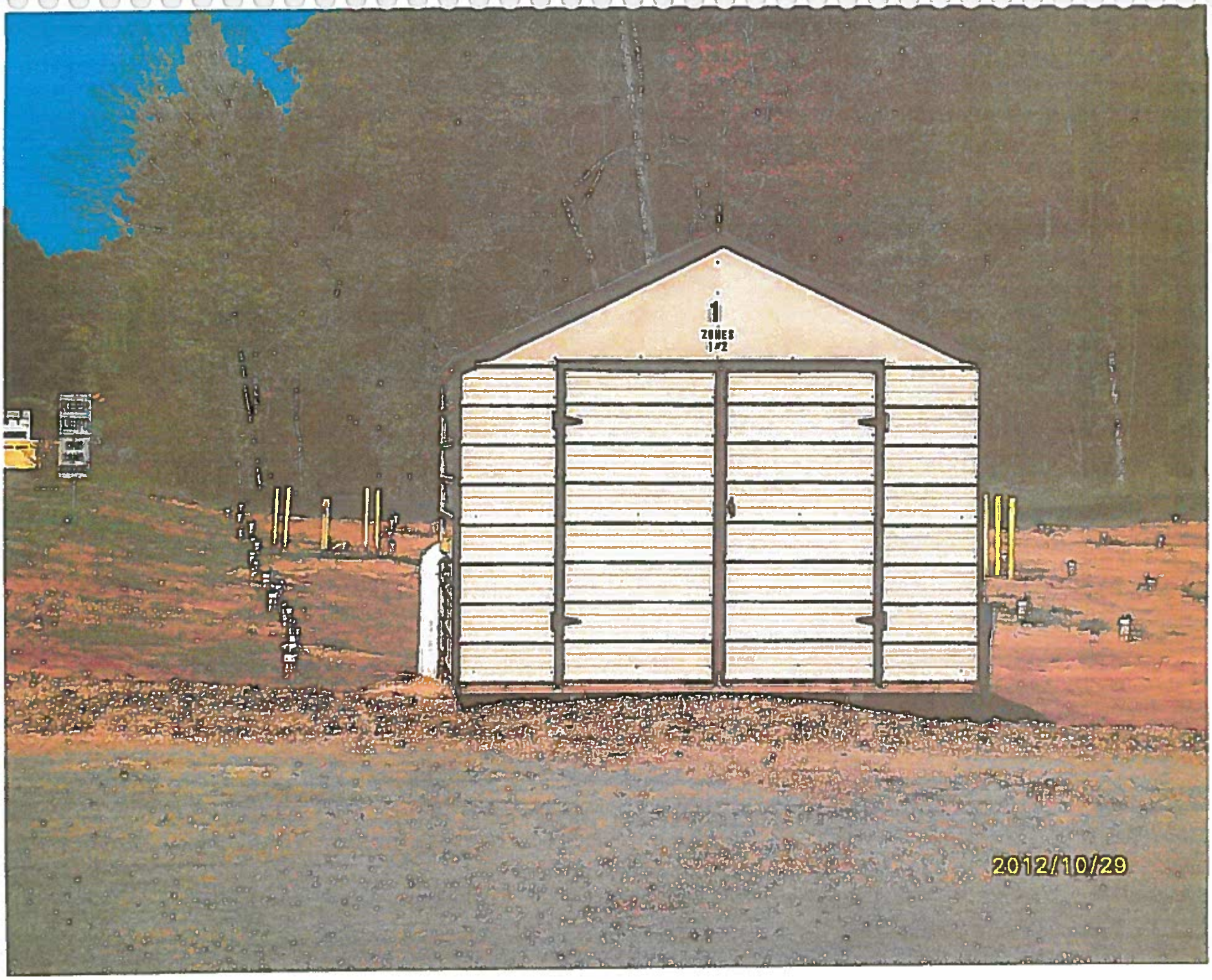
00840066



00840067



00840068



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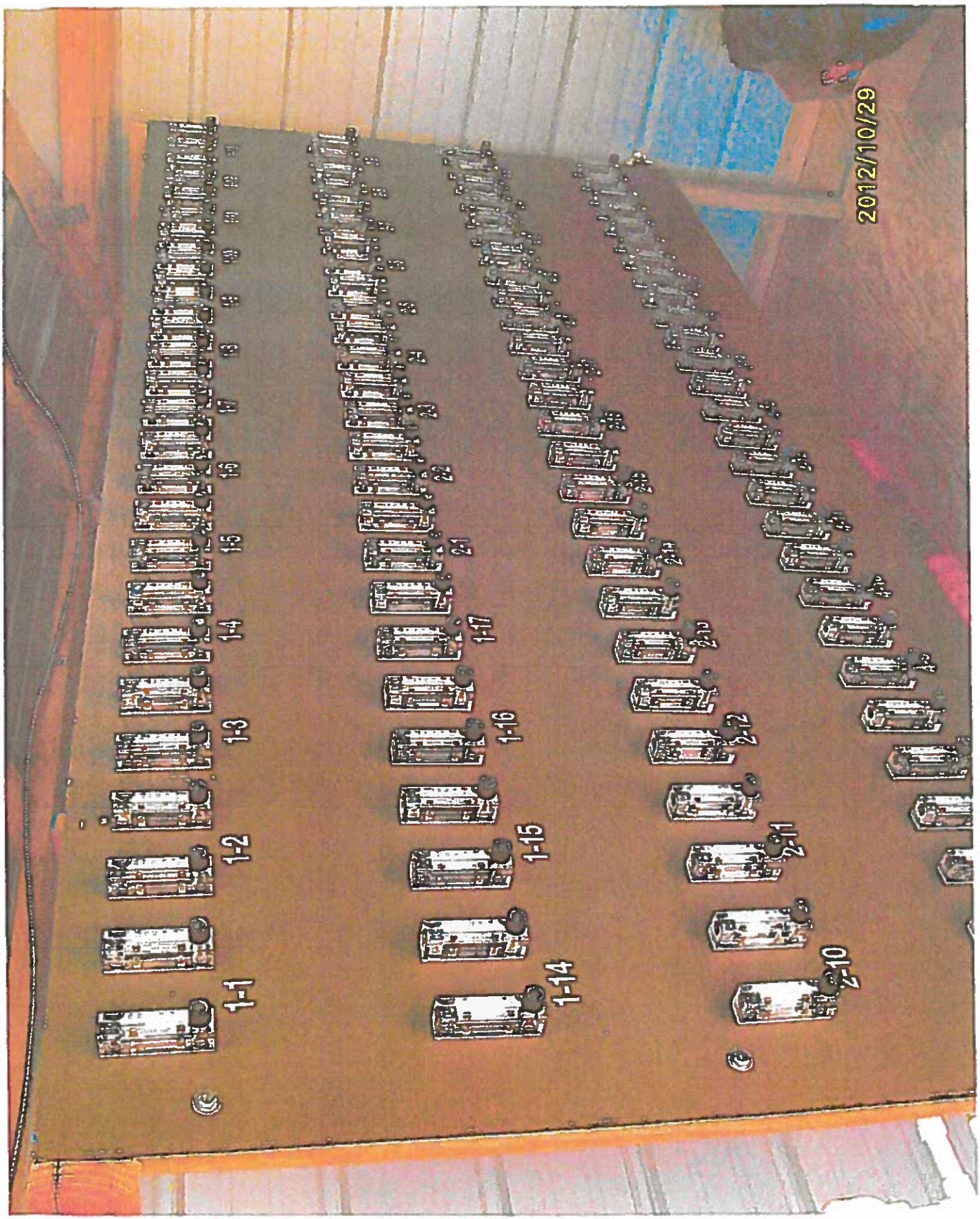
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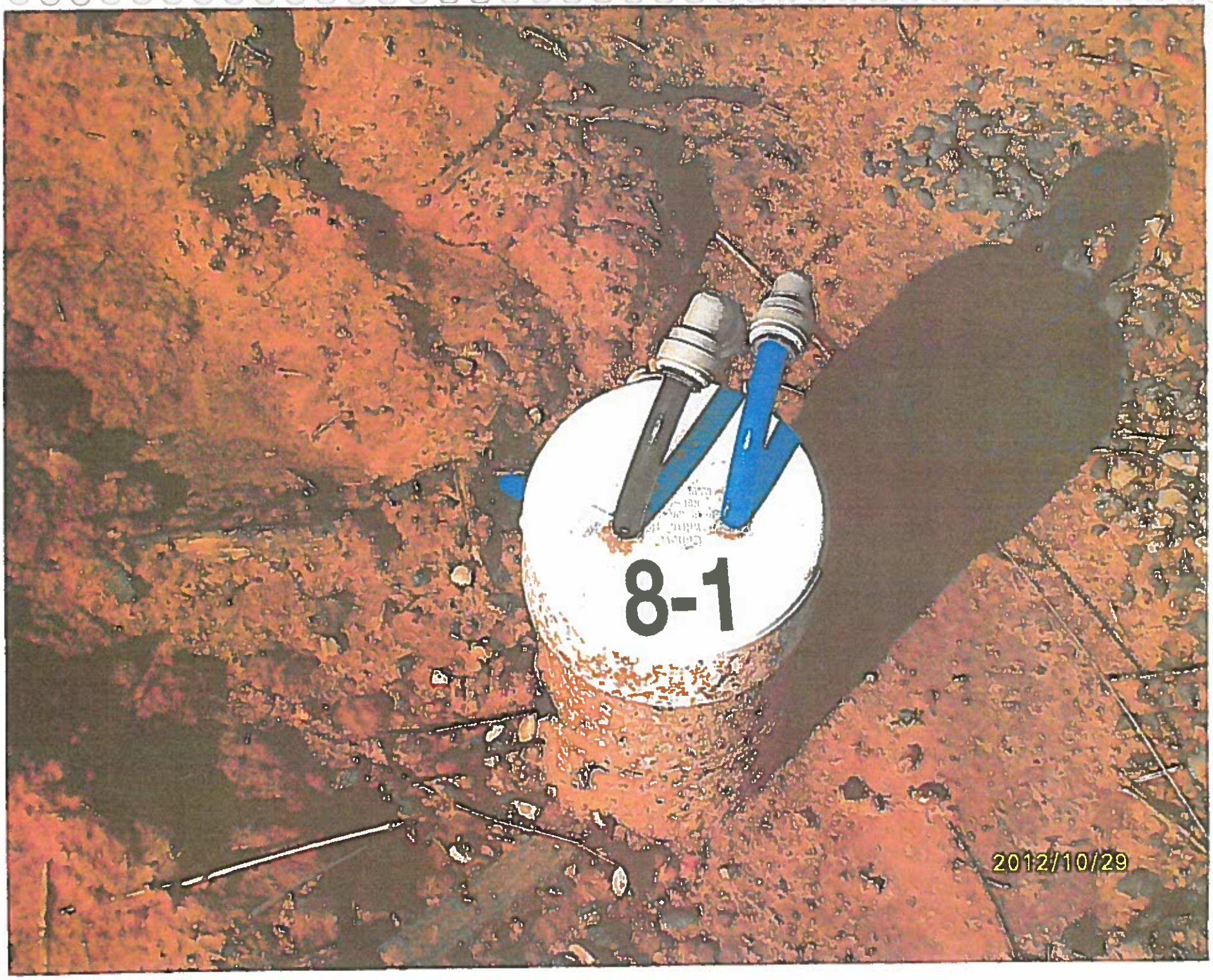
00840072



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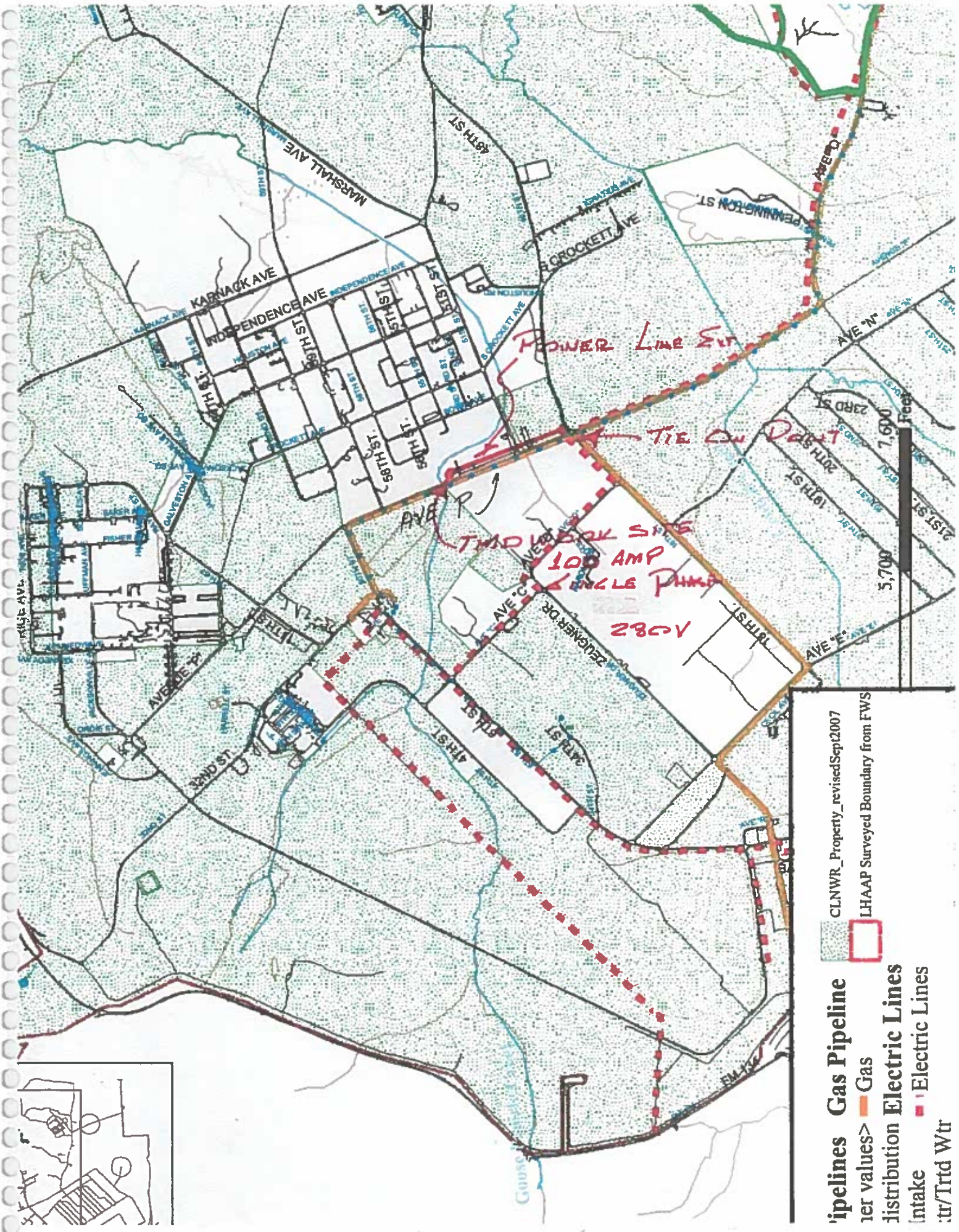

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Single Phase
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Karnack Ave
Independence Ave
Crockett Ave
Pennington St
Ave "N"
Ave "E"
Ave "C"
Zeugner Dr
Ave "P"
Ave "Q"
48th St
59th St
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Gas Pipeline
Gas
Electric Lines
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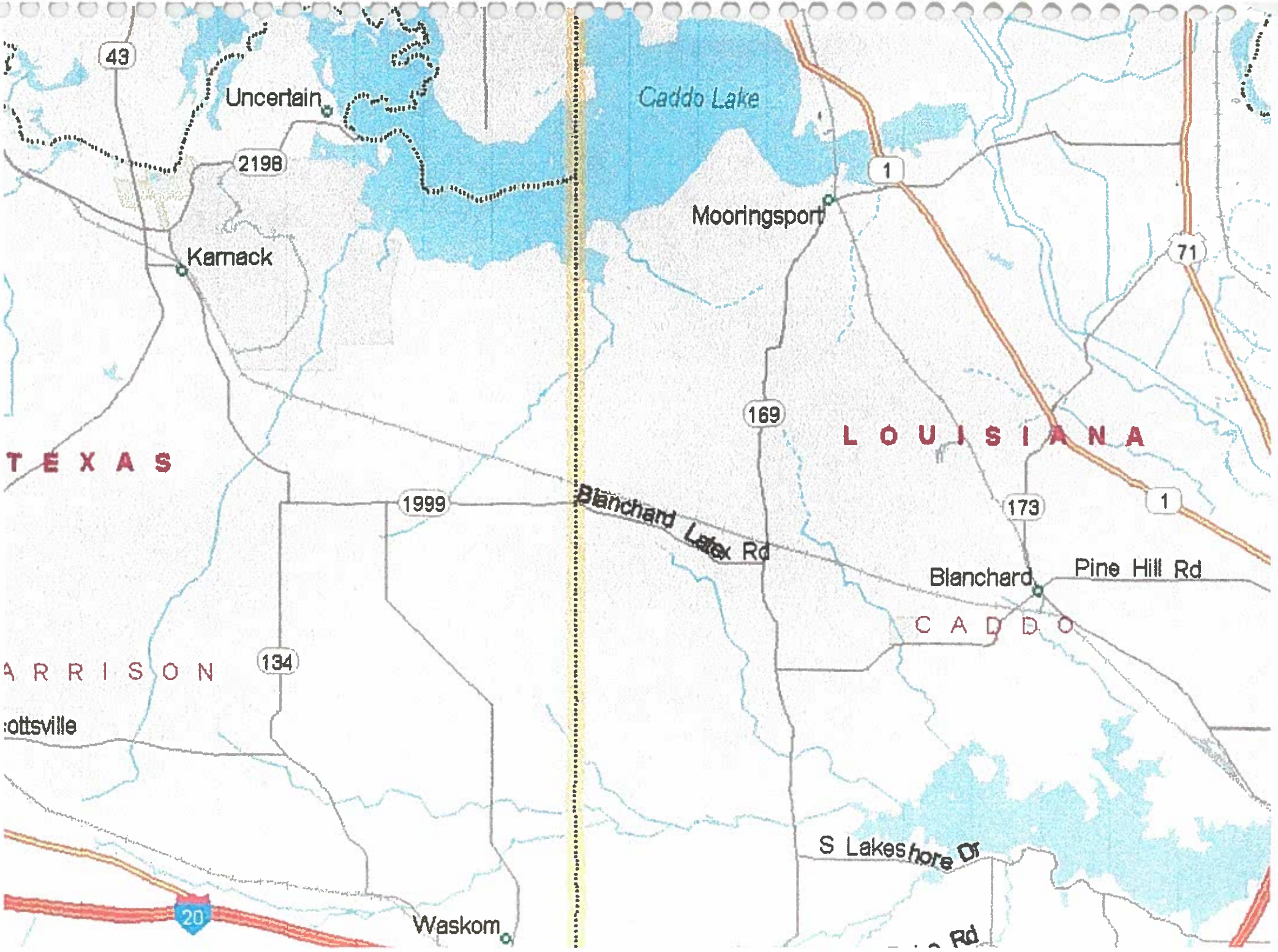
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Caddo Lake
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Mooringsport
Karnack
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TEXAS
LOUISIANA
1999
Blanchard Lake Rd
173
1
Blanchard
Pine Hill Rd
CADDO
134
ARRISON
ottsville
20
Waskom
S Lakeshore Dr
Rd

00840075

APPENDIX G. REFERENCES

1. Jacobs Engineering Group, Inc., Final Remedial Investigation Report Volume 1: Report for the Group 4 Sites, Longhorn Army Ammunition Plant, Karnack, Texas, January 2002, Contract No. DACA56-97-D-001.

2. Shaw Environmental, Inc., Final Record of Decision LHAAP-35B(37), Chemical Laboratory and LHAAP-67, Aboveground Storage Tank Farm, Longhorn Army Ammunition Plant, Karnack, Texas, June 2010, TERC No. DACA56-94-D-0020, Task Order No. 0109.

3. Advanced BioSystems, LLC Fact Sheet, Biological Plugs (In Situ Bioreactors (ISBRs)) for more Efficient Treatment of Ground Contamination.

4. Advanced BioSystems, LLC, Final Report - Bio Plug Pilot Study Longhorn Army Ammunition Plant Site-35B(37), March 2015, Contract No. W91ZLK-11-C-0013.

5. Advanced BioSystems, LLC, Site Work Plan – Pilot Test of an In Situ Microbial Bioreactor Enhanced Bioremediation Technology – LHAAP-35B(37). March 2012. Contract No. W91ZLK11C0013.

6. Texas Administrative Code, Title 30, Part 1, Chapter 331, Subchapter H, Rule §331.133 – Closure Standards for Injection Wells.

APPENDIX H. ABBREVIATIONS

ABS	=	Advanced BioSystems LLC
APG	=	Aberdeen Proving Ground
ATC	=	U.S. Army Aberdeen Test Center
ATEC	=	U.S. Army Test and Evaluation Command
ATSS	=	Aberdeen Test Support Services
COC	=	contaminant of concern
DO	=	dissolved oxygen
HDPE	=	high-density polyethylene
LHAAP	=	Longhorn Army Ammunition Plant
ORP	=	oxidation/reduction potential
PCE	=	tetrachloroethene
PVC	=	polyvinyl chloride
scfh	=	standard cubic feet per hour
TCE	=	trichloroethene
USAEC	=	U.S. Army Environmental Command
USEPA	=	U.S. Environmental Protection Agency
USFWS	=	U.S. Fish and Wildlife Service
VOC	=	volatile organic compound

APPENDIX I. DISTRIBUTION LIST

ATEC Project No. 2012-DT-ATC-ARSPT-F0863

Addressee	Final Report
Commander U.S. Army Environmental Command Cleanup and Munitions Response Division	
ATTN: IMAE-MW (Ms. Robin E. Paul)	1
ATTN: IMAE-MW (Mr. Nicholas Smith) 2450 Connell Road JBSA Fort Sam Houston, TX 78234-7664	1
Commander U.S. Army Aberdeen Test Center	
ATTN: TEDT-AT-SLE (Mr. Gene L. Fabian)	1
TEDT-AT-CSM Aberdeen Proving Ground, MD 21005-5059	1

Secondary distribution is controlled by Commander, U.S. Army Environmental Command, ATTN: IMAE-MW.

bhate ENVIRONMENT & INFRASTRUCTURE

LETTER OF TRANSMITTAL

DATE: June 6**,** 2018

PROJECT NAME: Remediation of Multiple Sites, Longhorn Army Ammunition Plant, Karnack, Texas (TX)

TO:	Rose Zeiler	BRAC Site Manager
	Richard Smith	USACE Project Manager
	Aaron Williams	USACE Project Engineer
FROM:	Kim Nemmers	Bhate Project Manager

SUBJECT: **Surface Water Data Transmittal - 2016**
Longhorn Army Ammunition Plant, Karnack,
TX Contract: W9128F-13-D-0012,
Delivery Order: W912BV17F0150

REMARKS

Surface Water and Perimeter well sampling data is currently collected at the following frequencies except when locations are dry:

Perimeter Wells	**Frequency**
PW108	Annually
PW110	Annually
PW111	Annually
PW112	Annually
PW133	Semi-Annually
PW134	Semi-Annually
Surface Water	**Frequency**
HBW-1	Harrison Bayou , quarterly
HBW-7	Harrison Bayou , quarterly
HBW-10	Harrison Bayou , quarterly
GPW-1	Goose Prairie Creek, quarterly
GPW-3	Goose Prairie Creek, quarterly

Surface Water sampling data is updated and reported to the regulatory agencies and to the public as it is available through handouts reviewed and distributed in association with the quarterly Restoration Advisory Board (RAB) meetings, and included in the Administrative Record along with other RAB meeting materials. The attached handouts were given at the January 2017 RAB meeting. Data associated with the 2016 surface water and perimeter well sampling events, including the data validation report (Quality Control Summary Report) for the samples, are attached for your file.

List of Attachments:

Harrison Bayou and Goose Prairie Creek Perchlorate Data Handouts
Quality Control Summary Report
Laboratory Data Packages

Harrison Bayou and Goose Prairie Creek – Perchlorate Data

Surface water samples are collected quarterly from each location in Harrison Bayou and Goose Prairie Creek, unless the sampling location is dry.

Surface Water Sample Data (in micrograms per liter)

Quarter	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st
Creek Sample ID	**Jul 1999**	**Sep 1999**	**Feb 2000**	**Apr 2000**	**Aug 2000**	**Dec 2000**	**Feb 2001**	**Apr 2001**	**July 2001**	**Oct 2001**	**Jan 2002**
GPW-1	<1.0U	-	4	<4.0 U	<4.0 U	<4.0 U	-	2.65	<4.0 U	<4.0 U	<4.0 U
GPW-3	<1.0U	<4.0 U	17	8	<4.0 U	<4.0 U	-	2.28	<4.0 U	<4.0 U	<4.0 U
HBW-1	-	<80.0 U	310	23	-	-	<4.0 U	-	<4.0 U	<4.0 U	<4.0 U
HBW-7	-	<8.0 U	370	110	-	-	<4.0 U	-	<4.0 U	<4.0 U	<4.0 U
HBW-10	-	<8.0 U	905	650	<4.0 U	-	<4.0 U	-	<4.0 U	-	-

Quarter	2nd	3rd	4th	1st	2nd	3rd	3rd	4th	2nd	3rd	4th
Creek Sample ID	**June 2002**	**Sept 2002**	**Dec 2002**	**Feb 2003**	**June 2003**	**Aug 2003**	**July 2004**	**Dec 2006**	**May 2007**	**Aug 2007**	**Dec 2007**
GPW-1	<4.0 U	<4.0 U	18.3	18.6	59.9	-	2.25	-	<1.0 U	<1.0 U	10.7
GPW-3	<4.0 U	<4.0 U	5.49	12.6	14.7	-	2.2	-	<1.0 U	<1.0 U	7.48
HBW-1	<4.0 U	<4.0 U	<4.0 U	-	<4.0 U	99.3	<0.2U	<1.0 U	<1.0 U	122	<1.0 U
HBW-7	<4.0 U	<4.0 U	<4.0 U	-	<4.0 U	<4.0 U	<0.2U	<1.0 U	<1.0 U	1.02	<1.0 U
HBW-10	<4.0 U	<4.0 U	<4.0 U	-	<4.0 U	-	<0.2U	<1.0 U	<1.0 U	<1.0 U	<1.0 U

Quarter	1st	2nd	3rd	4th	2nd	3rd	3rd	3rd	4th	1st	2nd
Creek Sample ID	**Mar 2008**	**Jun 2008**	**Sep 2008**	**Dec 2008**	**May 2009**	**Jul 2009**	**Aug 2009**	**Sep 2009**	**Dec 2009**	**Mar 2010**	**Jun 2010**
GPW-1	27	<0.5U	<0.5U	<0.22U	16	<4U	NS	<1.2U	3.7	1.3J	<0.6U
GPW-3	21.9	9.42	1.1	<0.22U	8.9	<4U	NS	<0.6U	2.8	1.8J	<0.6U
HBW-1	<0.5U	<0.5U	<0.5U	<0.22U	<0.55U	<4U	NS	<1.5U	<0.275U	1.5U	<0.6U
HBW-7	<0.5U	<0.5U	<0.5U	<0.22U	<0.55U	<4U	24	<1.2U	<0.275U	1.5U	<0.6U
HBW-10	<0.5U	<0.5U	<0.5U	<0.22U	<0.55U	<4U	NS	<1.5U	<0.275U	1.2U	<0.6U

Quarter	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st
Creek Sample ID	**Sep 2010**	**Dec 2010**	**Mar 2011**	**Jun 2011**	**Sep 2011**	**Dec 2011**	**Mar 2012**	**Jun 2012**	**Not Applicable**	**Jan & Feb 2013**	**Mar 2013**
GPW-1	dry	<0.1U	8.7	dry	dry	1.76	0.163J	dry	NS	1.65	0.735
GPW-3	dry	0.199J	0.673	dry	dry	1.31	0.261	dry	NS	1.74	0.754
HBW-1	dry	<0.1U	<0.2U	dry	dry	<0.1U	0.1U	dry	NS	<0.2U	<0.2U
HBW-7	dry	<0.1U	<0.2U	dry	dry	0.171J	0.1U	dry	NS	<0.2U	<0.2U
HBW-10	dry	<0.1U	<0.2U	dry	dry	<0.1U	0.1U	dry	NS	<0.2U	<0.2U

Quarter	2nd	3rd	4th	1st	2nd	3nd	4th	1st	2nd	3rd	4th
Creek Sample ID	**Jun 2013**	**Sept 2013**	**Dec 2013**	**Feb 2014**	**May 2014**	**Aug 2014**	**Nov 2014**	**Feb 2015**	**May 2015**	**Aug 2015**	**Nov 2015**
GPW-1	dry	<0.2 U	dry	0.766	dry	dry	0.244 J	0.311 J	0.156J	dry	0.142 J
GPW-3	dry	<0.2 U	dry	1.15	dry	dry	0.276 J	0.344 J	dry	dry	0.311 J
HBW-1	<0.2U	<0.2 U	dry	<0.2 U	dry	dry	<0.2 U	<0.2 U	dry	dry	<0.2 U
HBW-7	<0.2U	<0.2 U	dry	0.201 J	dry	dry	<0.2 U	0.124 J	dry	dry	<0.2 U
HBW-10	<0.2U	<0.2 U	dry	<0.2 U	dry	dry	<0.2 U	<0.2 U	dry	dry	<0.2 U

Quarter	1st	2nd	3rd	4th
Creek Sample ID	**Feb 2016**	**May 2016**	**Aug 2016**	**Nov 2016**
GPW-1	0.447	6.59	<0.2 U	0.301 J
GPW-3	0.474	0.457	0.141	0.563
HBW-1	<0.2 U	<0.2 U	<0.2 U	<0.2 U
HBW-7	<0.2 U	<0.2 U	<0.2 U	0.318 J
HBW-10	<0.2 U	<0.2 U	<0.2 U	<0.2 U

NS – not sampled U – non-detect J – Estimated Dry – no surface water

LHAAP Perimeter Well Monitoring – Perchlorate Data

Groundwater samples are currently collected annually from four wells and semi-annually from two wells on the LHAAP perimeter.

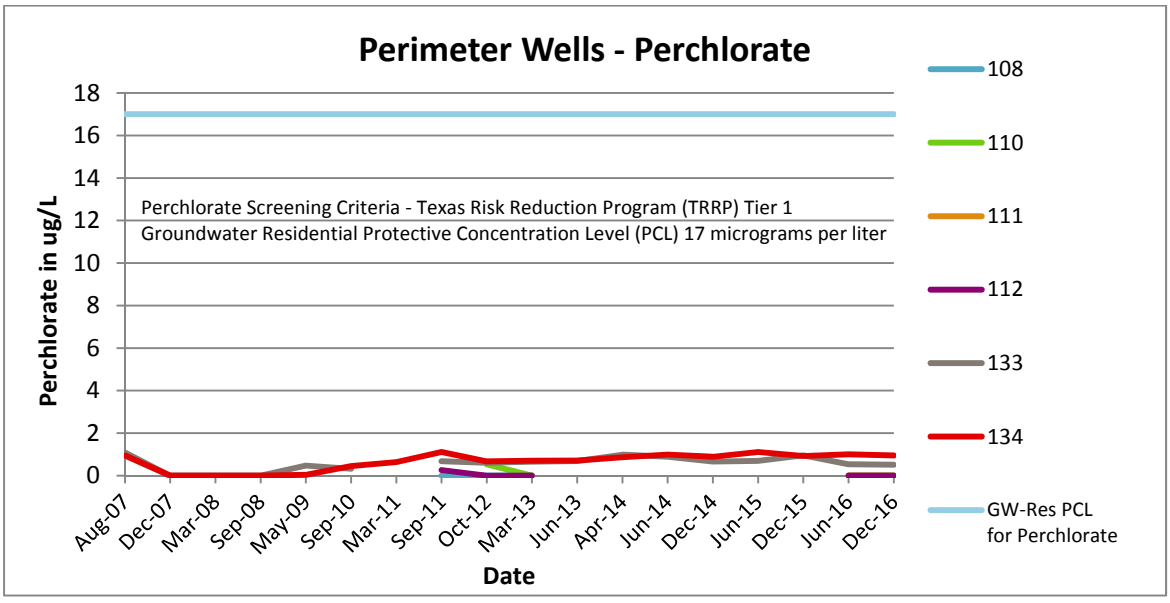
Perimeter Well Sample Data
(in micrograms per liter)

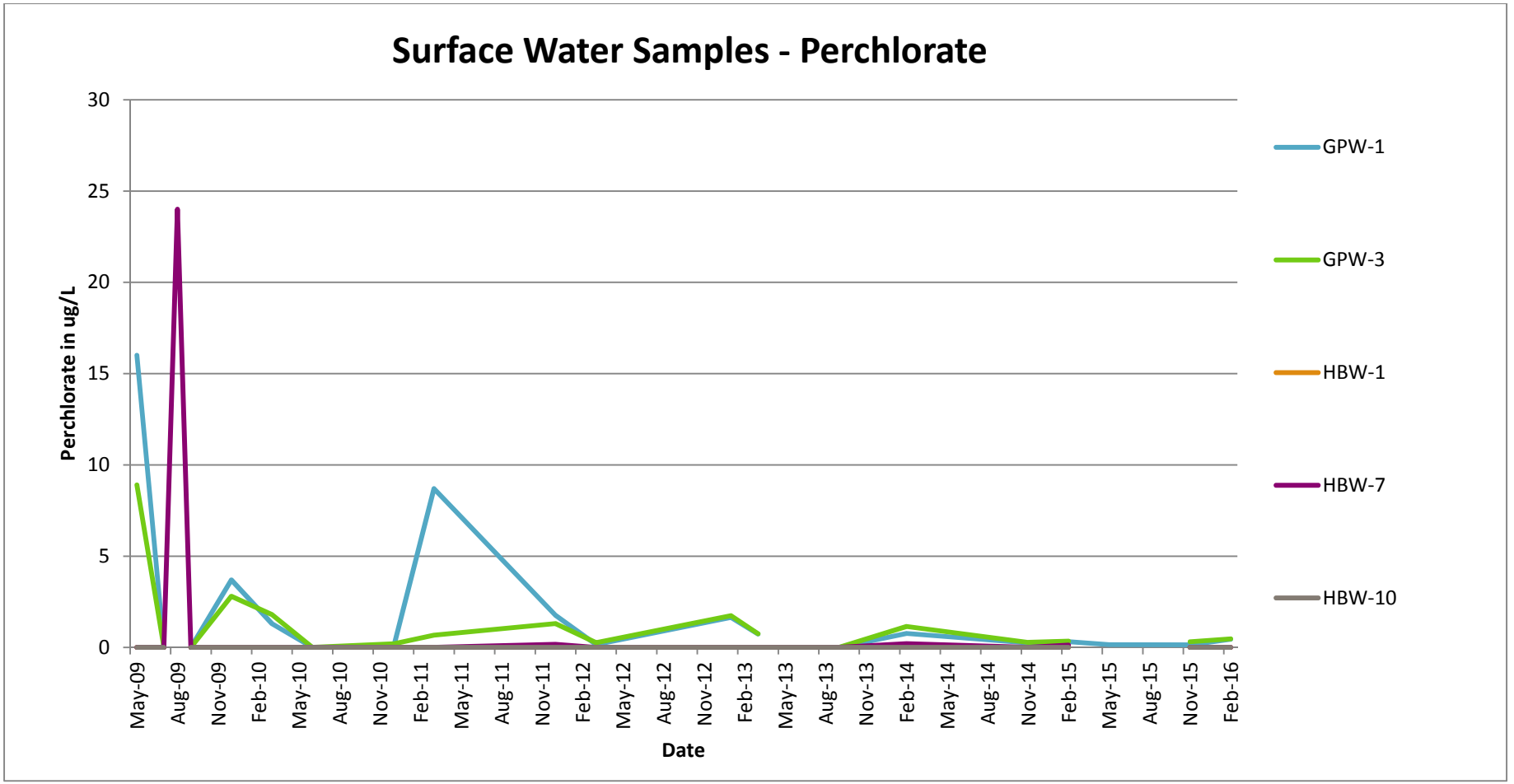
Well ID	Jun 2005	Sep 2005	Sep 2006	May 2007	Aug 2007	Dec 2007	Mar 2008	Sep 2008	May 2009	Sep 2009	Mar 2010
108	NS	NS	10 U	NS	0.5 U	NS	NS	2.5 U	NS	1.2 U	NS
110	NS	NS	10 U	NS	10 U	NS	NS	5.0 U	NS	6 U	NS
111	NS	NS	4 U	NS	0.5 U	NS	NS	0.5 U	NS	0.3 U	NS
112	NS	NS	5 U	NS	3 U	NS	NS	2.0 U	NS	3 U	NS
133	0.541	0.597	1.08	1 U	1.09	0.5 U	0.5 U	0.5 U	0.47 J	0.32	Dry
134	0.881	0.725	0.708 J	1 U	0.949 J	0.5 U	0.5 U	0.829 U	0.04 J	0.3 U	0.3 U

Well ID	Sep 2010	Mar 2011	Sep 2011	Oct 2012	Mar 2013	Jun 2013	Apr 2014	Jun 2014	Dec 2014	Jun 2015	Dec 2015
108	3 U	NS	0.1 U	0.2 U	0.2 U	NS	NS	0.2 U	NS	0.566	NS
110	Dry	NS	Dry	0.535	0.2 U	NS	NS	0.2 U	NS	2U	NS
111	Dry	NS	Dry	Dry	1.32	NS	NS	Dry	NS	0.2U	NS
112	3 U	NS	0.26	0.2 U	0.2 U	NS	NS	0.458	NS	2U	NS
133	0.32	Dry	0.68	0.598	0.655	0.685	0.988	0.887	0.665	0.692	0.952
134	0.45	0.636	1.11	0.671	0.698	0.706	0.863	0.989	0.890	1.11	0.925

Well ID	Jun 2016	Nov/Dec 2016
108	0.2 U	NS
110	0.2 U	0.2 U
111	0.2 U	0.2 U
112	0.2 U	0.2 U
133	0.536	0.513
134	0.997	0.947

Notes:
J – Estimated U – Non-Detect Dry – Well Dry NS – Not Sampled

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Perchlorate in ug/L
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May-09
Aug-09
Nov-09
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Aug-14
Nov-14
Feb-15
May-15
Aug-15
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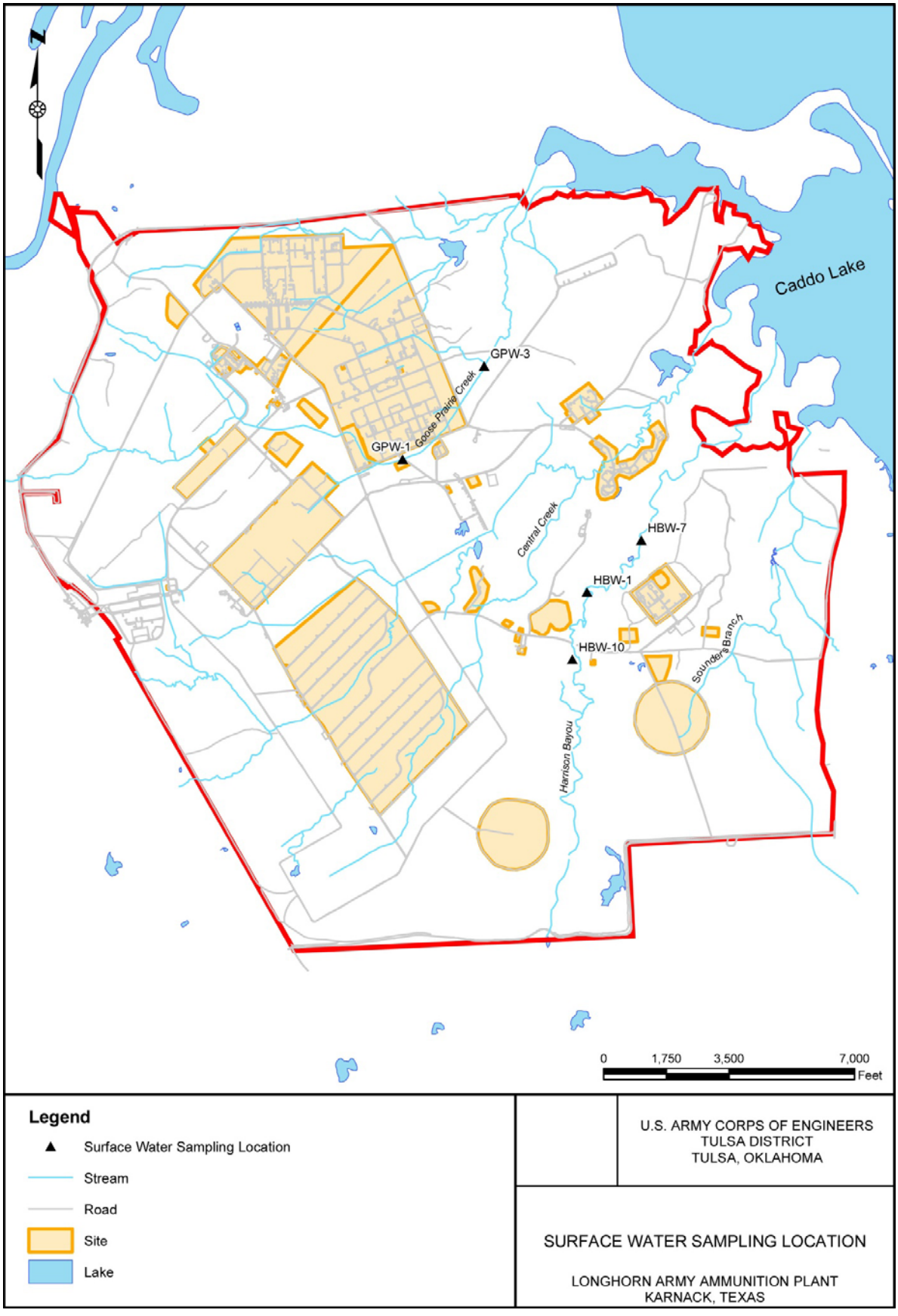
Date
GPW-1
GPW-3
HBW-1
HBW-7
HBW-10

Longhorn Army Ammuntion Plant Creek Sampling Locations



LHAAP Perimeter Well Monitoring – Perchlorate Data

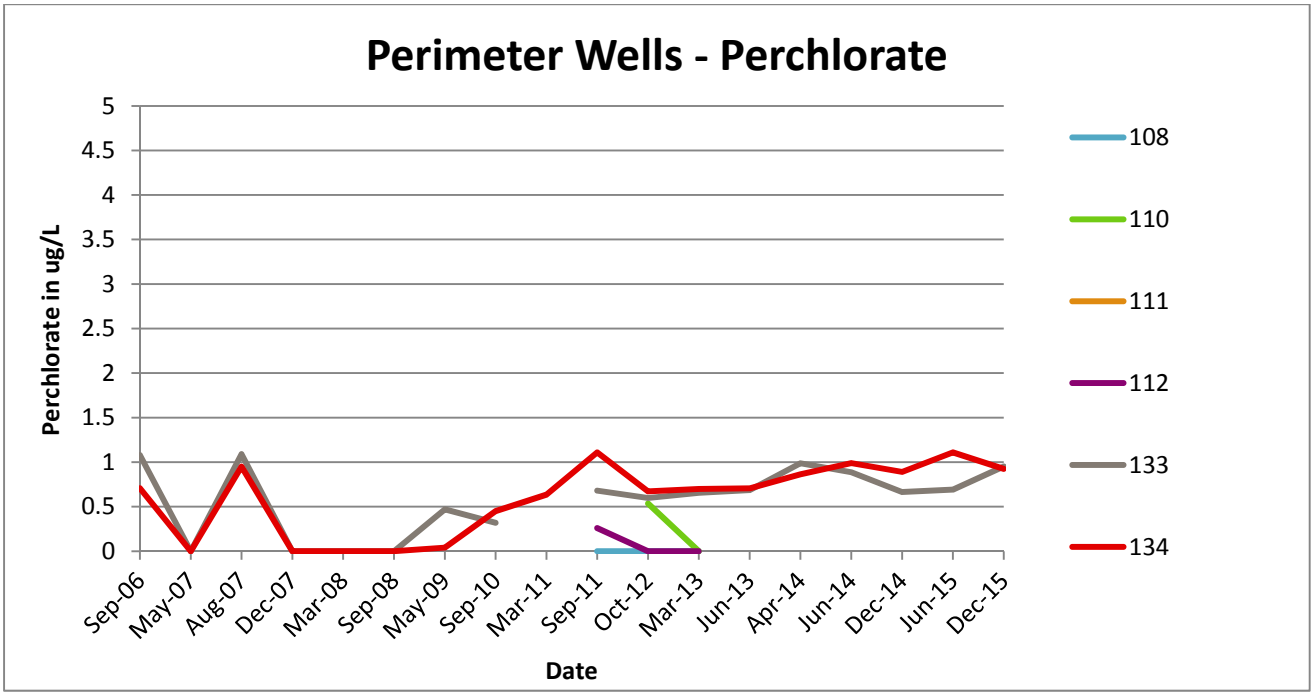
Groundwater samples are currently collected annually from four wells and semi-annually from two wells on the LHAAP perimeter.

Historical Perimeter Well Sample Data
(in micrograms per liter)

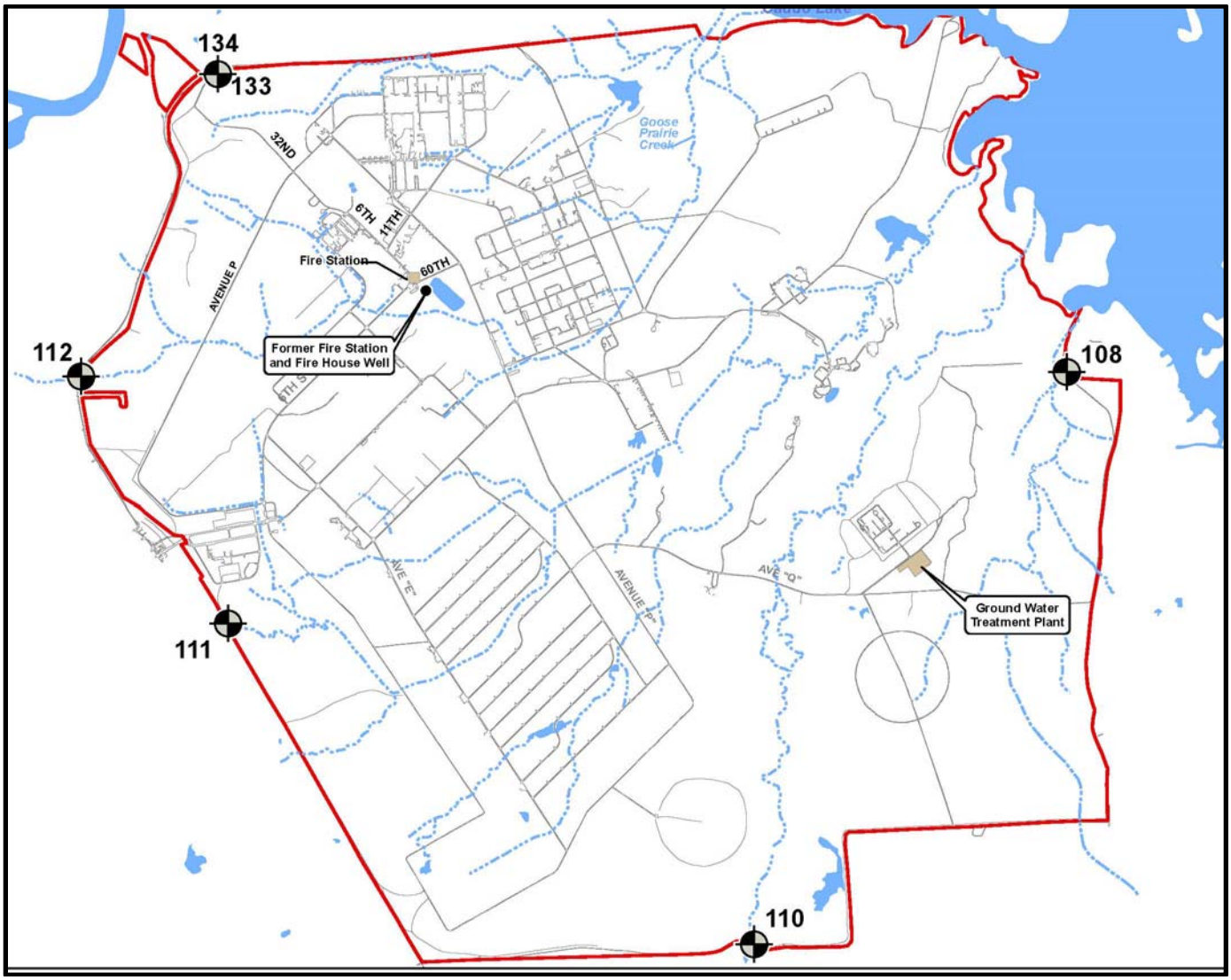
Well ID	Jun 2005	Sep 2005	Sep 2006	May 2007	Aug 2007	Dec 2007	Mar 2008	Sep 2008	May 2009	Sep 2009	Mar 2010
108	NS	NS	10 U	NS	0.5 U	NS	NS	2.5 U	NS	1.2 U	NS
110	NS	NS	10 U	NS	10 U	NS	NS	5.0 U	NS	6 U	NS
111	NS	NS	4 U	NS	0.5 U	NS	NS	0.5 U	NS	0.3 U	NS
112	NS	NS	5 U	NS	3 U	NS	NS	2.0 U	NS	3 U	NS
133	0.541	0.597	1.08	1 U	1.09	0.5 U	0.5 U	0.5 U	0.47 J	0.32	Dry
134	0.881	0.725	0.708 J	1 U	0.949 J	0.5 U	0.5 U	0.829 U	0.04 J	0.3 U	0.3 U

Well ID	Sep 2010	Mar 2011	Sep 2011	Oct 2012	Mar 2013	Jun 2013	Apr 2014	Jun 2014	Dec 2014	Jun 2015	Dec 2015
108	3 U	NS	0.1 U	0.2 U	0.2 U	NS	NS	0.2 U	NS	0.566	NS
110	Dry	NS	Dry	0.535	0.2 U	NS	NS	0.2 U	NS	2U	NS
111	Dry	NS	Dry	Dry	1.32	NS	NS	Dry	NS	0.2U	NS
112	3 U	NS	0.26	0.2 U	0.2 U	NS	NS	0.458	NS	2U	NS
133	0.32	Dry	0.68	0.598	0.655	0.685	0.988	0.887	0.665	0.692	0.952
134	0.45	0.636	1.11	0.671	0.698	0.706	0.863	0.989	0.890	1.11	0.925

Notes:
J – Estimated U – Non-Detect Dry – Well Dry NS – Not Sampled



Longhorn Army Ammuntion Plant Map with Perimeter Well Locations



QUALITY CONTROL SUMMARY REPORT
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

Prepared For:





U.S. Army Corps of Engineers

Prepared By:

AECOM

AECOM Technical Services

June 2016

Table of Contents

1 INTRODUCTION ***1***
1.1 Intended Use of Data **1**
1.2 Preservation and Holding Times **1**
1.3 Calibrations **1**
1.3.1 Continuing Calibration Verifications (CCV) **1**
1.3.2 Blanks **1**
1.3.3 Surrogates **1**
1.3.4 Laboratory Control Sample (LCS) **2**
2 DATA USABILITY SUMMARY ***2***

List of Tables

Table 1: Completeness by Method
Table 2: Field Sample Identification and Laboratory Identification

1 INTRODUCTION

AECOM reviewed four data packages from Microbac Laboratory Services, Marietta, OH. Surface and groundwater samples were collected November 19, December 29, 2015 and February 25, 2016 at Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas. Data were reviewed for conformance to the requirements of the following guidance documents: Automated Data Review by Laboratory Data Consultants (ADR.net), United States Environmental Protection Agency (EPA) Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, (EPA, July 2002), and EPA Contract Laboratory Program National Functional Guidelines for Low Concentration Organic Data Review, (EPA, June 2001).

1.1 Intended Use of Data

Groundwater treatment activities consist of monitoring of treated water to ensure compliance with the discharge limitations.

Analyses requested included:

- SW6850 – Perchlorates by LC/MS/MS

Table 2 lists the sample identifications and their associated laboratory identifications.

1.2 Preservation and Holding Times

Sample identification data were evaluated for agreement with the chain-of-custody (COC). All samples were received in appropriate containers, within the proper temperature range, in good condition, and with the required signatures.

1.3 Calibrations

Initial calibration criteria modification includes RSD< or = to 30%, two compounds allowed up to 40%. If the continuing calibration verification (CCV) compound exceeds 30% drift, the compound is checked in the LCS, if both are outside recovery limits, the compound is rejected, R. If only the CCV exceeds recovery criteria and is less than ± 40% drift, then the compound is qualified J or UJ.

1.3.1 Continuing Calibration Verifications (CCV)

CCVs within control limits.

1.3.2 Blanks

Where contamination by a target analyte of one of the various blanks was found, if the sample result for an associated sample was non-detect or less than 5X (10X for common laboratory contaminants) the analyte concentration in the blank, the corresponding sample result for the analyte was qualified B. Where the sample result for the affected analyte was greater than 5X the amount in the blank, no qualifier was applied.

No blank contamination found.

1.3.3 Surrogates

All surrogates are within criteria.

1.3.4 Laboratory Control Sample (LCS)

All LCS are within criteria.

2 DATA USABILITY SUMMARY

The data are usable for the intended purposes of the project. The data quality objectives have been met for the project.

Table 1: Completeness by Method

Method	Total Analytes	No. of Rejected Results	% Completeness
SW6850	13	0	100

Table 2: Field Sample Identification and Laboratory Identification

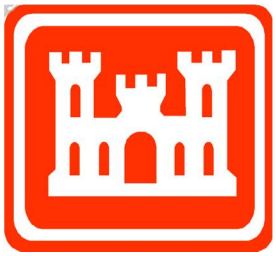
Client Sample ID	Lab Sample ID	Collected	SW6850
HBW7-111915	L1511223-01	11/19/15	X
HBW10-111915	L1511223-02	11/19/15	X
HBW1-111915	L1511223-03	11/19/15	X
GPW1-111915	L1511223-04	11/19/15	X
GPW3-111915	L1511223-05	11/19/15	X
PW133-122915	L15121571-01	12/29/15	X
PW134-122915	L15121571-02	12/29/15	X
HBW 7-022516	L16021328-01	2/25/16	X
HBW 10-022516	L16021328-02	2/25/16	X
HBW 1-022516	L16021328-03	2/25/16	X
GPW 3-022516	L16021328-04	2/25/16	X
GPW 1-022516	L16021328-05	2/25/16	X

Laboratory data packages will be included in a separate file.

QUALITY CONTROL SUMMARY REPORT
SURFACE WATER 2016
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

Prepared For:





U.S. Army Corps of Engineers

Prepared By:

AECOM

AECOM Technical Services

November 2017

Table of Contents

1 INTRODUCTION ***1***
1.1 Intended Use of Data **1**
1.2 Preservation and Holding Times **1**
1.3 Calibrations **1**
1.3.1 Continuing Calibration Verifications (CCV) **1**
1.4 Blanks **1**
1.5 Laboratory Control Sample(LCS)/Laboratory Control Sample Duplicate(LCSD) **2**
1.6 Matrix Spike (MS)/Matrix Spike Duplicate Sample (MSD) **2**
1.7 Internal Standards. **2**
1.8 Field Precision **2**
2 DATA USABILITY SUMMARY ***2***

List of Tables

Table 1: Field Sample Identification and Laboratory Identification
Table 2: Qualified Analytical Data
Table 3: Completeness by Method

1 INTRODUCTION

AECOM reviewed three data packages from Microbac Laboratory Services, Marietta, OH. Surface water samples were collected May 27, August 23, and November 29, 2016 at Goose Prairie Creek and Harrison Bayou at the Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas. Data were reviewed for conformance to the requirements of the following guidance documents: Automated Data Review by Laboratory Data Consultants (ADR.net), United States Environmental Protection Agency (EPA) Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, (EPA, January 2017), and EPA Contract Laboratory Program National Functional Guidelines for Low Concentration Organic Data Review, (EPA, January 2017).

1.1 Intended Use of Data

Groundwater treatment activities consist of monitoring of treated water to ensure compliance with the discharge limitations.

Analyses requested included:

- SW6850 – Perchlorate by LC/MS/MS

Table 1 lists the sample identification numbers (IDs) and their associated laboratory IDs. **Table 2** lists qualified results with the associated quality control parameter that was exceeded.

1.2 Preservation and Holding Times

Sample identification data were evaluated for agreement with the chain-of-custody (COC). All samples were received in appropriate containers, within the proper temperature range, in good condition, and with the required signatures.

1.3 Calibrations

Initial calibration acceptance criteria are specified in Worksheet 24 of the project-specific QAPP. For perchlorate, the methods criteria are a relative standard deviation (RSD) less than or equal to 20 percent (%) or a correlation coefficient (r^2) $\geq$ 0.99. All calibrations met the method criteria.

1.3.1 Continuing Calibration Verifications (CCV)

The continuing calibration verification (CCV) acceptance criteria are specified in Worksheet 24 of the project-specific QAPP. For perchlorate, the methods criteria are if the CCV exceeds 15% difference (%D), the compound is checked in the LCS, if both are outside recovery limits, the compound is rejected, R. If only the CCV exceeds recovery criteria and is less than ± 15% difference, then the compound is qualified J or UJ.

All CCVs were within the acceptance criteria.

1.4 Blanks

If the sample result for an associated sample was non-detect or less than 5X (10X for common laboratory contaminants) the analyte concentration in the blank, the corresponding sample result for the analyte was qualified U. Where the sample result for the affected analyte was greater than 5X (10X) the amount in the blank, no qualifier was applied.

Perchlorate was not detected in the blanks.

1.5 Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD)

LCS/LCSD recoveries were evaluated using limits defined for each method in Worksheet 15 of the project-specific QAPP.

All LCS/LCSD recoveries were within the control limits.

1.6 Matrix Spike (MS)/Matrix Spike Duplicate Sample (MSD)

MS/MSD recoveries were evaluated using limits defined for each method in Worksheet 15 of the project-specific QAPP. An MS/MSD was not run on a client sample. Therefore, matrix-specific accuracy and variability were not evaluated.

1.7 Internal Standards.

When the percent recovery for an internal standard in a sample is outside the laboratory limits, the associated sample is qualified for the analyte(s) associated with the internal standard(s) outside of the acceptance criteria.

Internal standard recoveries were within the acceptance criteria.

1.8 Field Precision

Precision is the measure of variability of individual sample measurements. Evaluation of field duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate samples divided by the mean and expressed as a percent. Field duplicate RPD limits were set at 0-25% for groundwater matrices. Field duplicate samples were not submitted with this sample set; therefore, field duplicate variability was not evaluated.

2 DATA USABILITY SUMMARY

The data are usable for the intended purposes of the project (see Table 3). The data quality objectives have been met for the project.

Table 1: Field Sample Identification and Laboratory Identification

Client Sample ID	Laboratory Sample ID	SW6850
GPW1-052716	L16051583-01	X
GPW3-052716	L16051583-02	X
HBW1-052716	L16051583-03	X
HBW10-052716	L16051583-04	X
HBW7-052716	L16051583-05	X
HBW 7 - 082316	L16081156-01	X
HBW 10 - 082316	L16081156-02	X
HBW 1 - 082316	L11081156-03	X
GPW 1 - 082316	L11081156-04	X
GPW 3 - 082316	L11081156-05	X
HBW7-112916	L16111326-01	X
HBW10-112916	L16111326-02	X
HBW1-112916	L16111326-03	X
GPW1-112916	L16111326-04	X
GPW3-112916	L16111326-05	X

Laboratory – Microbac Laboratories in Marietta, Ohio
SW-846 - Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.
X – Sample analyzed for indicated parameter.

Table 2: Qualified Analytical Data

Client Sample ID	Laboratory Sample ID	Analyte Name	Data Validation Qualifier	Reason for Qualification
N/A	N/A	N/A	N/A	N/A

N/A – Not applicable.

Table 3: Completeness by Method

Method	No. of Rejected Results	% Completeness
SW6850	0	100

SW-846 - Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.

QUALITY CONTROL SUMMARY REPORT
PERIMETER WELL SAMPLING
JUNE & NOVEMBER/DECEMBER 2016
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

Prepared For:





U.S. Army Corps of Engineers

Prepared By:

AECOM

AECOM Technical Services

May 2018

Table of Contents

1 INTRODUCTION ***1***
1.1 Intended Use of Data **1**
1.2 Preservation and Holding Times **1**
1.3 Calibrations **1**
1.3.1 Calibration Verifications (CCV) **1**
1.4 Blanks **1**
1.5 Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD) **2**
1.6 Matrix Spike (MS)/Matrix Spike Duplicate Sample (MSD) **2**
1.7 Internal Standards **2**
1.8 Field Precision **2**
2 DATA USABILITY SUMMARY ***2***

List of Tables

Table 1: Field Sample Identification and Laboratory Identification
Table 2: Qualified Analytical Data
Table 3: Completeness by Method

1 INTRODUCTION

AECOM reviewed three data packages from Microbac Laboratory Services, Marietta, OH. Perimeter well groundwater samples were collected June 29 and 30, 2016, November 7, 2016, and December 2, 2016 at the Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas. Data were reviewed for conformance to the requirements of the following guidance documents: Automated Data Review by Laboratory Data Consultants (ADR.net) and the Final Quality Assurance Project Plan (QAPP) for the Longhorn Ammunition Plant in Karnack, Texas (AECOM Technical Services, July 2015).

1.1 Intended Use of Data

These groundwater sampling activities were performed to monitor perchlorate concentrations in the perimeter monitoring wells.

The requested analysis was:

- United States Environmental Protection Agency (EPA) SW-846 Method 6850 – Perchlorate

Table 1 lists the sample identification numbers (IDs) and their associated laboratory IDs. Table 2 lists qualified results with the associated quality control parameter that was exceeded.

1.2 Preservation and Holding Times

Sample identification data were evaluated for agreement with the chain-of-custody (COC). All samples were received in appropriate containers, within the proper temperature range, in good condition, and with the required signatures.

1.3 Calibrations

Initial calibration acceptance criteria are specified in Worksheet 24 of the project-specific QAPP. For perchlorate, the methods criteria are a relative standard deviation (RSD) less than or equal to 20 percent (%) or a correlation coefficient (r^2) $\geq$ 0.99. All calibrations met the method criteria.

1.3.1 Calibration Verifications (CCV)

The continuing calibration verification (CCV) acceptance criteria are specified in Worksheet 24 of the project-specific QAPP. For perchlorate, the methods criteria are if the CCV exceeds 15% difference (%D), the compound is checked in the laboratory control sample (LCS), if both are outside recovery limits, the compound is rejected, R. If only the CCV exceeds recovery criteria and is less than ± 15% difference, then the compound is qualified J or UJ.

All CCVs were within the acceptance criteria.

1.4 Blanks

If the sample result for an associated sample was non-detect or less than 5X (10X for common laboratory contaminants) the analyte concentration in the blank, the corresponding sample result for the analyte was qualified U. Where the sample result for the affected analyte was greater than 5X (10X) the amount in the blank, no qualifier was applied. Perchlorate was not detected in the method or calibration blanks.

1.5 Laboratory Control Sample (LCS)/Laboratory Control Sample Duplicate (LCSD)

LCS/LCSD recoveries were evaluated using limits defined for each method in Worksheet 15 of the project-specific QAPP.

All LCS/LCSD recoveries were within the control limits.

1.6 Matrix Spike (MS)/Matrix Spike Duplicate Sample (MSD)

MS/MSD recoveries were evaluated using limits defined for each method in Worksheet 15 of the project-specific QAPP.

All MS/MSD recoveries were within the control limits.

1.7 Internal Standards

When the percent recovery for an internal standard in a sample is outside the laboratory limits, the associated sample is qualified for the analyte(s) associated with the internal standard(s) outside of the acceptance criteria.

Internal standard recoveries were within the acceptance criteria.

1.8 Field Precision

Precision is the measure of variability of individual sample measurements. Evaluation of field duplicates for precision was done using the Relative Percent Difference (RPD). The RPD is defined as the difference between two duplicate sample results divided by the mean and expressed as a percent. Field duplicate RPD limits for sample results greater than five times the level of quantitation for inorganic constituents is ±50% for groundwater matrices (see QAPP Worksheet #12). Three field duplicate samples were submitted with this sample set. Field duplicate variability was acceptable.

2 DATA USABILITY SUMMARY

The data are usable for the intended purposes of the project (see Table 3). The data quality objectives have been met for the project.

Table 1: Field Sample Identification and Laboratory Identification

Client Sample ID	Laboratory Sample ID	SW-846 6850	Comment
June 2016			
PW108-062916	L16070033-01	X	
PW110-062916	L16070033-02	X	
PW111-063016	L16070033-08	X	
PW112-063016	L16070033-09	X	
PW133-063016	L16070033-05	X	MS/MSD parent
PW134-063016	L16070033-03	X	
PW134FD-063016	L16070033-04	X	Field duplicate of PW134-063016
November/December 2016			
PW110-110716	L16110420-05	X	
PW110FD-110716	L16110420-06	X	Field duplicate of PW110-110716
PW111-110716	L16110420-01	X	
PW112-110716	L16110420-02	X	MS/MSD parent
PW133-120216	L16120281-04	X	
PW133FD-120216	L16120281-05	X	Field duplicate of PW133-120216
PW134-120216	L16120281-01	X	MS/MSD parent

Laboratory – Microbac Laboratories in Marietta, Ohio
MS/MSD – Matrix spike/matrix spike duplicate sample.
SW-846 - Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.
X – Sample analyzed for indicated parameter.

Microbac

Laboratory Report Number: L16021328

Kayla Teague
AECOM Technical Services, Inc.
16000 Dallas Parkway
Dallas, TX 75248

Please find enclosed the analytical results for the samples you submitted to Microbac Laboratories. Review and compilation of your report was completed by Microbac's Ohio Valley Division (OVD). If you have any questions, comments, or require further assistance regarding this report, please contact your service representative listed below.

Laboratory Contact:
Stephanie Mossburg – Team Chemist/Data Specialist
(740) 373-4071
Stephanie.Mossburg@microbac.com

I certify that all test results meet all of the requirements of the DoD QSM and other applicable contract terms and conditions. Any exceptions are attached to this cover page or addressed in the method narratives presented in the report. All results for soil samples are reported on a 'dry-weight' basis unless specified otherwise. Analytical results for water and wastes are reported on a 'as received' basis unless specified otherwise. A statement of uncertainty for each analysis is available upon request. This laboratory report shall not be reproduced, except in full, without the written approval of Microbac Laboratories, DoD ELAP certification number 2936.01. The reported results are related only to the samples analyzed as received.

This report was certified on March 07 2016

David L. Vandenberg

David Vandenberg – Managing Director

State of Origin: TX
Accrediting Authority: Texas Commission on Environmental Quality ID:T104704252-07-TX
QAPP: DOD Ver 4.1

Microbac

Lab Report #: L16021328
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Stephanie Mossburg

Record of Sample Receipt and Inspection

Comments/Discrepancies

This is the record of the shipment conditions and the inspection records for the samples received and reported as a sample delivery group (SDG). All of the samples were inspected and observed to conform to our receipt policies, except as noted below.

There were no discrepancies.

Discrepancy	Resolution

Coolers

Cooler #	Temperature Gun	Temperature	COC #	Airbill #	Temp Required?
0010170	I	1.0		J2317165965	X

Inspection Checklist

#	Question	Result
1	Were shipping coolers sealed?	Yes
2	Were custody seals intact?	Yes
3	Were cooler temperatures in range of 0-6?	Yes
4	Was ice present?	Yes
5	Were COC's received/information complete/signed and dated?	Yes
6	Were sample containers intact and match COC?	Yes
7	Were sample labels intact and match COC?	Yes
8	Were the correct containers and volumes received?	Yes
9	Were samples received within EPA hold times?	Yes
10	Were correct preservatives used? (water only)	Yes
11	Were pH ranges acceptable? (voa's excluded)	NA
12	Were VOA samples free of headspace (less than 6mm)?	NA

Microbac

Lab Report #: L16021328
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Stephanie Mossburg

Samples Received

Client ID	Laboratory ID	Date Collected	Date Received
HBW 7- 022516	L16021328-01	02/25/2016 12:40	02/26/2016 09:41
HBW 10- 022516	L16021328-02	02/25/2016 12:50	02/26/2016 09:41
HBW 1- 022516	L16021328-03	02/25/2016 13:05	02/26/2016 09:41
GPW 3- 022516	L16021328-04	02/25/2016 13:20	02/26/2016 09:41
GPW 1- 022516	L16021328-05	02/25/2016 13:40	02/26/2016 09:41

Microbac REPORT L16021328
PREPARED FOR AECOM Technical Services, Inc.
WORK ID:

1.0 Summary Data 5
1.1 Narratives 6
1.2 Certificate of Analysis 13
2.0 Full Sample Data Package 18
2.1 General Chromatography Data 19
2.1.1 6850 LC/MS Data 20
2.1.1.1 Summary Data 21
2.1.1.2 QC Summary Data 26
2.1.1.3 Sample Data 89
2.1.1.4 Standards Data 100
2.1.1.5 Raw QC Data 153
3.0 Attachments 158

1.0 Summary Data

1.1 Narratives

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L16021328
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG559292	**Reviewer Name:**	Eric Lawson
LRC Date:	2016-03-07 00:00:00		

Laboratory Data Package Cover Page

X	R1	Field chain-of-custody documentation;
X	R2	Sample identification cross-reference;
X	R3	Test reports (analytical data sheets) for each environmental sample that includes: (a) Items consistent with NELAC Chapter 5, (b) dilution factors, (c) preparation methods, (d) cleanup methods, and (e) a.if required for the project, tentatively identified compounds (TICs).
X	R4	Surrogate recovery data including: (a) Calculated recovery (%R), and (b) the laboratory's surrogate QC limits.
X	R5	Test reports/summary forms for blank samples;
X	R6	Test reports/summary forms for laboratory control samples (LCSs) including: (a) LCS spiking amounts, (b) calculated %R for each analyte, and (c) the laboratory's LCS QC limits.
X	R7	Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including: (a) samples associated with the MS/MSD clearly identified, (b) MS/MSD spiking compounds, (c) concentration of each MS/MSD analyte measured in the parent and spiked samples, (d) calculated %Rs and relative percent differences (RPDs), and (e) the laboratory's MS/MSD QC limits.
X	R8	Laboratory analytical duplicate (if applicable) recovery and precision: (a) the amount of analyte measured in the duplicate, (b) the calculated RPD, and (c) the laboratory's QC limits for analytical duplicates.
X	R9	List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
X	R10	Other problems or anomalies.

Name (Printed)	Signature	Official Title (Printed)	Date
Eric Lawson		Chemist III	2016-03-07 13:45:06

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L16021328
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG559292	**Reviewer Name:**	Eric Lawson
LRC Date:	2016-03-07 00:00:00		

Description	Yes	No	NA	NR	ER#
Chain-of-custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
Were all departures from standard conditions described in an exception report?	X				
Sample and quality control (QC) identification	X				
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
Test reports					
Were all samples prepared and analyzed within holding times?	X				
Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
Were calculations checked by a peer or supervisor?	X				
Were all analyte identifications checked by a peer or supervisor?	X				
Were sample detection limits reported for all analytes not detected?	X				
Were all results for soil and sediment samples reported on a dry weight basis?			X		
Were % moisture (or solids) reported for all soil and sediment samples?			X		
Were bulk soils/solids samples for volatile analysis extracted with methanol per SW846 Method 5035?			X		
If required for the project, are TICs reported?			X		
Surrogate recovery data					
Were surrogates added prior to extraction?			X		
Were surrogate percent recoveries in all samples within the laboratory QC limits?			X		
Test reports/summary forms for blank samples					
Were appropriate type(s) of blanks analyzed?	X				
Were blanks analyzed at the appropriate frequency?	X				
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
Were blank concentrations < MQL?	X				
Laboratory control samples (LCS):					
Were all COCs included in the LCS?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L16021328
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG559292	**Reviewer Name:**	Eric Lawson
LRC Date:	2016-03-07 00:00:00		

Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
Were LCSs analyzed at the required frequency?	X				
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
Does the detectability check sample data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
Was the LCSD RPD within QC limits?			X		
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?			X		
Were MS/MSD analyzed at the appropriate frequency?			X		
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?			X		
Were MS/MSD RPDs within laboratory QC limits?			X		
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?			X		
Were analytical duplicates analyzed at the appropriate frequency?			X		
Were RPDs or relative standard deviations within the laboratory QC limits?			X		
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?	X				
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
Was applicable and available technology used to lower the SDL to minimize the matrix interference effects on the sample results?	X				
Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	X				
Initial calibration (ICAL)					
Were response factors and/or relative response factors for each analyte within QC limits?	X				
Were percent RSDs or correlation coefficient criteria met?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L16021328
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG559292	**Reviewer Name:**	Eric Lawson
LRC Date:	2016-03-07 00:00:00		

Was the number of standards recommended in the method used for all analytes?	X				
Were all points generated between the lowest and highest standard used to calculate the curve?	X				
Are ICAL data available for all instruments used?	X				
Has the initial calibration curve been verified using an appropriate second source standard?	X				
Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?	X				
Were percent differences for each analyte within the method-required QC limits?	X				
Was the ICAL curve verified for each analyte?	X				
Was the absolute value of the analyte concentration in the inorganic CCB < MDL?			X		
Mass spectral tuning					
Was the appropriate compound for the method used for tuning?	X				
Were ion abundance data within the method-required QC limits?	X				
Internal standards (IS)					
Were IS area counts and retention times within the method-required QC limits?	X				
Raw data (NELAC Section 5.5.10)					
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
Were data associated with manual integrations flagged on the raw data?	X				
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			X		
Tentatively identified compounds (TICs)					
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
Interference Check Sample (ICS) results					
Were percent recoveries within method QC limits?			X		
Serial dilutions, post digestion spikes, and method of standard additions					
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
Method detection limit (MDL) studies					

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L16021328
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG559292	**Reviewer Name:**	Eric Lawson
LRC Date:	2016-03-07 00:00:00		

Was a MDL study performed for each reported analyte?	X				
Is the MDL either adjusted or supported by the analysis of DCSs?	X				
Proficiency test reports					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?	X				
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5?	X				
Is documentation of the analyst's competency up-to-date and on file?	X				
Verification/validation documentation for methods (NELAC Chapter 5)					
Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
Laboratory standard operating procedures (SOPs)					
Are laboratory SOPs current and on file for each method performed	X				

1. Items identified by the letter “R” must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter “S” should be retained and made available upon request for the appropriate retention period;

2. O = organic analyses; I = inorganic analyses (and general chemistry, when applicable);

3. NA = Not applicable;

4. NR = Not reviewed;

5. ER# = Exception Report identification number (an Exception Report should be completed for an item if “NR” or “No” is checked).

The Exception Report for each “No” or “Not Reviewed (NR)” item in Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L16021328
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG559292	**Reviewer Name:**	Eric Lawson
LRC Date:	2016-03-07 00:00:00		

below, I affirm to the best of my knowledge all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [ ] This laboratory meets an exception under 30 TAC §25.6 and was last inspection by [ ] TCEQ or [ ] _____ on **(enter date of last inspection**). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Exceptions Report

There are no exceptions.

1.2 Certificate of Analysis

Microbac

Lab Report #: L16021328
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Stephanie Mossburg

Certificate of Analysis

Sample #:	L16021328-01	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	HBW 7- 022516	**Prep Method:**	6850	**Prep Date:**	03/02/2016 08:34
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	03/02/2016 10:46
Workgroup #:	WG559292	**Analyst:**	WTD	**Run Date:**	03/03/2016 05:45
Collect Date:	02/25/2016 12:40	**Dilution:**	1	**File ID:**	1LM.LM33634
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.200	U	0.400	0.200	0.100

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L16021328
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Stephanie Mossburg

Certificate of Analysis

Sample #:	L16021328-02	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	HBW 10- 022516	**Prep Method:**	6850	**Prep Date:**	03/02/2016 08:34
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	03/02/2016 10:46
Workgroup #:	WG559292	**Analyst:**	WTD	**Run Date:**	03/03/2016 07:00
Collect Date:	02/25/2016 12:50	**Dilution:**	1	**File ID:**	1LM.LM33638
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.200	U	0.400	0.200	0.100

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L16021328
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Stephanie Mossburg

Certificate of Analysis

Sample #:	L16021328-03	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	HBW 1- 022516	**Prep Method:**	6850	**Prep Date:**	03/02/2016 08:34
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	03/02/2016 10:46
Workgroup #:	WG559292	**Analyst:**	WTD	**Run Date:**	03/03/2016 07:19
Collect Date:	02/25/2016 13:05	**Dilution:**	1	**File ID:**	1LM.LM33639
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.200	U	0.400	0.200	0.100

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L16021328
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Stephanie Mossburg

Certificate of Analysis

Sample #:	L16021328-04	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	GPW 3- 022516	**Prep Method:**	6850	**Prep Date:**	03/02/2016 08:34
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	03/02/2016 10:46
Workgroup #:	WG559292	**Analyst:**	WTD	**Run Date:**	03/03/2016 07:38
Collect Date:	02/25/2016 13:20	**Dilution:**	1	**File ID:**	1LM.LM33640
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.474		0.400	0.200	0.100

Certificate of Analysis

Sample #:	L16021328-05	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	GPW 1- 022516	**Prep Method:**	6850	**Prep Date:**	03/02/2016 08:34
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	03/02/2016 10:46
Workgroup #:	WG559292	**Analyst:**	WTD	**Run Date:**	03/03/2016 07:57
Collect Date:	02/25/2016 13:40	**Dilution:**	1	**File ID:**	1LM.LM33641
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.447		0.400	0.200	0.100

2.0 Full Sample Data Package

2.1 General Chromatography Data

2.1.1 6850 LC/MS Data

2.1.1.1 Summary Data

Microbac

Lab Report #: L16021328
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Stephanie Mossburg

Certificate of Analysis

Sample #:	L16021328-01	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	HBW 7- 022516	**Prep Method:**	6850	**Prep Date:**	03/02/2016 08:34
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	03/02/2016 10:46
Workgroup #:	WG559292	**Analyst:**	WTD	**Run Date:**	03/03/2016 05:45
Collect Date:	02/25/2016 12:40	**Dilution:**	1	**File ID:**	1LM.LM33634
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.200	U	0.400	0.200	0.100

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L16021328
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Stephanie Mossburg

Certificate of Analysis

Sample #:	L16021328-02	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	HBW 10- 022516	**Prep Method:**	6850	**Prep Date:**	03/02/2016 08:34
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	03/02/2016 10:46
Workgroup #:	WG559292	**Analyst:**	WTD	**Run Date:**	03/03/2016 07:00
Collect Date:	02/25/2016 12:50	**Dilution:**	1	**File ID:**	1LM.LM33638
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.200	U	0.400	0.200	0.100

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L16021328
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Stephanie Mossburg

Certificate of Analysis

Sample #:	L16021328-03	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	HBW 1- 022516	**Prep Method:**	6850	**Prep Date:**	03/02/2016 08:34
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	03/02/2016 10:46
Workgroup #:	WG559292	**Analyst:**	WTD	**Run Date:**	03/03/2016 07:19
Collect Date:	02/25/2016 13:05	**Dilution:**	1	**File ID:**	1LM.LM33639
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.200	U	0.400	0.200	0.100

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L16021328
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Stephanie Mossburg

Certificate of Analysis

Sample #:	L16021328-04	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	GPW 3- 022516	**Prep Method:**	6850	**Prep Date:**	03/02/2016 08:34
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	03/02/2016 10:46
Workgroup #:	WG559292	**Analyst:**	WTD	**Run Date:**	03/03/2016 07:38
Collect Date:	02/25/2016 13:20	**Dilution:**	1	**File ID:**	1LM.LM33640
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.474		0.400	0.200	0.100

Certificate of Analysis

Sample #:	L16021328-05	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	GPW 1- 022516	**Prep Method:**	6850	**Prep Date:**	03/02/2016 08:34
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	03/02/2016 10:46
Workgroup #:	WG559292	**Analyst:**	WTD	**Run Date:**	03/03/2016 07:57
Collect Date:	02/25/2016 13:40	**Dilution:**	1	**File ID:**	1LM.LM33641
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.447		0.400	0.200	0.100

2.1.1.2 QC Summary Data

Example Calculation 6850 - Perchlorate

Concentration from Linear Regression

Step 1: Retrieve Curve Data From Plot, y = mx + b

y = response ratio = response of analyte / response of internal standard (IS) = Rx/Ristd

x = amount ratio = concentration analyte/concentration internal standard (IS) = Cx / Cistd

m = slope from curve (1.45)

b = intercept from curve (-0.00242)

y = 1.45x + -0.00242

Step 2: Substitute the value for y

where y = 12600/226000 = 0.055752

Step 3: Solve for x

x = (y - b)/m = 0.0040119

Step 4: Solve for analyte concentration Cx

Cx = (Cis)(x) = (5 ug/L)(0.040119) = 0.200594 ug/L

Example Calculation - Water:

Slope from curve, m:	1.45
Intercept from curve, b:	-0.00242
Response of analyte, Rx:	12600
Response of Internal Standard , Ristd:	226000
Concentration of IS, Cistd (ug/L):	5.00
Response Ratio:	0.05575
Amount Ratio:	0.04012
Analyte Concentration, Cx (ug/L) :	0.200594

Example Calculation - Soil:

Analyte Concentration, Cx (ug/L):	0.20059
Amount of soil extracted (g):	5.00
Final volume of extract (mL):	50.00
Percent solids (Pct wt.)	100
Concentration in soil (ug/kg):	2.005938

Perchlorate Conductivity Check
(perchlorate1)

Conductivity Probe Calibration Check: 1400 /1410 µs/cm

Working MCT Level: 10,000 µs/cm

Sample	Conductivity (µs/cm)	Pretreatment or Dilution Needed
WG559292-01 MCT	9840	
-02 WLK	1.1	
-03 LCS	1.1	
L16021255-01 RQL	1151	
-02 MS	707	
-03 MSD	697	
~~12[illegible]~~		
~~-03~~		
-04	699	
-05	1137	
-06	173	
-07	239	
-08	40.6	
-09	226	
-10	402	
-11	2370	
-12	3580	
-13	3600	
-14	3560	
L16021328-01	75.2	
-02	74.3	
-03	75.5	
-04	57.3	
-05	58.5	
L16030008-01	2900	

Analyst: Anthony Carter

Date/Time: 3/2/16 / 12:00pm

DCN#116977

Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 030216_WTD.TXT

Analyst1: WTD Analyst2: ADC

Method: 6850 SOP: HPLC06 Rev: 7

Maintenance Log ID: Syringe Filter Lot#: 150506254

Eluent ID#:

Column 1 ID: KP-RPPX250 Column 2 ID: NA

Workgroups: WG559015, WG559292

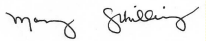
Internal STD: COA18071 Surrogate STD: NA Calibration STD STD72683 (02/17/2016)

CCV STD: STD72683 LCS STD: STD72685 MS/MSD STD: STD72685

Comments: L16021262s and L16021255s diluted based on historical data.

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	1LM.LM33567	WG559340-01 CCB	1	1		03/02/16 08:34
2	1LM.LM33568	WG559340-02 STD (0.1 ug/L)	1	1	STD72683	03/02/16 08:53
3	1LM.LM33569	WG559340-03 STD (0.2 ug/L)	1	1	STD72683	03/02/16 09:12
4	1LM.LM33570	WG559340-04 STD (0.5 ug/L)	1	1	STD72683	03/02/16 09:31
5	1LM.LM33571	WG559340-05 STD (1.0 ug/L)	1	1	STD72683	03/02/16 09:50
6	1LM.LM33572	WG559340-06 STD (2.0 ug/L)	1	1	STD72683	03/02/16 10:09
7	1LM.LM33573	WG559340-07 STD (5.0 ug/L)	1	1	STD72683	03/02/16 10:28
8	1LM.LM33574	WG559340-08 STD (10 ug/L)	1	1	STD72683	03/02/16 10:46
9	1LM.LM33575	WG559340-09 SSCV (1.0 ug/L)	1	1	STD72685	03/02/16 11:05
10	1LM.LM33576	WG559291-01 CCB	1	1		03/02/16 11:25
11	1LM.LM33577	WG559291-02 CCV (1.0ug/L)	1	1	STD72683	03/02/16 11:44
12	1LM.LM33578	WG559015-05 MRL (0.2ug/L)	1	1	STD72683	03/02/16 12:03
13	1LM.LM33579	WG559015-01 MCT (0.2ug/L)	1	1	STD72685	03/02/16 12:22
14	1LM.LM33580	WG559015-02 BLANK	1	1		03/02/16 12:41
15	1LM.LM33581	WG559015-05 MRL (0.2ug/L)	1	1	STD72683	03/02/16 13:01
16	1LM.LM33582	WG559015-03 LCS (0.2ug/L)	1	1	STD72685	03/02/16 13:20
17	1LM.LM33583	WG559015-04 LCS2 (0.2ug/L)	1	1	STD72685	03/02/16 13:39
18	1LM.LM33584	L16021060-01 ADC	1	1	STD72685	03/02/16 13:58
19	1LM.LM33585	L16021060-02 ADC	1	1	STD72685	03/02/16 14:17
20	1LM.LM33586	L16021060-03 ADC	1	1	STD72685	03/02/16 14:36
21	1LM.LM33587	L16021060-04 ADC	1	1	STD72685	03/02/16 14:55
22	1LM.LM33588	L16021262-01 (20x)	1	20		03/02/16 15:13
23	1LM.LM33589	L16021262-02 (5000x)	1	5000		03/02/16 15:32
24	1LM.LM33590	WG559291-03 CCV (1.0ug/L)	1	1	STD72683	03/02/16 15:51
25	1LM.LM33591	WG559015-06 MRL (0.2ug/L)	1	1	STD72683	03/02/16 16:10
26	1LM.LM33592	WG559291-04 CCB	1	1		03/02/16 16:29
27	1LM.LM33593	L16021262-03 (100X)	1	100		03/02/16 16:48
28	1LM.LM33594	L16021262-04 (2000X)	1	2000		03/02/16 17:07
29	1LM.LM33595	L16021262-05 (1000X)	1	1000		03/02/16 17:26
30	1LM.LM33596	L16021262-06 (10,000X)	1	10000		03/02/16 17:45
31	1LM.LM33597	L16021262-07 (10,000X)	1	10000		03/02/16 18:04
32	1LM.LM33598	L16021262-08 (5000X)	1	5000		03/02/16 18:23
33	1LM.LM33599	L16021262-09 (5000X)	1	5000		03/02/16 18:42

Page: 1 Approved: 04-MAR-16



Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 030216_WTD.TXT

Analyst1: WTD Analyst2: ADC

Method: 6850 SOP: HPLC06 Rev: 7

Maintenance Log ID: Syringe Filter Lot#: 150506254

Eluent ID#:

Workgroups: Column 1 ID: KP-RPPX250 Column 2 ID: NA

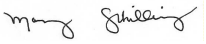
WG559015, WG559292

Internal STD: COA18071 Surrogate STD: NA STD72683 (02/17/2016)

CCV STD: STD72683 LCS STD: STD72685 STD72685

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
34	1LM.LM33600	L16021262-10 (100,000X)	1	100000		03/02/16 19:01
35	1LM.LM33601	L16021262-11 (10,000X)	1	10000		03/02/16 19:20
36	1LM.LM33602	L16021262-12 (10,000X)	1	10000		03/02/16 19:39
37	1LM.LM33603	WG559291-05 CCV (1.0ug/L)	1	1	STD72683	03/02/16 19:58
38	1LM.LM33604	WG559015-07 MRL (0.2ug/L)	1	1	STD72683	03/02/16 20:17
39	1LM.LM33605	WG559291-06 CCB	1	1		03/02/16 20:35
40	1LM.LM33606	L16021262-13 (10,000X)	1	10000		03/02/16 20:54
41	1LM.LM33607	L16021262-14 (10,000X)	1	10000		03/02/16 21:13
42	1LM.LM33608	WG559291-07 CCV (1.0ug/L)	1	1	STD72683	03/02/16 21:32
43	1LM.LM33609	WG559015-08 MRL (0.2ug/L)	1	1	STD72683	03/02/16 21:51
44	1LM.LM33610	WG559291-08 CCB	1	1		03/02/16 22:10
45	1LM.LM33611	WG559292-07 MRL (0.2ug/L)	1	1	STD72685	03/02/16 22:29
46	1LM.LM33612	WG559292-01 MCT (0.2ug/L)	1	1	STD72685	03/02/16 22:48
47	1LM.LM33613	WG559292-02 BLANK	1	1		03/02/16 23:07
48	1LM.LM33614	WG559292-03 LCS (0.2ug/L)	1	1	STD72685	03/02/16 23:26
93	1LM.LM33615	L16021255-01 REF 100X	1	100		03/02/16 23:45
50	1LM.LM33616	L16021255-02 MS 100X	1	100	STD72685	03/03/16 00:04
51	1LM.LM33617	L16021255-03 MSD 100X	1	100	STD72685	03/03/16 00:23
94	1LM.LM33618	L16021255-04 20X	1	20		03/03/16 00:42
53	1LM.LM33619	L16021255-05 20X	1	20		03/03/16 01:01
54	1LM.LM33620	L16021255-06 200X	1	200		03/03/16 01:20
55	1LM.LM33621	L16021255-07 100X	1	100		03/03/16 01:39
56	1LM.LM33622	WG559291-09 CCV (1.0ug/L)	1	1	STD72685	03/03/16 01:57
57	1LM.LM33623	WG559292-08 MRL (0.2ug/L)	1	1	STD72685	03/03/16 02:16
58	1LM.LM33624	WG559291-10 CCB	1	1		03/03/16 02:35
59	1LM.LM33625	L16021255-08	1	1		03/03/16 02:54
60	1LM.LM33626	L16021255-09 500X	1	500		03/03/16 03:13
61	1LM.LM33627	L16021255-10 5000X	1	5000		03/03/16 03:32
62	1LM.LM33628	L16021255-11 5000X	1	5000		03/03/16 03:51
63	1LM.LM33629	L16021255-12 100X	1	100		03/03/16 04:10
64	1LM.LM33630	L16021255-13 10,000X	1	10000		03/03/16 04:29
65	1LM.LM33631	L16021255-14 10,000X	1	10000		03/03/16 04:48
66	1LM.LM33632	L16030008-01	1	1		03/03/16 05:07
67	1LM.LM33633	L16030008-01 10X	1	10		03/03/16 05:26
68	1LM.LM33634	L16021328-01	1	1		03/03/16 05:45
69	1LM.LM33635	WG559291-11 CCV (1.0ug/L)	1	1	STD72685	03/03/16 06:04

 Approved: 04-MAR-16



Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 030216_WTD.TXT

Analyst1: WTD Analyst2: ADC

Method: 6850 SOP: HPLC06 Rev: 7

Maintenance Log ID: Syringe Filter Lot#: 150506254

Eluent ID#:

Column 1 ID: KP-RPPX250 Column 2 ID: NA

Workgroups: WG559015, WG559292

Internal STD: COA18071 Surrogate STD: NA STD72683 (02/17/2016)

CCV STD: STD72683 LCS STD: STD72685 STD72685

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
70	1LM.LM33636	WG559292-09 MRL (0.2ug/L)	1	1	STD72685	03/03/16 06:23
71	1LM.LM33637	WG559291-12 CCB	1	1		03/03/16 06:41
72	1LM.LM33638	L16021328-02	1	1		03/03/16 07:00
73	1LM.LM33639	L16021328-03	1	1		03/03/16 07:19
74	1LM.LM33640	L16021328-04	1	1		03/03/16 07:38
75	1LM.LM33641	L16021328-05	1	1		03/03/16 07:57
76	1LM.LM33642	WG559291-13 CCV (1.0ug/L)	1	1	STD72685	03/03/16 08:16
77	1LM.LM33643	WG559292-10 MRL (0.2ug/L)	1	1	STD72685	03/03/16 08:35
78	1LM.LM33644	WG559291-14 CCB	1	1		03/03/16 08:54
79	1LM.LM33645	L16021255-05 200X	1	200		03/03/16 09:13
80	1LM.LM33646	L16021255-06	1	1		03/03/16 09:32
81	1LM.LM33647	L16021255-12 1000X	1	1000		03/03/16 09:51
95	1LM.LM33648	L16021255-04	1	1		03/03/16 10:10
96	1LM.LM33649	L16021255-02 MS	1	1	STD72685	03/03/16 10:29
97	1LM.LM33650	L16021255-03 MSD	1	1	STD72685	03/03/16 10:48
85	1LM.LM33651	WG559291-15 CCV (1.0ug/L)	1	1	STD72685	03/03/16 11:07
86	1LM.LM33652	WG559292-11 MRL (0.2ug/L)	1	1	STD72685	03/03/16 11:25
87	1LM.LM33653	WG559291-16 CCB	1	1		03/03/16 11:44

Comments

Seq.	Rerun	Dil.	Reason	Analytes
12	X			
	WG559015-05 incorrect vial location.			
50				
	DNR. Incorrect information on the supplied Chain of Custody.			
51				
	DNR. Incorrect information on the supplied Chain of Custody.			
94	X	1	Analyzed too dilute	
	L16021255-04			
53	X	200	Over Calibration Range	Perchlorate
	L16021255-05			
54	X	1	Analyzed too dilute	
	L16021255-06			
63	X	1000	Over Calibration Range	
	L16021255-12 100X			

Page: 3 Approved: 04-MAR-16



Microbac Laboratories Inc.

Data Checklist

Date: 02-MAR-2016
Analyst: WTD
Analyst: ADC
Method: 6850
Instrument: LCMS1
Curve Workgroup: NA
Runlog ID: 73617
Analytical Workgroups: L16021255,L16021328,030008,021262,021060

ANALYTICAL	
System Performance Check	NA
DFTPP (GCMS)	NA
Endrin/DDT breakdown (8081/GCMS)	NA
Pentachlorophenol/benzidine tailing (GCMS)	NA
Eluent check (IC)/system pressure (HPLC)	NA
Window standard (FID)	NA
Initial Calibration	NA
Average RF	NA
Linear regression or higher order curve	NA
Alternate source standard (ICV) % Difference	NA
Continuing Calibration (CCV)	X
% D/% Drift	X
Minimum response factors (GCMS)	X
Continuing calibration blank (CCB) (IC/LCMS)	X
Limit of quantitation verification (LOQV) (LCMS)	X
Special standards	NA
Blanks	X
TCL hits	ND
Surrogate recoveries	NA
LCS/LCSD (Laboratory Control Sample)	X
Recoveries	X
Surrogate recoveries	NA
MS/MSD/Sample duplicates	X
Recoveries	X
%RPD	X
Interference check sample (ICS) (LCMS)	MCT
Samples	X
TCL hits	X
Mass spectra (MS/HPLC)/2nd column confirmations (ECD/FID/HPLC)	NA
Surrogate recoveries	NA
Internal standard areas (MS)	X
Library searches (GCMS)	NA
Calculations & correct factors	X
Compounds above calibration range	X
Reruns	X
Manual integrations	NA
Project/client specific requirements	X
REPORTING	
Upload batch form	X
KOBRA workgroup data/forms/bench sheets	X
Case narratives	
Check for completeness	X
Primary Reviewer	WTD
SUPERVISORY/SECONDARY REVIEW	
Check for compliance with method and project specific requirements	X
Check the completeness/accuracy of reported information	X
Data qualifiers	X
Secondary Reviewer	MES

Primary Reviewer: 03-MAR-2016

Secondary Reviewer: 04-MAR-2016

CHECKLIST1 - Modified 03/05/2008

Generated: MAR-04-2016 13:53:03

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 6850 **AAB#:** WG559292

Login Number: L16021328

Client ID	ID	Date Collected	TCLP Date	Time Held	Max Hold	Q	Extract Date	Time Held	Max Hold	Q	Run Date	Time Held	Max Hold	Q
HBW 7- 022516	01	02/25/16					03/02/2016	5.8	28		03/03/16	.9	28	
HBW 10- 022516	02	02/25/16					03/02/2016	5.8	28		03/03/16	.9	28	
HBW 1- 022516	03	02/25/16					03/02/2016	5.8	28		03/03/16	.9	28	
GPW 3- 022516	04	02/25/16					03/02/2016	5.8	28		03/03/16	1	28	
GPW 1- 022516	05	02/25/16					03/02/2016	5.8	28		03/03/16	1	28	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 4656042
Report generated 03/04/2016 13:54

METHOD BLANK SUMMARY

Login Number: L16021328
Blank File ID: 1LM.LM33613
Prep Date: 03/02/16 08:34
Analyzed Date: 03/02/16 23:07
Analyst: WTD

Work Group: WG559292
Blank Sample ID: WG559292-02
Instrument ID: LCMS1
Method: 6850

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
QCMRL	WG559292-07	1LM.LM33611	03/02/16 22:29	01
MCT	WG559292-01	1LM.LM33612	03/02/16 22:48	01
LCS	WG559292-03	1LM.LM33614	03/02/16 23:26	01
QCMRL	WG559292-08	1LM.LM33623	03/03/16 02:16	01
HBW 7- 022516	L16021328-01	1LM.LM33634	03/03/16 05:45	01
QCMRL	WG559292-09	1LM.LM33636	03/03/16 06:23	01
HBW 10- 022516	L16021328-02	1LM.LM33638	03/03/16 07:00	01
HBW 1- 022516	L16021328-03	1LM.LM33639	03/03/16 07:19	01
GPW 3- 022516	L16021328-04	1LM.LM33640	03/03/16 07:38	01
GPW 1- 022516	L16021328-05	1LM.LM33641	03/03/16 07:57	01
QCMRL	WG559292-10	1LM.LM33643	03/03/16 08:35	01
QCMRL	WG559292-11	1LM.LM33652	03/03/16 11:25	01

Report Name: BLANK_SUMMARY
PDF File ID: 4656080
Report generated 03/04/2016 13:54

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L16021328 Prep Date: 03/02/16 08:34 Sample ID: WG559292-02
Instrument ID: LCMS1 Run Date: 03/02/16 23:07 Prep Method: 6850
File ID: 1LM.LM33613 Analyst: WTD Method: 6850
Workgroup (AAB#): WG559292 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-02-MAR-16

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
Perchlorate	0.100	0.400	0.100	1	U

DL Method Detection Limit
LOQ Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > 1/2 RL

Report Name:BLANK
PDF ID: 4656081
04-MAR-2016 13:54

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L16021328 **Run Date:** 03/02/2016 **Sample ID:** WG559292-03
Instrument ID: LCMS1 **Run Time:** 23:26 **Prep Method:** 6850
File ID: 1LM.LM33614 **Analyst:** WTD **Method:** 6850
Workgroup (AAB#): WG559292 **Matrix:** Water **Units:** ug/L
QC Key: DOD4 **Lot#:** STD72685 **Cal ID:** LCMS1-02-MAR-16

Analytes	Expected	Found	% Rec	LCS Limits	Q
Perchlorate	0.200	0.198	99.0	80 - 120	

LCS - Modified 03/06/2008
PDF File ID: 4656082
Report generated: 03/04/2016 13:54

Microbac Laboratories Inc.
INITIAL CALIBRATION SUMMARY

Login Number: L16021328
Analytical Method: 6850
ICAL Workgroup: WG559340

Instrument ID: LCMS1
Initial Calibration Date: 02-MAR-16 10:46
Column ID: F

Analyte		AVG RF	% RSD	LINEAR (R)	QUAD (R^2)
Perchlorate		1.808	3.97	1.00000	

R = Correlation coefficient; 0.995 minimum
R^2 = Coefficient of determination; 0.99 minimum

INT_CAL - Modified 03/06/2008
PDF File ID: 4656084
Report generated 03/04/2016 13:54

Login Number: L16021328
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 02-MAR-16 10:46
Column ID: F

Analyte	WG559340-02			WG559340-03			WG559340-04		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Perchlorate	0.100	18400.0000	1.879	0.200	37000.0000	1.850	0.500	89000.0000	1.810

INT_CAL - Modified 03/06/2008
PDF File ID: 4656084
Report generated 03/04/2016 13:54

Login Number: L16021328
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 02-MAR-16 10:46
Column ID: F

Analyte	WG559340-05			WG559340-06			WG559340-07		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Perchlorate	1.00	183000.000	1.829	2.00	363000.000	1.777	5.00	871000.000	1.779

INT_CAL - Modified 03/06/2008
PDF File ID: 4656084
Report generated 03/04/2016 13:54

Login Number: L16021328
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 02-MAR-16 10:46
Column ID: F

Analyte	WG559340-08		
	CONC	RESP	RF
Perchlorate	10.0	1650000.00	1.729

INT_CAL - Modified 03/06/2008
PDF File ID: 4656084
Report generated 03/04/2016 13:54

Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L16021328 Run Date: 03/02/2016 Sample ID: WG559340-09
Instrument ID: LCMS1 Run Time: 11:05 Method: 6850
File ID: 1LM.LM33575 Analyst: WTD QC Key: DOD4
ICal Workgroup: WG559340 Cal ID: LCMS1 - 02-MAR-16

Analyte		Expected	Found	Units	RF	%D	UCL	Q
Perchlorate		1.00	1.03	ug/L	1.83	3.00	15	

* Exceeds %D Limit

ALT - Modified 09/06/2007
Version 1.5 PDF File ID: 4656085
Report generated 03/04/2016 13:55

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L16021328	**Run Date:**	03/02/2016	**Sample ID:**	WG559291-08
Instrument ID:	LCMS1	**Run Time:**	22:10	**Method:**	6850
File ID:	1LM.LM33610	**Analyst:**	WTD	**Units:**	ug/L
Workgroup (AAB#):	WG559292	**Cal ID:**	LCMS1 - 02-MAR-16		
Matrix:	WATER	**QAPP:**	DOD4		

Analytes	MDL	RDL	Concentration	Qualifier
Perchlorate	0.100	0.400	0.100	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 4656087
Report generated 03/04/2016 13:55

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L16021328	**Run Date:**	03/03/2016	**Sample ID:**	WG559291-10
Instrument ID:	LCMS1	**Run Time:**	02:35	**Method:**	6850
File ID:	1LM.LM33624	**Analyst:**	WTD	**Units:**	ug/L
Workgroup (AAB#):	WG559292	**Cal ID:**	LCMS1 - 02-MAR-16		
Matrix:	WATER	**QAPP:**	DOD4		

Analytes	MDL	RDL	Concentration	Qualifier
Perchlorate	0.100	0.400	0.100	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 4656087
Report generated 03/04/2016 13:55

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L16021328	**Run Date:**	03/03/2016	**Sample ID:**	WG559291-12
Instrument ID:	LCMS1	**Run Time:**	06:41	**Method:**	6850
File ID:	1LM.LM33637	**Analyst:**	WTD	**Units:**	ug/L
Workgroup (AAB#):	WG559292	**Cal ID:**	LCMS1 - 02-MAR-16		
Matrix:	WATER	**QAPP:**	DOD4		

Analytes	MDL	RDL	Concentration	Qualifier
Perchlorate	0.100	0.400	0.100	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 4656087
Report generated 03/04/2016 13:55

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L16021328 | Run Date: 03/03/2016 | Sample ID: WG559291-14
Instrument ID: LCMS1 | Run Time: 08:54 | Method: 6850
File ID: 1LM.LM33644 | Analyst: WTD | Units: ug/L
Workgroup (AAB#): WG559292 | Cal ID: LCMS1 - 02-MAR-16
Matrix: WATER | QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Perchlorate	0.100	0.400	0.100	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 4656087
Report generated 03/04/2016 13:55

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L16021328	**Run Date:**	03/03/2016	**Sample ID:**	WG559291-16
Instrument ID:	LCMS1	**Run Time:**	11:44	**Method:**	6850
File ID:	1LM.LM33653	**Analyst:**	WTD	**Units:**	ug/L
Workgroup (AAB#):	WG559292	**Cal ID:**	LCMS1 - 02-MAR-16		
Matrix:	WATER	**QAPP:**	DOD4		

Analytes	MDL	RDL	Concentration	Qualifier
Perchlorate	0.100	0.400	0.100	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 4656087
Report generated 03/04/2016 13:55

Login Number: L16021328 Run Date: 03/02/2016 Sample ID: WG559291-07
Instrument ID: LCMS1 Run Time: 21:32 Method: 6850
File ID: 1LM.LM33608 Analyst: WTD QC Key: DOD4
Workgroup (AAB#): WG559292 Cal ID: LCMS1 - 02-MAR-16
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	1.02	ug/L	1.81	2.00	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 4656086
Report generated 03/04/2016 13:55

Login Number: L16021328 Run Date: 03/03/2016 Sample ID: WG559291-09
Instrument ID: LCMS1 Run Time: 01:57 Method: 6850
File ID: 1LM.LM33622 Analyst: WTD QC Key: DOD4
Workgroup (AAB#): WG559292 Cal ID: LCMS1 - 02-MAR-16
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	1.00	ug/L	1.78	0	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 4656086
Report generated 03/04/2016 13:55

Login Number: L16021328 Run Date: 03/03/2016 Sample ID: WG559291-11
Instrument ID: LCMS1 Run Time: 06:04 Method: 6850
File ID: 1LM.LM33635 Analyst: WTD QC Key: DOD4
Workgroup (AAB#): WG559292 Cal ID: LCMS1 - 02-MAR-16
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	1.02	ug/L	1.81	2.00	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 4656086
Report generated 03/04/2016 13:55

Login Number: L16021328 Run Date: 03/03/2016 Sample ID: WG559291-13
Instrument ID: LCMS1 Run Time: 08:16 Method: 6850
File ID: 1LM.LM33642 Analyst: WTD QC Key: DOD4
Workgroup (AAB#): WG559292 Cal ID: LCMS1 - 02-MAR-16
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	1.02	ug/L	1.81	2.00	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 4656086
Report generated 03/04/2016 13:55

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L16021328 Run Date: 03/03/2016 Sample ID: WG559291-15

Instrument ID: LCMS1 Run Time: 11:07 Method: 6850

File ID: 1LM.LM33651 Analyst: WTD QC Key: DOD4

Workgroup (AAB#): WG559292 Cal ID: LCMS1 - 02-MAR-16

Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	1.02	ug/L	1.80	2.00	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008

PDF File ID: 4656086

Report generated 03/04/2016 13:55

Login Number: L16021328 Run Date: 03/02/2016 Sample ID: WG559292-07
Instrument ID: LCMS1 Run Time: 22:29 Prep Method: 6850
File ID: 1LM.LM33611 Analyst: WTD Method: 6850
Workgroup (AAB#): WG559292 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-02-MAR-16

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.196	98.0	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 4656083
Report generated 03/04/2016 13:54

Login Number: L16021328 Run Date: 03/03/2016 Sample ID: WG559292-08
Instrument ID: LCMS1 Run Time: 02:16 Prep Method: 6850
File ID: 1LM.LM33623 Analyst: WTD Method: 6850
Workgroup (AAB#): WG559292 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-02-MAR-16

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.196	98.0	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 4656083
Report generated 03/04/2016 13:54

Login Number: L16021328 Run Date: 03/03/2016 Sample ID: WG559292-09
Instrument ID: LCMS1 Run Time: 06:23 Prep Method: 6850
File ID: 1LM.LM33636 Analyst: WTD Method: 6850
Workgroup (AAB#): WG559292 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-02-MAR-16

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.194	97.0	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 4656083
Report generated 03/04/2016 13:54

Login Number: L16021328 Run Date: 03/03/2016 Sample ID: WG559292-10
Instrument ID: LCMS1 Run Time: 08:35 Prep Method: 6850
File ID: 1LM.LM33643 Analyst: WTD Method: 6850
Workgroup (AAB#): WG559292 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-02-MAR-16

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.196	98.0	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 4656083
Report generated 03/04/2016 13:54

Login Number: L16021328 Run Date: 03/03/2016 Sample ID: WG559292-11
Instrument ID: LCMS1 Run Time: 11:25 Prep Method: 6850
File ID: 1LM.LM33652 Analyst: WTD Method: 6850
Workgroup (AAB#): WG559292 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-02-MAR-16

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.190	95.0	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 4656083
Report generated 03/04/2016 13:54

Microbac Laboratories Inc.
INTERNAL STANDARD AREA SUMMARY
(COMPARED TO AVERAGE OF ICAL)

Login Number:L16021328
Instrument ID:LCMS1
Workgroup (AAB#):WG559292

ICAL CCV Number:WG559340-05
CAL ID: LCMS1-02-MAR-16
Matrix:WATER

Sample Number	Dilution	Tag	IS-1
WG559340	NA	NA	494000
Upper Limit	NA	NA	741000
Lower Limit	NA	NA	247000
L16021328-01	1.00	01	512000
L16021328-02	1.00	01	536000
L16021328-03	1.00	01	522000
L16021328-04	1.00	01	520000
L16021328-05	1.00	01	522000
WG559292-02	1.00	01	515000
WG559292-03	1.00	01	529000

IS-1 - O18LP

Underline = Response outside limits

INTERNAL_STD_AVG_ICAL - Modified 03/10/2010
PDF File ID: 4656088
Report generated 03/04/2016 13:55

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16021328	**Prep Method:**	6850	**Samplenum:**	L16021328-01
Instrument:	LCMS1	**Prep Date:**	03/02/2016 08:34	**File ID:**	1LM.LM33634
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG559292	**Analysis Date:**	03/03/2016 05:45	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	8290	2570	3.23	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16021328	**Prep Method:**	6850	**Samplenum:**	L16021328-02
Instrument:	LCMS1	**Prep Date:**	03/02/2016 08:34	**File ID:**	1LM.LM33638
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG559292	**Analysis Date:**	03/03/2016 07:00	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	14900	5120	2.91	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16021328	**Prep Method:**	6850	**Samplenum:**	L16021328-03
Instrument:	LCMS1	**Prep Date:**	03/02/2016 08:34	**File ID:**	1LM.LM33639
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG559292	**Analysis Date:**	03/03/2016 07:19	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	8140	3360	2.42	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16021328	**Prep Method:**	6850	**Samplenum:**	L16021328-04
Instrument:	LCMS1	**Prep Date:**	03/02/2016 08:34	**File ID:**	1LM.LM33640
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG559292	**Analysis Date:**	03/03/2016 07:38	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	88500	27800	3.18	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16021328	**Prep Method:**	6850	**Samplenum:**	L16021328-05
Instrument:	LCMS1	**Prep Date:**	03/02/2016 08:34	**File ID:**	1LM.LM33641
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG559292	**Analysis Date:**	03/03/2016 07:57	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	83900	27200	3.08	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16021328	**Prep Method:**		**Samplenum:**	WG559291-07
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM33608
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG559292	**Analysis Date:**	03/02/2016 21:32	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	193000	60100	3.21	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16021328	**Prep Method:**		**Samplenum:**	WG559291-08
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM33610
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG559292	**Analysis Date:**	03/02/2016 22:10	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	959	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16021328	**Prep Method:**		**Samplenum:**	WG559291-09
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM33622
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG559292	**Analysis Date:**	03/03/2016 01:57	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	186000	60200	3.09	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16021328	**Prep Method:**		**Samplenum:**	WG559291-10
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM33624
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG559292	**Analysis Date:**	03/03/2016 02:35	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	0.000	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16021328	**Prep Method:**		**Samplenum:**	WG559291-11
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM33635
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG559292	**Analysis Date:**	03/03/2016 06:04	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	189000	60400	3.13	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16021328	**Prep Method:**		**Samplenum:**	WG559291-12
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM33637
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG559292	**Analysis Date:**	03/03/2016 06:41	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	0.000	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16021328	**Prep Method:**		**Samplenum:**	WG559291-13
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM33642
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG559292	**Analysis Date:**	03/03/2016 08:16	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	192000	60400	3.18	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16021328	**Prep Method:**		**Samplenum:**	WG559291-14
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM33644
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG559292	**Analysis Date:**	03/03/2016 08:54	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	656	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16021328	**Prep Method:**		**Samplenum:**	WG559291-15
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM33651
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG559292	**Analysis Date:**	03/03/2016 11:07	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	185000	58400	3.17	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16021328	**Prep Method:**		**Samplenum:**	WG559291-16
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM33653
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG559292	**Analysis Date:**	03/03/2016 11:44	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	0.000	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16021328	**Prep Method:**	6850	**Samplenum:**	WG559292-01
Instrument:	LCMS1	**Prep Date:**	03/02/2016 08:34	**File ID:**	1LM.LM33612
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG559292	**Analysis Date:**	03/02/2016 22:48	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	36500	12000	3.04	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16021328	**Prep Method:**	6850	**Samplenum:**	WG559292-02
Instrument:	LCMS1	**Prep Date:**	03/02/2016 08:34	**File ID:**	1LM.LM33613
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG559292	**Analysis Date:**	03/02/2016 23:07	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	721	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16021328	**Prep Method:**	6850	**Samplenum:**	WG559292-03
Instrument:	LCMS1	**Prep Date:**	03/02/2016 08:34	**File ID:**	1LM.LM33614
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG559292	**Analysis Date:**	03/02/2016 23:26	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	38900	12000	3.24	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16021328	**Prep Method:**	6850	**Samplenum:**	WG559292-07
Instrument:	LCMS1	**Prep Date:**	03/02/2016 08:34	**File ID:**	1LM.LM33611
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG559292	**Analysis Date:**	03/02/2016 22:29	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	39500	12700	3.11	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16021328	**Prep Method:**	6850	**Samplenum:**	WG559292-08
Instrument:	LCMS1	**Prep Date:**	03/02/2016 08:34	**File ID:**	1LM.LM33623
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG559292	**Analysis Date:**	03/03/2016 02:16	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	38900	12300	3.16	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16021328	**Prep Method:**	6850	**Samplenum:**	WG559292-09
Instrument:	LCMS1	**Prep Date:**	03/02/2016 08:34	**File ID:**	1LM.LM33636
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG559292	**Analysis Date:**	03/03/2016 06:23	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	38900	13500	2.88	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16021328	**Prep Method:**	6850	**Samplenum:**	WG559292-10
Instrument:	LCMS1	**Prep Date:**	03/02/2016 08:34	**File ID:**	1LM.LM33643
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG559292	**Analysis Date:**	03/03/2016 08:35	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	39300	13500	2.91	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16021328	**Prep Method:**	6850	**Samplenum:**	WG559292-11
Instrument:	LCMS1	**Prep Date:**	03/02/2016 08:34	**File ID:**	1LM.LM33652
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG559292	**Analysis Date:**	03/03/2016 11:25	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	36800	12300	2.99	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16021328	**Prep Method:**		**Samplenum:**	WG559340-02
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM33568
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG559292	**Analysis Date:**	03/02/2016 08:53	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	18400	5910	3.11	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16021328	**Prep Method:**		**Samplenum:**	WG559340-03
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM33569
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG559292	**Analysis Date:**	03/02/2016 09:12	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	37000	11900	3.11	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16021328	**Prep Method:**		**Samplenum:**	WG559340-04
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM33570
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG559292	**Analysis Date:**	03/02/2016 09:31	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	89000	30400	2.93	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16021328	**Prep Method:**		**Samplenum:**	WG559340-05
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM33571
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG559292	**Analysis Date:**	03/02/2016 09:50	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	183000	56800	3.22	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16021328	**Prep Method:**		**Samplenum:**	WG559340-06
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM33572
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG559292	**Analysis Date:**	03/02/2016 10:09	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	363000	117000	3.10	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16021328	**Prep Method:**		**Samplenum:**	WG559340-07
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM33573
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG559292	**Analysis Date:**	03/02/2016 10:28	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	871000	282000	3.09	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16021328	**Prep Method:**		**Samplenum:**	WG559340-08
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM33574
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG559292	**Analysis Date:**	03/02/2016 10:46	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	1650000	530000	3.11	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16021328	**Prep Method:**		**Samplenum:**	WG559340-09
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM33575
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG559292	**Analysis Date:**	03/02/2016 11:05	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	190000	62200	3.05	2.3	3.8	

2.1.1.3 Sample Data

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Data File	LM33634.wiff	**Result Table**	030216_WTD.rdb
Acquisition Date	3/3/2016 5:45:09 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

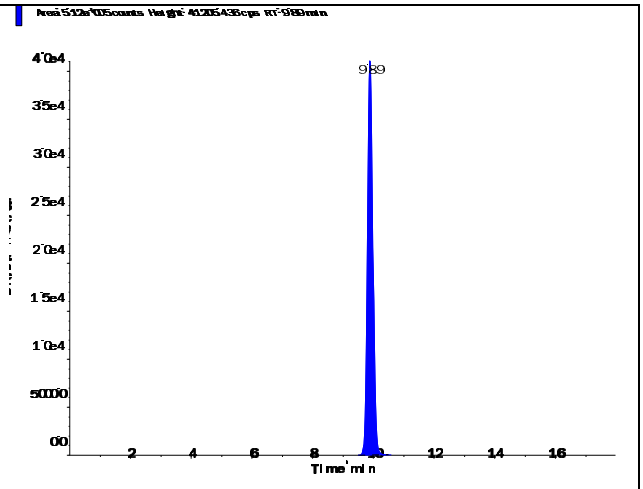
Sample Name	L16021328-01	**Injection Vial**	45.00
Data File	LM33634.wiff	**Injection Volume**	10.00
Acquisition Date	3/3/2016 5:45:09 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	030216_WTD.rdb
Sample ID	L16021328-01	**Dilution Factor**	1.00
Sample Comment	11.00	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	5.120e+05	9.89	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	8.290e+03	9.90	N/A	0.0339
Perchlorate conf	2.570e+03	9.90	N/A	0.0308

O18LP (Internal Standard)

RT (Exp. RT): 9.89(9.94) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



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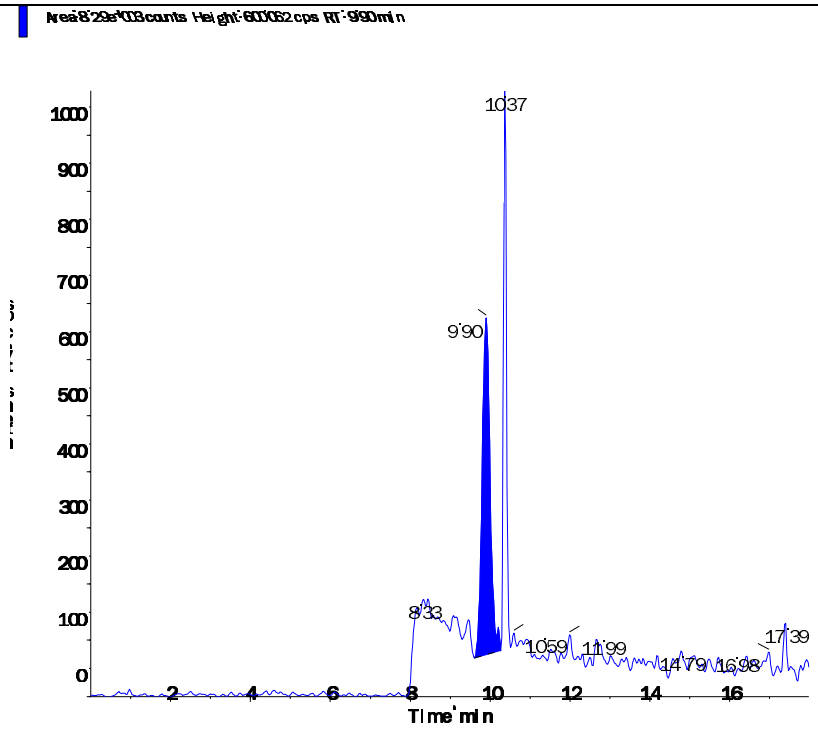
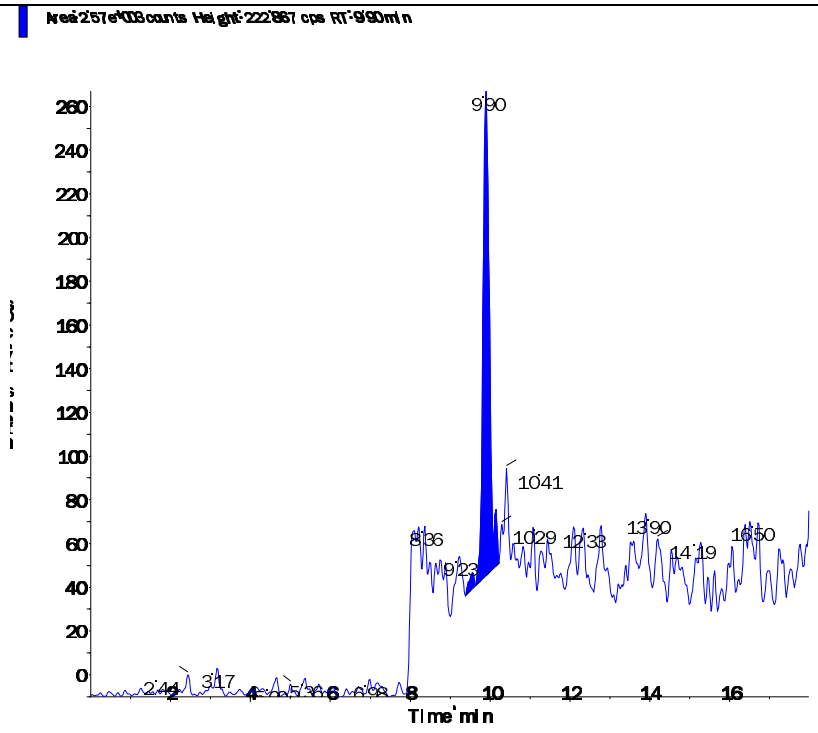
Printed: 3/3/2016 2:41 PM

Perchlorate (98.8/83.3 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	 9.90 (9.94) min 0.0339 ng/ml 0.016 (Unknown)



Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	 9.90 (9.92) min 0.0308 ng/ml 0.005 (Unknown)



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Printed: 3/3/2016 2:42 PM

Data File	LM33638.wiff	**Result Table**	030216_WTD.rdb
Acquisition Date	3/3/2016 7:00:53 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

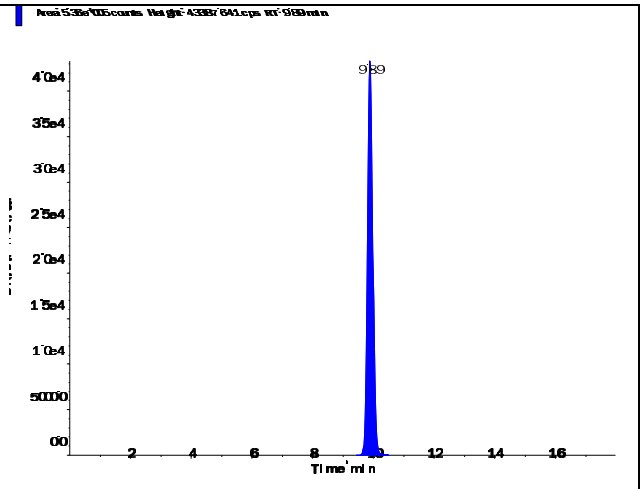
Sample Name	L16021328-02	**Injection Vial**	46.00
Data File	LM33638.wiff	**Injection Volume**	10.00
Acquisition Date	3/3/2016 7:00:53 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	030216_WTD.rdb
Sample ID	L16021328-02	**Dilution Factor**	1.00
Sample Comment	11.00	**Weight to Volume**	0.00

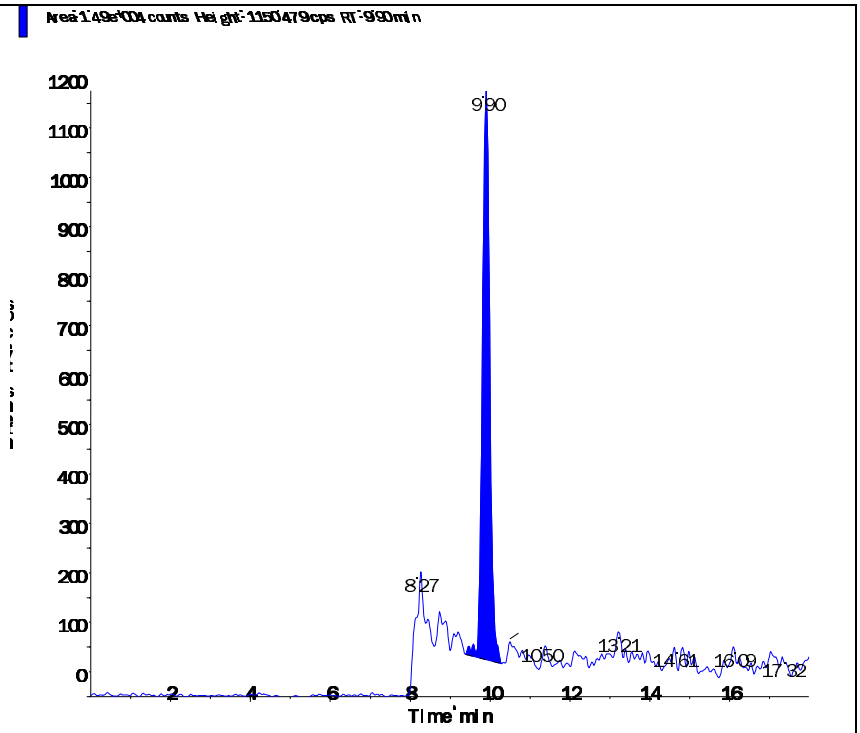
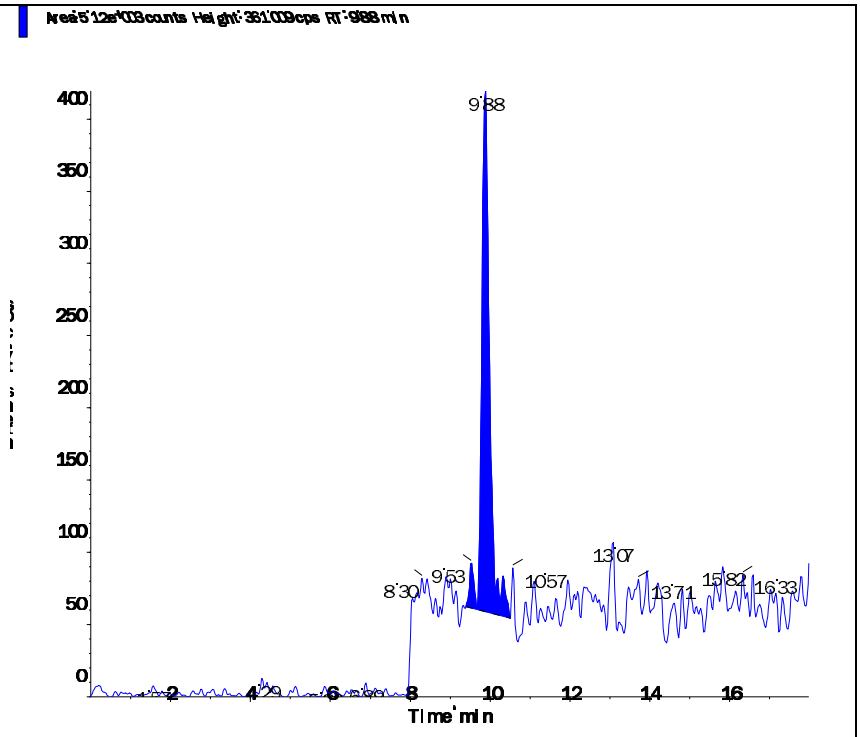
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	5.360e+05	9.89	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.490e+04	9.90	N/A	0.0669
Perchlorate conf	5.120e+03	9.88	N/A	0.0709

O18LP (Internal Standard)

RT (Exp. RT): 9.89(9.94) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.90 (9.94) min Calculated conc: 0.0669 ng/ml Area Ratio: 0.028 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.88 (9.92) min Calculated conc: 0.0709 ng/ml Area Ratio: 0.01 Sample Type: (Unknown)	

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Data File	LM33639.wiff	**Result Table**	030216_WTD.rdb
Acquisition Date	3/3/2016 7:19:50 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

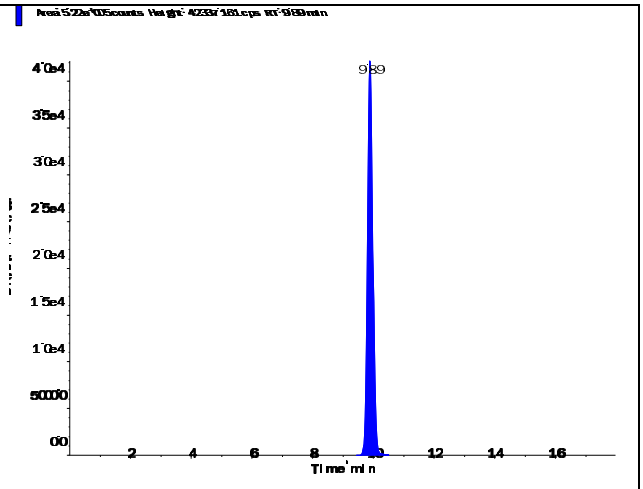
Sample Name	L16021328-03	**Injection Vial**	47.00
Data File	LM33639.wiff	**Injection Volume**	10.00
Acquisition Date	3/3/2016 7:19:50 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	030216_WTD.rdb
Sample ID	L16021328-03	**Dilution Factor**	1.00
Sample Comment	11.00	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	5.220e+05	9.89	5.00	-

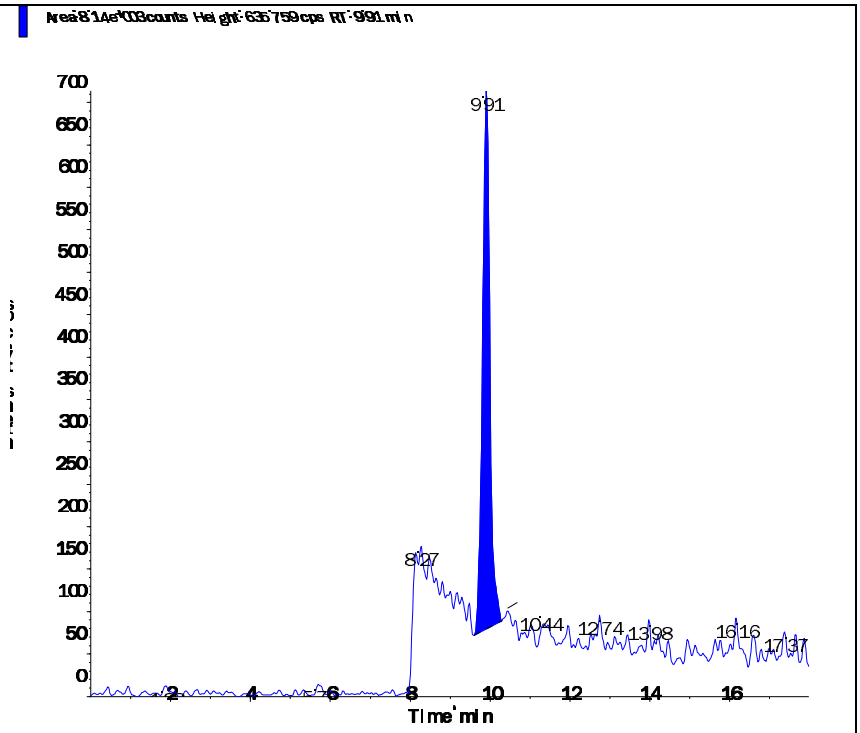
Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	8.140e+03	9.91	N/A	0.0321
Perchlorate conf	3.360e+03	9.89	N/A	0.0432

O18LP (Internal Standard)

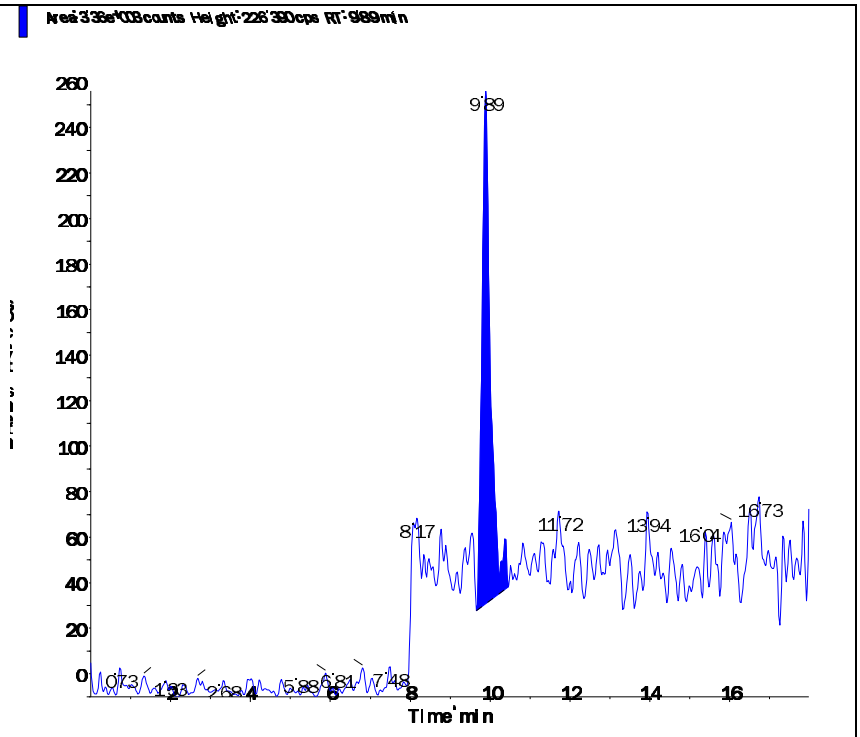
RT (Exp. RT): 9.89(9.94) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	9.91 (9.94) min 0.0321 ng/ml 0.016 (Unknown)



Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	9.89 (9.92) min 0.0432 ng/ml 0.006 (Unknown)



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Data File	LM33640.wiff	**Result Table**	030216_WTD.rdb
Acquisition Date	3/3/2016 7:38:45 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

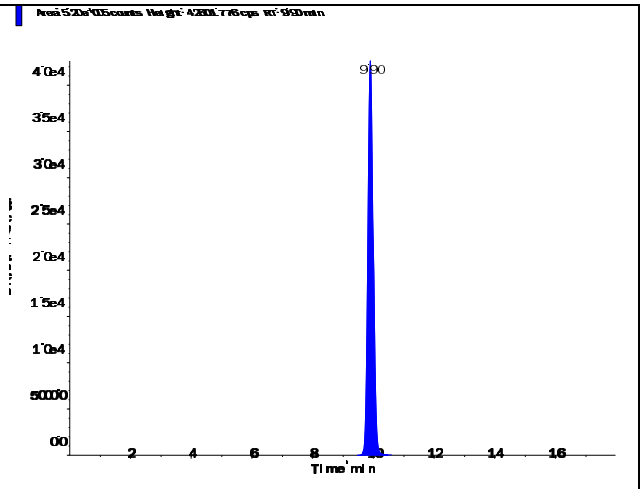
Sample Name	L16021328-04	**Injection Vial**	48.00
Data File	LM33640.wiff	**Injection Volume**	10.00
Acquisition Date	3/3/2016 7:38:45 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	030216_WTD.rdb
Sample ID	L16021328-04	**Dilution Factor**	1.00
Sample Comment	11.00	**Weight to Volume**	0.00

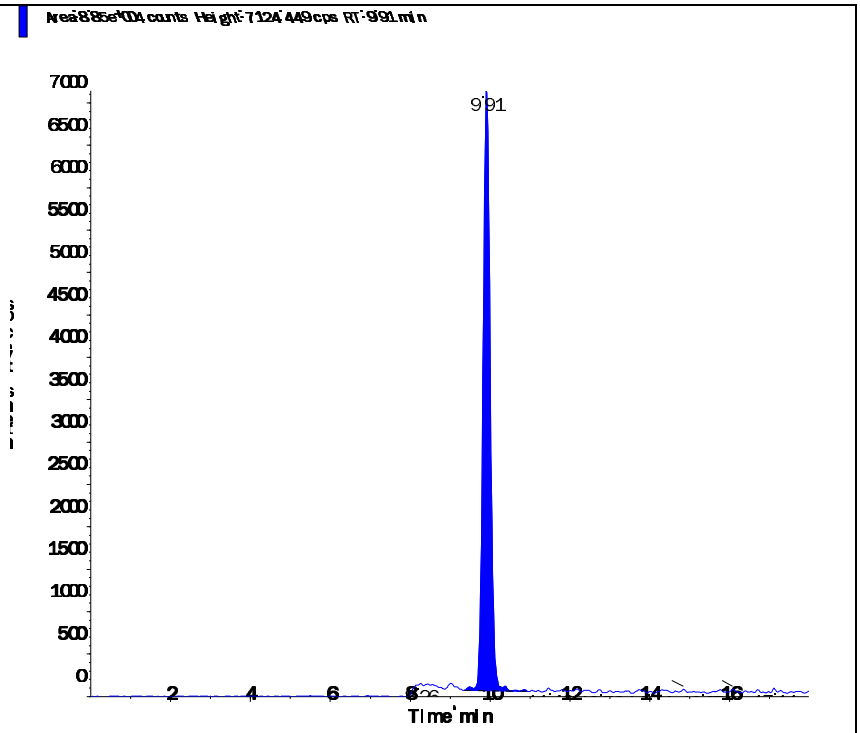
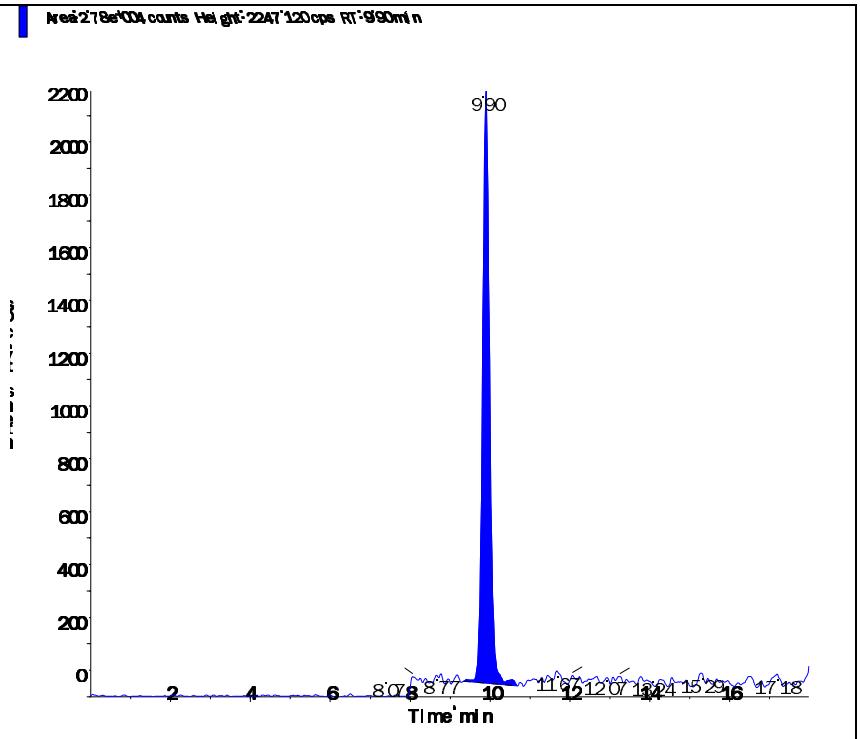
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	5.200e+05	9.90	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	8.850e+04	9.91	N/A	0.474
Perchlorate conf	2.780e+04	9.90	N/A	0.46

O18LP (Internal Standard)

RT (Exp. RT): 9.90(9.94) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.91 (9.94) min Calculated conc: 0.474 ng/ml Area Ratio: 0.17 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.90 (9.92) min Calculated conc: 0.46 ng/ml Area Ratio: 0.053 Sample Type: (Unknown)	

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Data File	LM33641.wiff	**Result Table**	030216_WTD.rdb
Acquisition Date	3/3/2016 7:57:42 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

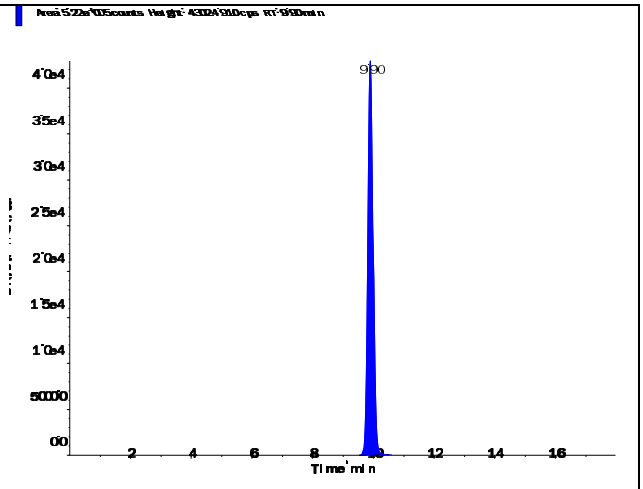
Sample Name	L16021328-05	**Injection Vial**	49.00
Data File	LM33641.wiff	**Injection Volume**	10.00
Acquisition Date	3/3/2016 7:57:42 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	030216_WTD.rdb
Sample ID	L16021328-05	**Dilution Factor**	1.00
Sample Comment	11.00	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	5.220e+05	9.90	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	8.390e+04	9.91	N/A	0.447
Perchlorate conf	2.720e+04	9.90	N/A	0.449

O18LP (Internal Standard)

RT (Exp. RT): 9.90(9.94) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



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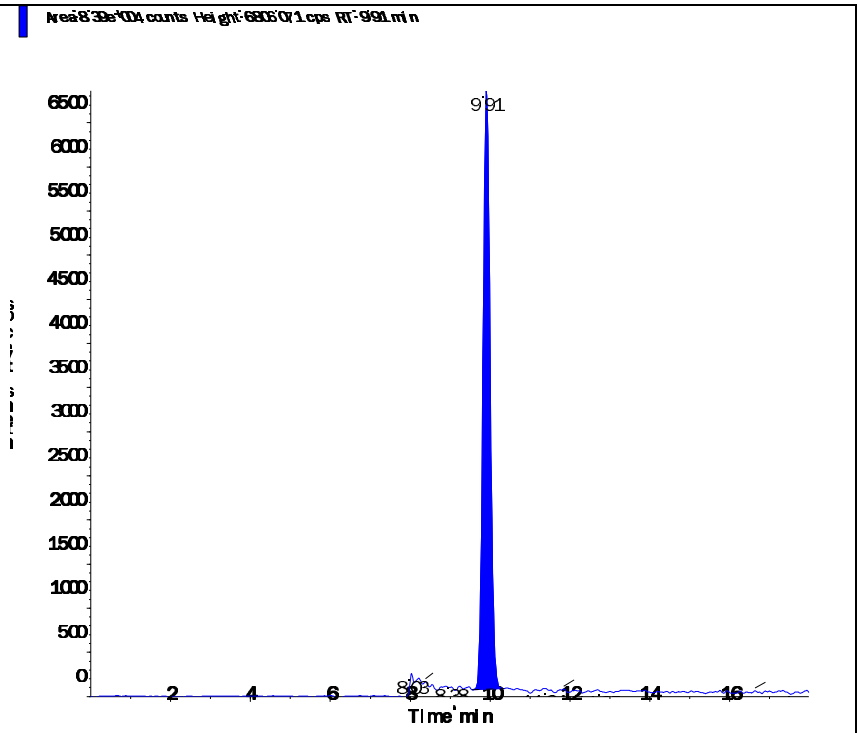
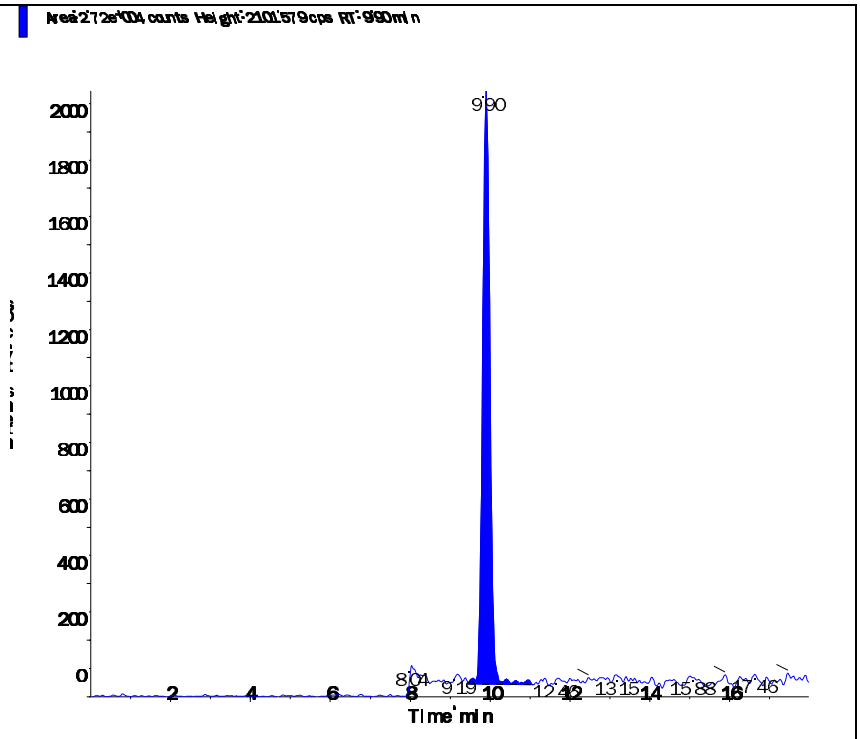
Perchlorate (98.8/83.3 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	9.91 (9.94) min 0.447 ng/ml 0.161 (Unknown)



Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	9.90 (9.92) min 0.449 ng/ml 0.052 (Unknown)



2.1.1.4 Standards Data

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Printed: 3/4/2016 1:53 PM

Data File	LM33567.wiff	**Result Table**	030316_WTD.rdb
Acquisition Date	3/2/2016 8:34:25 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

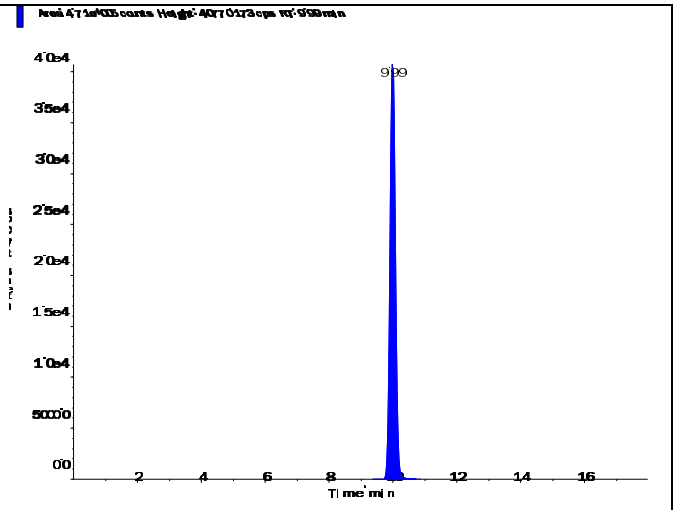
Sample Name	WG559340-01 CCB	**Injection Vial**	51.00
Data File	LM33567.wiff	**Injection Volume**	10.00
Acquisition Date	3/2/2016 8:34:25 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	030316_WTD.rdb
Sample ID	WG559340-01	**Dilution Factor**	1.00
Sample Comment	11.00	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.710e+05	9.99	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	0.000e+00	0.00	N/A	No Peak
Perchlorate conf	0.000e+00	0.00	N/A	No Peak

O18LP (Internal Standard)

RT (Exp. RT): 9.99(9.94) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



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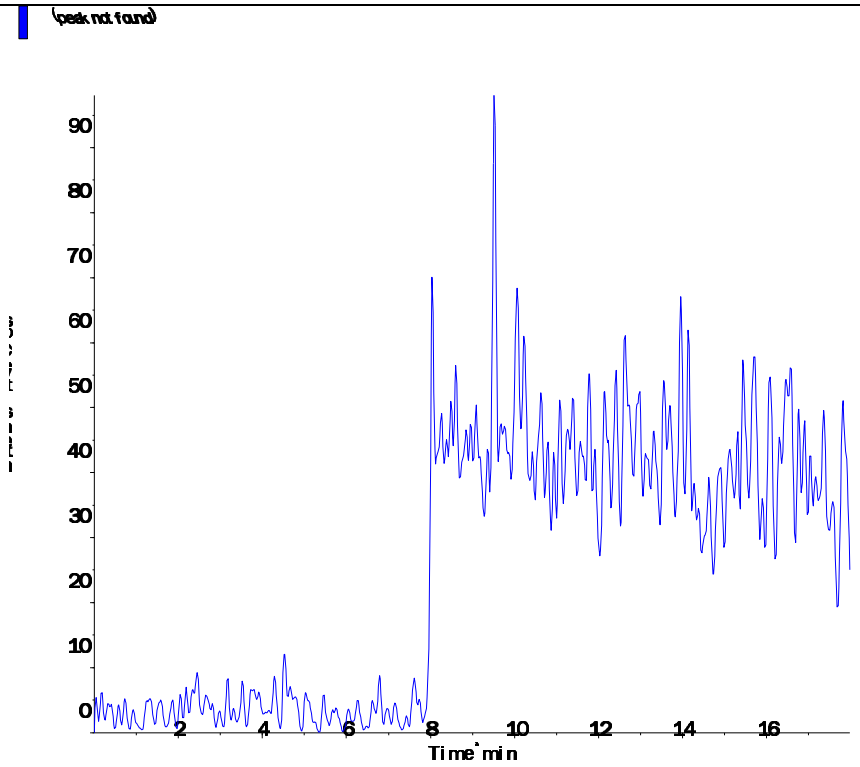
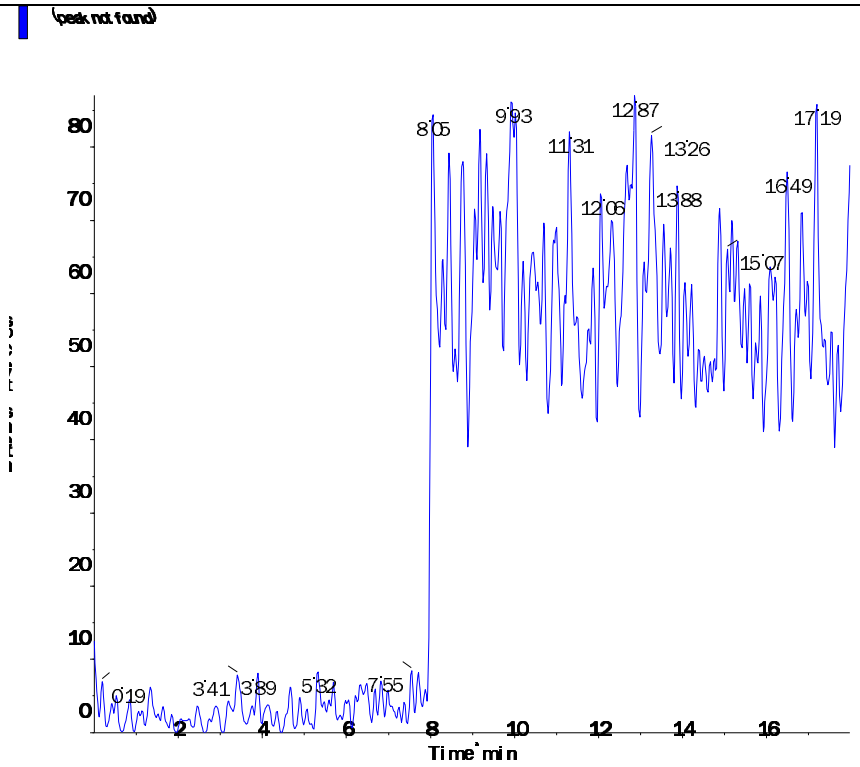
Printed: 3/4/2016 1:53 PM

Perchlorate (98.8/83.3 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	0.00 (9.94) min No Peak ng/ml 0.00 (Unknown)



Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	0.00 (9.92) min No Peak ng/ml 0.00 (Unknown)



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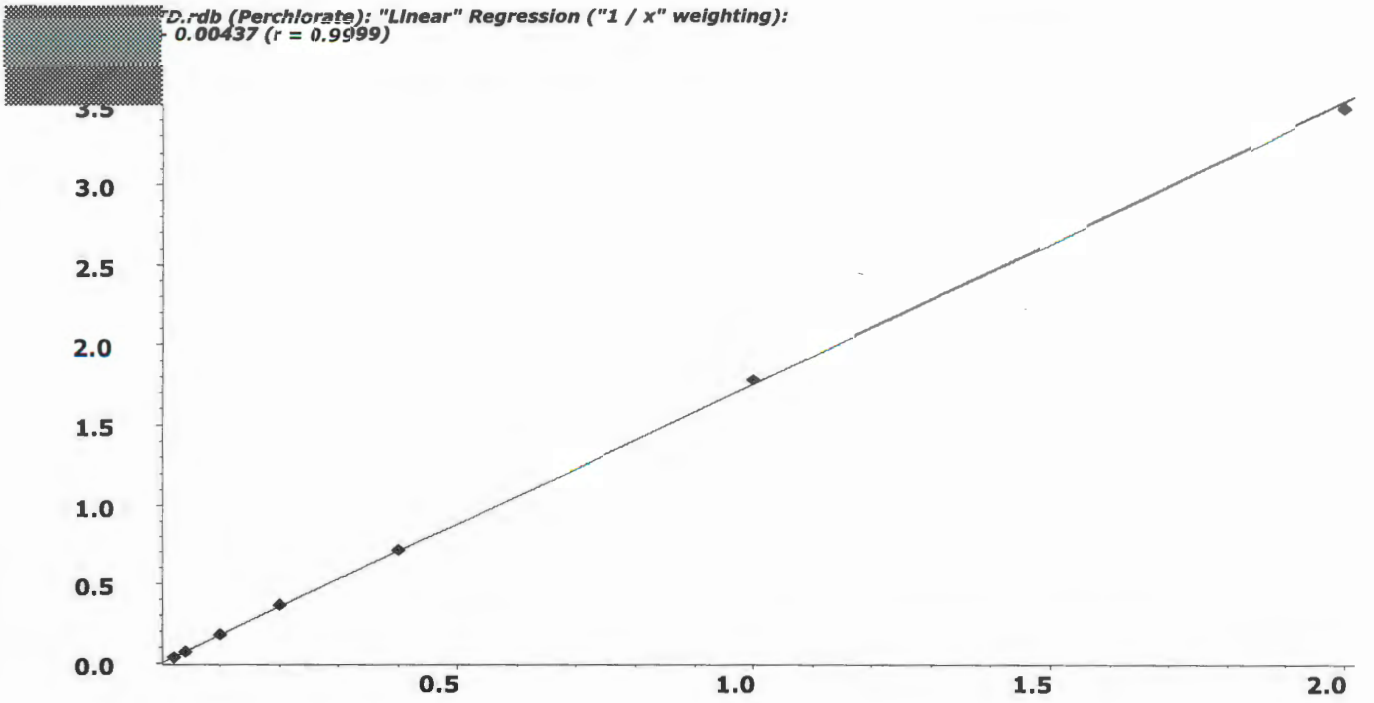
Printed: 3/3/2016 1:59 PM

Analyte Name: **Perchlorate**
Internal Standard: O18LP

Data File	LM33567.wiff	**Result Table**	030216_WTD.rdb
Acquisition Date	3/2/2016 8:34:25 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

Regression Equation: y = 1.75 x + 0.00437 (r = 0.9999)

Expected Concentration	Number of Values	Mean Calculated Concentration	% Accuracy	Std. Deviation	%CV
0.10	1	0.09	95.0	N/A	N/A
0.20	1	0.20	99.5	N/A	N/A
0.50	1	0.50	101.0	N/A	N/A
1.00	1	1.03	103.4	N/A	N/A
2.00	1	2.02	101.0	N/A	N/A
5.00	1	5.07	101.5	N/A	N/A
10.00	1	9.87	98.7	N/A	N/A



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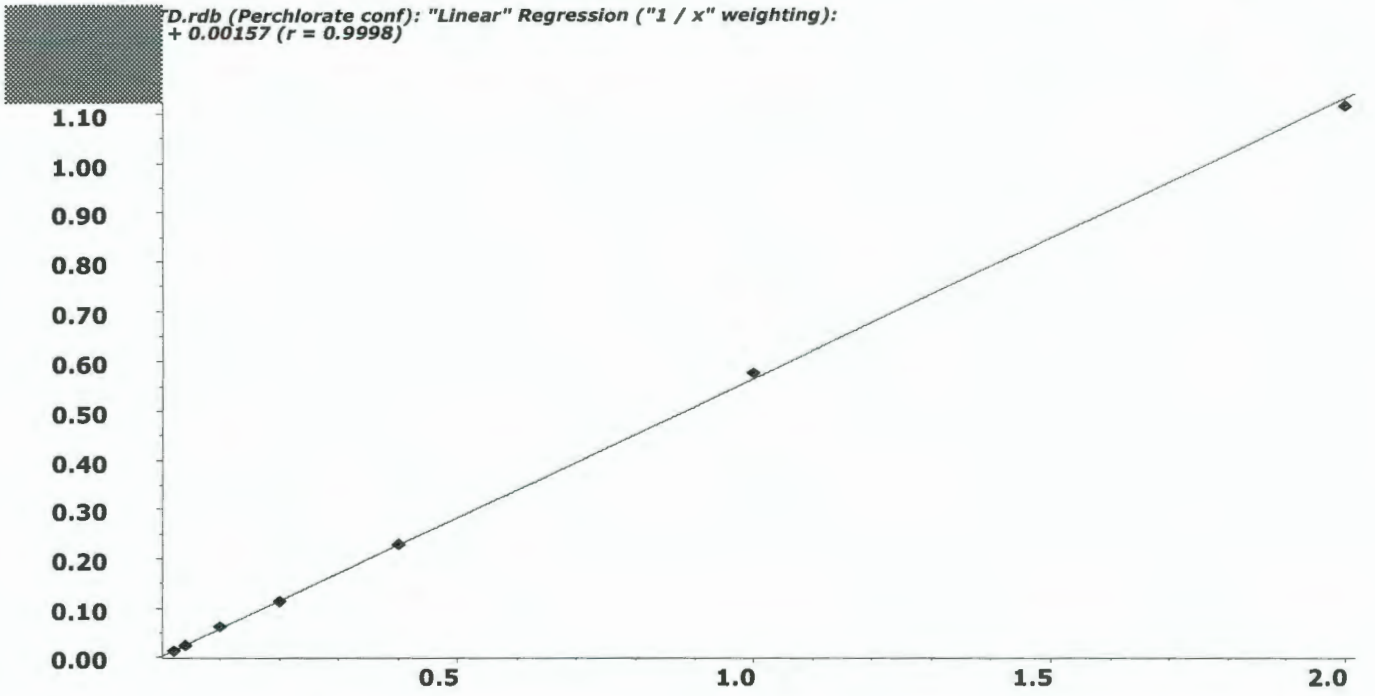
Created with Analyst Reporter
Printed: 3/3/2016 1:59 PM

Analyte Name: **Perchlorate conf**
Internal Standard: O18LP

Data File	LM33567.wiff	**Result Table**	030216_WTD.rdb
Acquisition Date	3/2/2016 8:34:25 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

Regression Equation: y = 0.562 x + 0.00157 (r = 0.9998)

Expected Concentration	Number of Values	Mean Calculated Concentration	% Accuracy	Std. Deviation	%CV
0.10	1	0.09	93.4	N/A	N/A
0.20	1	0.20	98.6	N/A	N/A
0.50	1	0.54	107.2	N/A	N/A
1.00	1	1.00	99.5	N/A	N/A
2.00	1	2.01	100.7	N/A	N/A
5.00	1	5.11	102.2	N/A	N/A
10.00	1	9.85	98.5	N/A	N/A



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Printed: 3/4/2016 1:54 PM

Data File	LM33568.wiff	**Result Table**	030316_WTD.rdb
Acquisition Date	3/2/2016 8:53:21 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

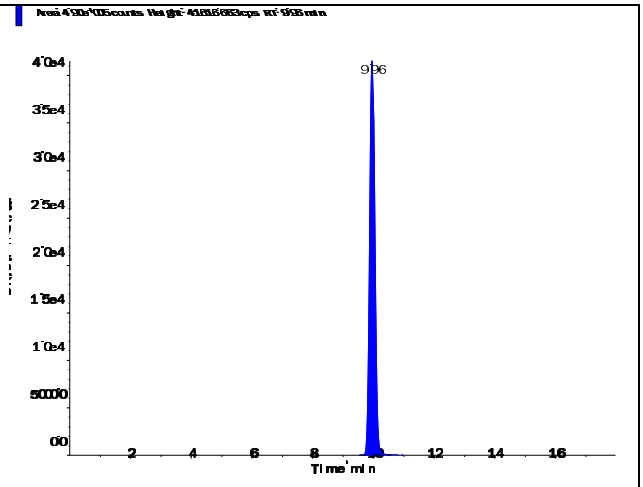
Sample Name	WG559340-02 STD (0.1 ug/L)	**Injection Vial**	52.00
Data File	LM33568.wiff	**Injection Volume**	10.00
Acquisition Date	3/2/2016 8:53:21 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Standard
Instrument Name	API 4000	**Result Table**	030316_WTD.rdb
Sample ID	WG559340-02	**Dilution Factor**	1.00
Sample Comment	1,1 STD72683	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.900e+05	9.96	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.840e+04	9.97	0.10	0.095
Perchlorate conf	5.910e+03	9.94	0.10	0.0934

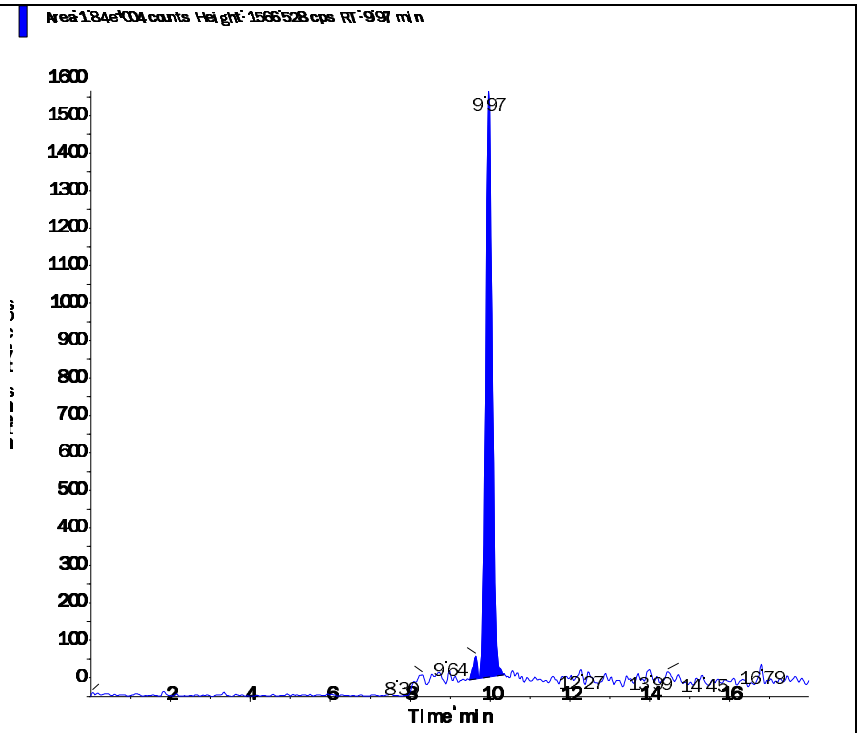
O18LP (Internal Standard)

RT (Exp. RT): 9.96(9.94) min
Concentration: 5.00 ug/L
Sample Type: (Standard)



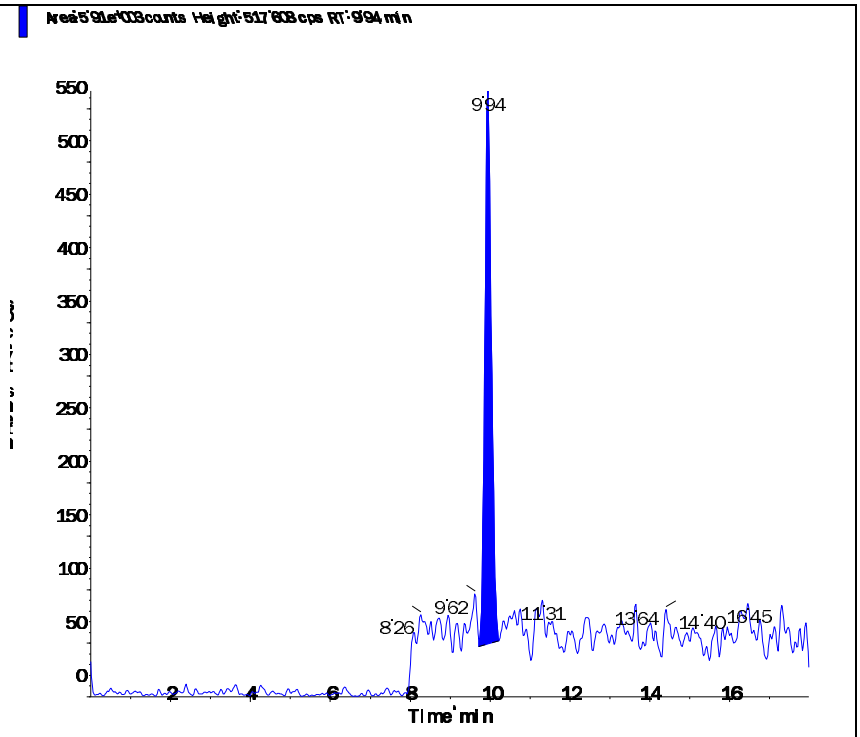
Perchlorate (98.8/83.3 amu)

RT (Exp. RT):	9.97 (9.94) min
Calculated conc:	0.095 ng/ml
Area Ratio:	0.038
Sample Type:	(Standard)



Perchlorate conf (100.8/85.2 amu)

RT (Exp. RT):	9.94 (9.92) min
Calculated conc:	0.0934 ng/ml
Area Ratio:	0.012
Sample Type:	(Standard)



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Data File	LM33569.wiff	**Result Table**	030316_WTD.rdb
Acquisition Date	3/2/2016 9:12:17 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

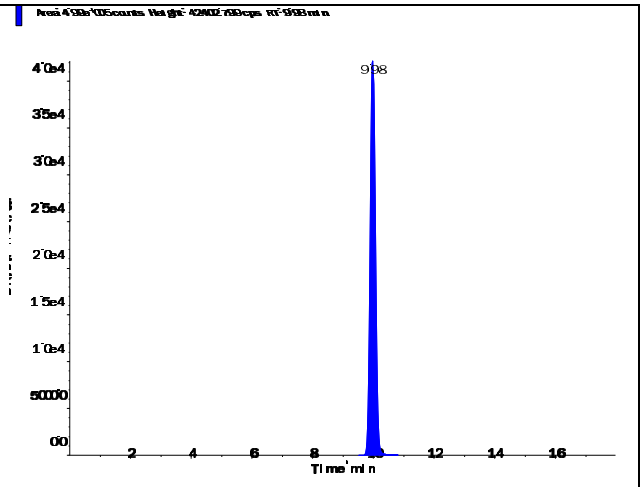
Sample Name	WG559340-03 STD (0.2 ug/L)	**Injection Vial**	53.00
Data File	LM33569.wiff	**Injection Volume**	10.00
Acquisition Date	3/2/2016 9:12:17 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Standard
Instrument Name	API 4000	**Result Table**	030316_WTD.rdb
Sample ID	WG559340-03	**Dilution Factor**	1.00
Sample Comment	1,1 STD72683	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.990e+05	9.98	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	3.700e+04	9.99	0.20	0.199
Perchlorate conf	1.190e+04	9.98	0.20	0.197

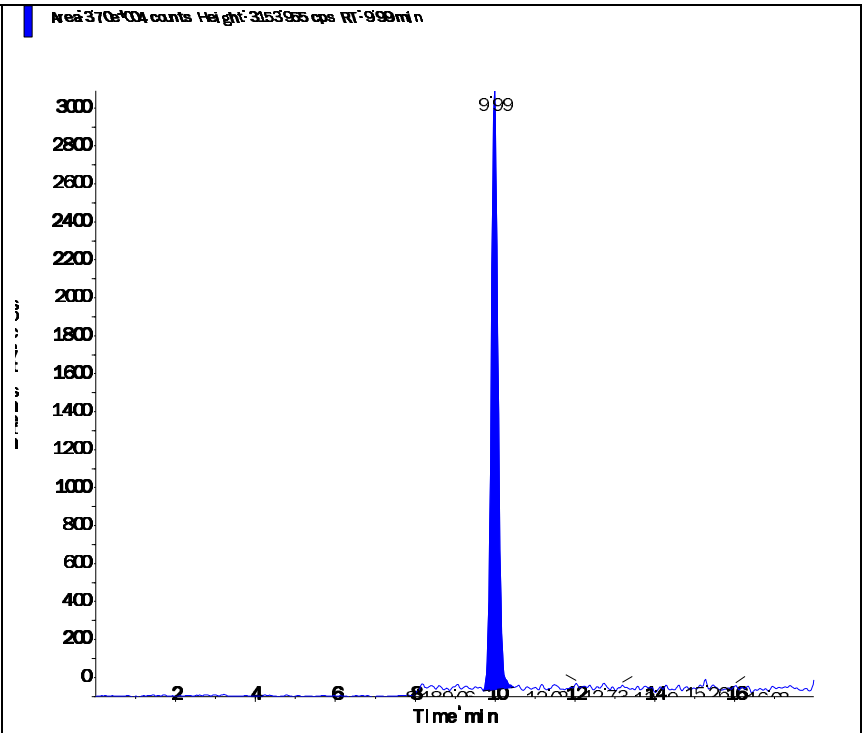
O18LP (Internal Standard)

RT (Exp. RT): 9.98(9.94) min
Concentration: 5.00 ug/L
Sample Type: (Standard)



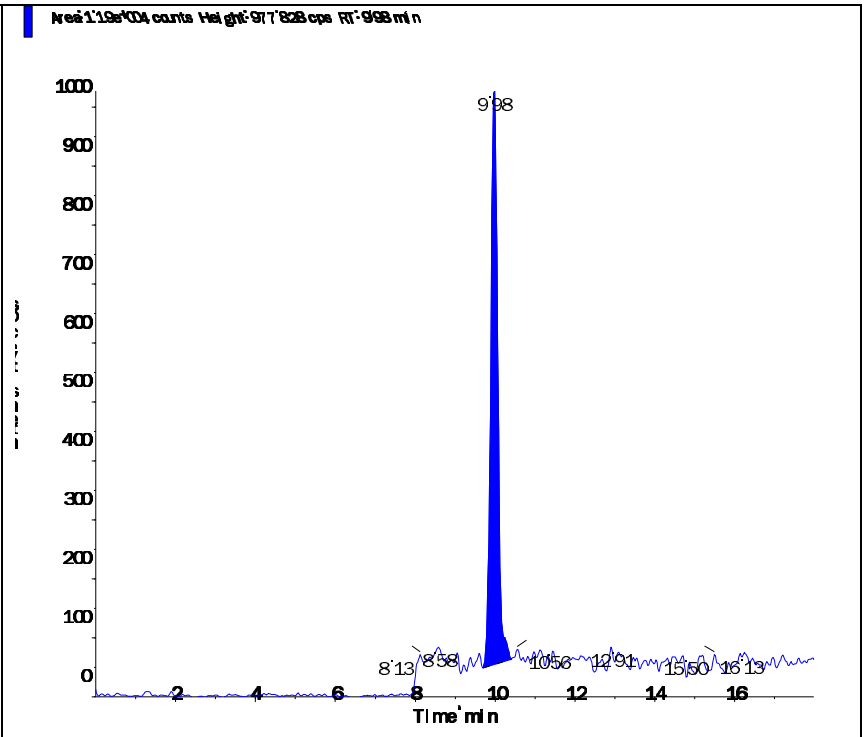
Perchlorate (98.8/83.3 amu)

RT (Exp. RT):	9.99 (9.94) min
Calculated conc:	0.199 ng/ml
Area Ratio:	0.074
Sample Type:	(Standard)



Perchlorate conf (100.8/85.2 amu)

RT (Exp. RT):	9.98 (9.92) min
Calculated conc:	0.197 ng/ml
Area Ratio:	0.024
Sample Type:	(Standard)



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Data File	LM33570.wiff	**Result Table**	030316_WTD.rdb
Acquisition Date	3/2/2016 9:31:14 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

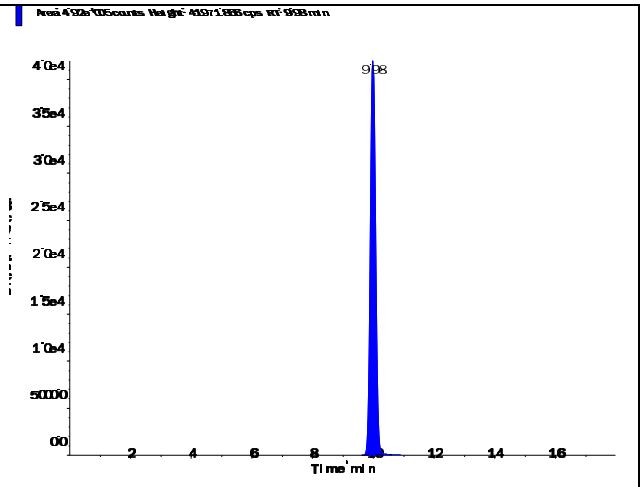
Sample Name	WG559340-04 STD (0.5 ug/L)	**Injection Vial**	54.00
Data File	LM33570.wiff	**Injection Volume**	10.00
Acquisition Date	3/2/2016 9:31:14 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Standard
Instrument Name	API 4000	**Result Table**	030316_WTD.rdb
Sample ID	WG559340-04	**Dilution Factor**	1.00
Sample Comment	1,1 STD72683	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.920e+05	9.98	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	8.900e+04	10.00	0.50	0.505
Perchlorate conf	3.040e+04	9.98	0.50	0.536

O18LP (Internal Standard)

RT (Exp. RT): 9.98(9.94) min
Concentration: 5.00 ug/L
Sample Type: (Standard)



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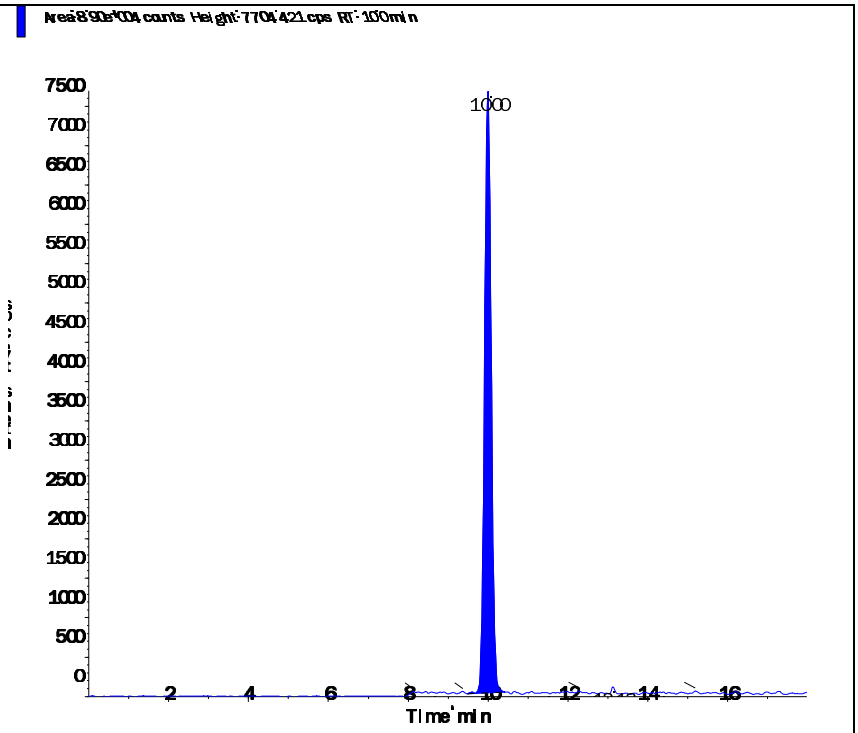
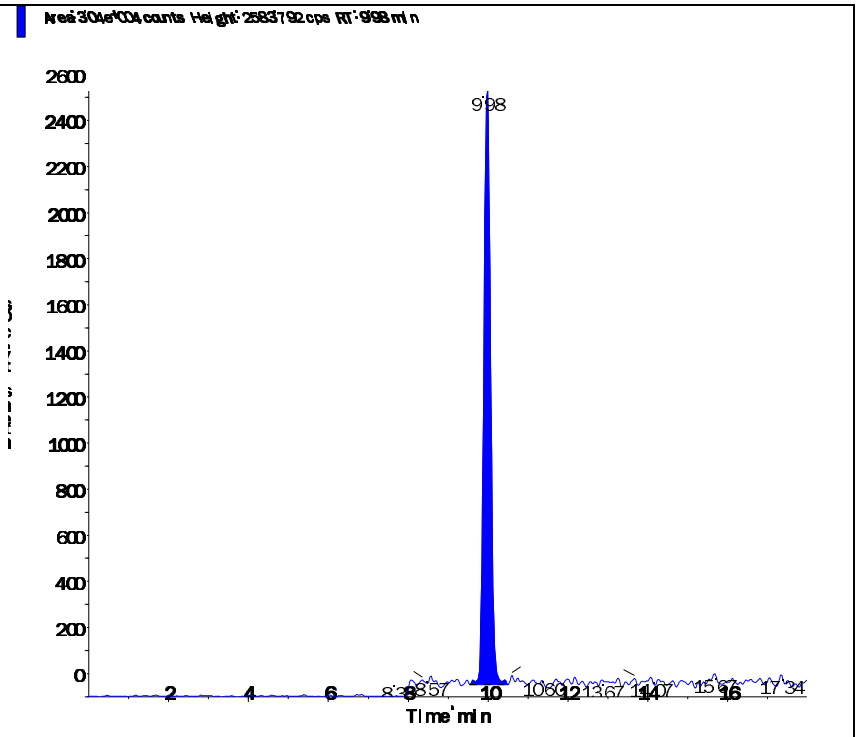
Perchlorate (98.8/83.3 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	10.00 (9.94) min 0.505 ng/ml 0.181 (Standard)



Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	9.98 (9.92) min 0.536 ng/ml 0.062 (Standard)



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Data File	LM33571.wiff	**Result Table**	030316_WTD.rdb
Acquisition Date	3/2/2016 9:50:09 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

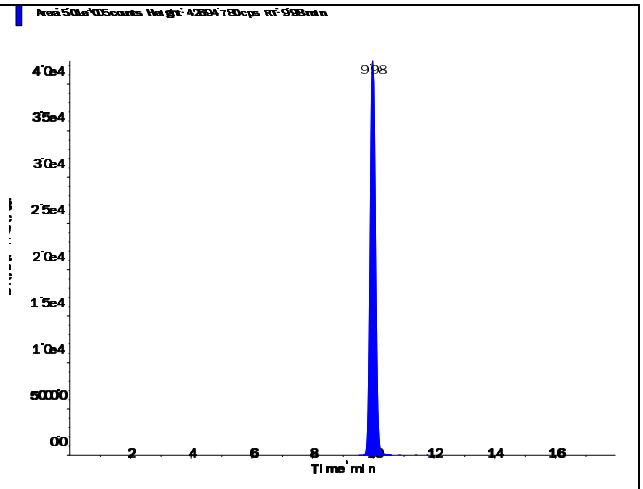
Sample Name	WG559340-05 STD (1.0 ug/L)	**Injection Vial**	55.00
Data File	LM33571.wiff	**Injection Volume**	10.00
Acquisition Date	3/2/2016 9:50:09 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Standard
Instrument Name	API 4000	**Result Table**	030316_WTD.rdb
Sample ID	WG559340-05	**Dilution Factor**	1.00
Sample Comment	1,1 STD72683	**Weight to Volume**	0.00

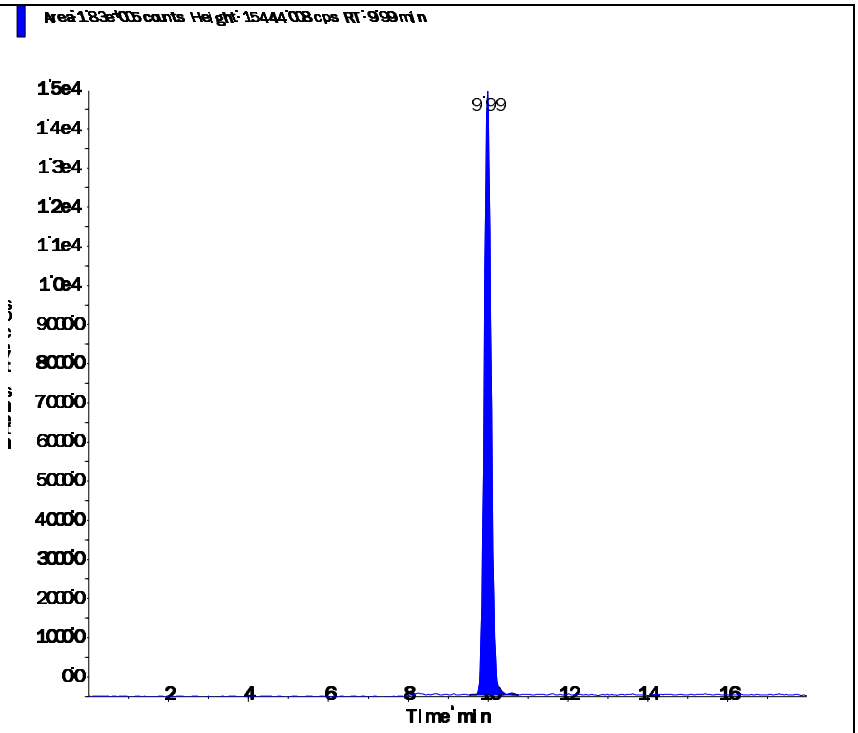
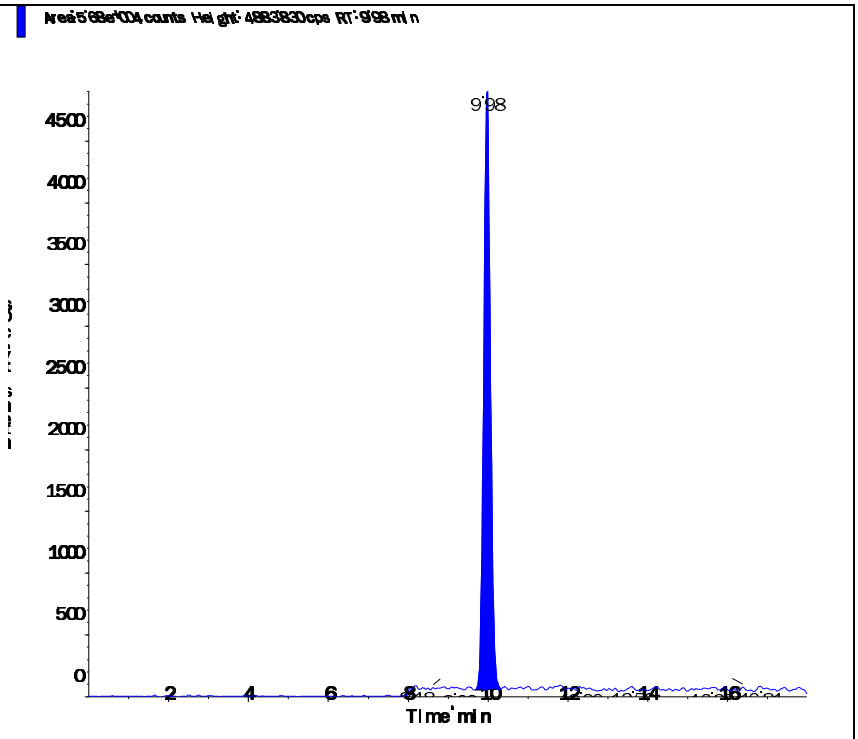
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	5.010e+05	9.98	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.830e+05	9.99	1.00	1.03
Perchlorate conf	5.680e+04	9.98	1.00	0.995

O18LP (Internal Standard)

RT (Exp. RT): 9.98(9.94) min
Concentration: 5.00 ug/L
Sample Type: (Standard)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.99 (9.94) min Calculated conc: 1.03 ng/ml Area Ratio: 0.366 Sample Type: (Standard)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.98 (9.92) min Calculated conc: 0.995 ng/ml Area Ratio: 0.113 Sample Type: (Standard)	

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Data File	LM33572.wiff	**Result Table**	030316_WTD.rdb
Acquisition Date	3/2/2016 10:09:06 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

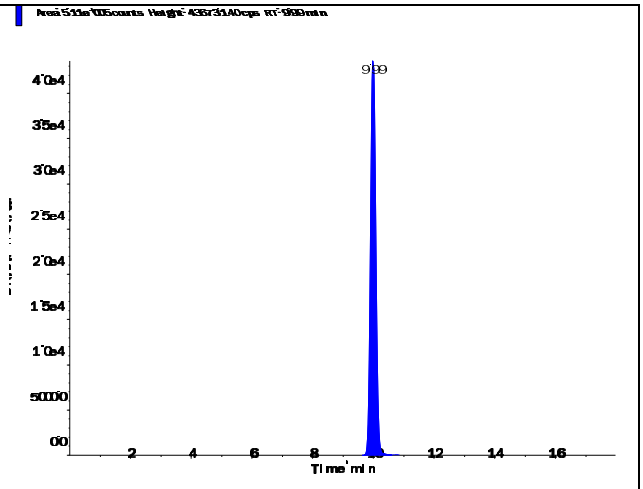
Sample Name	WG559340-06 STD (2.0 ug/L)	**Injection Vial**	56.00
Data File	LM33572.wiff	**Injection Volume**	10.00
Acquisition Date	3/2/2016 10:09:06 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Standard
Instrument Name	API 4000	**Result Table**	030316_WTD.rdb
Sample ID	WG559340-06	**Dilution Factor**	1.00
Sample Comment	1,1 STD72683	**Weight to Volume**	0.00

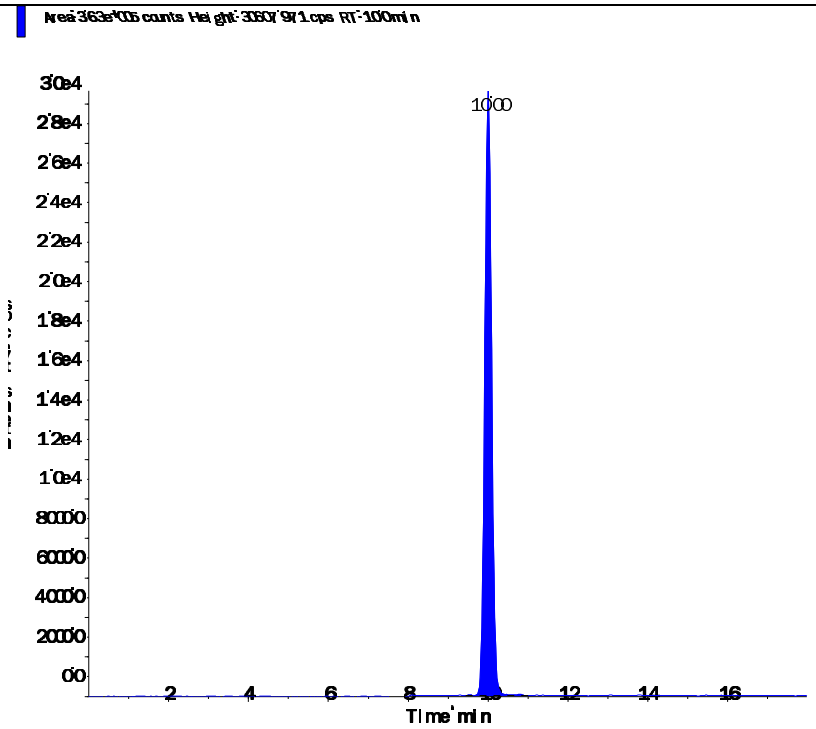
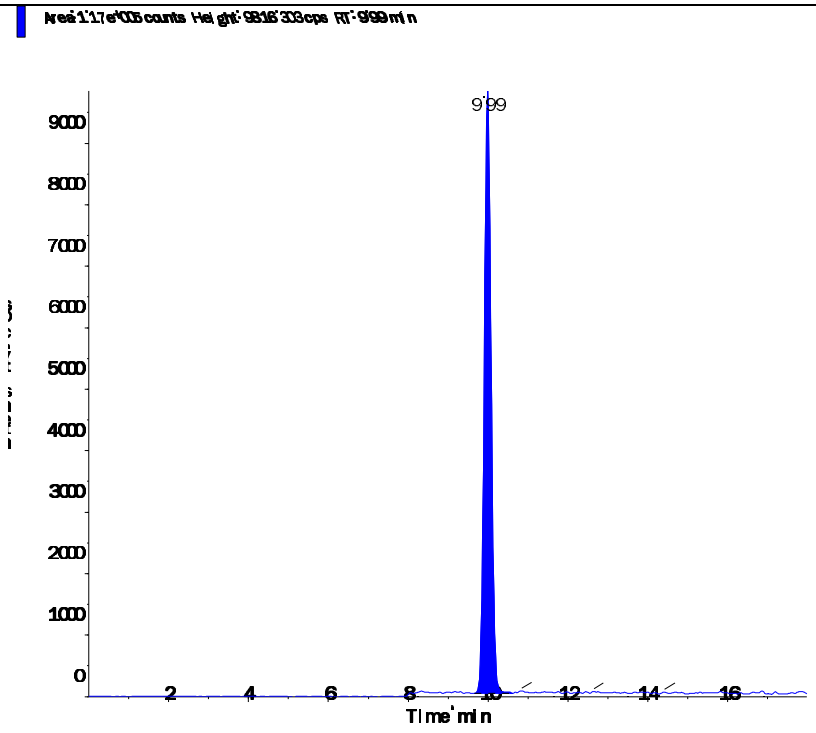
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	5.110e+05	9.99	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	3.630e+05	10.00	2.00	2.02
Perchlorate conf	1.170e+05	9.99	2.00	2.01

O18LP (Internal Standard)

RT (Exp. RT): 9.99(9.94) min
Concentration: 5.00 ug/L
Sample Type: (Standard)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 10.00 (9.94) min Calculated conc: 2.02 ng/ml Area Ratio: 0.711 Sample Type: (Standard)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.99 (9.92) min Calculated conc: 2.01 ng/ml Area Ratio: 0.228 Sample Type: (Standard)	

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Data File	LM33573.wiff	**Result Table**	030316_WTD.rdb
Acquisition Date	3/2/2016 10:28:00 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

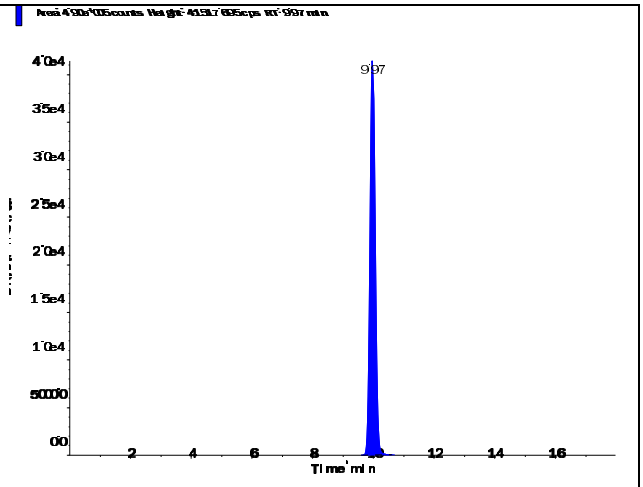
Sample Name	WG559340-07 STD (5.0 ug/L)	**Injection Vial**	57.00
Data File	LM33573.wiff	**Injection Volume**	10.00
Acquisition Date	3/2/2016 10:28:00 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Standard
Instrument Name	API 4000	**Result Table**	030316_WTD.rdb
Sample ID	WG559340-07	**Dilution Factor**	1.00
Sample Comment	1,1 STD72683	**Weight to Volume**	0.00

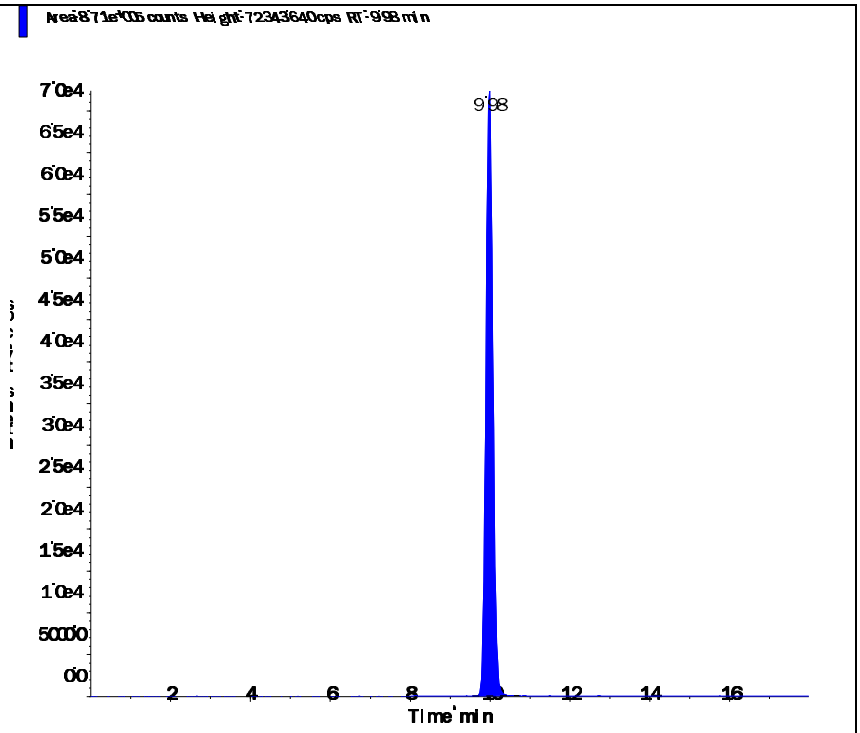
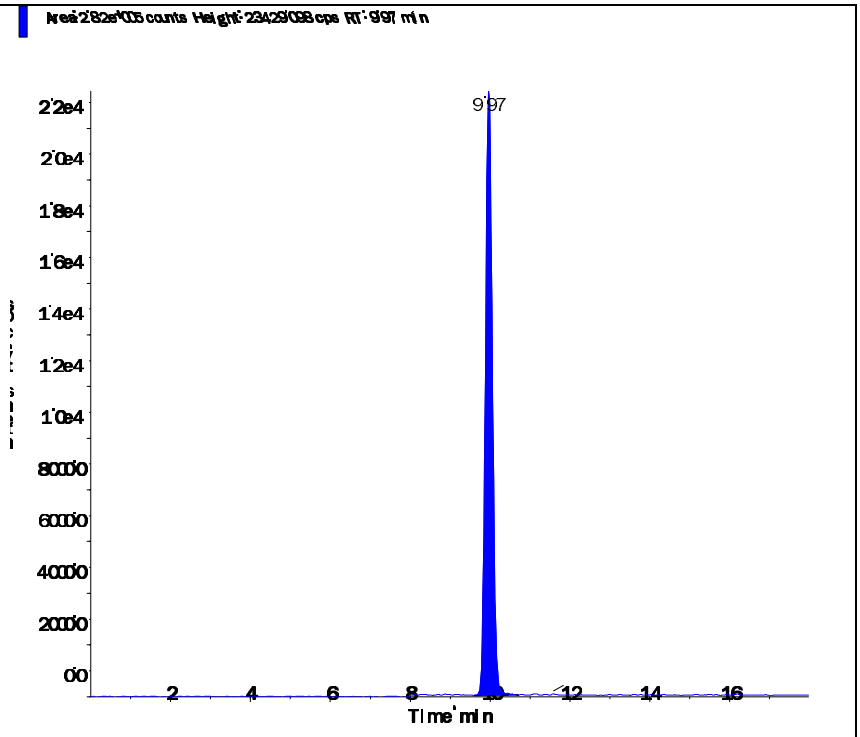
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.900e+05	9.97	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	8.710e+05	9.98	5.00	5.07
Perchlorate conf	2.820e+05	9.97	5.00	5.11

O18LP (Internal Standard)

RT (Exp. RT): 9.97(9.94) min
Concentration: 5.00 ug/L
Sample Type: (Standard)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.98 (9.94) min Calculated conc: 5.07 ng/ml Area Ratio: 1.779 Sample Type: (Standard)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.97 (9.92) min Calculated conc: 5.11 ng/ml Area Ratio: 0.576 Sample Type: (Standard)	

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Printed: 3/4/2016 1:56 PM

Data File	LM33574.wiff	**Result Table**	030316_WTD.rdb
Acquisition Date	3/2/2016 10:46:56 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

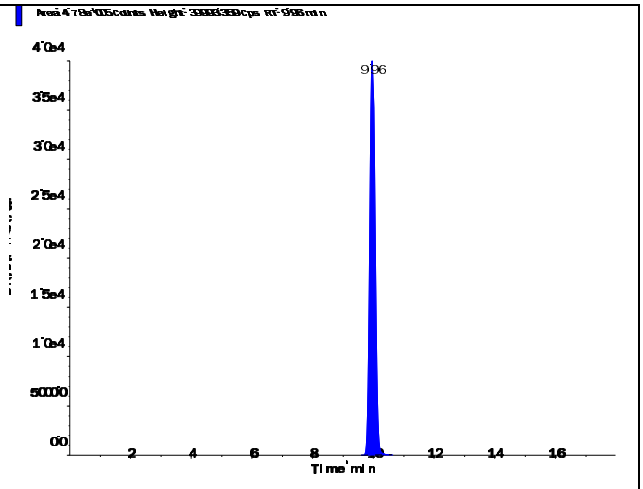
Sample Name	WG559340-08 STD (10 ug/L)	**Injection Vial**	58.00
Data File	LM33574.wiff	**Injection Volume**	10.00
Acquisition Date	3/2/2016 10:46:56 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Standard
Instrument Name	API 4000	**Result Table**	030316_WTD.rdb
Sample ID	WG559340-08	**Dilution Factor**	1.00
Sample Comment	1,1 STD72683	**Weight to Volume**	0.00

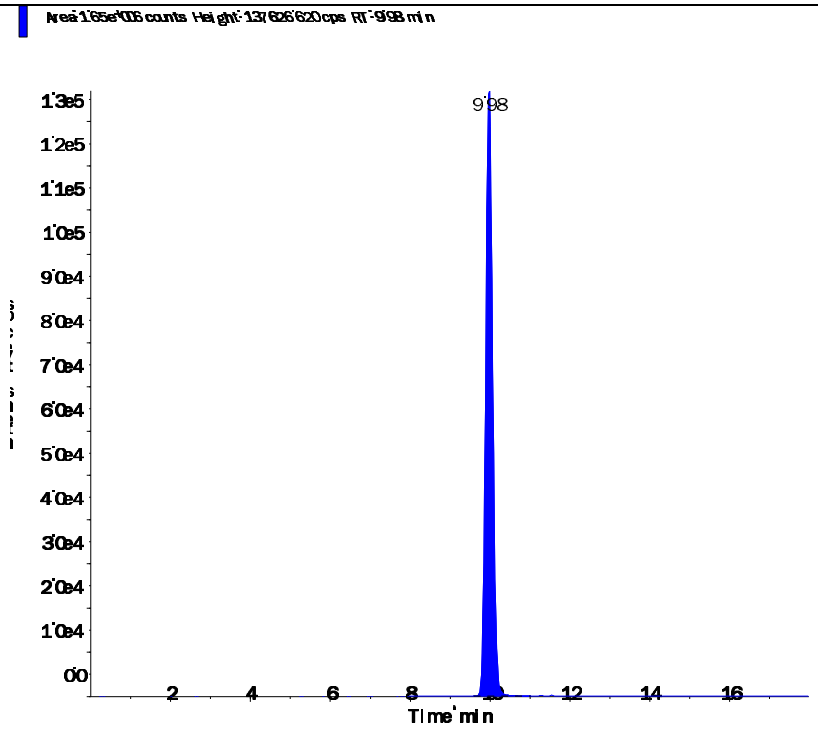
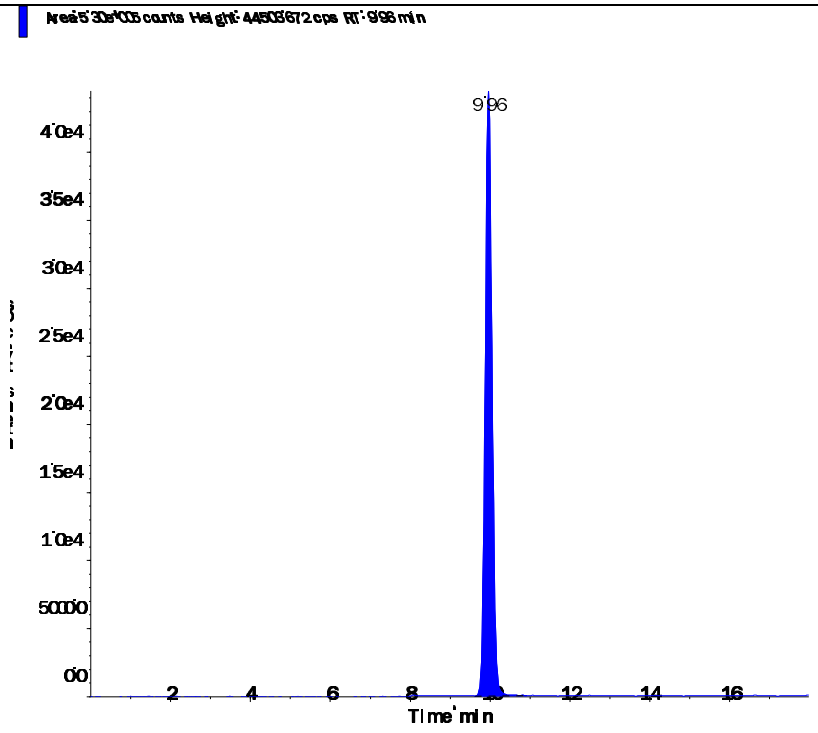
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.780e+05	9.96	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.650e+06	9.98	10.00	9.87
Perchlorate conf	5.300e+05	9.96	10.00	9.85

O18LP (Internal Standard)

RT (Exp. RT): 9.96(9.94) min
Concentration: 5.00 ug/L
Sample Type: (Standard)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.98 (9.94) min Calculated conc: 9.87 ng/ml Area Ratio: 3.458 Sample Type: (Standard)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.96 (9.92) min Calculated conc: 9.85 ng/ml Area Ratio: 1.11 Sample Type: (Standard)	

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Printed: 3/3/2016 2:21 PM

Data File	LM33575.wiff	**Result Table**	030216_WTD.rdb
Acquisition Date	3/2/2016 11:05:52 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

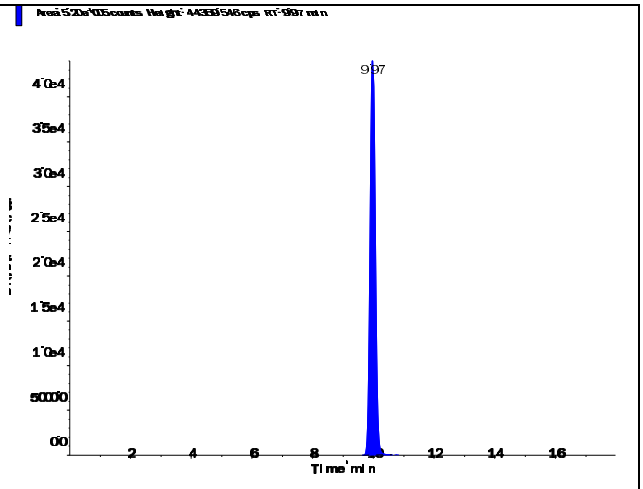
Sample Name	WG559340-09 SSCV (1.0 ug/L)	**Injection Vial**	59.00
Data File	LM33575.wiff	**Injection Volume**	10.00
Acquisition Date	3/2/2016 11:05:52 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Quality Control
Instrument Name	API 4000	**Result Table**	030216_WTD.rdb
Sample ID	WG559340-09	**Dilution Factor**	1.00
Sample Comment	1,1 STD72685	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	5.200e+05	9.97	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.900e+05	9.98	1.00	1.03
Perchlorate conf	6.220e+04	9.97	1.00	1.05

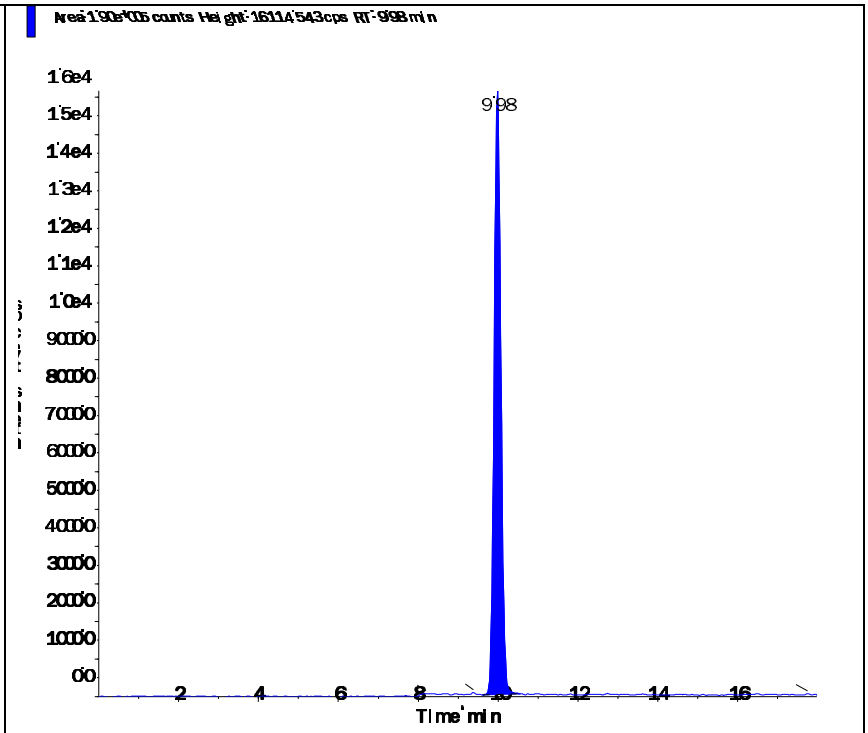
O18LP (Internal Standard)

RT (Exp. RT): 9.97(9.94) min
Concentration: 5.00 ug/L
Sample Type: (Quality Control)



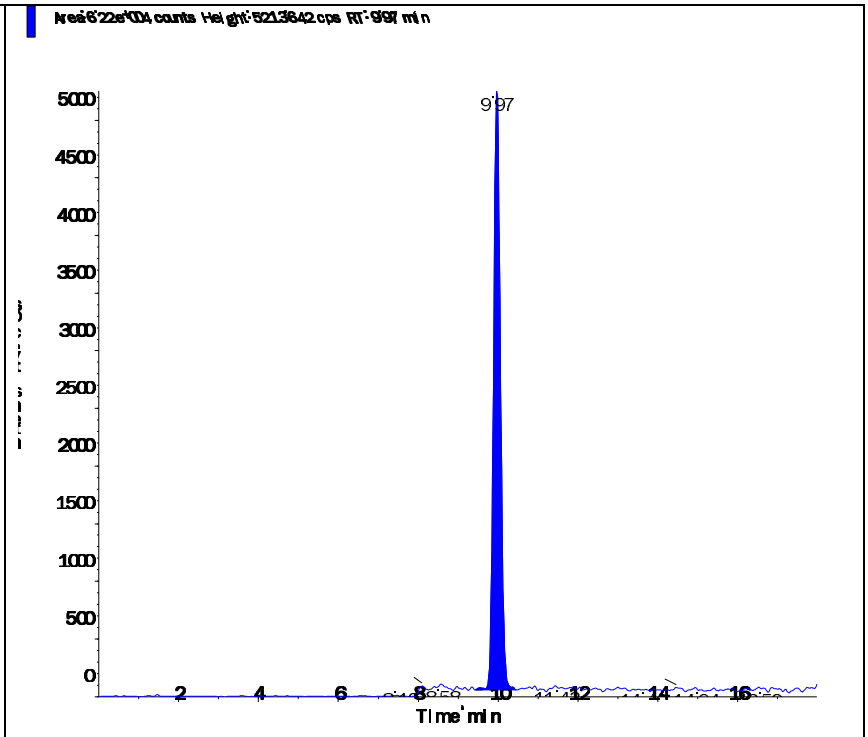
Perchlorate (98.8/83.3 amu)

RT (Exp. RT):	9.98 (9.94) min
Calculated conc:	1.03 ng/ml
Area Ratio:	0.366
Sample Type:	(Quality Control)



Perchlorate conf (100.8/85.2 amu)

RT (Exp. RT):	9.97 (9.92) min
Calculated conc:	1.05 ng/ml
Area Ratio:	0.12
Sample Type:	(Quality Control)



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Printed: 3/3/2016 2:32 PM

Data File	LM33608.wiff	**Result Table**	030216_WTD.rdb
Acquisition Date	3/2/2016 9:32:45 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

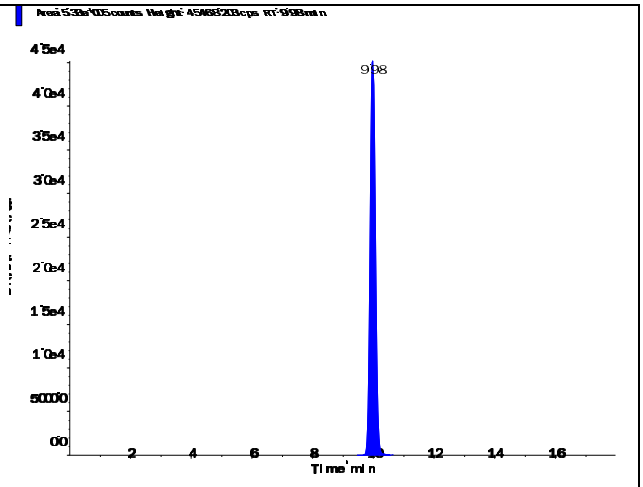
Sample Name	WG559291-07 CCV (1.0ug/L)	**Injection Vial**	55.00
Data File	LM33608.wiff	**Injection Volume**	10.00
Acquisition Date	3/2/2016 9:32:45 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Quality Control
Instrument Name	API 4000	**Result Table**	030216_WTD.rdb
Sample ID	WG559291-07	**Dilution Factor**	1.00
Sample Comment	1,1 STD72683	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	5.330e+05	9.98	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.930e+05	9.99	1.00	1.02
Perchlorate conf	6.010e+04	9.97	1.00	0.988

O18LP (Internal Standard)

RT (Exp. RT): 9.98(9.94) min
Concentration: 5.00 ug/L
Sample Type: (Quality Control)



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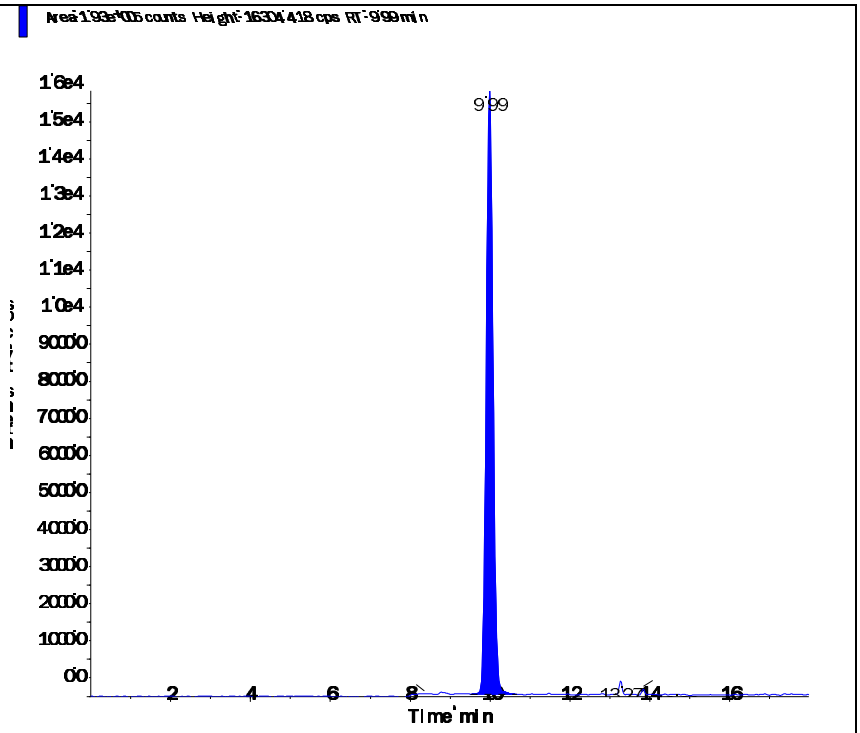
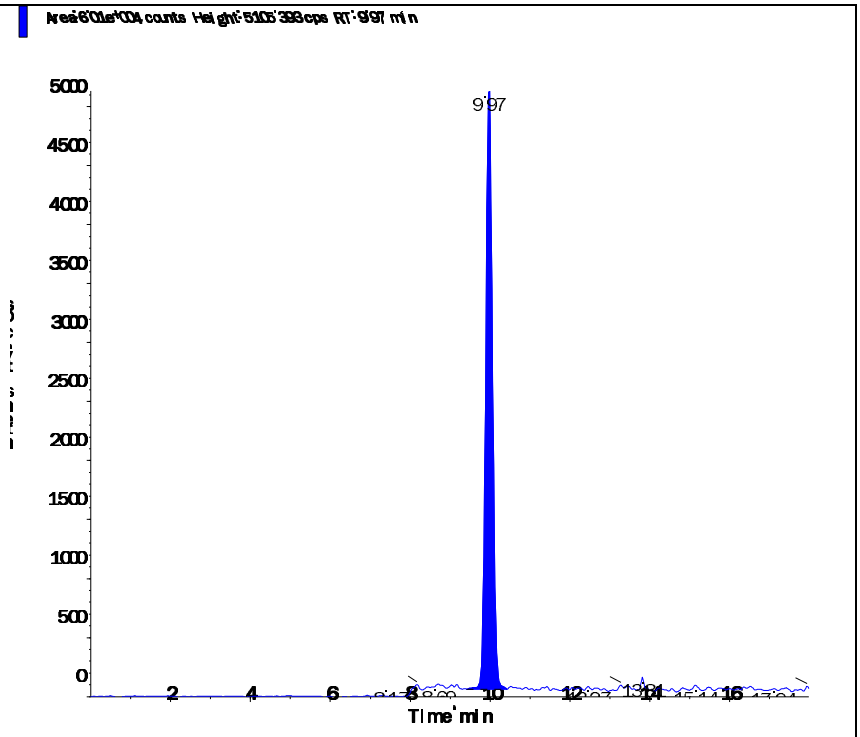
Perchlorate (98.8/83.3 amu)	
RT (Exp. RT):	9.99 (9.94) min
Calculated conc:	1.02 ng/ml
Area Ratio:	0.362
Sample Type:	(Quality Control)



Perchlorate conf (100.8/85.2 amu)	
RT (Exp. RT):	9.97 (9.92) min
Calculated conc:	0.988 ng/ml
Area Ratio:	0.113
Sample Type:	(Quality Control)



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Data File	LM33622.wiff	**Result Table**	030216_WTD.rdb
Acquisition Date	3/3/2016 1:57:55 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

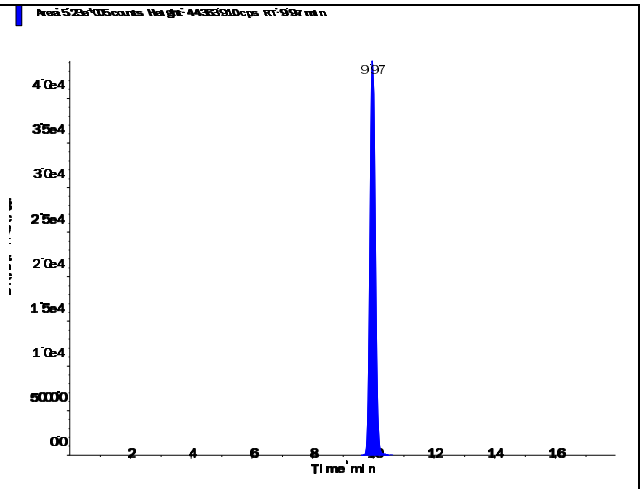
Sample Name	WG559291-09 CCV (1.0ug/L)	**Injection Vial**	55.00
Data File	LM33622.wiff	**Injection Volume**	10.00
Acquisition Date	3/3/2016 1:57:55 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Quality Control
Instrument Name	API 4000	**Result Table**	030216_WTD.rdb
Sample ID	WG559291-09	**Dilution Factor**	1.00
Sample Comment	1,1 STD72685	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	5.230e+05	9.97	5.00	-

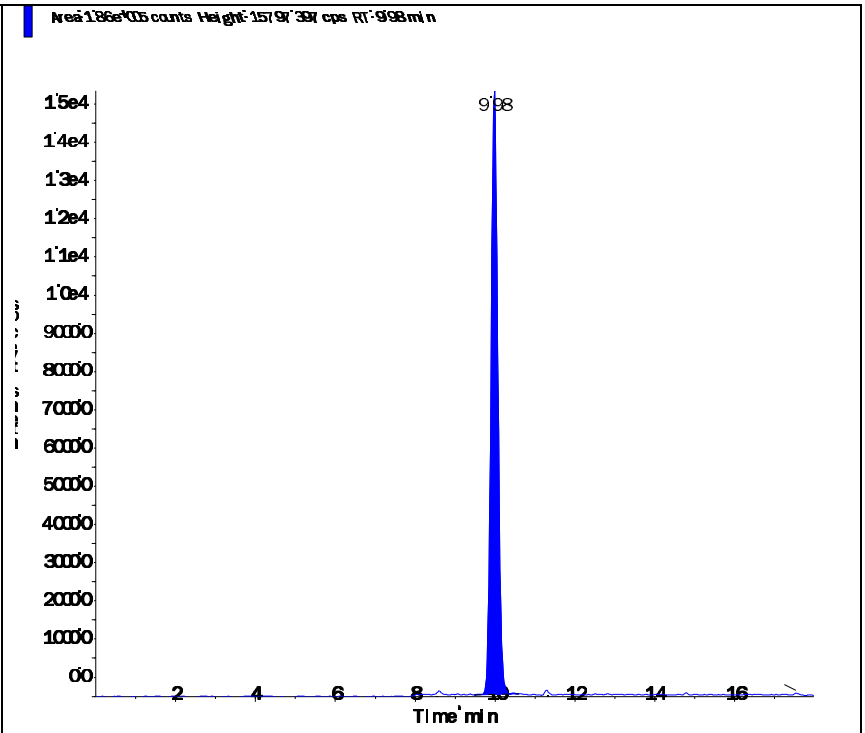
Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.860e+05	9.98	1.00	1.00
Perchlorate conf	6.020e+04	9.97	1.00	1.01

O18LP (Internal Standard)

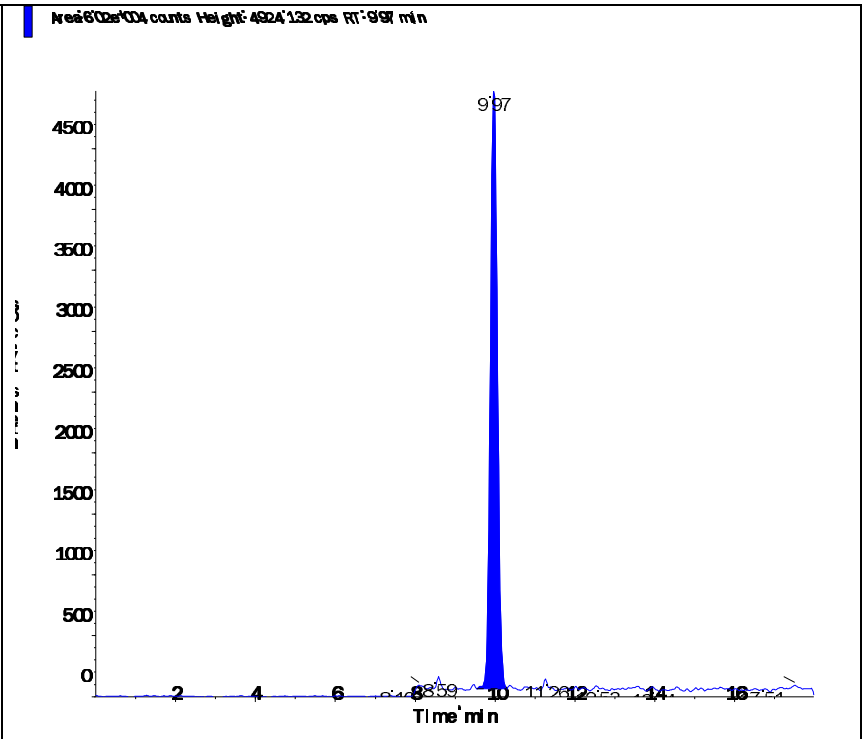
RT (Exp. RT): 9.97(9.94) min
Concentration: 5.00 ug/L
Sample Type: (Quality Control)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	 9.98 (9.94) min 1.00 ng/ml 0.355 (Quality Control)



Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	 9.97 (9.92) min 1.01 ng/ml 0.115 (Quality Control)



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Data File	LM33635.wiff	**Result Table**	030216_WTD.rdb
Acquisition Date	3/3/2016 6:04:06 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

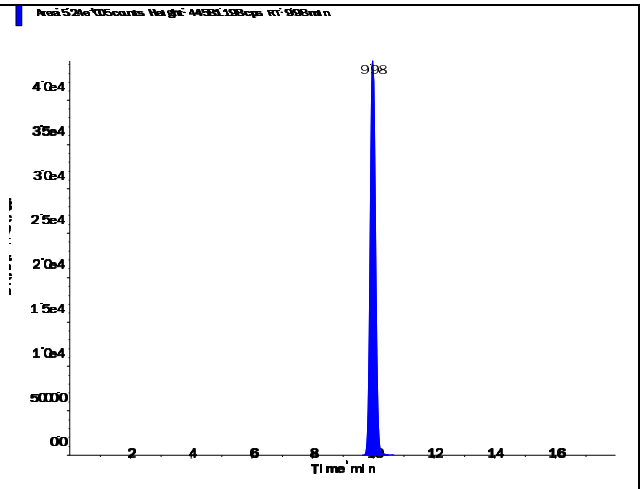
Sample Name	WG559291-11 CCV (1.0ug/L)	**Injection Vial**	55.00
Data File	LM33635.wiff	**Injection Volume**	10.00
Acquisition Date	3/3/2016 6:04:06 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Quality Control
Instrument Name	API 4000	**Result Table**	030216_WTD.rdb
Sample ID	WG559291-11	**Dilution Factor**	1.00
Sample Comment	1,1 STD72685	**Weight to Volume**	0.00

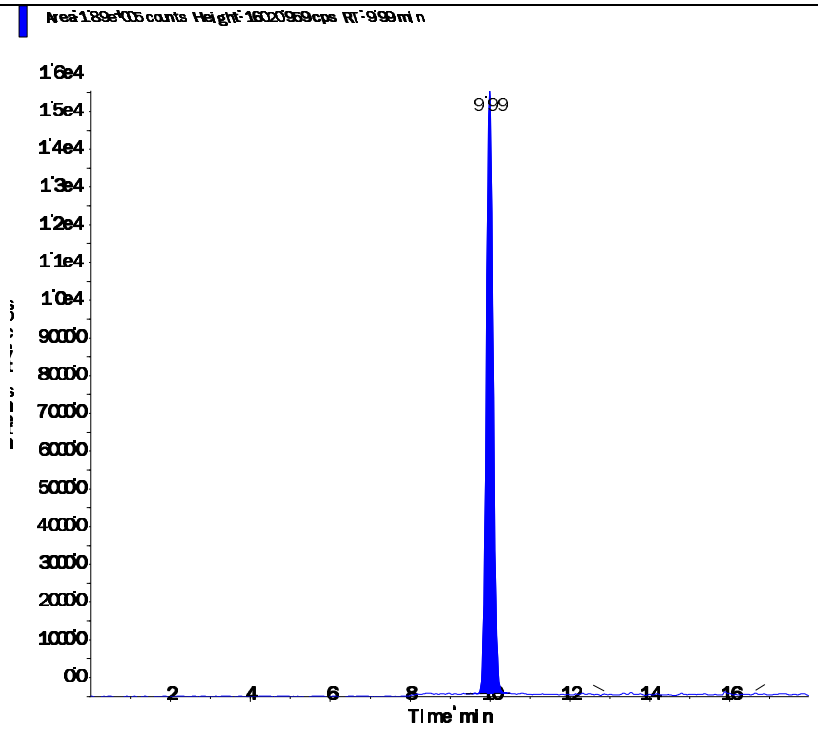
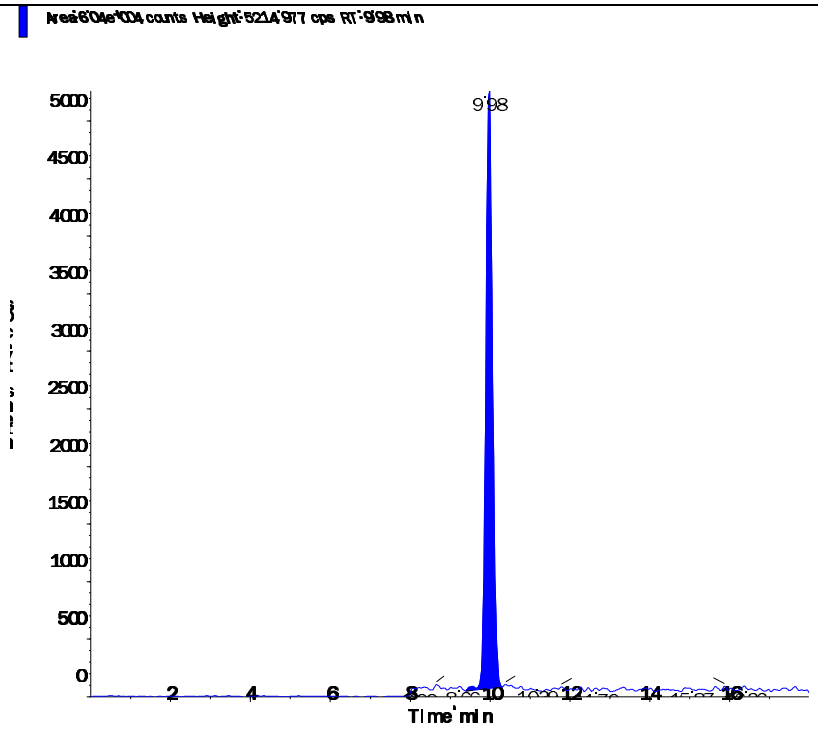
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	5.240e+05	9.98	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.890e+05	9.99	1.00	1.02
Perchlorate conf	6.040e+04	9.98	1.00	1.01

O18LP (Internal Standard)

RT (Exp. RT): 9.98(9.94) min
Concentration: 5.00 ug/L
Sample Type: (Quality Control)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.99 (9.94) min Calculated conc: 1.02 ng/ml Area Ratio: 0.362 Sample Type: (Quality Control)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.98 (9.92) min Calculated conc: 1.01 ng/ml Area Ratio: 0.115 Sample Type: (Quality Control)	

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Data File	LM33642.wiff	**Result Table**	030216_WTD.rdb
Acquisition Date	3/3/2016 8:16:40 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

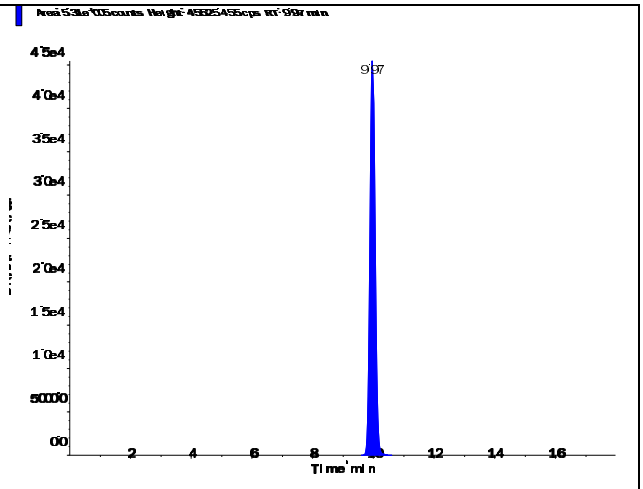
Sample Name	WG559291-13 CCV (1.0ug/L)	**Injection Vial**	55.00
Data File	LM33642.wiff	**Injection Volume**	10.00
Acquisition Date	3/3/2016 8:16:40 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Quality Control
Instrument Name	API 4000	**Result Table**	030216_WTD.rdb
Sample ID	WG559291-13	**Dilution Factor**	1.00
Sample Comment	1,1 STD72685	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	5.310e+05	9.97	5.00	-

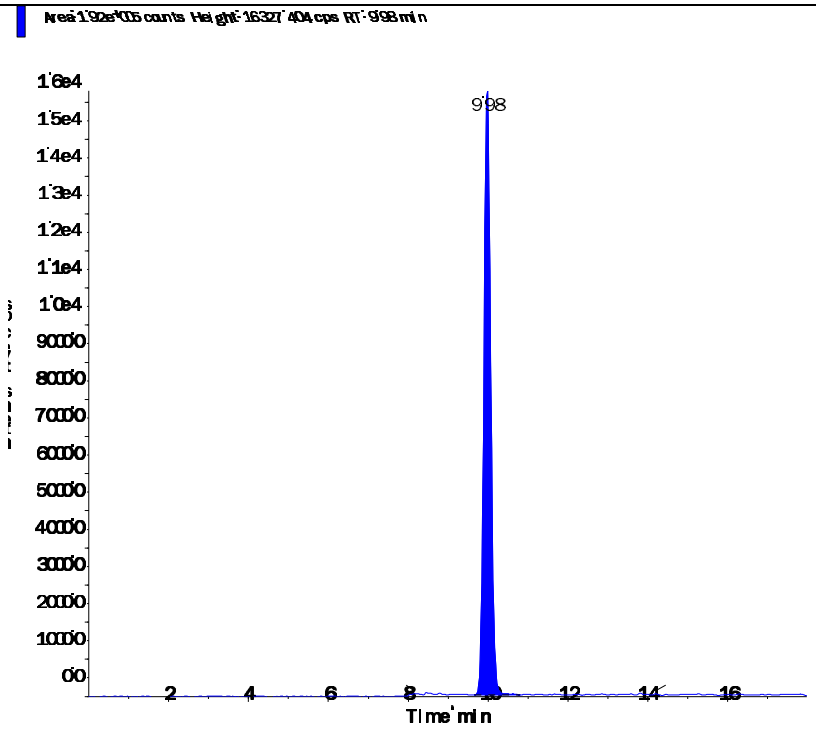
Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.920e+05	9.98	1.00	1.02
Perchlorate conf	6.040e+04	9.97	1.00	0.996

O18LP (Internal Standard)

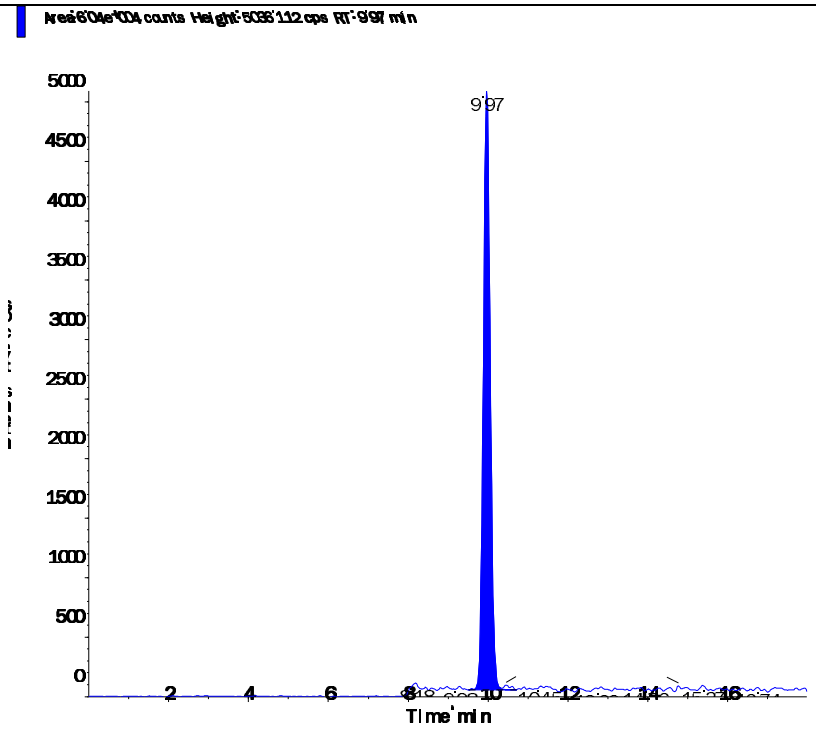
RT (Exp. RT): 9.97(9.94) min
Concentration: 5.00 ug/L
Sample Type: (Quality Control)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	 9.98 (9.94) min 1.02 ng/ml 0.361 (Quality Control)



Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	 9.97 (9.92) min 0.996 ng/ml 0.114 (Quality Control)



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Data File	LM33651.wiff	**Result Table**	030216_WTD.rdb
Acquisition Date	3/3/2016 11:07:03 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

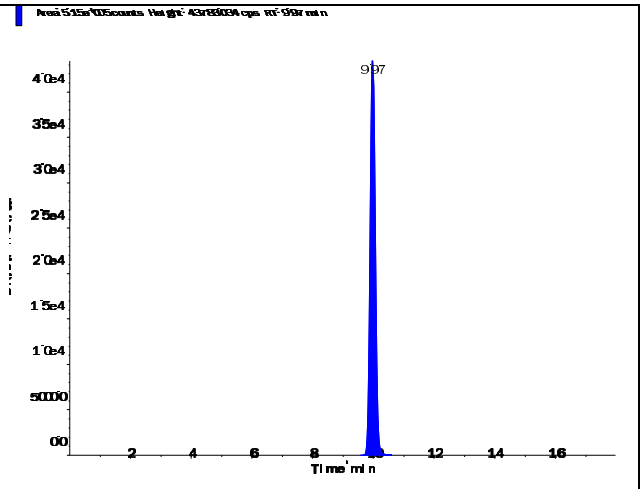
Sample Name	WG559291-15 CCV (1.0ug/L)	**Injection Vial**	55.00
Data File	LM33651.wiff	**Injection Volume**	10.00
Acquisition Date	3/3/2016 11:07:03 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Quality Control
Instrument Name	API 4000	**Result Table**	030216_WTD.rdb
Sample ID	WG559291-15	**Dilution Factor**	1.00
Sample Comment	1,1 STD72685	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	5.150e+05	9.97	5.00	-

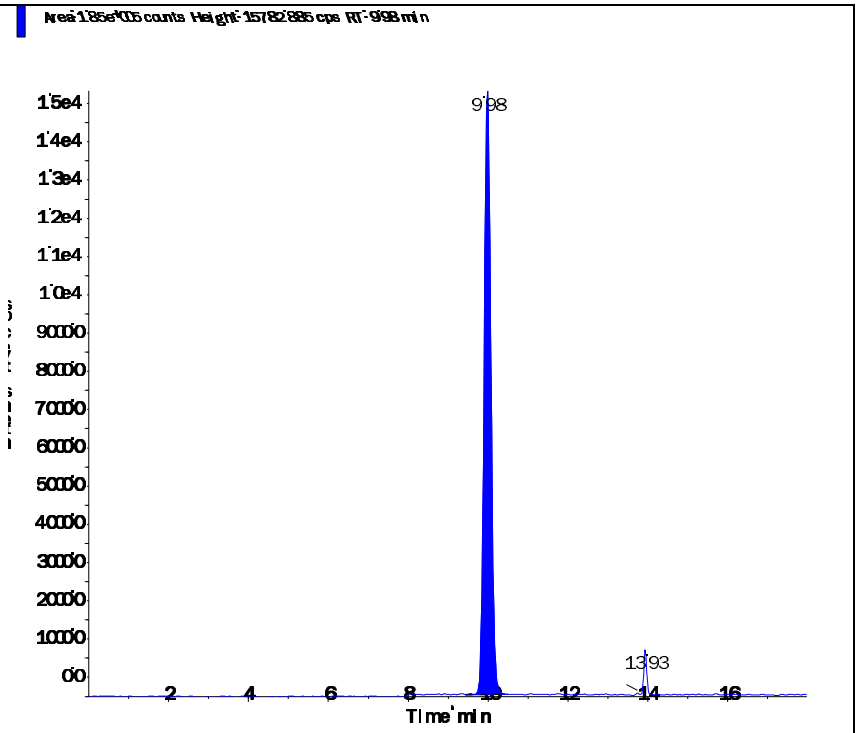
Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.850e+05	9.98	1.00	1.02
Perchlorate conf	5.840e+04	9.97	1.00	0.994

O18LP (Internal Standard)

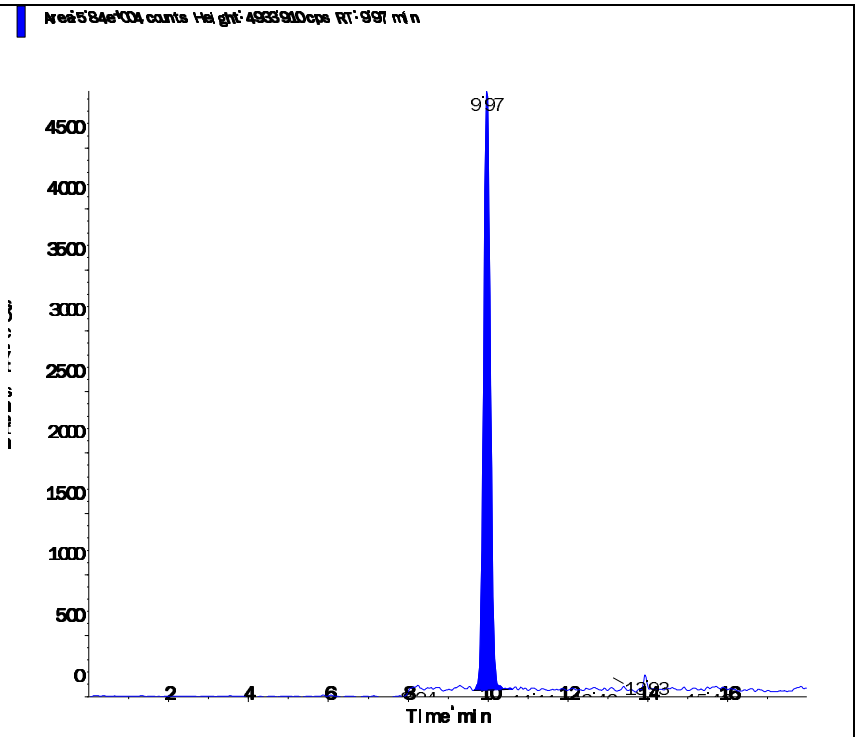
RT (Exp. RT): 9.97(9.94) min
Concentration: 5.00 ug/L
Sample Type: (Quality Control)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	9.98 (9.94) min 1.02 ng/ml 0.36 (Quality Control)



Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	9.97 (9.92) min 0.994 ng/ml 0.113 (Quality Control)



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Data File	LM33611.wiff	**Result Table**	030216_WTD.rdb
Acquisition Date	3/2/2016 10:29:34 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

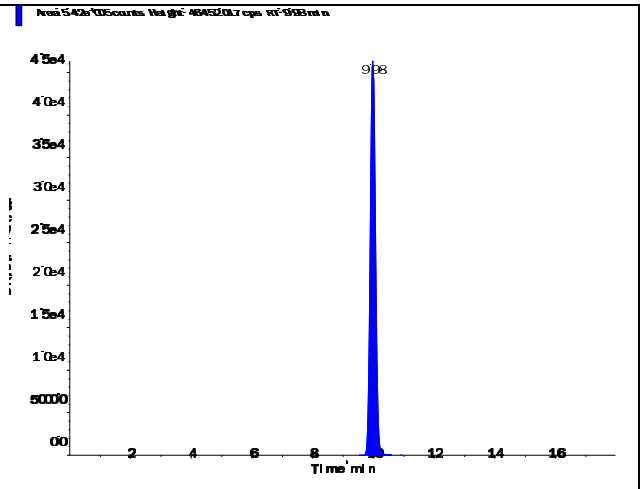
Sample Name	WG559292-07 MRL (0.2ug/L)	**Injection Vial**	53.00
Data File	LM33611.wiff	**Injection Volume**	10.00
Acquisition Date	3/2/2016 10:29:34 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	030216_WTD.rdb
Sample ID	WG559292-07	**Dilution Factor**	1.00
Sample Comment	1,1 STD72685	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	5.420e+05	9.98	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	3.950e+04	9.99	N/A	0.196
Perchlorate conf	1.270e+04	9.97	N/A	0.194

O18LP (Internal Standard)

RT (Exp. RT): 9.98(9.94) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



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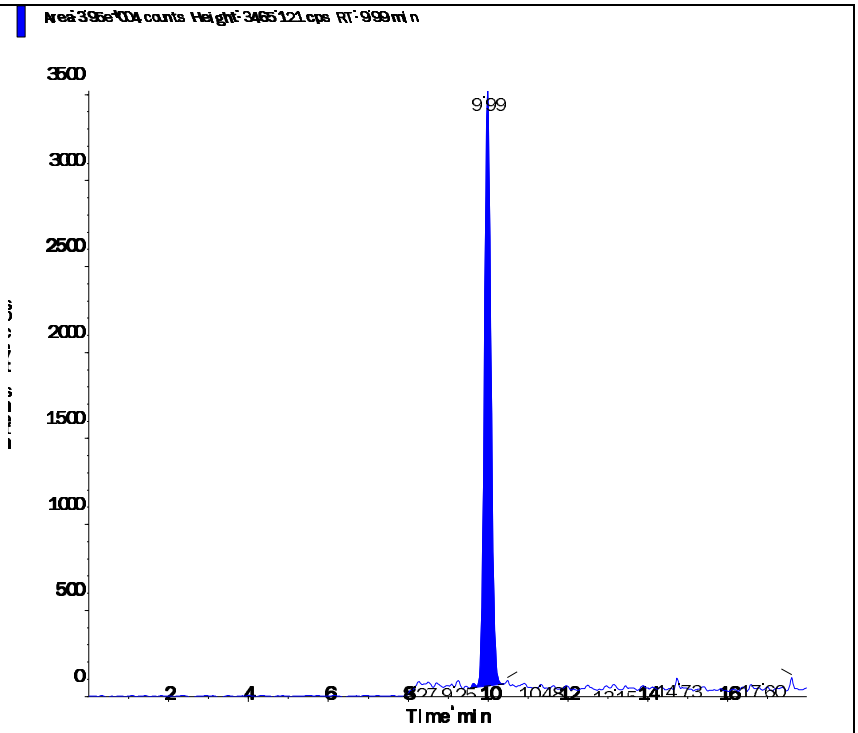
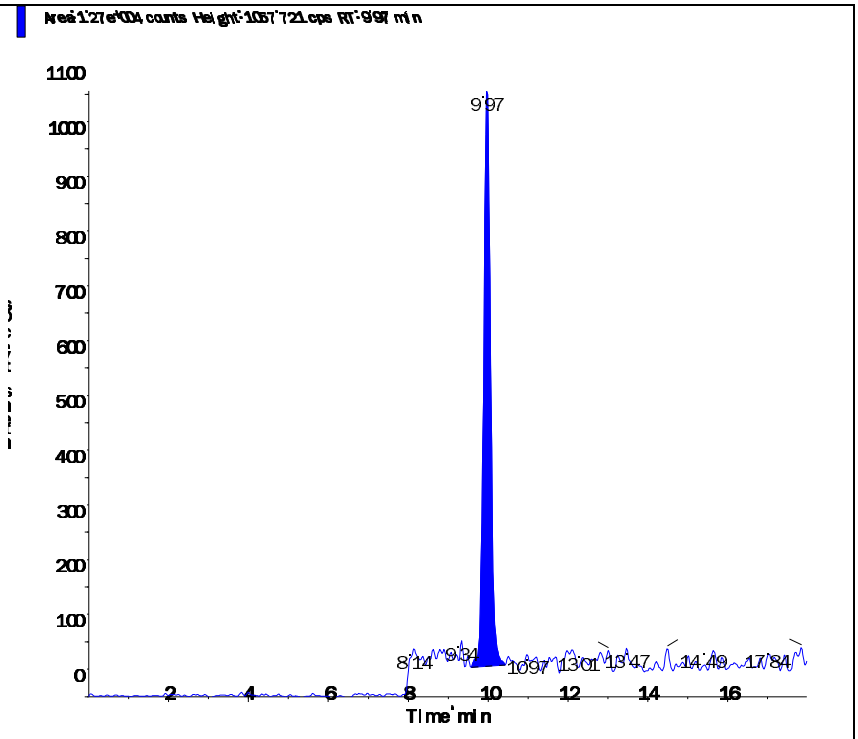
Perchlorate (98.8/83.3 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	9.99 (9.94) min 0.196 ng/ml 0.073 (Unknown)



Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	9.97 (9.92) min 0.194 ng/ml 0.023 (Unknown)



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Data File	LM33623.wiff	**Result Table**	030216_WTD.rdb
Acquisition Date	3/3/2016 2:16:51 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

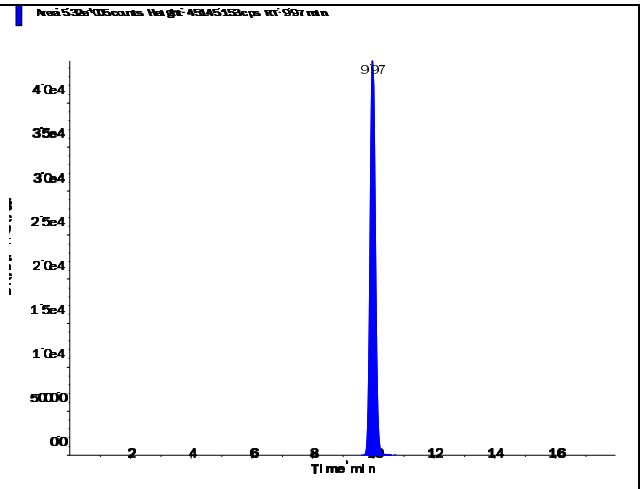
Sample Name	WG559292-08 MRL (0.2ug/L)	**Injection Vial**	53.00
Data File	LM33623.wiff	**Injection Volume**	10.00
Acquisition Date	3/3/2016 2:16:51 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	030216_WTD.rdb
Sample ID	WG559292-08	**Dilution Factor**	1.00
Sample Comment	1,1 STD72685	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	5.320e+05	9.97	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	3.890e+04	9.98	N/A	0.196
Perchlorate conf	1.230e+04	9.97	N/A	0.191

O18LP (Internal Standard)

RT (Exp. RT): 9.97(9.94) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



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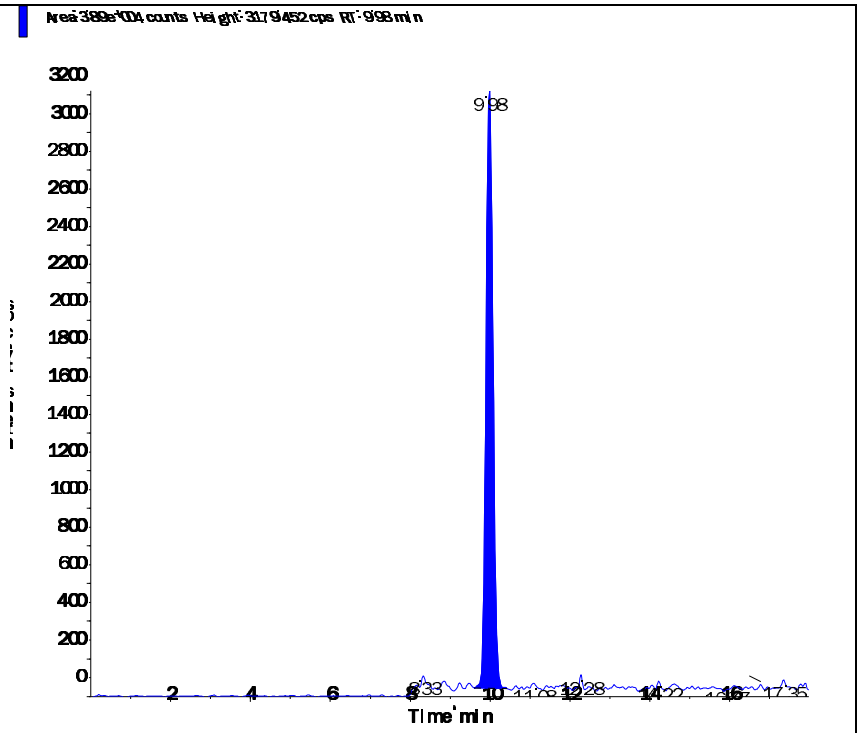
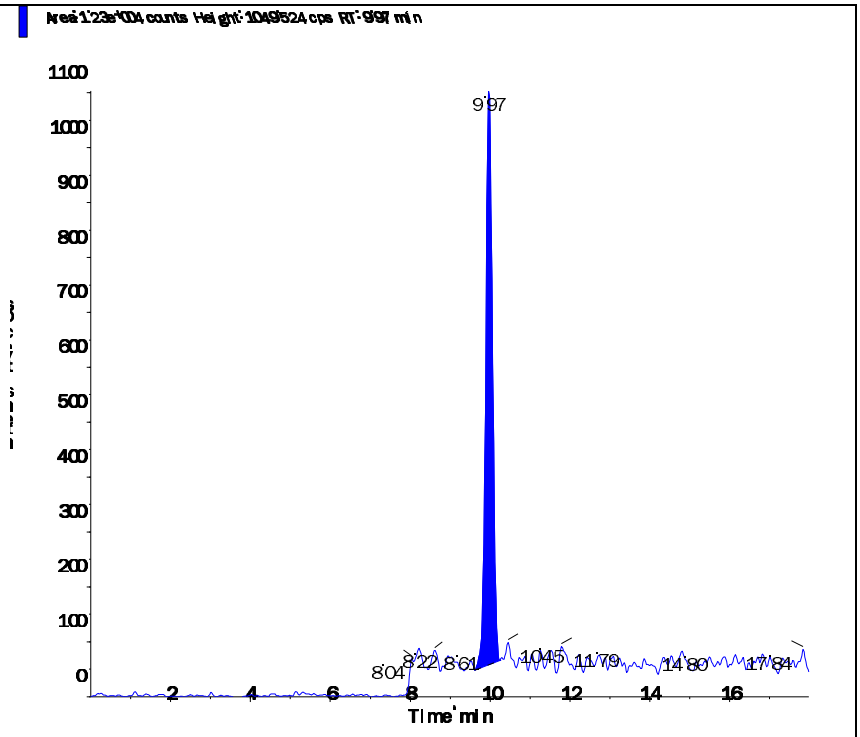
Perchlorate (98.8/83.3 amu)	
RT (Exp. RT):	9.98 (9.94) min
Calculated conc:	0.196 ng/ml
Area Ratio:	0.073
Sample Type:	(Unknown)



Perchlorate conf (100.8/85.2 amu)	
RT (Exp. RT):	9.97 (9.92) min
Calculated conc:	0.191 ng/ml
Area Ratio:	0.023
Sample Type:	(Unknown)



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Data File	LM33636.wiff	**Result Table**	030216_WTD.rdb
Acquisition Date	3/3/2016 6:23:01 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

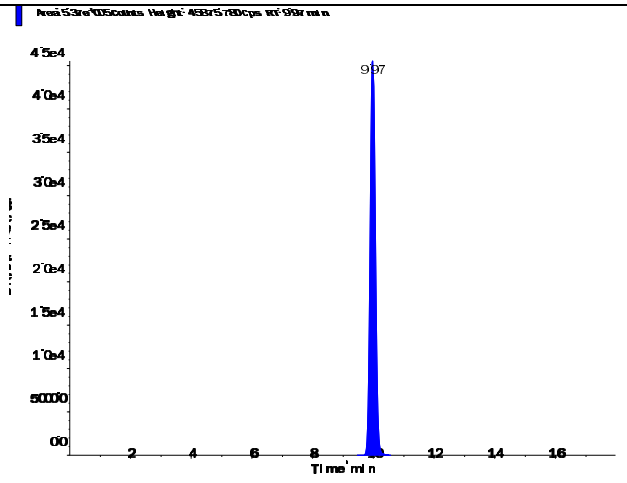
Sample Name	WG559292-09 MRL (0.2ug/L)	**Injection Vial**	53.00
Data File	LM33636.wiff	**Injection Volume**	10.00
Acquisition Date	3/3/2016 6:23:01 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	030216_WTD.rdb
Sample ID	WG559292-09	**Dilution Factor**	1.00
Sample Comment	1,1 STD72685	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	5.370e+05	9.97	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	3.890e+04	9.99	N/A	0.194
Perchlorate conf	1.350e+04	9.97	N/A	0.209

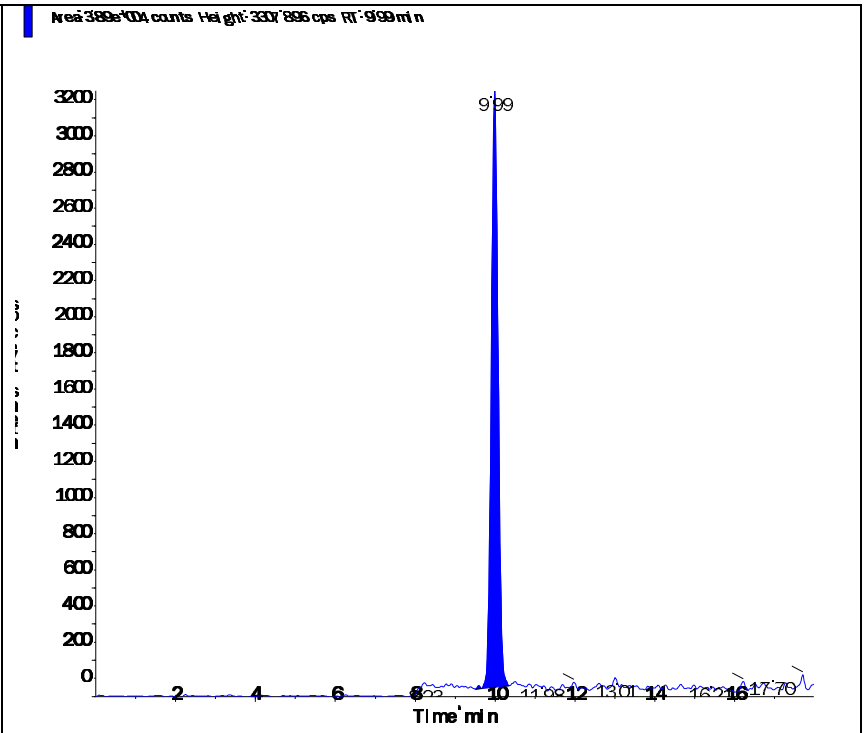
O18LP (Internal Standard)

RT (Exp. RT): 9.97(9.94) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



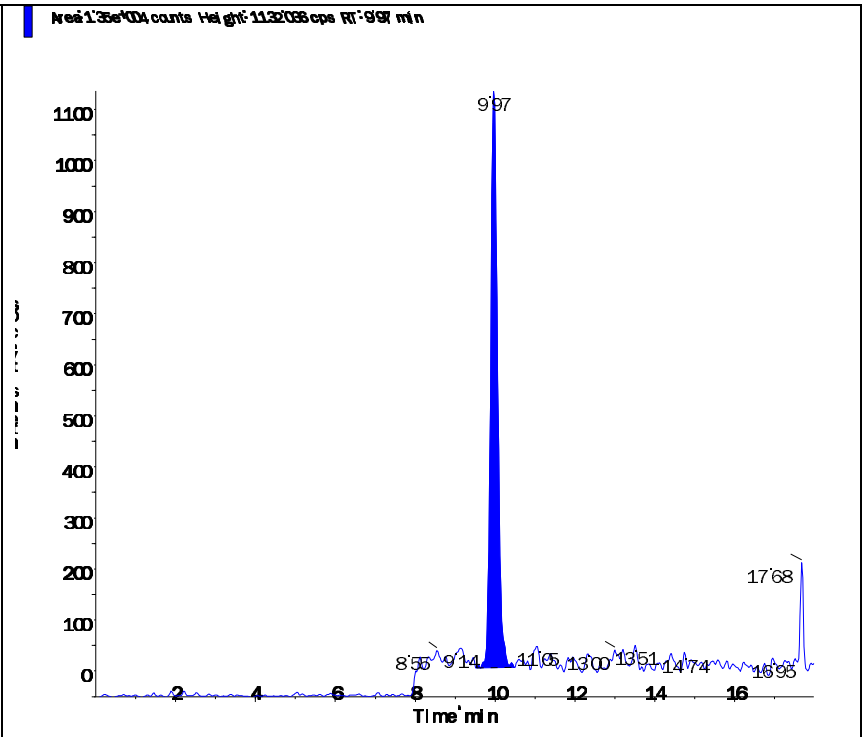
Perchlorate (98.8/83.3 amu)

RT (Exp. RT):	9.99 (9.94) min
Calculated conc:	0.194 ng/ml
Area Ratio:	0.072
Sample Type:	(Unknown)



Perchlorate conf (100.8/85.2 amu)

RT (Exp. RT):	9.97 (9.92) min
Calculated conc:	0.209 ng/ml
Area Ratio:	0.025
Sample Type:	(Unknown)



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Data File	LM33643.wiff	**Result Table**	030216_WTD.rdb
Acquisition Date	3/3/2016 8:35:36 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

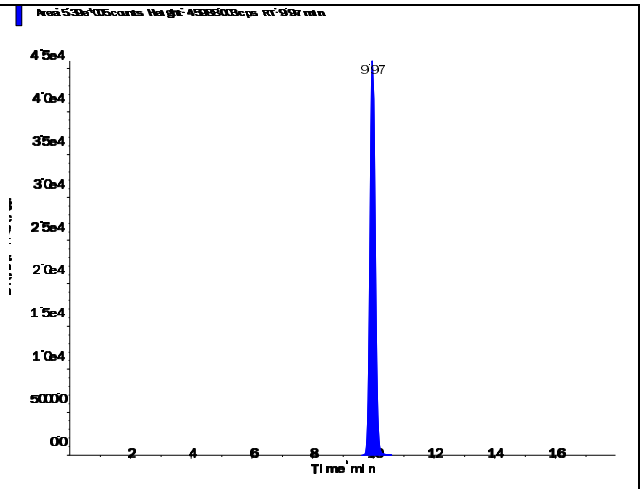
Sample Name	WG559292-10 MRL (0.2ug/L)	**Injection Vial**	53.00
Data File	LM33643.wiff	**Injection Volume**	10.00
Acquisition Date	3/3/2016 8:35:36 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	030216_WTD.rdb
Sample ID	WG559292-10	**Dilution Factor**	1.00
Sample Comment	1,1 STD72685	**Weight to Volume**	0.00

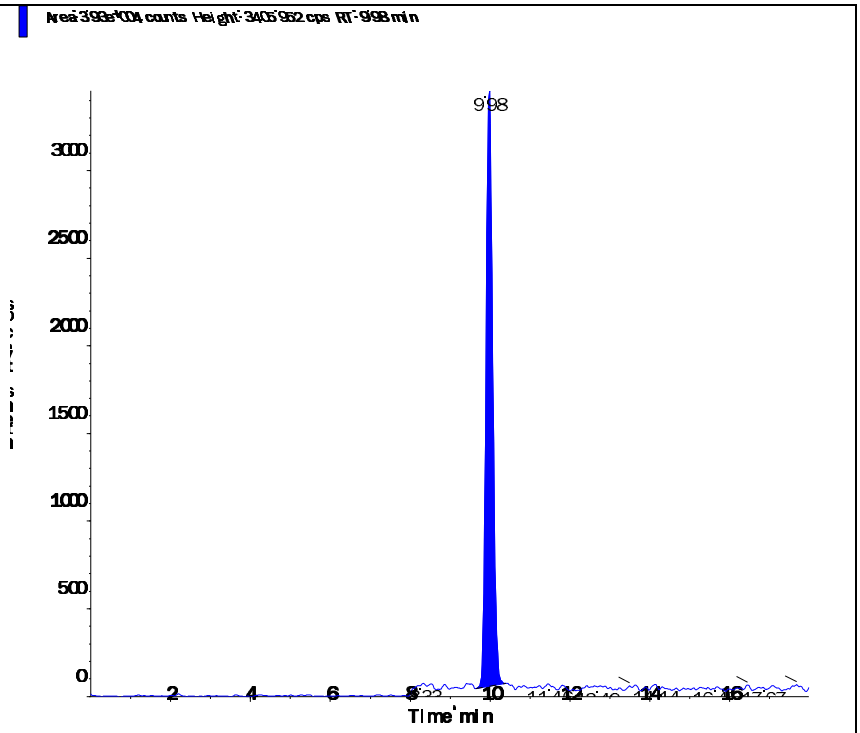
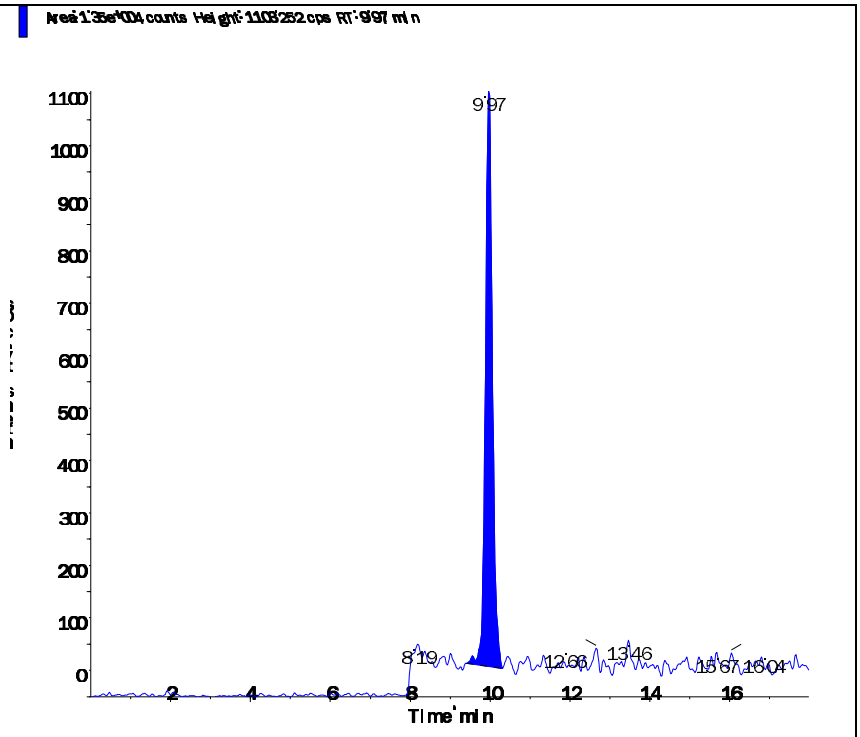
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	5.390e+05	9.97	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	3.930e+04	9.98	N/A	0.196
Perchlorate conf	1.350e+04	9.97	N/A	0.209

O18LP (Internal Standard)

RT (Exp. RT): 9.97(9.94) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.98 (9.94) min Calculated conc: 0.196 ng/ml Area Ratio: 0.073 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.97 (9.92) min Calculated conc: 0.209 ng/ml Area Ratio: 0.025 Sample Type: (Unknown)	

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Data File	LM33652.wiff	**Result Table**	030216_WTD.rdb
Acquisition Date	3/3/2016 11:25:58 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

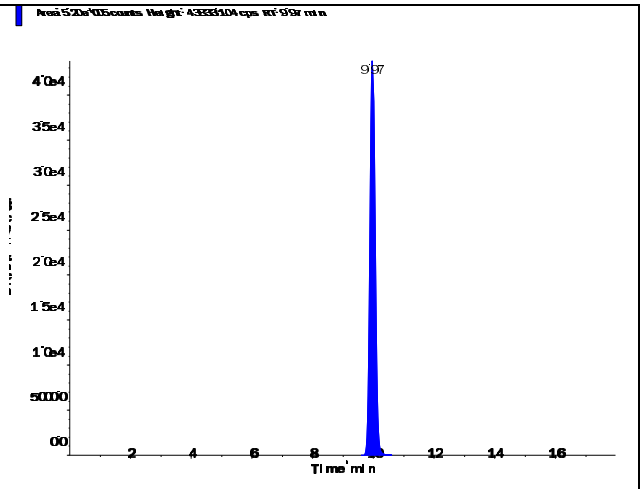
Sample Name	WG559292-11 MRL (0.2ug/L)	**Injection Vial**	53.00
Data File	LM33652.wiff	**Injection Volume**	10.00
Acquisition Date	3/3/2016 11:25:58 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	030216_WTD.rdb
Sample ID	WG559292-11	**Dilution Factor**	1.00
Sample Comment	1,1 STD72685	**Weight to Volume**	0.00

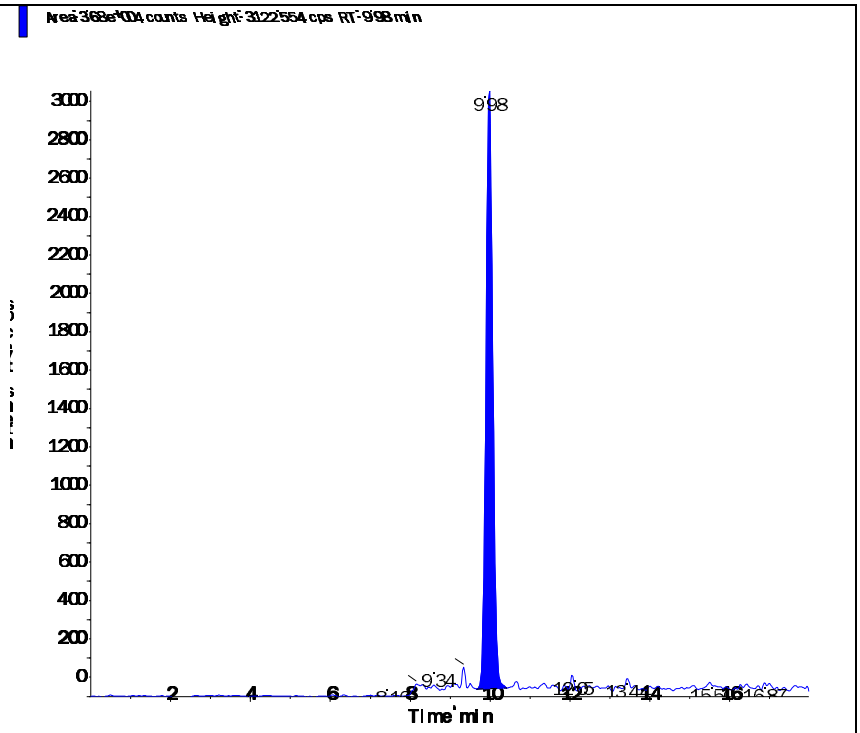
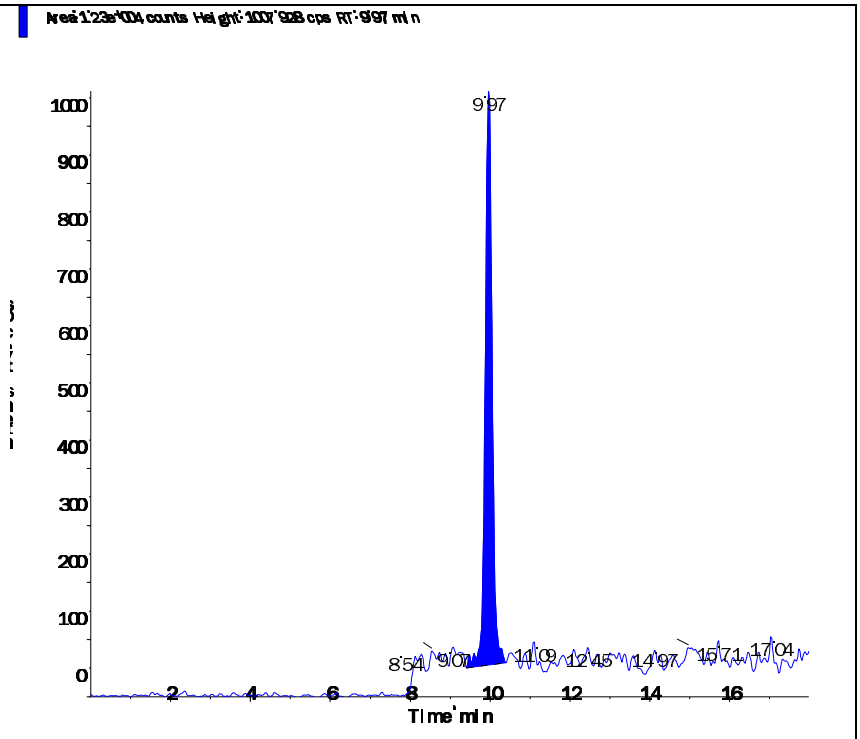
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	5.200e+05	9.97	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	3.680e+04	9.98	N/A	0.19
Perchlorate conf	1.230e+04	9.97	N/A	0.197

O18LP (Internal Standard)

RT (Exp. RT): 9.97(9.94) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.98 (9.94) min Calculated conc: 0.19 ng/ml Area Ratio: 0.071 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.97 (9.92) min Calculated conc: 0.197 ng/ml Area Ratio: 0.024 Sample Type: (Unknown)	

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Data File	LM33610.wiff	**Result Table**	030216_WTD.rdb
Acquisition Date	3/2/2016 10:10:37 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

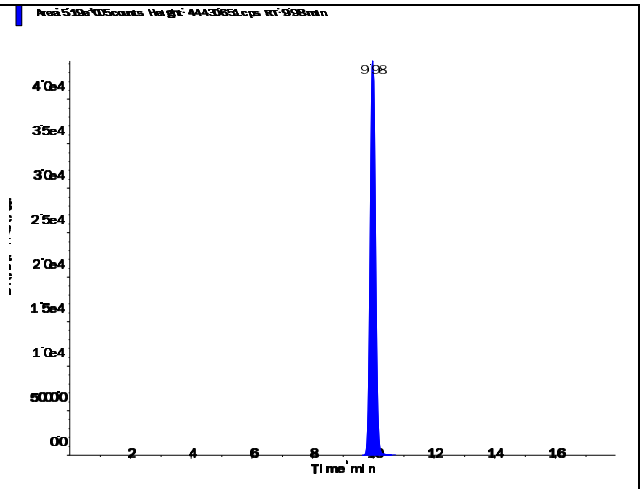
Sample Name	WG559291-08 CCB	**Injection Vial**	51.00
Data File	LM33610.wiff	**Injection Volume**	10.00
Acquisition Date	3/2/2016 10:10:37 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	030216_WTD.rdb
Sample ID	WG559291-08	**Dilution Factor**	1.00
Sample Comment	11.00	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	5.190e+05	9.98	5.00	-

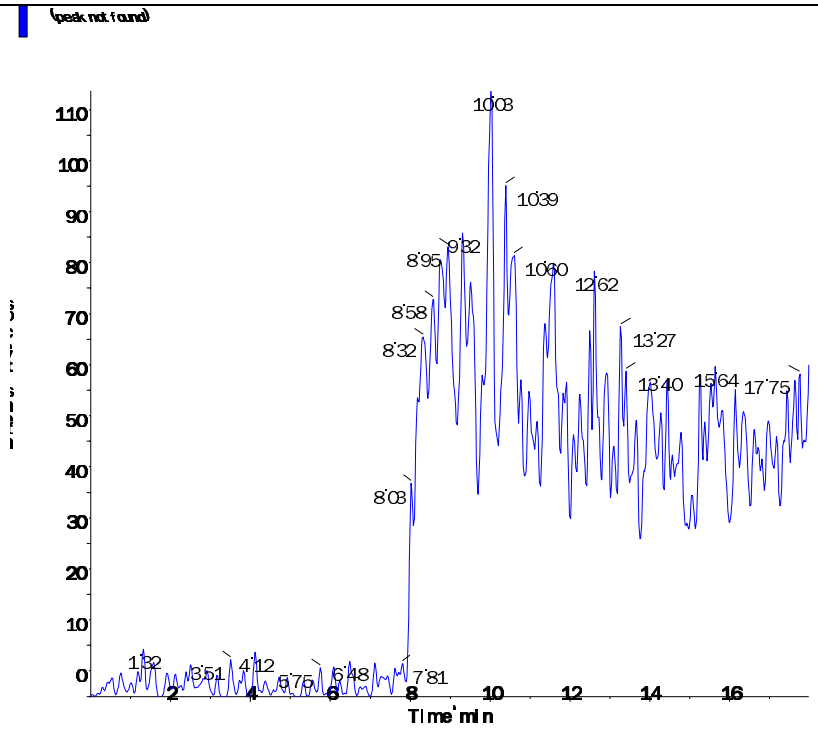
Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	0.000e+00	0.00	N/A	No Peak
Perchlorate conf	9.590e+02	10.00	N/A	0.0025

O18LP (Internal Standard)

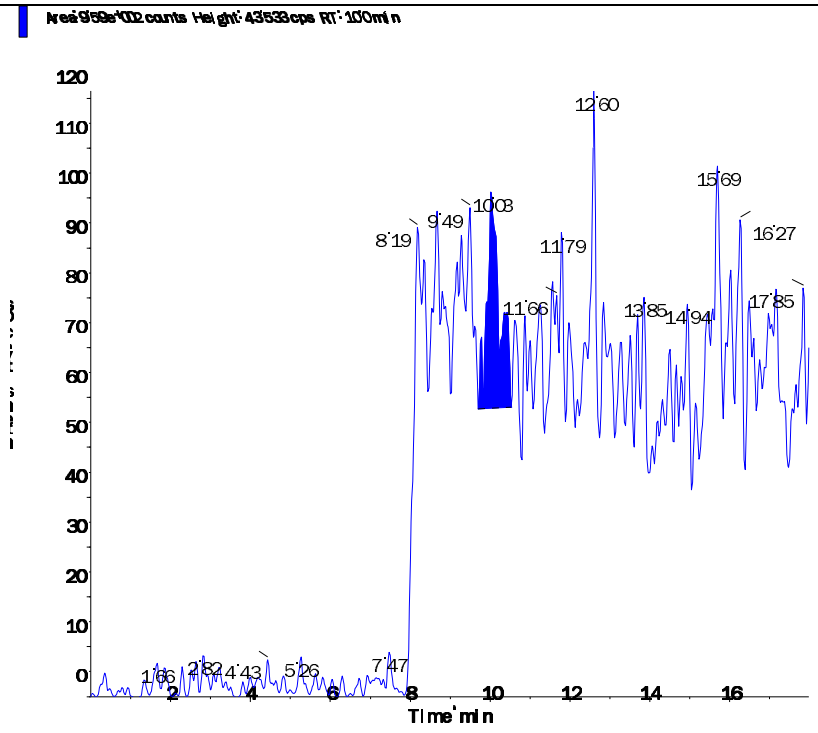
RT (Exp. RT): 9.98(9.94) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	 0.00 (9.94) min No Peak ng/ml 0.00 (Unknown)



Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	 10.00 (9.92) min 0.0025 ng/ml 0.002 (Unknown)



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Data File	LM33624.wiff	**Result Table**	030216_WTD.rdb
Acquisition Date	3/3/2016 2:35:46 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

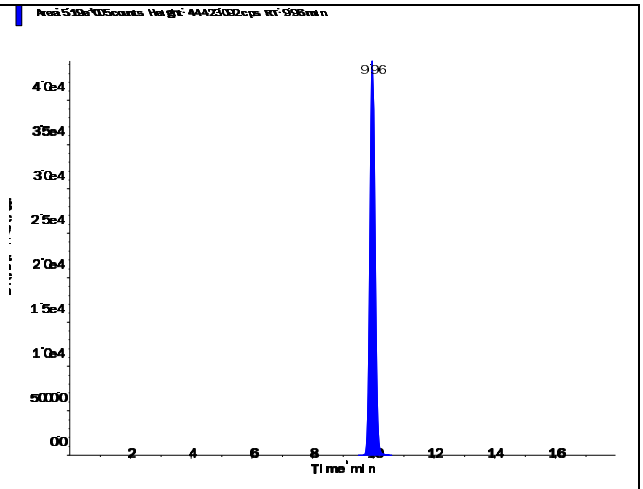
Sample Name	WG559291-10 CCB	**Injection Vial**	51.00
Data File	LM33624.wiff	**Injection Volume**	10.00
Acquisition Date	3/3/2016 2:35:46 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	030216_WTD.rdb
Sample ID	WG559291-10	**Dilution Factor**	1.00
Sample Comment	11.00	**Weight to Volume**	0.00

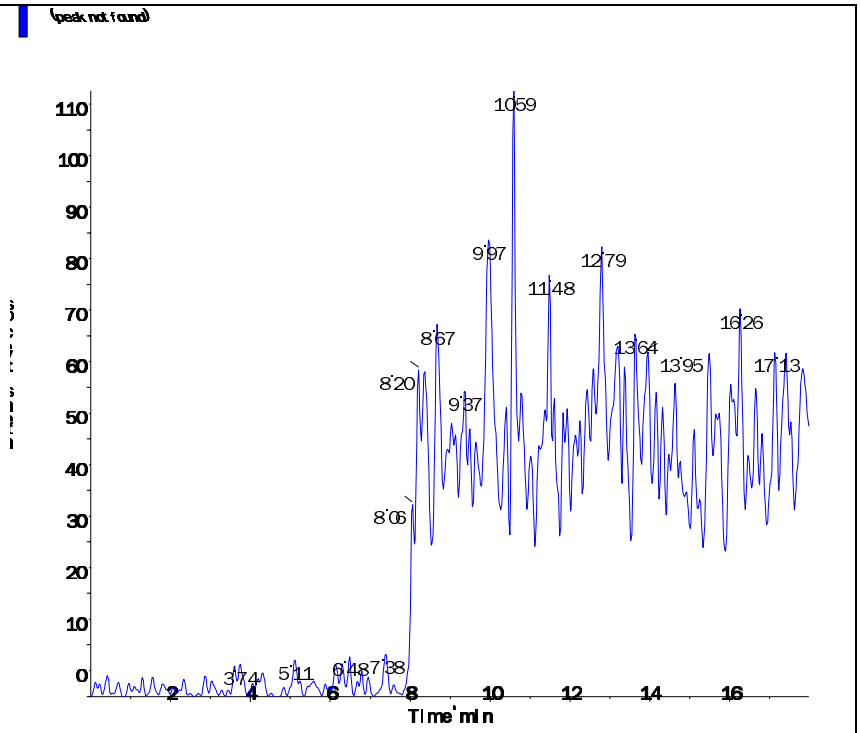
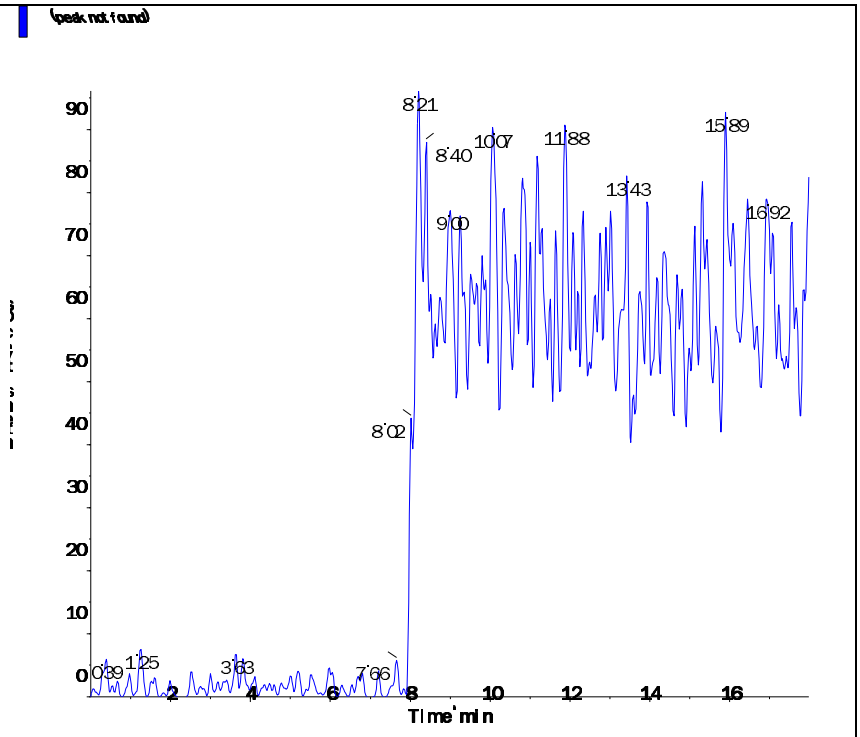
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	5.190e+05	9.96	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	0.000e+00	0.00	N/A	No Peak
Perchlorate conf	0.000e+00	0.00	N/A	No Peak

O18LP (Internal Standard)

RT (Exp. RT): 9.96(9.94) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 0.00 (9.94) min Calculated conc: No Peak ng/ml Area Ratio: 0.00 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 0.00 (9.92) min Calculated conc: No Peak ng/ml Area Ratio: 0.00 Sample Type: (Unknown)	

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Data File	LM33637.wiff	**Result Table**	030216_WTD.rdb
Acquisition Date	3/3/2016 6:41:58 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

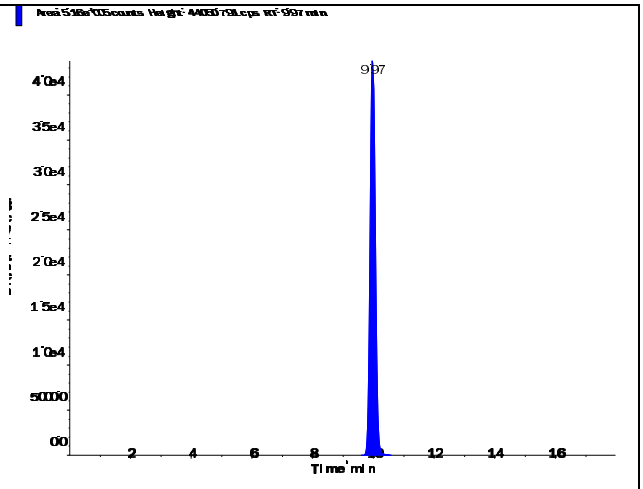
Sample Name	WG559291-12 CCB	**Injection Vial**	51.00
Data File	LM33637.wiff	**Injection Volume**	10.00
Acquisition Date	3/3/2016 6:41:58 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	030216_WTD.rdb
Sample ID	WG559291-12	**Dilution Factor**	1.00
Sample Comment	11.00	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	5.160e+05	9.97	5.00	-

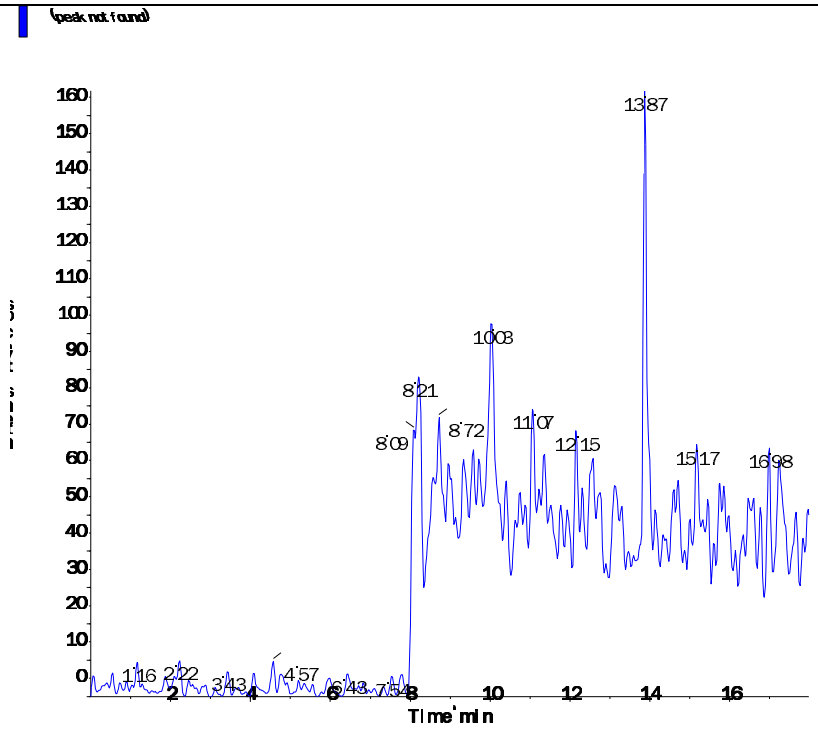
Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	0.000e+00	0.00	N/A	No Peak
Perchlorate conf	0.000e+00	0.00	N/A	No Peak

O18LP (Internal Standard)

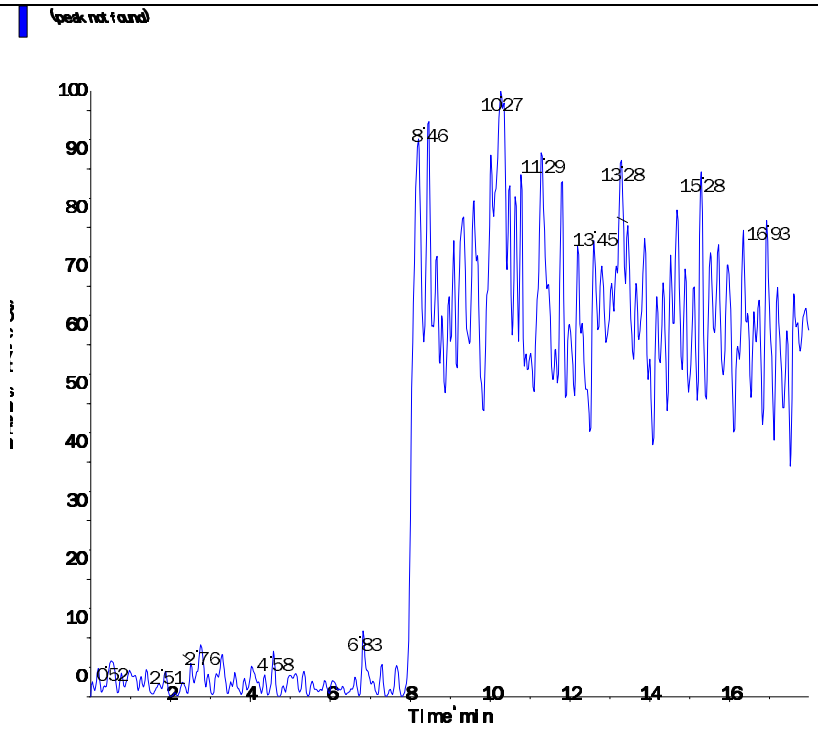
RT (Exp. RT): 9.97(9.94) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	0.00 (9.94) min No Peak ng/ml 0.00 (Unknown)



Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	0.00 (9.92) min No Peak ng/ml 0.00 (Unknown)



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Data File	LM33644.wiff	**Result Table**	030216_WTD.rdb
Acquisition Date	3/3/2016 8:54:31 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

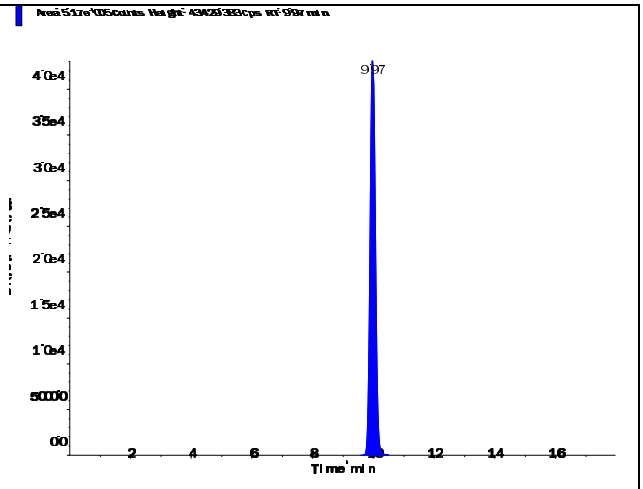
Sample Name	WG559291-14 CCB	**Injection Vial**	51.00
Data File	LM33644.wiff	**Injection Volume**	10.00
Acquisition Date	3/3/2016 8:54:31 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	030216_WTD.rdb
Sample ID	WG559291-14	**Dilution Factor**	1.00
Sample Comment	11.00	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	5.170e+05	9.97	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	0.000e+00	0.00	N/A	No Peak
Perchlorate conf	6.560e+02	9.95	N/A	< 0

O18LP (Internal Standard)

RT (Exp. RT): 9.97(9.94) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



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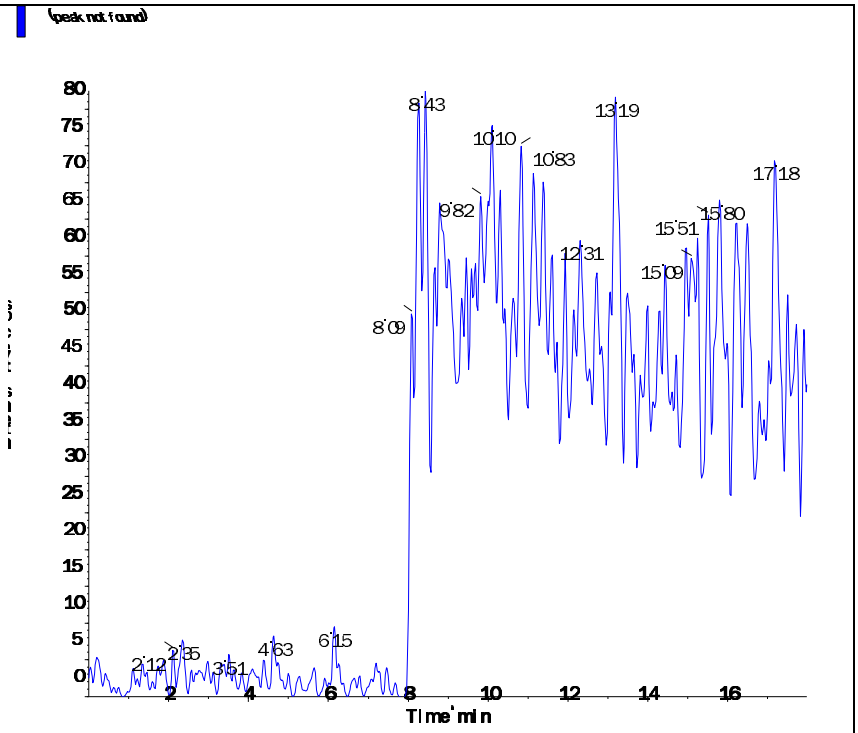
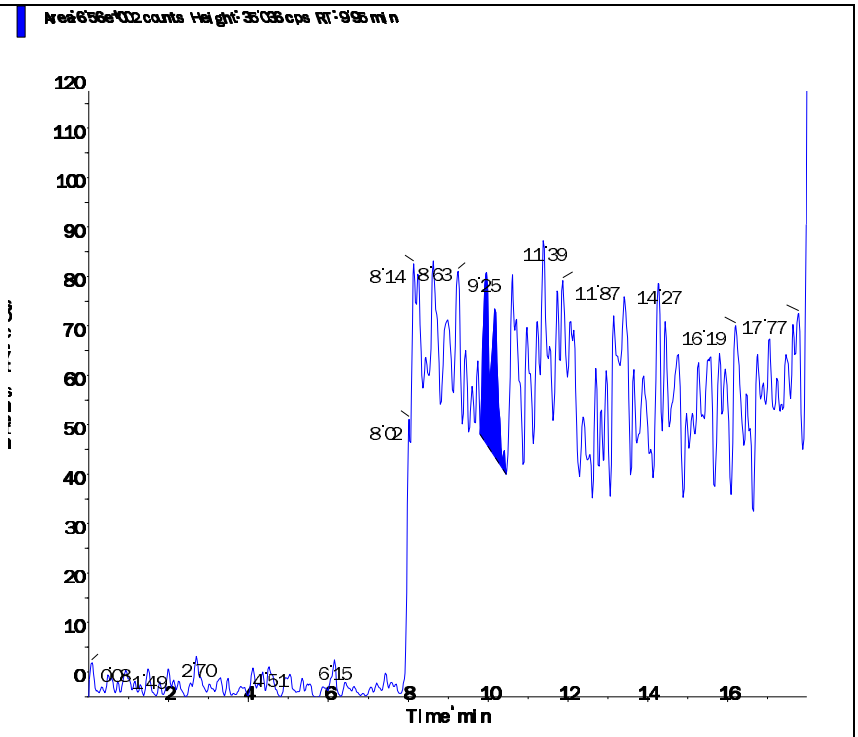
Created with Analyst Reporter
Printed: 3/3/2016 2:44 PM

Perchlorate (98.8/83.3 amu)	
RT (Exp. RT): 0.00 (9.94) min Calculated conc: No Peak ng/ml Area Ratio: 0.00 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu)	
RT (Exp. RT): 9.95 (9.92) min Calculated conc: < 0 ng/ml Area Ratio: 0.001 Sample Type: (Unknown)	

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Created with Analyst Reporter
Printed: 3/3/2016 2:47 PM

Data File	LM33653.wiff	**Result Table**	030216_WTD.rdb
Acquisition Date	3/3/2016 11:44:54 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

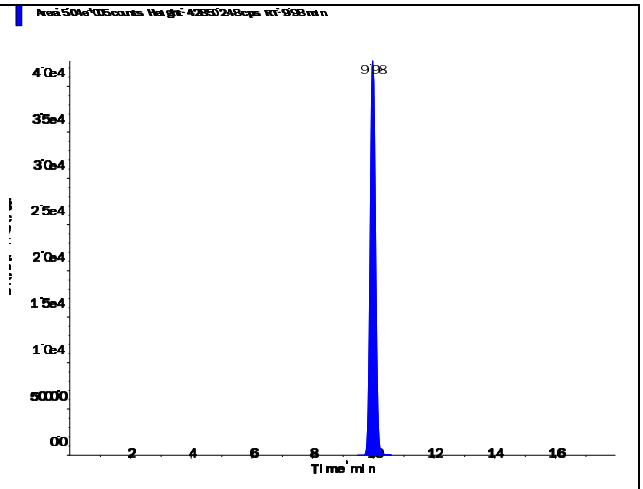
Sample Name	WG559291-16 CCB	**Injection Vial**	51.00
Data File	LM33653.wiff	**Injection Volume**	10.00
Acquisition Date	3/3/2016 11:44:54 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	030216_WTD.rdb
Sample ID	WG559291-16	**Dilution Factor**	1.00
Sample Comment	11.00	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	5.040e+05	9.98	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	0.000e+00	0.00	N/A	No Peak
Perchlorate conf	0.000e+00	0.00	N/A	No Peak

O18LP (Internal Standard)

RT (Exp. RT): 9.98(9.94) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



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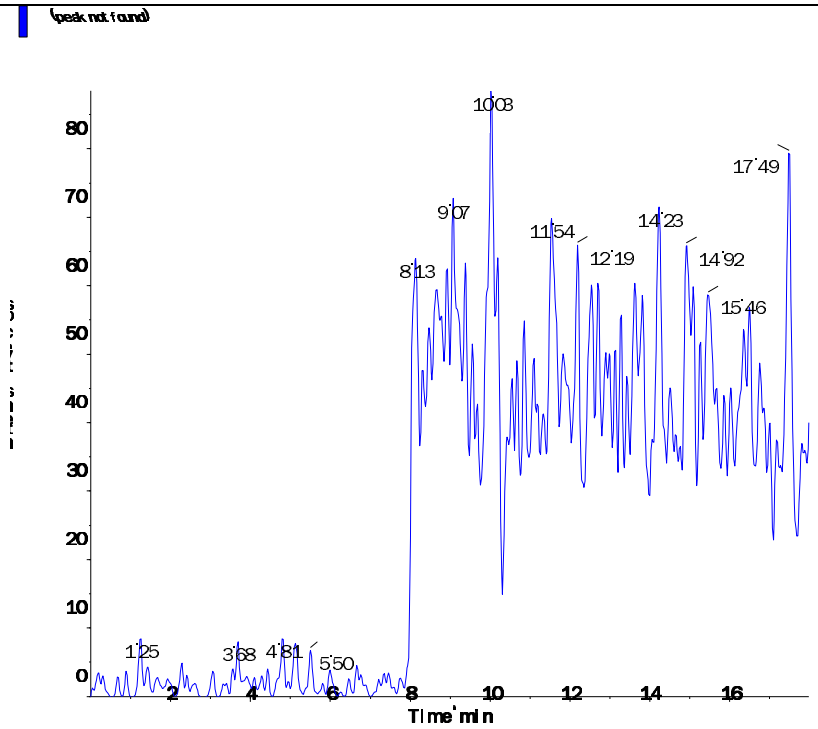
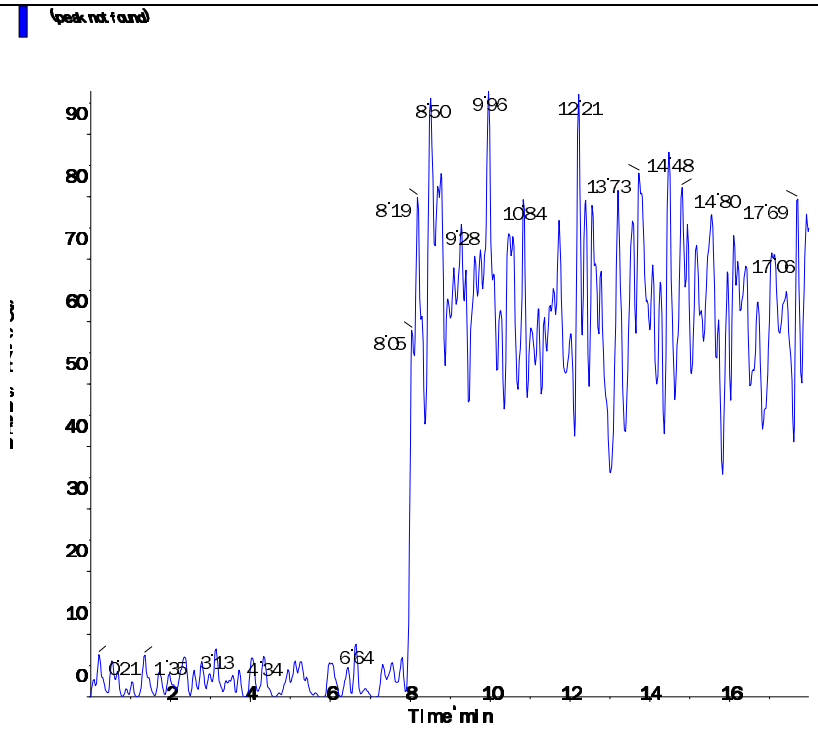
Created with Analyst Reporter
Printed: 3/3/2016 2:47 PM

Perchlorate (98.8/83.3 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	 0.00 (9.94) min No Peak ng/ml 0.00 (Unknown)



Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	 0.00 (9.92) min No Peak ng/ml 0.00 (Unknown)



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Created with Analyst Reporter
Printed: 3/3/2016 2:34 PM

Data File	LM33612.wiff	**Result Table**	030216_WTD.rdb
Acquisition Date	3/2/2016 10:48:29 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

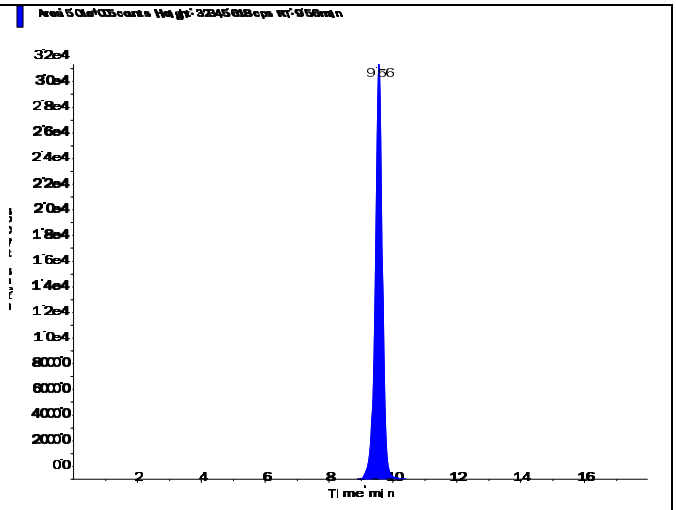
Sample Name	WG559292-01 MCT (0.2ug/L)	**Injection Vial**	26.00
Data File	LM33612.wiff	**Injection Volume**	10.00
Acquisition Date	3/2/2016 10:48:29 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	030216_WTD.rdb
Sample ID	WG559292-01	**Dilution Factor**	1.00
Sample Comment	1,1 STD72685	**Weight to Volume**	0.00

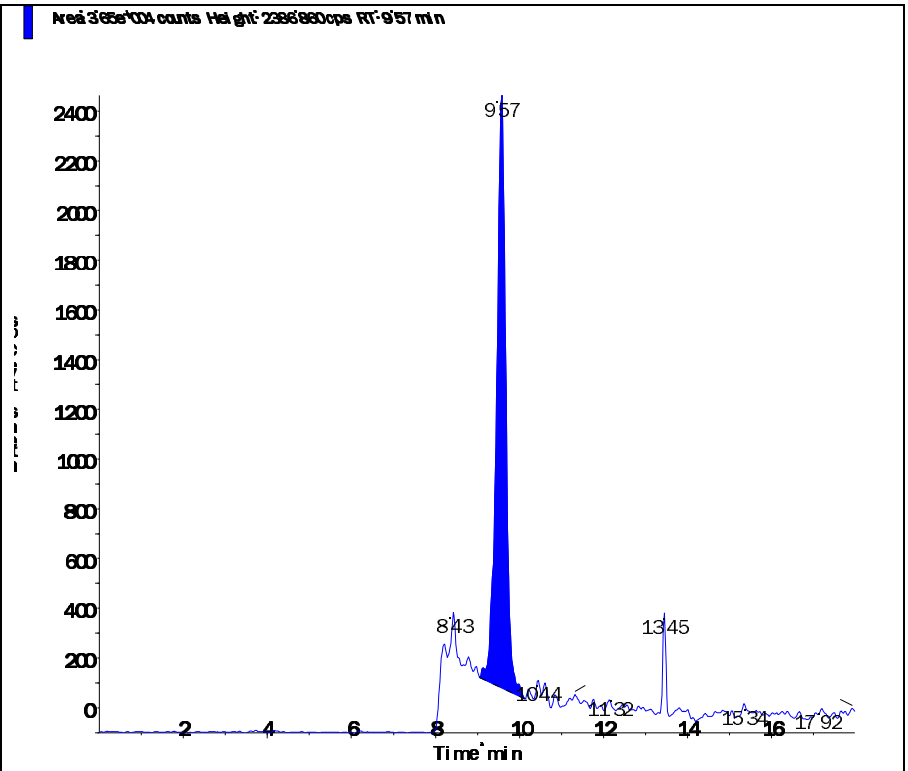
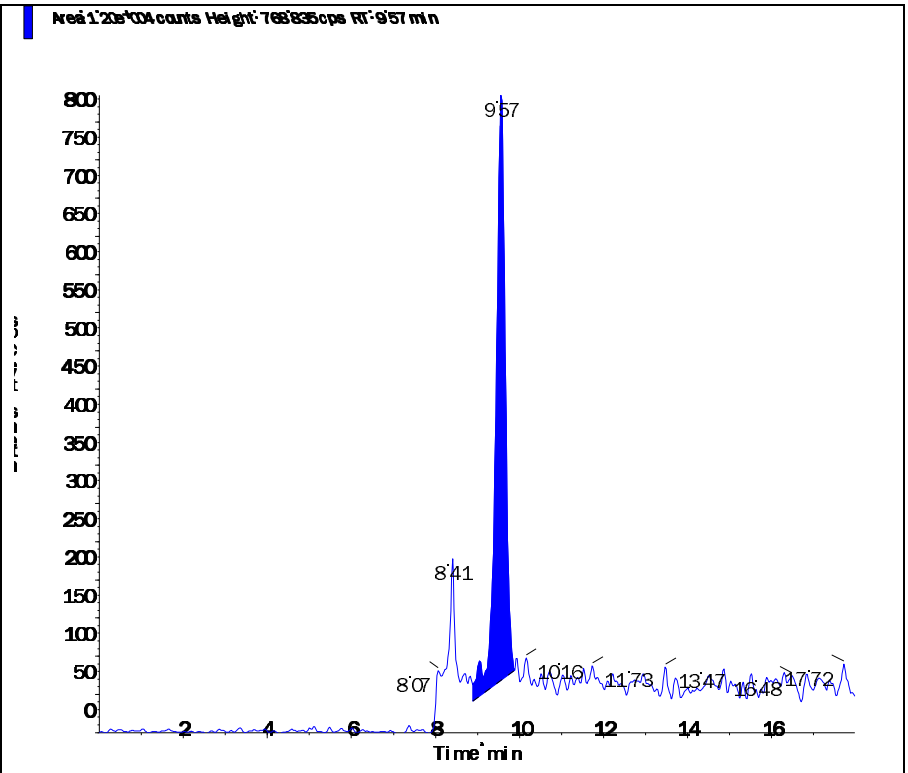
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	5.010e+05	9.56	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	3.650e+04	9.57	N/A	0.196
Perchlorate conf	1.200e+04	9.57	N/A	0.20

O18LP (Internal Standard)

RT (Exp. RT): 9.56(9.94) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.57 (9.94) min Calculated conc: 0.196 ng/ml Area Ratio: 0.073 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.57 (9.92) min Calculated conc: 0.20 ng/ml Area Ratio: 0.024 Sample Type: (Unknown)	

2.1.1.5 Raw QC Data

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Created with Analyst Reporter
Printed: 3/3/2016 2:34 PM

Data File	LM33613.wiff	**Result Table**	030216_WTD.rdb
Acquisition Date	3/2/2016 11:07:24 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

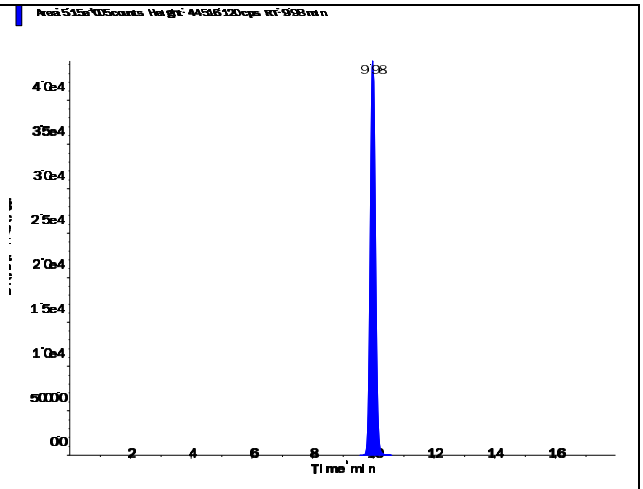
Sample Name	WG559292-02 BLANK	**Injection Vial**	27.00
Data File	LM33613.wiff	**Injection Volume**	10.00
Acquisition Date	3/2/2016 11:07:24 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	030216_WTD.rdb
Sample ID	WG559292-02	**Dilution Factor**	1.00
Sample Comment	11.00	**Weight to Volume**	0.00

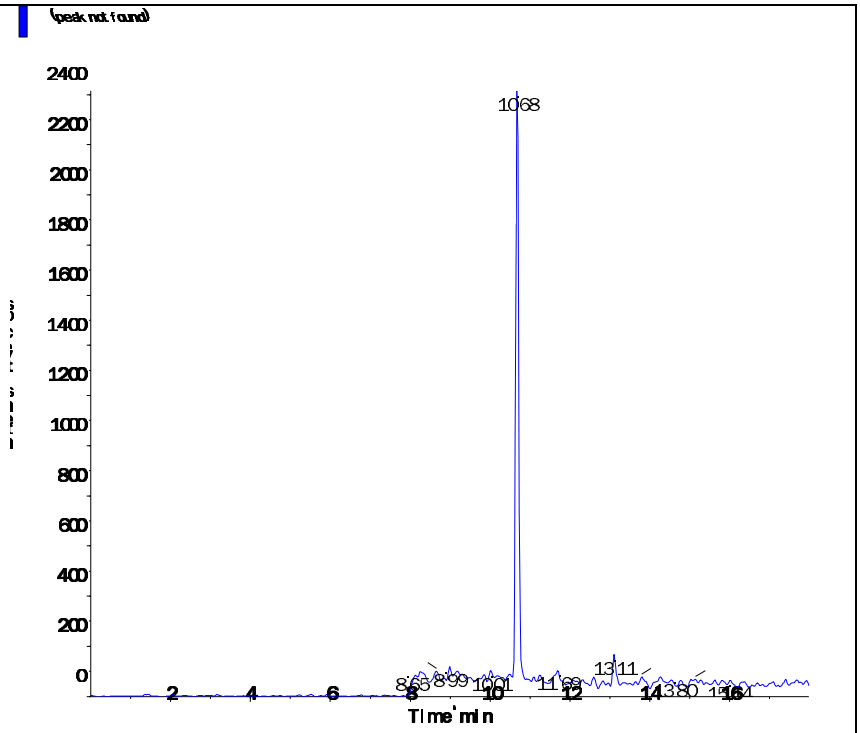
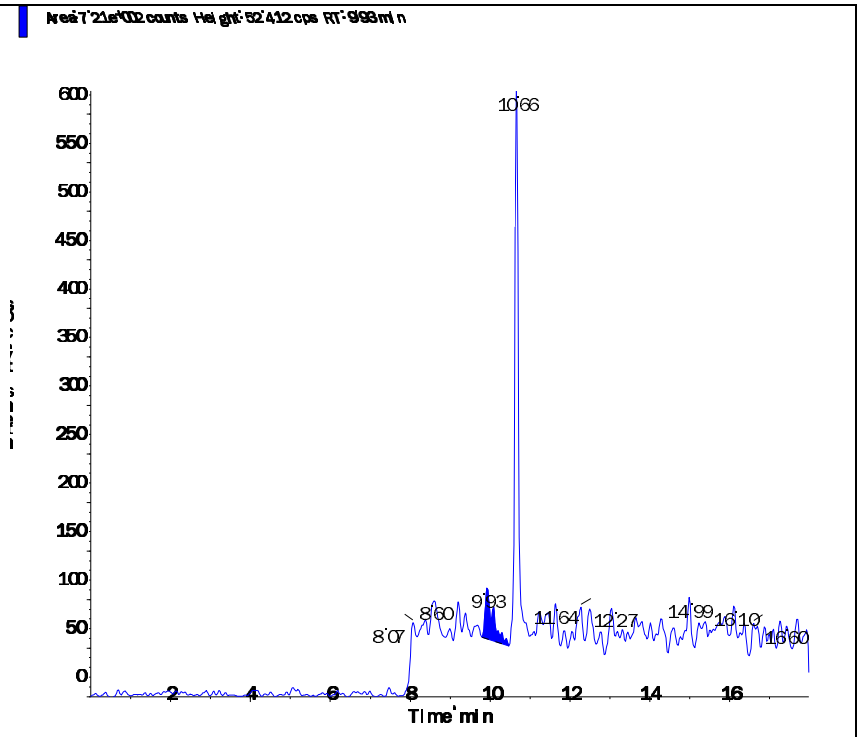
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	5.150e+05	9.98	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	0.000e+00	0.00	N/A	No Peak
Perchlorate conf	7.210e+02	9.93	N/A	< 0

O18LP (Internal Standard)

RT (Exp. RT): 9.98(9.94) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 0.00 (9.94) min Calculated conc: No Peak ng/ml Area Ratio: 0.00 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.93 (9.92) min Calculated conc: < 0 ng/ml Area Ratio: 0.001 Sample Type: (Unknown)	

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Created with Analyst Reporter
Printed: 3/3/2016 2:34 PM

Data File	LM33614.wiff	**Result Table**	030216_WTD.rdb
Acquisition Date	3/2/2016 11:26:22 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

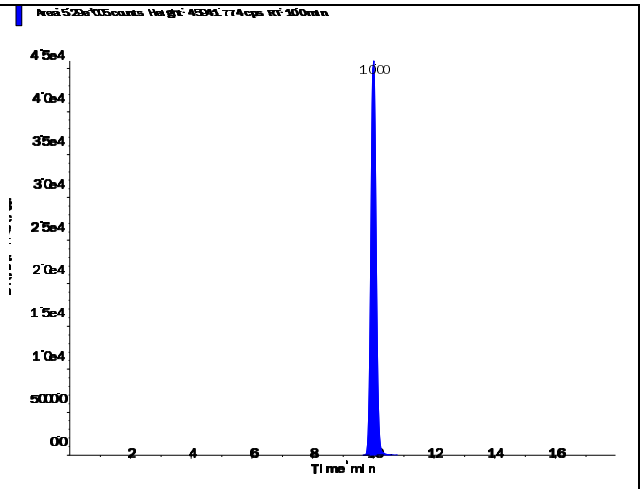
Sample Name	WG559292-03 LCS (0.2ug/L)	**Injection Vial**	28.00
Data File	LM33614.wiff	**Injection Volume**	10.00
Acquisition Date	3/2/2016 11:26:22 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	030216_WTD.rdb
Sample ID	WG559292-03	**Dilution Factor**	1.00
Sample Comment	1,1 STD72685	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	5.290e+05	10.00	5.00	-

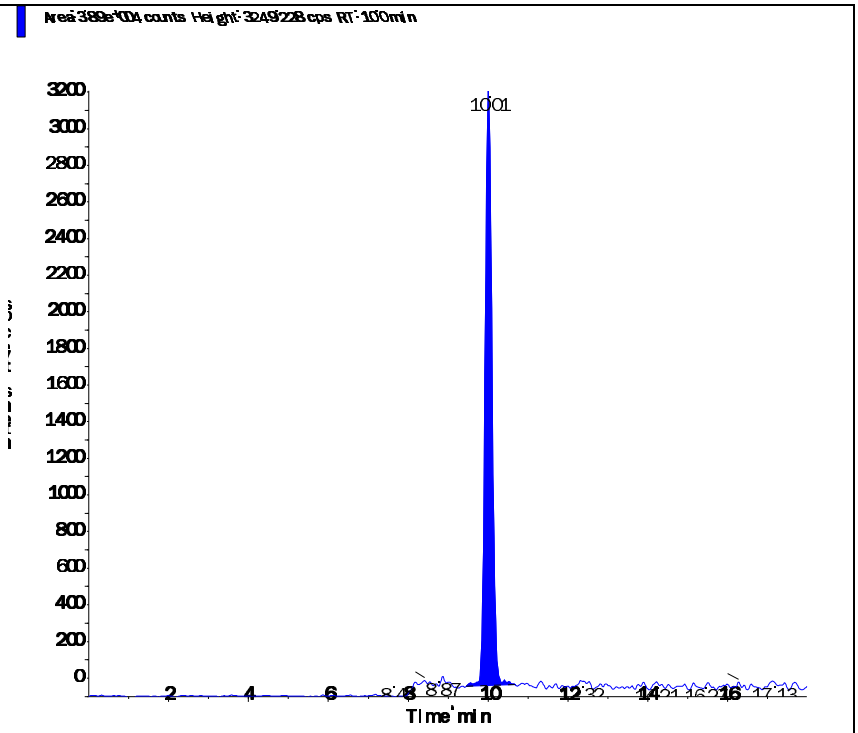
Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	3.890e+04	10.00	N/A	0.198
Perchlorate conf	1.200e+04	9.99	N/A	0.187

O18LP (Internal Standard)

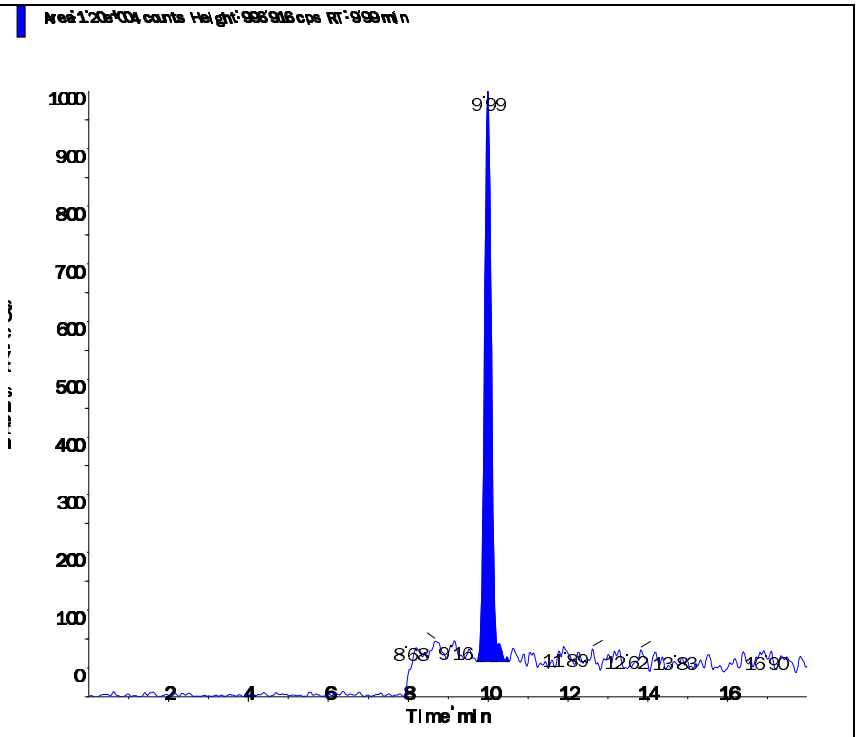
RT (Exp. RT): 10.00(9.94) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	 10.00 (9.94) min 0.198 ng/ml 0.074 (Unknown)



Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	 9.99 (9.92) min 0.187 ng/ml 0.023 (Unknown)



3.0 Attachments

Microbac Laboratories Inc.
Ohio Valley Division Analyst List
March 7, 2016

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001 – BIO-CHEM TESTING WVDEP 220	002 – REIC Consultants, Inc. WVDEP 060
003 – Sturm Environmental	004 – MICROBAC PITTSBURGH
005 – ES LABORATORIES	006 – ALCOSAN LABORATORIES
007 – ALS LABORATORIES	008 – BENCHMARK LABORATORIES
010 – MICROBAC CHICAGOLAND	AC – AMBER R. CARMICHAEL
ADC – ANTHONY D. CANTER	ADG – APRIL D. GREENE
AED – ALLEN E. DAVIS	ALS – ADRIANE L. STEED
AWE – ANDREW W. ESSIG	AZH – AFTER HOURS
BJO – BRIAN J. OGDEN	BKT – BRENDAN TORRENCE
BLG – BRENDA L. GREENWALT	BRG – BRENDA R. GREGORY
CAA – CASSIE A. AUGENSTEIN	CAF – CHERYL A. FLOWERS
CEB – CHAD E. BARNES	CJR – COURTNEY J. REXROAD
CLC – CHRYS L. CRAWFORD	CLS – CARA L. STRICKLER
CLW – CHARISSA L. WINTERS	CPD – CHAD P. DAVIS
CSH – CHRIS S. HILL	DAK – DEAN A. KETELSEN
DCM – DAVID C. MERCKLE	DEV – DAVID E. VANDENBERG
DIH – DEANNA I. HESSON	DLB – DAVID L. BUMGARNER
DLP – DOROTHY L. PAYNE	DLW – DIANA L. WRIGHT
DSM – DAVID S. MOSSOR	ECL – ERIC C. LAWSON
ENY – EMILY N. YOAK	ERP – ERIN R. PORTER
FJB – FRANCES J. BOLDEN	JBK – JEREMY B. KINNEY
JDH – JUSTIN D. HESSON	JDS – JARED D. SMITH
JJS – JOHN J. STE MARIE	JKP – JACQUELINE K. PARSONS
JLD – JESSICA L. DELONG	JLL – JOHN L. LENT
JMW – JEANA M. WHITE	JTP – JOSHUA T. PEMBERTON
JWR – JOHN W. RICHARDS	JWS – JACK W. SHEAVES
JYH – JI Y. HU	KAJ – KELLIE A. JOHNSON
KAT – KATHY A. TUCKER	KDW – KATHRYN D. WELCH
KEB – KATIE E. BARNES	KHR – KIM H. RHODES
KKB – KERRI K. BUCK	KRA – KATHY R. ALBERTSON
KRB – KAELY R. BECKER	KRP – KATHY R. PARSONS
LEC – LAURA E. CARPENTER	LKN – LINDA K. NEDEFF
LLS – LARRY L. STEPHENS	LSB – LESLIE S. BUCINA
MBK – MORGAN B. KNOWLTON	MDA – MIKE D. ALBERTSON
MDC – MIKE D. COCHRAN	MES – MARY E. SCHILLING
MLB – MEGAN L. BACHE	MMB – MAREN M. BEERY
MRT – MICHELLE R. TAYLOR	MSW – MATT S. WILSON
PDM – PIERCE D. MORRIS	PIT – MICROBAC WARRENDALE
PRL – PAIGE R. LAMB	PSW – PEGGY S. WEBB
QX – QIN XU	RAH – ROY A. HALSTEAD
REK – BOB E. KYER	RLB – BOB BUCHANAN
RM – RAYMOND MALEKE	RNP – RICK N. PETTY
RST – ROBIN S. TURNER	SAV – SARAH A. VANDENBERG
SCB – SARAH C. BOGOLIN	SDC – SHALYN D. CONLEY
SLM – STEPHANIE L. MOSSBURG	SLP – SHERI L. PFALZGRAF
TB – TODD BOYLE	TGF – TIM G. FELTON
TMB – TIFFANY M. BAILEY	TMM – TAMMY M. MORRIS
VC – VICKI COLLIER	WJB – WILL J. BEASLEY
WRR – WESLEY R. RICHARDS	WTD – WADE T. DELONG
XXX – UNAVAILABLE OR SUBCONTRACT	

Microbac Laboratories Inc.
List of Valid Qualifiers
March 07, 2016

Qualkey: DOD

Qualifier	Description
*	Surrogate or spike compound out of range
+	Correlation coefficient for the MSA is less than 0.995
<	Result is less than the associated numerical value.
>	Greater than
A	See the report narrative
B	The reported result is associated with a contaminated method blank.
B,H1	Analyte present in method blank. Sample analysis performed past holding time.
B1	Target analyte detected in method blank at or above the method reporting limit
B3	Target analyte detected in calibration blank at or above the method reporting limit
B4	The BOD unseeded dilution water blank exceeded 0.2 mg/L
C	Confirmed by GC/MS
CG	Confluent growth
CT1	Cooler temperature at sample reciept exceeded regulatory limit.
DL	Surrogate or spike compound was diluted out
E	Estimated concentration due to sample matrix interference
E,CT1	Estimated results. The cooler temperature at receipt exceeded regulatory guidelines for requested testing.
EDL	Elevated sample reporting limits, presence of non-target analytes
EMPC	Estimated Maximum Possible Concentration
F, S	Estimated result below quantitation limit; method of standard additions(MSA)
F,CT1	Estimated value; the analyte concentration was less than the RL/LOQ. The cooler temperature at receipt exceeded regula
FL	Free Liquid
FP1	Did not ignite.
H1	Sample analysis performed past holding time.
H1,CT1	Sample analysis performed past holding time. The cooler temperature at receipt exceeded regulatory guidelines for reque
I	Semiquantitative result (out of instrument calibration range)
J	Estimated concentration; sample matrix interference.
J	Estimated value ; the analyte concentration was greater than the highest standard
J	Estimated value ; the analyte concentration was less than the LOQ.
J	The reported result is an estimated value.
J,B	Analyte detected in both the method blank and sample above the MDL.
J,CT1	Estimated value ; the analyte concentration was less than the LOQ. Cooler temperature at sample reciept exceeded regu
J,H1	Estimated value ; the analyte concentration was less than the LOQ. Sample analysis performed past holding time.
J,H1	The reported result is an estimated value. Sample was analyzed past holding time.
J,P	Estimate; columns don't agree to within 40%
J,S	Estimated concentration; analyzed by method of standard addition (MSA)
JB	The reported result is an estimated value. The reported result is also associated with a contaminated method blank.
JQ	The reported result is an estimated value and one or more quality control criteria failed. See narrative.
L	Sample reporting limits elevated due to matrix interference
L1	The associated blank spike (LCS) recovery was above the laboratory acceptance limits.
L2	The associated blank spike (LCS) recovery was below the laboratory acceptance limits.
M	Matrix effect; the concentration is an estimate due to matrix effect.
N	Nontarget analyte; the analyte is a tentativlely identified compound (TIC) by GC/MS
NA	Not applicable
ND	Not detected at or above the reporting limit (RL)
ND, B	Not detected at or above the reporting limit (RL). Analyte present in method blank.
ND, CT1	Analyte was not detected. The concentration is below the reported LOD. The cooler temperature at receipt exceeded reg
ND, L	Not detected; sample reporting limit (RL) elevated due to interference
ND, S	Not detected; analyzed by method of standard addition (MSA)
ND,H1	Not detected; Sample analysis performed past holding time.
ND,H1,CT1	Not detected; Sample analysis performed past holding time. The cooler temperature at receipt exceeded regulatory guide
NF	Not found by library search
NFL	No free liquid
NI	Non-ignitable
NR	Analyte is not required to be analyzed
NS	Not spiked
P	Concentrations >40% difference between the two GC columns
Q	One or more quality control criteria failed. See narrative.
Q,H1	One or more quality control criteria failed. Sample analyzed past holding time. See narrative.
QNS	Quantity of sample not sufficient to perform analysis
RA	Reanalysis confirms reported results
RE	Reanalysis confirms sample matrix interference
S	Analyzed by method of standard addition (MSA)
SMI	Sample matrix interference on surrogate
SP	Reported results are for spike compounds only
T5	Laboratory not licensed for this parameter
TIC	Library Search Compound
TNTC	Too numerous to count

Microbac Laboratories Inc.
List of Valid Qualifiers
March 07, 2016

Qualkey: DOD

TNTC, B	Too numerous to count. Analyte present in method blank.
TNTC,CT1	Too numerous to count. The cooler temperature at receipt exceeded regulatory guidelines for requested testing.
TNTC,H1	Too numerous to count. Sample analysis performed past holding time.
U	Analyte was not detected. The concentration is below the reported LOD.
U,CT1	Analyte was not detected. The concentration is below the reported LOD. Cooler temperature at sample reciept exceeded
U,H1	Not detected; Sample analysis performed past holding time.
UJ	Undetected; the MDL and RL are estimated due to quality control discrepancies.
UQ	Undetected; the analyte was analyzed for, but not detected.
W	Post-digestion spike for furnace AA out of control limits
X	Exceeds regulatory limit
X, S	Exceeds regulatory limit; method of standard additions (MSA)
Z	Cannot be resolved from isomer - see below

AECOM

Chain of Custody Record

COC Number:

Laboratory:	Microbac POC: Stephanie Mossburg	**Project Manager:**	Debra Richmann
Address:	158 Starlite Drive	**Phone/Fax Number:**	210-296-2000
	Marietta, OH 45750	**Sampler (print):**	Scott Beesinger
Phone:	1-800-373-4071		
Client:	AECOM	**Signature:**	Scott Beesinger
Address:	112 East Pecan Ste. 400		
	San Antonio, TX 78205		
Turn Around Time:	STANDARD	**pH:**	
Project Name/Location:	Longhorn		
Project Number:	60256135.0009AA		

Mail to: Linda Raabe, 112 East Pecan STE. 400, San Antonio, TX 78205, 210-296-2000

Fed Ex Airbill No:

Program:

ERPIMS REQUIRED FIELDS

Site Name	Sample ID/Location ID	SBD	SED	Date	Time	Comp-	Grab	Matrix	Number of Containers	Perchlorate	SA CODE	Cooler ID	LOT CONTROL NUMBERS ABLOT	EBLOT	TBLOT
Harrison Bayou & Goose Prarie Creek	HBW 7 - 022516			2/25/16	12:40		X	W	1	X					
	HBW 10 - 022516			2/25/16	12:50		X	W	1	X					
	HBW 1 - 022516			2/25/16	13:05		X	W	1	X					
	GPW 3 - 022516			2/25/16	13:20		X	W	1	X					
	GPW 1 - 022516			2/25/16	13:40		X	W	1	X					

Comments: STANDARD TAT

Relinquished by: (Signature) Scott Beesinger	Date 2/25/16	Time 1500	Received by: (Signature)	Received by: (Signature)	Date	Time	Relinquished by: (Signature)
Relinquished by: (Signature)	Date	Time	Microbac OVD Received: 02/26/2016 09:41 By: BRENDA GREGORY 221000082487		Time		Remarks:

•Homogenize all composite samples prior to analysis

Manager, Pink QA/QC Manager

Brenda Gregory

00840265

Microbac Laboratories Inc.

Internal Chain of Custody Report

Login: L16021328
Account: 2551
Project: 2551.096
Samples: 5
Due Date: 08-MAR-2016

Samplenum	Container ID	Products
L16021328-01	706280	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	26-FEB-2016 13:07	CLS		
2	ANALYZ	W1	SEM	01-MAR-2016 14:10	ADC	BRG	
3	STORE	SEM	A1	02-MAR-2016 12:48	BRG	ADC	

Samplenum	Container ID	Products
L16021328-02	706281	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	26-FEB-2016 13:07	CLS		
2	ANALYZ	W1	SEM	01-MAR-2016 14:10	ADC	BRG	
3	STORE	SEM	A1	02-MAR-2016 12:48	BRG	ADC	

Samplenum	Container ID	Products
L16021328-03	706282	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	26-FEB-2016 13:07	CLS		
2	ANALYZ	W1	SEM	01-MAR-2016 14:10	ADC	BRG	
3	STORE	SEM	A1	02-MAR-2016 12:48	BRG	ADC	

Samplenum	Container ID	Products
L16021328-04	706283	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	26-FEB-2016 13:07	CLS		
2	ANALYZ	W1	SEM	01-MAR-2016 14:10	ADC	BRG	
3	STORE	SEM	A1	02-MAR-2016 12:48	BRG	ADC	

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login

Microbac Laboratories Inc.

Internal Chain of Custody Report

Login: L16021328
Account: 2551
Project: 2551.096
Samples: 5
Due Date: 08-MAR-2016

Samplenum	Container ID	Products
L16021328-05	706284	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	26-FEB-2016 13:07	CLS		
2	ANALYZ	W1	SEM	01-MAR-2016 14:10	ADC	BRG	
3	STORE	SEM	A1	02-MAR-2016 12:48	BRG	ADC	

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login

NELAP Addendum - January 4, 2016

Non-NELAP LIMS Product and Description

The following is a list of those tests that are not included in the Microbac – OVD NELAP Scope of Accreditation:

Heat of Combustion (BTU)
Total Halide by Bomb Combustion (TX)
Particle Sizing - 200 Mesh (PS200)
Specific Gravity/Density (SPGRAV)
Total Residual Chlorine (CL-TRL)
Total Volatile Solids (all forms) (TVS)
Total Coliform Bacteria (all methods)
Fecal Coliform Bacteria (all methods)
Sulfite (SO3)
Propionaldehyde (HPLC-UV)

SOLID AND HAZARDOUS CHEMICALS
Nitrogen, Ammonia by Method 350.1
Chromium, Hexavalent, Leachable by SM3500 Cr-B 2009
Phenolics, Total by Method 420.1
ASTM D3987-06

NELAP Accreditation by Laboratory SOP

NONPOTABLE WATER

OVD HPLC02/HPLC-UV

Nitroglycerin
Acetic acid
Butyric acid
Lactic acid
Propionic acid
Pyruvic acid

OVD MSS01/GC-MS

1,4-Phenylenediamine
1-Methylnaphthalene
1,4-Dioxane
Atrazine
Benzaldehyde
Biphenyl
Caprolactam
Hexamethylphosphoramide (HMPA)
Pentachlorobenzene
Pentachloroethane

NELAP Accreditation by Laboratory SOP

NONPOTABLE WATER

OVD MSV01/GC-MS

1, 1, 2-Trichloro-1,2,2-trifluoroethane
1,3-Butadiene
Cyclohexane
Cyclohexanone
Dimethyl disulfide
Dimethylsulfide
Ethyl-t-butylether (ETBE)
Isoprene
Methylacetate
Methylcyclohexane
T-amylmethylether (TAME)
Tetrahydrofuran (THF)

OVD HPLC07/HPLC-MS-MS

Hexamethylphosphoramide (XMPA-LCMS)

OVD HPLC12/HPLC/UV

Acetate
Formate

OVD RSK01/GC-FID

Acetylene
Propane

OVD K9305/ISE

Fluoroborate

SOLID AND HAZARDOUS CHEMICALS

OVD MSS0I/GC-MS

1-Methylnaphthalene
Benzaldehyde
Biphenyl
Caprolactam
Pentachloroethane

NELAP Accreditation by Laboratory SOP

SOLID AND HAZARDOUS CHEMICALS

OVD MSV0I/GC-MS

1.3-Butadiene
Cyclohexane
Cyclohexanone
Dimethyl disulfide
Dimethylsulfide
Ethyl-t-butylether (ETBE)
Isoprene
Methylacetate
Methylcyclohexane
n-Hexane
T-amylmethylether (TAME)

Microbac

Laboratory Report Number: L16051583

Kayla Teague
AECOM Technical Services, Inc.
16000 Dallas Parkway
Dallas, TX 75248

Please find enclosed the analytical results for the samples you submitted to Microbac Laboratories. Review and compilation of your report was completed by Microbac's Ohio Valley Division (OVD). If you have any questions, comments, or require further assistance regarding this report, please contact your service representative listed below.

Laboratory Contact:
Michelle Taylor – Client Services Specialist
(740) 373-4071
Michelle.Taylor@microbac.com

I certify that all test results meet all of the requirements of the DoD QSM and other applicable contract terms and conditions. Any exceptions are attached to this cover page or addressed in the method narratives presented in the report. All results for soil samples are reported on a 'dry-weight' basis unless specified otherwise. Analytical results for water and wastes are reported on a 'as received' basis unless specified otherwise. A statement of uncertainty for each analysis is available upon request. This laboratory report shall not be reproduced, except in full, without the written approval of Microbac Laboratories, DoD ELAP certification number 2936.01. The reported results are related only to the samples analyzed as received.

This report was certified on June 03 2016

David Vandenberg – Managing Director

State of Origin: TX
Accrediting Authority: Texas Commission on Environmental Quality ID:T104704252-07-TX
QAPP: DOD Ver 4.1

Microbac

Lab Report #: L16051583
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Michelle Taylor

Record of Sample Receipt and Inspection

Comments/Discrepancies

This is the record of the shipment conditions and the inspection records for the samples received and reported as a sample delivery group (SDG). All of the samples were inspected and observed to conform to our receipt policies, except as noted below.

The following discrepancies were noted:

Discrepancy	Resolution
HBW 1 - 022516 on COC but the label has HBW 1 - 052716. CLS	Please log per the COC. SLM

Coolers

Cooler #	Temperature Gun	Temperature	COC #	Airbill #	Temp Required?
00113835	H	3.0		J2317165161	X

Inspection Checklist

#	Question	Result
1	Were shipping coolers sealed?	Yes
2	Were custody seals intact?	Yes
3	Were cooler temperatures in range of 0-6?	Yes
4	Was ice present?	Yes
5	Were COC's received/information complete/signed and dated?	Yes
6	Were sample containers intact and match COC?	Yes
7	Were sample labels intact and match COC?	No
8	Were the correct containers and volumes received?	Yes
9	Were samples received within EPA hold times?	Yes
10	All samples were checked for pH and met the standard. Exceptions are noted above under discrepancy. (water only)	Yes
11	Were pH ranges acceptable? (voa's excluded)	NA
12	Were VOA samples free of headspace (less than 6mm)?	NA

Microbac

Lab Report #: L16051583
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Michelle Taylor

Samples Received

Client ID	Laboratory ID	Date Collected	Date Received
GPW 1 - 052716	L16051583-01	05/27/2016 08:50	05/28/2016 11:36
GPW 3 - 052716	L16051583-02	05/27/2016 09:05	05/28/2016 11:36
HBW 1 - 022516	L16051583-03	05/27/2016 09:20	05/28/2016 11:36
HBW 10 - 052716	L16051583-04	05/27/2016 09:33	05/28/2016 11:36
HBW 7 - 052716	L16051583-05	05/27/2016 09:50	05/28/2016 11:36

Microbac REPORT L16051583
PREPARED FOR AECOM Technical Services, Inc.
WORK ID:

1.0 Summary Data 5
1.1 Narratives 6
1.2 Certificate of Analysis 13
2.0 Full Sample Data Package 18
2.1 General Chromatography Data 19
2.1.1 6850 LC/MS Data 20
2.1.1.1 Summary Data 21
2.1.1.2 QC Summary Data 26
2.1.1.3 Sample Data 73
2.1.1.4 Standards Data 84
2.1.1.5 Raw QC Data 119
3.0 Attachments 126

1.0 Summary Data

1.1 Narratives

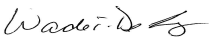
Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L16051583
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG570932	**Reviewer Name:**	Wade DeLong
LRC Date:	2016-06-02 00:00:00		

Laboratory Data Package Cover Page

	R1	Field chain-of-custody documentation;
	R2	Sample identification cross-reference;
	R3	Test reports (analytical data sheets) for each environmental sample that includes: (a) Items consistent with NELAC Chapter 5, (b) dilution factors, (c) preparation methods, (d) cleanup methods, and (e) a.if required for the project, tentatively identified compounds (TICs).
	R4	Surrogate recovery data including: (a) Calculated recovery (%R), and (b) the laboratory's surrogate QC limits.
	R5	Test reports/summary forms for blank samples;
	R6	Test reports/summary forms for laboratory control samples (LCSs) including: (a) LCS spiking amounts, (b) calculated %R for each analyte, and (c) the laboratory's LCS QC limits.
	R7	Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including: (a) samples associated with the MS/MSD clearly identified, (b) MS/MSD spiking compounds, (c) concentration of each MS/MSD analyte measured in the parent and spiked samples, (d) calculated %Rs and relative percent differences (RPDs), and (e) the laboratory's MS/MSD QC limits.
	R8	Laboratory analytical duplicate (if applicable) recovery and precision: (a) the amount of analyte measured in the duplicate, (b) the calculated RPD, and (c) the laboratory's QC limits for analytical duplicates.
	R9	List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
	R10	Other problems or anomalies.

Name (Printed)	Signature	Official Title (Printed)	Date
Wade DeLong		Chemist I	2016-06-02 20:26:04

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L16051583
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG570932	**Reviewer Name:**	Wade DeLong
LRC Date:	2016-06-02 00:00:00		

Description	Yes	No	NA	NR	ER#
Chain-of-custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
Were all departures from standard conditions described in an exception report?	X				
Sample and quality control (QC) identification	X				
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
Test reports					
Were all samples prepared and analyzed within holding times?	X				
Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
Were calculations checked by a peer or supervisor?	X				
Were all analyte identifications checked by a peer or supervisor?	X				
Were sample detection limits reported for all analytes not detected?	X				
Were all results for soil and sediment samples reported on a dry weight basis?			X		
Were % moisture (or solids) reported for all soil and sediment samples?			X		
Were bulk soils/solids samples for volatile analysis extracted with methanol per SW846 Method 5035?			X		
If required for the project, are TICs reported?			X		
Surrogate recovery data					
Were surrogates added prior to extraction?			X		
Were surrogate percent recoveries in all samples within the laboratory QC limits?			X		
Test reports/summary forms for blank samples	X				
Were appropriate type(s) of blanks analyzed?	X				
Were blanks analyzed at the appropriate frequency?	X				
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
Were blank concentrations < MQL?	X				
Laboratory control samples (LCS):					
Were all COCs included in the LCS?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L16051583
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG570932	**Reviewer Name:**	Wade DeLong
LRC Date:	2016-06-02 00:00:00		

Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
Were LCSs analyzed at the required frequency?	X				
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
Does the detectability check sample data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
Was the LCSD RPD within QC limits?	X				
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?			X		
Were MS/MSD analyzed at the appropriate frequency?			X		
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?			X		
Were MS/MSD RPDs within laboratory QC limits?			X		
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?			X		
Were analytical duplicates analyzed at the appropriate frequency?			X		
Were RPDs or relative standard deviations within the laboratory QC limits?			X		
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?	X				
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
Was applicable and available technology used to lower the SDL to minimize the matrix interference effects on the sample results?			X		
Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	X				
Initial calibration (ICAL)					
Were response factors and/or relative response factors for each analyte within QC limits?	X				
Were percent RSDs or correlation coefficient criteria met?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L16051583
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG570932	**Reviewer Name:**	Wade DeLong
LRC Date:	2016-06-02 00:00:00		

Was the number of standards recommended in the method used for all analytes?	X				
Were all points generated between the lowest and highest standard used to calculate the curve?	X				
Are ICAL data available for all instruments used?	X				
Has the initial calibration curve been verified using an appropriate second source standard?	X				
Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?	X				
Were percent differences for each analyte within the method-required QC limits?	X				
Was the ICAL curve verified for each analyte?	X				
Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	X				
Mass spectral tuning					
Was the appropriate compound for the method used for tuning?	X				
Were ion abundance data within the method-required QC limits?			X		
Internal standards (IS)					
Were IS area counts and retention times within the method-required QC limits?	X				
Raw data (NELAC Section 5.5.10)					
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
Were data associated with manual integrations flagged on the raw data?			X		
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			X		
Tentatively identified compounds (TICs)					
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
Interference Check Sample (ICS) results					
Were percent recoveries within method QC limits?	X				
Serial dilutions, post digestion spikes, and method of standard additions					
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?	X				
Method detection limit (MDL) studies					

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L16051583
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG570932	**Reviewer Name:**	Wade DeLong
LRC Date:	2016-06-02 00:00:00		

Was a MDL study performed for each reported analyte?	X				
Is the MDL either adjusted or supported by the analysis of DCSs?	X				
Proficiency test reports					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?	X				
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5?	X				
Is documentation of the analyst's competency up-to-date and on file?	X				
Verification/validation documentation for methods (NELAC Chapter 5)					
Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
Laboratory standard operating procedures (SOPs)					
Are laboratory SOPs current and on file for each method performed	X				

1. Items identified by the letter “R” must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter “S” should be retained and made available upon request for the appropriate retention period;

2. O = organic analyses; I = inorganic analyses (and general chemistry, when applicable);

3. NA = Not applicable;

4. NR = Not reviewed;

5. ER# = Exception Report identification number (an Exception Report should be completed for an item if “NR” or “No” is checked).

The Exception Report for each “No” or “Not Reviewed (NR)” item in Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L16051583
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG570932	**Reviewer Name:**	Wade DeLong
LRC Date:	2016-06-02 00:00:00		

below, I affirm to the best of my knowledge all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [ ] This laboratory meets an exception under 30 TAC §25.6 and was last inspection by [ ] TCEQ or [ ] _____ on **(enter date of last inspection**). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Exceptions Report

1.2 Certificate of Analysis

Microbac

Lab Report #: L16051583
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Michelle Taylor

Certificate of Analysis

Sample #:	L16051583-01	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	GPW 1 - 052716	**Prep Method:**	6850	**Prep Date:**	06/01/2016 12:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	05/03/2016 17:18
Workgroup #:	WG570932	**Analyst:**	JWR	**Run Date:**	06/01/2016 16:00
Collect Date:	05/27/2016 08:50	**Dilution:**	1	**File ID:**	1LM.LM35128
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	6.59		0.400	0.200	0.100

Certificate of Analysis

Sample #:	L16051583-02	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	GPW 3 - 052716	**Prep Method:**	6850	**Prep Date:**	06/01/2016 12:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	05/03/2016 17:18
Workgroup #:	WG570932	**Analyst:**	JWR	**Run Date:**	06/01/2016 16:19
Collect Date:	05/27/2016 09:05	**Dilution:**	1	**File ID:**	1LM.LM35129
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.457		0.400	0.200	0.100

Certificate of Analysis

Sample #:	L16051583-03	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	HBW 1 - 022516	**Prep Method:**	6850	**Prep Date:**	06/01/2016 12:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	05/03/2016 17:18
Workgroup #:	WG570932	**Analyst:**	JWR	**Run Date:**	06/01/2016 16:38
Collect Date:	05/27/2016 09:20	**Dilution:**	1	**File ID:**	1LM.LM35130
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.200	U	0.400	0.200	0.100

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L16051583
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Michelle Taylor

Certificate of Analysis

Sample #:	L16051583-04	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	HBW 10 - 052716	**Prep Method:**	6850	**Prep Date:**	06/01/2016 12:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	05/03/2016 17:18
Workgroup #:	WG570932	**Analyst:**	JWR	**Run Date:**	06/01/2016 16:57
Collect Date:	05/27/2016 09:33	**Dilution:**	1	**File ID:**	1LM.LM35131
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.200	U	0.400	0.200	0.100

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L16051583
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Michelle Taylor

Certificate of Analysis

Sample #:	L16051583-05	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	HBW 7 - 052716	**Prep Method:**	6850	**Prep Date:**	06/01/2016 12:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	05/03/2016 17:18
Workgroup #:	WG570932	**Analyst:**	JWR	**Run Date:**	06/01/2016 17:16
Collect Date:	05/27/2016 09:50	**Dilution:**	1	**File ID:**	1LM.LM35132
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.200	U	0.400	0.200	0.100

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L16051583
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Michelle Taylor

2.0 Full Sample Data Package

2.1 General Chromatography Data

2.1.1 6850 LC/MS Data

2.1.1.1 Summary Data

Microbac

Lab Report #: L16051583
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Michelle Taylor

Certificate of Analysis

Sample #:	L16051583-01	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	GPW 1 - 052716	**Prep Method:**	6850	**Prep Date:**	06/01/2016 12:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	05/03/2016 17:18
Workgroup #:	WG570932	**Analyst:**	JWR	**Run Date:**	06/01/2016 16:00
Collect Date:	05/27/2016 08:50	**Dilution:**	1	**File ID:**	1LM.LM35128
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	6.59		0.400	0.200	0.100

Certificate of Analysis

Sample #:	L16051583-02	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	GPW 3 - 052716	**Prep Method:**	6850	**Prep Date:**	06/01/2016 12:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	05/03/2016 17:18
Workgroup #:	WG570932	**Analyst:**	JWR	**Run Date:**	06/01/2016 16:19
Collect Date:	05/27/2016 09:05	**Dilution:**	1	**File ID:**	1LM.LM35129
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.457		0.400	0.200	0.100

Certificate of Analysis

Sample #:	L16051583-03	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	HBW 1 - 022516	**Prep Method:**	6850	**Prep Date:**	06/01/2016 12:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	05/03/2016 17:18
Workgroup #:	WG570932	**Analyst:**	JWR	**Run Date:**	06/01/2016 16:38
Collect Date:	05/27/2016 09:20	**Dilution:**	1	**File ID:**	1LM.LM35130
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.200	U	0.400	0.200	0.100

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L16051583
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Michelle Taylor

Certificate of Analysis

Sample #:	L16051583-04	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	HBW 10 - 052716	**Prep Method:**	6850	**Prep Date:**	06/01/2016 12:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	05/03/2016 17:18
Workgroup #:	WG570932	**Analyst:**	JWR	**Run Date:**	06/01/2016 16:57
Collect Date:	05/27/2016 09:33	**Dilution:**	1	**File ID:**	1LM.LM35131
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.200	U	0.400	0.200	0.100

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L16051583
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Michelle Taylor

Certificate of Analysis

Sample #:	L16051583-05	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	HBW 7 - 052716	**Prep Method:**	6850	**Prep Date:**	06/01/2016 12:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	05/03/2016 17:18
Workgroup #:	WG570932	**Analyst:**	JWR	**Run Date:**	06/01/2016 17:16
Collect Date:	05/27/2016 09:50	**Dilution:**	1	**File ID:**	1LM.LM35132
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.200	U	0.400	0.200	0.100

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L16051583
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Michelle Taylor

2.1.1.2 QC Summary Data

Example Calculation 6850 - Perchlorate

Concentration from Linear Regression

Step 1: Retrieve Curve Data From Plot, y = mx + b

y = response ratio = response of analyte / response of internal standard (IS) = Rx/Ristd

x = amount ratio = concentration analyte/concentration internal standard (IS) = Cx / Cistd

m = slope from curve (1.45)

b = intercept from curve (-0.00242)

y = 1.45x + -0.00242

Step 2: Substitute the value for y

where y = 12600/226000 = 0.055752

Step 3: Solve for x

x = (y - b)/m = 0.0040119

Step 4: Solve for analyte concentration Cx

Cx = (Cis)(x) = (5 ug/L)(0.040119) = 0.200594 ug/L

Example Calculation - Water:

Slope from curve, m:	1.45
Intercept from curve, b:	-0.00242
Response of analyte, Rx:	12600
Response of Internal Standard , Ristd:	226000
Concentration of IS, Cistd (ug/L):	5.00
Response Ratio:	0.05575
Amount Ratio:	0.04012
Analyte Concentration, Cx (ug/L) :	0.200594

Example Calculation - Soil:

Analyte Concentration, Cx (ug/L):	0.20059
Amount of soil extracted (g):	5.00
Final volume of extract (mL):	50.00
Percent solids (Pct wt.)	100
Concentration in soil (ug/kg):	2.005938

Perchlorate Conductivity Check
(perchlorate1)

Conductivity Probe Calibration Check: 1403 /1410 µs/cm

Working MCT Level: 10,000 µs/cm

Sample	Conductivity (µs/cm)	Pretreatment or Dilution Needed
WG570932-01 MCT	9,940.	
-02 BLK	0.37	
-03 LCS	0.41	
-04 LCS2	0.43	
L16051581-01	3,020.	
L16051583-01	155.1	
-02	147.1	
-03	198.7	
-04	198.1	
-05	253.	

Analyst: John Richards

Date/Time: 06/01/16 / 14:30

DCN#118818

Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 050316_JWR.TXT
Analyst1: JWR Analyst2: NA
Method: 6850 SOP: HPLC06 Rev: 8

Maintenance Log ID: Syringe Filter Lot#: 151125254
Eluent ID#:

Workgroups: Column 1 ID: KP-RPPX250 Column 2 ID: NA
Analytical WG567013 (soils)
Internal STD: COA18071 Surrogate STD: NA Calibration STD STD75510 (05/03/2016)
CCV STD: STD75510 LCS STD: STD75512 MS/MSD STD: STD75512

Comments: ICAL WG567320 : Alternate Source STD75512
Analytical Column : RPPX 5um (250x4.6mm)
K'Prime S/N RPPX250-02115

Samples L16041363(-05 and -10) were analyzed at dilutions based on their pre-run screen results.

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	1LM.LM34686	WG567320-01 CCB	1	1		05/03/16 15:06
2	1LM.LM34687	WG567320-02 STD (0.1 ug/L)	1	1	STD75510	05/03/16 15:25
3	1LM.LM34688	WG567320-03 STD (0.2 ug/L)	1	1	STD75510	05/03/16 15:43
4	1LM.LM34689	WG567320-04 STD (0.5 ug/L)	1	1	STD75510	05/03/16 16:02
5	1LM.LM34690	WG567320-05 STD (1.0 ug/L)	1	1	STD75510	05/03/16 16:21
6	1LM.LM34691	WG567320-06 STD (2.0 ug/L)	1	1	STD75510	05/03/16 16:40
7	1LM.LM34692	WG567320-07 STD (5.0 ug/L)	1	1	STD75510	05/03/16 16:59
8	1LM.LM34693	WG567320-08 STD (10 ug/L)	1	1	STD75510	05/03/16 17:18
9	1LM.LM34694	WG567320-09 SSCV (1.0 ug/L)	1	1	STD75512	05/03/16 17:37
10	1LM.LM34695	WG567321-01 CCB	1	1		05/03/16 17:56
11	1LM.LM34696	WG567321-02 CCV (1.0ug/L)	1	1	STD75510	05/03/16 18:15
12	1LM.LM34697	WG567013-07 MRL (2.0ug/kg)	7	1	STD75510	05/03/16 18:34
13	1LM.LM34698	WG567013-01 MCT (2.0ug/kg)	7	1	STD75512	05/03/16 18:53
14	1LM.LM34699	WG567013-02 BLANK	7	1		05/03/16 19:12
15	1LM.LM34700	WG567013-03 LCS (2.0ug/kg)	7	1	STD75512	05/03/16 19:31
16	1LM.LM34701	L16041363-07 RS	7	1		05/03/16 19:50
17	1LM.LM34702	L16041363-08 MS	7	1	STD75512	05/03/16 20:09
18	1LM.LM34703	L16041363-09 MSD	7	1	STD75512	05/03/16 20:28
19	1LM.LM34704	L16041363-01	7	1		05/03/16 20:46
20	1LM.LM34705	L16041363-02	7	1		05/03/16 21:05
21	1LM.LM34706	L16041363-03	7	1		05/03/16 21:24
22	1LM.LM34707	L16041363-04	7	1		05/03/16 21:43
23	1LM.LM34708	WG567321-03 CCV (1.0ug/L)	1	1	STD75510	05/03/16 22:02
24	1LM.LM34709	WG567013-08 MRL (2.0ug/kg)	7	1	STD75510	05/03/16 22:21
25	1LM.LM34710	WG567321-04 CCB	1	1		05/03/16 22:40
26	1LM.LM34711	L16041363-05 (5x)	7	5		05/03/16 22:59
27	1LM.LM34712	L16041363-06	7	1		05/03/16 23:18
28	1LM.LM34713	L16041363-10 (5x)	7	5		05/03/16 23:37
29	1LM.LM34714	WG567321-05 CCV (1.0ug/L)	1	1	STD75510	05/03/16 23:56
30	1LM.LM34715	WG567013-09 MRL (2.0ug/kg)	7	1	STD75510	05/04/16 00:15
31	1LM.LM34716	WG567321-06 CCB	1	1		05/04/16 00:34

Comments

Page: 1 Approved: 05-MAY-16

Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 050316_JWR.TXT

Analyst1: JWR Analyst2: NA

Method: 6850 SOP: HPLC06 Rev: 8

Maintenance Log ID: Syringe Filter Lot#: 151125254

Eluent ID#:

Workgroups: Column 1 ID: KP-RPPX250 Column 2 ID: NA

Analytical WG567013 (soils)

Internal STD: COA18071 Surrogate STD: NA STD75510 (05/03/2016)

CCV STD: STD75510 LCS STD: STD75512 STD75512

Comments

Seq.	Rerun	Dil.	Reason	Analytes
17				
	L16041363-08 MS : The MS %Rec is 129%. This is above the advisory limit of 120%. The parent sample to this MS had responses that passed the ion-ratio criteria, but had a quantified value below the method's detection limit, resulting in an assigned value of zero. If the quantified value for the parent sample were used in the %Rec calculation, the MS %Rec would be 93.9%.			
18				
	L16041363-09 MSD : The MSD %Rec is 131%. This is above the advisory limit of 120%. The parent sample to this MSD had responses that passed the ion-ratio criteria, but had a quantified value below the method's detection limit, resulting in an assigned value of zero. If the quantified value for the parent sample were used in the %Rec calculation, the MSD %Rec would be 95.4%.			

Page: 2 Approved: 05-MAY-16

Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 060116_JWR.TXT
Analyst1: JWR Analyst2: NA
Method: 6850 SOP: HPLC06 Rev: 8

Maintenance Log ID: Syringe Filter Lot#: 151125254
Eluent ID#:

Workgroups: Column 1 ID: KP-RPPX250 Column 2 ID: NA
Analytical WG570932 (waters)
Internal STD: COA18071 Surrogate STD: NA Calibration STD STD75510 (05/03/2016)
CCV STD: STD75510 LCS STD: STD75512 MS/MSD STD: NA

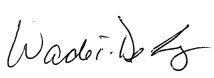
Comments:

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	1LM.LM35120	WG570935-01 CCB	1	1		06/01/16 13:28
2	1LM.LM35121	WG570935-02 CCV (1.0ug/L)	1	1	STD75510	06/01/16 13:47
3	1LM.LM35122	WG570932-05 MRL (0.2ug/L)	1	1	STD75510	06/01/16 14:06
4	1LM.LM35123	WG570932-01 MCT (0.2ug/L)	1	1	STD75512	06/01/16 14:25
5	1LM.LM35124	WG570932-02 BLANK	1	1		06/01/16 14:44
6	1LM.LM35125	WG570932-03 LCS (0.2ug/L)	1	1	STD75512	06/01/16 15:03
7	1LM.LM35126	WG570932-04 LCS2 (0.2ug/L)	1	1	STD75512	06/01/16 15:22
8	1LM.LM35127	L16051581-01	1	1		06/01/16 15:41
9	1LM.LM35128	L16051583-01	1	1		06/01/16 16:00
10	1LM.LM35129	L16051583-02	1	1		06/01/16 16:19
11	1LM.LM35130	L16051583-03	1	1		06/01/16 16:38
12	1LM.LM35131	L16051583-04	1	1		06/01/16 16:57
13	1LM.LM35132	L16051583-05	1	1		06/01/16 17:16
14	1LM.LM35133	WG570935-03 CCV (1.0ug/L)	1	1	STD75510	06/01/16 17:35
15	1LM.LM35134	WG570932-06 MRL (0.2ug/L)	1	1	STD75510	06/01/16 17:54
16	1LM.LM35135	WG570935-04 CCB	1	1		06/01/16 18:13

Comments

Seq.	Rerun	Dil.	Reason	Analytes

Page: 1 Approved: 02-JUN-16



Microbac Laboratories Inc.

Data Checklist

Date: 03-MAY-2016
Analyst: JWR
Analyst: NA
Method: 6850
Instrument: LCMS1
Curve Workgroup: WG567320
Runlog ID: 74891
Analytical Workgroups: L16041363 (SOILS)

ANALYTICAL	
System Performance Check	NA
DFTPP (GCMS)	NA
Endrin/DDT breakdown (8081/GCMS)	NA
Pentachlorophenol/benzidine tailing (GCMS)	NA
Eluent check (IC)/system pressure (HPLC)	NA
Window standard (FID)	NA
Initial Calibration	X
Average RF	NA
Linear regression or higher order curve	X
Alternate source standard (ICV) % Difference	X
Continuing Calibration (CCV)	X
% D/% Drift	X
Minimum response factors (GCMS)	X
Continuing calibration blank (CCB) (IC/LCMS)	X
Limit of quantitation verification (LOQV) (LCMS)	X
Special standards	NA
Blanks	X
TCL hits	ND
Surrogate recoveries	NA
LCS/LCSD (Laboratory Control Sample)	X
Recoveries	X
Surrogate recoveries	NA
MS/MSD/Sample duplicates	X
Recoveries	X
%RPD	X
Interference check sample (ICS) (LCMS)	MCT
Samples	X
TCL hits	X
Mass spectra (MS/HPLC)/2nd column confirmations (ECD/FID/HPLC)	NA
Surrogate recoveries	NA
Internal standard areas (MS)	X
Library searches (GCMS)	NA
Calculations & correct factors	X
Compounds above calibration range	NA
Reruns	NA
Manual integrations	NA
Project/client specific requirements	X
REPORTING	
Upload batch form	X
KOBRA workgroup data/forms/bench sheets	X
Case narratives	
Check for completeness	X
Primary Reviewer	JWR
SUPERVISORY/SECONDARY REVIEW	
Check for compliance with method and project specific requirements	X
Check the completeness/accuracy of reported information	X
Data qualifiers	X
Secondary Reviewer	WTD

Primary Reviewer:
04-MAY-2016
John Richards

Secondary Reviewer:
05-MAY-2016
Wade D

CHECKLIST1 - Modified 03/05/2008
Generated: MAY-05-2016 16:23:46

Microbac

Microbac Laboratories Inc.

Data Checklist

Date: 01-JUN-2016
Analyst: JWR
Analyst: NA
Method: 6850
Instrument: LCMS1
Curve Workgroup: NA
Runlog ID: 75450
Analytical Workgroups: L16051581, 1583

ANALYTICAL	
System Performance Check	NA
DFTPP (GCMS)	NA
Endrin/DDT breakdown (8081/GCMS)	NA
Pentachlorophenol/benzidine tailing (GCMS)	NA
Eluent check (IC)/system pressure (HPLC)	NA
Window standard (FID)	NA
Initial Calibration	NA
Average RF	NA
Linear regression or higher order curve	NA
Alternate source standard (ICV) % Difference	NA
Continuing Calibration (CCV)	X
% D/% Drift	X
Minimum response factors (GCMS)	X
Continuing calibration blank (CCB) (IC/LCMS)	X
Limit of quantitation verification (LOQV) (LCMS)	X
Special standards	NA
Blanks	X
TCL hits	ND
Surrogate recoveries	NA
LCS/LCSD (Laboratory Control Sample)	X
Recoveries	X
Surrogate recoveries	NA
MS/MSD/Sample duplicates	NA
Recoveries	NA
%RPD	NA
Interference check sample (ICS) (LCMS)	MCT
Samples	X
TCL hits	X
Mass spectra (MS/HPLC)/2nd column confirmations (ECD/FID/HPLC)	NA
Surrogate recoveries	NA
Internal standard areas (MS)	X
Library searches (GCMS)	NA
Calculations & correct factors	X
Compounds above calibration range	NA
Reruns	NA
Manual integrations	NA
Project/client specific requirements	X
REPORTING	
Upload batch form	X
KOBRA workgroup data/forms/bench sheets	X
Case narratives	
Check for completeness	X
Primary Reviewer	JWR
SUPERVISORY/SECONDARY REVIEW	
Check for compliance with method and project specific requirements	X
Check the completeness/accuracy of reported information	X
Data qualifiers	X
Secondary Reviewer	WTD

Primary Reviewer:
02-JUN-2016
John Richards

Secondary Reviewer:
02-JUN-2016
Wadei D

CHECKLIST1 - Modified 03/05/2008
Generated: JUN-02-2016 16:19:53

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 6850 **AAB#:** WG570932

Login Number: L16051583

Client ID	ID	Date Collected	TCLP Date	Time Held	Max Hold	Q	Extract Date	Time Held	Max Hold	Q	Run Date	Time Held	Max Hold	Q
GPW 1 - 052716	01	05/27/16					06/01/2016	5.1	28		06/01/16	.2	28	
GPW 3 - 052716	02	05/27/16					06/01/2016	5.1	28		06/01/16	.2	28	
HBW 1 - 022516	03	05/27/16					06/01/2016	5.1	28		06/01/16	.2	28	
HBW 10 - 052716	04	05/27/16					06/01/2016	5.1	28		06/01/16	.2	28	
HBW 7 - 052716	05	05/27/16					06/01/2016	5.1	28		06/01/16	.2	28	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 4791100
Report generated 06/03/2016 09:05

METHOD BLANK SUMMARY

Login Number: L16051583
Work Group: WG570932
Blank File ID: 1LM.LM35124
Blank Sample ID: WG570932-02
Prep Date: 06/01/16 12:00
Instrument ID: LCMS1
Analyzed Date: 06/01/16 14:44
Method: 6850
Analyst: JWR

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
QCMRL	WG570932-05	1LM.LM35122	06/01/16 14:06	01
MCT	WG570932-01	1LM.LM35123	06/01/16 14:25	01
LCS	WG570932-03	1LM.LM35125	06/01/16 15:03	01
LCS2	WG570932-04	1LM.LM35126	06/01/16 15:22	01
GPW 1 - 052716	L16051583-01	1LM.LM35128	06/01/16 16:00	01
GPW 3 - 052716	L16051583-02	1LM.LM35129	06/01/16 16:19	01
HBW 1 - 022516	L16051583-03	1LM.LM35130	06/01/16 16:38	01
HBW 10 - 052716	L16051583-04	1LM.LM35131	06/01/16 16:57	01
HBW 7 - 052716	L16051583-05	1LM.LM35132	06/01/16 17:16	01
QCMRL	WG570932-06	1LM.LM35134	06/01/16 17:54	01

Report Name: BLANK_SUMMARY
PDF File ID: 4791101
Report generated 06/03/2016 09:05

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number: L16051583 Prep Date: 06/01/16 12:00 Sample ID: WG570932-02
Instrument ID: LCMS1 Run Date: 06/01/16 14:44 Prep Method: 6850
File ID: 1LM.LM35124 Analyst: JWR Method: 6850
Workgroup (AAB#): WG570932 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-03-MAY-16

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
Perchlorate	0.100	0.400	0.100	1	U

DL Method Detection Limit
LOQ Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > 1/2 RL

Report Name:BLANK
PDF ID: 4791102
03-JUN-2016 09:05

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L16051583 Analyst: JWR Prep Method: 6850
Instrument ID: LCMS1 Matrix: Water Method: 6850
Workgroup (AAB#): WG570932 Units: ug/L
QC Key: DOD4 Lot #: STD75512

Sample ID: WG570932-03 LCS File ID: 1LM.LM35125 Run Date: 06/01/2016 15:03
Sample ID: WG570932-04 LCS2 File ID: 1LM.LM35126 Run Date: 06/01/2016 15:22

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Perchlorate	0.200	0.200	100	0.200	0.201	101	0.499	80 - 120	15	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 4791103
Report generated: 06/03/2016 09:05

Microbac Laboratories Inc.
INITIAL CALIBRATION SUMMARY

Login Number: L16051583
Analytical Method: 6850
ICAL Workgroup: WG567320

Instrument ID: LCMS1
Initial Calibration Date: 03-MAY-16 17:18
Column ID: F

Analyte		AVG RF	% RSD	LINEAR (R)	QUAD (R^2)
Perchlorate		1.699	4.81	1.00000	

R = Correlation coefficient; 0.995 minimum
R^2 = Coefficient of determination; 0.99 minimum

INT_CAL - Modified 03/06/2008
PDF File ID: 4791179
Report generated 06/03/2016 09:05

Login Number: L16051583
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 03-MAY-16 17:18
Column ID: F

Analyte	WG567320-02			WG567320-03			WG567320-04		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Perchlorate	0.100	17900.0000	1.792	0.200	34100.0000	1.718	0.500	82200.0000	1.637

INT_CAL - Modified 03/06/2008
PDF File ID: 4791179
Report generated 06/03/2016 09:05

Microbac Laboratories Inc.
INITIAL CALIBRATION DATA

Login Number: L16051583
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 03-MAY-16 17:18
Column ID: F

Analyte	WG567320-05			WG567320-06			WG567320-07		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Perchlorate	1.00	168000.000	1.697	2.00	330000.000	1.672	5.00	810000.000	1.695

INT_CAL - Modified 03/06/2008
PDF File ID: 4791179
Report generated 06/03/2016 09:05

Login Number: L16051583
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 03-MAY-16 17:18
Column ID: F

Analyte	WG567320-08		
	CONC	RESP	RF
Perchlorate	10.0	1530000.00	1.680

INT_CAL - Modified 03/06/2008
PDF File ID: 4791179
Report generated 06/03/2016 09:05

Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L16051583 Run Date: 05/03/2016 Sample ID: WG567320-09
Instrument ID: LCMS1 Run Time: 17:37 Method: 6850
File ID: 1LM.LM34694 Analyst: JWR QC Key: DOD4
ICal Workgroup: WG567320 Cal ID: LCMS1 - 03-MAY-16

Analyte		Expected	Found	Units	RF	%D	UCL	Q
Perchlorate		1.00	0.985	ug/L	1.66	1.50	15	

* Exceeds %D Limit

ALT - Modified 09/06/2007
Version 1.5 PDF File ID: 4791180
Report generated 06/03/2016 09:06

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L16051583 | Run Date: 06/01/2016 | Sample ID: WG570935-01
Instrument ID: LCMS1 | Run Time: 13:28 | Method: 6850
File ID: 1LM.LM35120 | Analyst: JWR | Units: ug/L
Workgroup (AAB#): WG570932 | Cal ID: LCMS1 - 03-MAY-16
Matrix: WATER | QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Perchlorate	0.100	0.400	0.100	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 4791106
Report generated 06/03/2016 09:06

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L16051583 | Run Date: 06/01/2016 | Sample ID: WG570935-04
Instrument ID: LCMS1 | Run Time: 18:13 | Method: 6850
File ID: 1LM.LM35135 | Analyst: JWR | Units: ug/L
Workgroup (AAB#): WG570932 | Cal ID: LCMS1 - 03-MAY-16
Matrix: WATER | QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Perchlorate	0.100	0.400	0.100	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 4791106
Report generated 06/03/2016 09:06

Login Number: L16051583 Run Date: 06/01/2016 Sample ID: WG570935-02
Instrument ID: LCMS1 Run Time: 13:47 Method: 6850
File ID: 1LM.LM35121 Analyst: JWR QC Key: DOD4
Workgroup (AAB#): WG570932 Cal ID: LCMS1 - 03-MAY-16
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	1.02	ug/L	1.72	2.00	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 4791105
Report generated 06/03/2016 09:06

Login Number: L16051583 Run Date: 06/01/2016 Sample ID: WG570935-03
Instrument ID: LCMS1 Run Time: 17:35 Method: 6850
File ID: 1LM.LM35133 Analyst: JWR QC Key: DOD4
Workgroup (AAB#): WG570932 Cal ID: LCMS1 - 03-MAY-16
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	0.983	ug/L	1.66	1.70	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 4791105
Report generated 06/03/2016 09:06

Login Number: L16051583 Run Date: 06/01/2016 Sample ID: WG570932-05
Instrument ID: LCMS1 Run Time: 14:06 Prep Method: 6850
File ID: 1LM.LM35122 Analyst: JWR Method: 6850
Workgroup (AAB#): WG570932 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-03-MAY-16

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.201	101	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 4791104
Report generated 06/03/2016 09:05

Login Number: L16051583 Run Date: 06/01/2016 Sample ID: WG570932-06
Instrument ID: LCMS1 Run Time: 17:54 Prep Method: 6850
File ID: 1LM.LM35134 Analyst: JWR Method: 6850
Workgroup (AAB#): WG570932 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-03-MAY-16

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.200	100	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 4791104
Report generated 06/03/2016 09:05

Microbac Laboratories Inc.
INTERNAL STANDARD AREA SUMMARY
(COMPARED TO AVERAGE OF ICAL)

Login Number: L16051583
Instrument ID: LCMS1
Workgroup (AAB#): WG570932

ICAL CCV Number: WG567320-05
CAL ID: LCMS1-03-MAY-16
Matrix: WATER

Sample Number	Dilution	Tag	IS-1
WG567320	NA	NA	489000
Upper Limit	NA	NA	733500
Lower Limit	NA	NA	244500
L16051583-01	1.00	01	440000
L16051583-02	1.00	01	482000
L16051583-03	1.00	01	430000
L16051583-04	1.00	01	437000
L16051583-05	1.00	01	439000
WG570932-02	1.00	01	490000
WG570932-03	1.00	01	500000
WG570932-04	1.00	01	499000

IS-1 - O18LP

Underline = Response outside limits

INTERNAL_STD_AVG_ICAL - Modified 03/10/2010
PDF File ID: 4791107
Report generated 06/03/2016 09:06

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16051583	**Prep Method:**	6850	**Samplenum:**	L16051583-01
Instrument:	LCMS1	**Prep Date:**	06/01/2016 12:00	**File ID:**	1LM.LM35128
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG570932	**Analysis Date:**	06/01/2016 16:00	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	977000	340000	2.87	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16051583	**Prep Method:**	6850	**Samplenum:**	L16051583-02
Instrument:	LCMS1	**Prep Date:**	06/01/2016 12:00	**File ID:**	1LM.LM35129
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG570932	**Analysis Date:**	06/01/2016 16:19	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	74700	26400	2.83	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16051583	**Prep Method:**	6850	**Samplenum:**	L16051583-03
Instrument:	LCMS1	**Prep Date:**	06/01/2016 12:00	**File ID:**	1LM.LM35130
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG570932	**Analysis Date:**	06/01/2016 16:38	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	3570	1320	2.70	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16051583	**Prep Method:**	6850	**Samplenum:**	L16051583-04
Instrument:	LCMS1	**Prep Date:**	06/01/2016 12:00	**File ID:**	1LM.LM35131
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG570932	**Analysis Date:**	06/01/2016 16:57	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	2780	813	3.42	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16051583	**Prep Method:**	6850	**Samplenum:**	L16051583-05
Instrument:	LCMS1	**Prep Date:**	06/01/2016 12:00	**File ID:**	1LM.LM35132
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG570932	**Analysis Date:**	06/01/2016 17:16	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	7820	2990	2.62	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16051583	**Prep Method:**		**Samplenum:**	WG567320-02
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM34687
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG570932	**Analysis Date:**	05/03/2016 15:25	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	17900	6950	2.58	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16051583	**Prep Method:**		**Samplenum:**	WG567320-03
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM34688
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG570932	**Analysis Date:**	05/03/2016 15:43	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	34100	11900	2.87	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16051583	**Prep Method:**		**Samplenum:**	WG567320-04
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM34689
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG570932	**Analysis Date:**	05/03/2016 16:02	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	82200	29400	2.80	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16051583	**Prep Method:**		**Samplenum:**	WG567320-05
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM34690
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG570932	**Analysis Date:**	05/03/2016 16:21	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	168000	56600	2.97	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16051583	**Prep Method:**		**Samplenum:**	WG567320-06
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM34691
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG570932	**Analysis Date:**	05/03/2016 16:40	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	330000	108000	3.06	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16051583	**Prep Method:**		**Samplenum:**	WG567320-07
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM34692
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG570932	**Analysis Date:**	05/03/2016 16:59	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	810000	269000	3.01	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16051583	**Prep Method:**		**Samplenum:**	WG567320-08
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM34693
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG570932	**Analysis Date:**	05/03/2016 17:18	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	1530000	512000	2.99	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16051583	**Prep Method:**		**Samplenum:**	WG567320-09
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM34694
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG570932	**Analysis Date:**	05/03/2016 17:37	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	169000	56300	3.00	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16051583	**Prep Method:**	6850	**Samplenum:**	WG570932-01
Instrument:	LCMS1	**Prep Date:**	06/01/2016 12:00	**File ID:**	1LM.LM35123
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG570932	**Analysis Date:**	06/01/2016 14:25	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	32300	11700	2.76	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16051583	**Prep Method:**	6850	**Samplenum:**	WG570932-02
Instrument:	LCMS1	**Prep Date:**	06/01/2016 12:00	**File ID:**	1LM.LM35124
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG570932	**Analysis Date:**	06/01/2016 14:44	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	0.000	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16051583	**Prep Method:**	6850	**Samplenum:**	WG570932-03
Instrument:	LCMS1	**Prep Date:**	06/01/2016 12:00	**File ID:**	1LM.LM35125
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG570932	**Analysis Date:**	06/01/2016 15:03	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	34300	12300	2.79	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16051583	**Prep Method:**	6850	**Samplenum:**	WG570932-04
Instrument:	LCMS1	**Prep Date:**	06/01/2016 12:00	**File ID:**	1LM.LM35126
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG570932	**Analysis Date:**	06/01/2016 15:22	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	34300	12600	2.72	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16051583	**Prep Method:**	6850	**Samplenum:**	WG570932-05
Instrument:	LCMS1	**Prep Date:**	06/01/2016 12:00	**File ID:**	1LM.LM35122
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG570932	**Analysis Date:**	06/01/2016 14:06	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	33800	12300	2.75	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16051583	**Prep Method:**	6850	**Samplenum:**	WG570932-06
Instrument:	LCMS1	**Prep Date:**	06/01/2016 12:00	**File ID:**	1LM.LM35134
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG570932	**Analysis Date:**	06/01/2016 17:54	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	39600	13800	2.87	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16051583	**Prep Method:**		**Samplenum:**	WG570935-01
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM35120
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG570932	**Analysis Date:**	06/01/2016 13:28	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	0.000	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16051583	**Prep Method:**		**Samplenum:**	WG570935-02
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM35121
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG570932	**Analysis Date:**	06/01/2016 13:47	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	167000	57700	2.89	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16051583	**Prep Method:**		**Samplenum:**	WG570935-03
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM35133
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG570932	**Analysis Date:**	06/01/2016 17:35	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	184000	64500	2.85	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16051583	**Prep Method:**		**Samplenum:**	WG570935-04
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM35135
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG570932	**Analysis Date:**	06/01/2016 18:13	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	0.000	0.000	2.3	3.8	*

2.1.1.3 Sample Data

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Created with Analyst Reporter
Printed: 6/2/2016 2:51 PM

Data File	LM35128.wiff	**Result Table**	060116_JWR.rdb
Acquisition Date	6/1/2016 4:00:24 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

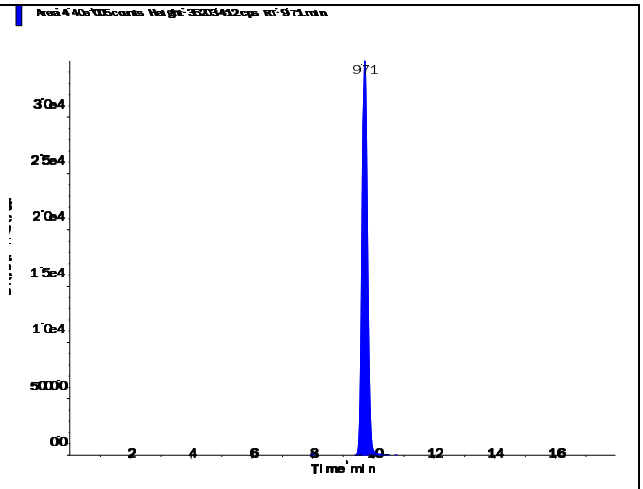
Sample Name	L16051583-01	**Injection Vial**	9.00
Data File	LM35128.wiff	**Injection Volume**	10.00
Acquisition Date	6/1/2016 4:00:24 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	060116_JWR.rdb
Sample ID	L16051583-01	**Dilution Factor**	1.00
Sample Comment	1,1 (Hist)	**Weight to Volume**	0.00

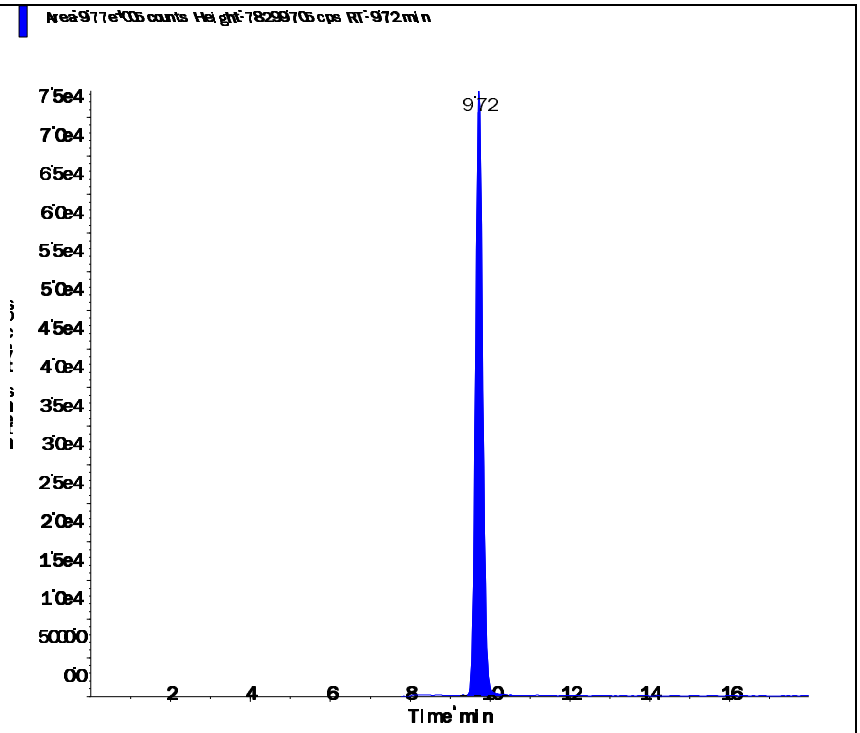
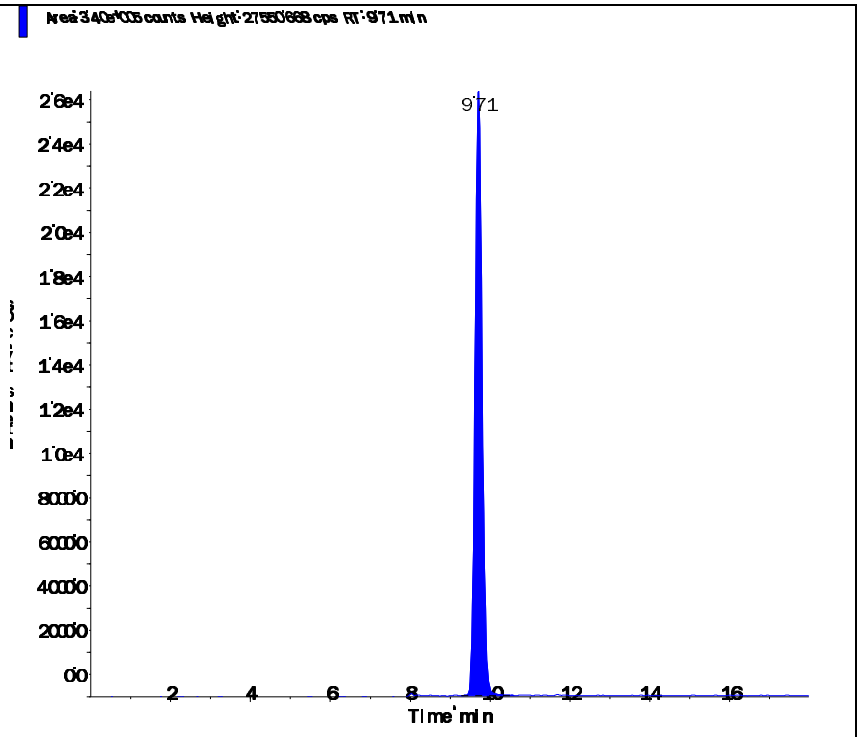
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.400e+05	9.71	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	9.770e+05	9.72	N/A	6.59
Perchlorate conf	3.400e+05	9.71	N/A	6.91

O18LP (Internal Standard)

RT (Exp. RT): 9.71(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.72 (9.84) min Calculated conc: 6.59 ng/ml Area Ratio: 2.217 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.71 (9.84) min Calculated conc: 6.91 ng/ml Area Ratio: 0.773 Sample Type: (Unknown)	

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Data File	LM35129.wiff	**Result Table**	060116_JWR.rdb
Acquisition Date	6/1/2016 4:19:21 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

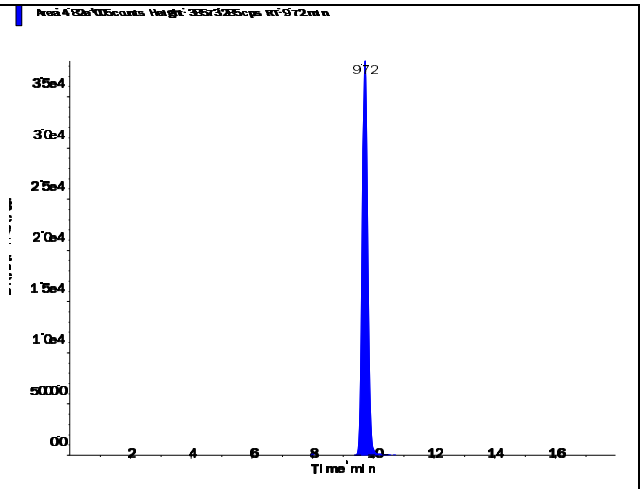
Sample Name	L16051583-02	**Injection Vial**	10.00
Data File	LM35129.wiff	**Injection Volume**	10.00
Acquisition Date	6/1/2016 4:19:21 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	060116_JWR.rdb
Sample ID	L16051583-02	**Dilution Factor**	1.00
Sample Comment	1,1 (Hist)	**Weight to Volume**	0.00

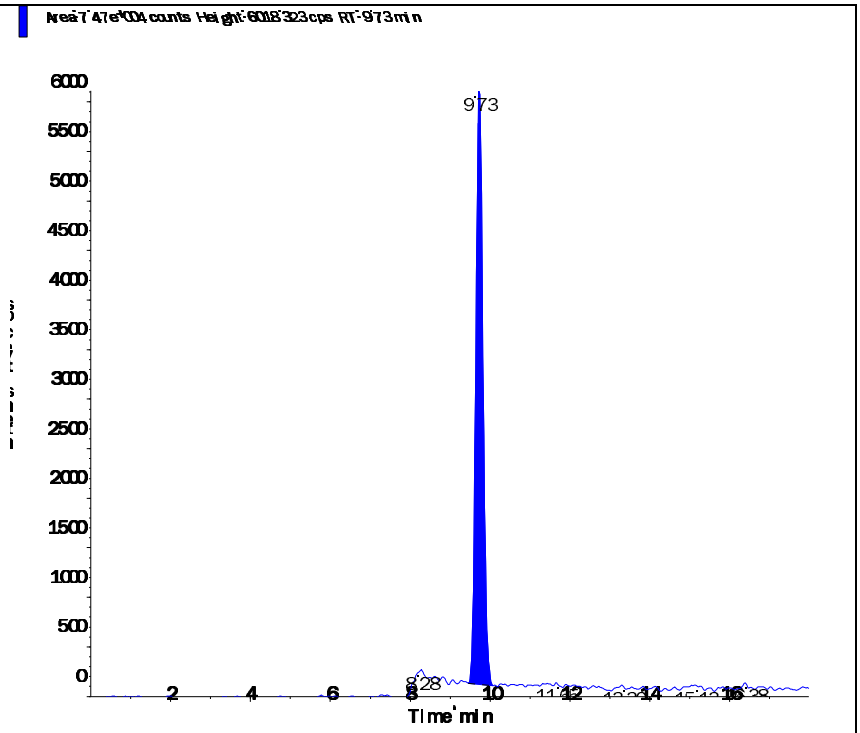
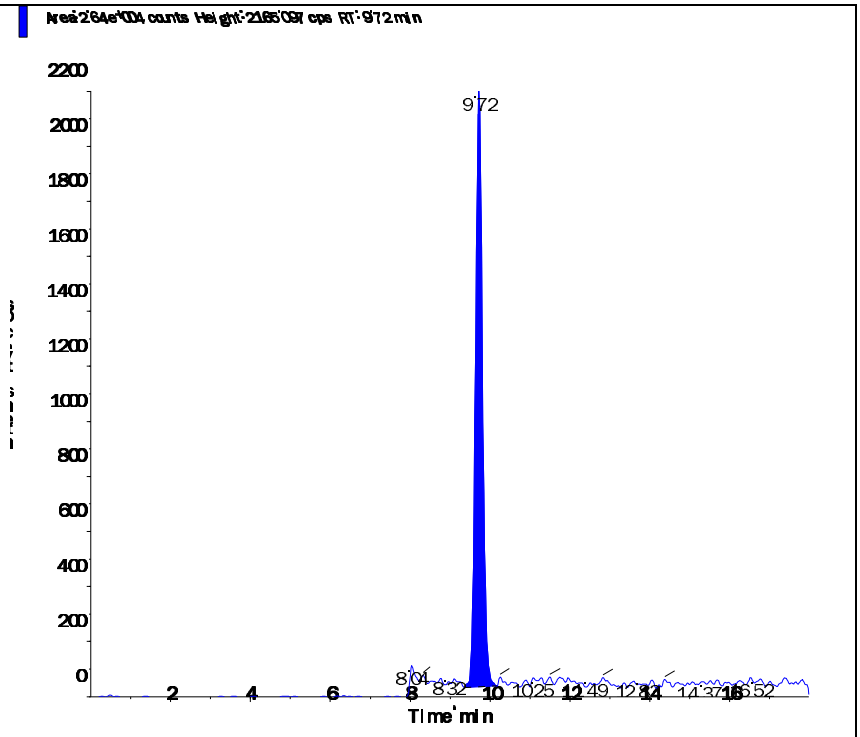
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.820e+05	9.72	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	7.470e+04	9.73	N/A	0.457
Perchlorate conf	2.640e+04	9.72	N/A	0.471

O18LP (Internal Standard)

RT (Exp. RT): 9.72(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.73 (9.84) min Calculated conc: 0.457 ng/ml Area Ratio: 0.155 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.72 (9.84) min Calculated conc: 0.471 ng/ml Area Ratio: 0.055 Sample Type: (Unknown)	

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Data File	LM35130.wiff	**Result Table**	060116_JWR.rdb
Acquisition Date	6/1/2016 4:38:19 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

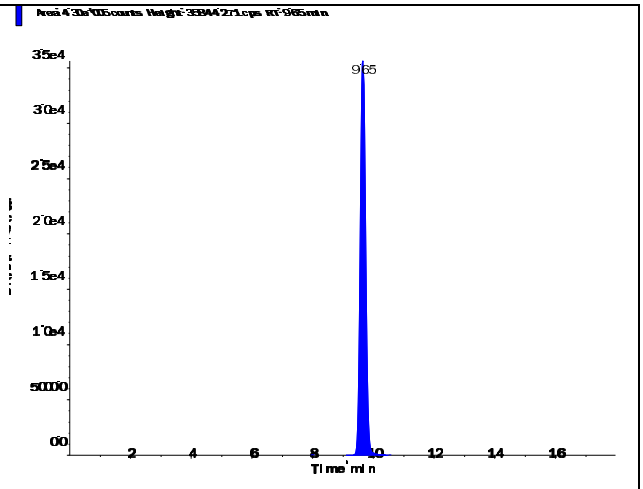
Sample Name	L16051583-03	**Injection Vial**	11.00
Data File	LM35130.wiff	**Injection Volume**	10.00
Acquisition Date	6/1/2016 4:38:19 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	060116_JWR.rdb
Sample ID	L16051583-03	**Dilution Factor**	1.00
Sample Comment	1,1 (Hist)	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.300e+05	9.65	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	3.570e+03	9.65	N/A	0.0209
Perchlorate conf	1.320e+03	9.63	N/A	0.0071

O18LP (Internal Standard)

RT (Exp. RT): 9.65(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



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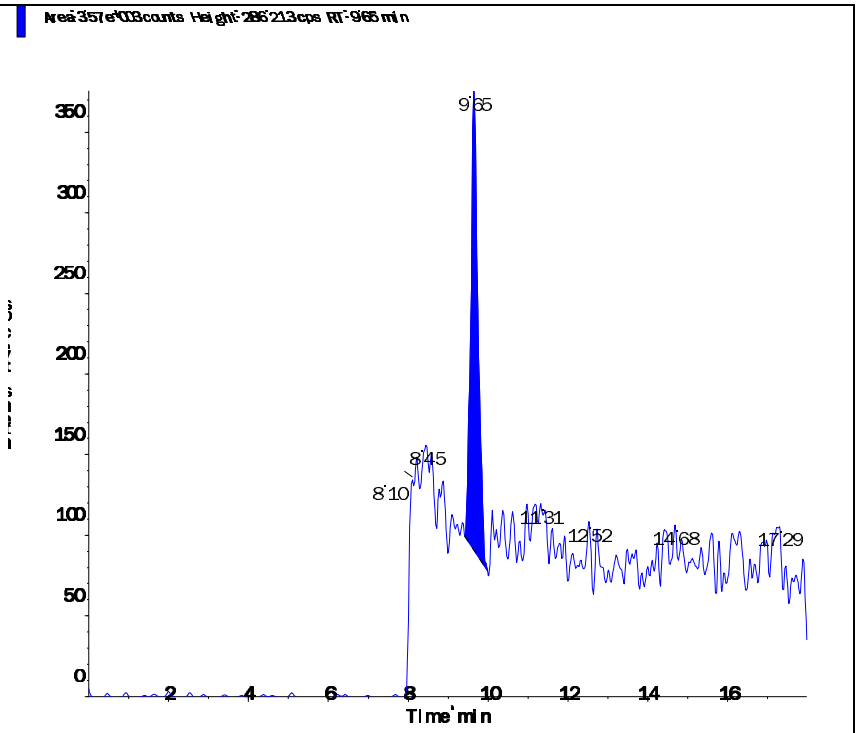
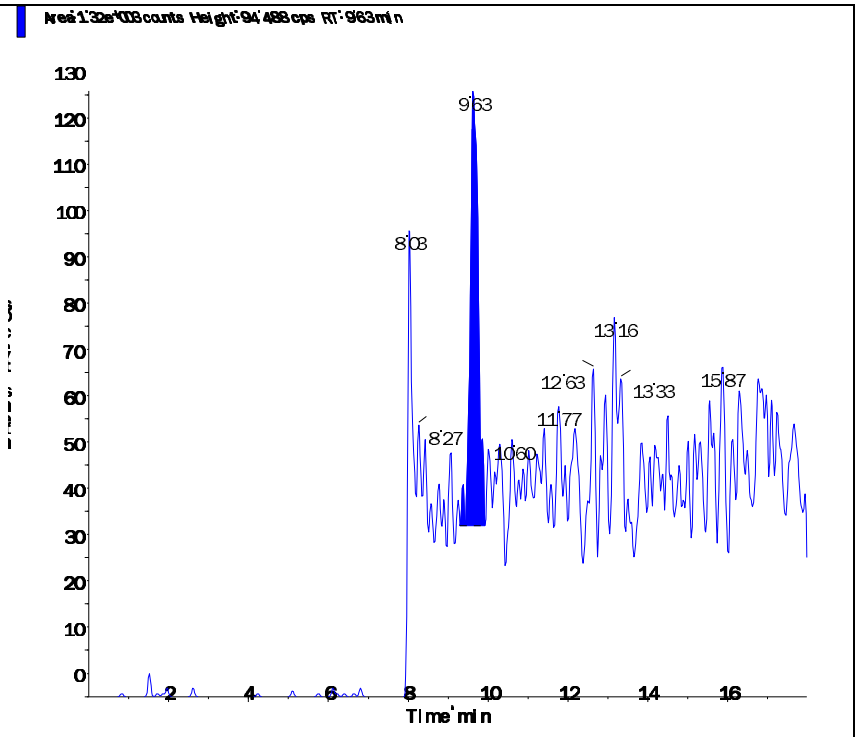
Created with Analyst Reporter
Printed: 6/2/2016 2:52 PM

Perchlorate (98.8/83.3 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	9.65 (9.84) min 0.0209 ng/ml 0.008 (Unknown)



Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	9.63 (9.84) min 0.0071 ng/ml 0.003 (Unknown)



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Created with Analyst Reporter
Printed: 6/2/2016 2:52 PM

Data File	LM35131.wiff	**Result Table**	060116_JWR.rdb
Acquisition Date	6/1/2016 4:57:15 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

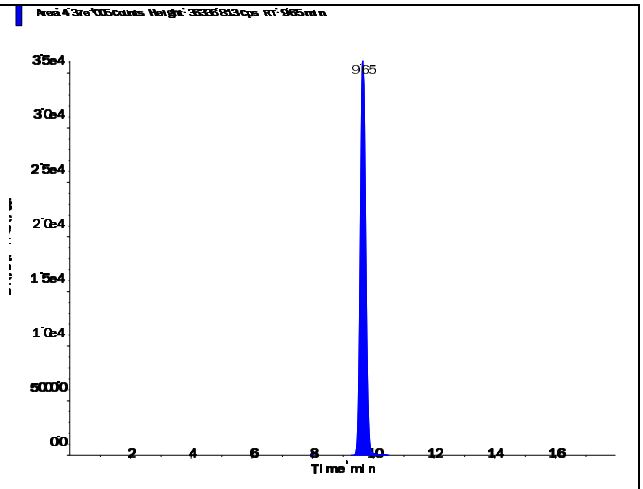
Sample Name	L16051583-04	**Injection Vial**	12.00
Data File	LM35131.wiff	**Injection Volume**	10.00
Acquisition Date	6/1/2016 4:57:15 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	060116_JWR.rdb
Sample ID	L16051583-04	**Dilution Factor**	1.00
Sample Comment	1,1 (Hist)	**Weight to Volume**	0.00

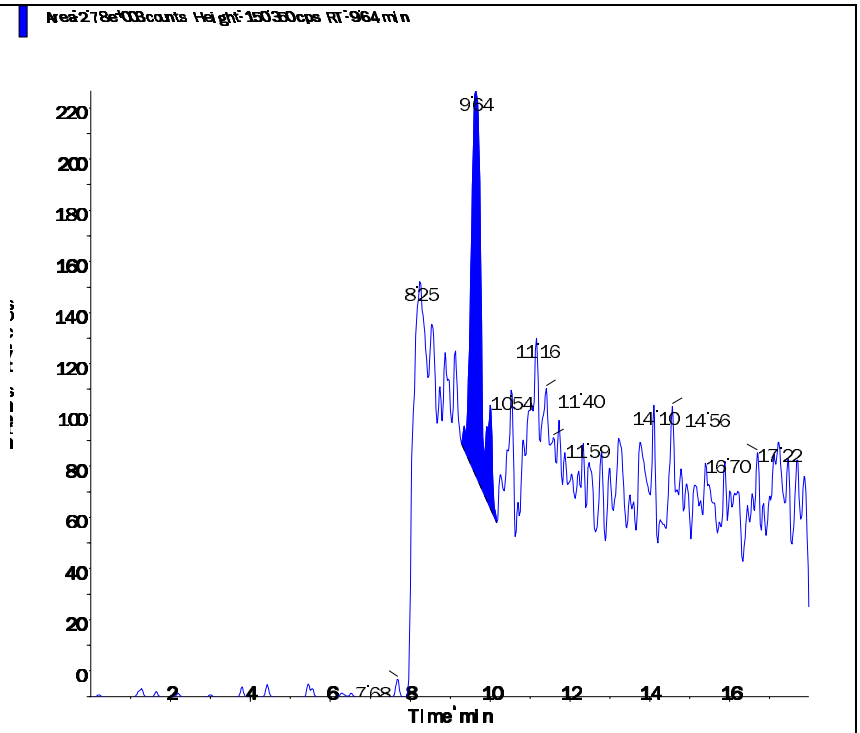
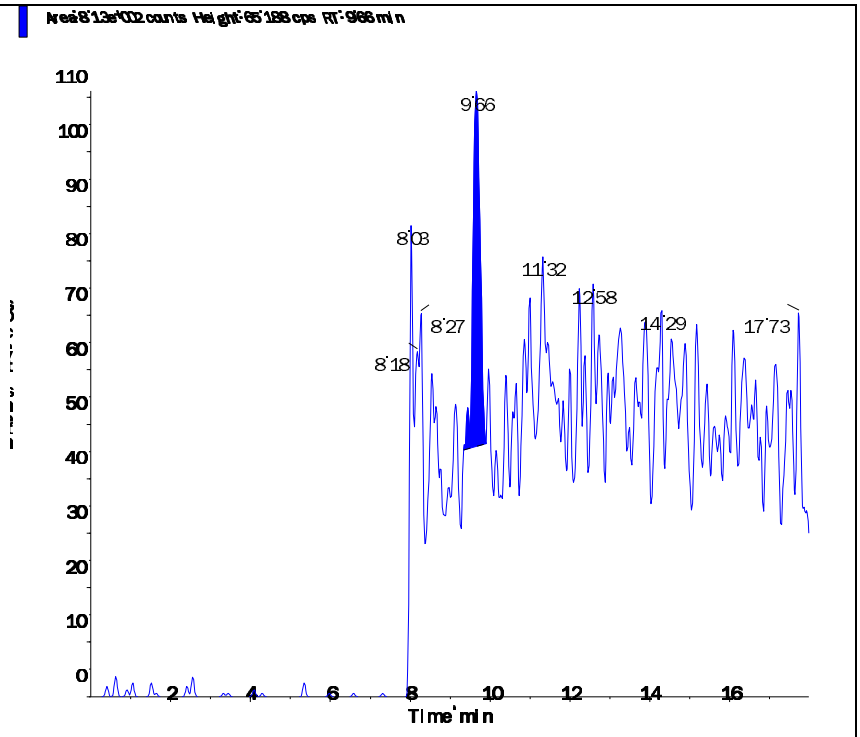
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.370e+05	9.65	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	2.780e+03	9.64	N/A	0.0151
Perchlorate conf	8.130e+02	9.66	N/A	< 0

O18LP (Internal Standard)

RT (Exp. RT): 9.65(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.64 (9.84) min Calculated conc: 0.0151 ng/ml Area Ratio: 0.006 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.66 (9.84) min Calculated conc: < 0 ng/ml Area Ratio: 0.002 Sample Type: (Unknown)	

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Data File	LM35132.wiff	**Result Table**	060116_JWR.rdb
Acquisition Date	6/1/2016 5:16:10 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

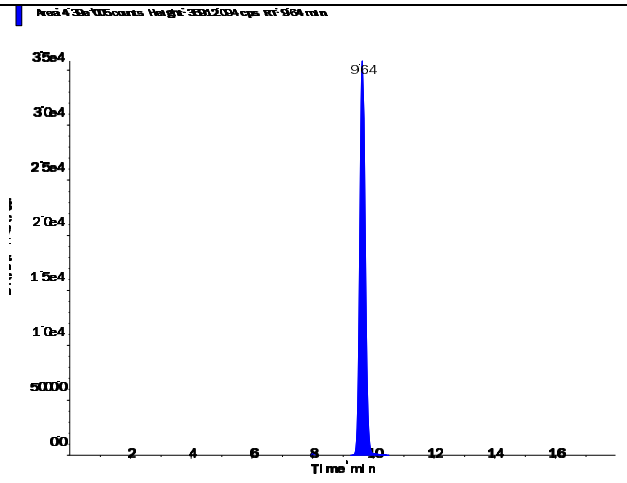
Sample Name	L16051583-05	**Injection Vial**	13.00
Data File	LM35132.wiff	**Injection Volume**	10.00
Acquisition Date	6/1/2016 5:16:10 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	060116_JWR.rdb
Sample ID	L16051583-05	**Dilution Factor**	1.00
Sample Comment	1,1 (Hist)	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.390e+05	9.64	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	7.820e+03	9.65	N/A	0.0492
Perchlorate conf	2.990e+03	9.62	N/A	0.0406

O18LP (Internal Standard)

RT (Exp. RT): 9.64(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



s.dataFile Page 1 of 2

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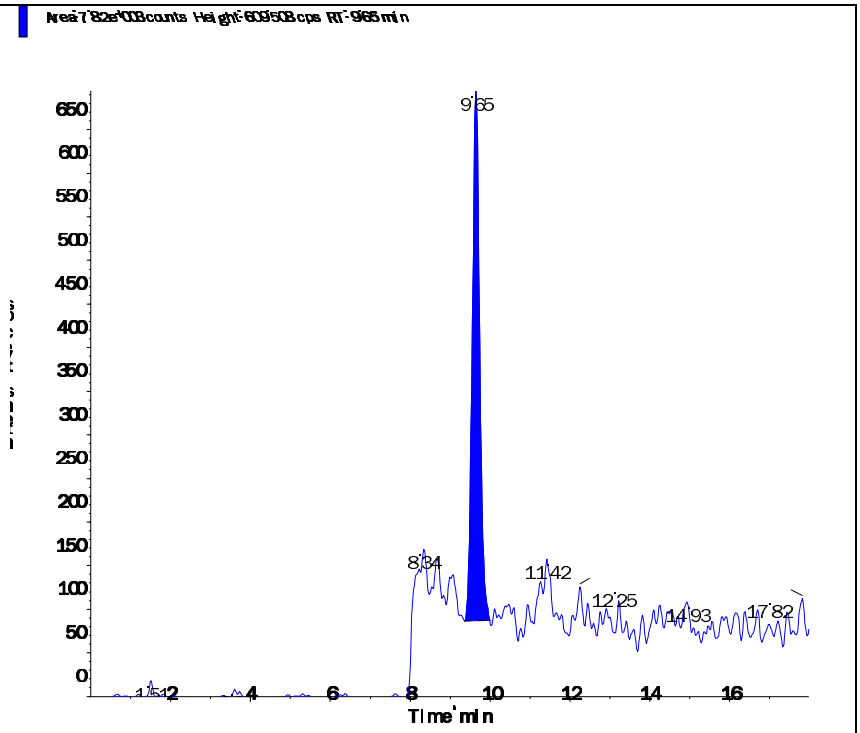
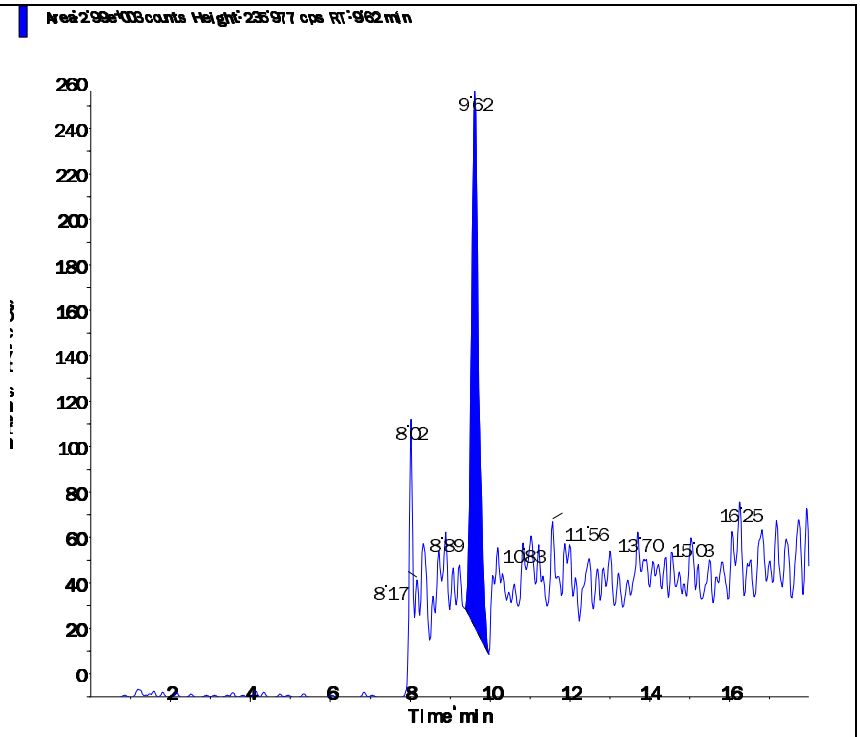
Perchlorate (98.8/83.3 amu)	
RT (Exp. RT):	9.65 (9.84) min
Calculated conc:	0.0492 ng/ml
Area Ratio:	0.018
Sample Type:	(Unknown)



Perchlorate conf (100.8/85.2 amu)	
RT (Exp. RT):	9.62 (9.84) min
Calculated conc:	0.0406 ng/ml
Area Ratio:	0.007
Sample Type:	(Unknown)



2.1.1.4 Standards Data

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Data File	LM34686.wiff	**Result Table**	060116_JWR.rdb
Acquisition Date	5/3/2016 3:06:05 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

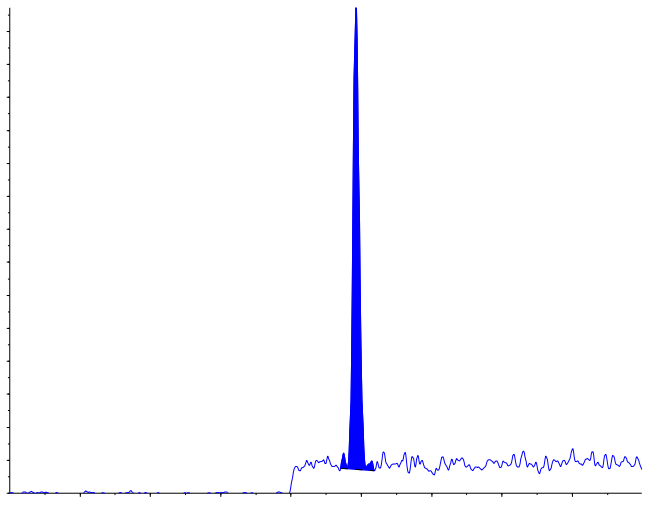
Sample Name	WG567320-01 CCB	**Injection Vial**	1.00
Data File	LM34686.wiff	**Injection Volume**	10.00
Acquisition Date	5/3/2016 3:06:05 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	060116_JWR.rdb
Sample ID	WG567320-01	**Dilution Factor**	1.00
Sample Comment	11.00	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	5.020e+05	9.84	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	0.000e+00	0.00	N/A	No Peak
Perchlorate conf	0.000e+00	0.00	N/A	No Peak

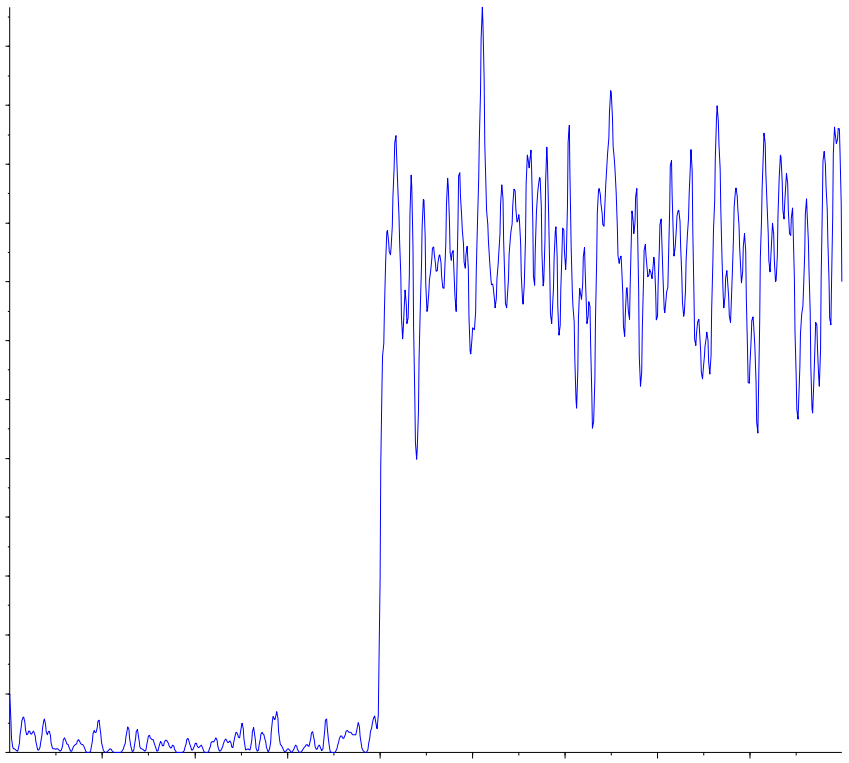
O18LP (Internal Standard)

RT (Exp. RT): 9.84(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



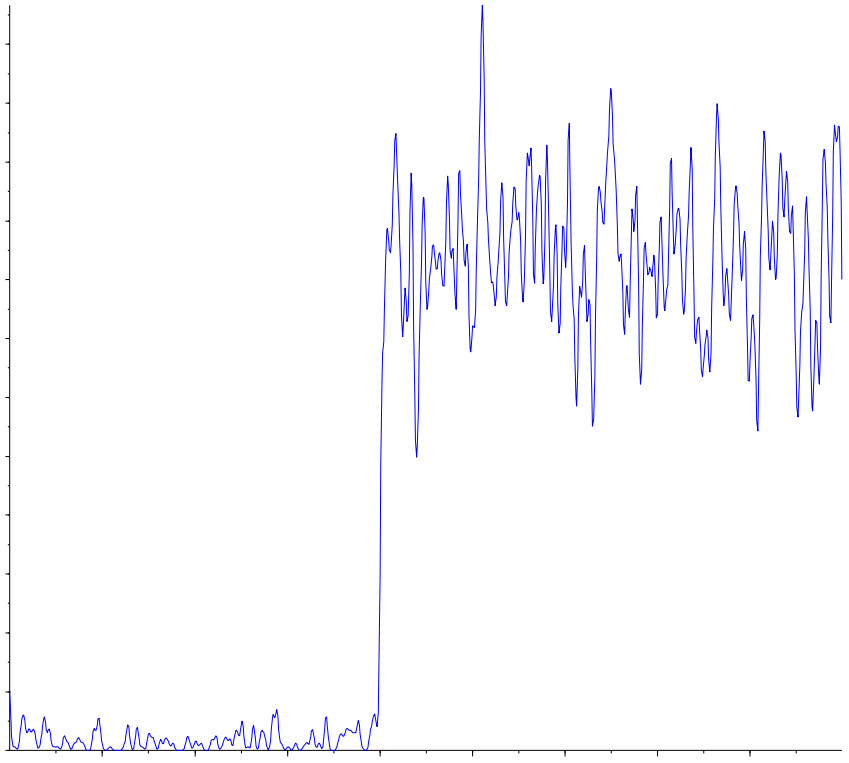
Perchlorate (98.8/83.3 amu)

RT (Exp. RT):	0.00 (9.84) min
Calculated conc:	No Peak ng/ml
Area Ratio:	0.00
Sample Type:	(Unknown)



Perchlorate conf (100.8/85.2 amu)

RT (Exp. RT):	0.00 (9.84) min
Calculated conc:	No Peak ng/ml
Area Ratio:	0.00
Sample Type:	(Unknown)



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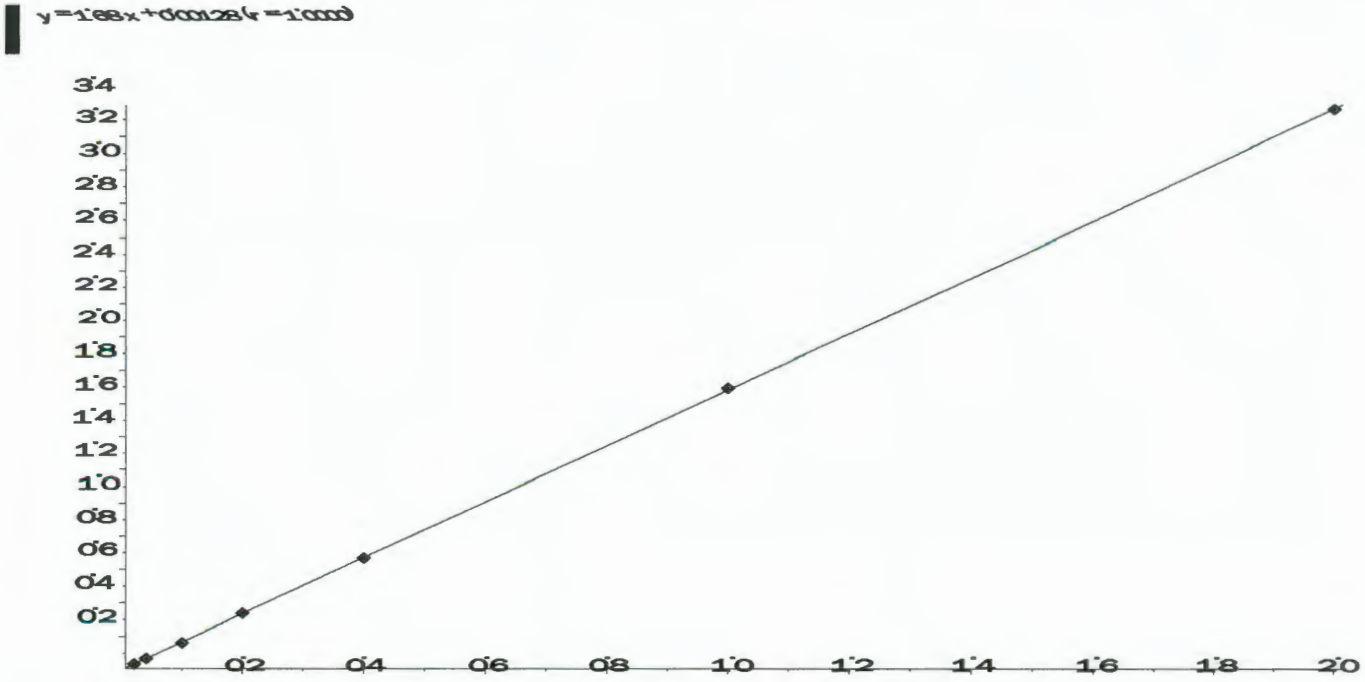
Analyte Name: **Perchlorate**
Internal Standard: O18LP

Data File	LM34686.wiff	**Result Table**	050316_JWR.rdb
Acquisition Date	5/3/2016 3:06:05 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

Regression Equation: y = 1.68 x + 0.00128 (r = 1.0000)

Expected Concentration	Number of Values	Mean Calculated Concentration	% Accuracy	Std. Deviation	%CV
0.10	1	0.10	102.8	N/A	N/A
0.20	1	0.20	100.3	N/A	N/A
0.50	1	0.48	96.6	N/A	N/A
1.00	1	1.01	100.5	N/A	N/A
2.00	1	1.99	99.3	N/A	N/A
5.00	1	5.04	100.7	N/A	N/A
10.00	1	9.99	99.9	N/A	N/A



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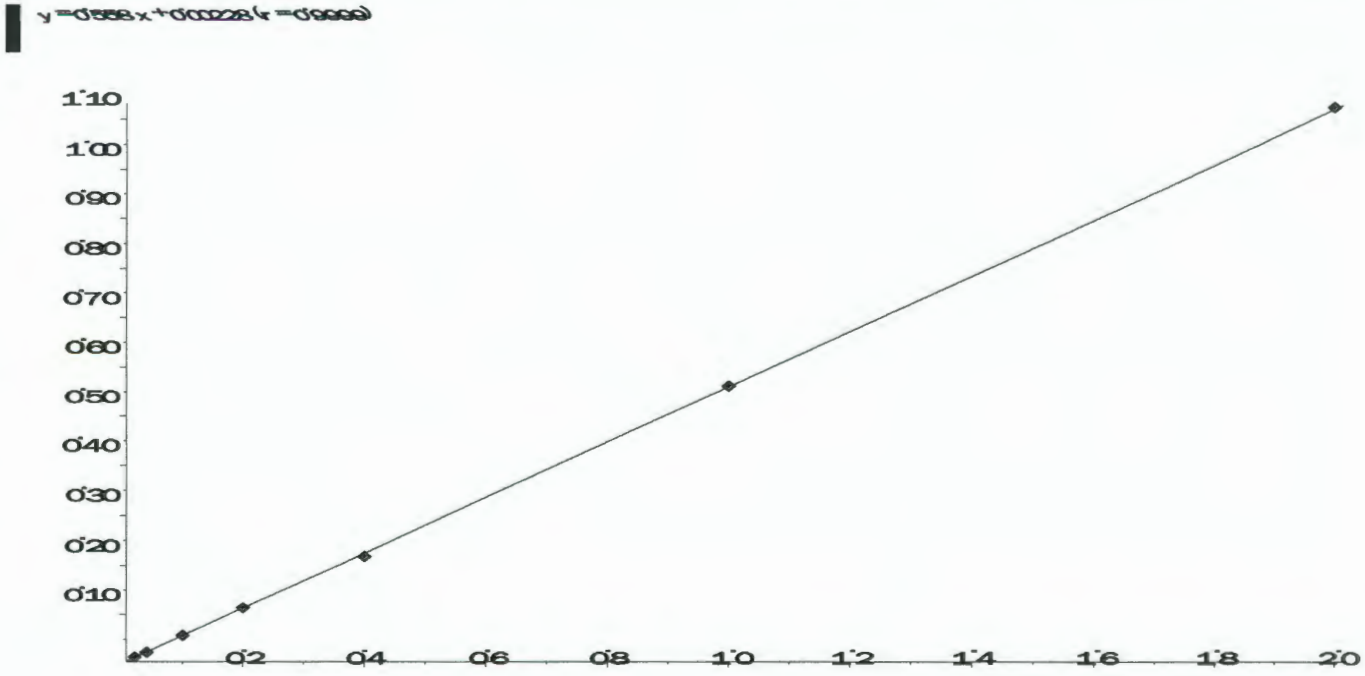
Analyte Name: **Perchlorate conf**
Internal Standard: O18LP

Data File	LM34686.wiff	**Result Table**	050316_JWR.rdb
Acquisition Date	5/3/2016 3:06:05 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

Regression Equation: y = 0.558 x + 0.00228 (r = 0.9999)

Expected Concentration	Number of Values	Mean Calculated Concentration	% Accuracy	Std. Deviation	%CV
0.10	1	0.10	104.3	N/A	N/A
0.20	1	0.19	96.8	N/A	N/A
0.50	1	0.50	100.6	N/A	N/A
1.00	1	1.00	100.5	N/A	N/A
2.00	1	1.94	97.2	N/A	N/A
5.00	1	5.02	100.4	N/A	N/A
10.00	1	10.03	100.3	N/A	N/A



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Data File	LM34687.wiff	**Result Table**	060116_JWR.rdb
Acquisition Date	5/3/2016 3:25:04 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

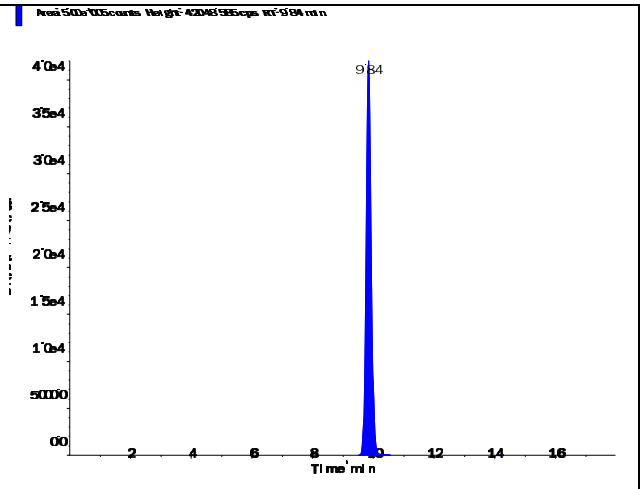
Sample Name	WG567320-02 STD (0.1 ug/L)	**Injection Vial**	2.00
Data File	LM34687.wiff	**Injection Volume**	10.00
Acquisition Date	5/3/2016 3:25:04 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Standard
Instrument Name	API 4000	**Result Table**	060116_JWR.rdb
Sample ID	WG567320-02	**Dilution Factor**	1.00
Sample Comment	1,1 STD75510	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	5.000e+05	9.84	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.790e+04	9.85	0.10	0.103
Perchlorate conf	6.950e+03	9.83	0.10	0.104

O18LP (Internal Standard)

RT (Exp. RT): 9.84(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Standard)



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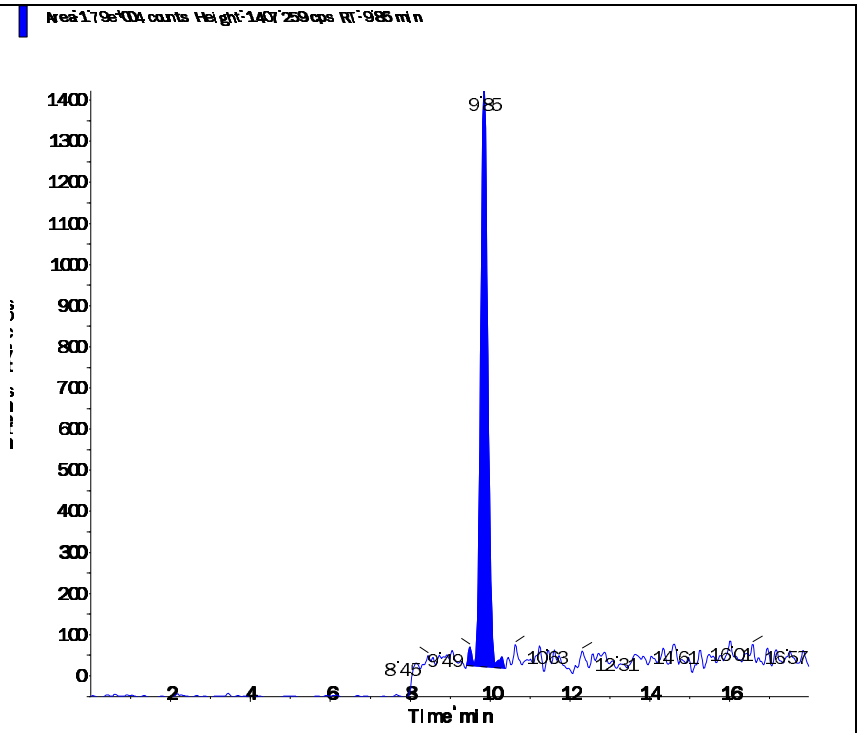
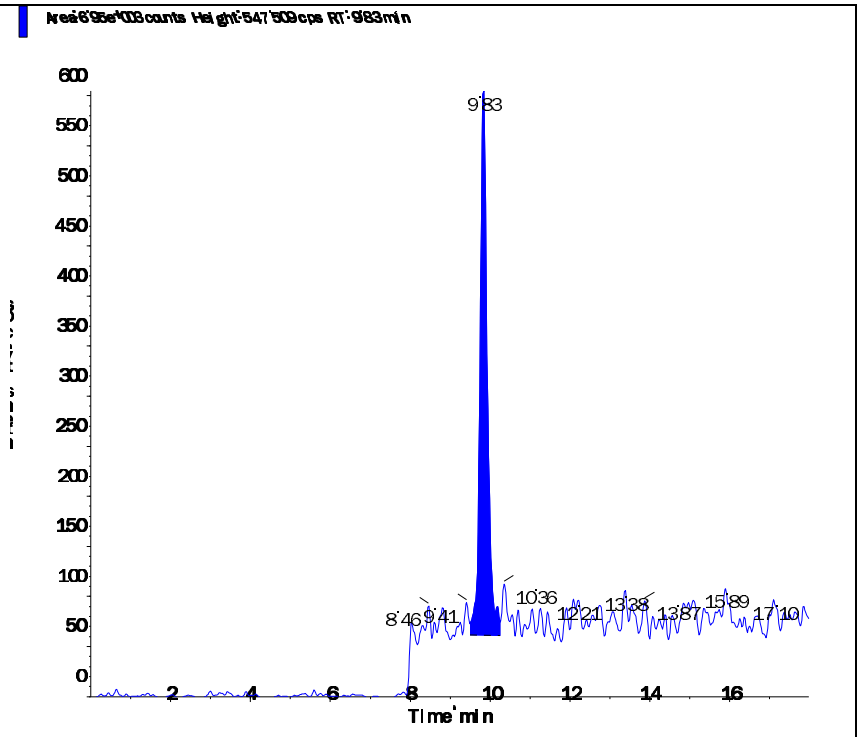
Perchlorate (98.8/83.3 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	9.85 (9.84) min 0.103 ng/ml 0.036 (Standard)



Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	9.83 (9.84) min 0.104 ng/ml 0.014 (Standard)



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Data File	LM34688.wiff	**Result Table**	060116_JWR.rdb
Acquisition Date	5/3/2016 3:43:59 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

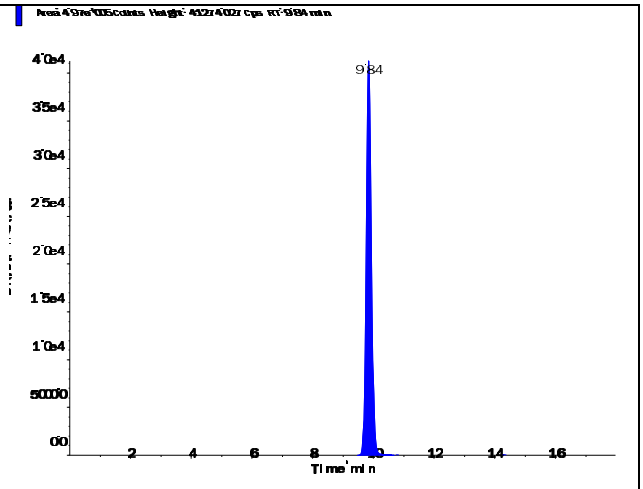
Sample Name	WG567320-03 STD (0.2 ug/L)	**Injection Vial**	3.00
Data File	LM34688.wiff	**Injection Volume**	10.00
Acquisition Date	5/3/2016 3:43:59 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Standard
Instrument Name	API 4000	**Result Table**	060116_JWR.rdb
Sample ID	WG567320-03	**Dilution Factor**	1.00
Sample Comment	1,1 STD75510	**Weight to Volume**	0.00

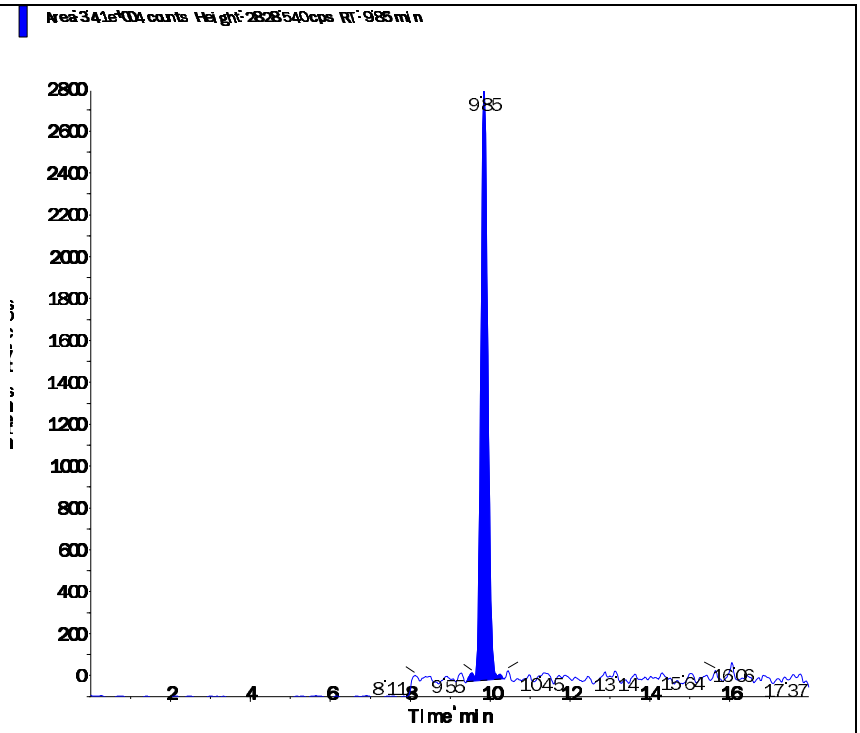
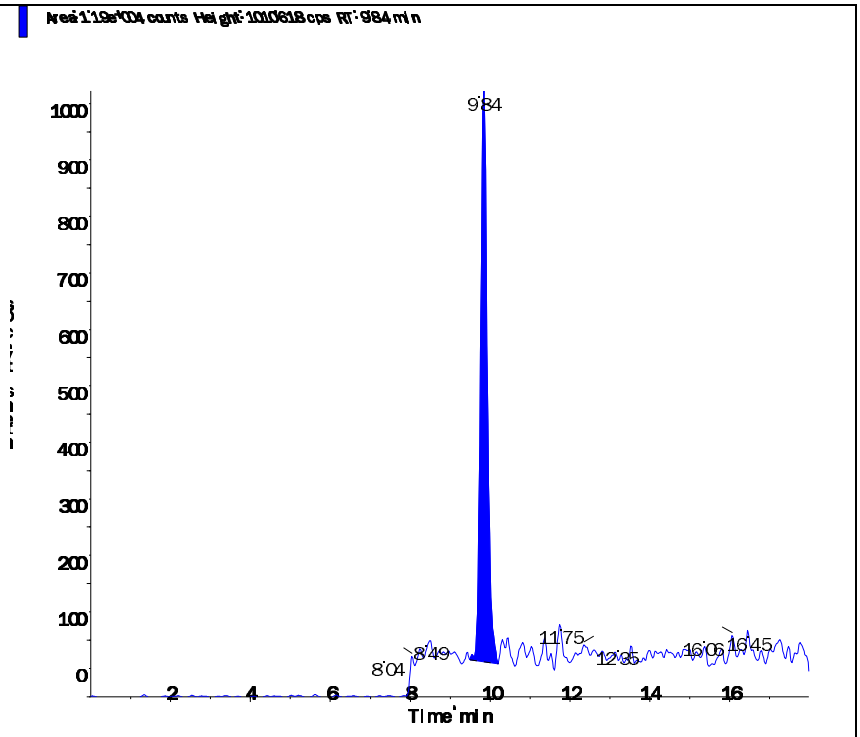
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.970e+05	9.84	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	3.410e+04	9.85	0.20	0.201
Perchlorate conf	1.190e+04	9.84	0.20	0.194

O18LP (Internal Standard)

RT (Exp. RT): 9.84(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Standard)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.85 (9.84) min Calculated conc: 0.201 ng/ml Area Ratio: 0.069 Sample Type: (Standard)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.84 (9.84) min Calculated conc: 0.194 ng/ml Area Ratio: 0.024 Sample Type: (Standard)	

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Data File	LM34689.wiff	**Result Table**	060116_JWR.rdb
Acquisition Date	5/3/2016 4:02:52 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

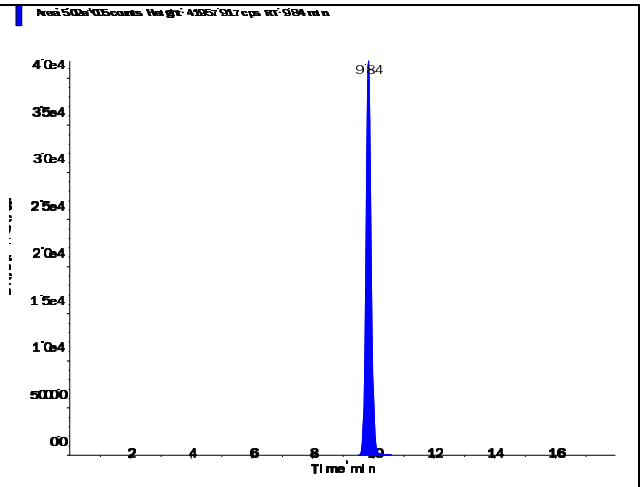
Sample Name	WG567320-04 STD (0.5 ug/L)	**Injection Vial**	4.00
Data File	LM34689.wiff	**Injection Volume**	10.00
Acquisition Date	5/3/2016 4:02:52 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Standard
Instrument Name	API 4000	**Result Table**	060116_JWR.rdb
Sample ID	WG567320-04	**Dilution Factor**	1.00
Sample Comment	1,1 STD75510	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	5.020e+05	9.84	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	8.220e+04	9.85	0.50	0.483
Perchlorate conf	2.940e+04	9.84	0.50	0.503

O18LP (Internal Standard)

RT (Exp. RT): 9.84(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Standard)



s.dataFile Page 1 of 2

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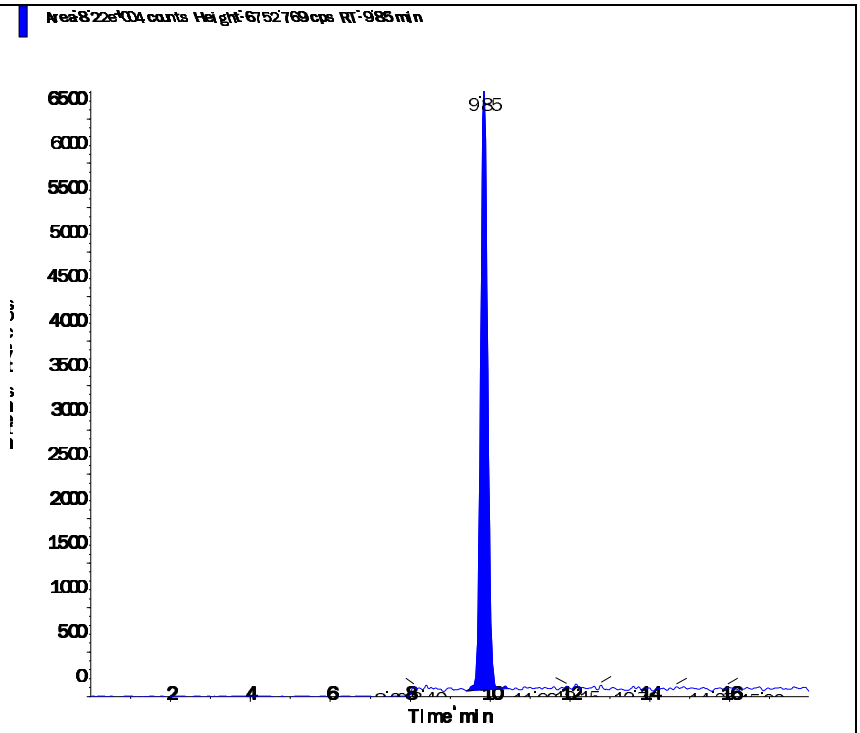
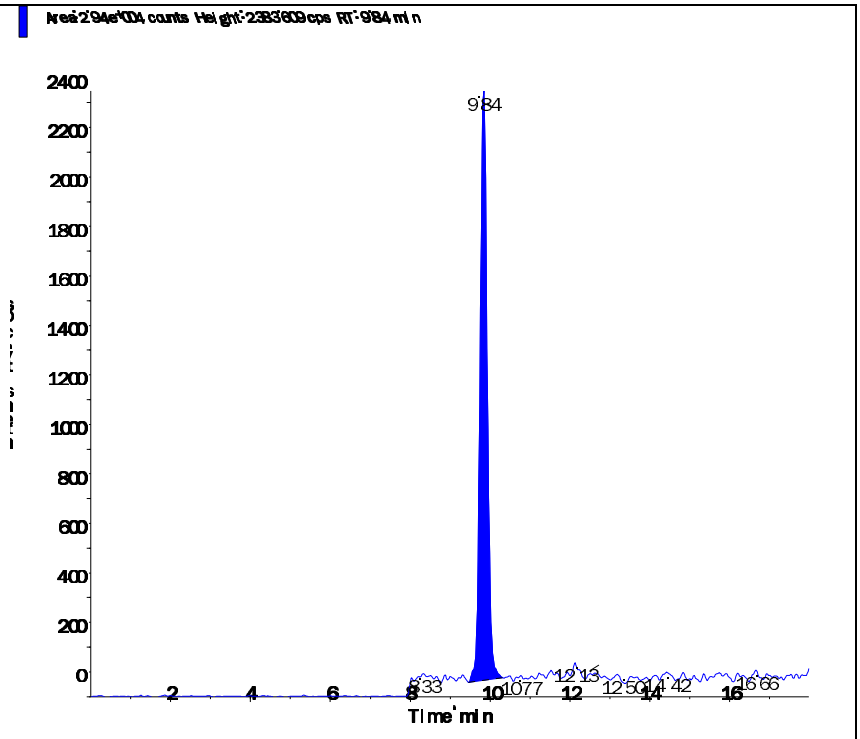
Perchlorate (98.8/83.3 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	9.85 (9.84) min 0.483 ng/ml 0.164 (Standard)



Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	9.84 (9.84) min 0.503 ng/ml 0.058 (Standard)



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Data File	LM34690.wiff	**Result Table**	060116_JWR.rdb
Acquisition Date	5/3/2016 4:21:49 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

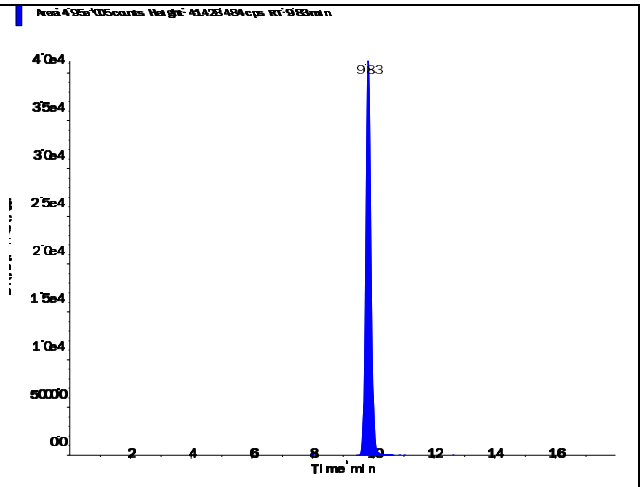
Sample Name	WG567320-05 STD (1.0 ug/L)	**Injection Vial**	5.00
Data File	LM34690.wiff	**Injection Volume**	10.00
Acquisition Date	5/3/2016 4:21:49 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Standard
Instrument Name	API 4000	**Result Table**	060116_JWR.rdb
Sample ID	WG567320-05	**Dilution Factor**	1.00
Sample Comment	1,1 STD75510	**Weight to Volume**	0.00

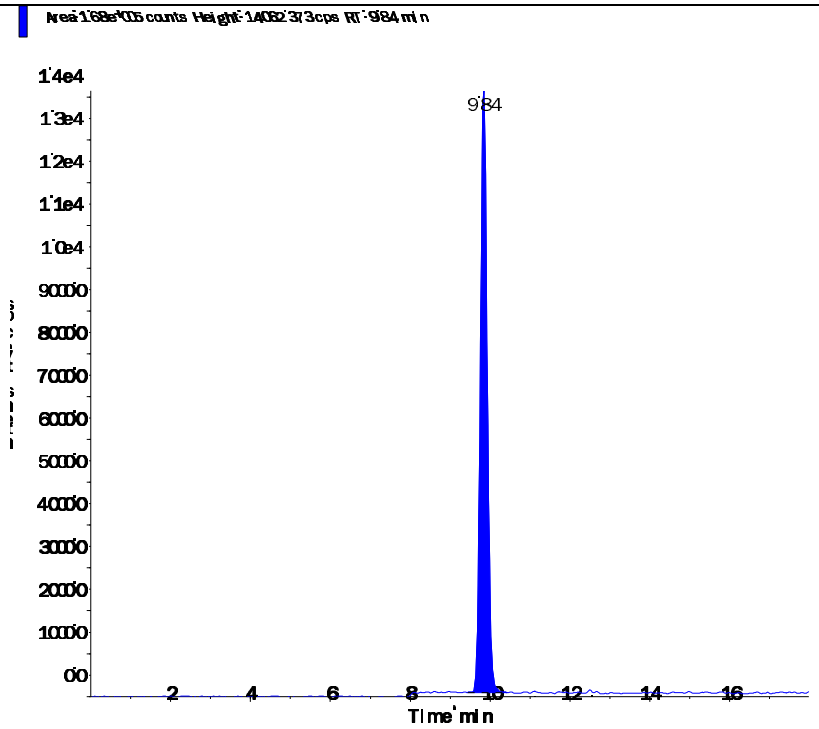
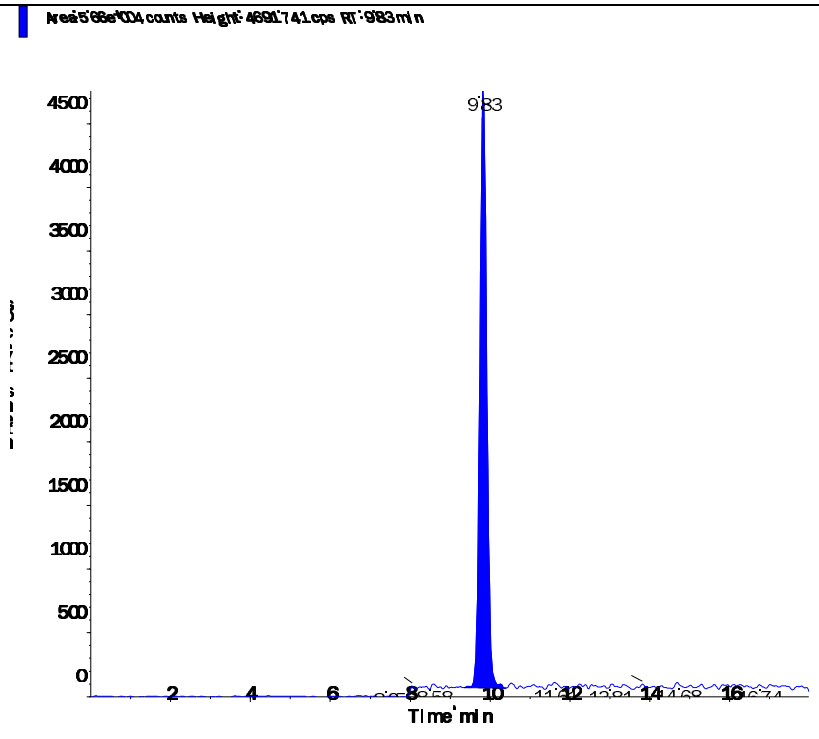
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.950e+05	9.83	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.680e+05	9.84	1.00	1.01
Perchlorate conf	5.660e+04	9.83	1.00	1.00

O18LP (Internal Standard)

RT (Exp. RT): 9.83(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Standard)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.84 (9.84) min Calculated conc: 1.01 ng/ml Area Ratio: 0.339 Sample Type: (Standard)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.83 (9.84) min Calculated conc: 1.00 ng/ml Area Ratio: 0.114 Sample Type: (Standard)	

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Data File	LM34691.wiff	**Result Table**	060116_JWR.rdb
Acquisition Date	5/3/2016 4:40:45 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

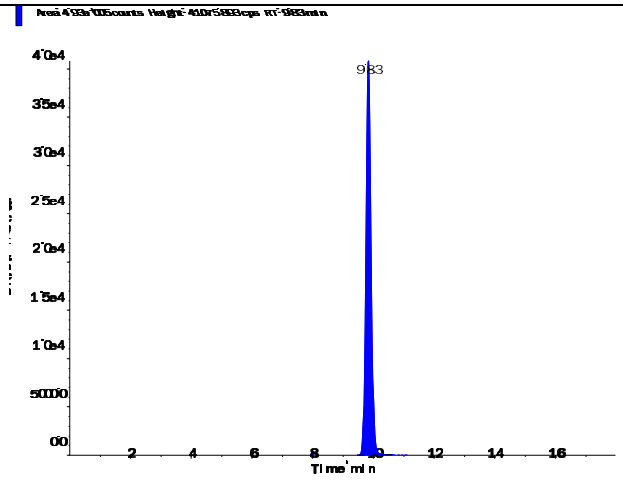
Sample Name	WG567320-06 STD (2.0 ug/L)	**Injection Vial**	6.00
Data File	LM34691.wiff	**Injection Volume**	10.00
Acquisition Date	5/3/2016 4:40:45 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Standard
Instrument Name	API 4000	**Result Table**	060116_JWR.rdb
Sample ID	WG567320-06	**Dilution Factor**	1.00
Sample Comment	1,1 STD75510	**Weight to Volume**	0.00

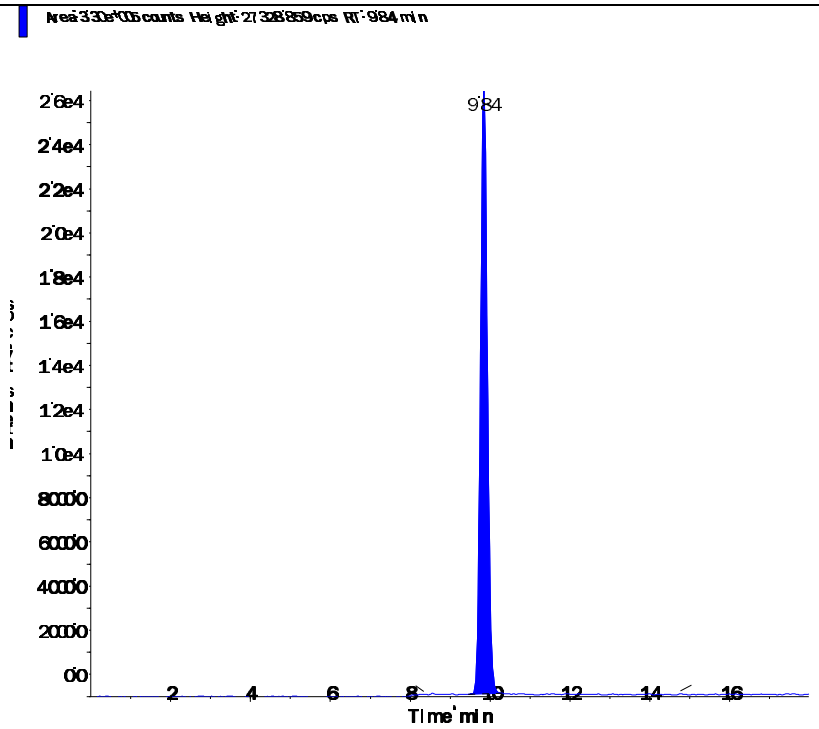
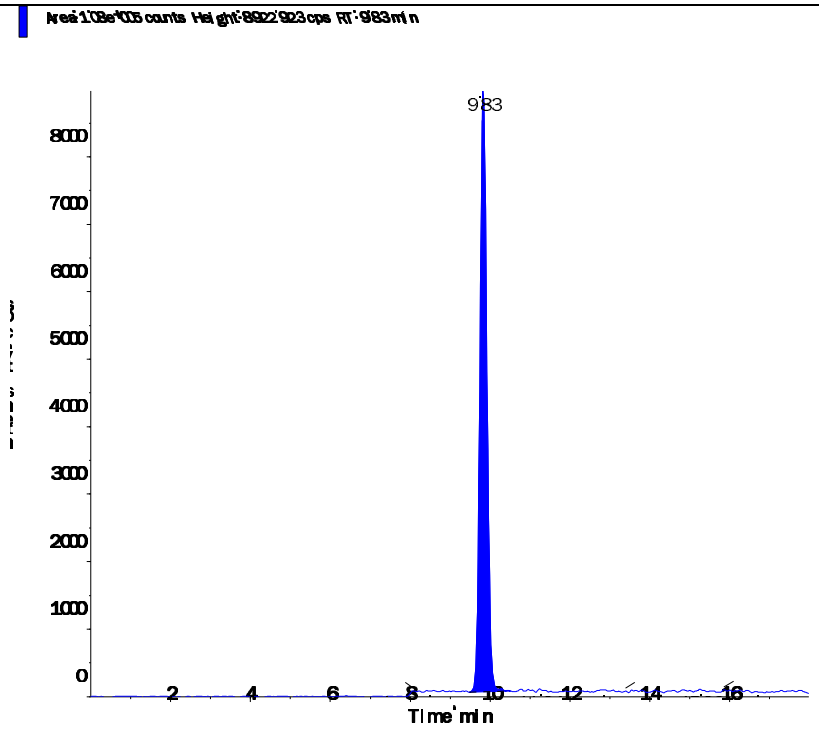
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.930e+05	9.83	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	3.300e+05	9.84	2.00	1.99
Perchlorate conf	1.080e+05	9.83	2.00	1.94

O18LP (Internal Standard)

RT (Exp. RT): 9.83(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Standard)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.84 (9.84) min Calculated conc: 1.99 ng/ml Area Ratio: 0.669 Sample Type: (Standard)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.83 (9.84) min Calculated conc: 1.94 ng/ml Area Ratio: 0.219 Sample Type: (Standard)	

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Data File	LM34692.wiff	**Result Table**	060116_JWR.rdb
Acquisition Date	5/3/2016 4:59:42 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

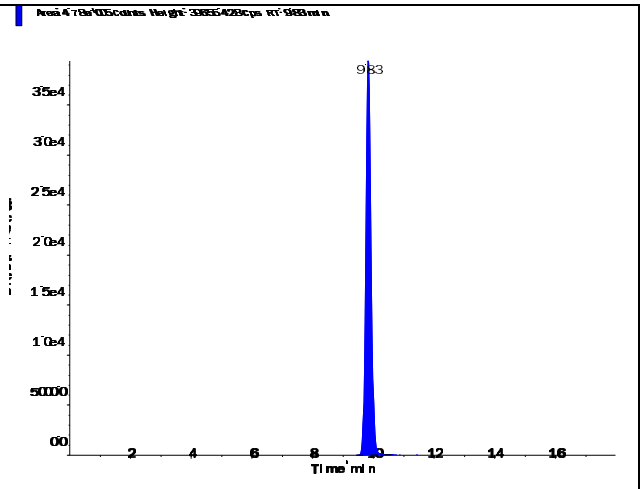
Sample Name	WG567320-07 STD (5.0 ug/L)	**Injection Vial**	7.00
Data File	LM34692.wiff	**Injection Volume**	10.00
Acquisition Date	5/3/2016 4:59:42 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Standard
Instrument Name	API 4000	**Result Table**	060116_JWR.rdb
Sample ID	WG567320-07	**Dilution Factor**	1.00
Sample Comment	1,1 STD75510	**Weight to Volume**	0.00

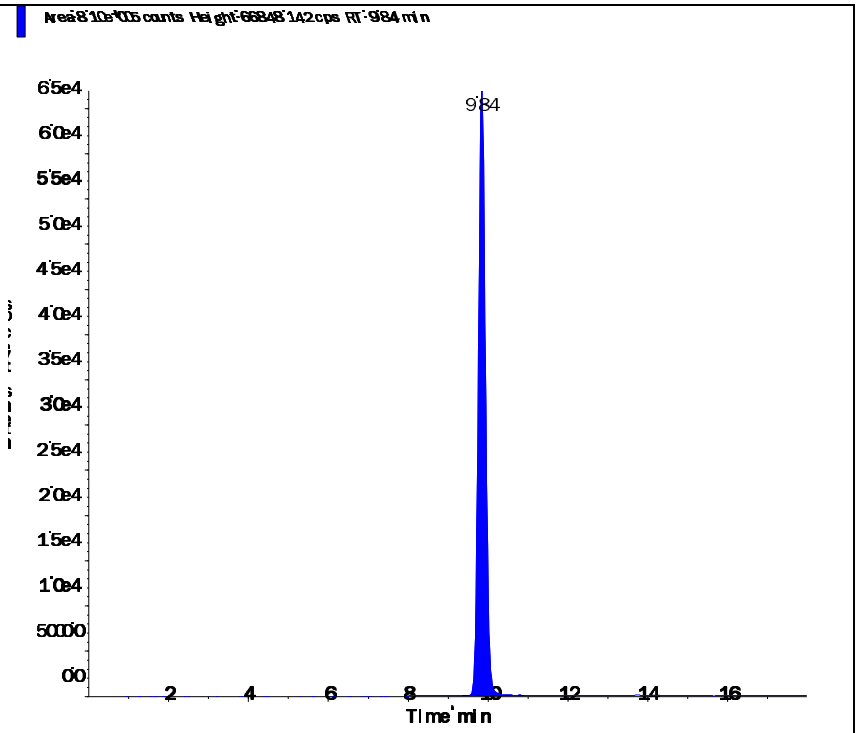
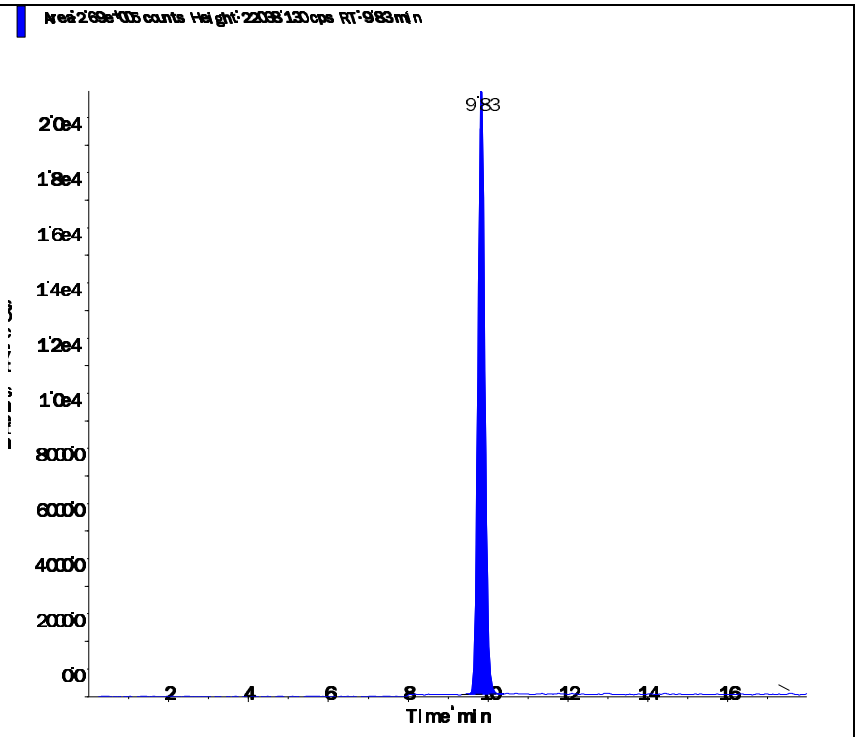
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.780e+05	9.83	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	8.100e+05	9.84	5.00	5.04
Perchlorate conf	2.690e+05	9.83	5.00	5.02

O18LP (Internal Standard)

RT (Exp. RT): 9.83(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Standard)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.84 (9.84) min Calculated conc: 5.04 ng/ml Area Ratio: 1.695 Sample Type: (Standard)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.83 (9.84) min Calculated conc: 5.02 ng/ml Area Ratio: 0.562 Sample Type: (Standard)	

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Data File	LM34693.wiff	**Result Table**	060116_JWR.rdb
Acquisition Date	5/3/2016 5:18:37 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

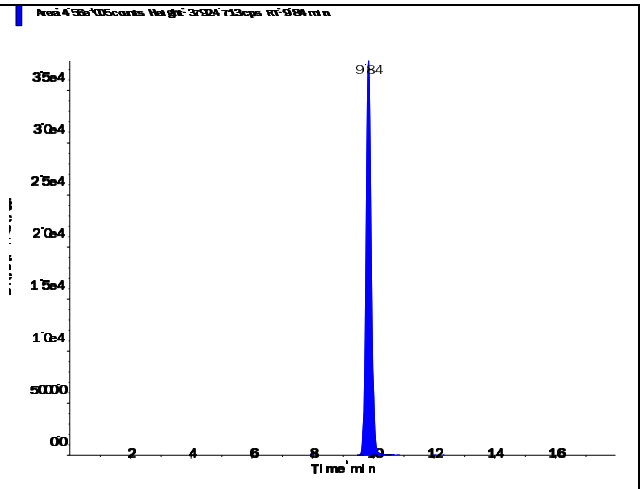
Sample Name	WG567320-08 STD (10 ug/L)	**Injection Vial**	8.00
Data File	LM34693.wiff	**Injection Volume**	10.00
Acquisition Date	5/3/2016 5:18:37 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Standard
Instrument Name	API 4000	**Result Table**	060116_JWR.rdb
Sample ID	WG567320-08	**Dilution Factor**	1.00
Sample Comment	1,1 STD75510	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.560e+05	9.84	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.530e+06	9.85	10.00	9.99
Perchlorate conf	5.120e+05	9.83	10.00	10.00

O18LP (Internal Standard)

RT (Exp. RT): 9.84(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Standard)



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Perchlorate (98.8/83.3 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	9.85 (9.84) min 9.99 ng/ml 3.36 (Standard)
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	9.83 (9.84) min 10.00 ng/ml 1.122 (Standard)

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Printed: 5/4/2016 1:23 PM

Data File	LM34694.wiff	**Result Table**	050316_JWR.rdb
Acquisition Date	5/3/2016 5:37:34 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

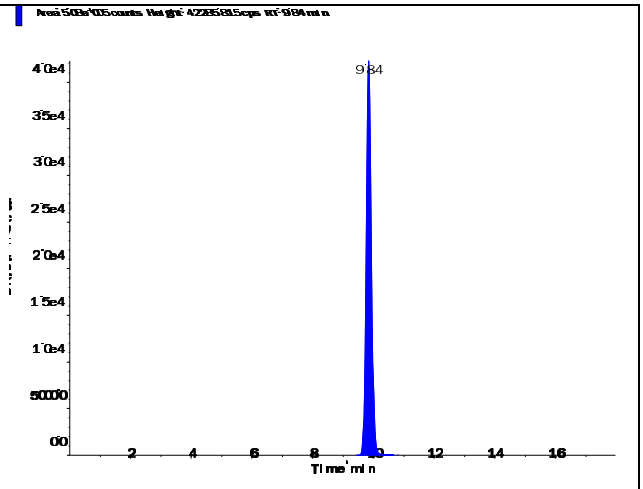
Sample Name	WG567320-09 SSCV (1.0 ug/L)	**Injection Vial**	9.00
Data File	LM34694.wiff	**Injection Volume**	10.00
Acquisition Date	5/3/2016 5:37:34 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Quality Control
Instrument Name	API 4000	**Result Table**	050316_JWR.rdb
Sample ID	WG567320-09	**Dilution Factor**	1.00
Sample Comment	1,1 STD75512	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	5.080e+05	9.84	5.00	-

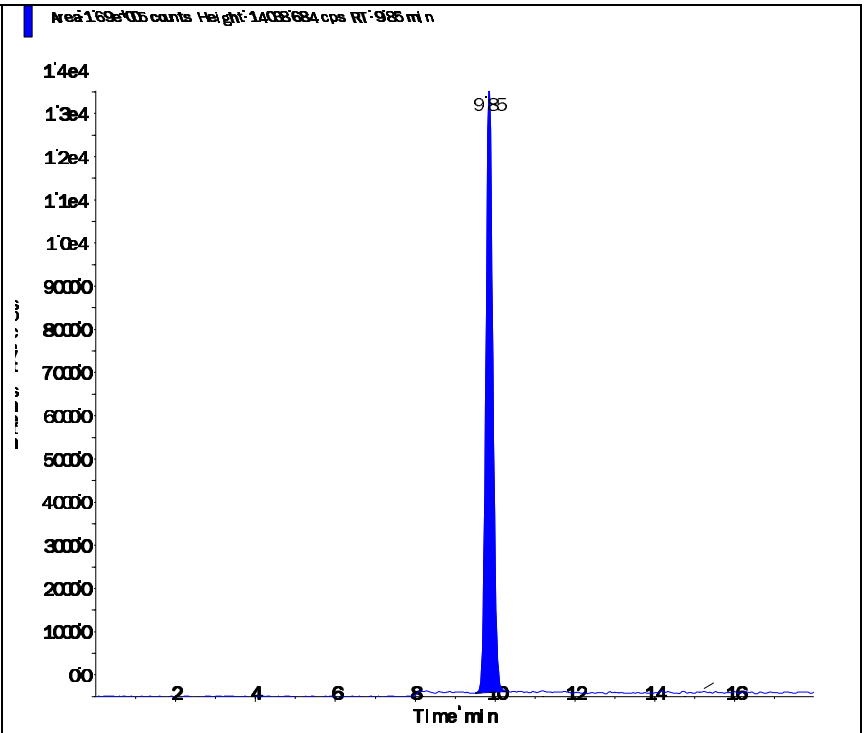
Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.690e+05	9.85	1.00	0.985
Perchlorate conf	5.630e+04	9.84	1.00	0.973

O18LP (Internal Standard)

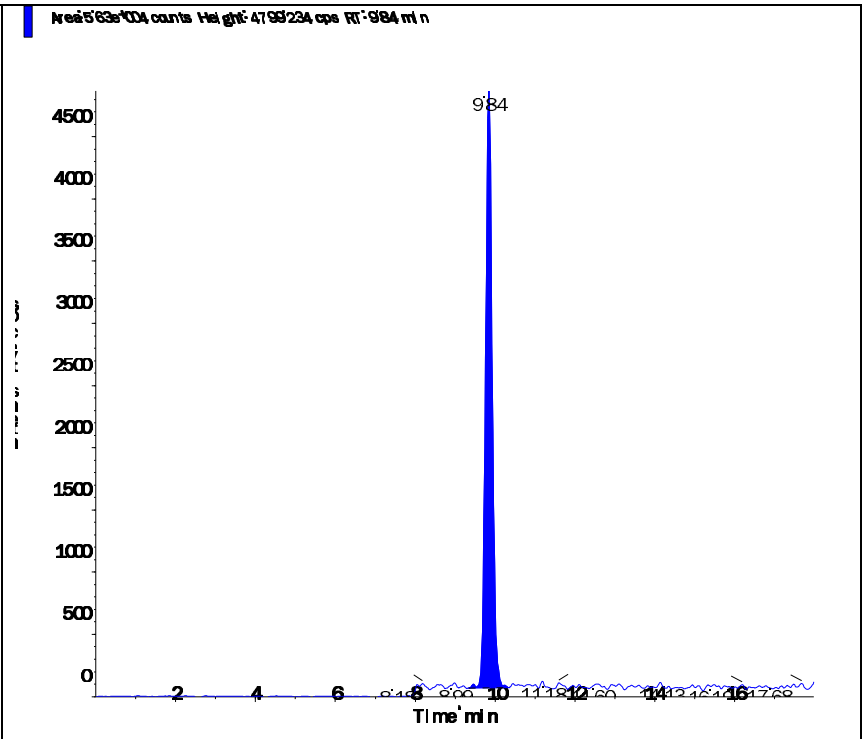
RT (Exp. RT): 9.84(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Quality Control)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	 9.85 (9.84) min 0.985 ng/ml 0.332 (Quality Control)



Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	 9.84 (9.84) min 0.973 ng/ml 0.111 (Quality Control)



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Data File	LM35121.wiff	**Result Table**	060116_JWR.rdb
Acquisition Date	6/1/2016 1:47:51 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

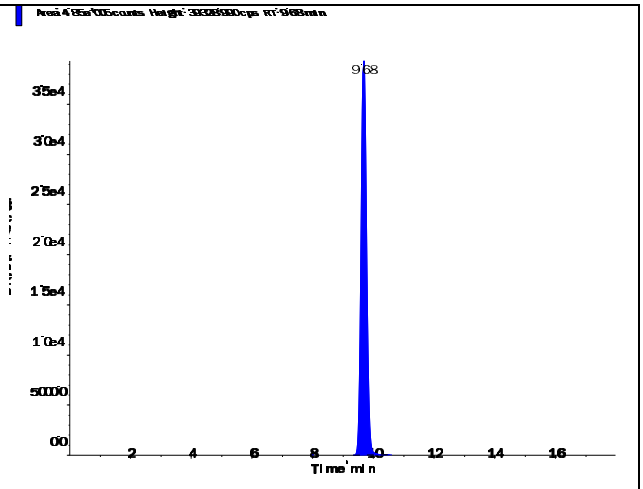
Sample Name	WG570935-02 CCV (1.0ug/L)	**Injection Vial**	3.00
Data File	LM35121.wiff	**Injection Volume**	10.00
Acquisition Date	6/1/2016 1:47:51 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Quality Control
Instrument Name	API 4000	**Result Table**	060116_JWR.rdb
Sample ID	WG570935-02	**Dilution Factor**	1.00
Sample Comment	1,1 STD75510	**Weight to Volume**	0.00

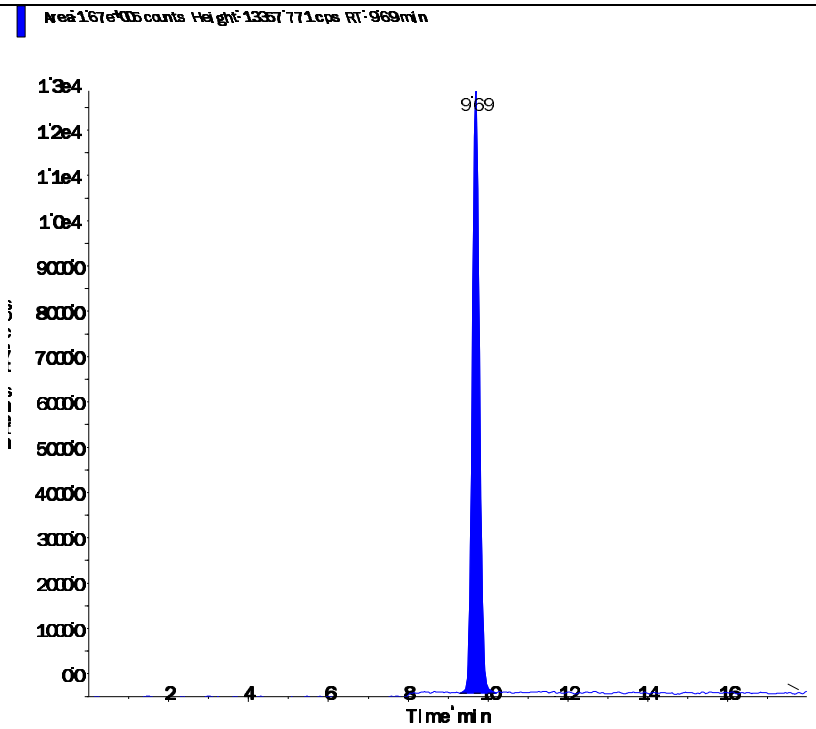
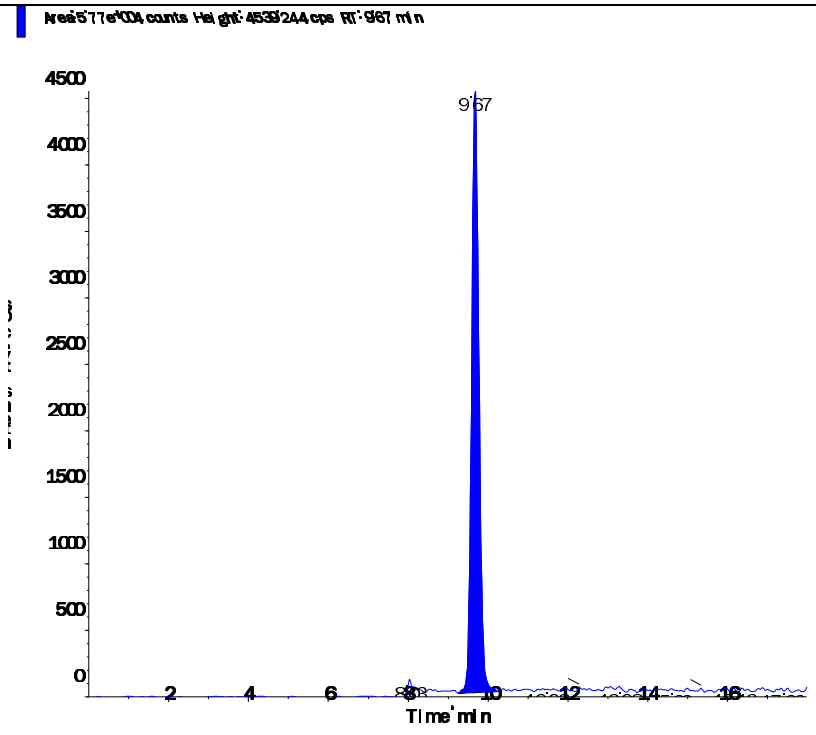
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.850e+05	9.68	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.670e+05	9.69	1.00	1.02
Perchlorate conf	5.770e+04	9.67	1.00	1.04

O18LP (Internal Standard)

RT (Exp. RT): 9.68(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Quality Control)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.69 (9.84) min Calculated conc: 1.02 ng/ml Area Ratio: 0.343 Sample Type: (Quality Control)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.67 (9.84) min Calculated conc: 1.04 ng/ml Area Ratio: 0.119 Sample Type: (Quality Control)	

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Data File	LM35133.wiff	**Result Table**	060116_JWR.rdb
Acquisition Date	6/1/2016 5:35:06 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

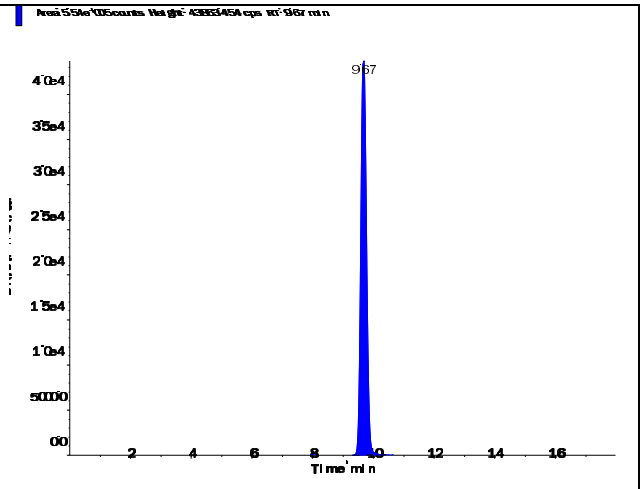
Sample Name	WG570935-03 CCV (1.0ug/L)	**Injection Vial**	3.00
Data File	LM35133.wiff	**Injection Volume**	10.00
Acquisition Date	6/1/2016 5:35:06 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Quality Control
Instrument Name	API 4000	**Result Table**	060116_JWR.rdb
Sample ID	WG570935-03	**Dilution Factor**	1.00
Sample Comment	1,1 STD75510	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	5.540e+05	9.67	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.840e+05	9.69	1.00	0.983
Perchlorate conf	6.450e+04	9.67	1.00	1.02

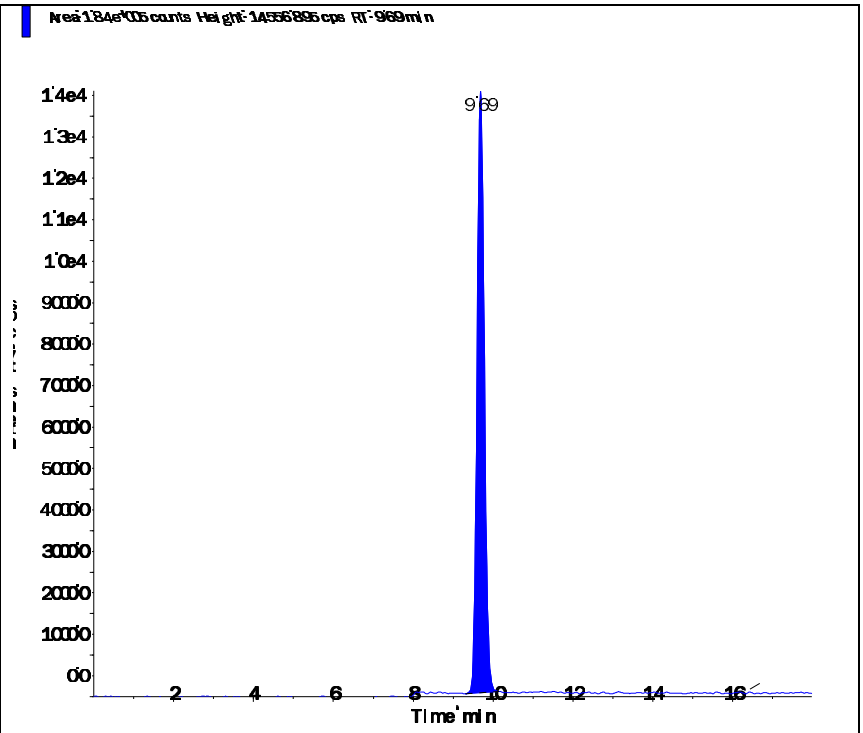
O18LP (Internal Standard)

RT (Exp. RT): 9.67(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Quality Control)



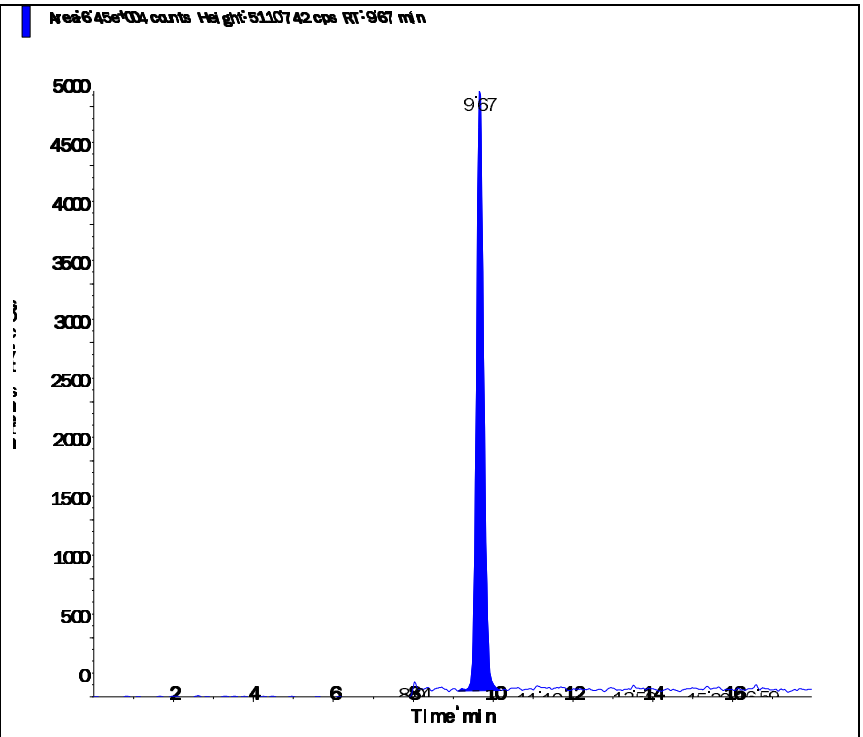
Perchlorate (98.8/83.3 amu)

RT (Exp. RT):	9.69 (9.84) min
Calculated conc:	0.983 ng/ml
Area Ratio:	0.332
Sample Type:	(Quality Control)



Perchlorate conf (100.8/85.2 amu)

RT (Exp. RT):	9.67 (9.84) min
Calculated conc:	1.02 ng/ml
Area Ratio:	0.116
Sample Type:	(Quality Control)



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Data File	LM35122.wiff	**Result Table**	060116_JWR.rdb
Acquisition Date	6/1/2016 2:06:46 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

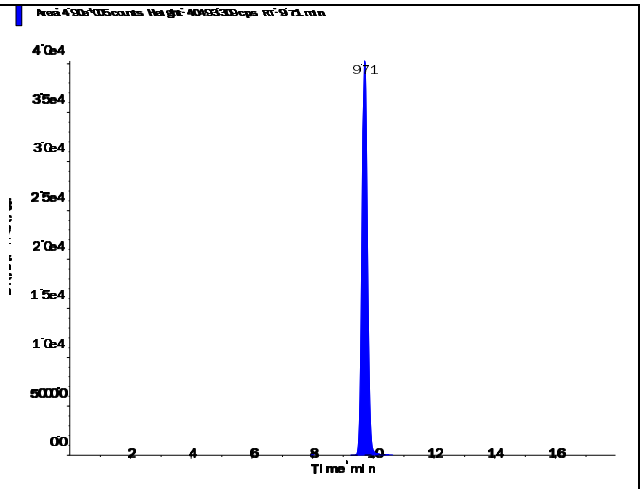
Sample Name	WG570932-05 MRL (0.2ug/L)	**Injection Vial**	2.00
Data File	LM35122.wiff	**Injection Volume**	10.00
Acquisition Date	6/1/2016 2:06:46 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	060116_JWR.rdb
Sample ID	WG570932-05	**Dilution Factor**	1.00
Sample Comment	1,1 STD75510	**Weight to Volume**	0.00

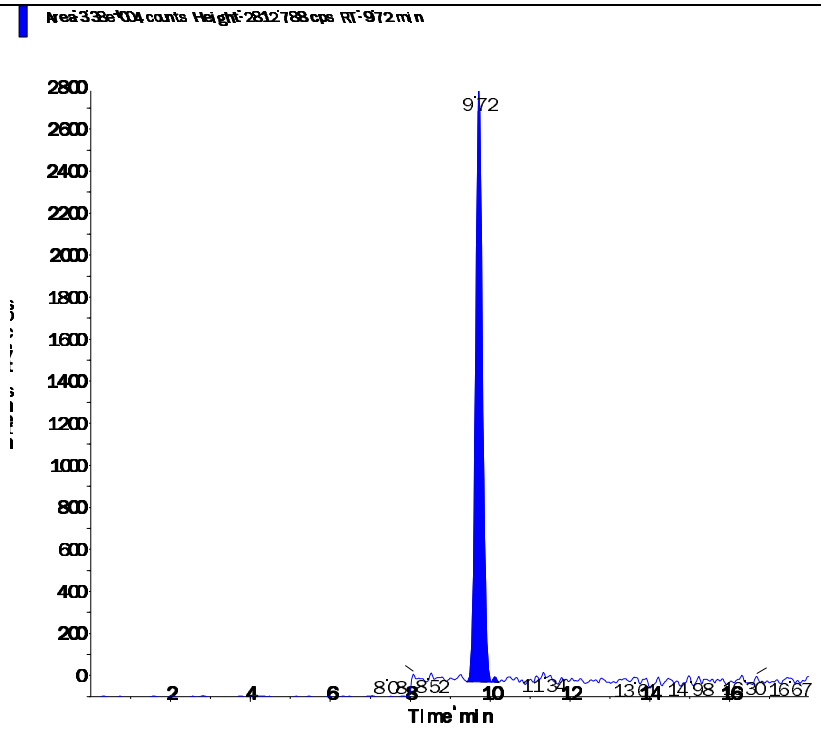
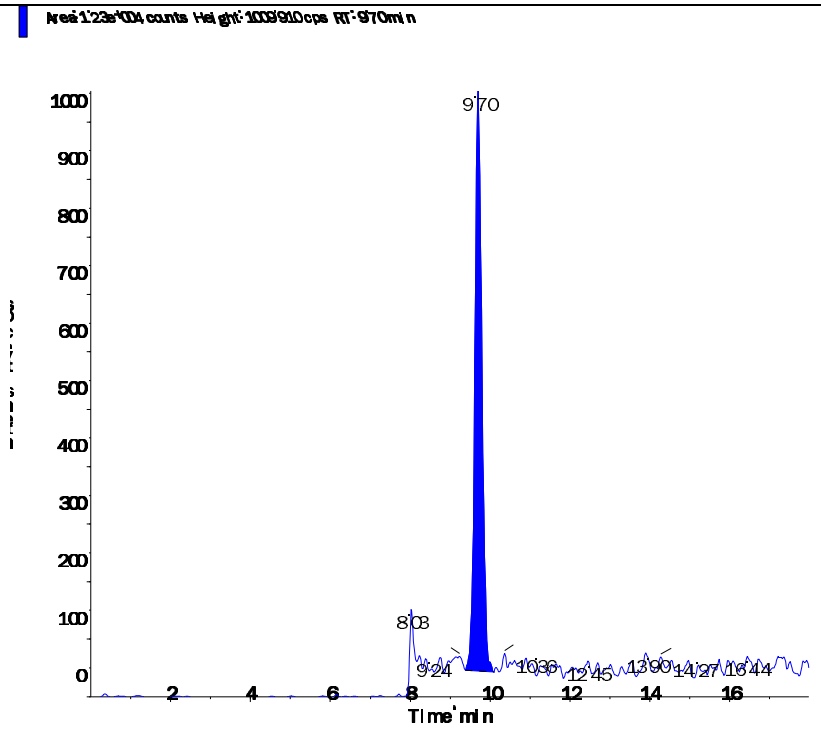
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.900e+05	9.71	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	3.380e+04	9.72	N/A	0.201
Perchlorate conf	1.230e+04	9.70	N/A	0.204

O18LP (Internal Standard)

RT (Exp. RT): 9.71(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.72 (9.84) min Calculated conc: 0.201 ng/ml Area Ratio: 0.069 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.70 (9.84) min Calculated conc: 0.204 ng/ml Area Ratio: 0.025 Sample Type: (Unknown)	

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Data File	LM35134.wiff	**Result Table**	060116_JWR.rdb
Acquisition Date	6/1/2016 5:54:03 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

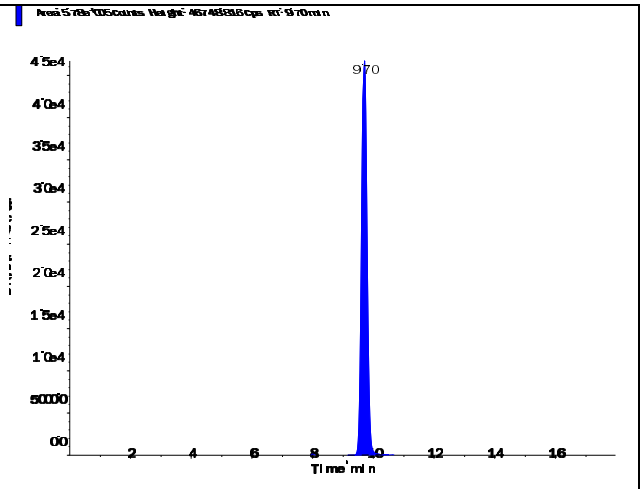
Sample Name	WG570932-06 MRL (0.2ug/L)	**Injection Vial**	2.00
Data File	LM35134.wiff	**Injection Volume**	10.00
Acquisition Date	6/1/2016 5:54:03 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	060116_JWR.rdb
Sample ID	WG570932-06	**Dilution Factor**	1.00
Sample Comment	1,1 STD75510	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	5.780e+05	9.70	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	3.960e+04	9.70	N/A	0.20
Perchlorate conf	1.380e+04	9.69	N/A	0.193

O18LP (Internal Standard)

RT (Exp. RT): 9.70(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



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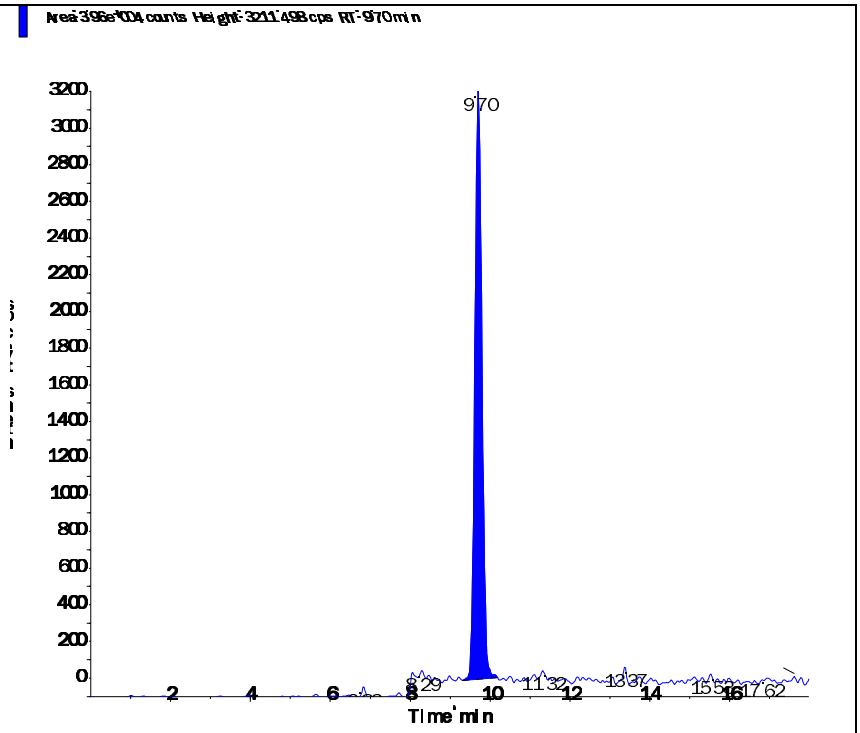
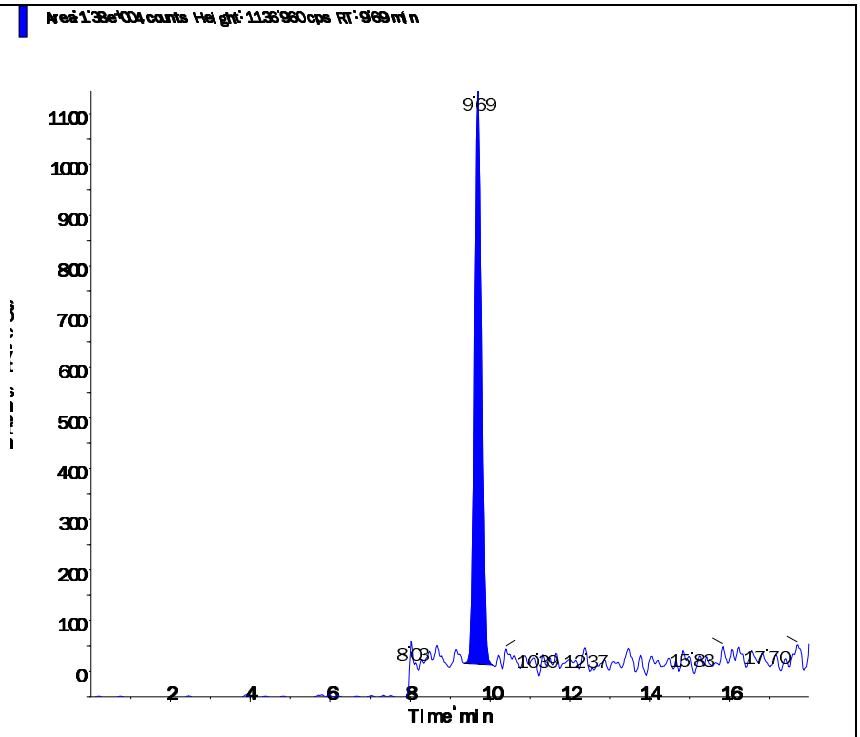
Perchlorate (98.8/83.3 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	 9.70 (9.84) min 0.20 ng/ml 0.069 (Unknown)



Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	 9.69 (9.84) min 0.193 ng/ml 0.024 (Unknown)



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Data File	LM35120.wiff	**Result Table**	060116_JWR.rdb
Acquisition Date	6/1/2016 1:28:59 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

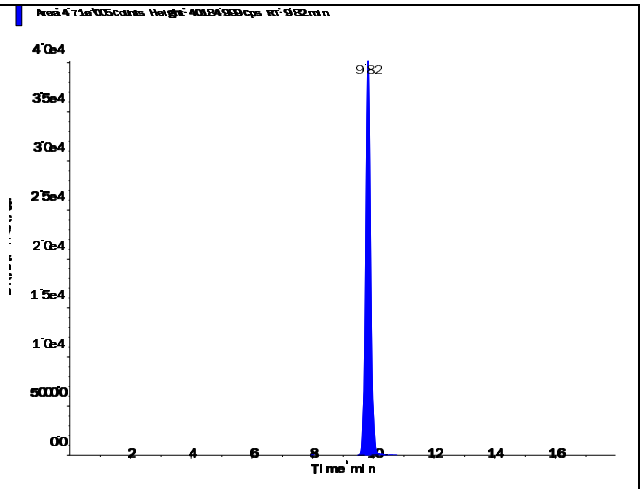
Sample Name	WG570935-01 CCB	**Injection Vial**	1.00
Data File	LM35120.wiff	**Injection Volume**	10.00
Acquisition Date	6/1/2016 1:28:59 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	060116_JWR.rdb
Sample ID	WG570935-01	**Dilution Factor**	1.00
Sample Comment	11.00	**Weight to Volume**	0.00

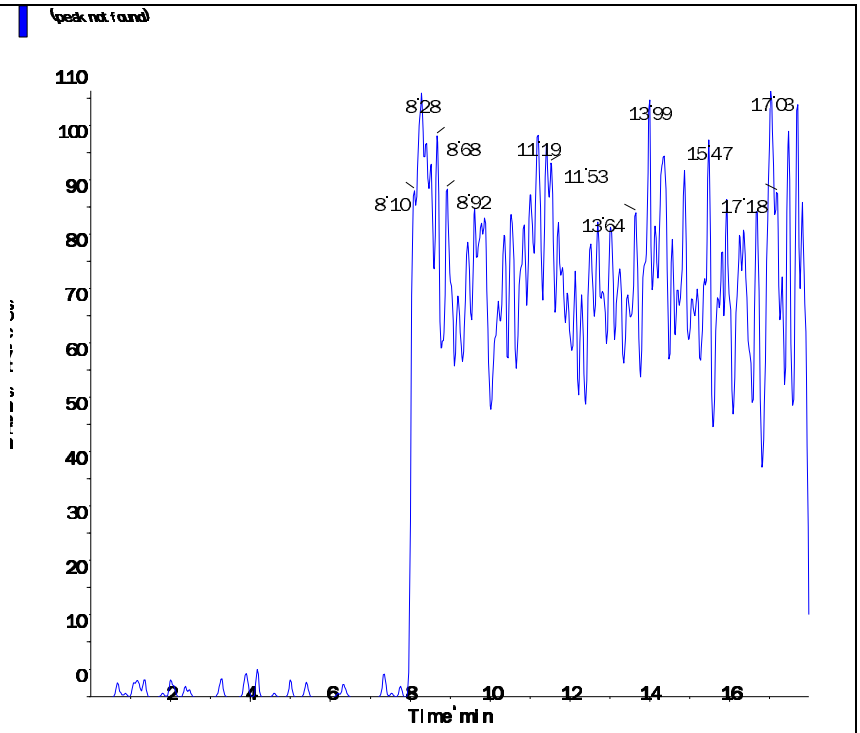
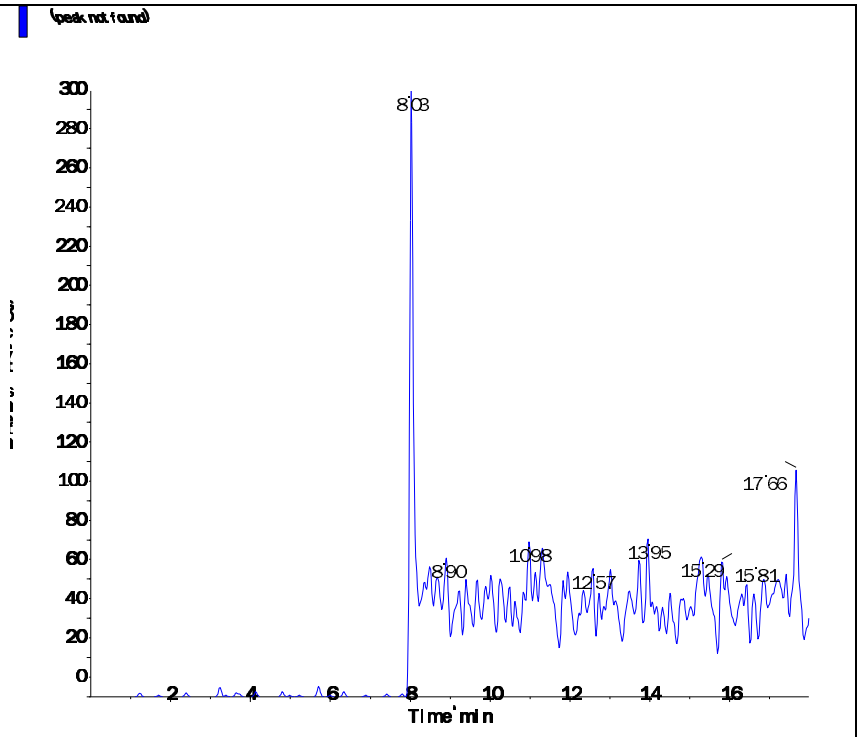
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.710e+05	9.82	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	0.000e+00	0.00	N/A	No Peak
Perchlorate conf	0.000e+00	0.00	N/A	No Peak

O18LP (Internal Standard)

RT (Exp. RT): 9.82(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 0.00 (9.84) min Calculated conc: No Peak ng/ml Area Ratio: 0.00 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 0.00 (9.84) min Calculated conc: No Peak ng/ml Area Ratio: 0.00 Sample Type: (Unknown)	

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Created with Analyst Reporter
Printed: 6/2/2016 2:53 PM

Data File	LM35135.wiff	**Result Table**	060116_JWR.rdb
Acquisition Date	6/1/2016 6:13:00 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

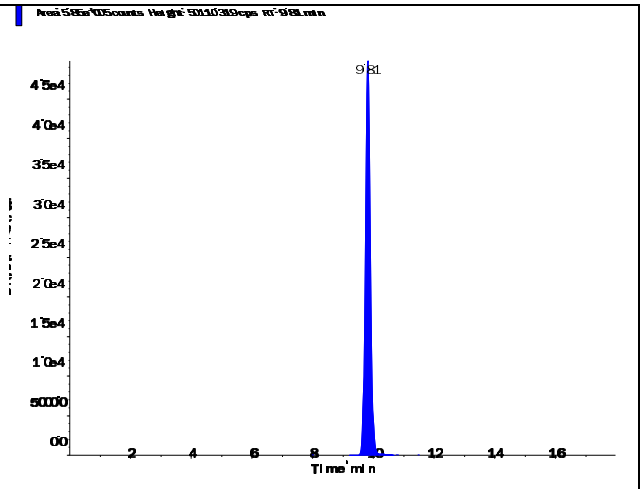
Sample Name	WG570935-04 CCB	**Injection Vial**	1.00
Data File	LM35135.wiff	**Injection Volume**	10.00
Acquisition Date	6/1/2016 6:13:00 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	060116_JWR.rdb
Sample ID	WG570935-04	**Dilution Factor**	1.00
Sample Comment	11.00	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	5.850e+05	9.81	5.00	-

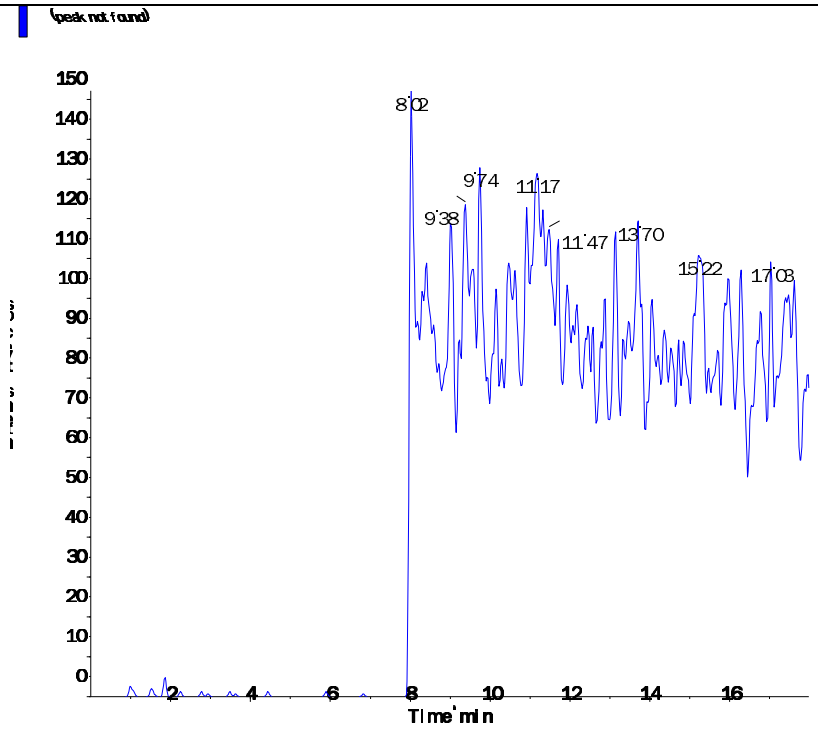
Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	0.000e+00	0.00	N/A	No Peak
Perchlorate conf	0.000e+00	0.00	N/A	No Peak

O18LP (Internal Standard)

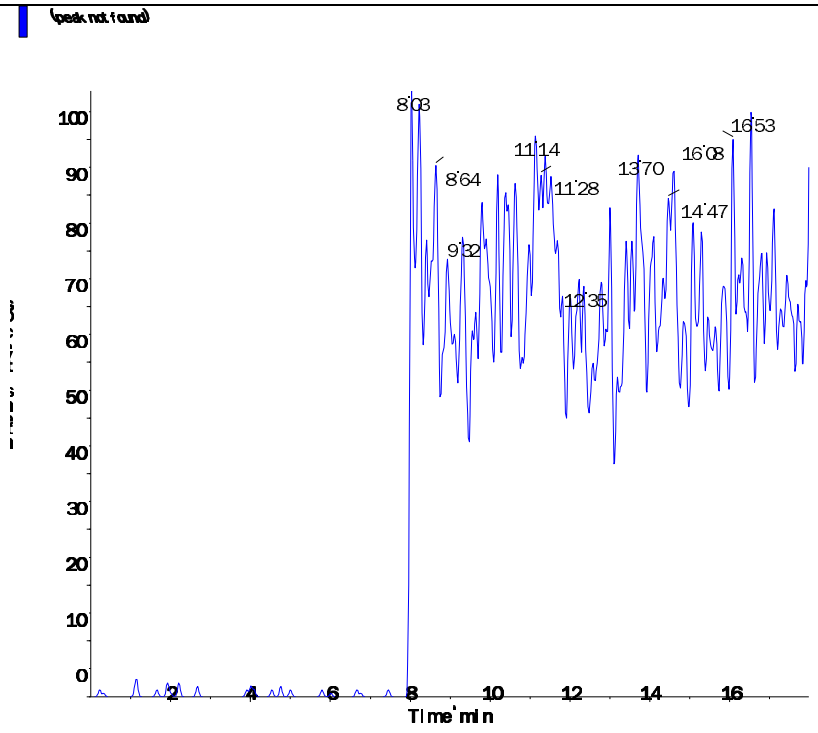
RT (Exp. RT): 9.81(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	 0.00 (9.84) min No Peak ng/ml 0.00 (Unknown)



Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	 0.00 (9.84) min No Peak ng/ml 0.00 (Unknown)



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Printed: 6/2/2016 2:49 PM

Data File	LM35123.wiff	**Result Table**	060116_JWR.rdb
Acquisition Date	6/1/2016 2:25:43 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

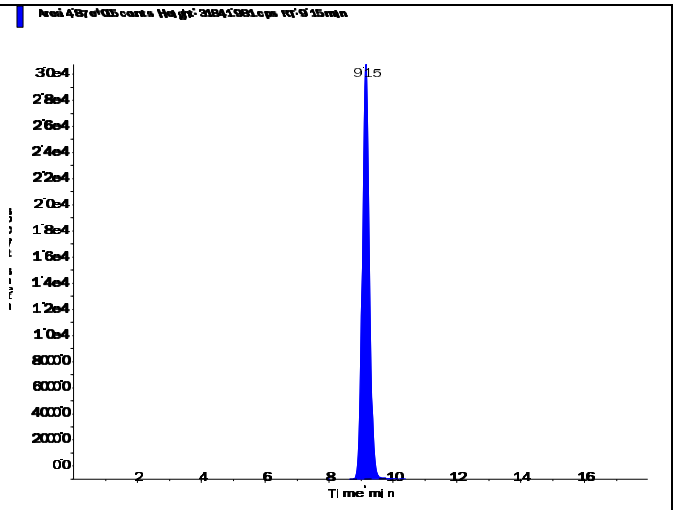
Sample Name	WG570932-01 MCT (0.2ug/L)	**Injection Vial**	4.00
Data File	LM35123.wiff	**Injection Volume**	10.00
Acquisition Date	6/1/2016 2:25:43 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	060116_JWR.rdb
Sample ID	WG570932-01	**Dilution Factor**	1.00
Sample Comment	1,1 STD75512	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.870e+05	9.15	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	3.230e+04	9.17	N/A	0.193
Perchlorate conf	1.170e+04	9.15	N/A	0.195

O18LP (Internal Standard)

RT (Exp. RT): 9.15(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



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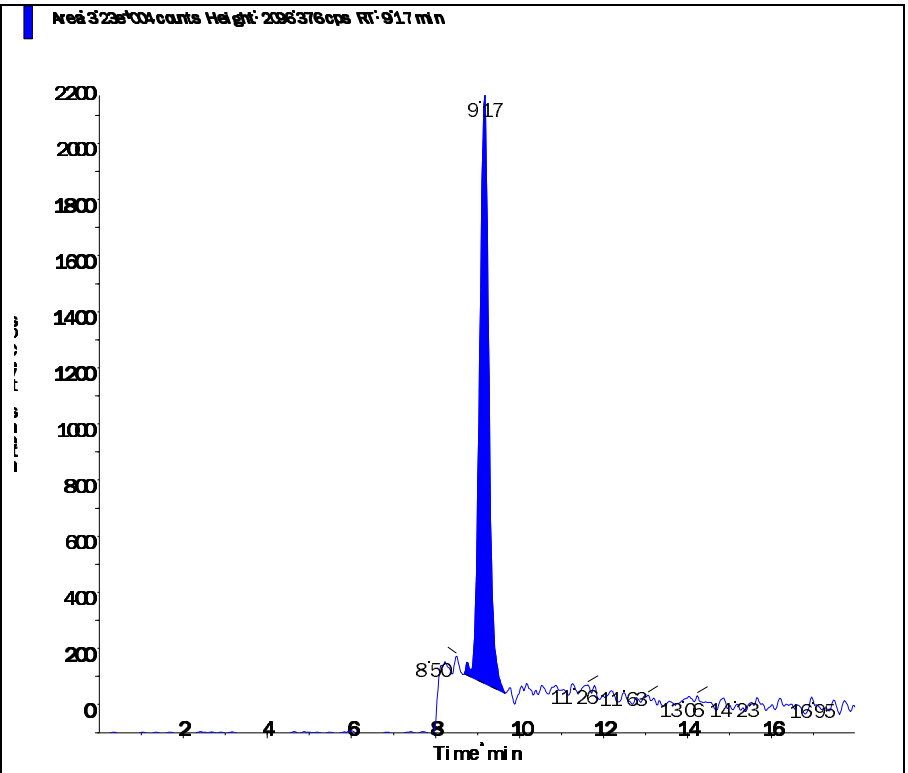
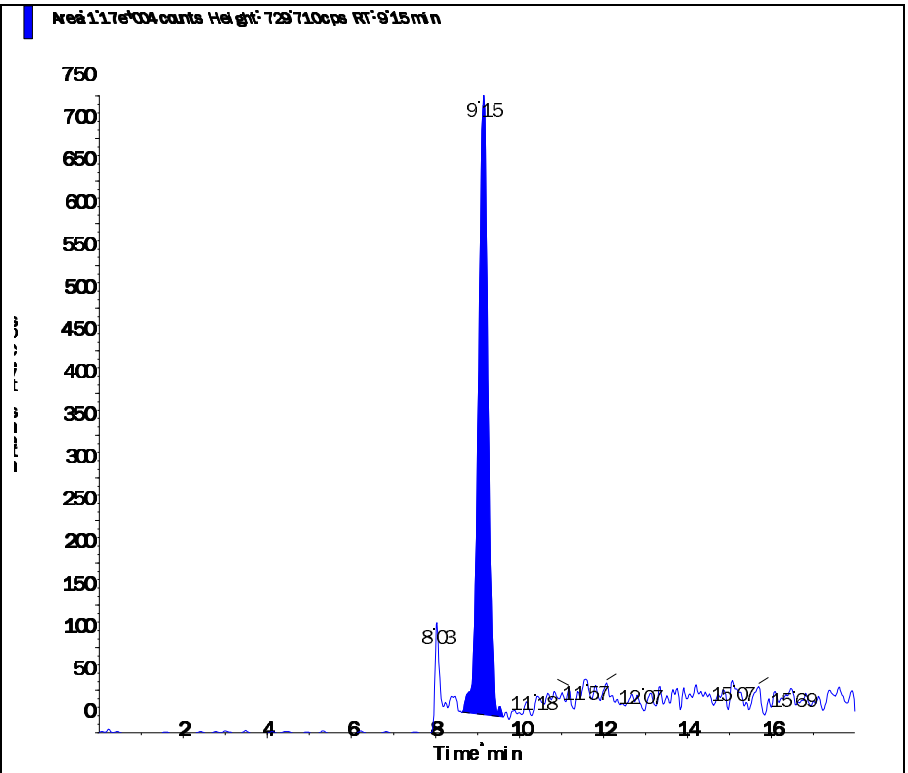
Created with Analyst Reporter
Printed: 6/2/2016 2:49 PM

Perchlorate (98.8/83.3 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	9.17 (9.84) min 0.193 ng/ml 0.066 (Unknown)



Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	9.15 (9.84) min 0.195 ng/ml 0.024 (Unknown)



2.1.1.5 Raw QC Data

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Printed: 6/2/2016 2:49 PM

Data File	LM35124.wiff	**Result Table**	060116_JWR.rdb
Acquisition Date	6/1/2016 2:44:38 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

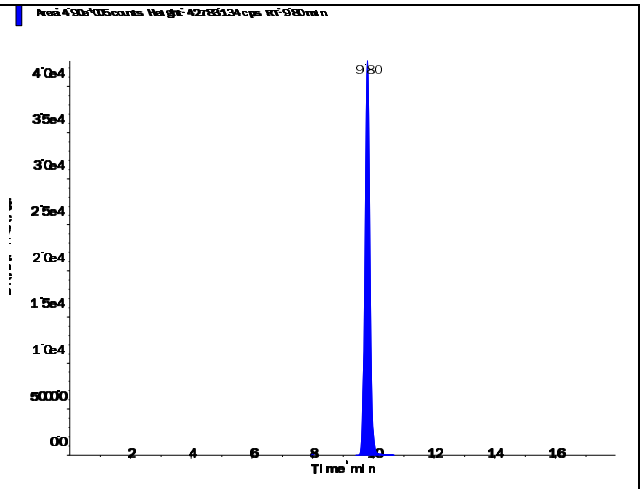
Sample Name	WG570932-02 BLANK	**Injection Vial**	5.00
Data File	LM35124.wiff	**Injection Volume**	10.00
Acquisition Date	6/1/2016 2:44:38 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	060116_JWR.rdb
Sample ID	WG570932-02	**Dilution Factor**	1.00
Sample Comment	11.00	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.900e+05	9.80	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	0.000e+00	0.00	N/A	No Peak
Perchlorate conf	0.000e+00	0.00	N/A	No Peak

O18LP (Internal Standard)

RT (Exp. RT): 9.80(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



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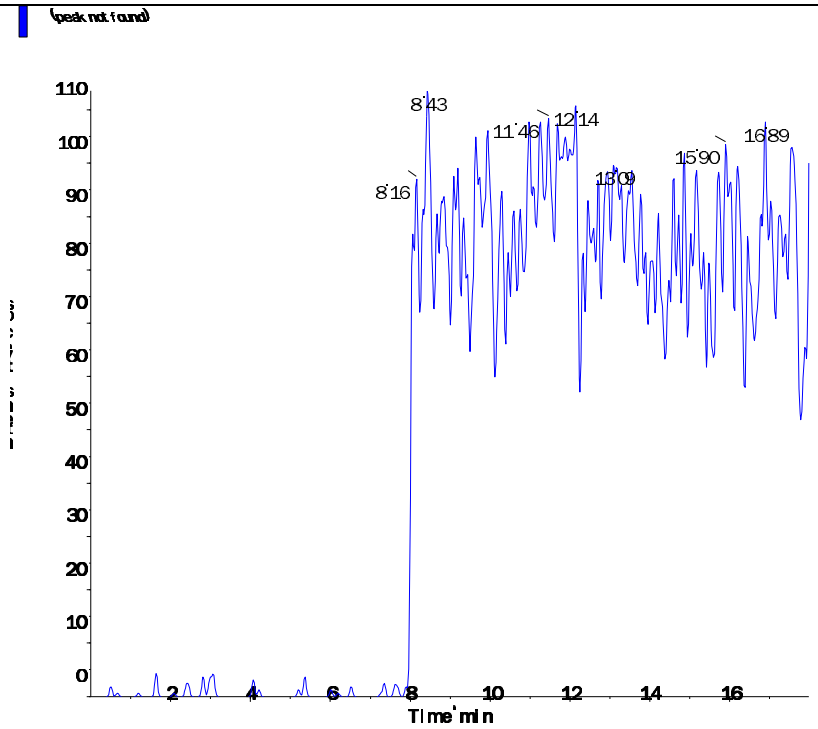
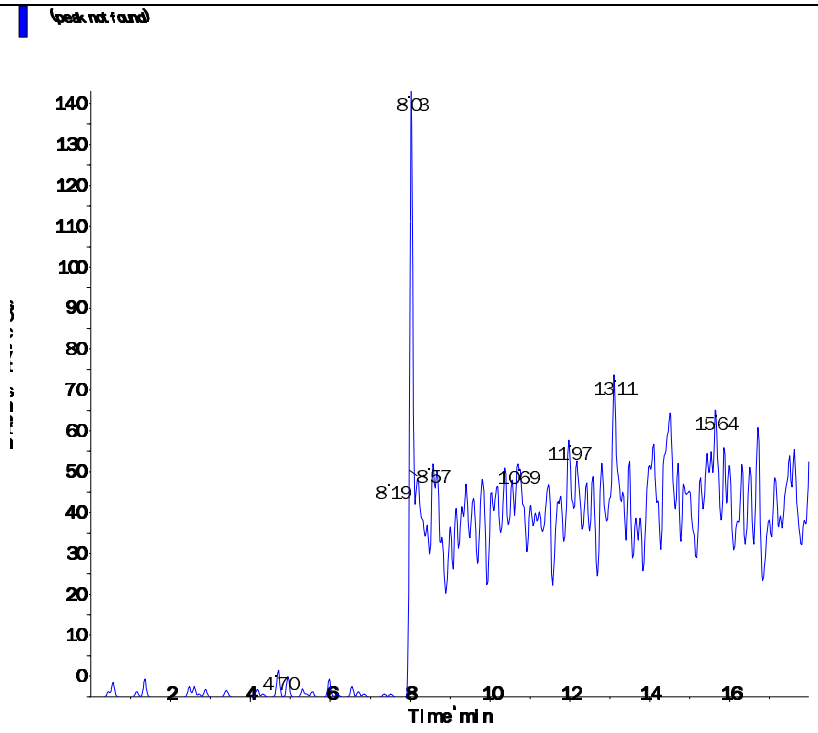
Printed: 6/2/2016 2:49 PM

Perchlorate (98.8/83.3 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	 0.00 (9.84) min No Peak ng/ml 0.00 (Unknown)



Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	 0.00 (9.84) min No Peak ng/ml 0.00 (Unknown)



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Created with Analyst Reporter
Printed: 6/2/2016 2:50 PM

Data File	LM35125.wiff	**Result Table**	060116_JWR.rdb
Acquisition Date	6/1/2016 3:03:34 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

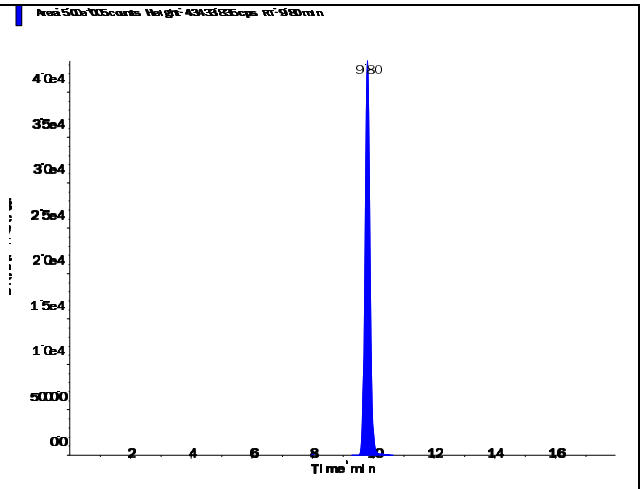
Sample Name	WG570932-03 LCS (0.2ug/L)	**Injection Vial**	6.00
Data File	LM35125.wiff	**Injection Volume**	10.00
Acquisition Date	6/1/2016 3:03:34 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	060116_JWR.rdb
Sample ID	WG570932-03	**Dilution Factor**	1.00
Sample Comment	1,1 STD75512	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	5.000e+05	9.80	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	3.430e+04	9.81	N/A	0.20
Perchlorate conf	1.230e+04	9.79	N/A	0.20

O18LP (Internal Standard)

RT (Exp. RT): 9.80(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



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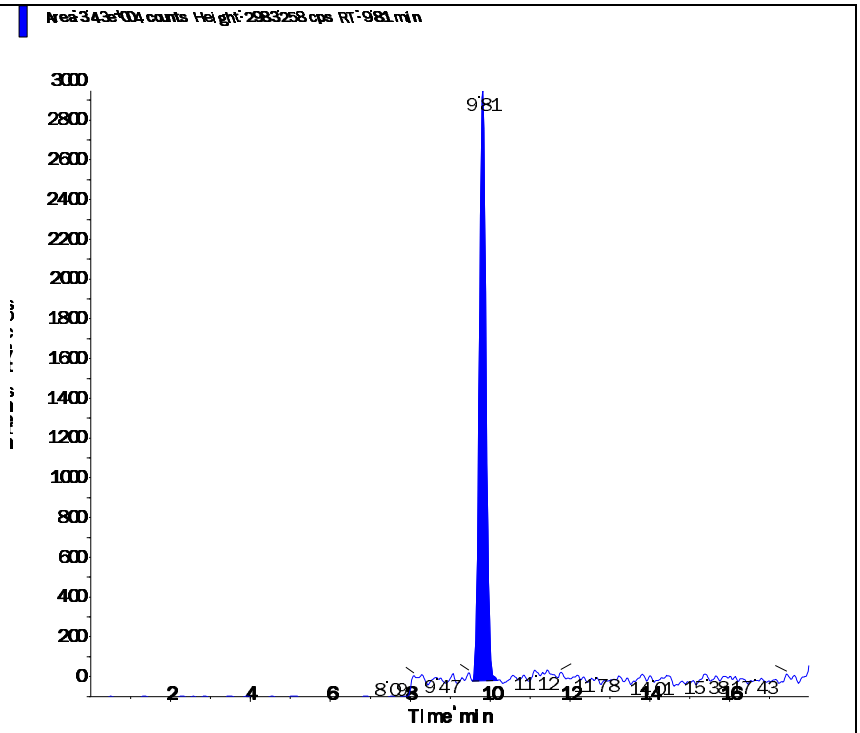
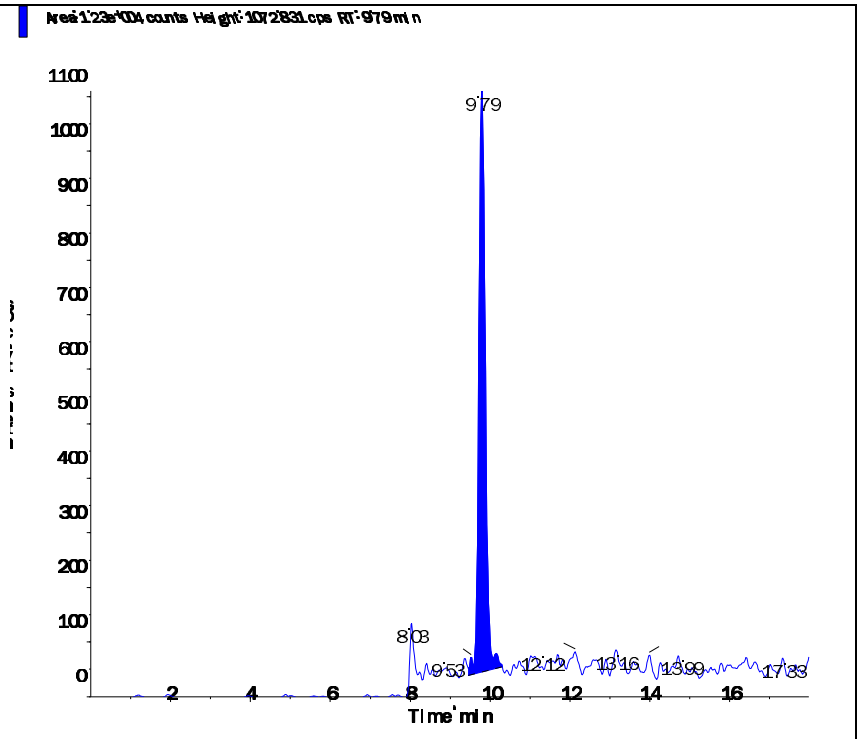
Printed: 6/2/2016 2:50 PM

Perchlorate (98.8/83.3 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	9.81 (9.84) min 0.20 ng/ml 0.069 (Unknown)



Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	9.79 (9.84) min 0.20 ng/ml 0.025 (Unknown)



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Created with Analyst Reporter
Printed: 6/2/2016 2:50 PM

Data File	LM35126.wiff	**Result Table**	060116_JWR.rdb
Acquisition Date	6/1/2016 3:22:31 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

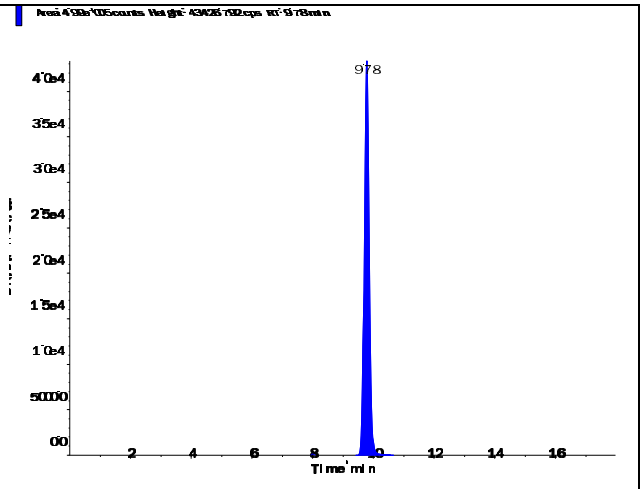
Sample Name	WG570932-04 LCS2 (0.2ug/L)	**Injection Vial**	7.00
Data File	LM35126.wiff	**Injection Volume**	10.00
Acquisition Date	6/1/2016 3:22:31 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	060116_JWR.rdb
Sample ID	WG570932-04	**Dilution Factor**	1.00
Sample Comment	1,1 STD75512	**Weight to Volume**	0.00

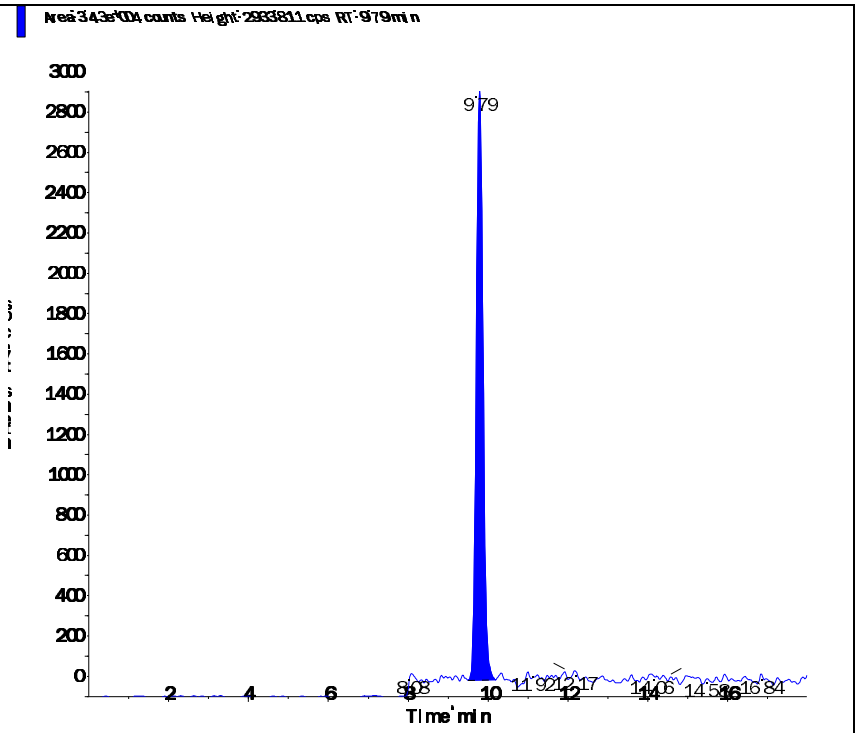
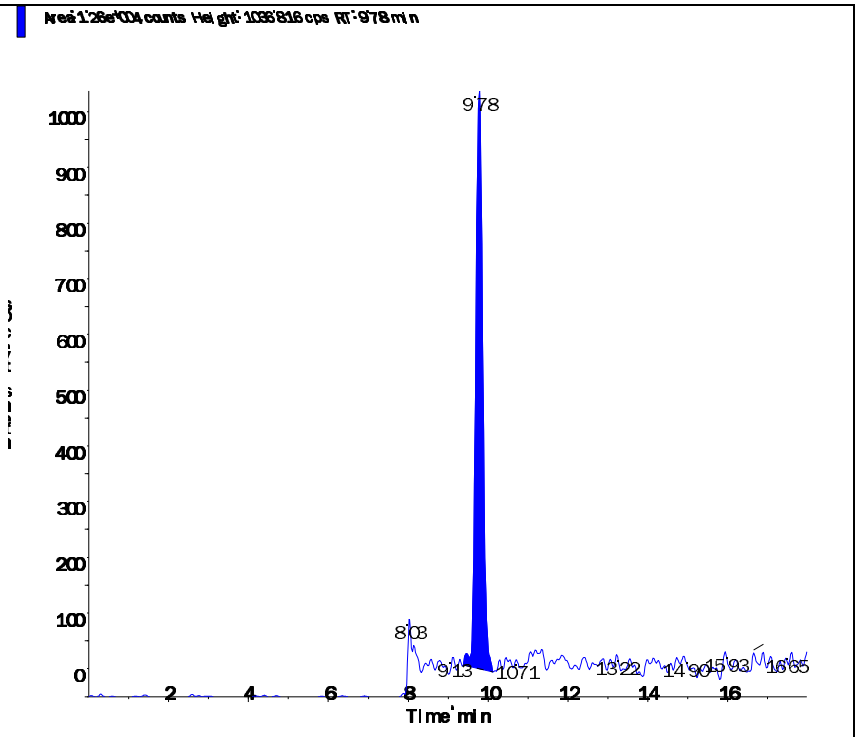
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.990e+05	9.78	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	3.430e+04	9.79	N/A	0.201
Perchlorate conf	1.260e+04	9.78	N/A	0.206

O18LP (Internal Standard)

RT (Exp. RT): 9.78(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.79 (9.84) min Calculated conc: 0.201 ng/ml Area Ratio: 0.069 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.78 (9.84) min Calculated conc: 0.206 ng/ml Area Ratio: 0.025 Sample Type: (Unknown)	

3.0 Attachments

Microbac Laboratories Inc.
Ohio Valley Division Analyst List
June 3, 2016

001 – BIO-CHEM TESTING WVDEP 220	002 – REIC Consultants, Inc. WVDEP 060
003 – Sturm Environmental	004 – MICROBAC PITTSBURGH
005 – ES LABORATORIES	006 – ALCOSAN LABORATORIES
007 – ALS LABORATORIES	008 – BENCHMARK LABORATORIES
010 – MICROBAC CHICAGOLAND	AC – AMBER R. CARMICHAEL
ADC – ANTHONY D. CANTER	ADG – APRIL D. GREENE
AED – ALLEN E. DAVIS	ALS – ADRIANE L. STEED
AMA – ALEXANDRA M. ALFRED	AWE – ANDREW W. ESSIG
AZH – AFTER HOURS	BJO – BRIAN J. OGDEN
BKT – BRENDAN TORRENCE	BLG – BRENDA L. GREENWALT
BRG – BRENDA R. GREGORY	CAA – CASSIE A. AUGENSTEIN
CAF – CHERYL A. FLOWERS	CEB – CHAD E. BARNES
CJR – COURTNEY J. REXROAD	CLC – CHRYS L. CRAWFORD
CLS – CARA L. STRICKLER	CLW – CHARISSA L. WINTERS
CPD – CHAD P. DAVIS	CSH – CHRIS S. HILL
DAK – DEAN A. KETELSEN	DCM – DAVID C. MERCKLE
DEV – DAVID E. VANDENBERG	DIH – DEANNA I. HESSON
DLB – DAVID L. BUMGARNER	DLP – DOROTHY L. PAYNE
DLW – DIANA L. WRIGHT	DSM – DAVID S. MOSSOR
ECL – ERIC C. LAWSON	EMW – ERIC M. WILKEN
ENY – EMILY N. YOAK	ERP – ERIN R. PORTER
FJB – FRANCES J. BOLDEN	JBK – JEREMY B. KINNEY
JDH – JUSTIN D. HESSON	JDS – JARED D. SMITH
JJS – JOHN J. STE MARIE	JKP – JACQUELINE K. PARSONS
JLD – JESSICA L. DELONG	JLL – JOHN L. LENT
JMW – JEANA M. WHITE	JTP – JOSHUA T. PEMBERTON
JWR – JOHN W. RICHARDS	JWS – JACK W. SHEAVES
JYH – JI Y. HU	KAJ – KELLIE A. JOHNSON
KAT – KATHY A. TUCKER	KDW – KATHRYN D. WELCH
KEB – KATIE E. BARNES	KHR – KIM H. RHODES
KKB – KERRI K. BUCK	KRA – KATHY R. ALBERTSON
KRB – KAELY R. BECKER	KRP – KATHY R. PARSONS
LEC – LAURA E. CARPENTER	LKN – LINDA K. NEDEFF
LLS – LARRY L. STEPHENS	LSB – LESLIE S. BUCINA
MAP – MARLA A. PORTER	MBK – MORGAN B. KNOWLTON
MDA – MIKE D. ALBERTSON	MDC – MIKE D. COCHRAN
MES – MARY E. SCHILLING	MLB – MEGAN L. BACHE
MMB – MAREN M. BEERY	MRT – MICHELLE R. TAYLOR
MSW – MATT S. WILSON	PDM – PIERCE D. MORRIS
PIT – MICROBAC WARRENDALE	PRL – PAIGE R. LAMB
PSW – PEGGY S. WEBB	QX – QIN XU
RAH – ROY A. HALSTEAD	REK – BOB E. KYER
RLB – BOB BUCHANAN	RM – RAYMOND MALEKE
RNP – RICK N. PETTY	RST – ROBIN S. TURNER
SAV – SARAH A. VANDENBERG	SCB – SARAH C. BOGOLIN
SDC – SHALYN D. CONLEY	SLM – STEPHANIE L. MOSSBURG
SLP – SHERI L. PFALZGRAF	TB – TODD BOYLE
TGF – TIM G. FELTON	TMB – TIFFANY M. BAILEY
TMM – TAMMY M. MORRIS	VC – VICKI COLLIER
WJB – WILL J. BEASLEY	WRR – WESLEY R. RICHARDS
WTD – WADE T. DELONG	XXX – UNAVAILABLE OR SUBCONTRACT

Microbac Laboratories Inc.
List of Valid Qualifiers
June 03, 2016

Qualkey: DOD

Qualifier	Description
*	Surrogate or spike compound out of range
+	Correlation coefficient for the MSA is less than 0.995
<	Result is less than the associated numerical value.
>	Greater than
A	See the report narrative
B	The reported result is associated with a contaminated method blank.
B,H1	Analyte present in method blank. Sample analysis performed past holding time.
B1	Target analyte detected in method blank at or above the method reporting limit
B3	Target analyte detected in calibration blank at or above the method reporting limit
B4	The BOD unseeded dilution water blank exceeded 0.2 mg/L
C	Confirmed by GC/MS
CG	Confluent growth
CT1	Cooler temperature at sample reciept exceeded regulatory limit.
DL	Surrogate or spike compound was diluted out
E	Estimated concentration due to sample matrix interference
E,CT1	Estimated results. The cooler temperature at receipt exceeded regulatory guidelines for requested testing.
EDL	Elevated sample reporting limits, presence of non-target analytes
EMPC	Estimated Maximum Possible Concentration
F, S	Estimated result below quantitation limit; method of standard additions(MSA)
F,CT1	Estimated value; the analyte concentration was less than the RL/LOQ. The cooler temperature at receipt exceeded regula
FL	Free Liquid
FP1	Did not ignite.
H1	Sample analysis performed past holding time.
H1,CT1	Sample analysis performed past holding time. The cooler temperature at receipt exceeded regulatory guidelines for reque
I	Semiquantitative result (out of instrument calibration range)
J	Estimated concentration; sample matrix interference.
J	Estimated value ; the analyte concentration was greater than the highest standard
J	Estimated value ; the analyte concentration was less than the LOQ.
J	The reported result is an estimated value.
J,B	Analyte detected in both the method blank and sample above the MDL.
J,CT1	Estimated value ; the analyte concentration was less than the LOQ. Cooler temperature at sample reciept exceeded regu
J,H1	Estimated value ; the analyte concentration was less than the LOQ. Sample analysis performed past holding time.
J,H1	The reported result is an estimated value. Sample was analyzed past holding time.
J,P	Estimate; columns don't agree to within 40%
J,S	Estimated concentration; analyzed by method of standard addition (MSA)
JB	The reported result is an estimated value. The reported result is also associated with a contaminated method blank.
JQ	The reported result is an estimated value and one or more quality control criteria failed. See narrative.
L	Sample reporting limits elevated due to matrix interference
L1	The associated blank spike (LCS) recovery was above the laboratory acceptance limits.
L2	The associated blank spike (LCS) recovery was below the laboratory acceptance limits.
M	Matrix effect; the concentration is an estimate due to matrix effect.
N	Nontarget analyte; the analyte is a tentativlely identified compound (TIC) by GC/MS
NA	Not applicable
ND	Not detected at or above the reporting limit (RL)
ND, B	Not detected at or above the reporting limit (RL). Analyte present in method blank.
ND, CT1	Analyte was not detected. The concentration is below the reported LOD. The cooler temperature at receipt exceeded reg
ND, L	Not detected; sample reporting limit (RL) elevated due to interference
ND, S	Not detected; analyzed by method of standard addition (MSA)
ND,H1	Not detected; Sample analysis performed past holding time.
ND,H1,CT1	Not detected; Sample analysis performed past holding time. The cooler temperature at receipt exceeded regulatory guide
NF	Not found by library search
NFL	No free liquid
NI	Non-ignitable
NR	Analyte is not required to be analyzed
NS	Not spiked
P	Concentrations >40% difference between the two GC columns
Q	One or more quality control criteria failed. See narrative.
Q,H1	One or more quality control criteria failed. Sample analyzed past holding time. See narrative.
QNS	Quantity of sample not sufficient to perform analysis
RA	Reanalysis confirms reported results
RE	Reanalysis confirms sample matrix interference
S	Analyzed by method of standard addition (MSA)
SMI	Sample matrix interference on surrogate
SP	Reported results are for spike compounds only
T5	Laboratory not licensed for this parameter
TIC	Library Search Compound
TNTC	Too numerous to count

Microbac Laboratories Inc.
List of Valid Qualifiers
June 03, 2016

Qualkey: DOD

TNTC, B	Too numerous to count. Analyte present in method blank.
TNTC,CT1	Too numerous to count. The cooler temperature at receipt exceeded regulatory guidelines for requested testing.
TNTC,H1	Too numerous to count. Sample analysis performed past holding time.
U	Analyte was not detected. The concentration is below the reported LOD.
U,CT1	Analyte was not detected. The concentration is below the reported LOD. Cooler temperature at sample reciept exceeded
U,H1	Not detected; Sample analysis performed past holding time.
UJ	Undetected; the MDL and RL are estimated due to quality control discrepancies.
UQ	Undetected; the analyte was analyzed for, but not detected.
W	Post-digestion spike for furnace AA out of control limits
X	Exceeds regulatory limit
X, S	Exceeds regulatory limit; method of standard additions (MSA)
Z	Cannot be resolved from isomer - see below

L16051583 / Revision: 0 / 135 total pages

AECOM

Chain of Custody Record

COC Number:

Laboratory:	Microbac POC: Stephanie Mossburg	Project Manager:	Debra Richmann	Mail to:	Linda Raabe
Address:	158 Starlite Drive	Phone/Fax Number:	210-296-2000		112 East Pecan STE. 400
	Marietta, OH 45750	Sampler (print):	Scott Beesinger		San Antonio, TX 78205
Phone:	1-800-373-4071				210-296-2000
Client:	AECOM	Signature:	Scott Beesinger	Fed Ex Airbill No:	
Address:	112 East Pecan Ste. 400				
	San Antonio, TX 78205	pH:		Program:	
Turn Around Time:	STANDARD				
Project Name/Location:	Longhorn			ERPIMS REQUIRED FIELDS	
Project Number:	60256135.0009AA				

Site Name	Sample ID/Location ID	SBD	SED	Date	Time	Comp*	Grab	Matrix	Number of Containers	Perchlorate	SA CODE	Cooler ID	LOT CONTROL NUMBERS ABLOT	EBLOT	TBLOT
Harrison Bayou & Goose Prarie Creek	GPW 1 - 052716			5/27/16	8:50		X	W	1	X					
	GPW 3 - 052716			5/27/16	9:05		X	W	1	X					
	HBW 1 - 022516			5/27/16	9:20		X	W	1	X					
	HBW 10 - 052716			5/27/16	9:33		X	W	1	X					
	HBW 7 - 052716			5/27/16	9:50		X	W	1	X					

Comments: STANDARD TAT

Relinquished by: (Signature) Scott Beesinger	Date 5/27/16	Time 1300	Received by: (Signature)	Received by: (Signature)	Date	Time	Relinquished by: (Signature)
Relinquished by: (Signature)	Date	Time	Received for Labo (Signature)				Remarks:

Microbac OVD
Received: 05/28/2016 11:36
By: BRENDA GREGORY 221000086523

Brenda Gregory

*Homogenize all composite samples prior to analysis

QA/QC Manager

00840400

Generated: 06/03/2016 10:10

Microbac Laboratories Inc.

Internal Chain of Custody Report

Login: L16051583
Account: 2551
Project: 2551.096
Samples: 5
Due Date: 10-JUN-2016

Samplenum	Container ID	Products
L16051583-01	752073	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	31-MAY-2016 09:25	CLS		
2	ANALYZ	W1	SEM	01-JUN-2016 09:32	JWR	CLS	
3	STORE	SEM	A1	01-JUN-2016 14:49	CLS	JWR	

Samplenum	Container ID	Products
L16051583-02	752074	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	31-MAY-2016 09:25	CLS		
2	ANALYZ	W1	SEM	01-JUN-2016 09:32	JWR	CLS	
3	STORE	SEM	A1	01-JUN-2016 14:49	CLS	JWR	

Samplenum	Container ID	Products
L16051583-03	752075	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	31-MAY-2016 09:25	CLS		
2	ANALYZ	W1	SEM	01-JUN-2016 09:32	JWR	CLS	
3	STORE	SEM	A1	01-JUN-2016 14:49	CLS	JWR	

Samplenum	Container ID	Products
L16051583-04	752076	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	31-MAY-2016 09:25	CLS		
2	ANALYZ	W1	SEM	01-JUN-2016 09:32	JWR	CLS	
3	STORE	SEM	A1	01-JUN-2016 14:49	CLS	JWR	

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login

Microbac Laboratories Inc.

Internal Chain of Custody Report

Login: L16051583
Account: 2551
Project: 2551.096
Samples: 5
Due Date: 10-JUN-2016

Samplenum	Container ID	Products
L16051583-05	752077	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	31-MAY-2016 09:25	CLS		
2	ANALYZ	W1	SEM	01-JUN-2016 09:32	JWR	CLS	
3	STORE	SEM	A1	01-JUN-2016 14:49	CLS	JWR	

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login

NELAP Addendum - January 4, 2016

Non-NELAP LIMS Product and Description

The following is a list of those tests that are not included in the Microbac – OVD NELAP Scope of Accreditation:

Heat of Combustion (BTU)
Total Halide by Bomb Combustion (TX)
Particle Sizing - 200 Mesh (PS200)
Specific Gravity/Density (SPGRAV)
Total Residual Chlorine (CL-TRL)
Total Volatile Solids (all forms) (TVS)
Total Coliform Bacteria (all methods)
Fecal Coliform Bacteria (all methods)
Sulfite (SO3)
Propionaldehyde (HPLC-UV)

SOLID AND HAZARDOUS CHEMICALS
Nitrogen, Ammonia by Method 350.1
Chromium, Hexavalent, Leachable by SM3500 Cr-B 2009
Phenolics, Total by Method 420.1
ASTM D3987-06

NELAP Accreditation by Laboratory SOP

NONPOTABLE WATER

OVD HPLC02/HPLC-UV

Nitroglycerin
Acetic acid
Butyric acid
Lactic acid
Propionic acid
Pyruvic acid

OVD MSS01/GC-MS

1,4-Phenylenediamine
1-Methylnaphthalene
1,4-Dioxane
Atrazine
Benzaldehyde
Biphenyl
Caprolactam
Hexamethylphosphoramide (HMPA)
Pentachlorobenzene
Pentachloroethane

NELAP Accreditation by Laboratory SOP

NONPOTABLE WATER

OVD MSV01/GC-MS

1, 1, 2-Trichloro-1,2,2-trifluoroethane
1,3-Butadiene
Cyclohexane
Cyclohexanone
Dimethyl disulfide
Dimethylsulfide
Ethyl-t-butylether (ETBE)
Isoprene
Methylacetate
Methylcyclohexane
T-amylmethylether (TAME)
Tetrahydrofuran (THF)

OVD HPLC07/HPLC-MS-MS

Hexamethylphosphoramide (XMPA-LCMS)

OVD HPLC12/HPLC/UV

Acetate
Formate

OVD RSK01/GC-FID

Acetylene
Propane

OVD K9305/ISE

Fluoroborate

SOLID AND HAZARDOUS CHEMICALS

OVD MSS0I/GC-MS

1-Methylnaphthalene
Benzaldehyde
Biphenyl
Caprolactam
Pentachloroethane

NELAP Accreditation by Laboratory SOP

SOLID AND HAZARDOUS CHEMICALS

OVD MSV0I/GC-MS

1.3-Butadiene
Cyclohexane
Cyclohexanone
Dimethyl disulfide
Dimethylsulfide
Ethyl-t-butylether (ETBE)
Isoprene
Methylacetate
Methylcyclohexane
n-Hexane
T-amylmethylether (TAME)

Microbac



Laboratory Report Number: L16081156

Kayla Teague
AECOM Technical Services, Inc.
1950 N Stemmons FWY
Dallas, TX 75207

Please find enclosed the analytical results for the samples you submitted to Microbac Laboratories. Review and compilation of your report was completed by Microbac's Ohio Valley Division (OVD). If you have any questions, comments, or require further assistance regarding this report, please contact your service representative listed below.

Laboratory Contact:
Michelle Taylor – Client Services Specialist
(740) 373-4071
Michelle.Taylor@microbac.com

I certify that all test results meet all of the requirements of the DoD QSM and other applicable contract terms and conditions. Any exceptions are attached to this cover page or addressed in the method narratives presented in the report. All results for soil samples are reported on a 'dry-weight' basis unless specified otherwise. Analytical results for water and wastes are reported on a 'as received' basis unless specified otherwise. A statement of uncertainty for each analysis is available upon request. This laboratory report shall not be reproduced, except in full, without the written approval of Microbac Laboratories, DoD ELAP certification number 2936.01. The reported results are related only to the samples analyzed as received.

This report was certified on September 06 2016

Leslie Bucina – Managing Director

State of Origin: TX
Accrediting Authority: Texas Commission on Environmental Quality ID:T104704252-07-TX
QAPP: DOD Ver 4.1

Microbac

Lab Report #: L16081156
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Michelle Taylor

Record of Sample Receipt and Inspection

Comments/Discrepancies

This is the record of the shipment conditions and the inspection records for the samples received and reported as a sample delivery group (SDG). All of the samples were inspected and observed to conform to our receipt policies, except as noted below.

There were no discrepancies.

Discrepancy	Resolution

Coolers

Cooler #	Temperature Gun	Temperature	COC #	Airbill #	Temp Required?
00114106	I	4.0		J4616883362	X

Inspection Checklist

#	Question	Result
1	Were shipping coolers sealed?	Yes
2	Were custody seals intact?	Yes
3	Were cooler temperatures in range of 0-6?	Yes
4	Was ice present?	Yes
5	Were COC's received/information complete/signed and dated?	Yes
6	Were sample containers intact and match COC?	Yes
7	Were sample labels intact and match COC?	Yes
8	Were the correct containers and volumes received?	Yes
9	Were samples received within EPA hold times?	Yes
10	All samples were checked for pH and met the standard. Exceptions are noted above under discrepancy. (water only)	Yes
11	Were pH ranges acceptable? (voa's excluded)	NA
12	Were VOA samples free of headspace (less than 6mm)?	NA

Microbac

Lab Report #: L16081156
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Michelle Taylor

Samples Received

Client ID	Laboratory ID	Date Collected	Date Received
HBW 7 - 082316	L16081156-01	08/23/2016 08:25	08/24/2016 10:10
HBW 10 - 082316	L16081156-02	08/23/2016 08:30	08/24/2016 10:10
HBW 1 - 082316	L16081156-03	08/23/2016 08:50	08/24/2016 10:10
GPW 1 - 082316	L16081156-04	08/23/2016 09:08	08/24/2016 10:10
GPW 3 - 082316	L16081156-05	08/23/2016 09:20	08/24/2016 10:10

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L16081156
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG582453	**Reviewer Name:**	Eric Lawson
LRC Date:	2016-09-06 00:00:00		

Laboratory Data Package Cover Page

X	R1	Field chain-of-custody documentation;
X	R2	Sample identification cross-reference;
X	R3	Test reports (analytical data sheets) for each environmental sample that includes: (a) Items consistent with NELAC Chapter 5, (b) dilution factors, (c) preparation methods, (d) cleanup methods, and (e) a.if required for the project, tentatively identified compounds (TICs).
X	R4	Surrogate recovery data including: (a) Calculated recovery (%R), and (b) the laboratory's surrogate QC limits.
X	R5	Test reports/summary forms for blank samples;
X	R6	Test reports/summary forms for laboratory control samples (LCSs) including: (a) LCS spiking amounts, (b) calculated %R for each analyte, and (c) the laboratory's LCS QC limits.
X	R7	Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including: (a) samples associated with the MS/MSD clearly identified, (b) MS/MSD spiking compounds, (c) concentration of each MS/MSD analyte measured in the parent and spiked samples, (d) calculated %Rs and relative percent differences (RPDs), and (e) the laboratory's MS/MSD QC limits.
X	R8	Laboratory analytical duplicate (if applicable) recovery and precision: (a) the amount of analyte measured in the duplicate, (b) the calculated RPD, and (c) the laboratory's QC limits for analytical duplicates.
X	R9	List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
X	R10	Other problems or anomalies.

Name (Printed)	Signature	Official Title (Printed)	Date
Eric Lawson		Chemist III	2016-09-06 15:24:04

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L16081156
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG582453	**Reviewer Name:**	Eric Lawson
LRC Date:	2016-09-06 00:00:00		

Description	Yes	No	NA	NR	ER#
Chain-of-custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
Were all departures from standard conditions described in an exception report?	X				
Sample and quality control (QC) identification	X				
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
Test reports					
Were all samples prepared and analyzed within holding times?	X				
Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
Were calculations checked by a peer or supervisor?	X				
Were all analyte identifications checked by a peer or supervisor?	X				
Were sample detection limits reported for all analytes not detected?	X				
Were all results for soil and sediment samples reported on a dry weight basis?			X		
Were % moisture (or solids) reported for all soil and sediment samples?			X		
Were bulk soils/solids samples for volatile analysis extracted with methanol per SW846 Method 5035?			X		
If required for the project, are TICs reported?			X		
Surrogate recovery data					
Were surrogates added prior to extraction?			X		
Were surrogate percent recoveries in all samples within the laboratory QC limits?			X		
Test reports/summary forms for blank samples	X				
Were appropriate type(s) of blanks analyzed?	X				
Were blanks analyzed at the appropriate frequency?	X				
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
Were blank concentrations < MQL?	X				
Laboratory control samples (LCS):					
Were all COCs included in the LCS?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L16081156
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG582453	**Reviewer Name:**	Eric Lawson
LRC Date:	2016-09-06 00:00:00		

Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
Were LCSs analyzed at the required frequency?	X				
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
Does the detectability check sample data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
Was the LCSD RPD within QC limits?	X				
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?			X		
Were MS/MSD analyzed at the appropriate frequency?			X		
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?			X		
Were MS/MSD RPDs within laboratory QC limits?			X		
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?			X		
Were analytical duplicates analyzed at the appropriate frequency?			X		
Were RPDs or relative standard deviations within the laboratory QC limits?			X		
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?	X				
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
Was applicable and available technology used to lower the SDL to minimize the matrix interference effects on the sample results?	X				
Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	X				
Initial calibration (ICAL)					
Were response factors and/or relative response factors for each analyte within QC limits?	X				
Were percent RSDs or correlation coefficient criteria met?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L16081156
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG582453	**Reviewer Name:**	Eric Lawson
LRC Date:	2016-09-06 00:00:00		

Was the number of standards recommended in the method used for all analytes?	X				
Were all points generated between the lowest and highest standard used to calculate the curve?	X				
Are ICAL data available for all instruments used?	X				
Has the initial calibration curve been verified using an appropriate second source standard?	X				
Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?	X				
Were percent differences for each analyte within the method-required QC limits?	X				
Was the ICAL curve verified for each analyte?	X				
Was the absolute value of the analyte concentration in the inorganic CCB < MDL?			X		
Mass spectral tuning					
Was the appropriate compound for the method used for tuning?	X				
Were ion abundance data within the method-required QC limits?	X				
Internal standards (IS)					
Were IS area counts and retention times within the method-required QC limits?	X				
Raw data (NELAC Section 5.5.10)					
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
Were data associated with manual integrations flagged on the raw data?	X				
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			X		
Tentatively identified compounds (TICs)					
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
Interference Check Sample (ICS) results					
Were percent recoveries within method QC limits?			X		
Serial dilutions, post digestion spikes, and method of standard additions					
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
Method detection limit (MDL) studies					

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L16081156
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG582453	**Reviewer Name:**	Eric Lawson
LRC Date:	2016-09-06 00:00:00		

Was a MDL study performed for each reported analyte?	X				
Is the MDL either adjusted or supported by the analysis of DCSs?	X				
Proficiency test reports					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?	X				
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5?	X				
Is documentation of the analyst's competency up-to-date and on file?	X				
Verification/validation documentation for methods (NELAC Chapter 5)					
Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
Laboratory standard operating procedures (SOPs)					
Are laboratory SOPs current and on file for each method performed	X				

1. Items identified by the letter “R” must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter “S” should be retained and made available upon request for the appropriate retention period;

2. O = organic analyses; I = inorganic analyses (and general chemistry, when applicable);

3. NA = Not applicable;

4. NR = Not reviewed;

5. ER# = Exception Report identification number (an Exception Report should be completed for an item if “NR” or “No” is checked).

The Exception Report for each “No” or “Not Reviewed (NR)” item in Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L16081156
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG582453	**Reviewer Name:**	Eric Lawson
LRC Date:	2016-09-06 00:00:00		

below, I affirm to the best of my knowledge all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [ ] This laboratory meets an exception under 30 TAC §25.6 and was last inspection by [ ] TCEQ or [ ] _____ on **(enter date of last inspection**). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Exceptions Report

There are no exceptions.

Microbac

Lab Report #: L16081156
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Michelle Taylor

Certificate of Analysis

Sample #:	L16081156-01	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	HBW 7 - 082316	**Prep Method:**	6850	**Prep Date:**	09/01/2016 17:30
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	05/03/2016 17:18
Workgroup #:	WG582453	**Analyst:**	JWR	**Run Date:**	09/01/2016 20:47
Collect Date:	08/23/2016 08:25	**Dilution:**	1	**File ID:**	1LM.LM36004
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.200	U	0.400	0.200	0.100

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L16081156
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Michelle Taylor

Certificate of Analysis

Sample #:	L16081156-02	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	HBW 10 - 082316	**Prep Method:**	6850	**Prep Date:**	09/01/2016 17:30
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	05/03/2016 17:18
Workgroup #:	WG582453	**Analyst:**	JWR	**Run Date:**	09/01/2016 21:05
Collect Date:	08/23/2016 08:30	**Dilution:**	1	**File ID:**	1LM.LM36005
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.200	U	0.400	0.200	0.100

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L16081156
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Michelle Taylor

Certificate of Analysis

Sample #:	L16081156-03	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	HBW 1 - 082316	**Prep Method:**	6850	**Prep Date:**	09/01/2016 17:30
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	05/03/2016 17:18
Workgroup #:	WG582453	**Analyst:**	JWR	**Run Date:**	09/01/2016 21:24
Collect Date:	08/23/2016 08:50	**Dilution:**	1	**File ID:**	1LM.LM36006
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.200	U	0.400	0.200	0.100

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L16081156
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Michelle Taylor

Certificate of Analysis

Sample #:	L16081156-04	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	GPW 1 - 082316	**Prep Method:**	6850	**Prep Date:**	09/01/2016 17:30
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	05/03/2016 17:18
Workgroup #:	WG582453	**Analyst:**	JWR	**Run Date:**	09/01/2016 22:40
Collect Date:	08/23/2016 09:08	**Dilution:**	1	**File ID:**	1LM.LM36010
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.200	U	0.400	0.200	0.100

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L16081156
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Michelle Taylor

Certificate of Analysis

Sample #:	L16081156-05	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	GPW 3 - 082316	**Prep Method:**	6850	**Prep Date:**	09/01/2016 17:30
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	05/03/2016 17:18
Workgroup #:	WG582453	**Analyst:**	JWR	**Run Date:**	09/01/2016 22:59
Collect Date:	08/23/2016 09:20	**Dilution:**	1	**File ID:**	1LM.LM36011
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.141	J	0.400	0.200	0.100

J	Estimated value ; the analyte concentration was less than the LOQ.

Microbac

Lab Report #: L16081156
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Michelle Taylor

2.1 General Chromatography Data

2.1.1 LC/MS Data (6850)

2.1.1.1 Summary Data

Microbac

Lab Report #: L16081156
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Michelle Taylor

Certificate of Analysis

Sample #:	L16081156-01	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	HBW 7 - 082316	**Prep Method:**	6850	**Prep Date:**	09/01/2016 17:30
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	05/03/2016 17:18
Workgroup #:	WG582453	**Analyst:**	JWR	**Run Date:**	09/01/2016 20:47
Collect Date:	08/23/2016 08:25	**Dilution:**	1	**File ID:**	1LM.LM36004
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.200	U	0.400	0.200	0.100

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L16081156
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Michelle Taylor

Certificate of Analysis

Sample #:	L16081156-02	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	HBW 10 - 082316	**Prep Method:**	6850	**Prep Date:**	09/01/2016 17:30
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	05/03/2016 17:18
Workgroup #:	WG582453	**Analyst:**	JWR	**Run Date:**	09/01/2016 21:05
Collect Date:	08/23/2016 08:30	**Dilution:**	1	**File ID:**	1LM.LM36005
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.200	U	0.400	0.200	0.100

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L16081156
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Michelle Taylor

Certificate of Analysis

Sample #:	L16081156-03	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	HBW 1 - 082316	**Prep Method:**	6850	**Prep Date:**	09/01/2016 17:30
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	05/03/2016 17:18
Workgroup #:	WG582453	**Analyst:**	JWR	**Run Date:**	09/01/2016 21:24
Collect Date:	08/23/2016 08:50	**Dilution:**	1	**File ID:**	1LM.LM36006
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.200	U	0.400	0.200	0.100

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L16081156
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Michelle Taylor

Certificate of Analysis

Sample #:	L16081156-04	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	GPW 1 - 082316	**Prep Method:**	6850	**Prep Date:**	09/01/2016 17:30
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	05/03/2016 17:18
Workgroup #:	WG582453	**Analyst:**	JWR	**Run Date:**	09/01/2016 22:40
Collect Date:	08/23/2016 09:08	**Dilution:**	1	**File ID:**	1LM.LM36010
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.200	U	0.400	0.200	0.100

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L16081156
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Michelle Taylor

Certificate of Analysis

Sample #:	L16081156-05	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	GPW 3 - 082316	**Prep Method:**	6850	**Prep Date:**	09/01/2016 17:30
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	05/03/2016 17:18
Workgroup #:	WG582453	**Analyst:**	JWR	**Run Date:**	09/01/2016 22:59
Collect Date:	08/23/2016 09:20	**Dilution:**	1	**File ID:**	1LM.LM36011
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.141	J	0.400	0.200	0.100

J	Estimated value ; the analyte concentration was less than the LOQ.

Microbac

Lab Report #: L16081156
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Michelle Taylor

2.1.1.2 QC Summary Data

Example Calculation 6850 - Perchlorate

Concentration from Linear Regression

Step 1: Retrieve Curve Data From Plot, y = mx + b

y = response ratio = response of analyte / response of internal standard (IS) = Rx/Ristd

x = amount ratio = concentration analyte/concentration internal standard (IS) = Cx / Cistd

m = slope from curve (1.45)

b = intercept from curve (-0.00242)

y = 1.45x + -0.00242

Step 2: Substitute the value for y

where y = 12600/226000 = 0.055752

Step 3: Solve for x

x = (y - b)/m = 0.0040119

Step 4: Solve for analyte concentration Cx

Cx = (Cis)(x) = (5 ug/L)(0.040119) = 0.200594 ug/L

Example Calculation - Water:

Slope from curve, m:	1.45
Intercept from curve, b:	-0.00242
Response of analyte, Rx:	12600
Response of Internal Standard , Ristd:	226000
Concentration of IS, Cistd (ug/L):	5.00
Response Ratio:	0.05575
Amount Ratio:	0.04012
Analyte Concentration, Cx (ug/L) :	0.200594

Example Calculation - Soil:

Analyte Concentration, Cx (ug/L):	0.20059
Amount of soil extracted (g):	5.00
Final volume of extract (mL):	50.00
Percent solids (Pct wt.)	100
Concentration in soil (ug/kg):	2.005938

Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 050316_JWR.TXT
Analyst1: JWR Analyst2: NA
Method: 6850 SOP: HPLC06 Rev: 8

Maintenance Log ID: Syringe Filter Lot#: 151125254
Eluent ID#:

Workgroups: Column 1 ID: KP-RPPX250 Column 2 ID: NA
Analytical WG567013 (soils)
Internal STD: COA18071 Surrogate STD: NA Calibration STD STD75510 (05/03/2016)
CCV STD: STD75510 LCS STD: STD75512 MS/MSD STD: STD75512

Comments: ICAL WG567320 : Alternate Source STD75512
Analytical Column : RPPX 5um (250x4.6mm)
K'Prime S/N RPPX250-02115

Samples L16041363(-05 and -10) were analyzed at dilutions based on their pre-run screen results.

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	1LM.LM34686	WG567320-01 CCB	1	1		05/03/16 15:06
2	1LM.LM34687	WG567320-02 STD (0.1 ug/L)	1	1	STD75510	05/03/16 15:25
3	1LM.LM34688	WG567320-03 STD (0.2 ug/L)	1	1	STD75510	05/03/16 15:43
4	1LM.LM34689	WG567320-04 STD (0.5 ug/L)	1	1	STD75510	05/03/16 16:02
5	1LM.LM34690	WG567320-05 STD (1.0 ug/L)	1	1	STD75510	05/03/16 16:21
6	1LM.LM34691	WG567320-06 STD (2.0 ug/L)	1	1	STD75510	05/03/16 16:40
7	1LM.LM34692	WG567320-07 STD (5.0 ug/L)	1	1	STD75510	05/03/16 16:59
8	1LM.LM34693	WG567320-08 STD (10 ug/L)	1	1	STD75510	05/03/16 17:18
9	1LM.LM34694	WG567320-09 SSCV (1.0 ug/L)	1	1	STD75512	05/03/16 17:37
10	1LM.LM34695	WG567321-01 CCB	1	1		05/03/16 17:56
11	1LM.LM34696	WG567321-02 CCV (1.0ug/L)	1	1	STD75510	05/03/16 18:15
12	1LM.LM34697	WG567013-07 MRL (2.0ug/kg)	7	1	STD75510	05/03/16 18:34
13	1LM.LM34698	WG567013-01 MCT (2.0ug/kg)	7	1	STD75512	05/03/16 18:53
14	1LM.LM34699	WG567013-02 BLANK	7	1		05/03/16 19:12
15	1LM.LM34700	WG567013-03 LCS (2.0ug/kg)	7	1	STD75512	05/03/16 19:31
16	1LM.LM34701	L16041363-07 RS	7	1		05/03/16 19:50
17	1LM.LM34702	L16041363-08 MS	7	1	STD75512	05/03/16 20:09
18	1LM.LM34703	L16041363-09 MSD	7	1	STD75512	05/03/16 20:28
19	1LM.LM34704	L16041363-01	7	1		05/03/16 20:46
20	1LM.LM34705	L16041363-02	7	1		05/03/16 21:05
21	1LM.LM34706	L16041363-03	7	1		05/03/16 21:24
22	1LM.LM34707	L16041363-04	7	1		05/03/16 21:43
23	1LM.LM34708	WG567321-03 CCV (1.0ug/L)	1	1	STD75510	05/03/16 22:02
24	1LM.LM34709	WG567013-08 MRL (2.0ug/kg)	7	1	STD75510	05/03/16 22:21
25	1LM.LM34710	WG567321-04 CCB	1	1		05/03/16 22:40
26	1LM.LM34711	L16041363-05 (5x)	7	5		05/03/16 22:59
27	1LM.LM34712	L16041363-06	7	1		05/03/16 23:18
28	1LM.LM34713	L16041363-10 (5x)	7	5		05/03/16 23:37
29	1LM.LM34714	WG567321-05 CCV (1.0ug/L)	1	1	STD75510	05/03/16 23:56
30	1LM.LM34715	WG567013-09 MRL (2.0ug/kg)	7	1	STD75510	05/04/16 00:15
31	1LM.LM34716	WG567321-06 CCB	1	1		05/04/16 00:34

Comments

Page: 1 Approved: 05-MAY-16

Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 050316_JWR.TXT

Analyst1: JWR Analyst2: NA

Method: 6850 SOP: HPLC06 Rev: 8

Maintenance Log ID: Syringe Filter Lot#: 151125254

Eluent ID#:

Workgroups: Column 1 ID: KP-RPPX250 Column 2 ID: NA

Analytical WG567013 (soils)

Internal STD: COA18071 Surrogate STD: NA STD75510 (05/03/2016)

CCV STD: STD75510 LCS STD: STD75512 STD75512

Comments

Seq.	Rerun	Dil.	Reason	Analytes
17				
	L16041363-08 MS : The MS %Rec is 129%. This is above the advisory limit of 120%. The parent sample to this MS had responses that passed the ion-ratio criteria, but had a quantified value below the method's detection limit, resulting in an assigned value of zero. If the quantified value for the parent sample were used in the %Rec calculation, the MS %Rec would be 93.9%.			
18				
	L16041363-09 MSD : The MSD %Rec is 131%. This is above the advisory limit of 120%. The parent sample to this MSD had responses that passed the ion-ratio criteria, but had a quantified value below the method's detection limit, resulting in an assigned value of zero. If the quantified value for the parent sample were used in the %Rec calculation, the MSD %Rec would be 95.4%.			

Page: 2 Approved: 05-MAY-16

Wade D

Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 090116_JWR.TXT
Analyst1: JWR Analyst2: NA
Method: 6850 SOP: HPLC06 Rev: 8

Maintenance Log ID: Syringe Filter Lot#: 151125254
Eluent ID#:

Workgroups: Column 1 ID: KP-RPPX250 Column 2 ID: NA
Analytical WG582453 (waters)

Internal STD: STD18071 Surrogate STD: NA Calibration STD STD75510 (05/03/2016)
CCV STD: STD75510 LCS STD: STD75512 MS/MSD STD: NA

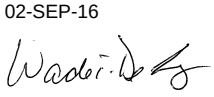
Comments:

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	1LM.LM35994	WG582454-01 CCB	1	1		09/01/16 17:37
2	1LM.LM35995	WG582454-02 CCV (1.0ug/L)	1	1	STD75510	09/01/16 17:56
3	1LM.LM35996	WG582453-05 MRL (0.2ug/L)	1	1	STD75510	09/01/16 18:15
4	1LM.LM35997	WG582453-01 MCT (0.2ug/L)	1	1	STD75512	09/01/16 18:34
5	1LM.LM35998	WG582453-02 BLANK	1	1		09/01/16 18:53
6	1LM.LM35999	WG582453-03 LCS (0.2ug/L)	1	1	STD75512	09/01/16 19:12
7	1LM.LM36000	WG582453-04 LCS2 (0.2ug/L)	1	1	STD75512	09/01/16 19:31
8	1LM.LM36001	L16081487-01	1	1		09/01/16 19:50
9	1LM.LM36002	L16081487-01 (RR 10x)(NR)	1	10		09/01/16 20:09
10	1LM.LM36003	L16081487-01 (RR 100x)(NR)	1	100		09/01/16 20:28
11	1LM.LM36004	L16081156-01	1	1		09/01/16 20:47
12	1LM.LM36005	L16081156-02	1	1		09/01/16 21:05
13	1LM.LM36006	L16081156-03	1	1		09/01/16 21:24
14	1LM.LM36007	WG582454-03 CCV (1.0ug/L)	1	1	STD75510	09/01/16 21:43
15	1LM.LM36008	WG582453-06 MRL (0.2ug/L)	1	1	STD75510	09/01/16 22:02
16	1LM.LM36009	WG582454-04 CCB	1	1		09/01/16 22:21
17	1LM.LM36010	L16081156-04	1	1		09/01/16 22:40
18	1LM.LM36011	L16081156-05	1	1		09/01/16 22:59
19	1LM.LM36012	L16081354-01	1	1		09/01/16 23:18
20	1LM.LM36013	WG582454-05 CCV (1.0ug/L)	1	1	STD75510	09/01/16 23:37
21	1LM.LM36014	WG582453-07 MRL (0.2ug/L)	1	1	STD75510	09/01/16 23:56
22	1LM.LM36015	WG582454-06 CCB	1	1		09/02/16 00:15

Comments

Seq.	Rerun	Dil.	Reason	Analytes
9				
	L16081487-01 (RR 10x)(NR) : This dilution was not needed.			
10				
	L16081487-01 (RR 100x)(NR) : This dilution was not needed.			

Page: 1 Approved: 02-SEP-16



Microbac Laboratories Inc.

Data Checklist

Date: 03-MAY-2016
Analyst: JWR
Analyst: NA
Method: 6850
Instrument: LCMS1
Curve Workgroup: WG567320
Runlog ID: 74891
Analytical Workgroups: L16041363 (SOILS)

ANALYTICAL	
System Performance Check	NA
DFTPP (GCMS)	NA
Endrin/DDT breakdown (8081/GCMS)	NA
Pentachlorophenol/benzidine tailing (GCMS)	NA
Eluent check (IC)/system pressure (HPLC)	NA
Window standard (FID)	NA
Initial Calibration	X
Average RF	NA
Linear regression or higher order curve	X
Alternate source standard (ICV) % Difference	X
Continuing Calibration (CCV)	X
% D/% Drift	X
Minimum response factors (GCMS)	X
Continuing calibration blank (CCB) (IC/LCMS)	X
Limit of quantitation verification (LOQV) (LCMS)	X
Special standards	NA
Blanks	X
TCL hits	ND
Surrogate recoveries	NA
LCS/LCSD (Laboratory Control Sample)	X
Recoveries	X
Surrogate recoveries	NA
MS/MSD/Sample duplicates	X
Recoveries	X
%RPD	X
Interference check sample (ICS) (LCMS)	MCT
Samples	X
TCL hits	X
Mass spectra (MS/HPLC)/2nd column confirmations (ECD/FID/HPLC)	NA
Surrogate recoveries	NA
Internal standard areas (MS)	X
Library searches (GCMS)	NA
Calculations & correct factors	X
Compounds above calibration range	NA
Reruns	NA
Manual integrations	NA
Project/client specific requirements	X
REPORTING	
Upload batch form	X
KOBRA workgroup data/forms/bench sheets	X
Case narratives	
Check for completeness	X
Primary Reviewer	JWR
SUPERVISORY/SECONDARY REVIEW	
Check for compliance with method and project specific requirements	X
Check the completeness/accuracy of reported information	X
Data qualifiers	X
Secondary Reviewer	WTD

Primary Reviewer:
04-MAY-2016
John Richards

Secondary Reviewer:
05-MAY-2016
Wade D

CHECKLIST1 - Modified 03/05/2008
Generated: MAY-05-2016 16:23:46

Microbac

Microbac Laboratories Inc.

Data Checklist

Date: 01-SEP-2016
Analyst: JWR
Analyst: NA
Method: 6850
Instrument: LCMS1
Curve Workgroup: NA
Runlog ID: 77288
Analytical Workgroups: L16081156, 1354, 1487

ANALYTICAL	
System Performance Check	NA
DFTPP (GCMS)	NA
Endrin/DDT breakdown (8081/GCMS)	NA
Pentachlorophenol/benzidine tailing (GCMS)	NA
Eluent check (IC)/system pressure (HPLC)	NA
Window standard (FID)	NA
Initial Calibration	NA
Average RF	NA
Linear regression or higher order curve	NA
Alternate source standard (ICV) % Difference	NA
Continuing Calibration (CCV)	X
% D/% Drift	X
Minimum response factors (GCMS)	X
Continuing calibration blank (CCB) (IC/LCMS)	X
Limit of quantitation verification (LOQV) (LCMS)	X
Special standards	NA
Blanks	X
TCL hits	ND
Surrogate recoveries	NA
LCS/LCSD (Laboratory Control Sample)	X
Recoveries	X
Surrogate recoveries	NA
MS/MSD/Sample duplicates	NA-LCS/LCS2
Recoveries	NA
%RPD	NA
Interference check sample (ICS) (LCMS)	MCT
Samples	X
TCL hits	X
Mass spectra (MS/HPLC)/2nd column confirmations (ECD/FID/HPLC)	NA
Surrogate recoveries	NA
Internal standard areas (MS)	X
Library searches (GCMS)	NA
Calculations & correct factors	X
Compounds above calibration range	NA
Reruns	NA
Manual integrations	MCT-ONLY
Project/client specific requirements	X
REPORTING	
Upload batch form	X
KOBRA workgroup data/forms/bench sheets	X
Case narratives	
Check for completeness	X
Primary Reviewer	JWR
SUPERVISORY/SECONDARY REVIEW	
Check for compliance with method and project specific requirements	X
Check the completeness/accuracy of reported information	X
Data qualifiers	X
Secondary Reviewer	WTD

Primary Reviewer:
02-SEP-2016
John Richards

Secondary Reviewer:
02-SEP-2016
Wade D

CHECKLIST1 - Modified 03/05/2008
Generated: SEP-02-2016 16:56:48

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 6850 **AAB#:** WG582453

Login Number: L16081156

Client ID	ID	Date Collected	TCLP Date	Time Held	Max Hold	Q	Extract Date	Time Held	Max Hold	Q	Run Date	Time Held	Max Hold	Q
HBW 7 - 082316	01	08/23/16					09/01/2016	9.4	28		09/01/16	.1	28	
HBW 10 - 082316	02	08/23/16					09/01/2016	9.4	28		09/01/16	.1	28	
HBW 1 - 082316	03	08/23/16					09/01/2016	9.4	28		09/01/16	.2	28	
GPW 1 - 082316	04	08/23/16					09/01/2016	9.3	28		09/01/16	.2	28	
GPW 3 - 082316	05	08/23/16					09/01/2016	9.3	28		09/01/16	.2	28	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 4924364
Report generated 09/06/2016 08:44

METHOD BLANK SUMMARY

Login Number: L16081156
Work Group: WG582453
Blank File ID: 1LM.LM35998
Blank Sample ID: WG582453-02
Prep Date: 09/01/16 17:30
Instrument ID: LCMS1
Analyzed Date: 09/01/16 18:53
Method: 6850
Analyst: JWR

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
QCMRL	WG582453-05	1LM.LM35996	09/01/16 18:15	01
MCT	WG582453-01	1LM.LM35997	09/01/16 18:34	01
LCS	WG582453-03	1LM.LM35999	09/01/16 19:12	01
LCS2	WG582453-04	1LM.LM36000	09/01/16 19:31	01
HBW 7 - 082316	L16081156-01	1LM.LM36004	09/01/16 20:47	01
HBW 10 - 082316	L16081156-02	1LM.LM36005	09/01/16 21:05	01
HBW 1 - 082316	L16081156-03	1LM.LM36006	09/01/16 21:24	01
QCMRL	WG582453-06	1LM.LM36008	09/01/16 22:02	01
GPW 1 - 082316	L16081156-04	1LM.LM36010	09/01/16 22:40	01
GPW 3 - 082316	L16081156-05	1LM.LM36011	09/01/16 22:59	01
QCMRL	WG582453-07	1LM.LM36014	09/01/16 23:56	01

Report Name: BLANK_SUMMARY
PDF File ID: 4924365
Report generated 09/06/2016 08:44

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L16081156 Prep Date: 09/01/16 17:30 Sample ID: WG582453-02
Instrument ID: LCMS1 Run Date: 09/01/16 18:53 Prep Method: 6850
File ID: 1LM.LM35998 Analyst: JWR Method: 6850
Workgroup (AAB#): WG582453 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-03-MAY-16

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
Perchlorate	0.100	0.400	0.100	1	U

DL Method Detection Limit
LOQ Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > 1/2 RL

Report Name:BLANK
PDF ID: 4924366
06-SEP-2016 08:44

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L16081156 Analyst: JWR Prep Method: 6850
Instrument ID: LCMS1 Matrix: Water Method: 6850
Workgroup (AAB#): WG582453 Units: ug/L
QC Key: DOD4 Lot #: STD75512

Sample ID: WG582453-03 LCS File ID: 1LM.LM35999 Run Date: 09/01/2016 19:12
Sample ID: WG582453-04 LCS2 File ID: 1LM.LM36000 Run Date: 09/01/2016 19:31

Analytes	LCS			LCS2			%RPD	%Rec Limits	RPD Lmt	Q
	Known	Found	% REC	Known	Found	% REC				
Perchlorate	0.200	0.187	93.5	0.200	0.215	108	13.9	80 - 120	15	

LCS_LCS2 - Modified 03/06/2008
PDF File ID: 4924367
Report generated: 09/06/2016 08:44

Login Number: L16081156
Analytical Method: 6850
ICAL Workgroup: WG567320
Instrument ID: LCMS1
Initial Calibration Date: 03-MAY-16 17:18
Column ID: F

Analyte		AVG RF	% RSD	LINEAR (R)	QUAD (R^2)
Perchlorate		1.699	4.81	1.00000	

R = Correlation coefficient; 0.995 minimum
R^2 = Coefficient of determination; 0.99 minimum

INT_CAL - Modified 03/06/2008
PDF File ID: 4924411
Report generated 09/06/2016 08:44

Login Number: L16081156
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 03-MAY-16 17:18
Column ID: F

Analyte	WG567320-02			WG567320-03			WG567320-04		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Perchlorate	0.100	17900.0000	1.792	0.200	34100.0000	1.718	0.500	82200.0000	1.637

INT_CAL - Modified 03/06/2008
PDF File ID: 4924411
Report generated 09/06/2016 08:44

Login Number: L16081156
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 03-MAY-16 17:18
Column ID: F

Analyte	WG567320-05			WG567320-06			WG567320-07		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Perchlorate	1.00	168000.000	1.697	2.00	330000.000	1.672	5.00	810000.000	1.695

INT_CAL - Modified 03/06/2008
PDF File ID: 4924411
Report generated 09/06/2016 08:44

Login Number: L16081156
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 03-MAY-16 17:18
Column ID: F

Analyte	WG567320-08		
	CONC	RESP	RF
Perchlorate	10.0	1530000.00	1.680

INT_CAL - Modified 03/06/2008
PDF File ID: 4924411
Report generated 09/06/2016 08:44

Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L16081156 Run Date: 05/03/2016 Sample ID: WG567320-09
Instrument ID: LCMS1 Run Time: 17:37 Method: 6850
File ID: 1LM.LM34694 Analyst: JWR QC Key: DOD4
ICal Workgroup: WG567320 Cal ID: LCMS1 - 03-MAY-16

Analyte		Expected	Found	Units	RF	%D	UCL	Q
Perchlorate		1.00	0.985	ug/L	1.66	1.50	15	

* Exceeds %D Limit

ALT - Modified 09/06/2007
Version 1.5 PDF File ID: 4924412
Report generated 09/06/2016 08:44

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L16081156 | Run Date: 09/01/2016 | Sample ID: WG582454-01
Instrument ID: LCMS1 | Run Time: 17:37 | Method: 6850
File ID: 1LM.LM35994 | Analyst: JWR | Units: ug/L
Workgroup (AAB#): WG582453 | Cal ID: LCMS1 - 03-MAY-16
Matrix: WATER | QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Perchlorate	0.100	0.400	0.100	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 4924370
Report generated 09/06/2016 08:44

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L16081156 | Run Date: 09/01/2016 | Sample ID: WG582454-04
Instrument ID: LCMS1 | Run Time: 22:21 | Method: 6850
File ID: 1LM.LM36009 | Analyst: JWR | Units: ug/L
Workgroup (AAB#): WG582453 | Cal ID: LCMS1 - 03-MAY-16
Matrix: WATER | QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Perchlorate	0.100	0.400	0.100	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 4924370
Report generated 09/06/2016 08:44

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L16081156	Run Date:	09/02/2016	Sample ID:	WG582454-06
Instrument ID:	LCMS1	Run Time:	00:15	Method:	6850
File ID:	1LM.LM36015	Analyst:	JWR	Units:	ug/L
Workgroup (AAB#):	WG582453	Cal ID:	LCMS1 - 03-MAY-16		
Matrix:	WATER	QAPP:	DOD4		

Analytes	MDL	RDL	Concentration	Qualifier
Perchlorate	0.100	0.400	0.100	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 4924370
Report generated 09/06/2016 08:44

Login Number: L16081156 Run Date: 09/01/2016 Sample ID: WG582454-02
Instrument ID: LCMS1 Run Time: 17:56 Method: 6850
File ID: 1LM.LM35995 Analyst: JWR QC Key: DOD4
Workgroup (AAB#): WG582453 Cal ID: LCMS1 - 03-MAY-16
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	0.998	ug/L	1.69	0.200	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 4924369
Report generated 09/06/2016 08:44

Login Number: L16081156 Run Date: 09/01/2016 Sample ID: WG582454-03
Instrument ID: LCMS1 Run Time: 21:43 Method: 6850
File ID: 1LM.LM36007 Analyst: JWR QC Key: DOD4
Workgroup (AAB#): WG582453 Cal ID: LCMS1 - 03-MAY-16
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	1.02	ug/L	1.72	2.00	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 4924369
Report generated 09/06/2016 08:44

Login Number: L16081156 Run Date: 09/01/2016 Sample ID: WG582454-05
Instrument ID: LCMS1 Run Time: 23:37 Method: 6850
File ID: 1LM.LM36013 Analyst: JWR QC Key: DOD4
Workgroup (AAB#): WG582453 Cal ID: LCMS1 - 03-MAY-16
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	1.01	ug/L	1.70	1.00	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 4924369
Report generated 09/06/2016 08:44

Login Number: L16081156 Run Date: 09/01/2016 Sample ID: WG582453-05
Instrument ID: LCMS1 Run Time: 18:15 Prep Method: 6850
File ID: 1LM.LM35996 Analyst: JWR Method: 6850
Workgroup (AAB#): WG582453 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-03-MAY-16

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.199	99.5	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 4924368
Report generated 09/06/2016 08:44

Login Number: L16081156 Run Date: 09/01/2016 Sample ID: WG582453-06
Instrument ID: LCMS1 Run Time: 22:02 Prep Method: 6850
File ID: 1LM.LM36008 Analyst: JWR Method: 6850
Workgroup (AAB#): WG582453 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-03-MAY-16

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.199	99.5	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 4924368
Report generated 09/06/2016 08:44

Login Number: L16081156 Run Date: 09/01/2016 Sample ID: WG582453-07
Instrument ID: LCMS1 Run Time: 23:56 Prep Method: 6850
File ID: 1LM.LM36014 Analyst: JWR Method: 6850
Workgroup (AAB#): WG582453 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-03-MAY-16

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.201	101	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 4924368
Report generated 09/06/2016 08:44

Microbac Laboratories Inc.
INTERNAL STANDARD AREA SUMMARY
(COMPARED TO AVERAGE OF ICAL)

Login Number:L16081156
Instrument ID:LCMS1
Workgroup (AAB#):WG582453

ICAL CCV Number:WG567320-05
CAL ID: LCMS1-03-MAY-16
Matrix:WATER

Sample Number	Dilution	Tag	IS-1
WG567320	NA	NA	489000
Upper Limit	NA	NA	733500
Lower Limit	NA	NA	244500
L16081156-01	1.00	01	388000
L16081156-02	1.00	01	357000
L16081156-03	1.00	01	364000
L16081156-04	1.00	01	404000
L16081156-05	1.00	01	402000
WG582453-02	1.00	01	344000
WG582453-03	1.00	01	351000
WG582453-04	1.00	01	351000

IS-1 - O18LP

Underline = Response outside limits

INTERNAL_STD_AVG_ICAL - Modified 03/10/2010
PDF File ID: 4924371
Report generated 09/06/2016 08:44

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16081156	**Prep Method:**	6850	**Samplenum:**	L16081156-01
Instrument:	LCMS1	**Prep Date:**	09/01/2016 17:30	**File ID:**	1LM.LM36004
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG582453	**Analysis Date:**	09/01/2016 20:47	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	10700	3720	2.88	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16081156	**Prep Method:**	6850	**Samplenum:**	L16081156-02
Instrument:	LCMS1	**Prep Date:**	09/01/2016 17:30	**File ID:**	1LM.LM36005
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG582453	**Analysis Date:**	09/01/2016 21:05	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	5380	1990	2.70	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16081156	**Prep Method:**	6850	**Samplenum:**	L16081156-03
Instrument:	LCMS1	**Prep Date:**	09/01/2016 17:30	**File ID:**	1LM.LM36006
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG582453	**Analysis Date:**	09/01/2016 21:24	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	4920	1770	2.78	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16081156	**Prep Method:**	6850	**Samplenum:**	L16081156-04
Instrument:	LCMS1	**Prep Date:**	09/01/2016 17:30	**File ID:**	1LM.LM36010
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG582453	**Analysis Date:**	09/01/2016 22:40	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	13000	5040	2.58	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16081156	**Prep Method:**	6850	**Samplenum:**	L16081156-05
Instrument:	LCMS1	**Prep Date:**	09/01/2016 17:30	**File ID:**	1LM.LM36011
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG582453	**Analysis Date:**	09/01/2016 22:59	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	19500	7270	2.68	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16081156	**Prep Method:**		**Samplenum:**	WG567320-02
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM34687
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG582453	**Analysis Date:**	05/03/2016 15:25	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	17900	6950	2.58	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16081156	**Prep Method:**		**Samplenum:**	WG567320-03
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM34688
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG582453	**Analysis Date:**	05/03/2016 15:43	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	34100	11900	2.87	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16081156	**Prep Method:**		**Samplenum:**	WG567320-04
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM34689
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG582453	**Analysis Date:**	05/03/2016 16:02	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	82200	29400	2.80	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16081156	**Prep Method:**		**Samplenum:**	WG567320-05
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM34690
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG582453	**Analysis Date:**	05/03/2016 16:21	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	168000	56600	2.97	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16081156	**Prep Method:**		**Samplenum:**	WG567320-06
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM34691
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG582453	**Analysis Date:**	05/03/2016 16:40	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	330000	108000	3.06	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16081156	**Prep Method:**		**Samplenum:**	WG567320-07
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM34692
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG582453	**Analysis Date:**	05/03/2016 16:59	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	810000	269000	3.01	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16081156	**Prep Method:**		**Samplenum:**	WG567320-08
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM34693
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG582453	**Analysis Date:**	05/03/2016 17:18	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	1530000	512000	2.99	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16081156	**Prep Method:**		**Samplenum:**	WG567320-09
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM34694
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG582453	**Analysis Date:**	05/03/2016 17:37	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	169000	56300	3.00	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16081156	**Prep Method:**	6850	**Samplenum:**	WG582453-01
Instrument:	LCMS1	**Prep Date:**	09/01/2016 17:30	**File ID:**	1LM.LM35997
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG582453	**Analysis Date:**	09/01/2016 18:34	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	22400	8220	2.73	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16081156	**Prep Method:**	6850	**Samplenum:**	WG582453-02
Instrument:	LCMS1	**Prep Date:**	09/01/2016 17:30	**File ID:**	1LM.LM35998
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG582453	**Analysis Date:**	09/01/2016 18:53	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	0.000	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16081156	**Prep Method:**	6850	**Samplenum:**	WG582453-03
Instrument:	LCMS1	**Prep Date:**	09/01/2016 17:30	**File ID:**	1LM.LM35999
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG582453	**Analysis Date:**	09/01/2016 19:12	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	22500	8970	2.51	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16081156	**Prep Method:**	6850	**Samplenum:**	WG582453-04
Instrument:	LCMS1	**Prep Date:**	09/01/2016 17:30	**File ID:**	1LM.LM36000
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG582453	**Analysis Date:**	09/01/2016 19:31	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	25800	9910	2.60	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16081156	**Prep Method:**	6850	**Samplenum:**	WG582453-05
Instrument:	LCMS1	**Prep Date:**	09/01/2016 17:30	**File ID:**	1LM.LM35996
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG582453	**Analysis Date:**	09/01/2016 18:15	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	23300	9380	2.48	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16081156	**Prep Method:**	6850	**Samplenum:**	WG582453-06
Instrument:	LCMS1	**Prep Date:**	09/01/2016 17:30	**File ID:**	1LM.LM36008
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG582453	**Analysis Date:**	09/01/2016 22:02	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	28500	10200	2.79	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16081156	**Prep Method:**	6850	**Samplenum:**	WG582453-07
Instrument:	LCMS1	**Prep Date:**	09/01/2016 17:30	**File ID:**	1LM.LM36014
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG582453	**Analysis Date:**	09/01/2016 23:56	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	30200	11800	2.56	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16081156	**Prep Method:**		**Samplenum:**	WG582454-01
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM35994
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG582453	**Analysis Date:**	09/01/2016 17:37	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	676	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16081156	**Prep Method:**		**Samplenum:**	WG582454-02
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM35995
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG582453	**Analysis Date:**	09/01/2016 17:56	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	123000	44200	2.78	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16081156	**Prep Method:**		**Samplenum:**	WG582454-03
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM36007
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG582453	**Analysis Date:**	09/01/2016 21:43	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	143000	49200	2.91	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16081156	**Prep Method:**		**Samplenum:**	WG582454-04
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM36009
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG582453	**Analysis Date:**	09/01/2016 22:21	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	0.000	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16081156	**Prep Method:**		**Samplenum:**	WG582454-05
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM36013
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG582453	**Analysis Date:**	09/01/2016 23:37	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	150000	52700	2.85	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16081156	**Prep Method:**		**Samplenum:**	WG582454-06
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM36015
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG582453	**Analysis Date:**	09/02/2016 00:15	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	0.000	0.000	2.3	3.8	*

3.0 Attachments

Microbac Laboratories Inc.
Ohio Valley Division Analyst List
September 6, 2016

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001 – BIO-CHEM TESTING WVDEP 220	002 – REIC Consultants, Inc. WVDEP 060
003 – Sturm Environmental	004 – MICROBAC PITTSBURGH
005 – ES LABORATORIES	006 – ALCOSAN LABORATORIES
007 – ALS LABORATORIES	008 – BENCHMARK LABORATORIES
010 – MICROBAC CHICAGOLAND	AC – AMBER R. CARMICHAEL
ADC – ANTHONY D. CANTER	ADG – APRIL D. GREENE
AED – ALLEN E. DAVIS	ALS – ADRIANE L. STEED
AMA – ALEXANDRA M. ALFRED	AWE – ANDREW W. ESSIG
AZH – AFTER HOURS	BJO – BRIAN J. OGDEN
BKT – BRENDAN TORRENCE	BLG – BRENDA L. GREENWALT
BNB – Brandi N. Bentley	BRG – BRENDA R. GREGORY
CAA – CASSIE A. AUGENSTEIN	CAF – CHERYL A. FLOWERS
CEB – CHAD E. BARNES	CJQ – Cameron J. Quick
CLC – CHRYS L. CRAWFORD	CLS – CARA L. STRICKLER
CLW – CHARISSA L. WINTERS	CPD – CHAD P. DAVIS
CSH – CHRIS S. HILL	CV – Carl Volkman
DAK – DEAN A. KETELSEN	DCM – DAVID C. MERCKLE
DEV – DAVID E. VANDENBERG	DIH – DEANNA I. HESSON
DLB – DAVID L. BUMGARNER	DLP – DOROTHY L. PAYNE
DSM – DAVID S. MOSSOR	ECL – ERIC C. LAWSON
EMW – ERIC M. WILKEN	ENY – EMILY N. YOAK
ERP – ERIN R. PORTER	FJB – FRANCES J. BOLDEN
HDC – HANAH D. COE	HDD – HANAH D. DAWKINS
JBK – JEREMY B. KINNEY	JDH – JUSTIN D. HESSON
JDS – JARED D. SMITH	JKP – JACQUELINE K. PARSONS
JLD – JESSICA L. DELONG	JLL – JOHN L. LENT
JMW – JEANA M. WHITE	JTP – JOSHUA T. PEMBERTON
JWR – JOHN W. RICHARDS	JWS – JACK W. SHEAVES
JYH – JI Y. HU	KAT – KATHY A. TUCKER
KDD – Katelyn D. Daley	KDW – KATHRYN D. WELCH
KEB – KATIE E. BARNES	KHR – KIM H. RHODES
KKB – KERRI K. BUCK	KRA – KATHY R. ALBERTSON
KRB – KAELY R. BECKER	KRP – KATHY R. PARSONS
LJH – Lacey J. Hendershot	LKN – LINDA K. NEDEFF
LLS – LARRY L. STEPHENS	LSB – LESLIE S. BUCINA
MAP – MARLA A. PORTER	MBK – MORGAN B. KNOWLTON
MDA – MIKE D. ALBERTSON	MDC – MIKE D. COCHRAN
MES – MARY E. SCHILLING	MMB – MAREN M. BEERY
MRT – MICHELLE R. TAYLOR	MSW – MATT S. WILSON
NPH – Natalie P. Hart	PDM – PIERCE D. MORRIS
PIT – MICROBAC WARRENDALE	QX – QIN XU
RAH – ROY A. HALSTEAD	REK – BOB E. KYER
RLB – BOB BUCHANAN	RNP – RICK N. PETTY
SAV – SARAH A. VANDENBERG	SCB – SARAH C. BOGOLIN
SDC – SHALYN D. CONLEY	SLM – STEPHANIE L. MOSSBURG
SLP – SHERI L. PFALZGRAF	TB – TODD BOYLE
TGF – TIM G. FELTON	TMB – TIFFANY M. BAILEY
TMM – TAMMY M. MORRIS	VC – VICKI COLLIER
WJB – WILL J. BEASLEY	WTD – WADE T. DELONG
XXX – UNAVAILABLE OR SUBCONTRACT	

Microbac Laboratories Inc.
List of Valid Qualifiers
September 06, 2016

Qualkey: DOD

Qualifier	Description
*	Surrogate or spike compound out of range
+	Correlation coefficient for the MSA is less than 0.995
<	Result is less than the associated numerical value.
>	Greater than
A	See the report narrative
B	The reported result is associated with a contaminated method blank.
B,H1	Analyte present in method blank. Sample analysis performed past holding time.
B1	Target analyte detected in method blank at or above the method reporting limit
B3	Target analyte detected in calibration blank at or above the method reporting limit
B4	The BOD unseeded dilution water blank exceeded 0.2 mg/L
C	Confirmed by GC/MS
CG	Confluent growth
CT1	Cooler temperature at sample reciept exceeded regulatory limit.
DL	Surrogate or spike compound was diluted out
E	Estimated concentration due to sample matrix interference
E,CT1	Estimated results. The cooler temperature at receipt exceeded regulatory guidelines for requested testing.
EDL	Elevated sample reporting limits, presence of non-target analytes
EMPC	Estimated Maximum Possible Concentration
F, S	Estimated result below quantitation limit; method of standard additions(MSA)
F,CT1	Estimated value; the analyte concentration was less than the RL/LOQ. The cooler temperature at receipt exceeded regula
FL	Free Liquid
FP1	Did not ignite.
H1	Sample analysis performed past holding time.
H1,CT1	Sample analysis performed past holding time. The cooler temperature at receipt exceeded regulatory guidelines for reque
I	Semiquantitative result (out of instrument calibration range)
J	Estimated concentration; sample matrix interference.
J	Estimated value ; the analyte concentration was greater than the highest standard
J	Estimated value ; the analyte concentration was less than the LOQ.
J	The reported result is an estimated value.
J,B	Analyte detected in both the method blank and sample above the MDL.
J,CT1	Estimated value ; the analyte concentration was less than the LOQ. Cooler temperature at sample reciept exceeded regu
J,H1	Estimated value ; the analyte concentration was less than the LOQ. Sample analysis performed past holding time.
J,H1	The reported result is an estimated value. Sample was analyzed past holding time.
J,P	Estimate; columns don't agree to within 40%
J,S	Estimated concentration; analyzed by method of standard addition (MSA)
JB	The reported result is an estimated value. The reported result is also associated with a contaminated method blank.
JQ	The reported result is an estimated value and one or more quality control criteria failed. See narrative.
L	Sample reporting limits elevated due to matrix interference
L1	The associated blank spike (LCS) recovery was above the laboratory acceptance limits.
L2	The associated blank spike (LCS) recovery was below the laboratory acceptance limits.
M	Matrix effect; the concentration is an estimate due to matrix effect.
N	Nontarget analyte; the analyte is a tentativlely identified compound (TIC) by GC/MS
NA	Not applicable
ND	Not detected at or above the reporting limit (RL)
ND, B	Not detected at or above the reporting limit (RL). Analyte present in method blank.
ND, CT1	Analyte was not detected. The concentration is below the reported LOD. The cooler temperature at receipt exceeded reg
ND, L	Not detected; sample reporting limit (RL) elevated due to interference
ND, S	Not detected; analyzed by method of standard addition (MSA)
ND,H1	Not detected; Sample analysis performed past holding time.
ND,H1,CT1	Not detected; Sample analysis performed past holding time. The cooler temperature at receipt exceeded regulatory guide
NF	Not found by library search
NFL	No free liquid
NI	Non-ignitable
NR	Analyte is not required to be analyzed
NS	Not spiked
P	Concentrations >40% difference between the two GC columns
Q	One or more quality control criteria failed. See narrative.
Q,H1	One or more quality control criteria failed. Sample analyzed past holding time. See narrative.
QNS	Quantity of sample not sufficient to perform analysis
RA	Reanalysis confirms reported results
RE	Reanalysis confirms sample matrix interference
S	Analyzed by method of standard addition (MSA)
SMI	Sample matrix interference on surrogate
SP	Reported results are for spike compounds only
T5	Laboratory not licensed for this parameter
TIC	Library Search Compound
TNTC	Too numerous to count

Microbac Laboratories Inc.
List of Valid Qualifiers
September 06, 2016

Qualkey: DOD

TNTC, B	Too numerous to count. Analyte present in method blank.
TNTC,CT1	Too numerous to count. The cooler temperature at receipt exceeded regulatory guidelines for requested testing.
TNTC,H1	Too numerous to count. Sample analysis performed past holding time.
U	Analyte was not detected. The concentration is below the reported LOD.
U,CT1	Analyte was not detected. The concentration is below the reported LOD. Cooler temperature at sample reciept exceeded
U,H1	Not detected; Sample analysis performed past holding time.
UJ	Undetected; the MDL and RL are estimated due to quality control discrepancies.
UQ	Undetected; the analyte was analyzed for, but not detected.
W	Post-digestion spike for furnace AA out of control limits
X	Exceeds regulatory limit
X, S	Exceeds regulatory limit; method of standard additions (MSA)
Z	Cannot be resolved from isomer - see below

L160811156 / Revision: 0 / 86 total pages

AECOM

Chain of Custody Record

COC Number:

Laboratory: Microbac POC: Stephanie Mossburg	Project Manager: Debra Richmann	Mail to: Linda Raabe	
Address: 158 Starlite Drive	Phone/Fax Number: 210-296-2000	112 East Pecan STE. 400	
Marietta, OH 45750	Sampler (print): Scott Beesinger	San Antonio, TX 78205	
Phone: 1-800-373-4071		210-296-2000	
Client: AECOM	Signature: Scott Beesinger	Fed Ex Airbill No:	
Address: 112 East Pecan Ste. 400			
San Antonio, TX 78205	pH:	Program:	
Turn Around Time: STANDARD			
Project Name/Location: Longhorn			
Project Number: 60256135.0009AA			

Site Name	Sample ID/Location ID	SBD	SED	Date	Time	Comp*	Grab	Matrix	Number of Containers	Perchlorate	SA CODE	Cooler ID	LOT CONTROL NUMBERS ABLOT	EBLOT	TBLOT
Harrison Bayou & Goose Prarie Creek	HBW 7 - 082316			8/23/16	8:25		X	W	1	X					
	HBW 10 - 082316			8/23/16	8:30		X	W	1	X					
	HBW 1 - 082316			8/23/16	8:50		X	W	1	X					
	GPW 1 - 082316			8/23/16	9:08		X	W	1	X					
	GPW 3 - 082316			8/23/16	9:20		X	W	1	X					

ERPIMS REQUIRED FIELDS

Comments: STANDARD TAT

Relinquished by: (Signature) Scott Beesinger	Date 8/23/16	Time 12:00	Received by: (Signature)	d by: (Signature)
Relinquished by: (Signature)	Date	Time	Received for Laboratory by: (Signature)	

Microbac OVD
Received: 08/24/2016 10:10
By: BRENDA GREGORY 221000090039
Brenda Gregory

*Homogenize all composite samples prior to analysis

Distribu ager

Generated: 09/06/2016 12:22

00840486

Microbac Laboratories Inc.

Internal Chain of Custody Report

Login: L16081156
Account: 2551
Project: 2551.096
Samples: 5
Due Date: 02-SEP-2016

Samplenum	Container ID	Products
L16081156-01	791622	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	24-AUG-2016 11:56	CLS		
2	ANALYZ	W1	SEM	01-SEP-2016 15:51	JWR	BRG	
3	STORE	SEM	A1	02-SEP-2016 16:46	BRG	JWR	

Samplenum	Container ID	Products
L16081156-02	791623	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	24-AUG-2016 11:56	CLS		
2	ANALYZ	W1	SEM	01-SEP-2016 15:51	JWR	BRG	
3	STORE	SEM	A1	02-SEP-2016 16:46	BRG	JWR	

Samplenum	Container ID	Products
L16081156-03	791624	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	24-AUG-2016 11:56	CLS		
2	ANALYZ	W1	SEM	01-SEP-2016 15:51	JWR	BRG	
3	STORE	SEM	A1	02-SEP-2016 16:46	BRG	JWR	

Samplenum	Container ID	Products
L16081156-04	791625	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	24-AUG-2016 11:56	CLS		
2	ANALYZ	W1	SEM	01-SEP-2016 15:51	JWR	BRG	
3	STORE	SEM	A1	02-SEP-2016 16:46	BRG	JWR	

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login

Microbac Laboratories Inc.

Internal Chain of Custody Report

Login: L16081156
Account: 2551
Project: 2551.096
Samples: 5
Due Date: 02-SEP-2016

Samplenum	Container ID	Products
L16081156-05	791626	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	24-AUG-2016 11:56	CLS		
2	ANALYZ	W1	SEM	01-SEP-2016 15:51	JWR	BRG	
3	STORE	SEM	A1	02-SEP-2016 16:46	BRG	JWR	

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login

NELAP Addendum - January 4, 2016

Non-NELAP LIMS Product and Description

The following is a list of those tests that are not included in the Microbac – OVD NELAP Scope of Accreditation:

Heat of Combustion (BTU)
Total Halide by Bomb Combustion (TX)
Particle Sizing - 200 Mesh (PS200)
Specific Gravity/Density (SPGRAV)
Total Residual Chlorine (CL-TRL)
Total Volatile Solids (all forms) (TVS)
Total Coliform Bacteria (all methods)
Fecal Coliform Bacteria (all methods)
Sulfite (SO3)
Propionaldehyde (HPLC-UV)

SOLID AND HAZARDOUS CHEMICALS
Nitrogen, Ammonia by Method 350.1
Chromium, Hexavalent, Leachable by SM3500 Cr-B 2009
Phenolics, Total by Method 420.1
ASTM D3987-06

NELAP Accreditation by Laboratory SOP

NONPOTABLE WATER

OVD HPLC02/HPLC-UV

Nitroglycerin
Acetic acid
Butyric acid
Lactic acid
Propionic acid
Pyruvic acid

OVD MSS01/GC-MS

1,4-Phenylenediamine
1-Methylnaphthalene
1,4-Dioxane
Atrazine
Benzaldehyde
Biphenyl
Caprolactam
Hexamethylphosphoramide (HMPA)
Pentachlorobenzene
Pentachloroethane

NELAP Accreditation by Laboratory SOP

NONPOTABLE WATER

OVD MSV01/GC-MS

1, 1, 2-Trichloro-1,2,2-trifluoroethane
1,3-Butadiene
Cyclohexane
Cyclohexanone
Dimethyl disulfide
Dimethylsulfide
Ethyl-t-butylether (ETBE)
Isoprene
Methylacetate
Methylcyclohexane
T-amylmethylether (TAME)
Tetrahydrofuran (THF)

OVD HPLC07/HPLC-MS-MS

Hexamethylphosphoramide (XMPA-LCMS)

OVD HPLC12/HPLC/UV

Acetate
Formate

OVD RSK01/GC-FID

Acetylene
Propane

OVD K9305/ISE

Fluoroborate

SOLID AND HAZARDOUS CHEMICALS

OVD MSS0I/GC-MS

1-Methylnaphthalene
Benzaldehyde
Biphenyl
Caprolactam
Pentachloroethane

NELAP Accreditation by Laboratory SOP

SOLID AND HAZARDOUS CHEMICALS

OVD MSV0I/GC-MS

1.3-Butadiene
Cyclohexane
Cyclohexanone
Dimethyl disulfide
Dimethylsulfide
Ethyl-t-butylether (ETBE)
Isoprene
Methylacetate
Methylcyclohexane
n-Hexane
T-amylmethylether (TAME)

Microbac



Laboratory Report Number: L16070033

Kayla Teague
AECOM Technical Services, Inc.
16000 Dallas Parkway
Dallas, TX 75248

Please find enclosed the analytical results for the samples you submitted to Microbac Laboratories. Review and compilation of your report was completed by Microbac's Ohio Valley Division (OVD). If you have any questions, comments, or require further assistance regarding this report, please contact your service representative listed below.

Laboratory Contact:
Michelle Taylor – Client Services Specialist
(740) 373-4071
Michelle.Taylor@microbac.com

I certify that all test results meet all of the requirements of the DoD QSM and other applicable contract terms and conditions. Any exceptions are attached to this cover page or addressed in the method narratives presented in the report. All results for soil samples are reported on a 'dry-weight' basis unless specified otherwise. Analytical results for water and wastes are reported on a 'as received' basis unless specified otherwise. A statement of uncertainty for each analysis is available upon request. This laboratory report shall not be reproduced, except in full, without the written approval of Microbac Laboratories, DoD ELAP certification number 2936.01. The reported results are related only to the samples analyzed as received.

This report was certified on July 07 2016

David L. Vandenberg

David Vandenberg – Managing Director

State of Origin: TX
Accrediting Authority: Texas Commission on Environmental Quality ID:T104704252-07-TX
QAPP: DOD Ver 4.1

Microbac

Lab Report #: L16070033
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Michelle Taylor

Record of Sample Receipt and Inspection

Comments/Discrepancies

This is the record of the shipment conditions and the inspection records for the samples received and reported as a sample delivery group (SDG). All of the samples were inspected and observed to conform to our receipt policies, except as noted below.

There were no discrepancies.

Discrepancy	Resolution

Coolers

Cooler #	Temperature Gun	Temperature	COC #	Airbill #	Temp Required?
0018109	I	4.0		J2317164813	X

Inspection Checklist

#	Question	Result
1	Were shipping coolers sealed?	Yes
2	Were custody seals intact?	Yes
3	Were cooler temperatures in range of 0-6?	Yes
4	Was ice present?	Yes
5	Were COC's received/information complete/signed and dated?	Yes
6	Were sample containers intact and match COC?	Yes
7	Were sample labels intact and match COC?	Yes
8	Were the correct containers and volumes received?	Yes
9	Were samples received within EPA hold times?	Yes
10	All samples were checked for pH and met the standard. Exceptions are noted above under discrepancy. (water only)	Yes
11	Were pH ranges acceptable? (voa's excluded)	NA
12	Were VOA samples free of headspace (less than 6mm)?	NA

Microbac

Lab Report #: L16070033
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Michelle Taylor

Samples Received

Client ID	Laboratory ID	Date Collected	Date Received
PW108-062916	L16070033-01	06/29/2016 11:00	07/01/2016 09:32
PW110-062916	L16070033-02	06/29/2016 13:55	07/01/2016 09:32
PW134-063016	L16070033-03	06/30/2016 08:10	07/01/2016 09:32
PW134FD-063016	L16070033-04	06/30/2016 08:10	07/01/2016 09:32
PW133-063016	L16070033-05	06/30/2016 08:55	07/01/2016 09:32
PW133MS-063016	L16070033-06	06/30/2016 08:55	07/01/2016 09:32
PW133MSD-063016	L16070033-07	06/30/2016 08:55	07/01/2016 09:32
PW111-063016	L16070033-08	06/30/2016 10:05	07/01/2016 09:32
PW112-063016	L16070033-09	06/30/2016 11:25	07/01/2016 09:32

Microbac REPORT L16070033
PREPARED FOR AECOM Technical Services, Inc.
WORK ID:

1.0 Summary Data 5
1.1 Narratives 6
1.2 Certificate of Analysis 13
2.0 Full Sample Data Package 20
2.1 General Chromatography Data 21
2.1.1 6850 LC/MS Data 22
2.1.1.1 Summary Data 23
2.1.1.2 QC Summary Data 30
2.1.1.3 Sample Data 87
2.1.1.4 Standards Data 106
2.1.1.5 Raw QC Data 149
3.0 Attachments 154

1.0 Summary Data

1.1 Narratives

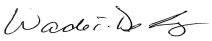
Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L16070033
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG575171	**Reviewer Name:**	Wade DeLong
LRC Date:	2016-07-06 00:00:00		

Laboratory Data Package Cover Page

	R1	Field chain-of-custody documentation;
	R2	Sample identification cross-reference;
	R3	Test reports (analytical data sheets) for each environmental sample that includes: (a) Items consistent with NELAC Chapter 5, (b) dilution factors, (c) preparation methods, (d) cleanup methods, and (e) a.if required for the project, tentatively identified compounds (TICs).
	R4	Surrogate recovery data including: (a) Calculated recovery (%R), and (b) the laboratory's surrogate QC limits.
	R5	Test reports/summary forms for blank samples;
	R6	Test reports/summary forms for laboratory control samples (LCSs) including: (a) LCS spiking amounts, (b) calculated %R for each analyte, and (c) the laboratory's LCS QC limits.
	R7	Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including: (a) samples associated with the MS/MSD clearly identified, (b) MS/MSD spiking compounds, (c) concentration of each MS/MSD analyte measured in the parent and spiked samples, (d) calculated %Rs and relative percent differences (RPDs), and (e) the laboratory's MS/MSD QC limits.
	R8	Laboratory analytical duplicate (if applicable) recovery and precision: (a) the amount of analyte measured in the duplicate, (b) the calculated RPD, and (c) the laboratory's QC limits for analytical duplicates.
	R9	List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
	R10	Other problems or anomalies.

Name (Printed)	Signature	Official Title (Printed)	Date
Wade DeLong		Chemist I	2016-07-06 19:32:05

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L16070033
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG575171	**Reviewer Name:**	Wade DeLong
LRC Date:	2016-07-06 00:00:00		

Description	Yes	No	NA	NR	ER#
Chain-of-custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
Were all departures from standard conditions described in an exception report?	X				
Sample and quality control (QC) identification	X				
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
Test reports					
Were all samples prepared and analyzed within holding times?	X				
Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
Were calculations checked by a peer or supervisor?	X				
Were all analyte identifications checked by a peer or supervisor?	X				
Were sample detection limits reported for all analytes not detected?	X				
Were all results for soil and sediment samples reported on a dry weight basis?			X		
Were % moisture (or solids) reported for all soil and sediment samples?			X		
Were bulk soils/solids samples for volatile analysis extracted with methanol per SW846 Method 5035?			X		
If required for the project, are TICs reported?			X		
Surrogate recovery data					
Were surrogates added prior to extraction?			X		
Were surrogate percent recoveries in all samples within the laboratory QC limits?			X		
Test reports/summary forms for blank samples	X				
Were appropriate type(s) of blanks analyzed?	X				
Were blanks analyzed at the appropriate frequency?	X				
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
Were blank concentrations < MQL?	X				
Laboratory control samples (LCS):					
Were all COCs included in the LCS?	X				

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L16070033
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG575171	**Reviewer Name:**	Wade DeLong
LRC Date:	2016-07-06 00:00:00		

Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
Were LCSs analyzed at the required frequency?	X				
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
Does the detectability check sample data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
Was the LCSD RPD within QC limits?			X		
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?	X				
Were MS/MSD analyzed at the appropriate frequency?	X				
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	X				
Were MS/MSD RPDs within laboratory QC limits?	X				
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?			X		
Were analytical duplicates analyzed at the appropriate frequency?			X		
Were RPDs or relative standard deviations within the laboratory QC limits?			X		
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?	X				
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
Was applicable and available technology used to lower the SDL to minimize the matrix interference effects on the sample results?			X		
Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	X				
Initial calibration (ICAL)					
Were response factors and/or relative response factors for each analyte within QC limits?	X				
Were percent RSDs or correlation coefficient criteria met?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L16070033
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG575171	**Reviewer Name:**	Wade DeLong
LRC Date:	2016-07-06 00:00:00		

Was the number of standards recommended in the method used for all analytes?	X				
Were all points generated between the lowest and highest standard used to calculate the curve?	X				
Are ICAL data available for all instruments used?	X				
Has the initial calibration curve been verified using an appropriate second source standard?	X				
Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?	X				
Were percent differences for each analyte within the method-required QC limits?	X				
Was the ICAL curve verified for each analyte?	X				
Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	X				
Mass spectral tuning					
Was the appropriate compound for the method used for tuning?	X				
Were ion abundance data within the method-required QC limits?			X		
Internal standards (IS)					
Were IS area counts and retention times within the method-required QC limits?	X				
Raw data (NELAC Section 5.5.10)					
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
Were data associated with manual integrations flagged on the raw data?	X				
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			X		
Tentatively identified compounds (TICs)					
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
Interference Check Sample (ICS) results					
Were percent recoveries within method QC limits?	X				
Serial dilutions, post digestion spikes, and method of standard additions					
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
Method detection limit (MDL) studies					

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L16070033
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG575171	**Reviewer Name:**	Wade DeLong
LRC Date:	2016-07-06 00:00:00		

Was a MDL study performed for each reported analyte?	X				
Is the MDL either adjusted or supported by the analysis of DCSs?	X				
Proficiency test reports					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?	X				
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5?	X				
Is documentation of the analyst's competency up-to-date and on file?	X				
Verification/validation documentation for methods (NELAC Chapter 5)					
Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
Laboratory standard operating procedures (SOPs)					
Are laboratory SOPs current and on file for each method performed	X				

1. Items identified by the letter “R” must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter “S” should be retained and made available upon request for the appropriate retention period;

2. O = organic analyses; I = inorganic analyses (and general chemistry, when applicable);

3. NA = Not applicable;

4. NR = Not reviewed;

5. ER# = Exception Report identification number (an Exception Report should be completed for an item if “NR” or “No” is checked).

The Exception Report for each “No” or “Not Reviewed (NR)” item in Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L16070033
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG575171	**Reviewer Name:**	Wade DeLong
LRC Date:	2016-07-06 00:00:00		

below, I affirm to the best of my knowledge all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [ ] This laboratory meets an exception under 30 TAC §25.6 and was last inspection by [ ] TCEQ or [ ] _____ on **(enter date of last inspection**). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Exceptions Report

1.2 Certificate of Analysis

Microbac

Lab Report #: L16070033
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Michelle Taylor

Certificate of Analysis

Sample #:	L16070033-01	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	PW108-062916	**Prep Method:**	6850	**Prep Date:**	07/05/2016 15:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	05/03/2016 17:18
Workgroup #:	WG575171	**Analyst:**	JWR	**Run Date:**	07/05/2016 17:25
Collect Date:	06/29/2016 11:00	**Dilution:**	1	**File ID:**	1LM.LM35611
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.200	U	0.400	0.200	0.100

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L16070033
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Michelle Taylor

Certificate of Analysis

Sample #:	L16070033-02	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	PW110-062916	**Prep Method:**	6850	**Prep Date:**	07/05/2016 15:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	05/03/2016 17:18
Workgroup #:	WG575171	**Analyst:**	JWR	**Run Date:**	07/05/2016 17:44
Collect Date:	06/29/2016 13:55	**Dilution:**	1	**File ID:**	1LM.LM35612
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.200	U	0.400	0.200	0.100

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L16070033
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Michelle Taylor

Certificate of Analysis

Sample #:	L16070033-03	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	PW134-063016	**Prep Method:**	6850	**Prep Date:**	07/05/2016 15:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	05/03/2016 17:18
Workgroup #:	WG575171	**Analyst:**	JWR	**Run Date:**	07/05/2016 18:03
Collect Date:	06/30/2016 08:10	**Dilution:**	1	**File ID:**	1LM.LM35613
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.997		0.400	0.200	0.100

Certificate of Analysis

Sample #:	L16070033-04	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	PW134FD-063016	**Prep Method:**	6850	**Prep Date:**	07/05/2016 15:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	05/03/2016 17:18
Workgroup #:	WG575171	**Analyst:**	JWR	**Run Date:**	07/05/2016 18:22
Collect Date:	06/30/2016 08:10	**Dilution:**	1	**File ID:**	1LM.LM35614
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	1.02		0.400	0.200	0.100

Certificate of Analysis

Sample #:	L16070033-05	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	PW133-063016	**Prep Method:**	6850	**Prep Date:**	07/05/2016 15:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	05/03/2016 17:18
Workgroup #:	WG575171	**Analyst:**	JWR	**Run Date:**	07/05/2016 20:15
Collect Date:	06/30/2016 08:55	**Dilution:**	1	**File ID:**	1LM.LM35620
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.536		0.400	0.200	0.100

Certificate of Analysis

Microbac

Lab Report #: L16070033
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Michelle Taylor

Sample #:	L16070033-06	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	PW133MS-063016	**Prep Method:**	6850	**Prep Date:**	07/05/2016 15:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	05/03/2016 17:18
Workgroup #:	WG575171	**Analyst:**	JWR	**Run Date:**	07/05/2016 20:34
Collect Date:	06/30/2016 08:55	**Dilution:**	1	**File ID:**	1LM.LM35621
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.734		0.400	0.200	0.100

Certificate of Analysis

Sample #:	L16070033-07	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	PW133MSD-063016	**Prep Method:**	6850	**Prep Date:**	07/05/2016 15:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	05/03/2016 17:18
Workgroup #:	WG575171	**Analyst:**	JWR	**Run Date:**	07/05/2016 20:53
Collect Date:	06/30/2016 08:55	**Dilution:**	1	**File ID:**	1LM.LM35622
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.721		0.400	0.200	0.100

Certificate of Analysis

Sample #:	L16070033-08	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	PW111-063016	**Prep Method:**	6850	**Prep Date:**	07/05/2016 15:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	05/03/2016 17:18
Workgroup #:	WG575171	**Analyst:**	JWR	**Run Date:**	07/05/2016 18:41
Collect Date:	06/30/2016 10:05	**Dilution:**	1	**File ID:**	1LM.LM35615
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.200	U	0.400	0.200	0.100

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L16070033
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Michelle Taylor

Certificate of Analysis

Sample #:	L16070033-09	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	PW112-063016	**Prep Method:**	6850	**Prep Date:**	07/05/2016 15:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	05/03/2016 17:18
Workgroup #:	WG575171	**Analyst:**	JWR	**Run Date:**	07/05/2016 18:59
Collect Date:	06/30/2016 11:25	**Dilution:**	1	**File ID:**	1LM.LM35616
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.200	U	0.400	0.200	0.100

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L16070033
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Michelle Taylor

2.0 Full Sample Data Package

2.1 General Chromatography Data

2.1.1 6850 LC/MS Data

2.1.1.1 Summary Data

Microbac

Lab Report #: L16070033
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Michelle Taylor

Certificate of Analysis

Sample #:	L16070033-01	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	PW108-062916	**Prep Method:**	6850	**Prep Date:**	07/05/2016 15:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	05/03/2016 17:18
Workgroup #:	WG575171	**Analyst:**	JWR	**Run Date:**	07/05/2016 17:25
Collect Date:	06/29/2016 11:00	**Dilution:**	1	**File ID:**	1LM.LM35611
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.200	U	0.400	0.200	0.100

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L16070033
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Michelle Taylor

Certificate of Analysis

Sample #:	L16070033-02	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	PW110-062916	**Prep Method:**	6850	**Prep Date:**	07/05/2016 15:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	05/03/2016 17:18
Workgroup #:	WG575171	**Analyst:**	JWR	**Run Date:**	07/05/2016 17:44
Collect Date:	06/29/2016 13:55	**Dilution:**	1	**File ID:**	1LM.LM35612
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.200	U	0.400	0.200	0.100

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L16070033
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Michelle Taylor

Certificate of Analysis

Sample #:	L16070033-03	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	PW134-063016	**Prep Method:**	6850	**Prep Date:**	07/05/2016 15:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	05/03/2016 17:18
Workgroup #:	WG575171	**Analyst:**	JWR	**Run Date:**	07/05/2016 18:03
Collect Date:	06/30/2016 08:10	**Dilution:**	1	**File ID:**	1LM.LM35613
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.997		0.400	0.200	0.100

Certificate of Analysis

Sample #:	L16070033-04	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	PW134FD-063016	**Prep Method:**	6850	**Prep Date:**	07/05/2016 15:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	05/03/2016 17:18
Workgroup #:	WG575171	**Analyst:**	JWR	**Run Date:**	07/05/2016 18:22
Collect Date:	06/30/2016 08:10	**Dilution:**	1	**File ID:**	1LM.LM35614
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	1.02		0.400	0.200	0.100

Certificate of Analysis

Sample #:	L16070033-05	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	PW133-063016	**Prep Method:**	6850	**Prep Date:**	07/05/2016 15:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	05/03/2016 17:18
Workgroup #:	WG575171	**Analyst:**	JWR	**Run Date:**	07/05/2016 20:15
Collect Date:	06/30/2016 08:55	**Dilution:**	1	**File ID:**	1LM.LM35620
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.536		0.400	0.200	0.100

Certificate of Analysis

Microbac

Lab Report #: L16070033
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Michelle Taylor

Sample #: L16070033-06 | **PrePrep Method:** N/A | **Instrument:** LCMS1
Client ID: PW133MS-063016 | **Prep Method:** 6850 | **Prep Date:** 07/05/2016 15:00
Matrix: Water | **Analytical Method:** 6850 | **Cal Date:** 05/03/2016 17:18
Workgroup #: WG575171 | **Analyst:** JWR | **Run Date:** 07/05/2016 20:34
Collect Date: 06/30/2016 08:55 | **Dilution:** 1 | **File ID:** 1LM.LM35621
Sample Tag: 01 | **Units:** ug/L

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.734		0.400	0.200	0.100

Certificate of Analysis

Sample #: L16070033-07 | **PrePrep Method:** N/A | **Instrument:** LCMS1
Client ID: PW133MSD-063016 | **Prep Method:** 6850 | **Prep Date:** 07/05/2016 15:00
Matrix: Water | **Analytical Method:** 6850 | **Cal Date:** 05/03/2016 17:18
Workgroup #: WG575171 | **Analyst:** JWR | **Run Date:** 07/05/2016 20:53
Collect Date: 06/30/2016 08:55 | **Dilution:** 1 | **File ID:** 1LM.LM35622
Sample Tag: 01 | **Units:** ug/L

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.721		0.400	0.200	0.100

Certificate of Analysis

Sample #: L16070033-08 | **PrePrep Method:** N/A | **Instrument:** LCMS1
Client ID: PW111-063016 | **Prep Method:** 6850 | **Prep Date:** 07/05/2016 15:00
Matrix: Water | **Analytical Method:** 6850 | **Cal Date:** 05/03/2016 17:18
Workgroup #: WG575171 | **Analyst:** JWR | **Run Date:** 07/05/2016 18:41
Collect Date: 06/30/2016 10:05 | **Dilution:** 1 | **File ID:** 1LM.LM35615
Sample Tag: 01 | **Units:** ug/L

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.200	U	0.400	0.200	0.100

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L16070033
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Michelle Taylor

Certificate of Analysis

Sample #:	L16070033-09	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	PW112-063016	**Prep Method:**	6850	**Prep Date:**	07/05/2016 15:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	05/03/2016 17:18
Workgroup #:	WG575171	**Analyst:**	JWR	**Run Date:**	07/05/2016 18:59
Collect Date:	06/30/2016 11:25	**Dilution:**	1	**File ID:**	1LM.LM35616
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.200	U	0.400	0.200	0.100

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L16070033
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Michelle Taylor

2.1.1.2 QC Summary Data

Example Calculation 6850 - Perchlorate

Concentration from Linear Regression

Step 1: Retrieve Curve Data From Plot, y = mx + b

y = response ratio = response of analyte / response of internal standard (IS) = Rx/Ristd

x = amount ratio = concentration analyte/concentration internal standard (IS) = Cx / Cistd

m = slope from curve (1.45)

b = intercept from curve (-0.00242)

y = 1.45x + -0.00242

Step 2: Substitute the value for y

where y = 12600/226000 = 0.055752

Step 3: Solve for x

x = (y - b)/m = 0.0040119

Step 4: Solve for analyte concentration Cx

Cx = (Cis)(x) = (5 ug/L)(0.040119) = 0.200594 ug/L

Example Calculation - Water:

Slope from curve, m:	1.45
Intercept from curve, b:	-0.00242
Response of analyte, Rx:	12600
Response of Internal Standard , Ristd:	226000
Concentration of IS, Cistd (ug/L):	5.00
Response Ratio:	0.05575
Amount Ratio:	0.04012
Analyte Concentration, Cx (ug/L) :	0.200594

Example Calculation - Soil:

Analyte Concentration, Cx (ug/L):	0.20059
Amount of soil extracted (g):	5.00
Final volume of extract (mL):	50.00
Percent solids (Pct wt.)	100
Concentration in soil (ug/kg):	2.005938

Perchlorate Conductivity Check
(perchlorate1)

Conductivity Probe Calibration Check: 1422 /1410 µs/cm

Working MCT Level: 10,000 µs/cm

Sample	Conductivity (µs/cm)	Pretreatment or Dilution Needed
WG575171-01 MCT	10,040.	
-02 Blank	0.34	
-03 LCS	0.54 ~~0.054~~ JWR 07/06/16	
L16061290-05	186.1	
L16070033-01	346.	
-02	8,150.	
-03	98.2	
-04	97.4	
-05 RS	185.7	
-06 MS	185.5	
-07 MSD	185.7	
-08	84.2	
-09	6,140.	

Analyst: John Richards

Date/Time: 07/06/16 / 16:50

DCN#119508

Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 050316_JWR.TXT
Analyst1: JWR Analyst2: NA
Method: 6850 SOP: HPLC06 Rev: 8

Maintenance Log ID: Syringe Filter Lot#: 151125254
Eluent ID#:

Workgroups: Column 1 ID: KP-RPPX250 Column 2 ID: NA
Analytical WG567013 (soils)
Internal STD: COA18071 Surrogate STD: NA Calibration STD STD75510 (05/03/2016)
CCV STD: STD75510 LCS STD: STD75512 MS/MSD STD: STD75512

Comments: ICAL WG567320 : Alternate Source STD75512
Analytical Column : RPPX 5um (250x4.6mm)
K'Prime S/N RPPX250-02115

Samples L16041363(-05 and -10) were analyzed at dilutions based on their pre-run screen results.

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	1LM.LM34686	WG567320-01 CCB	1	1		05/03/16 15:06
2	1LM.LM34687	WG567320-02 STD (0.1 ug/L)	1	1	STD75510	05/03/16 15:25
3	1LM.LM34688	WG567320-03 STD (0.2 ug/L)	1	1	STD75510	05/03/16 15:43
4	1LM.LM34689	WG567320-04 STD (0.5 ug/L)	1	1	STD75510	05/03/16 16:02
5	1LM.LM34690	WG567320-05 STD (1.0 ug/L)	1	1	STD75510	05/03/16 16:21
6	1LM.LM34691	WG567320-06 STD (2.0 ug/L)	1	1	STD75510	05/03/16 16:40
7	1LM.LM34692	WG567320-07 STD (5.0 ug/L)	1	1	STD75510	05/03/16 16:59
8	1LM.LM34693	WG567320-08 STD (10 ug/L)	1	1	STD75510	05/03/16 17:18
9	1LM.LM34694	WG567320-09 SSCV (1.0 ug/L)	1	1	STD75512	05/03/16 17:37
10	1LM.LM34695	WG567321-01 CCB	1	1		05/03/16 17:56
11	1LM.LM34696	WG567321-02 CCV (1.0ug/L)	1	1	STD75510	05/03/16 18:15
12	1LM.LM34697	WG567013-07 MRL (2.0ug/kg)	7	1	STD75510	05/03/16 18:34
13	1LM.LM34698	WG567013-01 MCT (2.0ug/kg)	7	1	STD75512	05/03/16 18:53
14	1LM.LM34699	WG567013-02 BLANK	7	1		05/03/16 19:12
15	1LM.LM34700	WG567013-03 LCS (2.0ug/kg)	7	1	STD75512	05/03/16 19:31
16	1LM.LM34701	L16041363-07 RS	7	1		05/03/16 19:50
17	1LM.LM34702	L16041363-08 MS	7	1	STD75512	05/03/16 20:09
18	1LM.LM34703	L16041363-09 MSD	7	1	STD75512	05/03/16 20:28
19	1LM.LM34704	L16041363-01	7	1		05/03/16 20:46
20	1LM.LM34705	L16041363-02	7	1		05/03/16 21:05
21	1LM.LM34706	L16041363-03	7	1		05/03/16 21:24
22	1LM.LM34707	L16041363-04	7	1		05/03/16 21:43
23	1LM.LM34708	WG567321-03 CCV (1.0ug/L)	1	1	STD75510	05/03/16 22:02
24	1LM.LM34709	WG567013-08 MRL (2.0ug/kg)	7	1	STD75510	05/03/16 22:21
25	1LM.LM34710	WG567321-04 CCB	1	1		05/03/16 22:40
26	1LM.LM34711	L16041363-05 (5x)	7	5		05/03/16 22:59
27	1LM.LM34712	L16041363-06	7	1		05/03/16 23:18
28	1LM.LM34713	L16041363-10 (5x)	7	5		05/03/16 23:37
29	1LM.LM34714	WG567321-05 CCV (1.0ug/L)	1	1	STD75510	05/03/16 23:56
30	1LM.LM34715	WG567013-09 MRL (2.0ug/kg)	7	1	STD75510	05/04/16 00:15
31	1LM.LM34716	WG567321-06 CCB	1	1		05/04/16 00:34

Comments

Page: 1 Approved: 05-MAY-16

Microbac

Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 050316_JWR.TXT

Analyst1: JWR Analyst2: NA

Method: 6850 SOP: HPLC06 Rev: 8

Maintenance Log ID: Syringe Filter Lot#: 151125254

Eluent ID#:

Workgroups: Column 1 ID: KP-RPPX250 Column 2 ID: NA

Analytical WG567013 (soils)

Internal STD: COA18071 Surrogate STD: NA STD75510 (05/03/2016)

CCV STD: STD75510 LCS STD: STD75512 STD75512

Comments

Seq.	Rerun	Dil.	Reason	Analytes
17				
	L16041363-08 MS : The MS %Rec is 129%. This is above the advisory limit of 120%. The parent sample to this MS had responses that passed the ion-ratio criteria, but had a quantified value below the method's detection limit, resulting in an assigned value of zero. If the quantified value for the parent sample were used in the %Rec calculation, the MS %Rec would be 93.9%.			
18				
	L16041363-09 MSD : The MSD %Rec is 131%. This is above the advisory limit of 120%. The parent sample to this MSD had responses that passed the ion-ratio criteria, but had a quantified value below the method's detection limit, resulting in an assigned value of zero. If the quantified value for the parent sample were used in the %Rec calculation, the MSD %Rec would be 95.4%.			

Page: 2 Approved: 05-MAY-16

Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 070516_JWR.TXT
Analyst1: JWR Analyst2: NA
Method: 6850 SOP: HPLC06 Rev: 8

Maintenance Log ID: Syringe Filter Lot#: 151125254
Eluent ID#:

Workgroups: Column 1 ID: KP-RPPX250 Column 2 ID: NA
Analytical WG575171 (waters)
Internal STD: STD18071 Surrogate STD: NA Calibration STD STD75510 (05/03/2016)
CCV STD: STD75510 LCS STD: STD75512 MS/MSD STD: STD75512

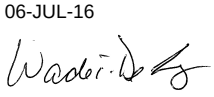
Comments: Sample L16061290-05 was analyzed at a 1000x dilution based on the results from its initial analysis on 07/01/2016.

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	1LM.LM35604	WG575212-01 CCB	1	1		07/05/16 15:12
2	1LM.LM35605	WG575212-02 CCV (1.0ug/L)	1	1	STD75510	07/05/16 15:31
3	1LM.LM35606	WG575171-07 MRL (0.2ug/L)	1	1	STD75510	07/05/16 15:50
4	1LM.LM35607	WG575171-01 MCT (0.2ug/L)	1	1	STD75512	07/05/16 16:09
5	1LM.LM35608	WG575171-02 BLANK	1	1		07/05/16 16:28
6	1LM.LM35609	WG575171-03 LCS (0.2ug/L)	1	1	STD75512	07/05/16 16:47
7	1LM.LM35610	L16061290-05 (1000x)	1	1000		07/05/16 17:06
8	1LM.LM35611	L16070033-01	1	1		07/05/16 17:25
9	1LM.LM35612	L16070033-02	1	1		07/05/16 17:44
10	1LM.LM35613	L16070033-03	1	1		07/05/16 18:03
11	1LM.LM35614	L16070033-04	1	1		07/05/16 18:22
12	1LM.LM35615	L16070033-08	1	1		07/05/16 18:41
13	1LM.LM35616	L16070033-09	1	1		07/05/16 18:59
14	1LM.LM35617	WG575212-03 CCV (1.0ug/L)	1	1	STD75510	07/05/16 19:18
15	1LM.LM35618	WG575171-08 MRL (0.2ug/L)	1	1	STD75510	07/05/16 19:37
16	1LM.LM35619	WG575212-04 CCB	1	1		07/05/16 19:56
17	1LM.LM35620	L16070033-05 RS	1	1		07/05/16 20:15
18	1LM.LM35621	L16070033-06 MS	1	1	STD75512	07/05/16 20:34
19	1LM.LM35622	L16070033-07 MSD	1	1	STD75512	07/05/16 20:53
20	1LM.LM35623	WG575212-05 CCV (1.0ug/L)	1	1	STD75510	07/05/16 21:12
21	1LM.LM35624	WG575171-09 MRL (0.2ug/L)	1	1	STD75510	07/05/16 21:31
22	1LM.LM35625	WG575212-06 CCB	1	1		07/05/16 21:50

Comments

Seq.	Rerun	Dil.	Reason	Analytes

Page: 1 Approved: 06-JUL-16



Microbac Laboratories Inc.

Data Checklist

Date: 03-MAY-2016
Analyst: JWR
Analyst: NA
Method: 6850
Instrument: LCMS1
Curve Workgroup: WG567320
Runlog ID: 74891
Analytical Workgroups: L16041363 (SOILS)

ANALYTICAL	
System Performance Check	NA
DFTPP (GCMS)	NA
Endrin/DDT breakdown (8081/GCMS)	NA
Pentachlorophenol/benzidine tailing (GCMS)	NA
Eluent check (IC)/system pressure (HPLC)	NA
Window standard (FID)	NA
Initial Calibration	X
Average RF	NA
Linear regression or higher order curve	X
Alternate source standard (ICV) % Difference	X
Continuing Calibration (CCV)	X
% D/% Drift	X
Minimum response factors (GCMS)	X
Continuing calibration blank (CCB) (IC/LCMS)	X
Limit of quantitation verification (LOQV) (LCMS)	X
Special standards	NA
Blanks	X
TCL hits	ND
Surrogate recoveries	NA
LCS/LCSD (Laboratory Control Sample)	X
Recoveries	X
Surrogate recoveries	NA
MS/MSD/Sample duplicates	X
Recoveries	X
%RPD	X
Interference check sample (ICS) (LCMS)	MCT
Samples	X
TCL hits	X
Mass spectra (MS/HPLC)/2nd column confirmations (ECD/FID/HPLC)	NA
Surrogate recoveries	NA
Internal standard areas (MS)	X
Library searches (GCMS)	NA
Calculations & correct factors	X
Compounds above calibration range	NA
Reruns	NA
Manual integrations	NA
Project/client specific requirements	X
REPORTING	
Upload batch form	X
KOBRA workgroup data/forms/bench sheets	X
Case narratives	
Check for completeness	X
Primary Reviewer	JWR
SUPERVISORY/SECONDARY REVIEW	
Check for compliance with method and project specific requirements	X
Check the completeness/accuracy of reported information	X
Data qualifiers	X
Secondary Reviewer	WTD

Primary Reviewer:
04-MAY-2016
John Richards

Secondary Reviewer:
05-MAY-2016
Wade D

CHECKLIST1 - Modified 03/05/2008
Generated: MAY-05-2016 16:23:46

Microbac Laboratories Inc.

Data Checklist

Date: 05-JUL-2016
Analyst: JWR
Analyst: NA
Method: 6850
Instrument: LCMS1
Curve Workgroup: NA
Runlog ID: 76133
Analytical Workgroups: L16061290-05 L16070033

ANALYTICAL	
System Performance Check	NA
DFTPP (GCMS)	NA
Endrin/DDT breakdown (8081/GCMS)	NA
Pentachlorophenol/benzidine tailing (GCMS)	NA
Eluent check (IC)/system pressure (HPLC)	NA
Window standard (FID)	NA
Initial Calibration	NA
Average RF	NA
Linear regression or higher order curve	NA
Alternate source standard (ICV) % Difference	NA
Continuing Calibration (CCV)	X
% D/% Drift	X
Minimum response factors (GCMS)	X
Continuing calibration blank (CCB) (IC/LCMS)	X
Limit of quantitation verification (LOQV) (LCMS)	X
Special standards	NA
Blanks	X
TCL hits	ND
Surrogate recoveries	NA
LCS/LCSD (Laboratory Control Sample)	X
Recoveries	X
Surrogate recoveries	NA
MS/MSD/Sample duplicates	X
Recoveries	X
%RPD	X
Interference check sample (ICS) (LCMS)	MCT
Samples	X
TCL hits	X
Mass spectra (MS/HPLC)/2nd column confirmations (ECD/FID/HPLC)	NA
Surrogate recoveries	NA
Internal standard areas (MS)	X
Library searches (GCMS)	NA
Calculations & correct factors	X
Compounds above calibration range	NA
Reruns	NA
Manual integrations	MCT-ONLY
Project/client specific requirements	X
REPORTING	
Upload batch form	X
KOBRA workgroup data/forms/bench sheets	X
Case narratives	
Check for completeness	X
Primary Reviewer	JWR
SUPERVISORY/SECONDARY REVIEW	
Check for compliance with method and project specific requirements	X
Check the completeness/accuracy of reported information	X
Data qualifiers	X
Secondary Reviewer	WTD

Primary Reviewer:
06-JUL-2016
John Richards

Secondary Reviewer:
06-JUL-2016
Wade D

CHECKLIST1 - Modified 03/05/2008
Generated: JUL-06-2016 15:35:02

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 6850 AAB#: WG575171

Login Number: L16070033

Client ID	ID	Date Collected	TCLP Date	Time Held	Max Hold	Q	Extract Date	Time Held	Max Hold	Q	Run Date	Time Held	Max Hold	Q
PW108-062916	01	06/29/16					07/05/2016	6.2	28		07/05/16	.1	28	
PW110-062916	02	06/29/16					07/05/2016	6	28		07/05/16	.1	28	
PW134-063016	03	06/30/16					07/05/2016	5.3	28		07/05/16	.1	28	
PW134FD-063016	04	06/30/16					07/05/2016	5.3	28		07/05/16	.1	28	
PW133-063016	05	06/30/16					07/05/2016	5.3	28		07/05/16	.2	28	
PW133MS-063016	06	06/30/16					07/05/2016	5.3	28		07/05/16	.2	28	
PW133MSD-063016	07	06/30/16					07/05/2016	5.3	28		07/05/16	.2	28	
PW111-063016	08	06/30/16					07/05/2016	5.2	28		07/05/16	.2	28	
PW112-063016	09	06/30/16					07/05/2016	5.1	28		07/05/16	.2	28	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 4841519
Report generated 07/07/2016 09:07

METHOD BLANK SUMMARY

Login Number: L16070033
Work Group: WG575171
Blank File ID: 1LM.LM35608
Blank Sample ID: WG575171-02
Prep Date: 07/05/16 15:00
Instrument ID: LCMS1
Analyzed Date: 07/05/16 16:28
Method: 6850
Analyst: JWR

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
QCMRL	WG575171-07	1LM.LM35606	07/05/16 15:50	01
MCT	WG575171-01	1LM.LM35607	07/05/16 16:09	01
LCS	WG575171-03	1LM.LM35609	07/05/16 16:47	01
PW108-062916	L16070033-01	1LM.LM35611	07/05/16 17:25	01
PW110-062916	L16070033-02	1LM.LM35612	07/05/16 17:44	01
PW134-063016	L16070033-03	1LM.LM35613	07/05/16 18:03	01
PW134FD-063016	L16070033-04	1LM.LM35614	07/05/16 18:22	01
PW111-063016	L16070033-08	1LM.LM35615	07/05/16 18:41	01
PW112-063016	L16070033-09	1LM.LM35616	07/05/16 18:59	01
QCMRL	WG575171-08	1LM.LM35618	07/05/16 19:37	01
PW133-063016	L16070033-05	1LM.LM35620	07/05/16 20:15	01
PW133MS-063016	L16070033-06	1LM.LM35621	07/05/16 20:34	01
PW133MSD-063016	L16070033-07	1LM.LM35622	07/05/16 20:53	01
QCMRL	WG575171-09	1LM.LM35624	07/05/16 21:31	01

Report Name: BLANK_SUMMARY
PDF File ID: 4841520
Report generated 07/07/2016 09:07

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number: L16070033 Prep Date: 07/05/16 15:00 Sample ID: WG575171-02
Instrument ID: LCMS1 Run Date: 07/05/16 16:28 Prep Method: 6850
File ID: 1LM.LM35608 Analyst: JWR Method: 6850
Workgroup (AAB#): WG575171 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-03-MAY-16

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
Perchlorate	0.100	0.400	0.100	1	U

DL Method Detection Limit
LOQ Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > 1/2 RL

Report Name:BLANK
PDF ID: 4841521
07-JUL-2016 09:07

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L16070033 **Run Date:** 07/05/2016 **Sample ID:** WG575171-03
Instrument ID: LCMS1 **Run Time:** 16:47 **Prep Method:** 6850
File ID: 1LM.LM35609 **Analyst:** JWR **Method:** 6850
Workgroup (AAB#): WG575171 **Matrix:** Water **Units:** ug/L
QC Key: DOD4 **Lot#:** STD75512 **Cal ID:** LCMS1-03-MAY-16

Analytes	Expected	Found	% Rec	LCS Limits	Q
Perchlorate	0.200	0.198	99.0	80 - 120	

LCS - Modified 03/06/2008
PDF File ID: 4841522
Report generated: 07/07/2016 09:07

Microbac Laboratories Inc.

MS/MSD REPORT

Loginnum:L16070033 Cal ID:LCMS1- 03-MAY-16 Worknum:WG575171

Instrument ID:LCMS1 Contract #: Prep Method:6850

Parent ID:L16070033-05 File ID:1LM.LM35620 Dil:1 Method:6850

Sample ID:L16070033-06 MS File ID:1LM.LM35621 Dil:1 Matrix:Water

Sample ID:L16070033-07 MSD File ID:1LM.LM35622 Dil:1 Units:ug/L

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Perchlorate	0.536	0.200	0.734	99	0.200	0.721	92.5	1.79	80 - 120	15	

* FAILS %REC LIMIT

FAILS RPD LIMIT

MS_MSD - Modified 03/06/2008

PDF File ID: 4841523

Report generated 07/07/2016 09:07

Microbac Laboratories Inc.
INITIAL CALIBRATION SUMMARY

Login Number: L16070033
Analytical Method: 6850
ICAL Workgroup: WG567320

Instrument ID: LCMS1
Initial Calibration Date: 03-MAY-16 17:18
Column ID: F

Analyte		AVG RF	% RSD	LINEAR (R)	QUAD (R^2)
Perchlorate		1.699	4.81	1.00000	

R = Correlation coefficient; 0.995 minimum
R^2 = Coefficient of determination; 0.99 minimum

INT_CAL - Modified 03/06/2008
PDF File ID: 4841642
Report generated 07/07/2016 09:07

Login Number: L16070033
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 03-MAY-16 17:18
Column ID: F

Analyte	WG567320-02			WG567320-03			WG567320-04		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Perchlorate	0.100	17900.0000	1.792	0.200	34100.0000	1.718	0.500	82200.0000	1.637

INT_CAL - Modified 03/06/2008
PDF File ID: 4841642
Report generated 07/07/2016 09:07

Login Number: L16070033
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 03-MAY-16 17:18
Column ID: F

Analyte	WG567320-05			WG567320-06			WG567320-07		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Perchlorate	1.00	168000.000	1.697	2.00	330000.000	1.672	5.00	810000.000	1.695

INT_CAL - Modified 03/06/2008
PDF File ID: 4841642
Report generated 07/07/2016 09:07

Login Number: L16070033
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 03-MAY-16 17:18
Column ID: F

Analyte	WG567320-08		
	CONC	RESP	RF
Perchlorate	10.0	1530000.00	1.680

INT_CAL - Modified 03/06/2008
PDF File ID: 4841642
Report generated 07/07/2016 09:07

Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L16070033 Run Date: 05/03/2016 Sample ID: WG567320-09
Instrument ID: LCMS1 Run Time: 17:37 Method: 6850
File ID: 1LM.LM34694 Analyst: JWR QC Key: DOD4
ICal Workgroup: WG567320 Cal ID: LCMS1 - 03-MAY-16

Analyte		Expected	Found	Units	RF	%D	UCL	Q
Perchlorate		1.00	0.985	ug/L	1.66	1.50	15	

* Exceeds %D Limit

ALT - Modified 09/06/2007
Version 1.5 PDF File ID: 4841643
Report generated 07/07/2016 09:08

Microbac Laboratories Inc.

CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L16070033	Run Date:	07/05/2016	Sample ID:	WG575212-01
Instrument ID:	LCMS1	Run Time:	15:12	Method:	6850
File ID:	1LM.LM35604	Analyst:	JWR	Units:	ug/L
Workgroup (AAB#):	WG575171	Cal ID:	LCMS1 - 03-MAY-16		
Matrix:	WATER	QAPP:	DOD4		

Analytes	MDL	RDL	Concentration	Qualifier
Perchlorate	0.100	0.400	0.100	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 4841526
Report generated 07/07/2016 09:08

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L16070033	**Run Date:**	07/05/2016	**Sample ID:**	WG575212-04
Instrument ID:	LCMS1	**Run Time:**	19:56	**Method:**	6850
File ID:	1LM.LM35619	**Analyst:**	JWR	**Units:**	ug/L
Workgroup (AAB#):	WG575171	**Cal ID:**	LCMS1 - 03-MAY-16		
Matrix:	WATER	**QAPP:**	DOD4		

Analytes	MDL	RDL	Concentration	Qualifier
Perchlorate	0.100	0.400	0.100	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 4841526
Report generated 07/07/2016 09:08

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L16070033 | Run Date: 07/05/2016 | Sample ID: WG575212-06
Instrument ID: LCMS1 | Run Time: 21:50 | Method: 6850
File ID: 1LM.LM35625 | Analyst: JWR | Units: ug/L
Workgroup (AAB#): WG575171 | Cal ID: LCMS1 - 03-MAY-16
Matrix: WATER | QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Perchlorate	0.100	0.400	0.100	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 4841526
Report generated 07/07/2016 09:08

Login Number: L16070033 Run Date: 07/05/2016 Sample ID: WG575212-02
Instrument ID: LCMS1 Run Time: 15:31 Method: 6850
File ID: 1LM.LM35605 Analyst: JWR QC Key: DOD4
Workgroup (AAB#): WG575171 Cal ID: LCMS1 - 03-MAY-16
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	0.981	ug/L	1.66	1.90	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 4841525
Report generated 07/07/2016 09:08

Login Number: L16070033 Run Date: 07/05/2016 Sample ID: WG575212-03
Instrument ID: LCMS1 Run Time: 19:18 Method: 6850
File ID: 1LM.LM35617 Analyst: JWR QC Key: DOD4
Workgroup (AAB#): WG575171 Cal ID: LCMS1 - 03-MAY-16
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	1.00	ug/L	1.69	0	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 4841525
Report generated 07/07/2016 09:08

Login Number: L16070033 Run Date: 07/05/2016 Sample ID: WG575212-05
Instrument ID: LCMS1 Run Time: 21:12 Method: 6850
File ID: 1LM.LM35623 Analyst: JWR QC Key: DOD4
Workgroup (AAB#): WG575171 Cal ID: LCMS1 - 03-MAY-16
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	0.996	ug/L	1.68	0.400	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 4841525
Report generated 07/07/2016 09:08

Login Number: L16070033 Run Date: 07/05/2016 Sample ID: WG575171-07
Instrument ID: LCMS1 Run Time: 15:50 Prep Method: 6850
File ID: 1LM.LM35606 Analyst: JWR Method: 6850
Workgroup (AAB#): WG575171 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-03-MAY-16

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.199	99.5	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 4841524
Report generated 07/07/2016 09:07

Login Number: L16070033 Run Date: 07/05/2016 Sample ID: WG575171-08
Instrument ID: LCMS1 Run Time: 19:37 Prep Method: 6850
File ID: 1LM.LM35618 Analyst: JWR Method: 6850
Workgroup (AAB#): WG575171 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-03-MAY-16

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.198	99.0	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 4841524
Report generated 07/07/2016 09:07

Login Number: L16070033 Run Date: 07/05/2016 Sample ID: WG575171-09
Instrument ID: LCMS1 Run Time: 21:31 Prep Method: 6850
File ID: 1LM.LM35624 Analyst: JWR Method: 6850
Workgroup (AAB#): WG575171 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-03-MAY-16

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.201	101	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 4841524
Report generated 07/07/2016 09:07

Microbac Laboratories Inc.
INTERNAL STANDARD AREA SUMMARY
(COMPARED TO AVERAGE OF ICAL)

Login Number:L16070033
Instrument ID:LCMS1
Workgroup (AAB#):WG575171

ICAL CCV Number:WG567320-05
CAL ID: LCMS1-03-MAY-16
Matrix:WATER

Sample Number	Dilution	Tag	IS-1
WG567320	NA	NA	489000
Upper Limit	NA	NA	733500
Lower Limit	NA	NA	244500
L16070033-01	1.00	01	426000
L16070033-02	1.00	01	340000
L16070033-03	1.00	01	439000
L16070033-04	1.00	01	446000
L16070033-05	1.00	01	485000
L16070033-06	1.00	01	495000
L16070033-07	1.00	01	475000
L16070033-08	1.00	01	468000
L16070033-09	1.00	01	353000
WG575171-02	1.00	01	436000
WG575171-03	1.00	01	439000

IS-1 - O18LP

Underline = Response outside limits

INTERNAL_STD_AVG_ICAL - Modified 03/10/2010
PDF File ID: 4841527
Report generated 07/07/2016 09:08

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16070033	**Prep Method:**	6850	**Samplenum:**	L16070033-01
Instrument:	LCMS1	**Prep Date:**	07/05/2016 15:00	**File ID:**	1LM.LM35611
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG575171	**Analysis Date:**	07/05/2016 17:25	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	3080	1210	2.55	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16070033	**Prep Method:**	6850	**Samplenum:**	L16070033-02
Instrument:	LCMS1	**Prep Date:**	07/05/2016 15:00	**File ID:**	1LM.LM35612
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG575171	**Analysis Date:**	07/05/2016 17:44	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	0.000	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16070033	**Prep Method:**	6850	**Samplenum:**	L16070033-03
Instrument:	LCMS1	**Prep Date:**	07/05/2016 15:00	**File ID:**	1LM.LM35613
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG575171	**Analysis Date:**	07/05/2016 18:03	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	148000	53600	2.76	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16070033	**Prep Method:**	6850	**Samplenum:**	L16070033-04
Instrument:	LCMS1	**Prep Date:**	07/05/2016 15:00	**File ID:**	1LM.LM35614
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG575171	**Analysis Date:**	07/05/2016 18:22	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	153000	53400	2.87	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16070033	**Prep Method:**	6850	**Samplenum:**	L16070033-05
Instrument:	LCMS1	**Prep Date:**	07/05/2016 15:00	**File ID:**	1LM.LM35620
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG575171	**Analysis Date:**	07/05/2016 20:15	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	88100	31400	2.81	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16070033	**Prep Method:**	6850	**Samplenum:**	L16070033-06
Instrument:	LCMS1	**Prep Date:**	07/05/2016 15:00	**File ID:**	1LM.LM35621
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG575171	**Analysis Date:**	07/05/2016 20:34	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	123000	43600	2.82	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16070033	**Prep Method:**	6850	**Samplenum:**	L16070033-07
Instrument:	LCMS1	**Prep Date:**	07/05/2016 15:00	**File ID:**	1LM.LM35622
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG575171	**Analysis Date:**	07/05/2016 20:53	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	116000	40600	2.86	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16070033	**Prep Method:**	6850	**Samplenum:**	L16070033-08
Instrument:	LCMS1	**Prep Date:**	07/05/2016 15:00	**File ID:**	1LM.LM35615
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG575171	**Analysis Date:**	07/05/2016 18:41	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	1860	1080	1.72	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16070033	**Prep Method:**	6850	**Samplenum:**	L16070033-09
Instrument:	LCMS1	**Prep Date:**	07/05/2016 15:00	**File ID:**	1LM.LM35616
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG575171	**Analysis Date:**	07/05/2016 18:59	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	0.000	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16070033	**Prep Method:**		**Samplenum:**	WG567320-02
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM34687
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG575171	**Analysis Date:**	05/03/2016 15:25	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	17900	6950	2.58	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16070033	**Prep Method:**		**Samplenum:**	WG567320-03
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM34688
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG575171	**Analysis Date:**	05/03/2016 15:43	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	34100	11900	2.87	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16070033	**Prep Method:**		**Samplenum:**	WG567320-04
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM34689
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG575171	**Analysis Date:**	05/03/2016 16:02	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	82200	29400	2.80	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16070033	**Prep Method:**		**Samplenum:**	WG567320-05
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM34690
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG575171	**Analysis Date:**	05/03/2016 16:21	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	168000	56600	2.97	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16070033	**Prep Method:**		**Samplenum:**	WG567320-06
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM34691
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG575171	**Analysis Date:**	05/03/2016 16:40	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	330000	108000	3.06	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16070033	**Prep Method:**		**Samplenum:**	WG567320-07
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM34692
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG575171	**Analysis Date:**	05/03/2016 16:59	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	810000	269000	3.01	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16070033	**Prep Method:**		**Samplenum:**	WG567320-08
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM34693
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG575171	**Analysis Date:**	05/03/2016 17:18	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	1530000	512000	2.99	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16070033	**Prep Method:**		**Samplenum:**	WG567320-09
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM34694
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG575171	**Analysis Date:**	05/03/2016 17:37	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	169000	56300	3.00	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16070033	**Prep Method:**	6850	**Samplenum:**	WG575171-01
Instrument:	LCMS1	**Prep Date:**	07/05/2016 15:00	**File ID:**	1LM.LM35607
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG575171	**Analysis Date:**	07/05/2016 16:09	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	26700	9850	2.71	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16070033	**Prep Method:**	6850	**Samplenum:**	WG575171-02
Instrument:	LCMS1	**Prep Date:**	07/05/2016 15:00	**File ID:**	1LM.LM35608
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG575171	**Analysis Date:**	07/05/2016 16:28	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	0.000	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16070033	**Prep Method:**	6850	**Samplenum:**	WG575171-03
Instrument:	LCMS1	**Prep Date:**	07/05/2016 15:00	**File ID:**	1LM.LM35609
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG575171	**Analysis Date:**	07/05/2016 16:47	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	29700	10900	2.72	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16070033	**Prep Method:**	6850	**Samplenum:**	WG575171-07
Instrument:	LCMS1	**Prep Date:**	07/05/2016 15:00	**File ID:**	1LM.LM35606
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG575171	**Analysis Date:**	07/05/2016 15:50	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	29700	10800	2.75	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16070033	**Prep Method:**	6850	**Samplenum:**	WG575171-08
Instrument:	LCMS1	**Prep Date:**	07/05/2016 15:00	**File ID:**	1LM.LM35618
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG575171	**Analysis Date:**	07/05/2016 19:37	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	34500	12500	2.76	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16070033	**Prep Method:**	6850	**Samplenum:**	WG575171-09
Instrument:	LCMS1	**Prep Date:**	07/05/2016 15:00	**File ID:**	1LM.LM35624
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG575171	**Analysis Date:**	07/05/2016 21:31	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	35800	12800	2.80	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16070033	**Prep Method:**		**Samplenum:**	WG575212-01
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM35604
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG575171	**Analysis Date:**	07/05/2016 15:12	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	0.000	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16070033	**Prep Method:**		**Samplenum:**	WG575212-02
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM35605
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG575171	**Analysis Date:**	07/05/2016 15:31	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	152000	54100	2.81	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16070033	**Prep Method:**		**Samplenum:**	WG575212-03
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM35617
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG575171	**Analysis Date:**	07/05/2016 19:18	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	157000	54600	2.88	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16070033	**Prep Method:**		**Samplenum:**	WG575212-04
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM35619
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG575171	**Analysis Date:**	07/05/2016 19:56	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	181	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16070033	**Prep Method:**		**Samplenum:**	WG575212-05
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM35623
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG575171	**Analysis Date:**	07/05/2016 21:12	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	165000	55700	2.96	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16070033	**Prep Method:**		**Samplenum:**	WG575212-06
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM35625
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG575171	**Analysis Date:**	07/05/2016 21:50	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	0.000	0.000	2.3	3.8	*

2.1.1.3 Sample Data

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Data File	LM35611.wiff	**Result Table**	070516_JWR.rdb
Acquisition Date	7/5/2016 5:25:10 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

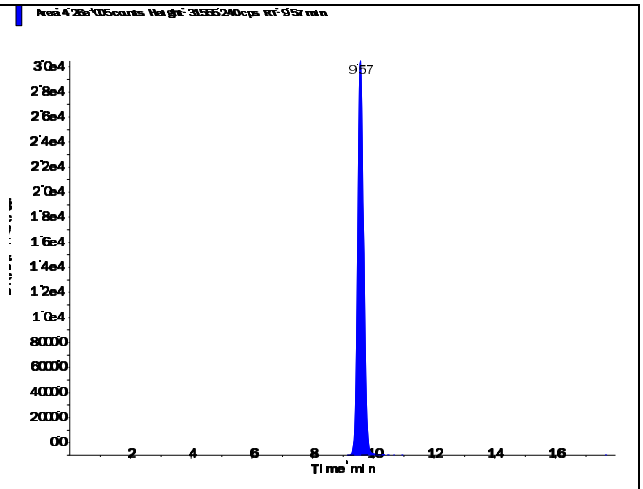
Sample Name	L16070033-01	**Injection Vial**	8.00
Data File	LM35611.wiff	**Injection Volume**	10.00
Acquisition Date	7/5/2016 5:25:10 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	070516_JWR.rdb
Sample ID	L16070033-01	**Dilution Factor**	1.00
Sample Comment	1,1 (Hist)	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.260e+05	9.57	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	3.080e+03	9.60	N/A	0.0177
Perchlorate conf	1.210e+03	9.57	N/A	0.005

O18LP (Internal Standard)

RT (Exp. RT): 9.57(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



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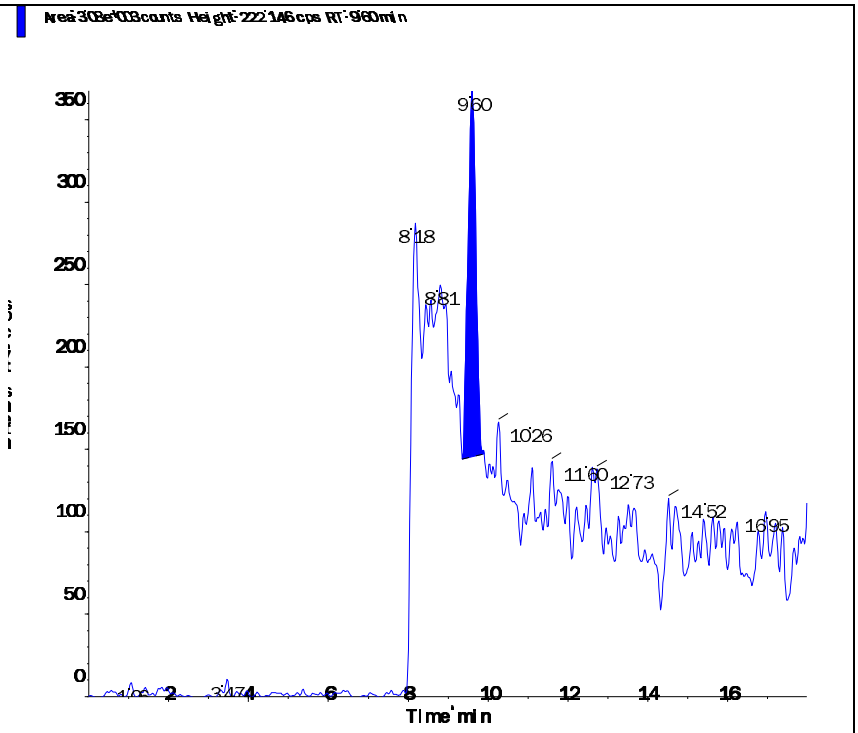
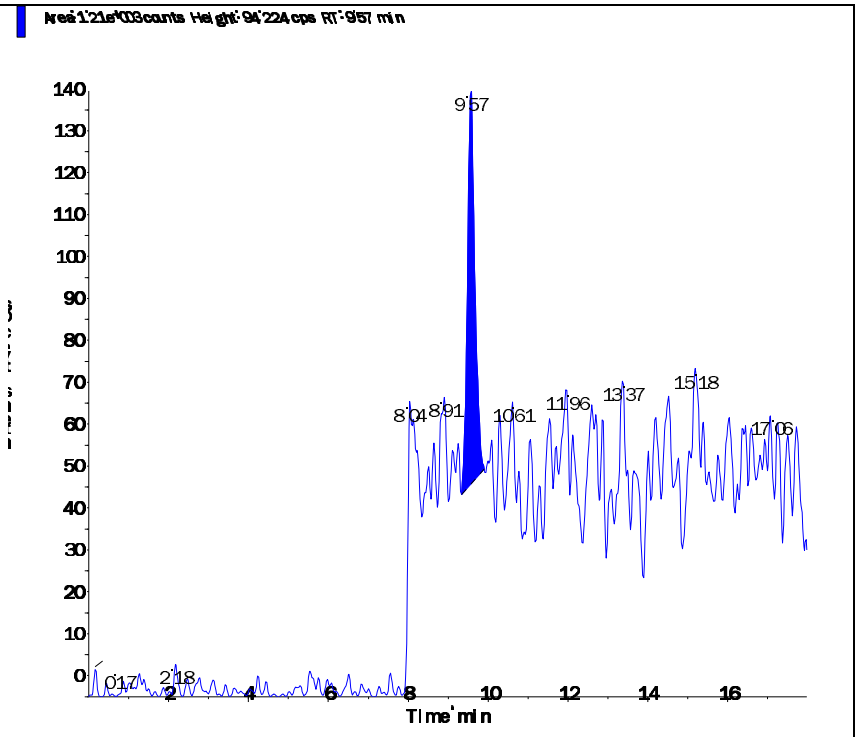
Created with Analyst Reporter
Printed: 7/6/2016 10:58 AM

Perchlorate (98.8/83.3 amu)	
RT (Exp. RT):	9.60 (9.84) min
Calculated conc:	0.0177 ng/ml
Area Ratio:	0.007
Sample Type:	(Unknown)



Perchlorate conf (100.8/85.2 amu)	
RT (Exp. RT):	9.57 (9.84) min
Calculated conc:	0.005 ng/ml
Area Ratio:	0.003
Sample Type:	(Unknown)



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Data File	LM35612.wiff	**Result Table**	070516_JWR.rdb
Acquisition Date	7/5/2016 5:44:10 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

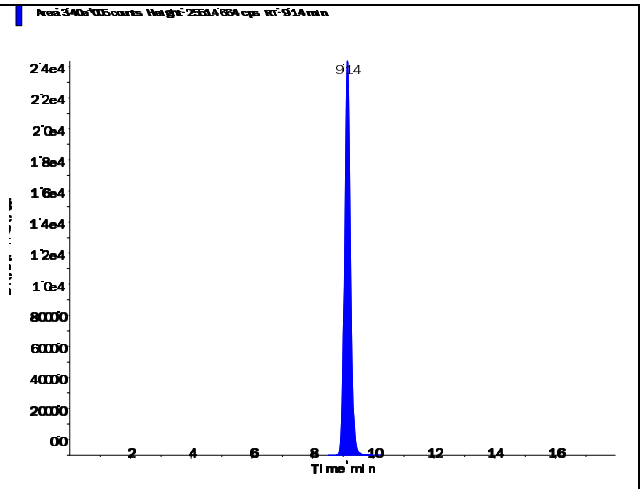
Sample Name	L16070033-02	**Injection Vial**	9.00
Data File	LM35612.wiff	**Injection Volume**	10.00
Acquisition Date	7/5/2016 5:44:10 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	070516_JWR.rdb
Sample ID	L16070033-02	**Dilution Factor**	1.00
Sample Comment	1,1 (Hist)	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.400e+05	9.14	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	0.000e+00	0.00	N/A	No Peak
Perchlorate conf	0.000e+00	0.00	N/A	No Peak

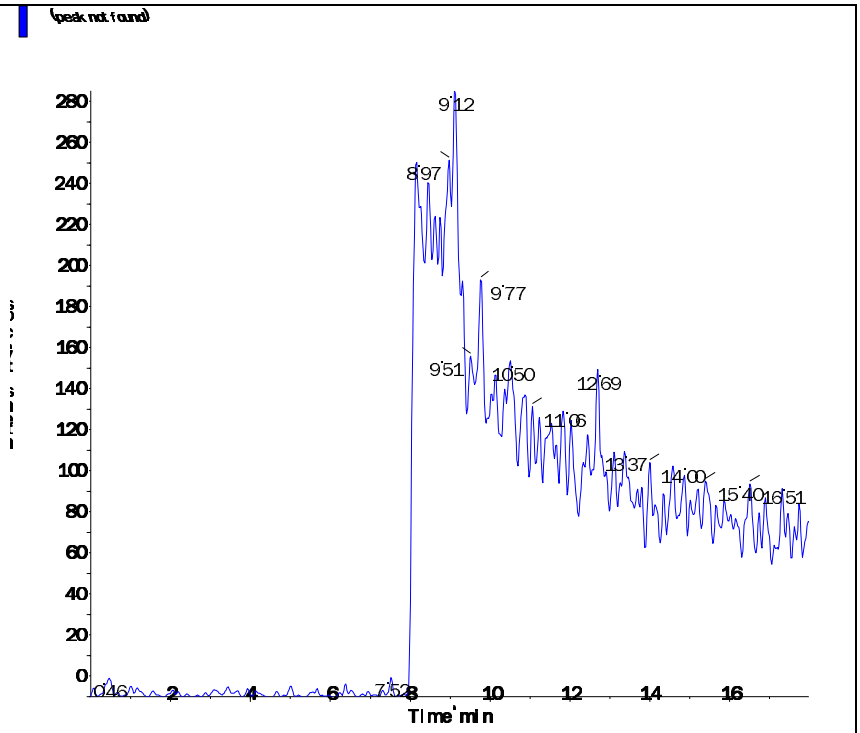
O18LP (Internal Standard)

RT (Exp. RT): 9.14(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



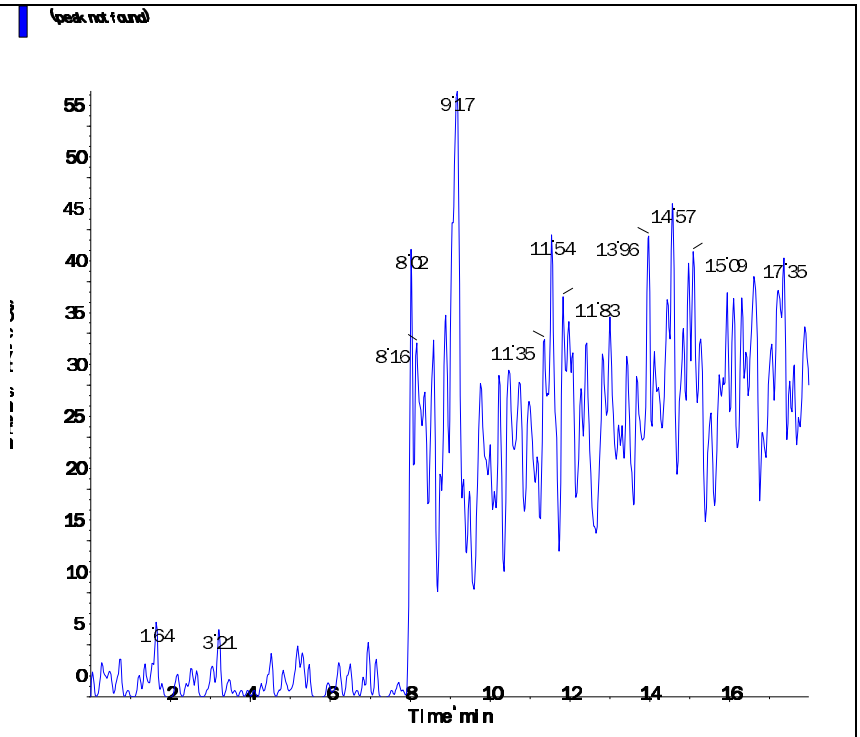
Perchlorate (98.8/83.3 amu)

RT (Exp. RT): 0.00 (9.84) min
Calculated conc: No Peak ng/ml
Area Ratio: 0.00
Sample Type: (Unknown)



Perchlorate conf (100.8/85.2 amu)

RT (Exp. RT): 0.00 (9.84) min
Calculated conc: No Peak ng/ml
Area Ratio: 0.00
Sample Type: (Unknown)



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Data File	LM35613.wiff	**Result Table**	070516_JWR.rdb
Acquisition Date	7/5/2016 6:03:09 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

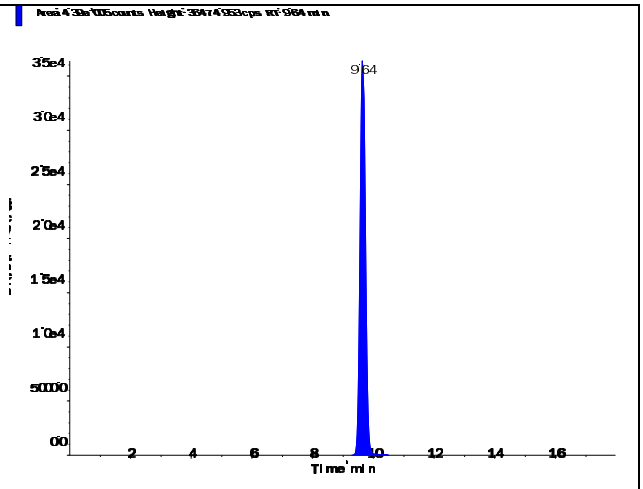
Sample Name	L16070033-03	**Injection Vial**	10.00
Data File	LM35613.wiff	**Injection Volume**	10.00
Acquisition Date	7/5/2016 6:03:09 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	070516_JWR.rdb
Sample ID	L16070033-03	**Dilution Factor**	1.00
Sample Comment	1,1 (Hist)	**Weight to Volume**	0.00

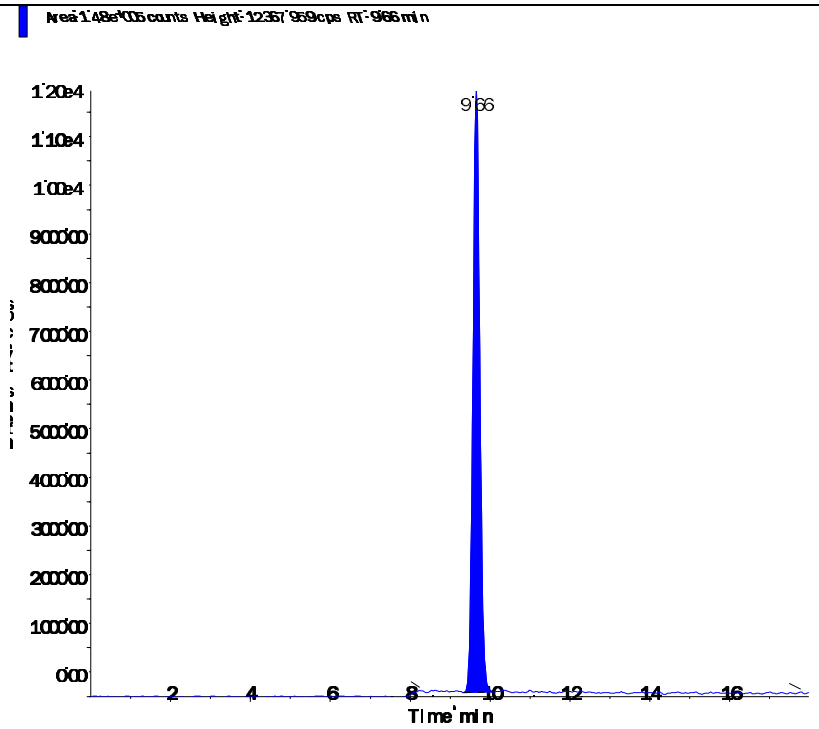
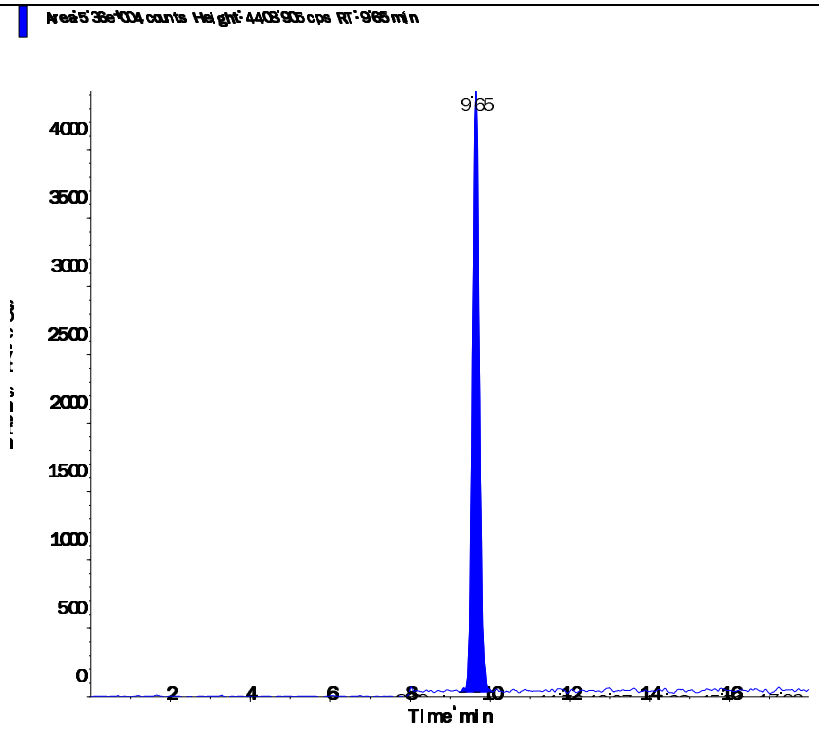
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.390e+05	9.64	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.480e+05	9.66	N/A	0.997
Perchlorate conf	5.360e+04	9.65	N/A	1.07

O18LP (Internal Standard)

RT (Exp. RT): 9.64(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.66 (9.84) min Calculated conc: 0.997 ng/ml Area Ratio: 0.337 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.65 (9.84) min Calculated conc: 1.07 ng/ml Area Ratio: 0.122 Sample Type: (Unknown)	

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Data File	LM35614.wiff	**Result Table**	070516_JWR.rdb
Acquisition Date	7/5/2016 6:22:04 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

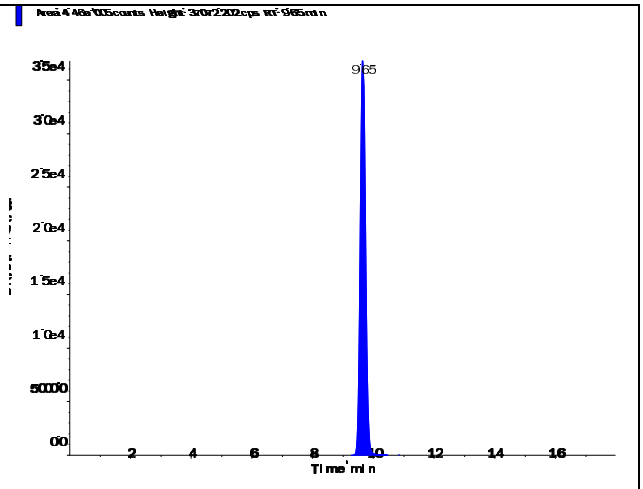
Sample Name	L16070033-04	**Injection Vial**	11.00
Data File	LM35614.wiff	**Injection Volume**	10.00
Acquisition Date	7/5/2016 6:22:04 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	070516_JWR.rdb
Sample ID	L16070033-04	**Dilution Factor**	1.00
Sample Comment	1,1 (Hist)	**Weight to Volume**	0.00

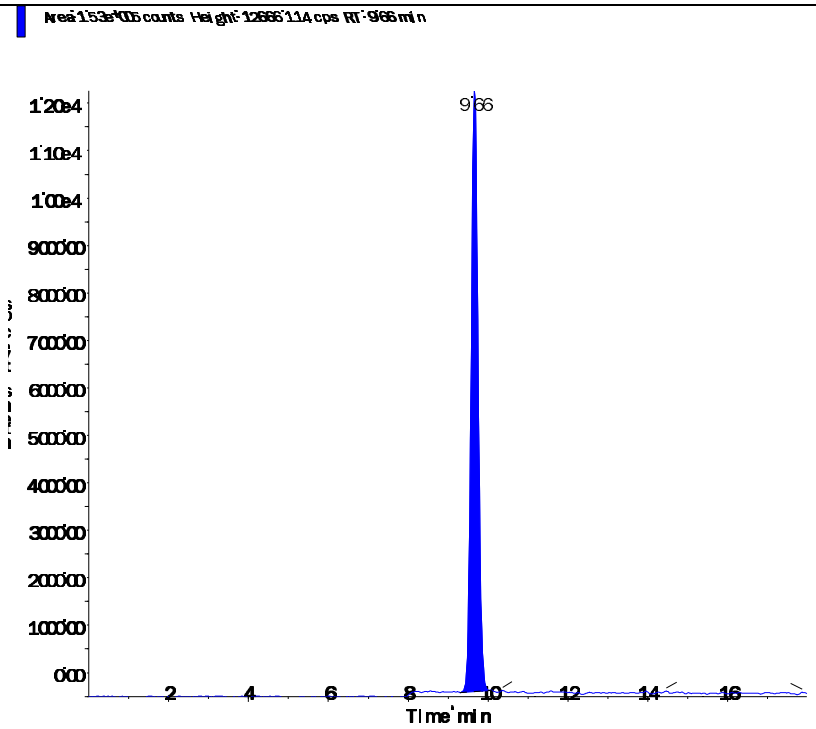
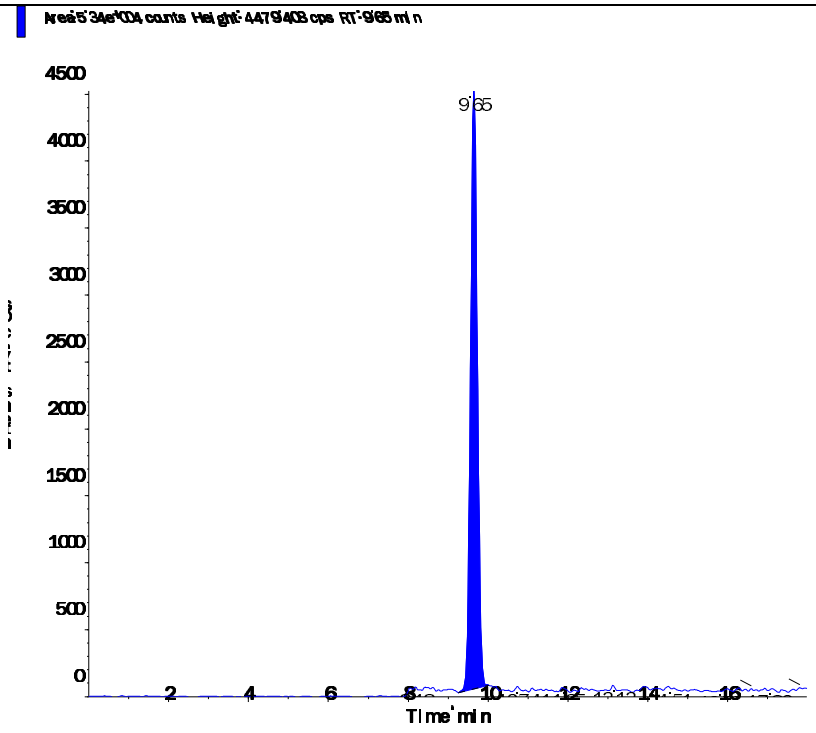
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.460e+05	9.65	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.530e+05	9.66	N/A	1.02
Perchlorate conf	5.340e+04	9.65	N/A	1.05

O18LP (Internal Standard)

RT (Exp. RT): 9.65(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.66 (9.84) min Calculated conc: 1.02 ng/ml Area Ratio: 0.343 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.65 (9.84) min Calculated conc: 1.05 ng/ml Area Ratio: 0.12 Sample Type: (Unknown)	

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Data File	LM35620.wiff	**Result Table**	070516_JWR.rdb
Acquisition Date	7/5/2016 8:15:39 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

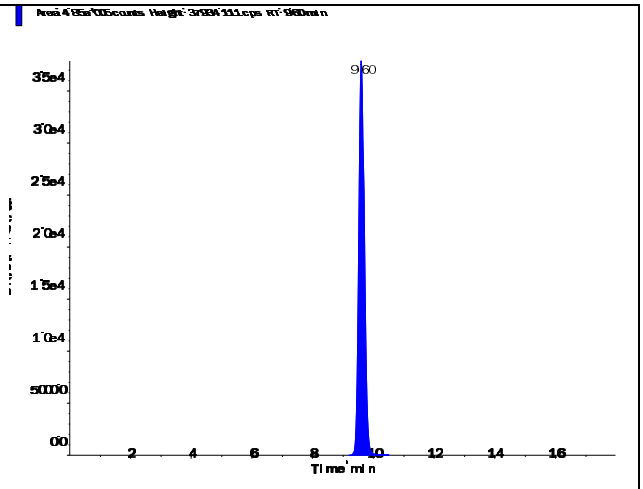
Sample Name	L16070033-05 RS	**Injection Vial**	14.00
Data File	LM35620.wiff	**Injection Volume**	10.00
Acquisition Date	7/5/2016 8:15:39 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	070516_JWR.rdb
Sample ID	WG575171-04	**Dilution Factor**	1.00
Sample Comment	1,1 (Hist)	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.850e+05	9.60	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	8.810e+04	9.62	N/A	0.536
Perchlorate conf	3.140e+04	9.60	N/A	0.56

O18LP (Internal Standard)

RT (Exp. RT): 9.60(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



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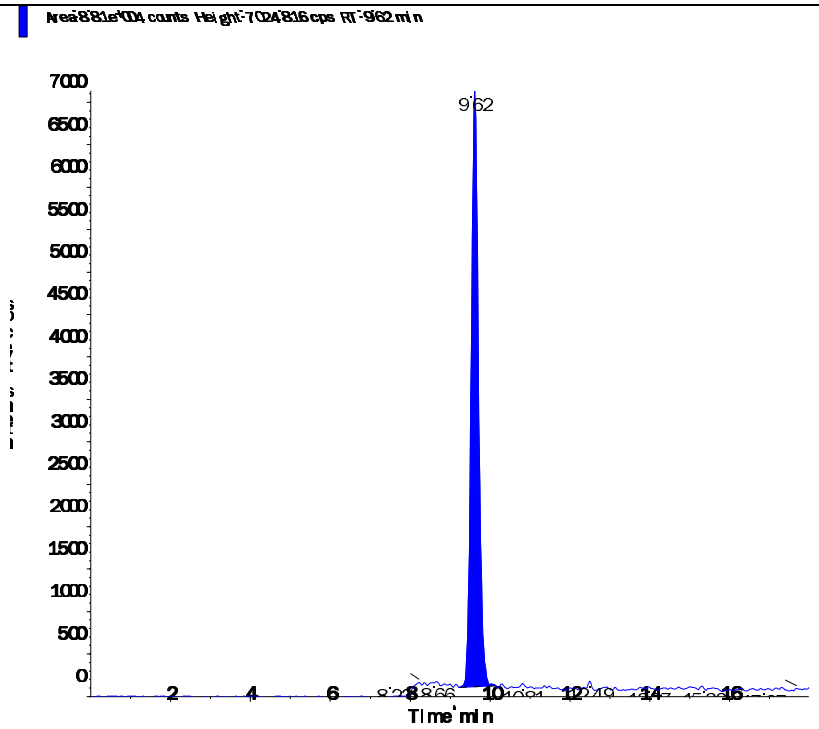
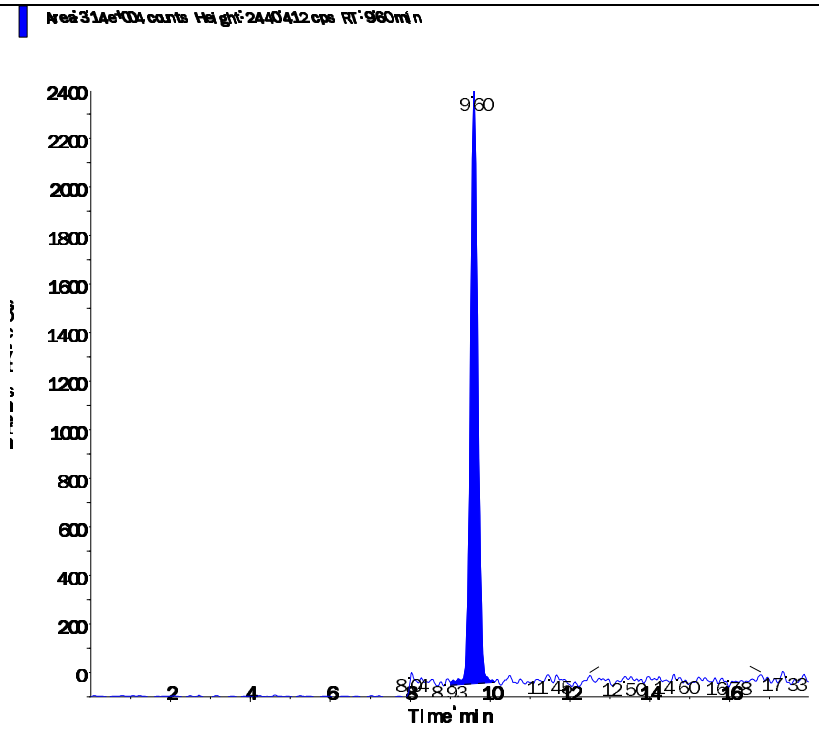
Perchlorate (98.8/83.3 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	 9.62 (9.84) min 0.536 ng/ml 0.182 (Unknown)



Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	 9.60 (9.84) min 0.56 ng/ml 0.065 (Unknown)



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Printed: 7/6/2016 11:02 AM

Data File	LM35621.wiff	**Result Table**	070516_JWR.rdb
Acquisition Date	7/5/2016 8:34:36 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

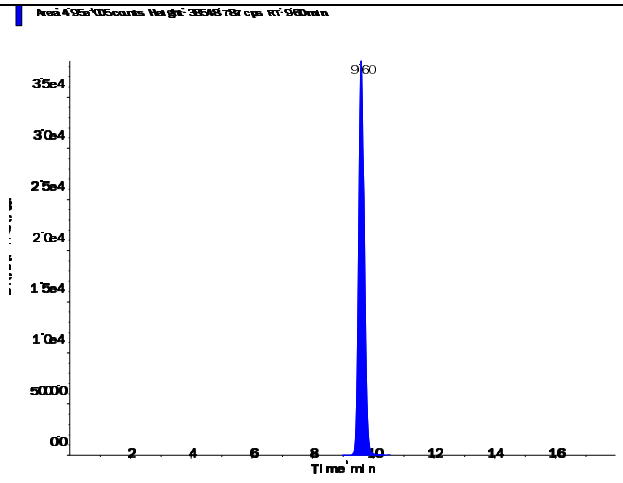
Sample Name	L16070033-06 MS	**Injection Vial**	15.00
Data File	LM35621.wiff	**Injection Volume**	10.00
Acquisition Date	7/5/2016 8:34:36 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	070516_JWR.rdb
Sample ID	WG575171-05	**Dilution Factor**	1.00
Sample Comment	1,1 STD75512	**Weight to Volume**	0.00

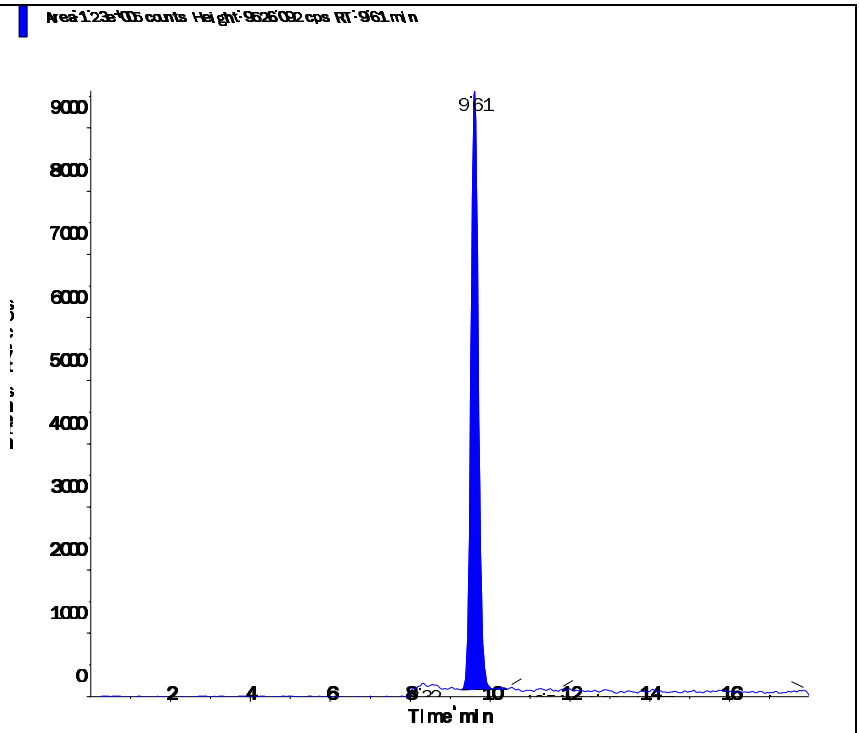
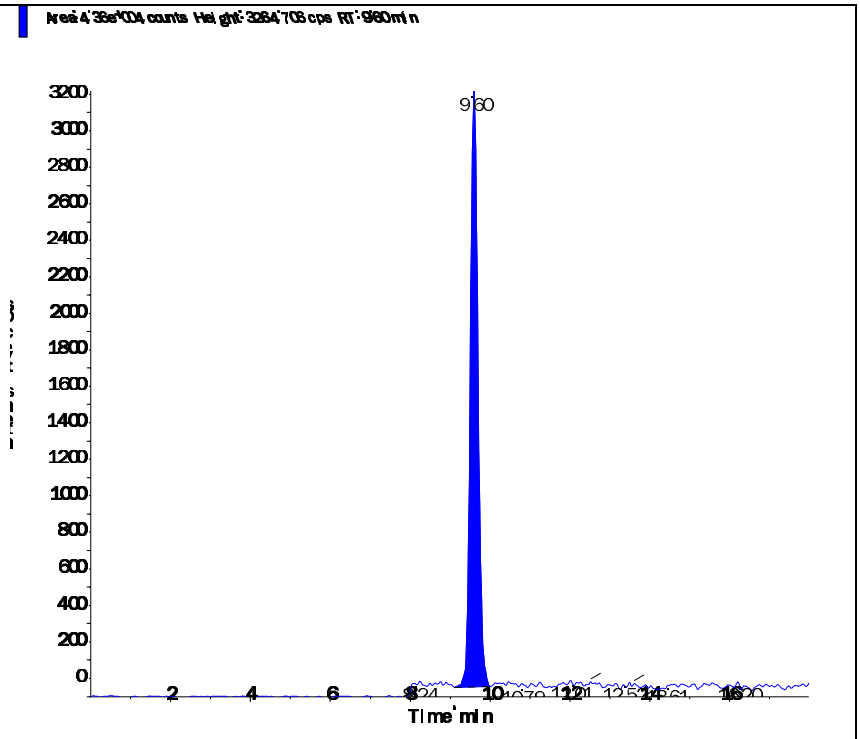
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.950e+05	9.60	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.230e+05	9.61	N/A	0.734
Perchlorate conf	4.360e+04	9.60	N/A	0.769

O18LP (Internal Standard)

RT (Exp. RT): 9.60(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.61 (9.84) min Calculated conc: 0.734 ng/ml Area Ratio: 0.248 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.60 (9.84) min Calculated conc: 0.769 ng/ml Area Ratio: 0.088 Sample Type: (Unknown)	

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Data File	LM35622.wiff	**Result Table**	070516_JWR.rdb
Acquisition Date	7/5/2016 8:53:31 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

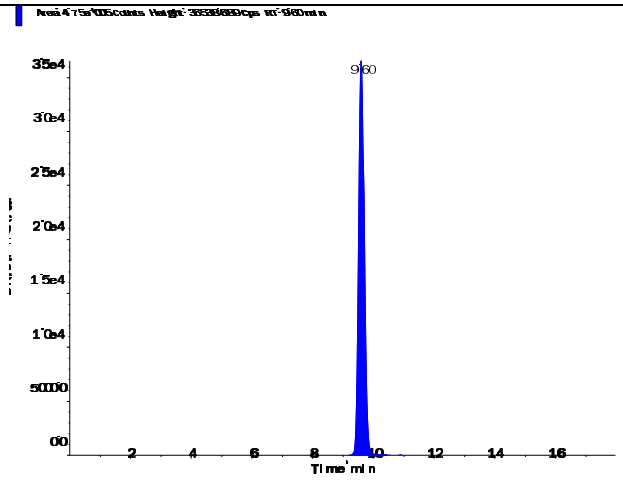
Sample Name	L16070033-07 MSD	**Injection Vial**	16.00
Data File	LM35622.wiff	**Injection Volume**	10.00
Acquisition Date	7/5/2016 8:53:31 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	070516_JWR.rdb
Sample ID	WG575171-06	**Dilution Factor**	1.00
Sample Comment	1,1 STD75512	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.750e+05	9.60	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.160e+05	9.61	N/A	0.721
Perchlorate conf	4.060e+04	9.60	N/A	0.745

O18LP (Internal Standard)

RT (Exp. RT): 9.60(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



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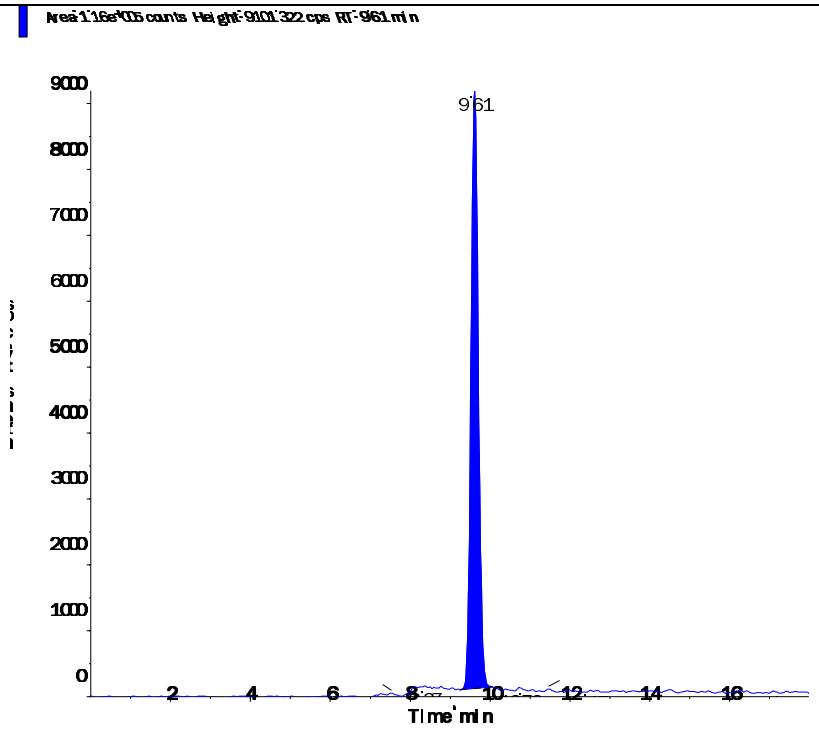
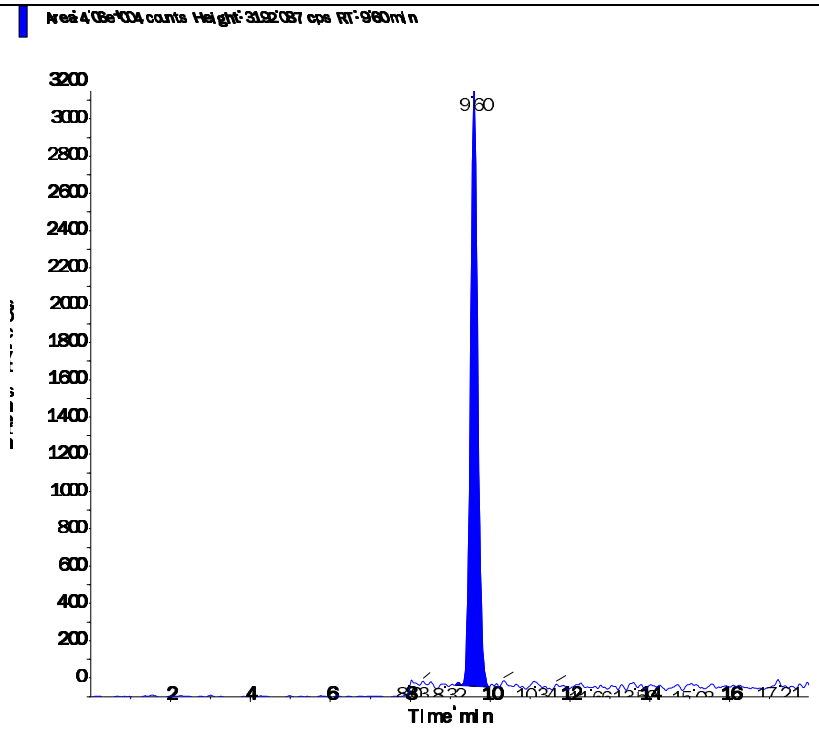
Perchlorate (98.8/83.3 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	 9.61 (9.84) min 0.721 ng/ml 0.244 (Unknown)



Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	 9.60 (9.84) min 0.745 ng/ml 0.085 (Unknown)



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Data File	LM35615.wiff	**Result Table**	070516_JWR.rdb
Acquisition Date	7/5/2016 6:41:00 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

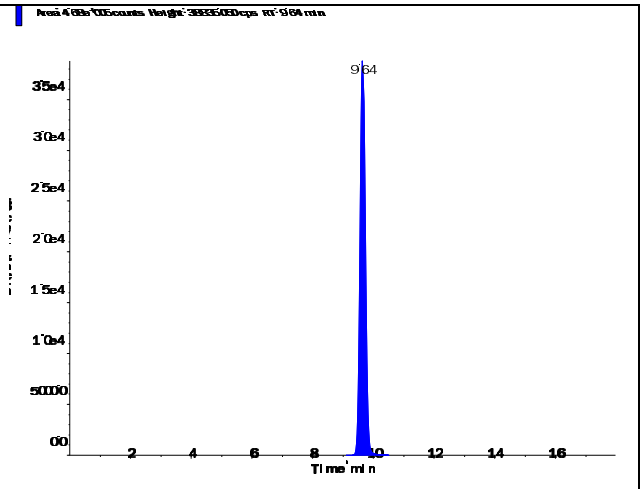
Sample Name	L16070033-08	**Injection Vial**	12.00
Data File	LM35615.wiff	**Injection Volume**	10.00
Acquisition Date	7/5/2016 6:41:00 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	070516_JWR.rdb
Sample ID	L16070033-08	**Dilution Factor**	1.00
Sample Comment	1,1 (Hist)	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.680e+05	9.64	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.860e+03	9.64	N/A	0.008
Perchlorate conf	1.080e+03	9.68	N/A	0.0003

O18LP (Internal Standard)

RT (Exp. RT): 9.64(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



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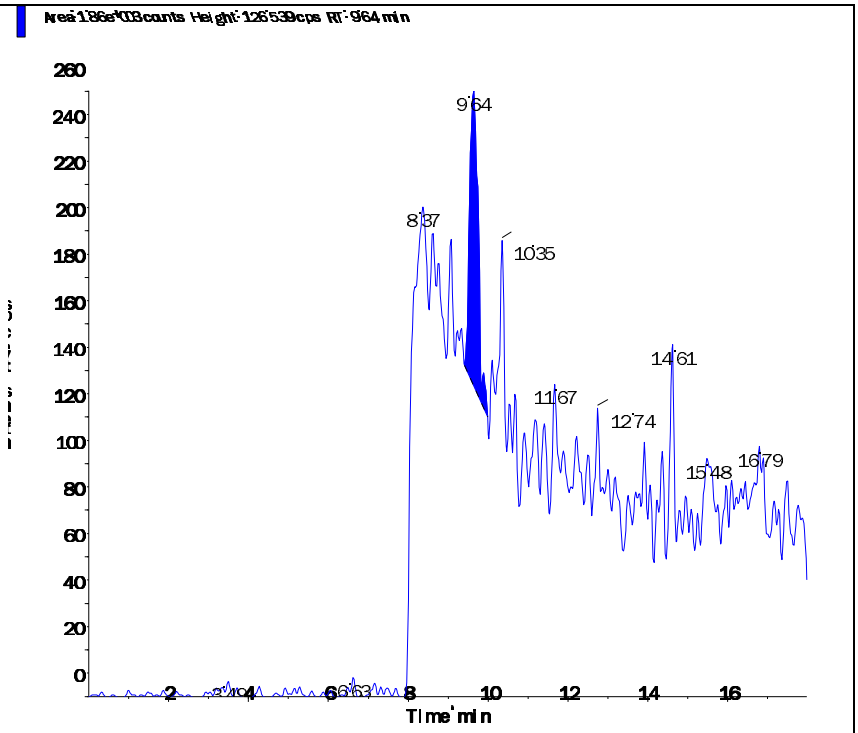
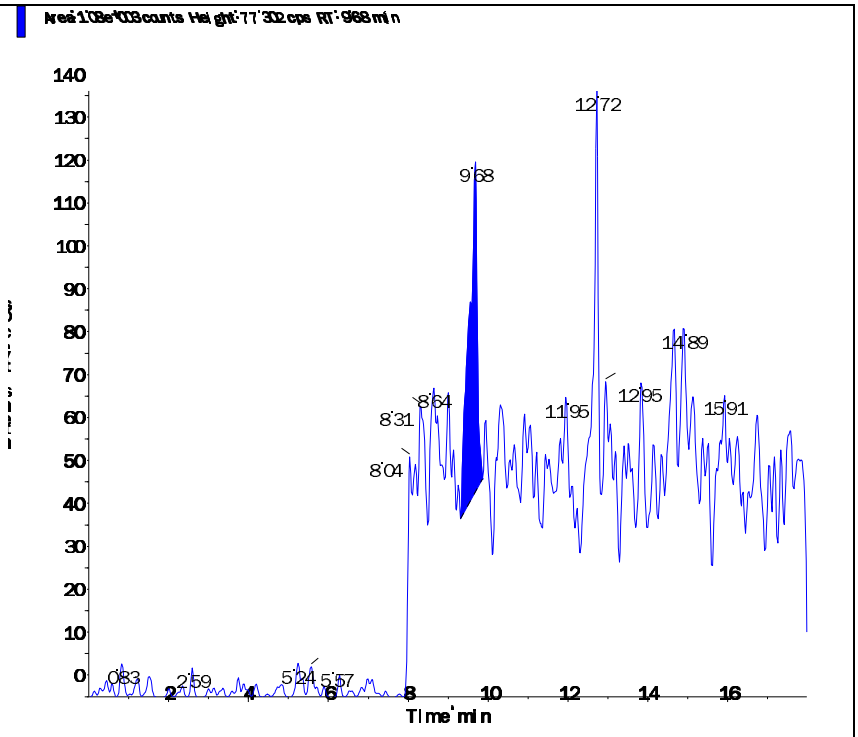
Perchlorate (98.8/83.3 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	9.64 (9.84) min 0.008 ng/ml 0.004 (Unknown)



Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	9.68 (9.84) min 0.0003 ng/ml 0.002 (Unknown)



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Data File	LM35616.wiff	**Result Table**	070516_JWR.rdb
Acquisition Date	7/5/2016 6:59:55 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

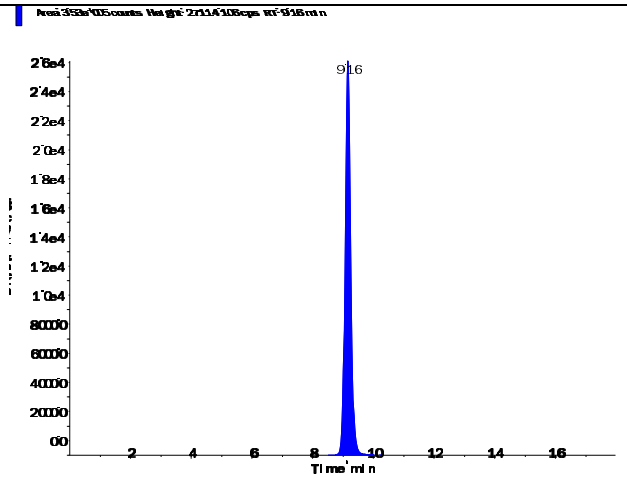
Sample Name	L16070033-09	**Injection Vial**	13.00
Data File	LM35616.wiff	**Injection Volume**	10.00
Acquisition Date	7/5/2016 6:59:55 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	070516_JWR.rdb
Sample ID	L16070033-09	**Dilution Factor**	1.00
Sample Comment	1,1 (Hist)	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.530e+05	9.16	5.00	-

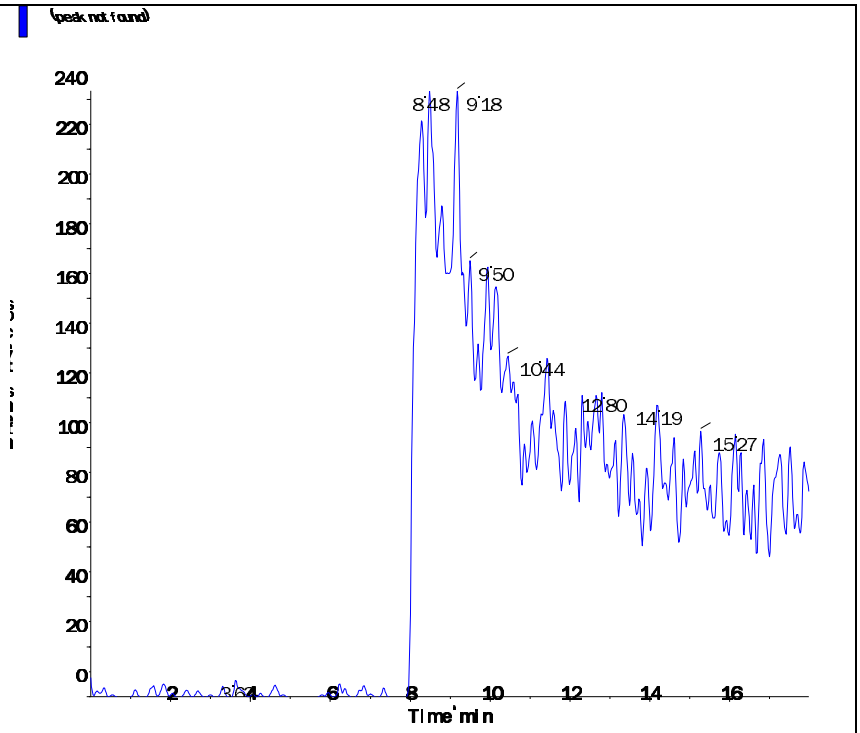
Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	0.000e+00	0.00	N/A	No Peak
Perchlorate conf	0.000e+00	0.00	N/A	No Peak

O18LP (Internal Standard)

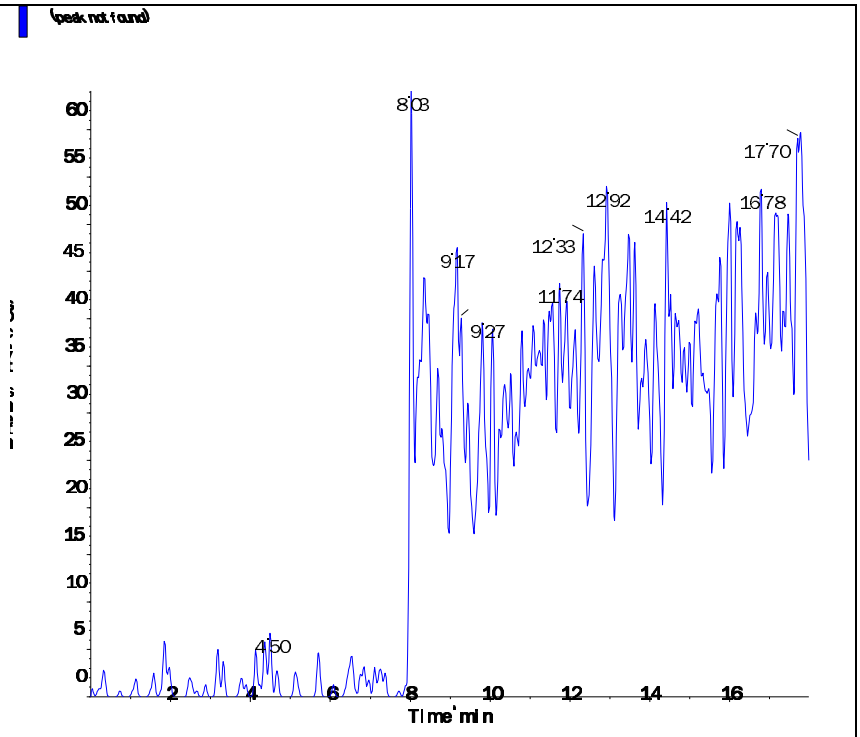
RT (Exp. RT): 9.16(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	0.00 (9.84) min No Peak ng/ml 0.00 (Unknown)



Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	0.00 (9.84) min No Peak ng/ml 0.00 (Unknown)



2.1.1.4 Standards Data

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Data File	LM34686.wiff	**Result Table**	070516_JWR.rdb
Acquisition Date	5/3/2016 3:06:05 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

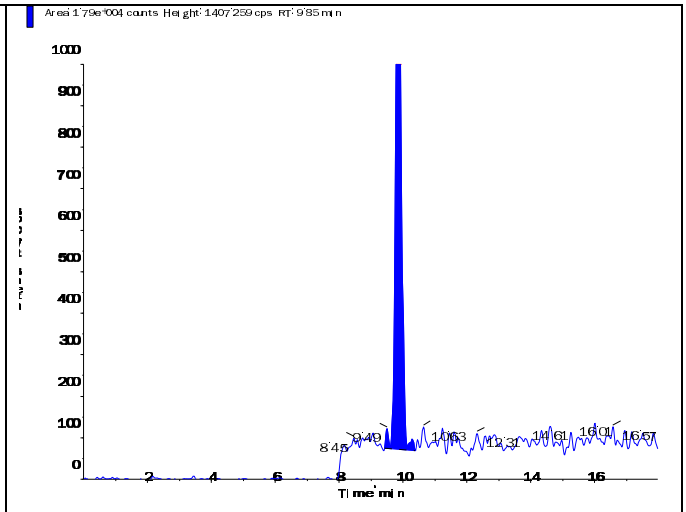
Sample Name	WG567320-01 CCB	**Injection Vial**	1.00
Data File	LM34686.wiff	**Injection Volume**	10.00
Acquisition Date	5/3/2016 3:06:05 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	070516_JWR.rdb
Sample ID	WG567320-01	**Dilution Factor**	1.00
Sample Comment	11.00	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	5.020e+05	9.84	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	0.000e+00	0.00	N/A	No Peak
Perchlorate conf	0.000e+00	0.00	N/A	No Peak

O18LP (Internal Standard)

RT (Exp. RT): 9.84(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



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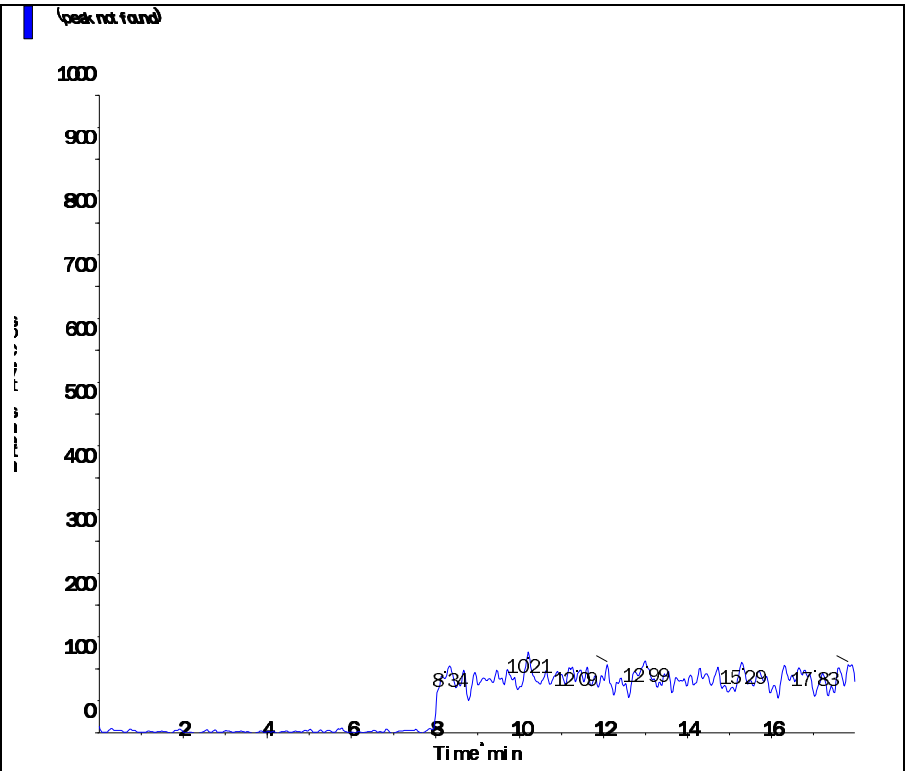
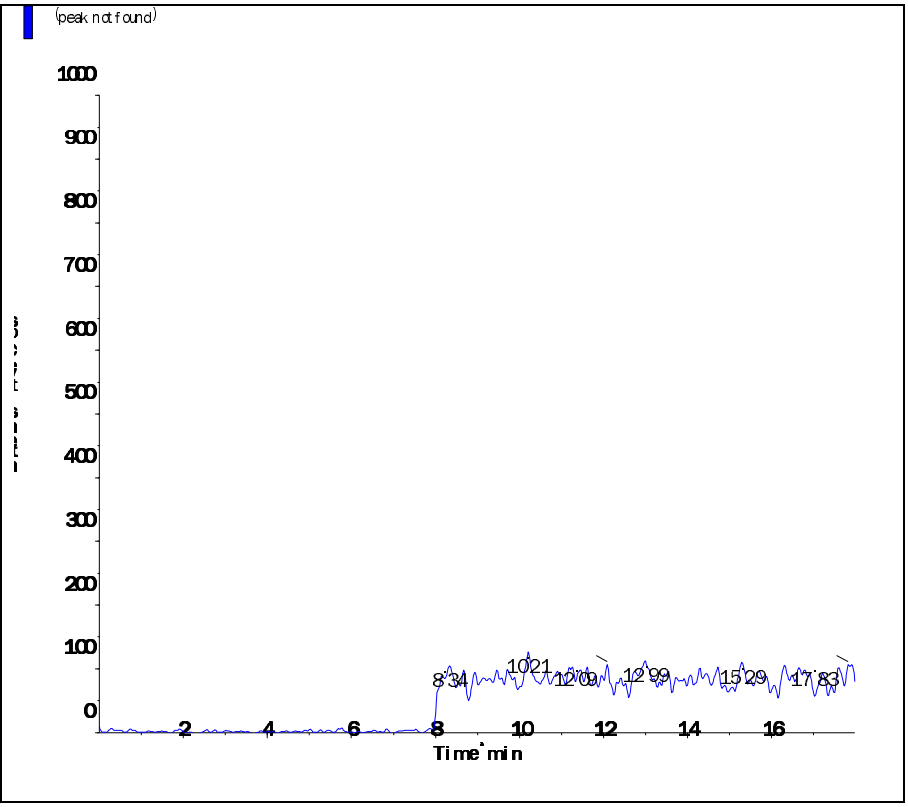
Perchlorate (98.8/83.3 amu) RT (Exp. RT): 0.00 (9.84) min Calculated conc: No Peak ng/ml Area Ratio: 0.00 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 0.00 (9.84) min Calculated conc: No Peak ng/ml Area Ratio: 0.00 Sample Type: (Unknown)	

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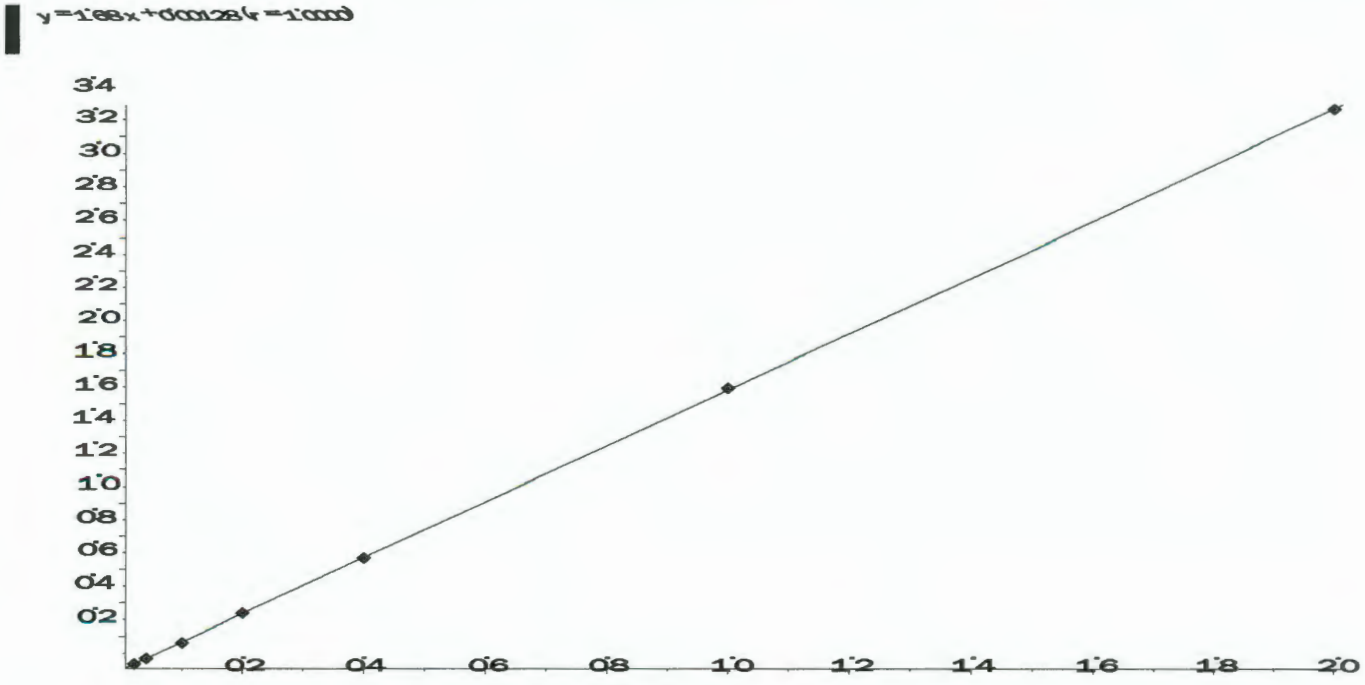
Analyte Name: **Perchlorate**
Internal Standard: O18LP

Data File	LM34686.wiff	**Result Table**	050316_JWR.rdb
Acquisition Date	5/3/2016 3:06:05 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

Regression Equation: y = 1.68 x + 0.00128 (r = 1.0000)

Expected Concentration	Number of Values	Mean Calculated Concentration	% Accuracy	Std. Deviation	%CV
0.10	1	0.10	102.8	N/A	N/A
0.20	1	0.20	100.3	N/A	N/A
0.50	1	0.48	96.6	N/A	N/A
1.00	1	1.01	100.5	N/A	N/A
2.00	1	1.99	99.3	N/A	N/A
5.00	1	5.04	100.7	N/A	N/A
10.00	1	9.99	99.9	N/A	N/A



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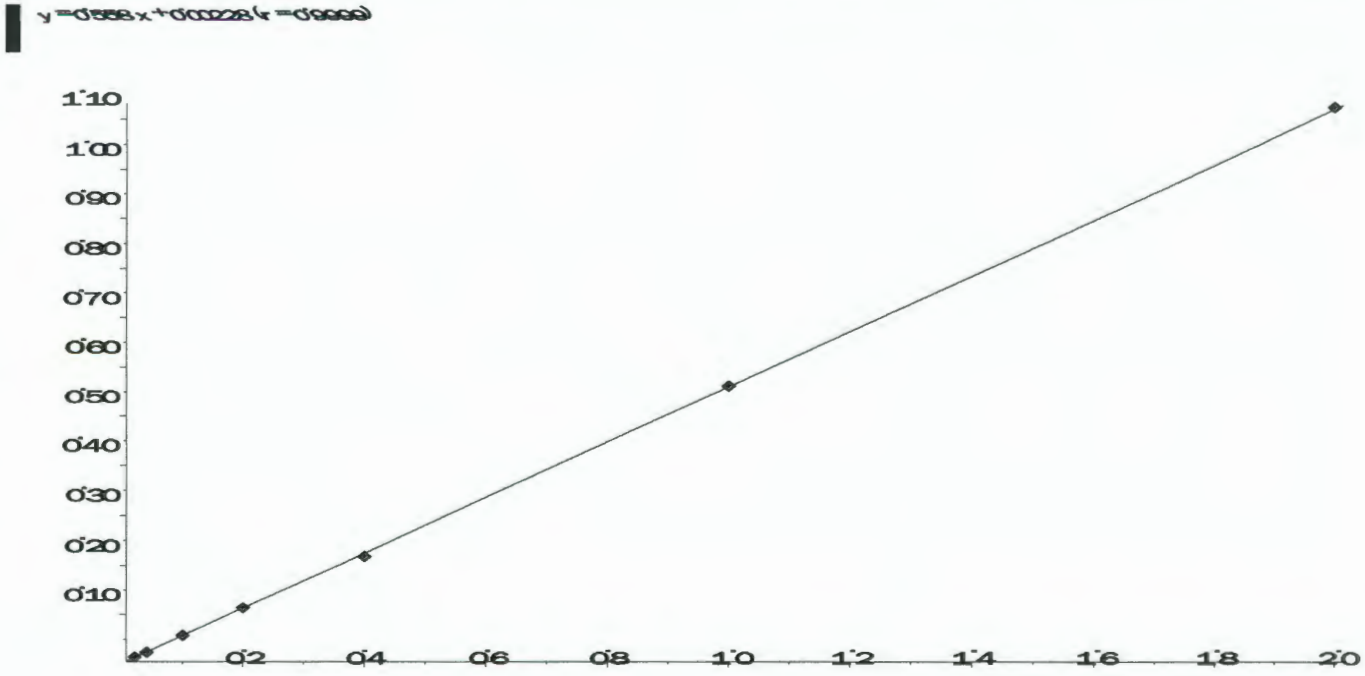
Created with Analyst Reporter
Printed: 5/4/2016 1:20 PM

Analyte Name: **Perchlorate conf**
Internal Standard: O18LP

Data File	LM34686.wiff	**Result Table**	050316_JWR.rdb
Acquisition Date	5/3/2016 3:06:05 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

Regression Equation: y = 0.558 x + 0.00228 (r = 0.9999)

Expected Concentration	Number of Values	Mean Calculated Concentration	% Accuracy	Std. Deviation	%CV
0.10	1	0.10	104.3	N/A	N/A
0.20	1	0.19	96.8	N/A	N/A
0.50	1	0.50	100.6	N/A	N/A
1.00	1	1.00	100.5	N/A	N/A
2.00	1	1.94	97.2	N/A	N/A
5.00	1	5.02	100.4	N/A	N/A
10.00	1	10.03	100.3	N/A	N/A



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Data File	LM34687.wiff	**Result Table**	070516_JWR.rdb
Acquisition Date	5/3/2016 3:25:04 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

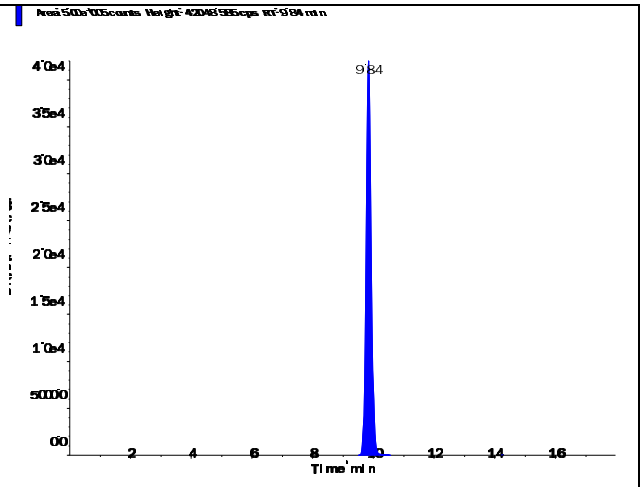
Sample Name	WG567320-02 STD (0.1 ug/L)	**Injection Vial**	2.00
Data File	LM34687.wiff	**Injection Volume**	10.00
Acquisition Date	5/3/2016 3:25:04 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Standard
Instrument Name	API 4000	**Result Table**	070516_JWR.rdb
Sample ID	WG567320-02	**Dilution Factor**	1.00
Sample Comment	1,1 STD75510	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	5.000e+05	9.84	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.790e+04	9.85	0.10	0.103
Perchlorate conf	6.950e+03	9.83	0.10	0.104

O18LP (Internal Standard)

RT (Exp. RT): 9.84(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Standard)



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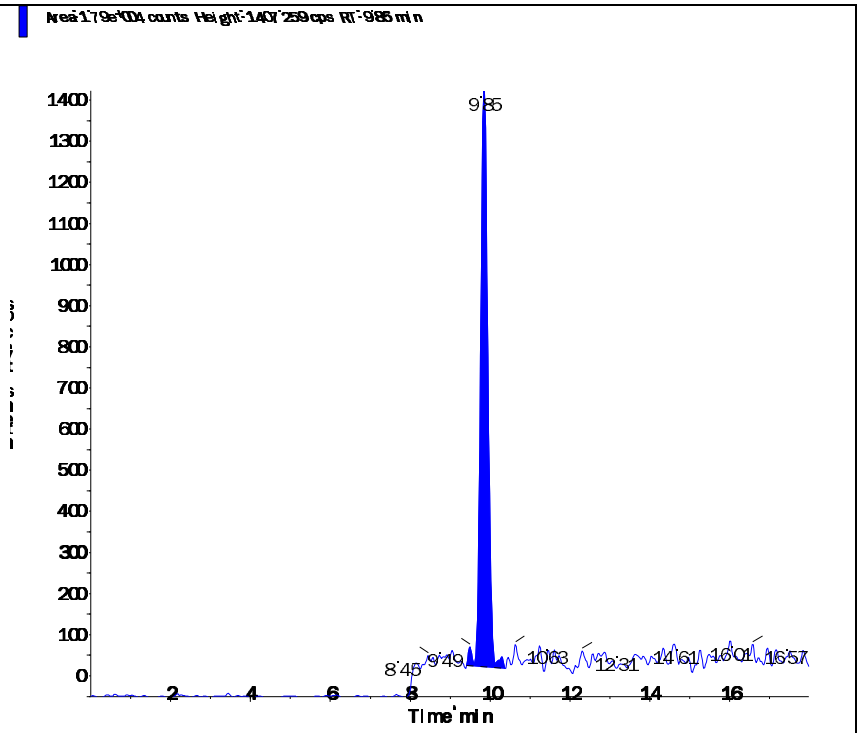
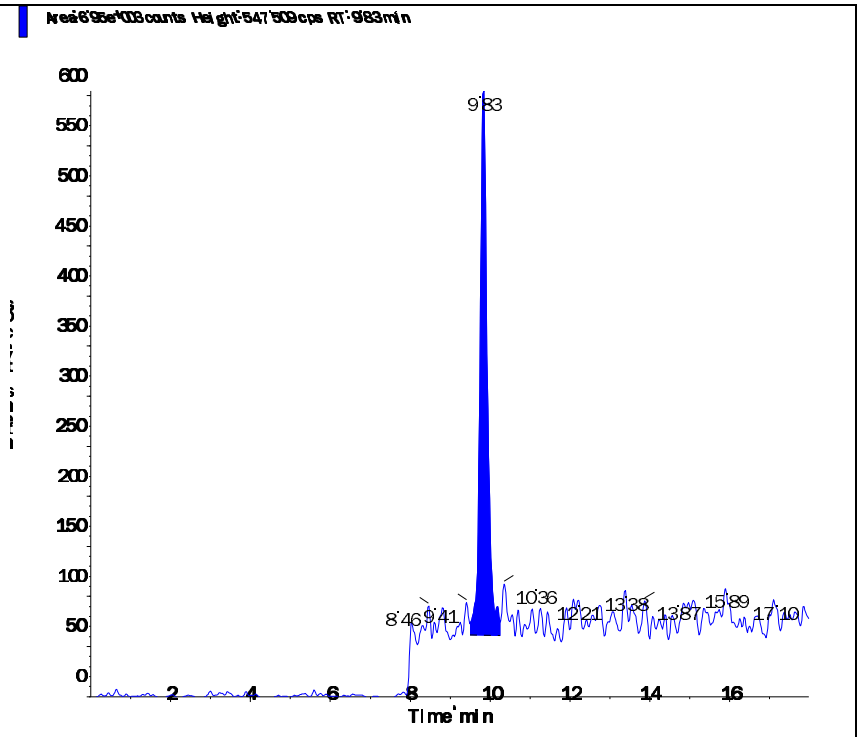
Perchlorate (98.8/83.3 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	9.85 (9.84) min 0.103 ng/ml 0.036 (Standard)



Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	9.83 (9.84) min 0.104 ng/ml 0.014 (Standard)



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Printed: 7/6/2016 10:54 AM

Data File	LM34688.wiff	**Result Table**	070516_JWR.rdb
Acquisition Date	5/3/2016 3:43:59 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

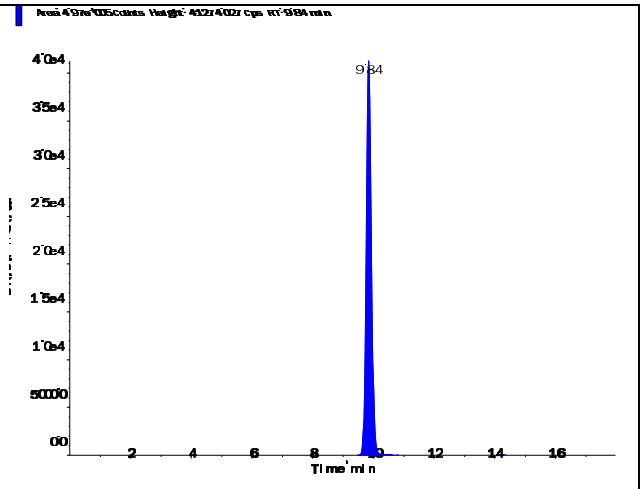
Sample Name	WG567320-03 STD (0.2 ug/L)	**Injection Vial**	3.00
Data File	LM34688.wiff	**Injection Volume**	10.00
Acquisition Date	5/3/2016 3:43:59 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Standard
Instrument Name	API 4000	**Result Table**	070516_JWR.rdb
Sample ID	WG567320-03	**Dilution Factor**	1.00
Sample Comment	1,1 STD75510	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.970e+05	9.84	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	3.410e+04	9.85	0.20	0.201
Perchlorate conf	1.190e+04	9.84	0.20	0.194

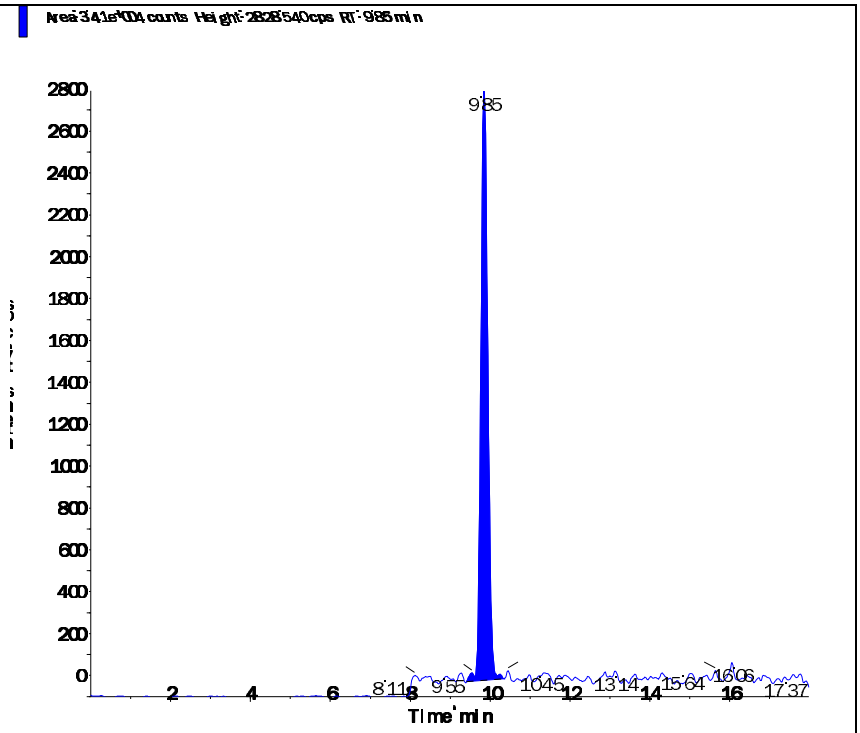
O18LP (Internal Standard)

RT (Exp. RT): 9.84(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Standard)



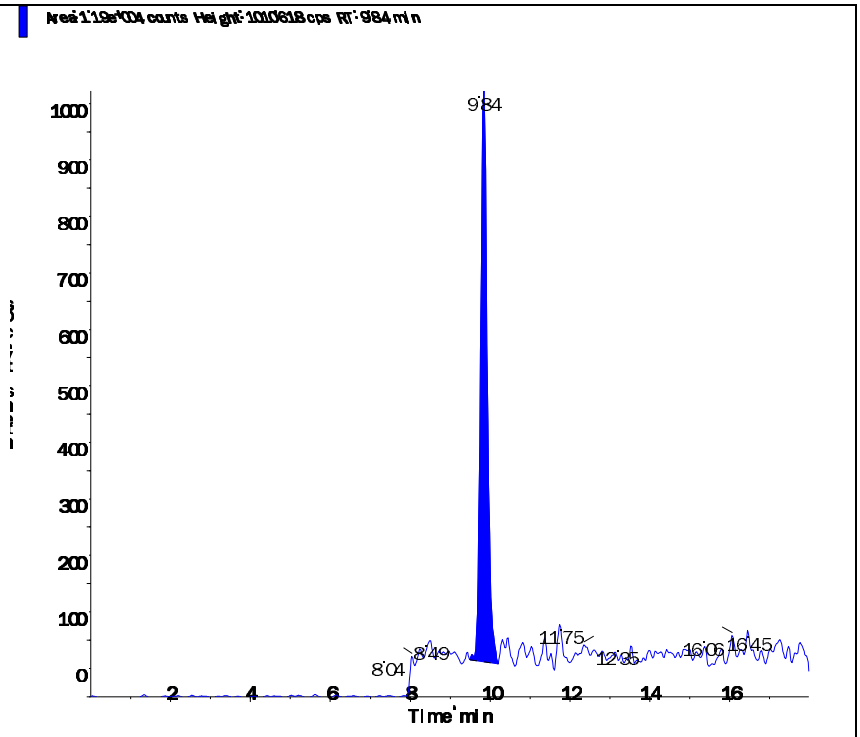
Perchlorate (98.8/83.3 amu)

RT (Exp. RT):	9.85 (9.84) min
Calculated conc:	0.201 ng/ml
Area Ratio:	0.069
Sample Type:	(Standard)



Perchlorate conf (100.8/85.2 amu)

RT (Exp. RT):	9.84 (9.84) min
Calculated conc:	0.194 ng/ml
Area Ratio:	0.024
Sample Type:	(Standard)



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Data File	LM34689.wiff	**Result Table**	070516_JWR.rdb
Acquisition Date	5/3/2016 4:02:52 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

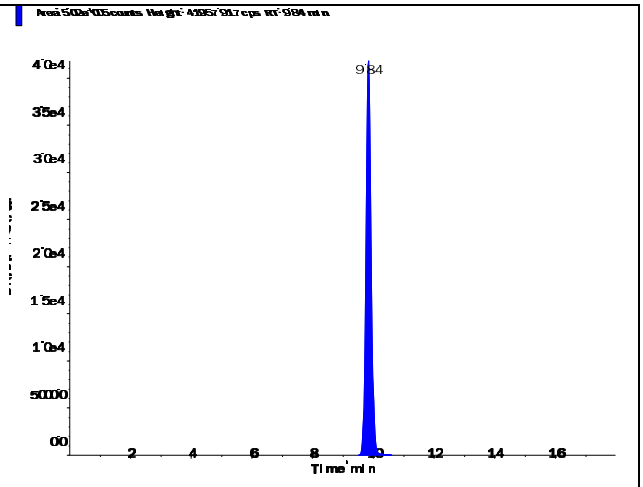
Sample Name	WG567320-04 STD (0.5 ug/L)	**Injection Vial**	4.00
Data File	LM34689.wiff	**Injection Volume**	10.00
Acquisition Date	5/3/2016 4:02:52 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Standard
Instrument Name	API 4000	**Result Table**	070516_JWR.rdb
Sample ID	WG567320-04	**Dilution Factor**	1.00
Sample Comment	1,1 STD75510	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	5.020e+05	9.84	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	8.220e+04	9.85	0.50	0.483
Perchlorate conf	2.940e+04	9.84	0.50	0.503

O18LP (Internal Standard)

RT (Exp. RT): 9.84(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Standard)



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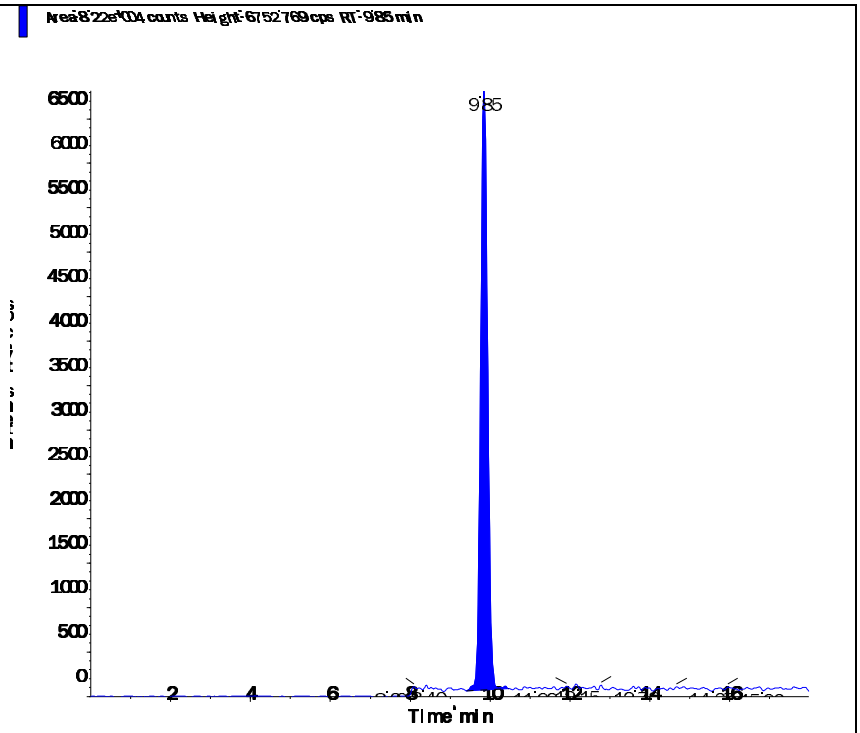
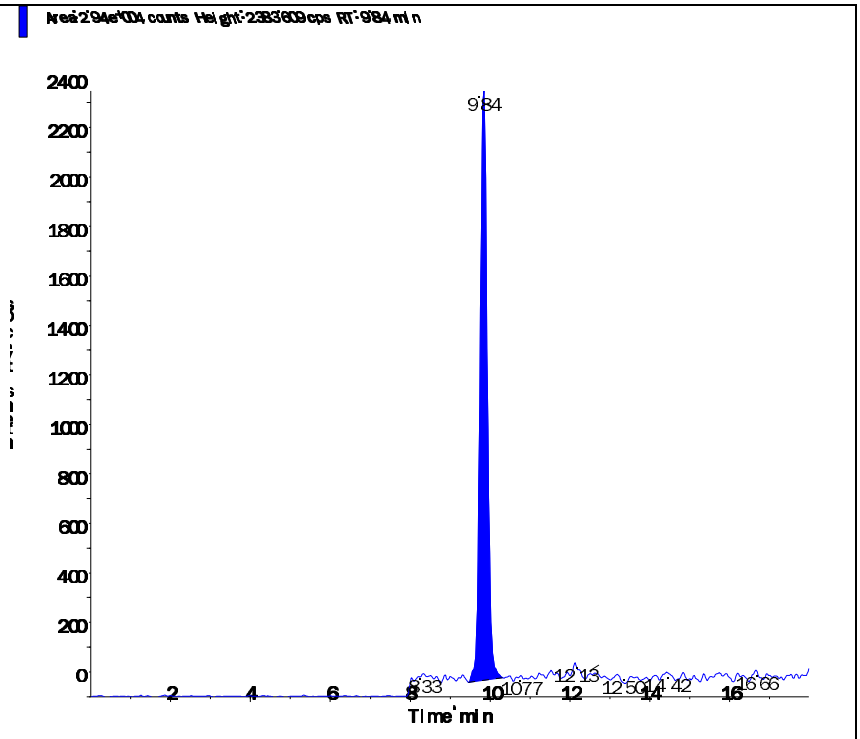
Perchlorate (98.8/83.3 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	9.85 (9.84) min 0.483 ng/ml 0.164 (Standard)



Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	9.84 (9.84) min 0.503 ng/ml 0.058 (Standard)



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Data File	LM34690.wiff	**Result Table**	070516_JWR.rdb
Acquisition Date	5/3/2016 4:21:49 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

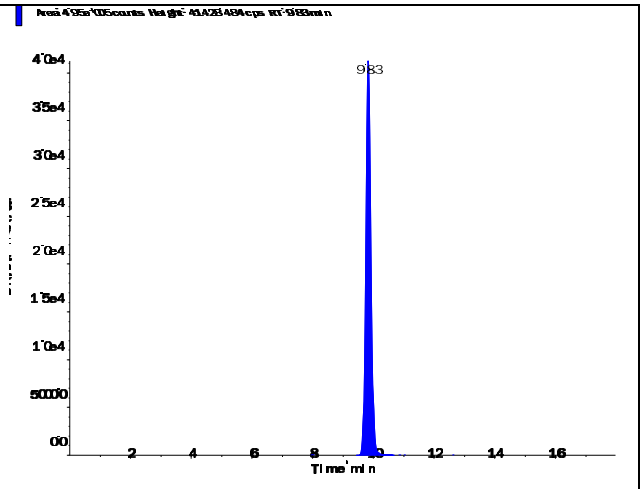
Sample Name	WG567320-05 STD (1.0 ug/L)	**Injection Vial**	5.00
Data File	LM34690.wiff	**Injection Volume**	10.00
Acquisition Date	5/3/2016 4:21:49 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Standard
Instrument Name	API 4000	**Result Table**	070516_JWR.rdb
Sample ID	WG567320-05	**Dilution Factor**	1.00
Sample Comment	1,1 STD75510	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.950e+05	9.83	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.680e+05	9.84	1.00	1.01
Perchlorate conf	5.660e+04	9.83	1.00	1.00

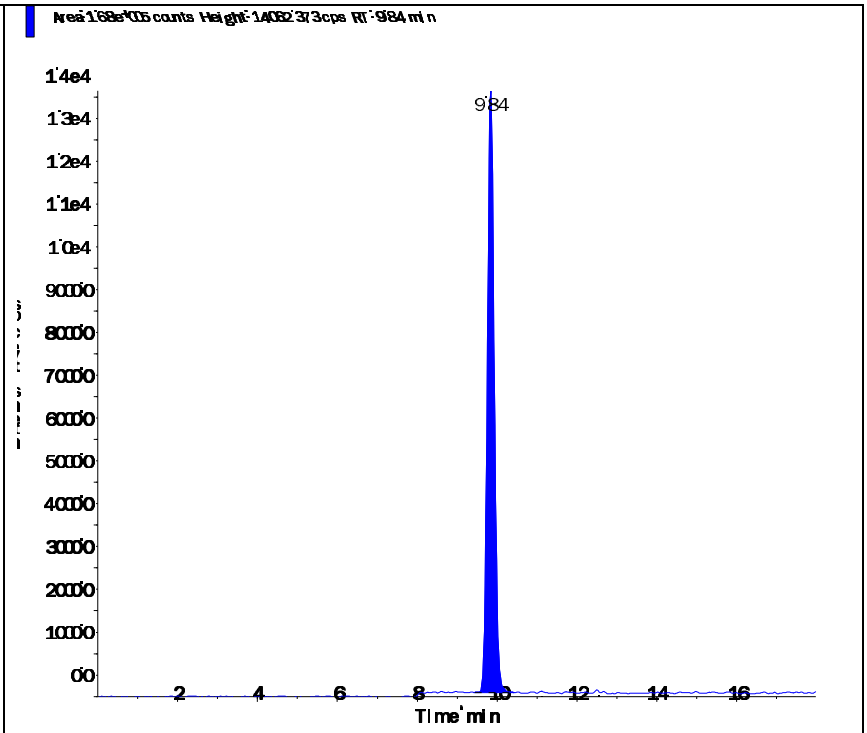
O18LP (Internal Standard)

RT (Exp. RT): 9.83(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Standard)



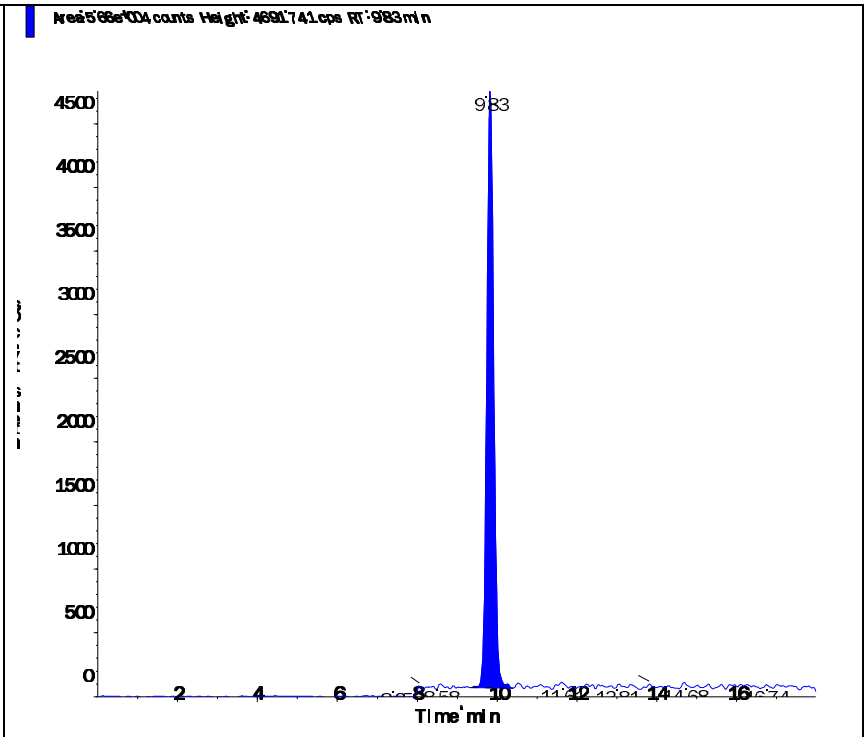
Perchlorate (98.8/83.3 amu)

RT (Exp. RT):	9.84 (9.84) min
Calculated conc:	1.01 ng/ml
Area Ratio:	0.339
Sample Type:	(Standard)



Perchlorate conf (100.8/85.2 amu)

RT (Exp. RT):	9.83 (9.84) min
Calculated conc:	1.00 ng/ml
Area Ratio:	0.114
Sample Type:	(Standard)



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Data File	LM34691.wiff	**Result Table**	070516_JWR.rdb
Acquisition Date	5/3/2016 4:40:45 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

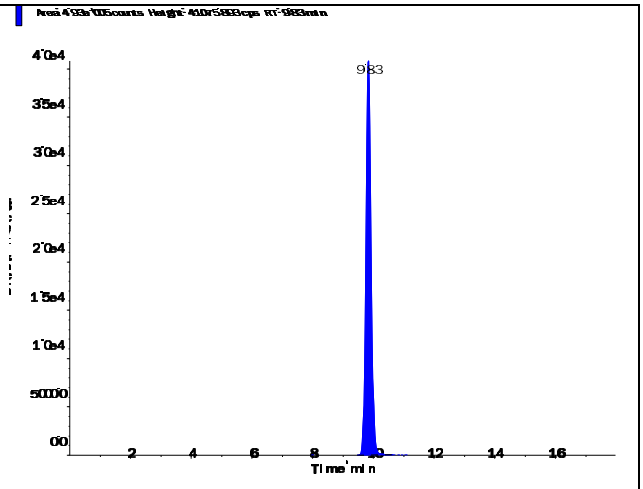
Sample Name	WG567320-06 STD (2.0 ug/L)	**Injection Vial**	6.00
Data File	LM34691.wiff	**Injection Volume**	10.00
Acquisition Date	5/3/2016 4:40:45 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Standard
Instrument Name	API 4000	**Result Table**	070516_JWR.rdb
Sample ID	WG567320-06	**Dilution Factor**	1.00
Sample Comment	1,1 STD75510	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.930e+05	9.83	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	3.300e+05	9.84	2.00	1.99
Perchlorate conf	1.080e+05	9.83	2.00	1.94

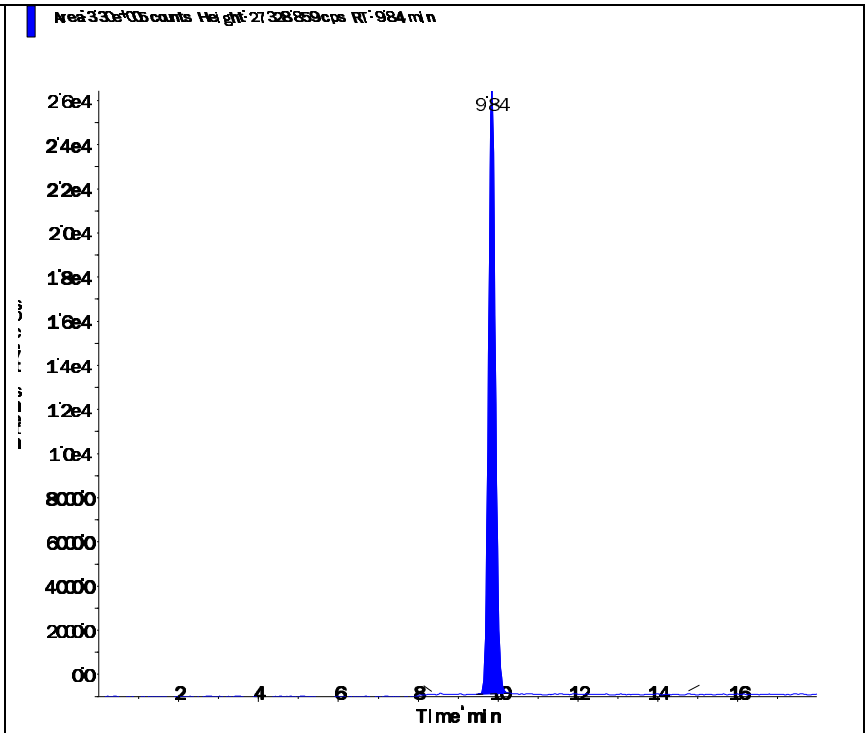
O18LP (Internal Standard)

RT (Exp. RT): 9.83(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Standard)



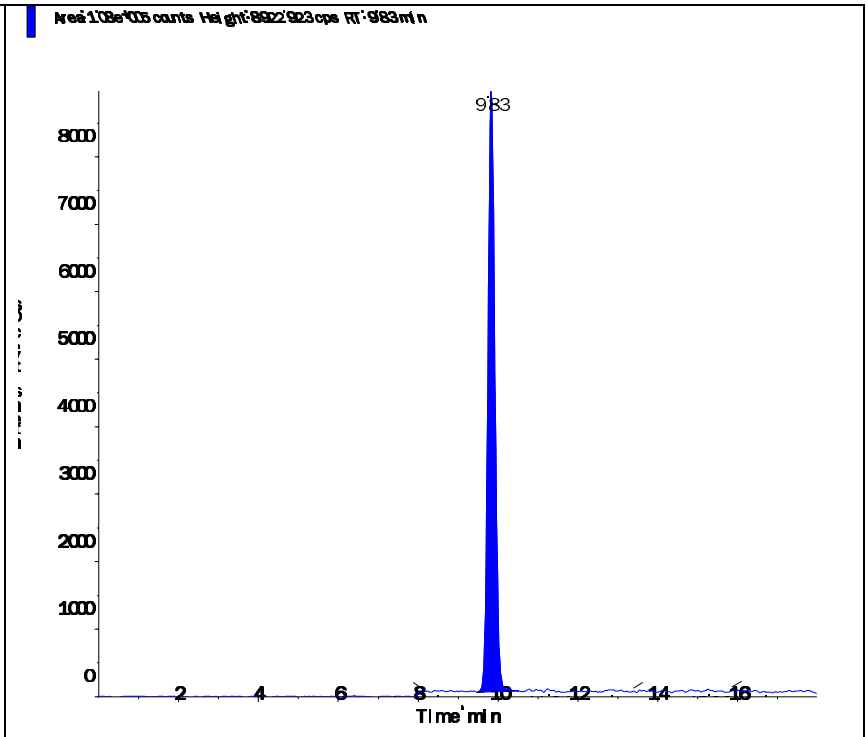
Perchlorate (98.8/83.3 amu)

RT (Exp. RT):	9.84 (9.84) min
Calculated conc:	1.99 ng/ml
Area Ratio:	0.669
Sample Type:	(Standard)



Perchlorate conf (100.8/85.2 amu)

RT (Exp. RT):	9.83 (9.84) min
Calculated conc:	1.94 ng/ml
Area Ratio:	0.219
Sample Type:	(Standard)



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Data File	LM34692.wiff	**Result Table**	070516_JWR.rdb
Acquisition Date	5/3/2016 4:59:42 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

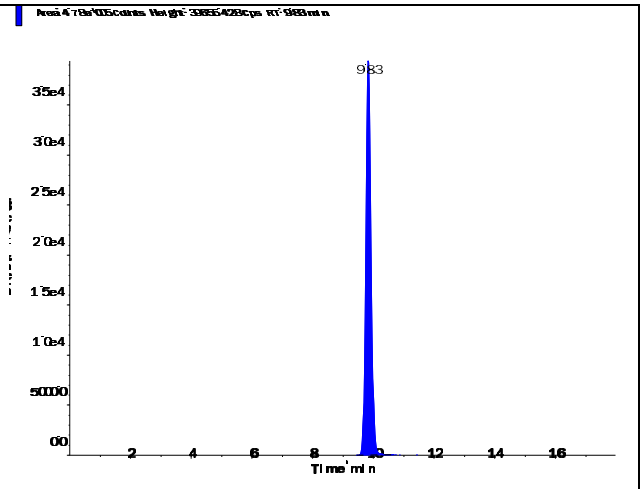
Sample Name	WG567320-07 STD (5.0 ug/L)	**Injection Vial**	7.00
Data File	LM34692.wiff	**Injection Volume**	10.00
Acquisition Date	5/3/2016 4:59:42 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Standard
Instrument Name	API 4000	**Result Table**	070516_JWR.rdb
Sample ID	WG567320-07	**Dilution Factor**	1.00
Sample Comment	1,1 STD75510	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.780e+05	9.83	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	8.100e+05	9.84	5.00	5.04
Perchlorate conf	2.690e+05	9.83	5.00	5.02

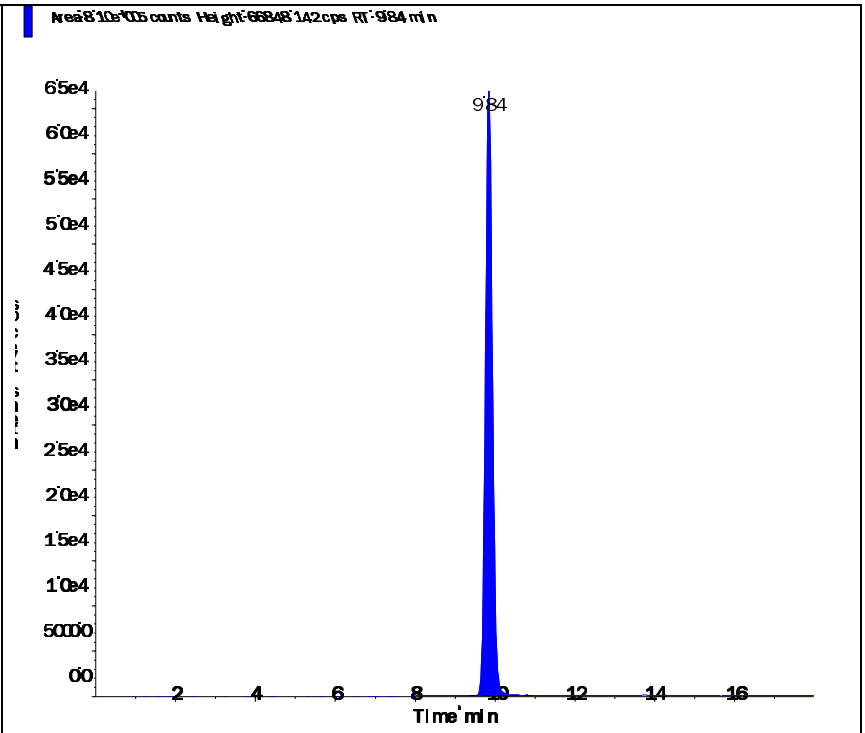
O18LP (Internal Standard)

RT (Exp. RT): 9.83(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Standard)



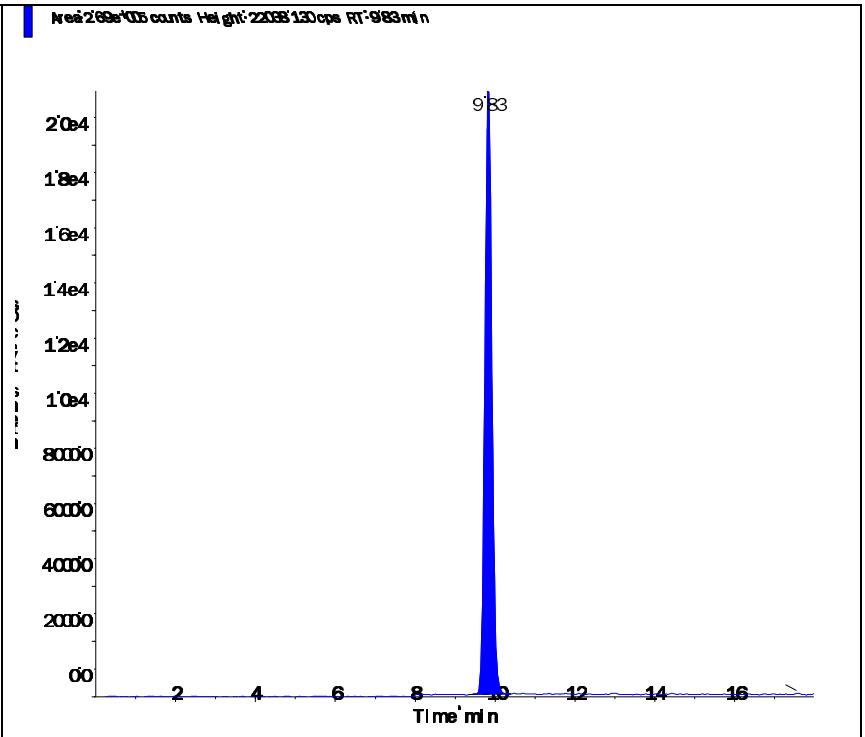
Perchlorate (98.8/83.3 amu)

RT (Exp. RT):	9.84 (9.84) min
Calculated conc:	5.04 ng/ml
Area Ratio:	1.695
Sample Type:	(Standard)



Perchlorate conf (100.8/85.2 amu)

RT (Exp. RT):	9.83 (9.84) min
Calculated conc:	5.02 ng/ml
Area Ratio:	0.562
Sample Type:	(Standard)



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Data File	LM34693.wiff	**Result Table**	070516_JWR.rdb
Acquisition Date	5/3/2016 5:18:37 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

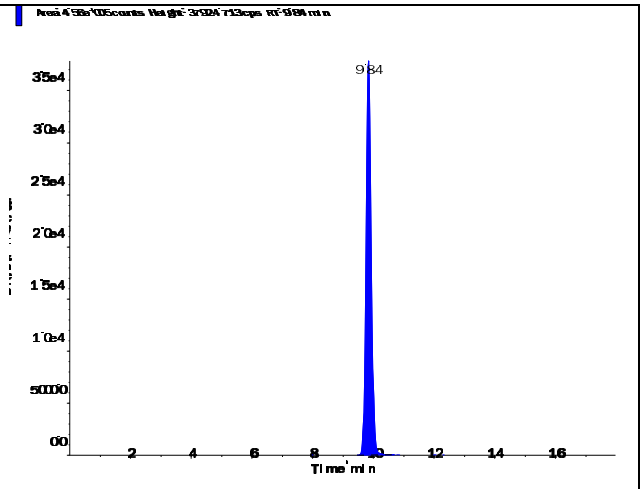
Sample Name	WG567320-08 STD (10 ug/L)	**Injection Vial**	8.00
Data File	LM34693.wiff	**Injection Volume**	10.00
Acquisition Date	5/3/2016 5:18:37 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Standard
Instrument Name	API 4000	**Result Table**	070516_JWR.rdb
Sample ID	WG567320-08	**Dilution Factor**	1.00
Sample Comment	1,1 STD75510	**Weight to Volume**	0.00

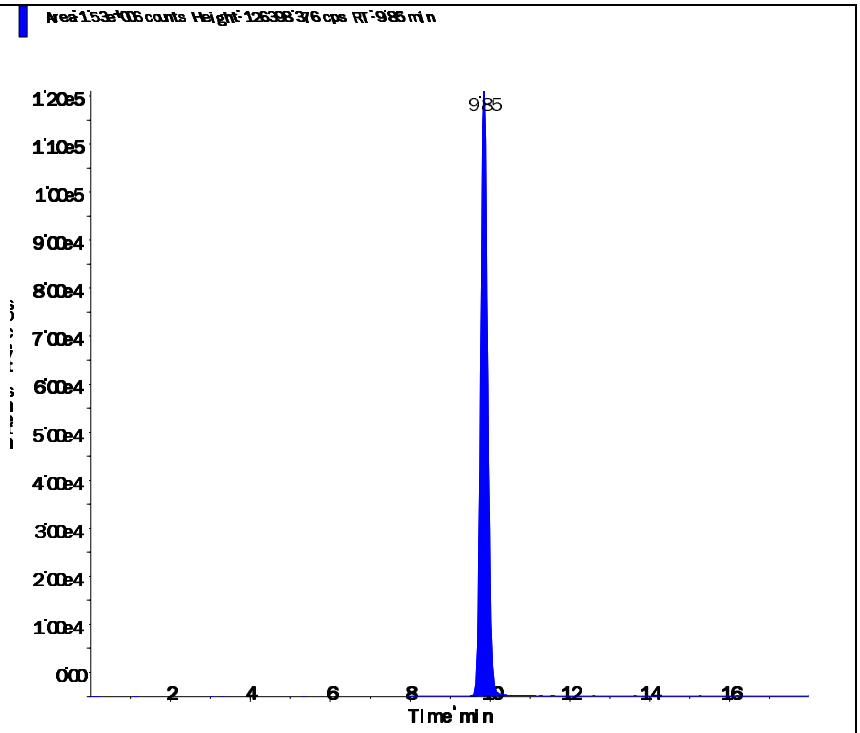
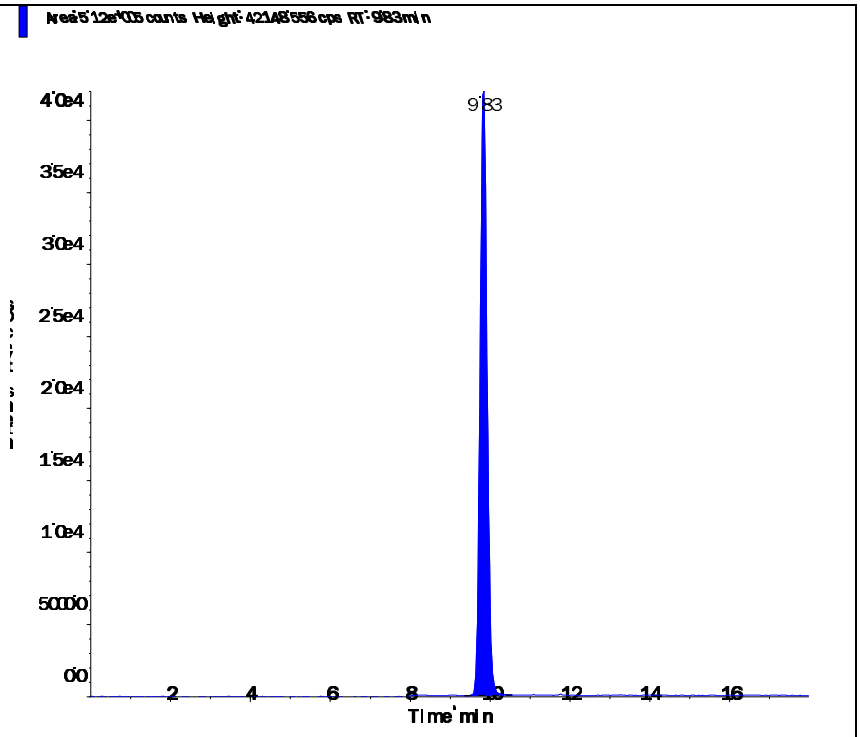
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.560e+05	9.84	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.530e+06	9.85	10.00	9.99
Perchlorate conf	5.120e+05	9.83	10.00	10.00

O18LP (Internal Standard)

RT (Exp. RT): 9.84(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Standard)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.85 (9.84) min Calculated conc: 9.99 ng/ml Area Ratio: 3.36 Sample Type: (Standard)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.83 (9.84) min Calculated conc: 10.00 ng/ml Area Ratio: 1.122 Sample Type: (Standard)	

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Printed: 5/4/2016 1:23 PM

Data File	LM34694.wiff	**Result Table**	050316_JWR.rdb
Acquisition Date	5/3/2016 5:37:34 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

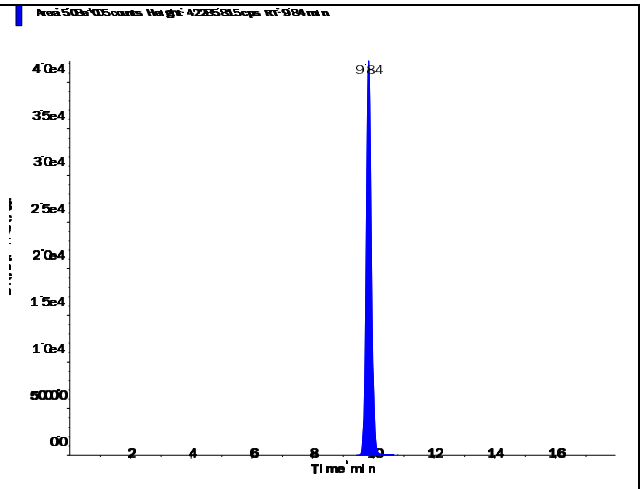
Sample Name	WG567320-09 SSCV (1.0 ug/L)	**Injection Vial**	9.00
Data File	LM34694.wiff	**Injection Volume**	10.00
Acquisition Date	5/3/2016 5:37:34 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Quality Control
Instrument Name	API 4000	**Result Table**	050316_JWR.rdb
Sample ID	WG567320-09	**Dilution Factor**	1.00
Sample Comment	1,1 STD75512	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	5.080e+05	9.84	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.690e+05	9.85	1.00	0.985
Perchlorate conf	5.630e+04	9.84	1.00	0.973

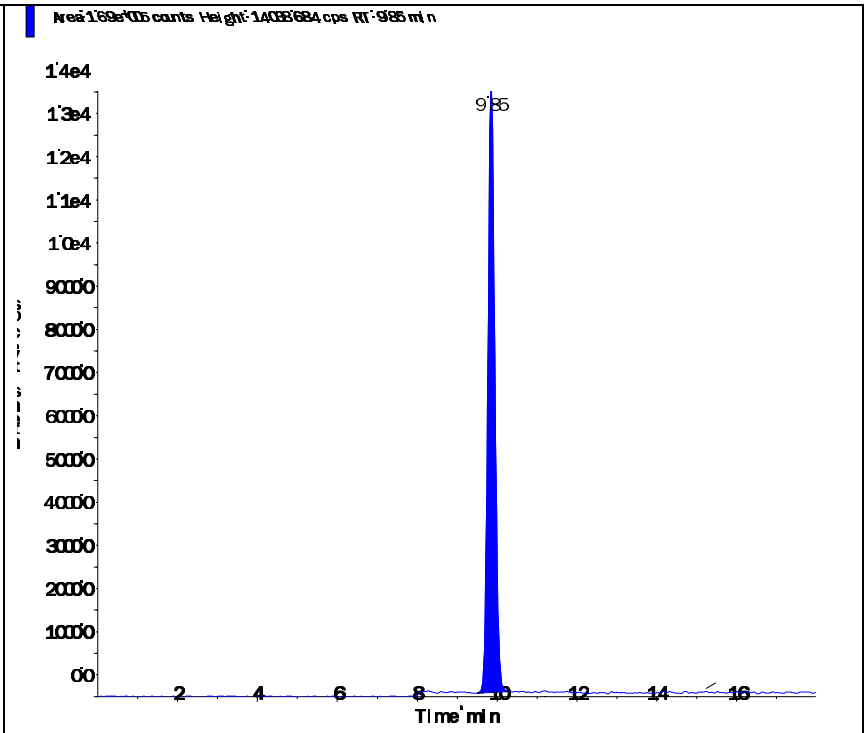
O18LP (Internal Standard)

RT (Exp. RT): 9.84(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Quality Control)



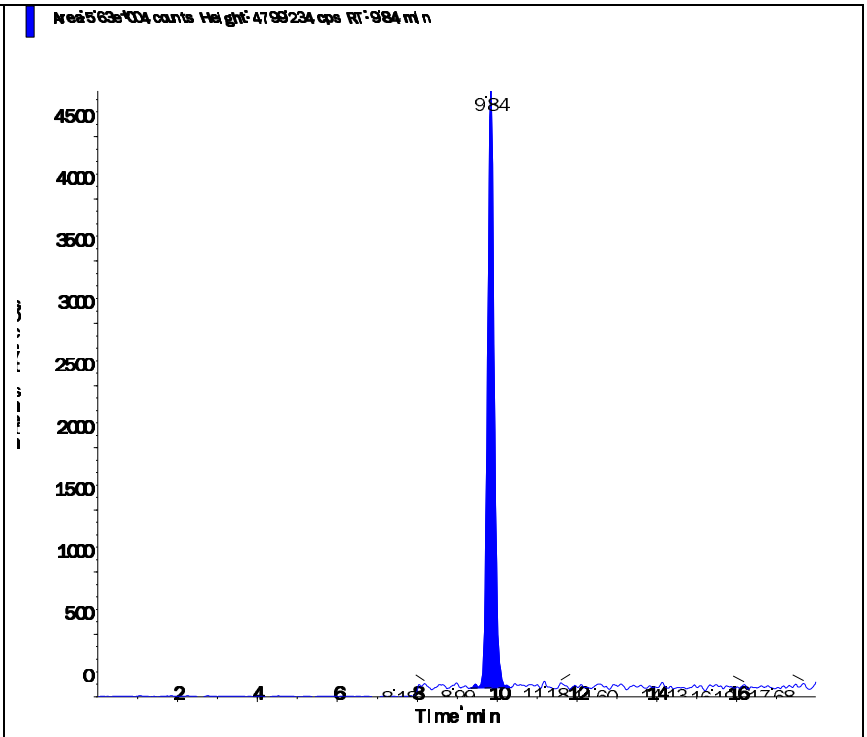
Perchlorate (98.8/83.3 amu)

RT (Exp. RT):	9.85 (9.84) min
Calculated conc:	0.985 ng/ml
Area Ratio:	0.332
Sample Type:	(Quality Control)



Perchlorate conf (100.8/85.2 amu)

RT (Exp. RT):	9.84 (9.84) min
Calculated conc:	0.973 ng/ml
Area Ratio:	0.111
Sample Type:	(Quality Control)



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Data File	LM35605.wiff	**Result Table**	070516_JWR.rdb
Acquisition Date	7/5/2016 3:31:37 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

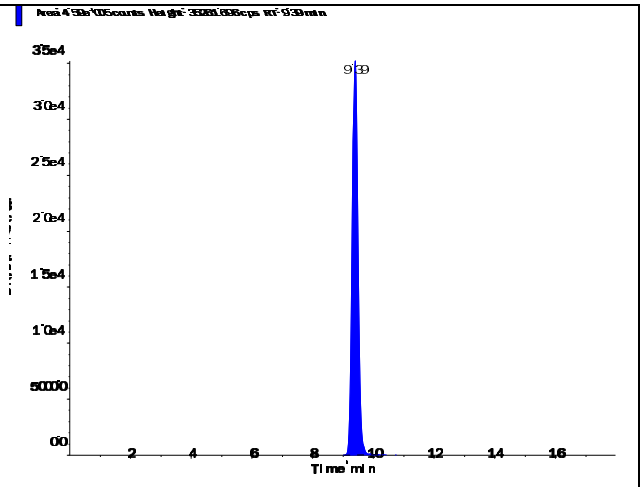
Sample Name	WG575212-02 CCV (1.0ug/L)	**Injection Vial**	3.00
Data File	LM35605.wiff	**Injection Volume**	10.00
Acquisition Date	7/5/2016 3:31:37 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Quality Control
Instrument Name	API 4000	**Result Table**	070516_JWR.rdb
Sample ID	WG575212-02	**Dilution Factor**	1.00
Sample Comment	1,1 STD75510	**Weight to Volume**	0.00

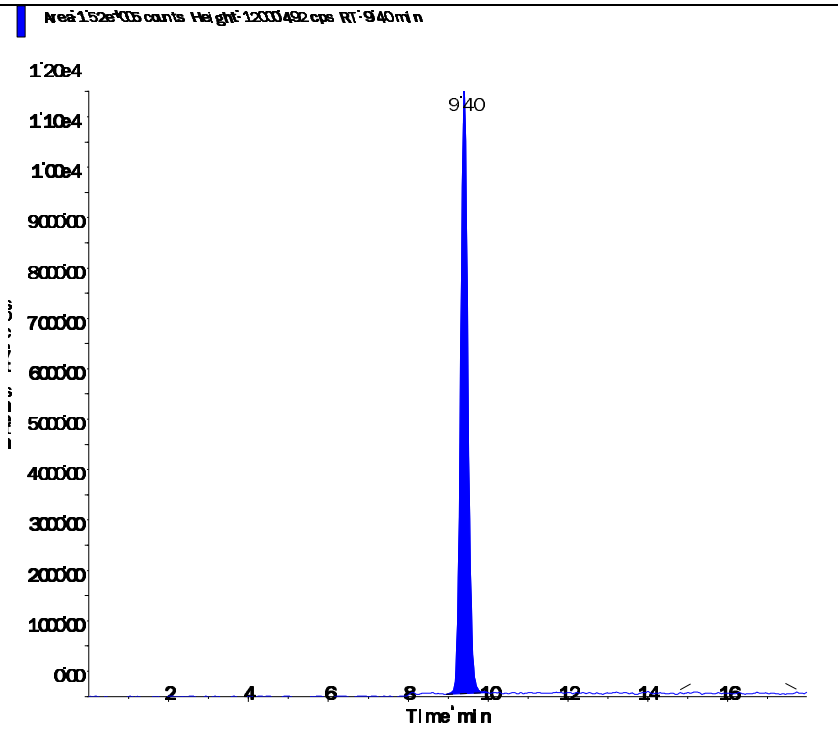
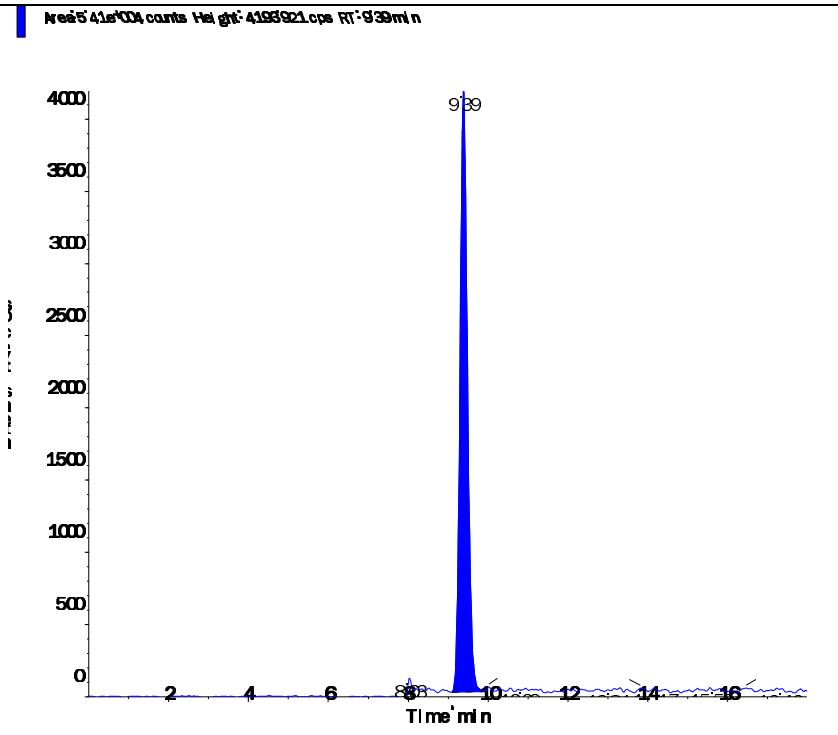
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.590e+05	9.39	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.520e+05	9.40	1.00	0.981
Perchlorate conf	5.410e+04	9.39	1.00	1.04

O18LP (Internal Standard)

RT (Exp. RT): 9.39(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Quality Control)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.40 (9.84) min Calculated conc: 0.981 ng/ml Area Ratio: 0.331 Sample Type: (Quality Control)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.39 (9.84) min Calculated conc: 1.04 ng/ml Area Ratio: 0.118 Sample Type: (Quality Control)	

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Data File	LM35617.wiff	**Result Table**	070516_JWR.rdb
Acquisition Date	7/5/2016 7:18:51 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

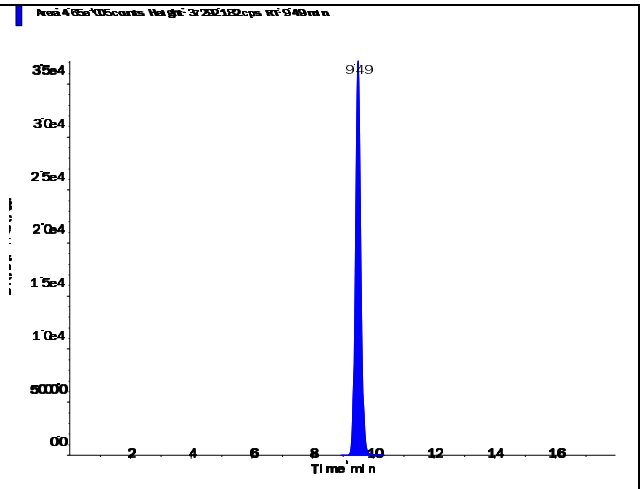
Sample Name	WG575212-03 CCV (1.0ug/L)	**Injection Vial**	3.00
Data File	LM35617.wiff	**Injection Volume**	10.00
Acquisition Date	7/5/2016 7:18:51 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Quality Control
Instrument Name	API 4000	**Result Table**	070516_JWR.rdb
Sample ID	WG575212-03	**Dilution Factor**	1.00
Sample Comment	1,1 STD75510	**Weight to Volume**	0.00

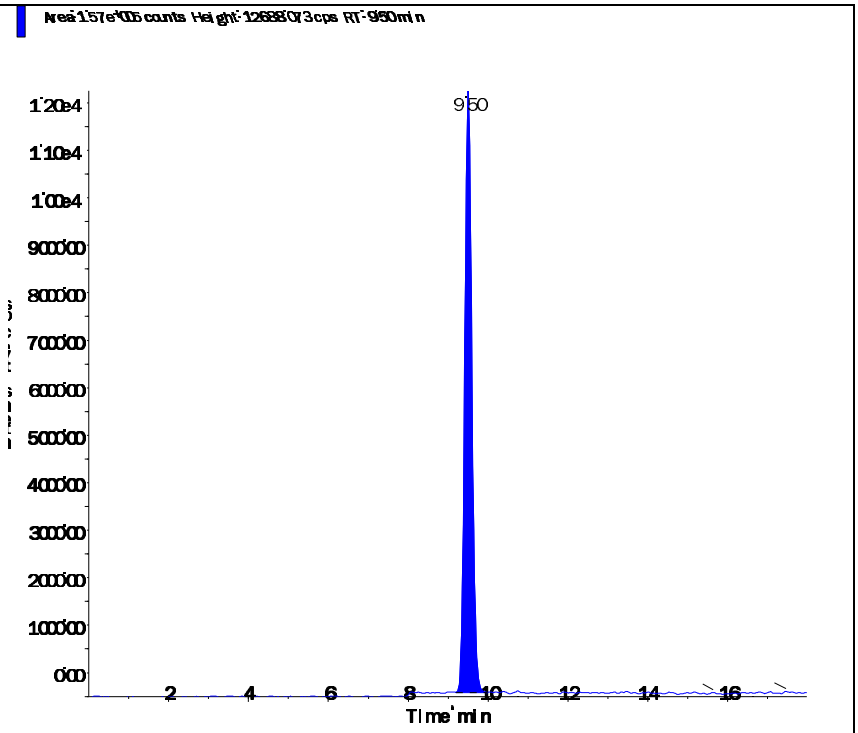
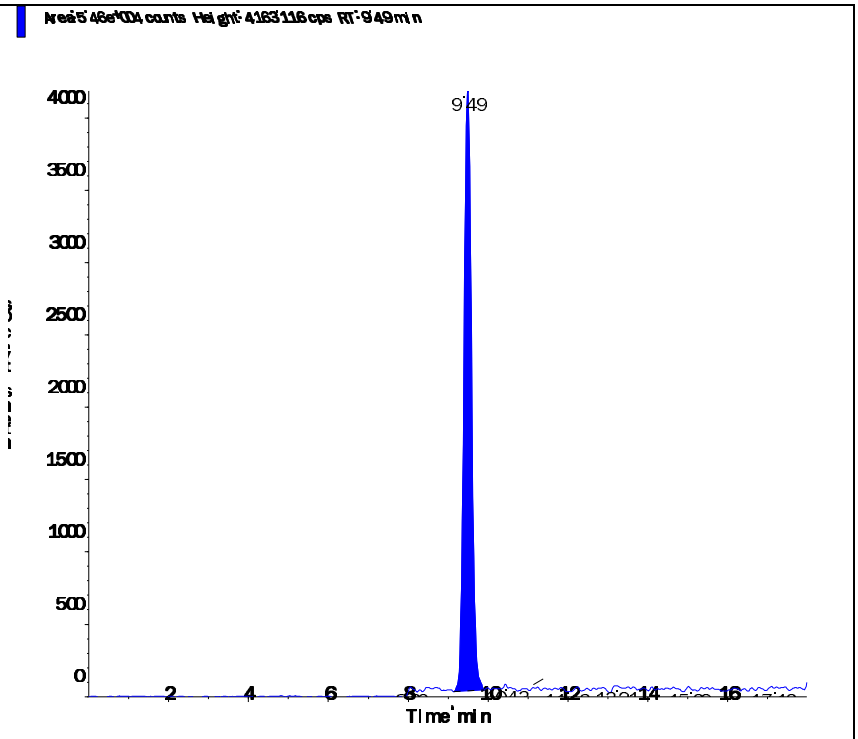
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.650e+05	9.49	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.570e+05	9.50	1.00	1.00
Perchlorate conf	5.460e+04	9.49	1.00	1.03

O18LP (Internal Standard)

RT (Exp. RT): 9.49(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Quality Control)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.50 (9.84) min Calculated conc: 1.00 ng/ml Area Ratio: 0.338 Sample Type: (Quality Control)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.49 (9.84) min Calculated conc: 1.03 ng/ml Area Ratio: 0.117 Sample Type: (Quality Control)	

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Data File	LM35623.wiff	**Result Table**	070516_JWR.rdb
Acquisition Date	7/5/2016 9:12:27 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

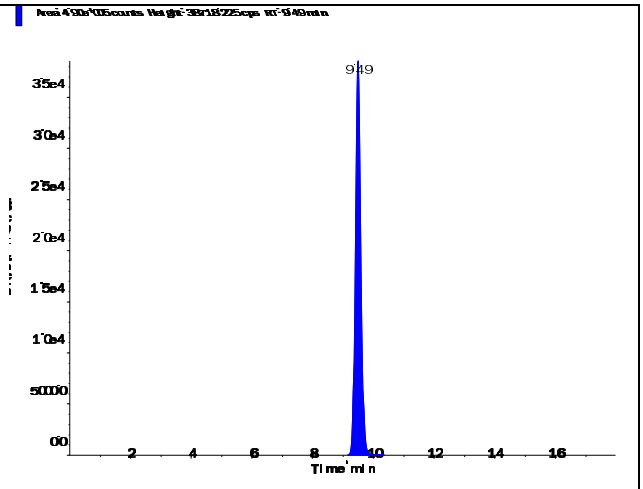
Sample Name	WG575212-05 CCV (1.0ug/L)	**Injection Vial**	3.00
Data File	LM35623.wiff	**Injection Volume**	10.00
Acquisition Date	7/5/2016 9:12:27 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Quality Control
Instrument Name	API 4000	**Result Table**	070516_JWR.rdb
Sample ID	WG575212-05	**Dilution Factor**	1.00
Sample Comment	1,1 STD75510	**Weight to Volume**	0.00

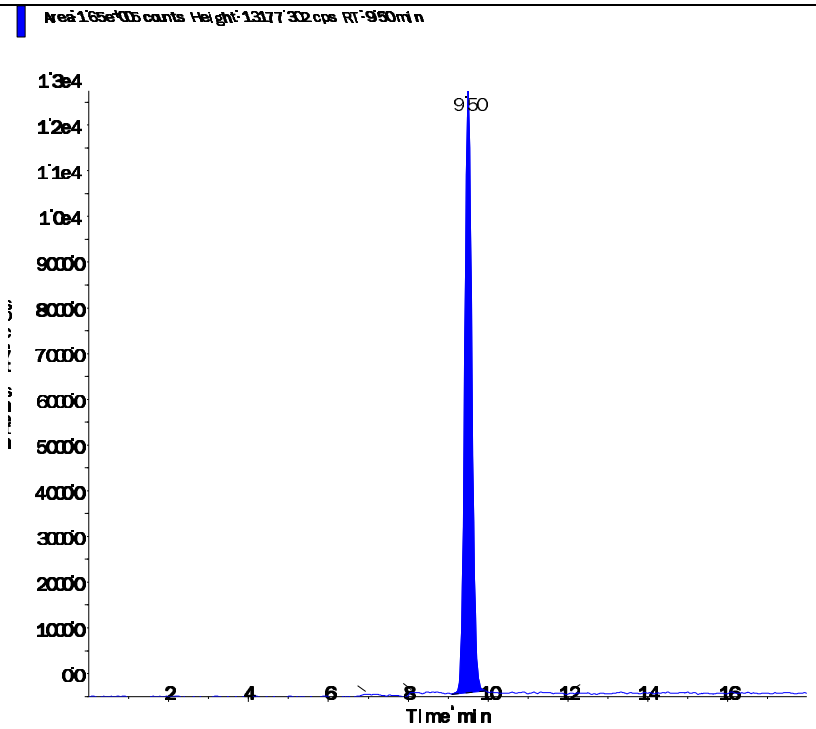
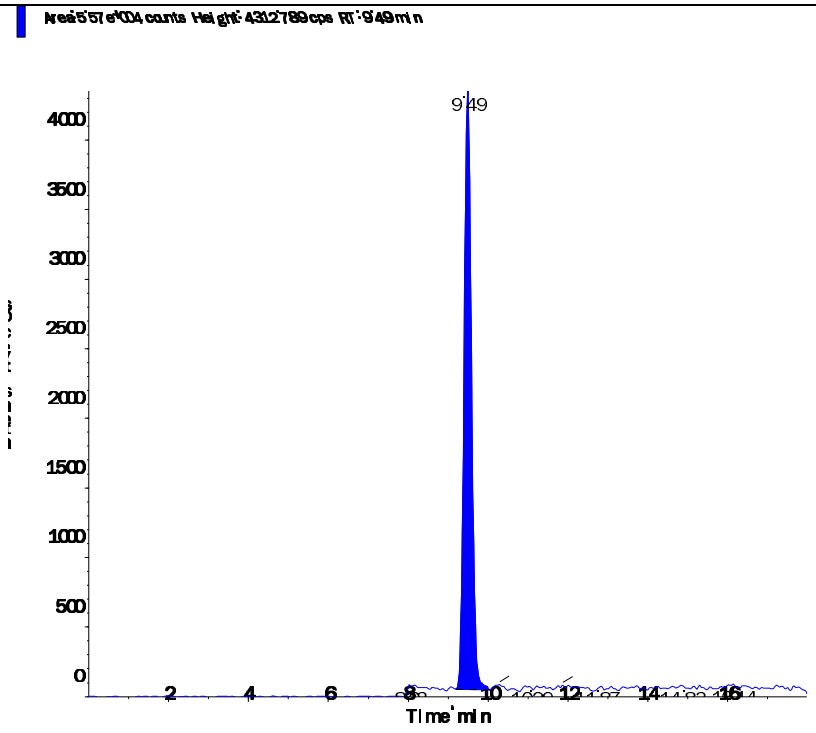
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.900e+05	9.49	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.650e+05	9.50	1.00	0.996
Perchlorate conf	5.570e+04	9.49	1.00	0.999

O18LP (Internal Standard)

RT (Exp. RT): 9.49(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Quality Control)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.50 (9.84) min Calculated conc: 0.996 ng/ml Area Ratio: 0.336 Sample Type: (Quality Control)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.49 (9.84) min Calculated conc: 0.999 ng/ml Area Ratio: 0.114 Sample Type: (Quality Control)	

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Data File	LM35606.wiff	**Result Table**	070516_JWR.rdb
Acquisition Date	7/5/2016 3:50:32 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

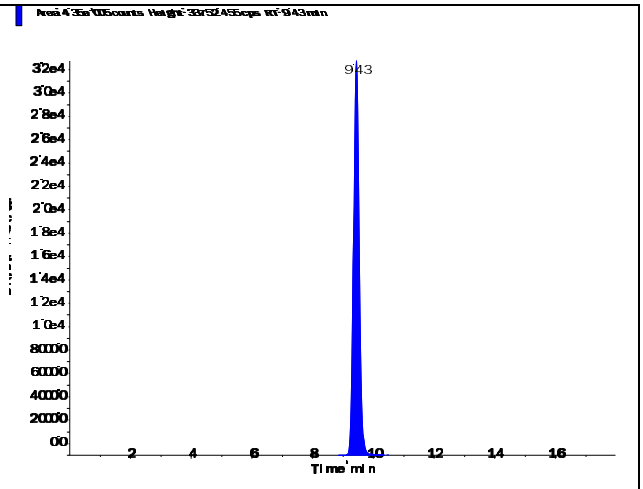
Sample Name	WG575171-07 MRL (0.2ug/L)	**Injection Vial**	2.00
Data File	LM35606.wiff	**Injection Volume**	10.00
Acquisition Date	7/5/2016 3:50:32 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	070516_JWR.rdb
Sample ID	WG575171-07	**Dilution Factor**	1.00
Sample Comment	1,1 STD75510	**Weight to Volume**	0.00

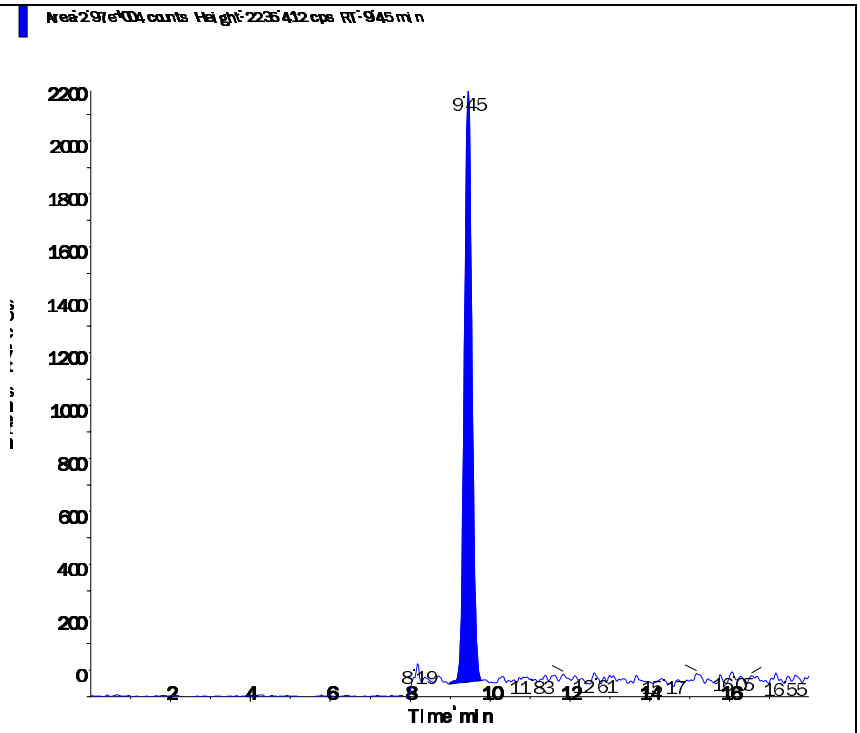
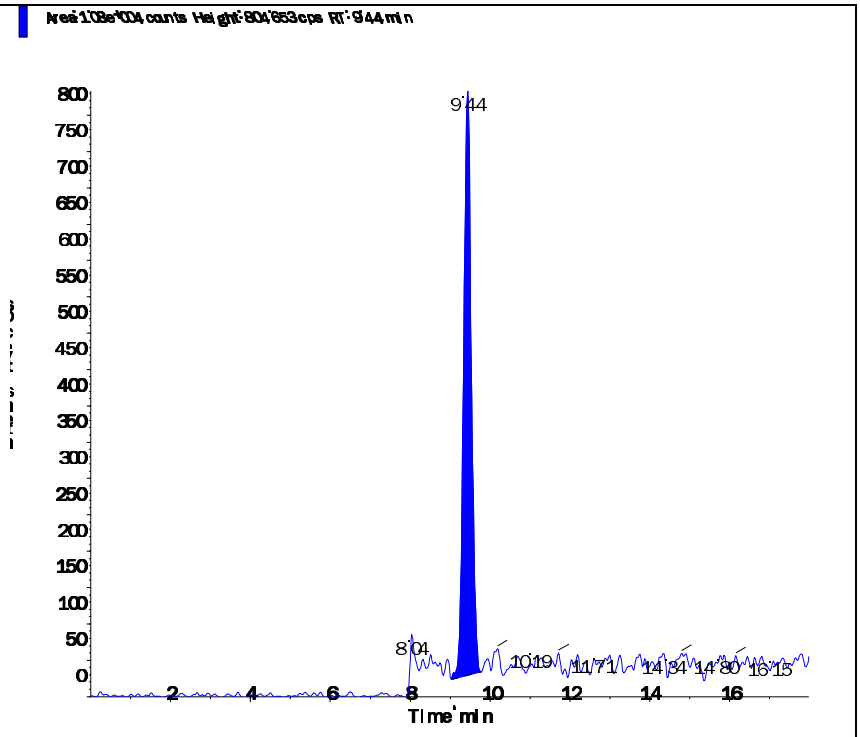
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.350e+05	9.43	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	2.970e+04	9.45	N/A	0.199
Perchlorate conf	1.080e+04	9.44	N/A	0.202

O18LP (Internal Standard)

RT (Exp. RT): 9.43(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.45 (9.84) min Calculated conc: 0.199 ng/ml Area Ratio: 0.068 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.44 (9.84) min Calculated conc: 0.202 ng/ml Area Ratio: 0.025 Sample Type: (Unknown)	

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Data File	LM35618.wiff	**Result Table**	070516_JWR.rdb
Acquisition Date	7/5/2016 7:37:48 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

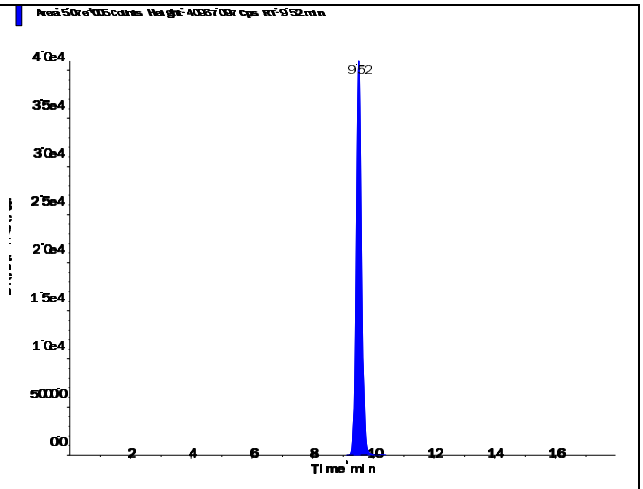
Sample Name	WG575171-08 MRL (0.2ug/L)	**Injection Vial**	2.00
Data File	LM35618.wiff	**Injection Volume**	10.00
Acquisition Date	7/5/2016 7:37:48 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	070516_JWR.rdb
Sample ID	WG575171-08	**Dilution Factor**	1.00
Sample Comment	1,1 STD75510	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	5.070e+05	9.52	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	3.450e+04	9.53	N/A	0.198
Perchlorate conf	1.250e+04	9.51	N/A	0.20

O18LP (Internal Standard)

RT (Exp. RT): 9.52(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



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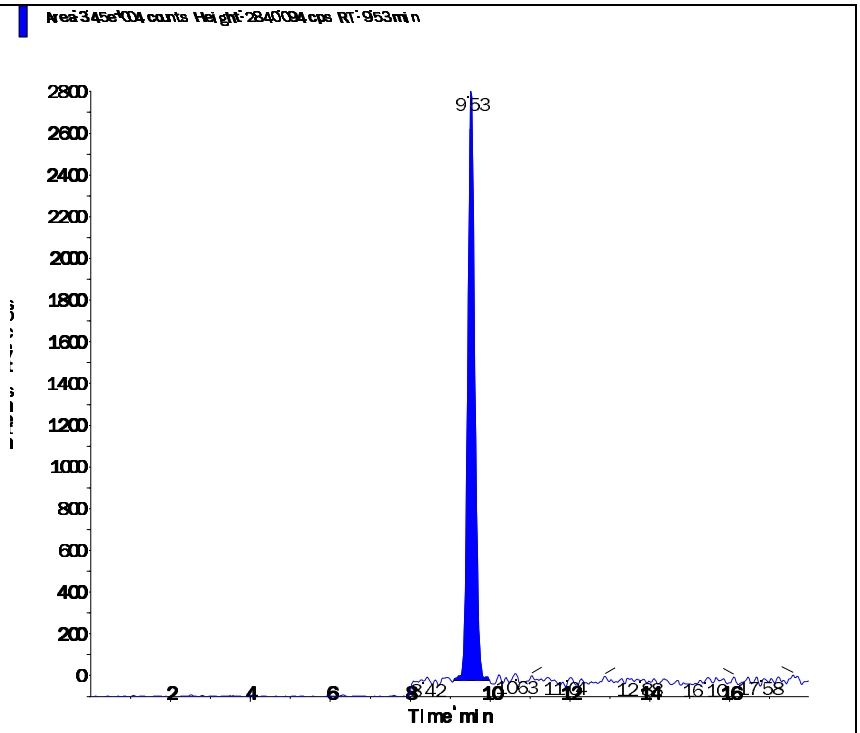
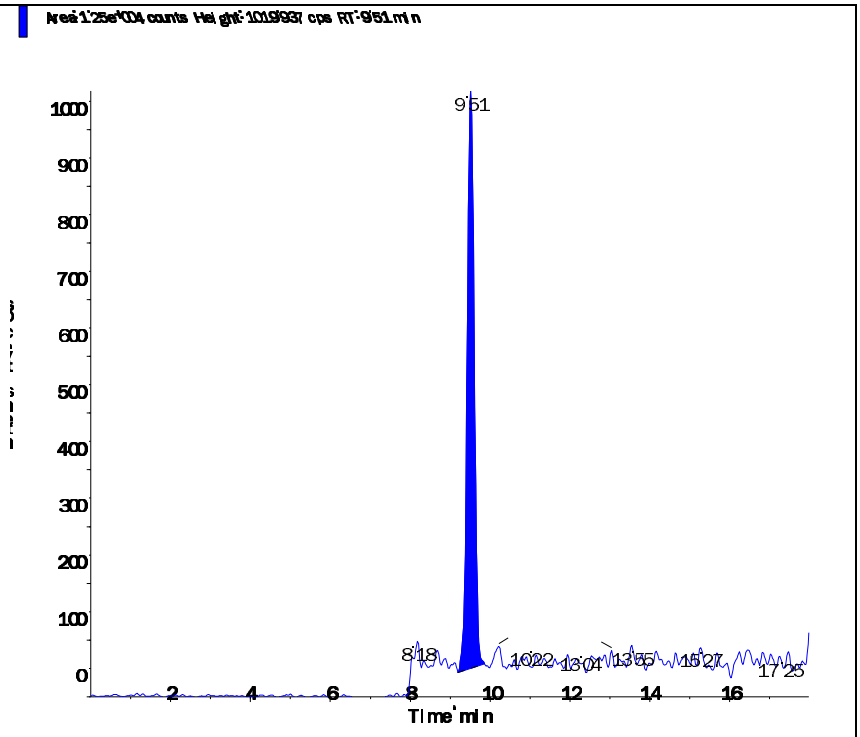
Perchlorate (98.8/83.3 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	9.53 (9.84) min 0.198 ng/ml 0.068 (Unknown)



Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	9.51 (9.84) min 0.20 ng/ml 0.025 (Unknown)



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Data File	LM35624.wiff	**Result Table**	070516_JWR.rdb
Acquisition Date	7/5/2016 9:31:24 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

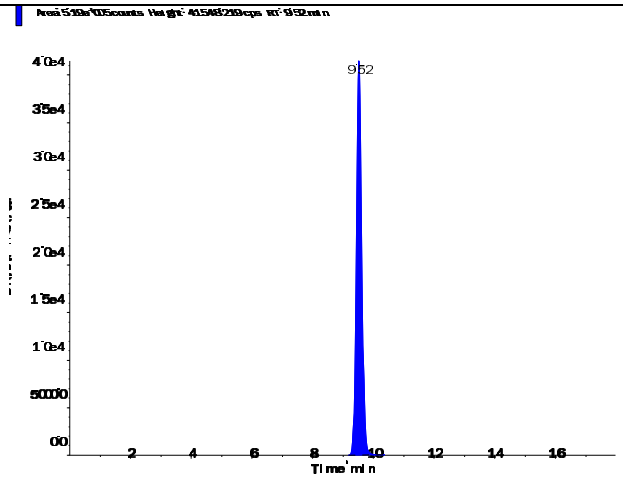
Sample Name	WG575171-09 MRL (0.2ug/L)	**Injection Vial**	2.00
Data File	LM35624.wiff	**Injection Volume**	10.00
Acquisition Date	7/5/2016 9:31:24 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	070516_JWR.rdb
Sample ID	WG575171-09	**Dilution Factor**	1.00
Sample Comment	1,1 STD75510	**Weight to Volume**	0.00

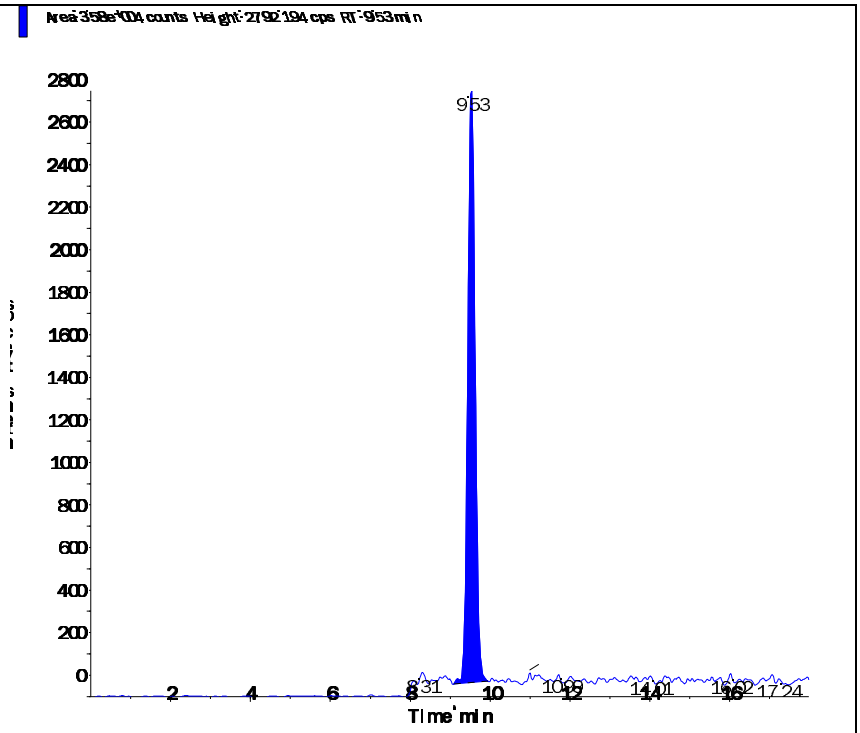
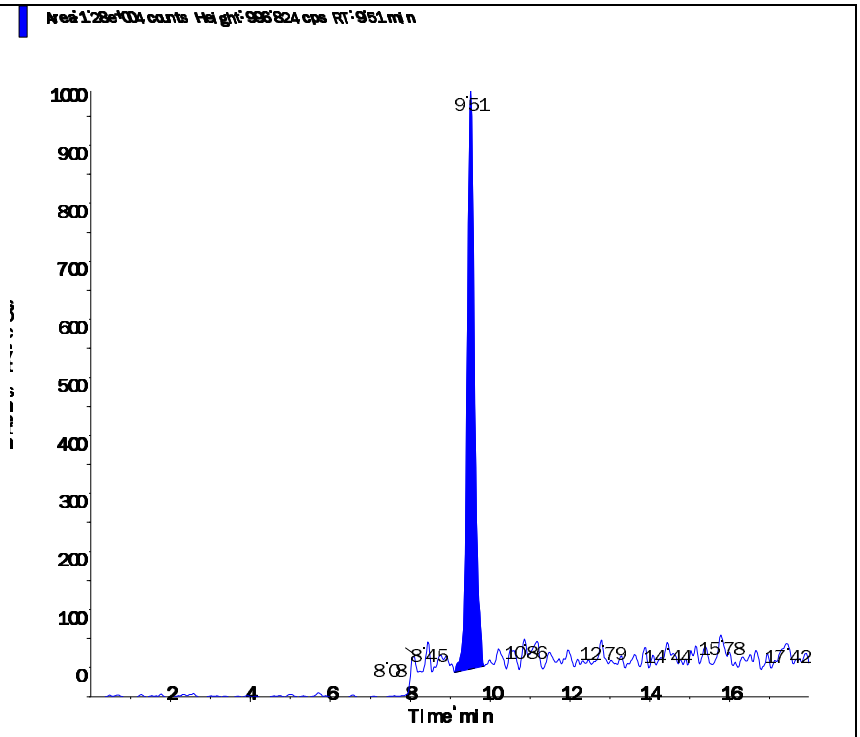
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	5.190e+05	9.52	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	3.580e+04	9.53	N/A	0.201
Perchlorate conf	1.280e+04	9.51	N/A	0.20

O18LP (Internal Standard)

RT (Exp. RT): 9.52(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.53 (9.84) min Calculated conc: 0.201 ng/ml Area Ratio: 0.069 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.51 (9.84) min Calculated conc: 0.20 ng/ml Area Ratio: 0.025 Sample Type: (Unknown)	

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Data File	LM35604.wiff	**Result Table**	070516_JWR.rdb
Acquisition Date	7/5/2016 3:12:44 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

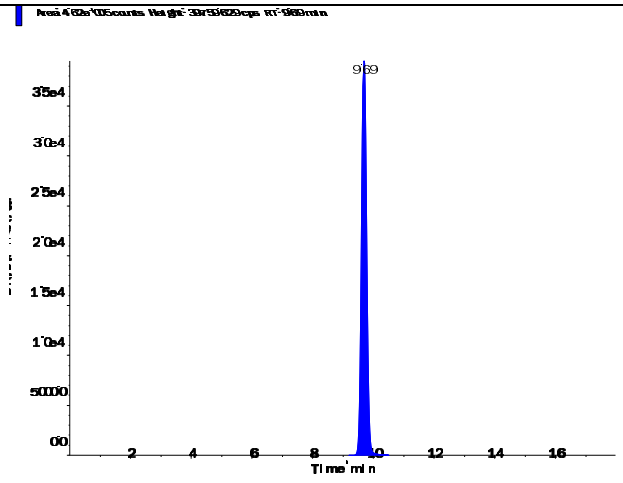
Sample Name	WG575212-01 CCB	**Injection Vial**	1.00
Data File	LM35604.wiff	**Injection Volume**	10.00
Acquisition Date	7/5/2016 3:12:44 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	070516_JWR.rdb
Sample ID	WG575212-01	**Dilution Factor**	1.00
Sample Comment	11.00	**Weight to Volume**	0.00

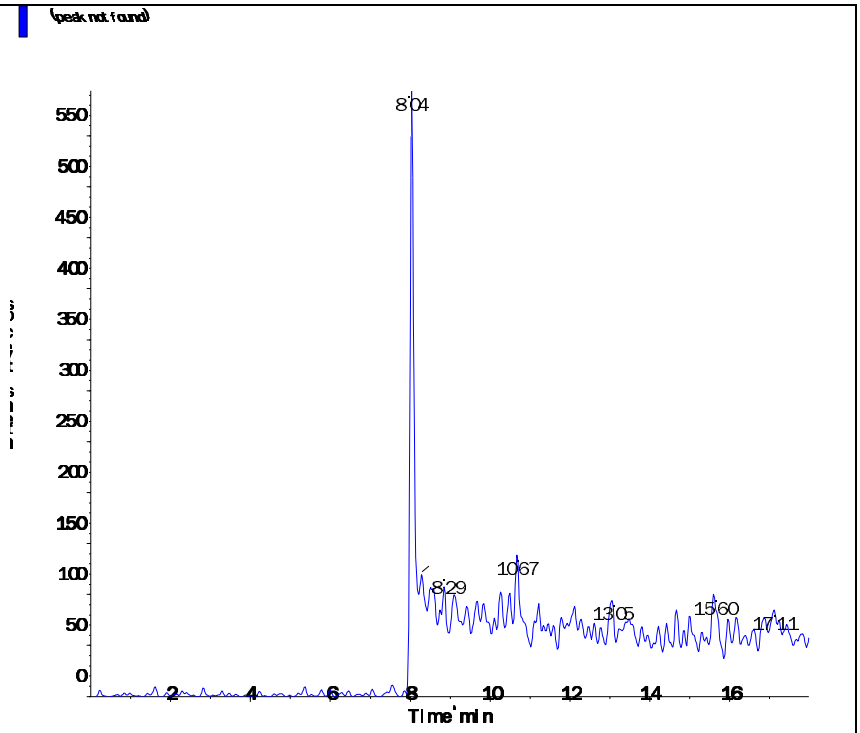
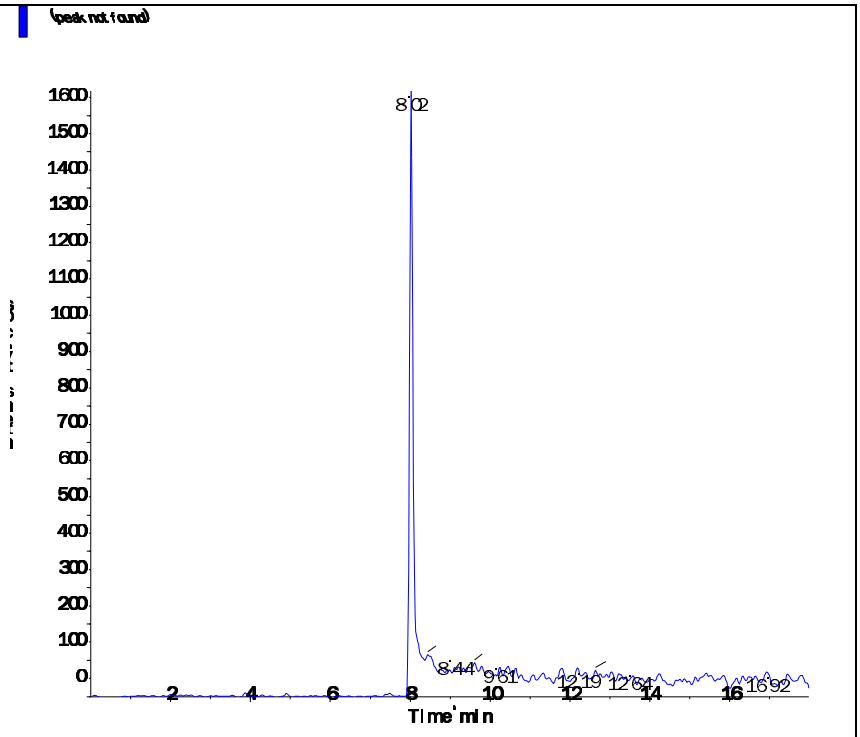
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.620e+05	9.69	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	0.000e+00	0.00	N/A	No Peak
Perchlorate conf	0.000e+00	0.00	N/A	No Peak

O18LP (Internal Standard)

RT (Exp. RT): 9.69(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 0.00 (9.84) min Calculated conc: No Peak ng/ml Area Ratio: 0.00 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 0.00 (9.84) min Calculated conc: No Peak ng/ml Area Ratio: 0.00 Sample Type: (Unknown)	

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Data File	LM35619.wiff	**Result Table**	070516_JWR.rdb
Acquisition Date	7/5/2016 7:56:44 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

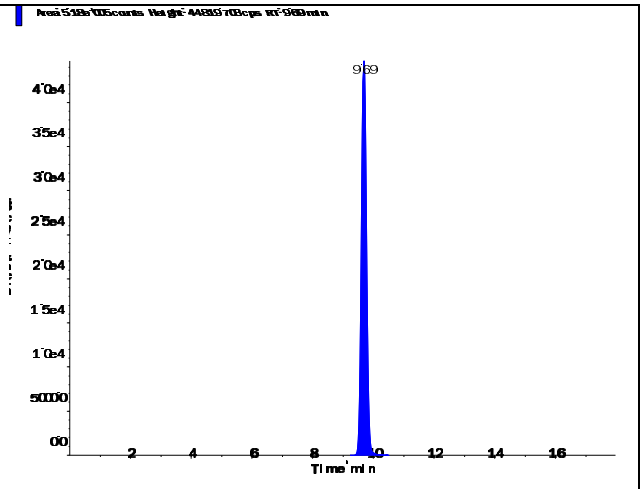
Sample Name	WG575212-04 CCB	**Injection Vial**	1.00
Data File	LM35619.wiff	**Injection Volume**	10.00
Acquisition Date	7/5/2016 7:56:44 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	070516_JWR.rdb
Sample ID	WG575212-04	**Dilution Factor**	1.00
Sample Comment	11.00	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	5.180e+05	9.69	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	0.000e+00	0.00	N/A	No Peak
Perchlorate conf	1.810e+02	9.45	N/A	< 0

O18LP (Internal Standard)

RT (Exp. RT): 9.69(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



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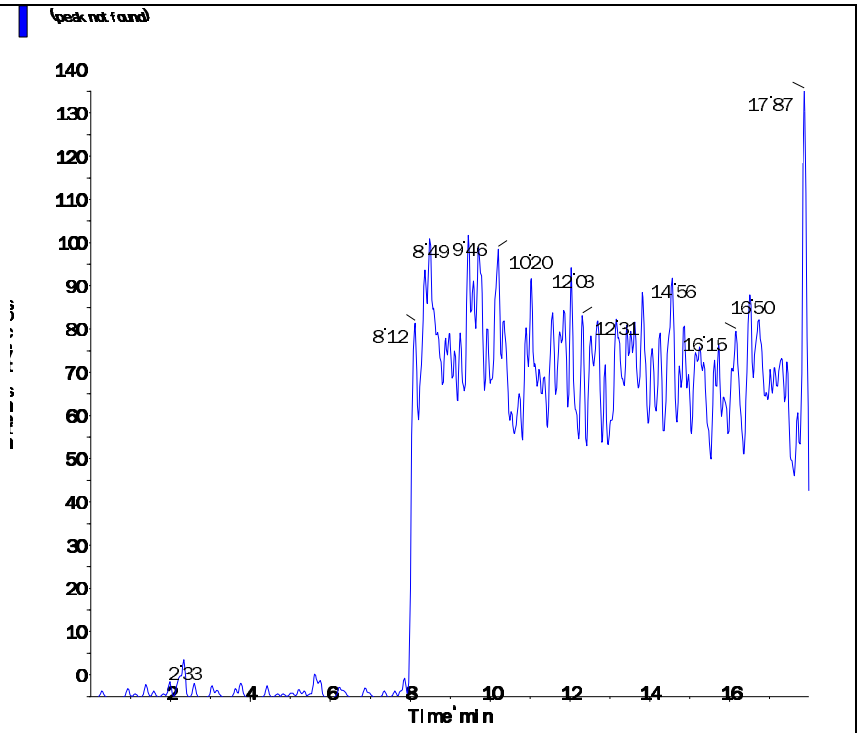
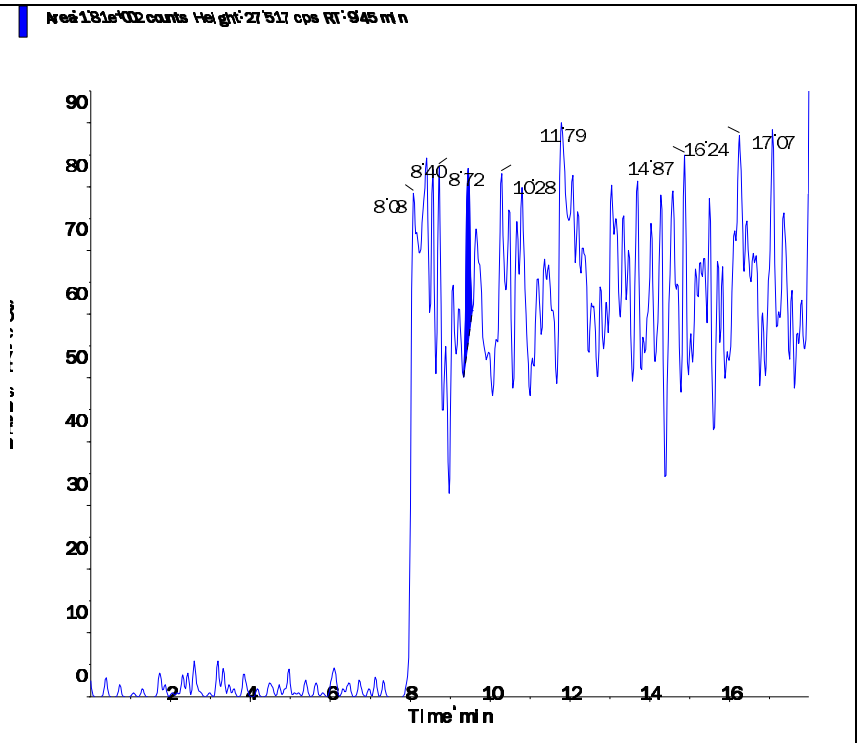
Perchlorate (98.8/83.3 amu)	
RT (Exp. RT):	0.00 (9.84) min
Calculated conc:	No Peak ng/ml
Area Ratio:	0.00
Sample Type:	(Unknown)

Perchlorate conf (100.8/85.2 amu)	
RT (Exp. RT):	9.45 (9.84) min
Calculated conc:	< 0 ng/ml
Area Ratio:	0.00
Sample Type:	(Unknown)

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Data File	LM35625.wiff	**Result Table**	070516_JWR.rdb
Acquisition Date	7/5/2016 9:50:20 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

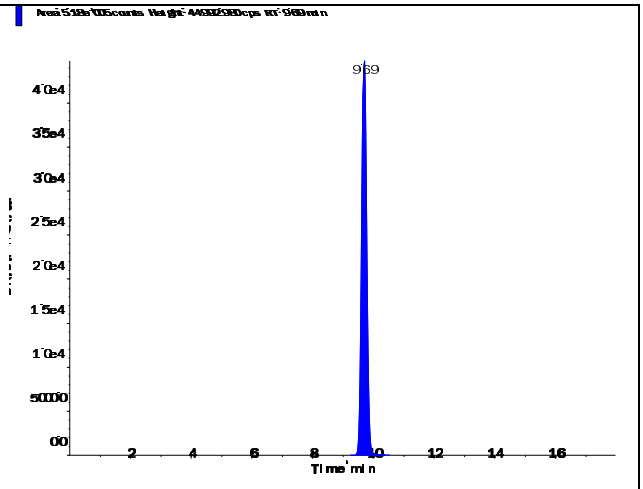
Sample Name	WG575212-06 CCB	**Injection Vial**	1.00
Data File	LM35625.wiff	**Injection Volume**	10.00
Acquisition Date	7/5/2016 9:50:20 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	070516_JWR.rdb
Sample ID	WG575212-06	**Dilution Factor**	1.00
Sample Comment	11.00	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	5.180e+05	9.69	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	0.000e+00	0.00	N/A	No Peak
Perchlorate conf	0.000e+00	0.00	N/A	No Peak

O18LP (Internal Standard)

RT (Exp. RT): 9.69(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



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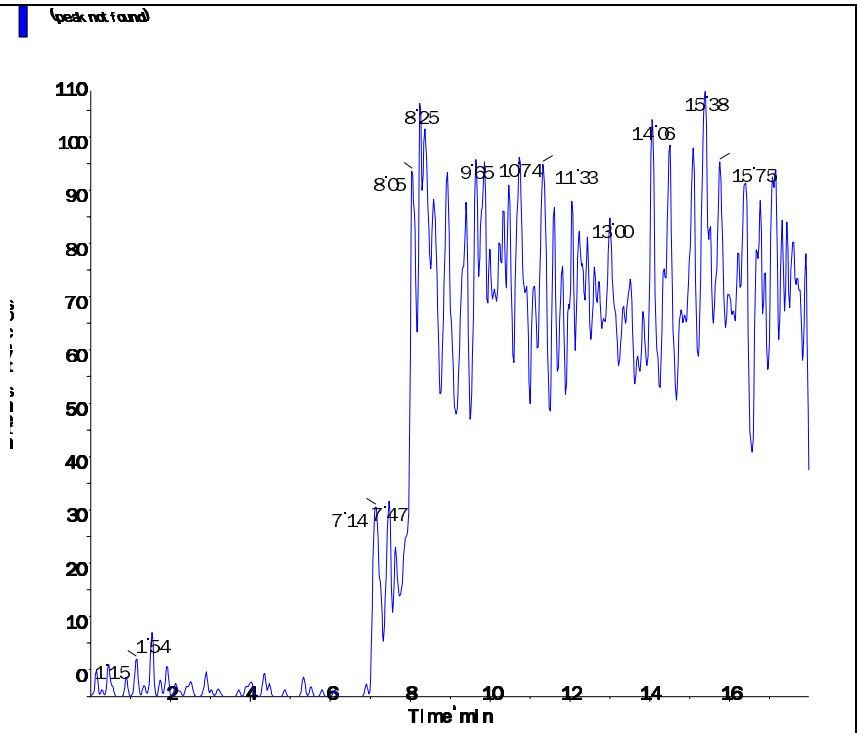
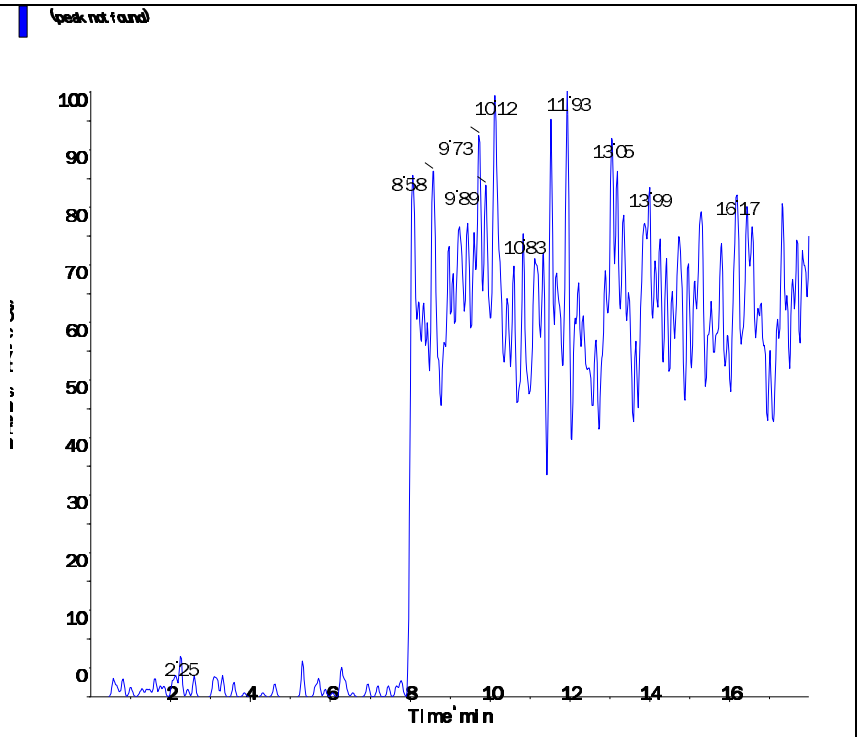
Printed: 7/6/2016 11:03 AM

Perchlorate (98.8/83.3 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	0.00 (9.84) min No Peak ng/ml 0.00 (Unknown)



Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	0.00 (9.84) min No Peak ng/ml 0.00 (Unknown)



Applied Biosystems | MDS SCIEX

Created with Analyst Reporter
Printed: 7/6/2016 10:57 AM

Data File	LM35607.wiff	**Result Table**	070516_JWR.rdb
Acquisition Date	7/5/2016 4:09:27 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

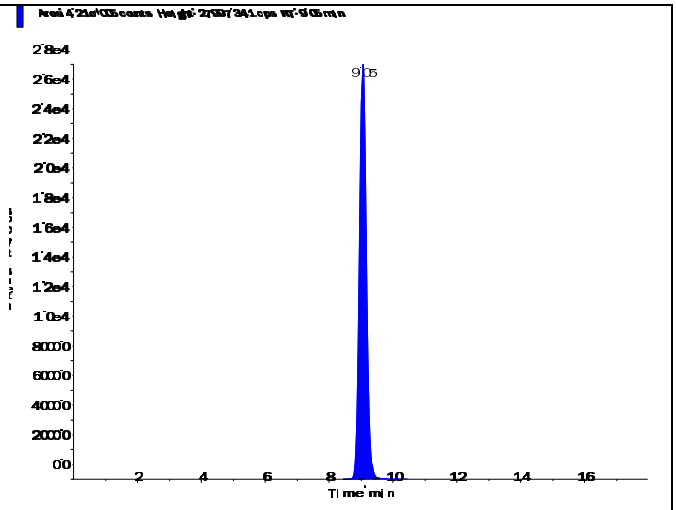
Sample Name	WG575171-01 MCT (0.2ug/L)	**Injection Vial**	4.00
Data File	LM35607.wiff	**Injection Volume**	10.00
Acquisition Date	7/5/2016 4:09:27 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	070516_JWR.rdb
Sample ID	WG575171-01	**Dilution Factor**	1.00
Sample Comment	1,1 STD75512	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.210e+05	9.05	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	2.670e+04	9.08	N/A	0.184
Perchlorate conf	9.850e+03	9.05	N/A	0.189

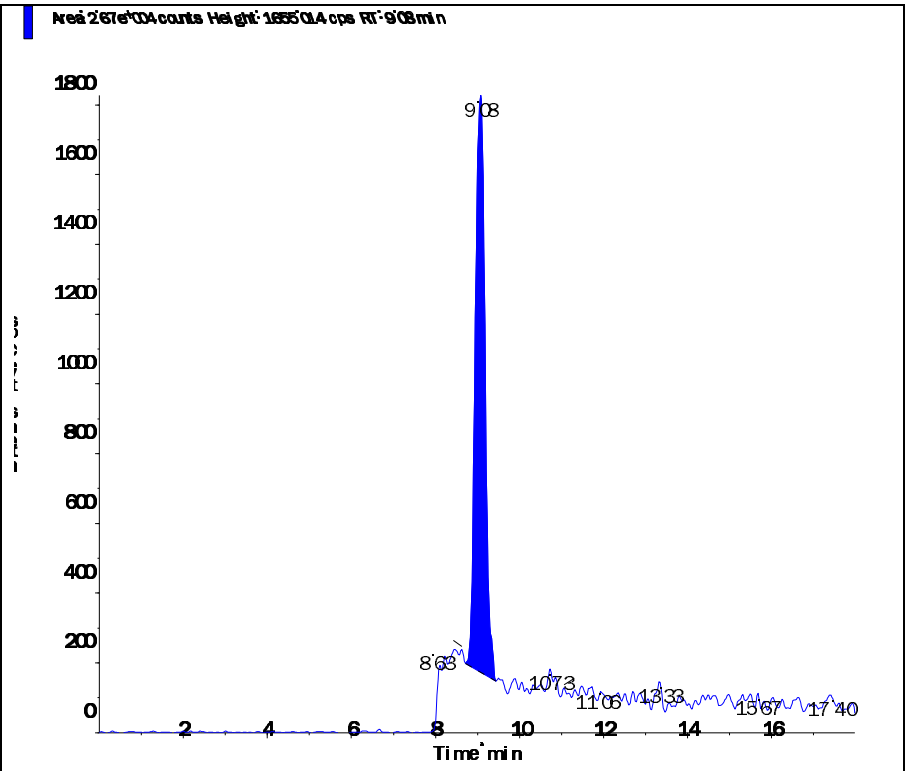
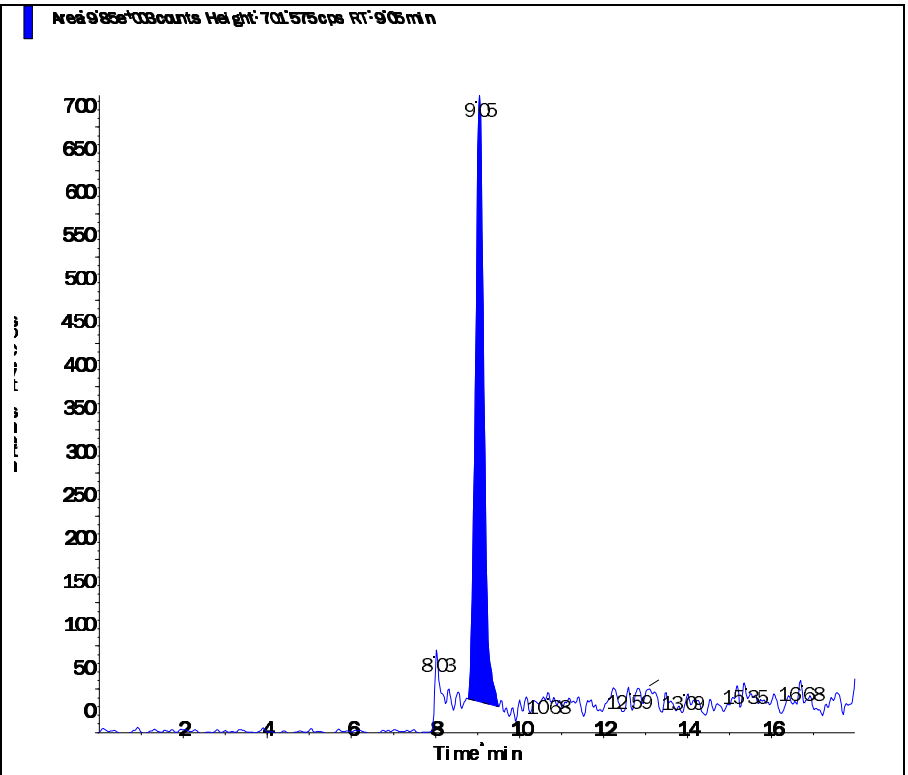
O18LP (Internal Standard)

RT (Exp. RT): 9.05(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)

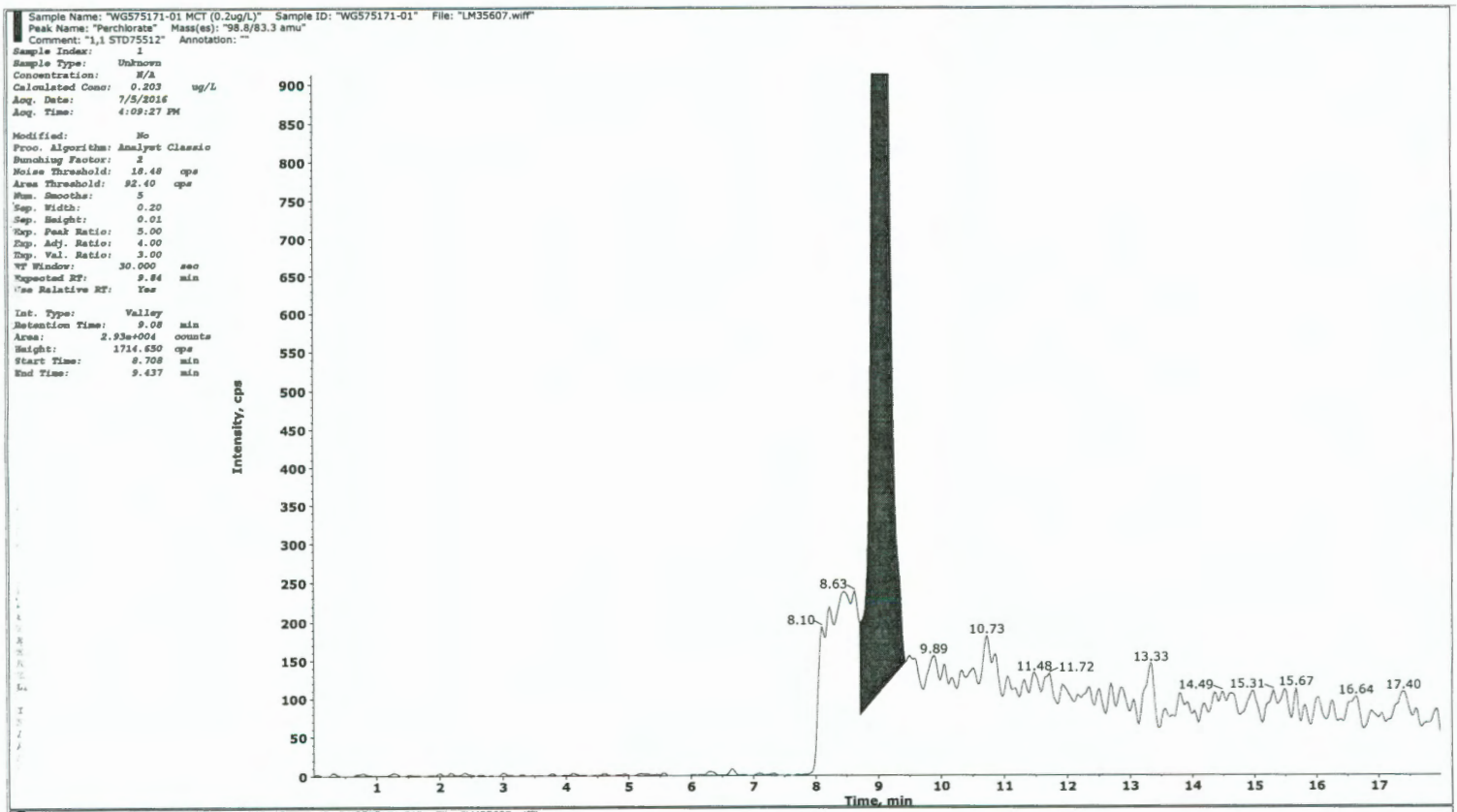


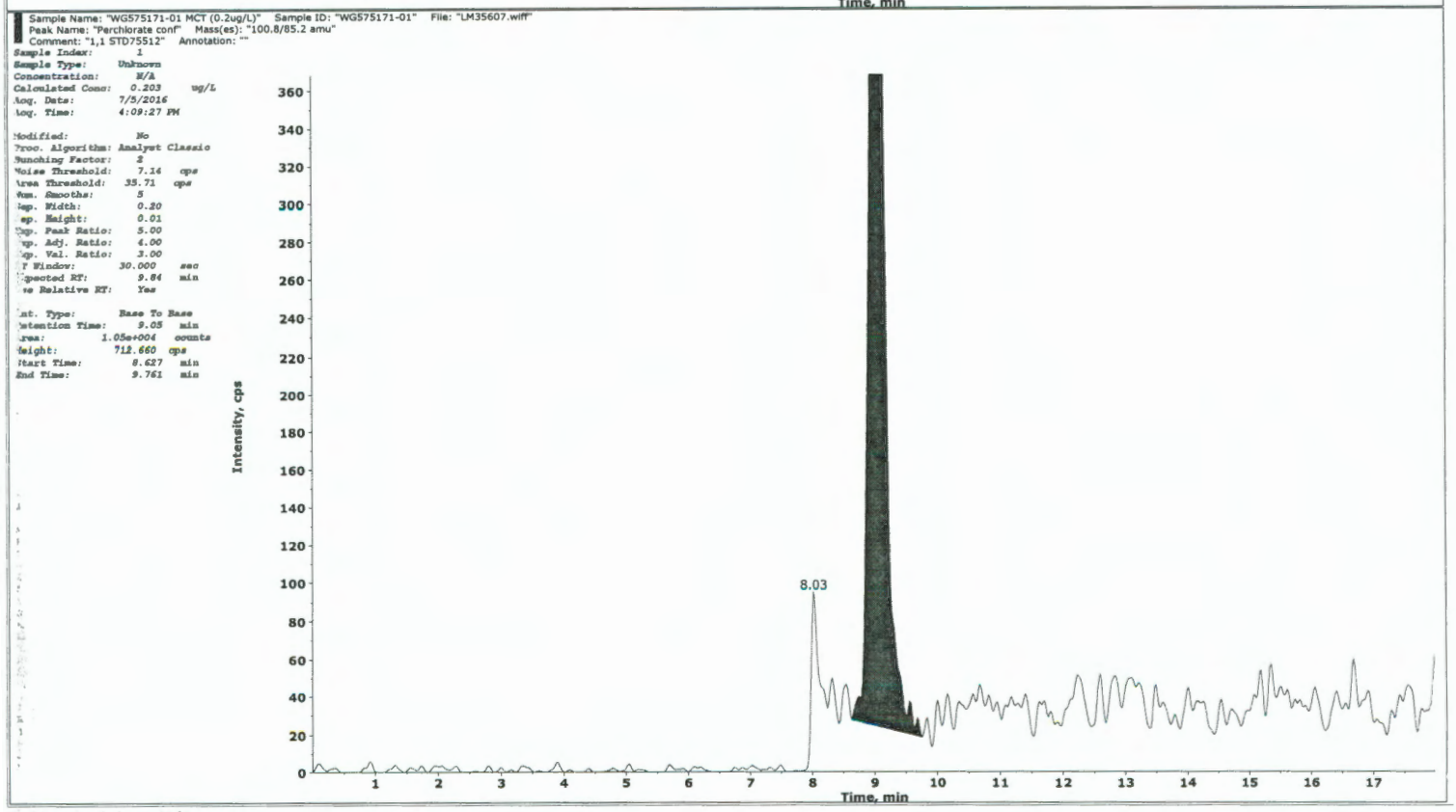
Applied Biosystems | MDS SCIEX

Created with Analyst Reporter
Printed: 7/6/2016 10:57 AM

Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.08 (9.84) min Calculated conc: 0.184 ng/ml Area Ratio: 0.063 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.05 (9.84) min Calculated conc: 0.189 ng/ml Area Ratio: 0.023 Sample Type: (Unknown)	

Printing Time: 10:32:02 AM
Printing Date: Wednesday, July 06, 2016



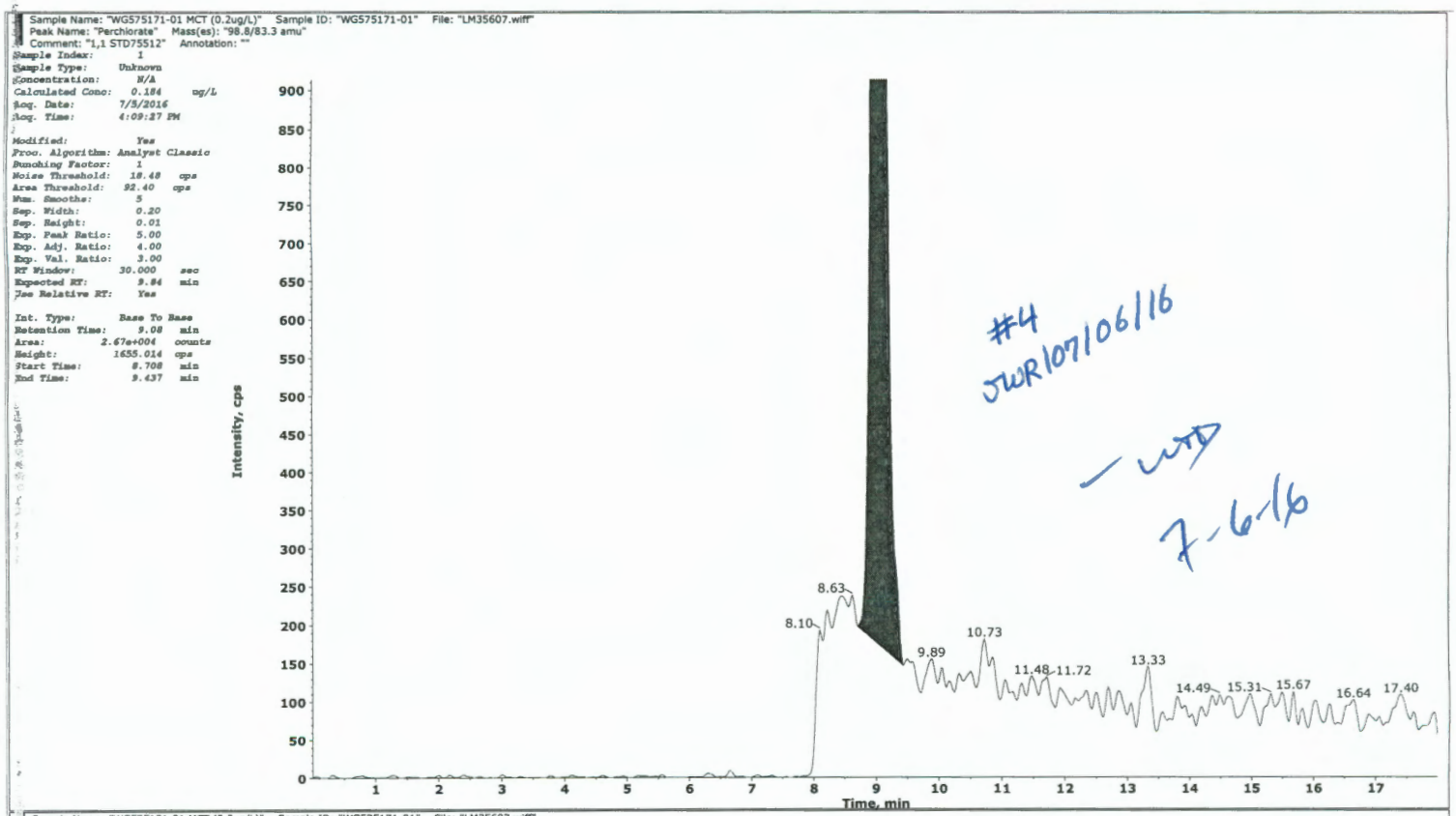


Collected by: N/A
Electronic Signature: no
Operator: lcms1

Printing Time: 10:35:23 AM
Printing Date: Wednesday, July 06, 2016

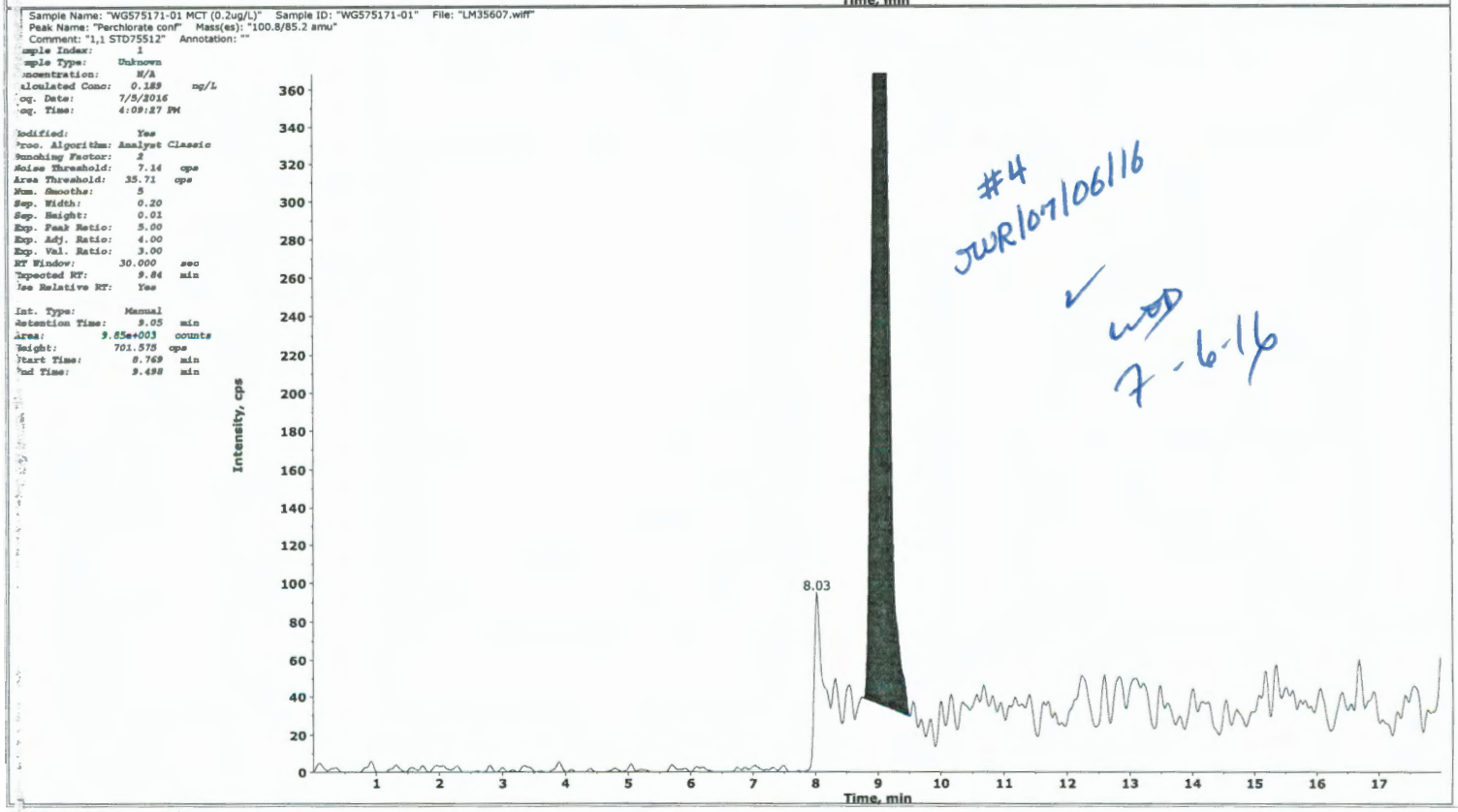
Sample Name: "WG575171-01 MCT (0.2ug/L)" Sample ID: "WG575171-01" File: "LM35607.wiff"
Peak Name: "Perchlorate" Mass(es): "98.8/83.3 amu"
Comment: "1,1 STD75512" Annotation: ""

Sample Index:	1
Sample Type:	Unknown
Concentration:	N/A
Calculated Conc:	0.184 ng/L
Acq. Date:	7/5/2016
Acq. Time:	4:09:27 PM
Modified:	Yes
Proc. Algorithm:	Analyst Classic
Smoothing Factor:	1
Noise Threshold:	18.48 cps
Area Threshold:	92.40 cps
Num. Smooths:	5
Exp. Width:	0.20
Exp. Height:	0.01
Exp. Peak Ratio:	5.00
Exp. Adj. Ratio:	4.00
Exp. Val. Ratio:	3.00
RT Window:	30.000 sec
Expected RT:	9.84 min
Use Relative RT:	Yes
Int. Type:	Base To Base
Retention Time:	9.08 min
Area:	2.67e+004 counts
Height:	1655.014 cps
Start Time:	8.708 min
End Time:	9.437 min



Sample Name: "WG575171-01 MCT (0.2ug/L)" Sample ID: "WG575171-01" File: "LM35607.wiff"
Peak Name: "Perchlorate conf" Mass(es): "100.8/85.2 amu"
Comment: "1,1 STD75512" Annotation: ""

Sample Index:	1
Sample Type:	Unknown
Concentration:	N/A
Calculated Conc:	0.189 ng/L
Acq. Date:	7/5/2016
Acq. Time:	4:09:27 PM
Modified:	Yes
Proc. Algorithm:	Analyst Classic
Smoothing Factor:	2
Noise Threshold:	7.14 cps
Area Threshold:	35.71 cps
Num. Smooths:	5
Exp. Width:	0.20
Exp. Height:	0.01
Exp. Peak Ratio:	5.00
Exp. Adj. Ratio:	4.00
Exp. Val. Ratio:	3.00
RT Window:	30.000 sec
Expected RT:	9.84 min
Use Relative RT:	Yes
Int. Type:	Manual
Retention Time:	9.05 min
Area:	9.85e+003 counts
Height:	701.575 cps
Start Time:	8.769 min
End Time:	9.498 min



Collected by: N/A
Electronic Signature: no
Operator: lcmsl

2.1.1.5 Raw QC Data

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Created with Analyst Reporter
Printed: 7/6/2016 10:57 AM

Data File	LM35608.wiff	**Result Table**	070516_JWR.rdb
Acquisition Date	7/5/2016 4:28:22 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

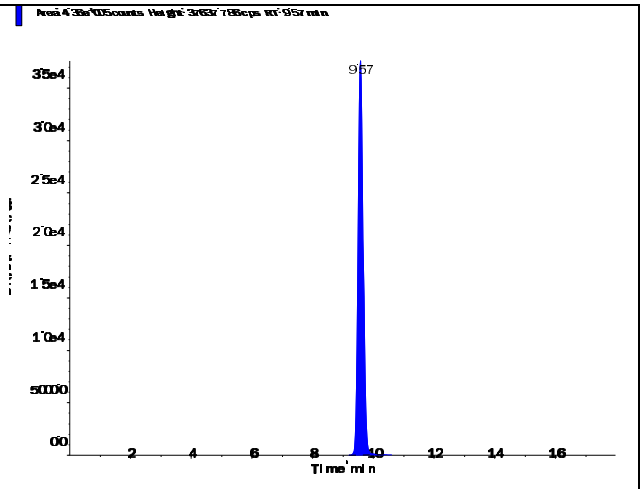
Sample Name	WG575171-02 BLANK	**Injection Vial**	5.00
Data File	LM35608.wiff	**Injection Volume**	10.00
Acquisition Date	7/5/2016 4:28:22 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	070516_JWR.rdb
Sample ID	WG575171-02	**Dilution Factor**	1.00
Sample Comment	11.00	**Weight to Volume**	0.00

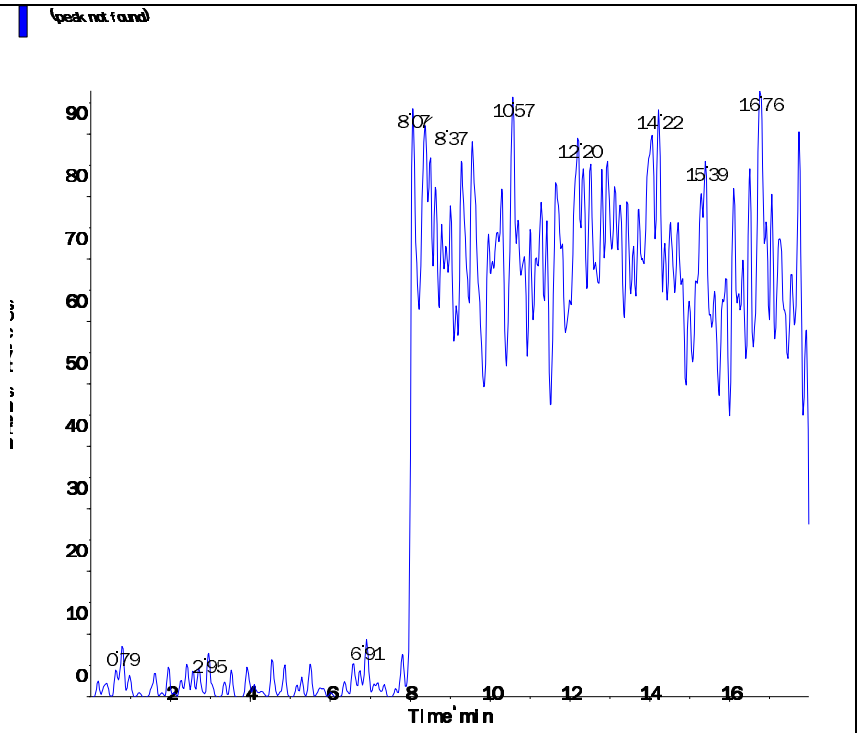
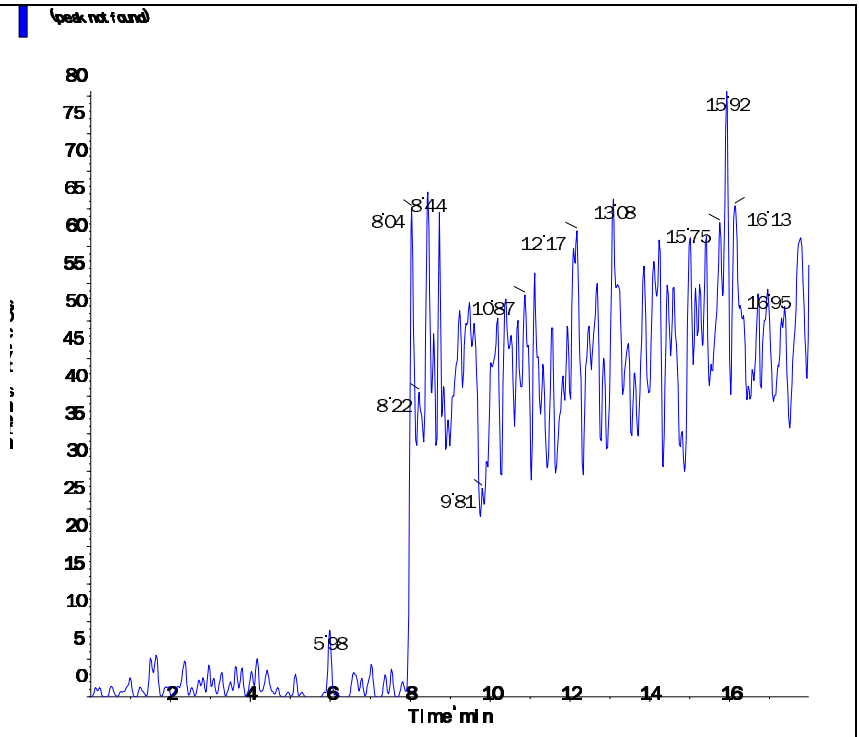
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.360e+05	9.57	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	0.000e+00	0.00	N/A	No Peak
Perchlorate conf	0.000e+00	0.00	N/A	No Peak

O18LP (Internal Standard)

RT (Exp. RT): 9.57(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 0.00 (9.84) min Calculated conc: No Peak ng/ml Area Ratio: 0.00 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 0.00 (9.84) min Calculated conc: No Peak ng/ml Area Ratio: 0.00 Sample Type: (Unknown)	

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Created with Analyst Reporter
Printed: 7/6/2016 10:58 AM

Data File	LM35609.wiff	**Result Table**	070516_JWR.rdb
Acquisition Date	7/5/2016 4:47:18 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

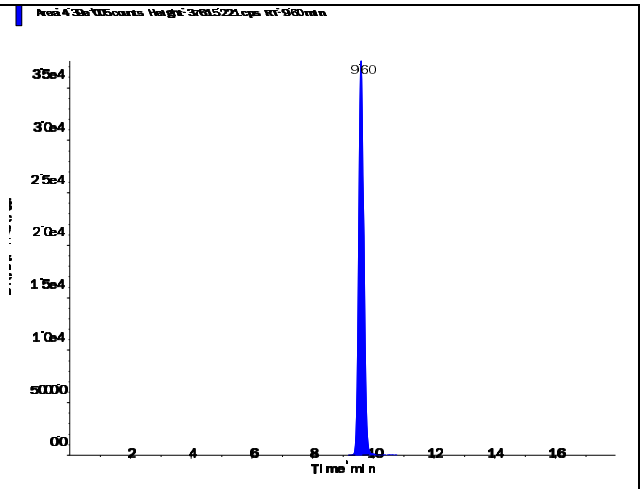
Sample Name	WG575171-03 LCS (0.2ug/L)	**Injection Vial**	6.00
Data File	LM35609.wiff	**Injection Volume**	10.00
Acquisition Date	7/5/2016 4:47:18 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	070516_JWR.rdb
Sample ID	WG575171-03	**Dilution Factor**	1.00
Sample Comment	1,1 STD75512	**Weight to Volume**	0.00

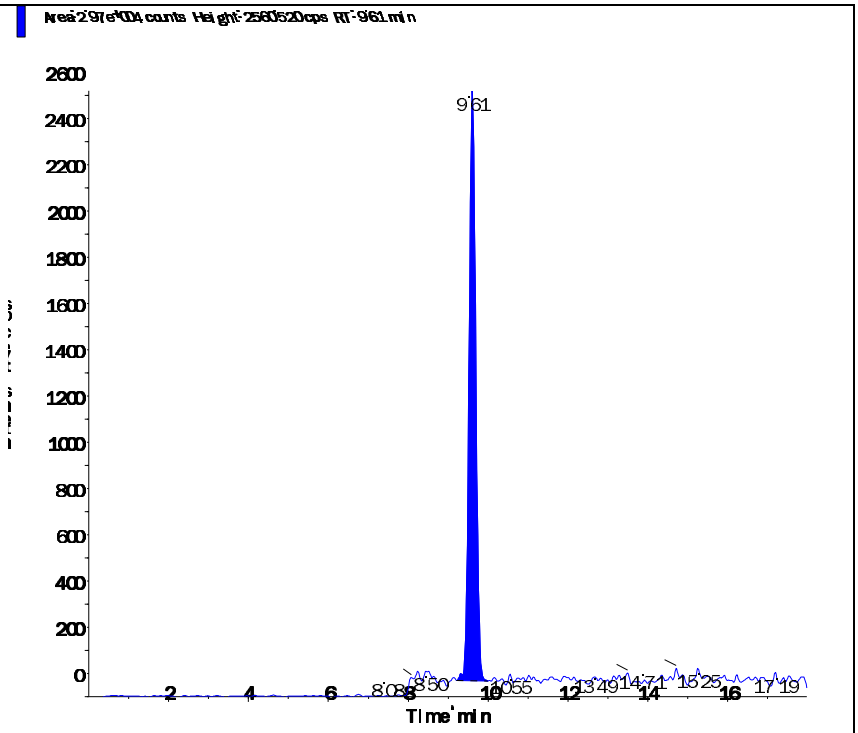
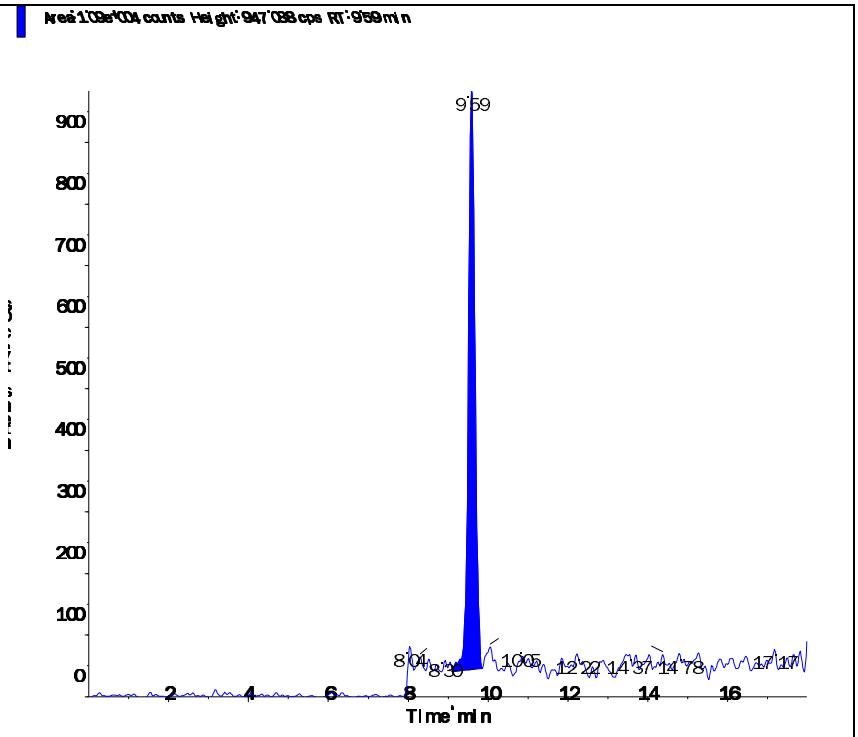
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.390e+05	9.60	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	2.970e+04	9.61	N/A	0.198
Perchlorate conf	1.090e+04	9.59	N/A	0.202

O18LP (Internal Standard)

RT (Exp. RT): 9.60(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.61 (9.84) min Calculated conc: 0.198 ng/ml Area Ratio: 0.068 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.59 (9.84) min Calculated conc: 0.202 ng/ml Area Ratio: 0.025 Sample Type: (Unknown)	

3.0 Attachments

Microbac Laboratories Inc.
Ohio Valley Division Analyst List
July 7, 2016

001 – BIO-CHEM TESTING WVDEP 220
002 – REIC Consultants, Inc. WVDEP 060
003 – Sturm Environmental
004 – MICROBAC PITTSBURGH
005 – ES LABORATORIES
006 – ALCOSAN LABORATORIES
007 – ALS LABORATORIES
008 – BENCHMARK LABORATORIES
010 – MICROBAC CHICAGOLAND
AC – AMBER R. CARMICHAEL
ADC – ANTHONY D. CANTER
ADG – APRIL D. GREENE
AED – ALLEN E. DAVIS
ALS – ADRIANE L. STEED
AMA – ALEXANDRA M. ALFRED
AWE – ANDREW W. ESSIG
AZH – AFTER HOURS
BJO – BRIAN J. OGDEN
BKT – BRENDAN TORRENCE
BLG – BRENDA L. GREENWALT
BNB – Brandi N. Bentley
BRG – BRENDA R. GREGORY
CAA – CASSIE A. AUGENSTEIN
CAF – CHERYL A. FLOWERS
CEB – CHAD E. BARNES
CJQ – Cameron J. Quick
CJR – COURTNEY J. REXROAD
CLC – CHRYS L. CRAWFORD
CLS – CARA L. STRICKLER
CLW – CHARISSA L. WINTERS
CPD – CHAD P. DAVIS
CSH – CHRIS S. HILL
CV – Carl Volkman
DAK – DEAN A. KETELSEN
DCM – DAVID C. MERCKLE
DEV – DAVID E. VANDENBERG
DIH – DEANNA I. HESSON
DLB – DAVID L. BUMGARNER
DLP – DOROTHY L. PAYNE
DLW – DIANA L. WRIGHT
DSM – DAVID S. MOSSOR
ECL – ERIC C. LAWSON
EMW – ERIC M. WILKEN
ENY – EMILY N. YOAK
ERP – ERIN R. PORTER
FJB – FRANCES J. BOLDEN
JBK – JEREMY B. KINNEY
JDH – JUSTIN D. HESSON
JDS – JARED D. SMITH
JJS – JOHN J. STE MARIE
JKP – JACQUELINE K. PARSONS
JLD – JESSICA L. DELONG
JLL – JOHN L. LENT
JMW – JEANA M. WHITE
JTP – JOSHUA T. PEMBERTON
JWR – JOHN W. RICHARDS
JWS – JACK W. SHEAVES
JYH – JI Y. HU
KAJ – KELLIE A. JOHNSON
KAT – KATHY A. TUCKER
KDW – KATHRYN D. WELCH
KEB – KATIE E. BARNES
KHR – KIM H. RHODES
KKB – KERRI K. BUCK
KRA – KATHY R. ALBERTSON
KRB – KAELY R. BECKER
KRP – KATHY R. PARSONS
LEC – LAURA E. CARPENTER
LJH – Lacey J. Hendershot
LKN – LINDA K. NEDEFF
LLS – LARRY L. STEPHENS
LSB – LESLIE S. BUCINA
MAP – MARLA A. PORTER
MBK – MORGAN B. KNOWLTON
MDA – MIKE D. ALBERTSON
MDC – MIKE D. COCHRAN
MES – MARY E. SCHILLING
MLB – MEGAN L. BACHE
MMB – MAREN M. BEERY
MRT – MICHELLE R. TAYLOR
MSW – MATT S. WILSON
NPH – Natalie P. Hart
PDM – PIERCE D. MORRIS
PIT – MICROBAC WARRENDALE
PRL – PAIGE R. LAMB
PSW – PEGGY S. WEBB
QX – QIN XU
RAH – ROY A. HALSTEAD
REK – BOB E. KYER
RLB – BOB BUCHANAN
RM – RAYMOND MALEKE
RNP – RICK N. PETTY
RST – ROBIN S. TURNER
SAV – SARAH A. VANDENBERG
SCB – SARAH C. BOGOLIN
SDC – SHALYN D. CONLEY
SLM – STEPHANIE L. MOSSBURG
SLP – SHERI L. PFALZGRAF
TB – TODD BOYLE
TGF – TIM G. FELTON
TMB – TIFFANY M. BAILEY
TMM – TAMMY M. MORRIS
VC – VICKI COLLIER
WJB – WILL J. BEASLEY
WRR – WESLEY R. RICHARDS
WTD – WADE T. DELONG
XXX – UNAVAILABLE OR SUBCONTRACT

Microbac Laboratories Inc.
List of Valid Qualifiers
July 07, 2016

Qualkey: DOD

Qualifier	Description
*	Surrogate or spike compound out of range
+	Correlation coefficient for the MSA is less than 0.995
<	Result is less than the associated numerical value.
>	Greater than
A	See the report narrative
B	The reported result is associated with a contaminated method blank.
B,H1	Analyte present in method blank. Sample analysis performed past holding time.
B1	Target analyte detected in method blank at or above the method reporting limit
B3	Target analyte detected in calibration blank at or above the method reporting limit
B4	The BOD unseeded dilution water blank exceeded 0.2 mg/L
C	Confirmed by GC/MS
CG	Confluent growth
CT1	Cooler temperature at sample reciept exceeded regulatory limit.
DL	Surrogate or spike compound was diluted out
E	Estimated concentration due to sample matrix interference
E,CT1	Estimated results. The cooler temperature at receipt exceeded regulatory guidelines for requested testing.
EDL	Elevated sample reporting limits, presence of non-target analytes
EMPC	Estimated Maximum Possible Concentration
F, S	Estimated result below quantitation limit; method of standard additions(MSA)
F,CT1	Estimated value; the analyte concentration was less than the RL/LOQ. The cooler temperature at receipt exceeded regula
FL	Free Liquid
FP1	Did not ignite.
H1	Sample analysis performed past holding time.
H1,CT1	Sample analysis performed past holding time. The cooler temperature at receipt exceeded regulatory guidelines for reque
I	Semiquantitative result (out of instrument calibration range)
J	Estimated concentration; sample matrix interference.
J	Estimated value ; the analyte concentration was greater than the highest standard
J	Estimated value ; the analyte concentration was less than the LOQ.
J	The reported result is an estimated value.
J,B	Analyte detected in both the method blank and sample above the MDL.
J,CT1	Estimated value ; the analyte concentration was less than the LOQ. Cooler temperature at sample reciept exceeded regu
J,H1	Estimated value ; the analyte concentration was less than the LOQ. Sample analysis performed past holding time.
J,H1	The reported result is an estimated value. Sample was analyzed past holding time.
J,P	Estimate; columns don't agree to within 40%
J,S	Estimated concentration; analyzed by method of standard addition (MSA)
JB	The reported result is an estimated value. The reported result is also associated with a contaminated method blank.
JQ	The reported result is an estimated value and one or more quality control criteria failed. See narrative.
L	Sample reporting limits elevated due to matrix interference
L1	The associated blank spike (LCS) recovery was above the laboratory acceptance limits.
L2	The associated blank spike (LCS) recovery was below the laboratory acceptance limits.
M	Matrix effect; the concentration is an estimate due to matrix effect.
N	Nontarget analyte; the analyte is a tentativlely identified compound (TIC) by GC/MS
NA	Not applicable
ND	Not detected at or above the reporting limit (RL)
ND, B	Not detected at or above the reporting limit (RL). Analyte present in method blank.
ND, CT1	Analyte was not detected. The concentration is below the reported LOD. The cooler temperature at receipt exceeded reg
ND, L	Not detected; sample reporting limit (RL) elevated due to interference
ND, S	Not detected; analyzed by method of standard addition (MSA)
ND,H1	Not detected; Sample analysis performed past holding time.
ND,H1,CT1	Not detected; Sample analysis performed past holding time. The cooler temperature at receipt exceeded regulatory guide
NF	Not found by library search
NFL	No free liquid
NI	Non-ignitable
NR	Analyte is not required to be analyzed
NS	Not spiked
P	Concentrations >40% difference between the two GC columns
Q	One or more quality control criteria failed. See narrative.
Q,H1	One or more quality control criteria failed. Sample analyzed past holding time. See narrative.
QNS	Quantity of sample not sufficient to perform analysis
RA	Reanalysis confirms reported results
RE	Reanalysis confirms sample matrix interference
S	Analyzed by method of standard addition (MSA)
SMI	Sample matrix interference on surrogate
SP	Reported results are for spike compounds only
T5	Laboratory not licensed for this parameter
TIC	Library Search Compound
TNTC	Too numerous to count

Microbac Laboratories Inc.
List of Valid Qualifiers
July 07, 2016

Qualkey: DOD

TNTC, B	Too numerous to count. Analyte present in method blank.
TNTC,CT1	Too numerous to count. The cooler temperature at receipt exceeded regulatory guidelines for requested testing.
TNTC,H1	Too numerous to count. Sample analysis performed past holding time.
U	Analyte was not detected. The concentration is below the reported LOD.
U,CT1	Analyte was not detected. The concentration is below the reported LOD. Cooler temperature at sample reciept exceeded
U,H1	Not detected; Sample analysis performed past holding time.
UJ	Undetected; the MDL and RL are estimated due to quality control discrepancies.
UQ	Undetected; the analyte was analyzed for, but not detected.
W	Post-digestion spike for furnace AA out of control limits
X	Exceeds regulatory limit
X, S	Exceeds regulatory limit; method of standard additions (MSA)
Z	Cannot be resolved from isomer - see below

AECOM

Chain of Custody Record

COC Number:

Laboratory:	Microbac POC: Stephanie Mossburg	Project Manager:	Debra Richmann
Address:	158 Starlite Drive	Phone/Fax Number:	210-296-2000
	Marietta, OH 45750	Sampler (print):	Scott Beesinger
Phone:	1-800-373-4071		
Client:	AECOM	Signature:	Scott Beesinger
Address:	112 East Pecan Ste. 400		
	San Antonio, TX 78205		
Turn Around Time:	STANDARD	pH:	
Project Name/Location:	Longhorn		
Project Number:	60256135.0009AA		

Mail to: Linda Raabe, 112 East Pecan STE. 400, San Antonio, TX 78205, 210-296-2000

Fed Ex Airbill No:

Program:

ERPIMS REQUIRED FIELDS

Site Name	Sample ID/Location ID	SBD	SED	Date	Time	Comp*	Grab	Matrix	Number of Containers	PERCHLORATE	SA CODE	Cooler ID	LOT CONTROL NUMBERS ABLOT	EBLOT	TBLOT
PERIMETER WELLS	PW108-062916			6/29/16	1100		✓	W	1	✓					
	PW110-062916			6/29/16	1355		✓	W	1	✓					
	PW134-063016			6/30/16	0810		✓	W	1	✓					
	PW134FD-063016			6/30/16	0810		✓	W	1	✓					
	PW133-063016			6/30/16	0855		✓	W	1	✓					
	PW133MS-063016			6/30/16	0855		✓	W	1	✓					
	PW133MSD-063016			6/30/16	0855		✓	W	1	✓					
	PW111-063016			6/30/16	1005		✓	W	1	✓					
	PW112-063016			6/30/16	1125		✓	W	1	✓					

Comments: STANDARD TAT

Microbac OVD
Received: 07/01/2016 09:32
By: CARA STRICKLER
221000087920
Cara Strickler

	Date	Time		Date	Time	Relinquished by: (Signature)
Relinquished by: (Signature) Scott Beesinger	6/30/16	1500	Received:			
Relinquished by: (Signature)	Date	Time	Received for Laboratory by: (Signature)	Date	Time	Remarks:

*Homogenize all composite samples prior to analysis

Distribution: White to Laboratory, Canary to Project Manager, Pink QA/QC Manager

Microbac Laboratories Inc.

Internal Chain of Custody Report

Login: L16070033
Account: 2551
Project: 2551.096
Samples: 9
Due Date: 12-JUL-2016

Samplenum	Container ID	Products
L16070033-01	769207	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	01-JUL-2016 11:15	CLS		
2	ANALYZ	W1	SEM	05-JUL-2016 13:48	JWR	BRG	

Samplenum	Container ID	Products
L16070033-02	769208	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	01-JUL-2016 11:15	CLS		
2	ANALYZ	W1	SEM	05-JUL-2016 13:48	JWR	BRG	

Samplenum	Container ID	Products
L16070033-03	769209	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	01-JUL-2016 11:15	CLS		
2	ANALYZ	W1	SEM	05-JUL-2016 13:48	JWR	BRG	

Samplenum	Container ID	Products
L16070033-04	769210	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	01-JUL-2016 11:15	CLS		
2	ANALYZ	W1	SEM	05-JUL-2016 13:48	JWR	BRG	

Samplenum	Container ID	Products
L16070033-05	769211	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	01-JUL-2016 11:15	CLS		
2	ANALYZ	W1	SEM	05-JUL-2016 13:48	JWR	BRG	

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login

Microbac Laboratories Inc.

Internal Chain of Custody Report

Login: L16070033
Account: 2551
Project: 2551.096
Samples: 9
Due Date: 12-JUL-2016

Samplenum	Container ID	Products
L16070033-06	769212	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	01-JUL-2016 11:15	CLS		
2	ANALYZ	W1	SEM	05-JUL-2016 13:48	JWR	BRG	

Samplenum	Container ID	Products
L16070033-07	769213	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	01-JUL-2016 11:15	CLS		
2	ANALYZ	W1	SEM	05-JUL-2016 13:48	JWR	BRG	

Samplenum	Container ID	Products
L16070033-08	769214	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	01-JUL-2016 11:15	CLS		
2	ANALYZ	W1	SEM	05-JUL-2016 13:48	JWR	BRG	

Samplenum	Container ID	Products
L16070033-09	769215	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	01-JUL-2016 11:15	CLS		
2	ANALYZ	W1	SEM	05-JUL-2016 13:48	JWR	BRG	

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login

NELAP Addendum - January 4, 2016

Non-NELAP LIMS Product and Description

The following is a list of those tests that are not included in the Microbac – OVD NELAP Scope of Accreditation:

Heat of Combustion (BTU)
Total Halide by Bomb Combustion (TX)
Particle Sizing - 200 Mesh (PS200)
Specific Gravity/Density (SPGRAV)
Total Residual Chlorine (CL-TRL)
Total Volatile Solids (all forms) (TVS)
Total Coliform Bacteria (all methods)
Fecal Coliform Bacteria (all methods)
Sulfite (SO3)
Propionaldehyde (HPLC-UV)

SOLID AND HAZARDOUS CHEMICALS
Nitrogen, Ammonia by Method 350.1
Chromium, Hexavalent, Leachable by SM3500 Cr-B 2009
Phenolics, Total by Method 420.1
ASTM D3987-06

NELAP Accreditation by Laboratory SOP

NONPOTABLE WATER

OVD HPLC02/HPLC-UV

Nitroglycerin
Acetic acid
Butyric acid
Lactic acid
Propionic acid
Pyruvic acid

OVD MSS01/GC-MS

1,4-Phenylenediamine
1-Methylnaphthalene
1,4-Dioxane
Atrazine
Benzaldehyde
Biphenyl
Caprolactam
Hexamethylphosphoramide (HMPA)
Pentachlorobenzene
Pentachloroethane

NELAP Accreditation by Laboratory SOP

NONPOTABLE WATER

OVD MSV01/GC-MS

1, 1, 2-Trichloro-1,2,2-trifluoroethane
1,3-Butadiene
Cyclohexane
Cyclohexanone
Dimethyl disulfide
Dimethylsulfide
Ethyl-t-butylether (ETBE)
Isoprene
Methylacetate
Methylcyclohexane
T-amylmethylether (TAME)
Tetrahydrofuran (THF)

OVD HPLC07/HPLC-MS-MS

Hexamethylphosphoramide (XMPA-LCMS)

OVD HPLC12/HPLC/UV

Acetate
Formate

OVD RSK01/GC-FID

Acetylene
Propane

OVD K9305/ISE

Fluoroborate

SOLID AND HAZARDOUS CHEMICALS

OVD MSS0I/GC-MS

1-Methylnaphthalene
Benzaldehyde
Biphenyl
Caprolactam
Pentachloroethane

NELAP Accreditation by Laboratory SOP

SOLID AND HAZARDOUS CHEMICALS

OVD MSV0I/GC-MS

1.3-Butadiene
Cyclohexane
Cyclohexanone
Dimethyl disulfide
Dimethylsulfide
Ethyl-t-butylether (ETBE)
Isoprene
Methylacetate
Methylcyclohexane
n-Hexane
T-amylmethylether (TAME)

Microbac

Laboratory Report Number: L16110420

Kayla Teague
AECOM Technical Services, Inc.
1950 N Stemmons FWY
Dallas, TX 75207

Please find enclosed the analytical results for the samples you submitted to Microbac Laboratories. Review and compilation of your report was completed by Microbac's Ohio Valley Division (OVD). If you have any questions, comments, or require further assistance regarding this report, please contact your service representative listed below.

Laboratory Contact:
Adriane Steed – Client Services Specialist
(740) 373-4071
Adriane.Steed@microbac.com

I certify that all test results meet all of the requirements of the DoD QSM and other applicable contract terms and conditions. Any exceptions are attached to this cover page or addressed in the method narratives presented in the report. All results for soil samples are reported on a 'dry-weight' basis unless specified otherwise. Analytical results for water and wastes are reported on a 'as received' basis unless specified otherwise. A statement of uncertainty for each analysis is available upon request. This laboratory report shall not be reproduced, except in full, without the written approval of Microbac Laboratories, DoD ELAP certification number 2936.01. The reported results are related only to the samples analyzed as received.

This report was certified on November 18 2016

Leslie Bucina – Managing Director

State of Origin: TX
Accrediting Authority: Texas Commission on Environmental Quality ID:T104704252-07-TX
QAPP: DOD Ver 4.1

Microbac

Lab Report #: L16110420
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Record of Sample Receipt and Inspection

Comments/Discrepancies

This is the record of the shipment conditions and the inspection records for the samples received and reported as a sample delivery group (SDG). All of the samples were inspected and observed to conform to our receipt policies, except as noted below.

There were no discrepancies.

Discrepancy	Resolution

Coolers

Cooler #	Temperature Gun	Temperature	COC #	Airbill #	Temp Required?
00114108	H	3.0		J4616883095	X
00110671	H	2.0		J4616883086	X

Inspection Checklist

#	Question	Result
1	Were shipping coolers sealed?	Yes
2	Were custody seals intact?	Yes
3	Were cooler temperatures in range of 0-6?	Yes
4	Was ice present?	Yes
5	Were COC's received/information complete/signed and dated?	Yes
6	Were sample containers intact and match COC?	Yes
7	Were sample labels intact and match COC?	Yes
8	Were the correct containers and volumes received?	Yes
9	Were samples received within EPA hold times?	Yes
10	Were correct preservatives used? (water only)	Yes
11	Were pH ranges acceptable? (voa's excluded)	Yes
12	Were VOA samples free of headspace (less than 6mm)?	NA

Microbac

Lab Report #: L16110420
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Samples Received

Client ID	Laboratory ID	Date Collected	Date Received
PW111-110716	L16110420-01	11/07/2016 09:00	11/08/2016 11:16
PW112-110716	L16110420-02	11/07/2016 10:20	11/08/2016 11:16
PW112MS-110716	L16110420-03	11/07/2016 10:20	11/08/2016 11:16
PW112MSD-110716	L16110420-04	11/07/2016 10:20	11/08/2016 11:16
PW110-110716	L16110420-05	11/07/2016 11:35	11/08/2016 11:16
PW110FD-110716	L16110420-06	11/07/2016 11:35	11/08/2016 11:16

Microbac REPORT L16110420
PREPARED FOR AECOM Technical Services, Inc.
WORK ID:

1.0 Summary Data 5
1.1 Narratives 6
1.2 Certificate of Analysis 13
2.0 Full Sample Data Package 21
2.1 General Chromatography Data 22
2.1.1 6850 LC/MS Data 23
2.1.1.1 Summary Data 24
2.1.1.2 QC Summary Data 32
2.1.1.3 Sample Data 93
2.1.1.4 Standards Data 106
2.1.1.5 Raw QC Data 153
3.0 Attachments 158

1.0 Summary Data

1.1 Narratives

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L16110420
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG591037	**Reviewer Name:**	Eric Lawson
LRC Date:	2016-11-16 00:00:00		

Laboratory Data Package Cover Page

	R1	Field chain-of-custody documentation;
	R2	Sample identification cross-reference;
	R3	Test reports (analytical data sheets) for each environmental sample that includes: (a) Items consistent with NELAC Chapter 5, (b) dilution factors, (c) preparation methods, (d) cleanup methods, and (e) a.if required for the project, tentatively identified compounds (TICs).
	R4	Surrogate recovery data including: (a) Calculated recovery (%R), and (b) the laboratory's surrogate QC limits.
	R5	Test reports/summary forms for blank samples;
	R6	Test reports/summary forms for laboratory control samples (LCSs) including: (a) LCS spiking amounts, (b) calculated %R for each analyte, and (c) the laboratory's LCS QC limits.
	R7	Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including: (a) samples associated with the MS/MSD clearly identified, (b) MS/MSD spiking compounds, (c) concentration of each MS/MSD analyte measured in the parent and spiked samples, (d) calculated %Rs and relative percent differences (RPDs), and (e) the laboratory's MS/MSD QC limits.
	R8	Laboratory analytical duplicate (if applicable) recovery and precision: (a) the amount of analyte measured in the duplicate, (b) the calculated RPD, and (c) the laboratory's QC limits for analytical duplicates.
	R9	List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
	R10	Other problems or anomalies.

Name (Printed)	Signature	Official Title (Printed)	Date
Eric Lawson		Chemist III	2016-11-16 19:14:24

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L16110420
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG591037	**Reviewer Name:**	Eric Lawson
LRC Date:	2016-11-16 00:00:00		

Description	Yes	No	NA	NR	ER#
Chain-of-custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
Were all departures from standard conditions described in an exception report?	X				
Sample and quality control (QC) identification	X				
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
Test reports					
Were all samples prepared and analyzed within holding times?	X				
Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
Were calculations checked by a peer or supervisor?	X				
Were all analyte identifications checked by a peer or supervisor?	X				
Were sample detection limits reported for all analytes not detected?	X				
Were all results for soil and sediment samples reported on a dry weight basis?			X		
Were % moisture (or solids) reported for all soil and sediment samples?			X		
Were bulk soils/solids samples for volatile analysis extracted with methanol per SW846 Method 5035?			X		
If required for the project, are TICs reported?			X		
Surrogate recovery data					
Were surrogates added prior to extraction?			X		
Were surrogate percent recoveries in all samples within the laboratory QC limits?			X		
Test reports/summary forms for blank samples	X				
Were appropriate type(s) of blanks analyzed?	X				
Were blanks analyzed at the appropriate frequency?	X				
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
Were blank concentrations < MQL?	X				
Laboratory control samples (LCS):					
Were all COCs included in the LCS?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L16110420
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG591037	**Reviewer Name:**	Eric Lawson
LRC Date:	2016-11-16 00:00:00		

Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
Were LCSs analyzed at the required frequency?	X				
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
Does the detectability check sample data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
Was the LCSD RPD within QC limits?			X		
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?	X				
Were MS/MSD analyzed at the appropriate frequency?	X				
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	X				
Were MS/MSD RPDs within laboratory QC limits?	X				
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?			X		
Were analytical duplicates analyzed at the appropriate frequency?			X		
Were RPDs or relative standard deviations within the laboratory QC limits?			X		
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?	X				
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
Was applicable and available technology used to lower the SDL to minimize the matrix interference effects on the sample results?	X				
Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	X				
Initial calibration (ICAL)					
Were response factors and/or relative response factors for each analyte within QC limits?	X				
Were percent RSDs or correlation coefficient criteria met?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L16110420
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG591037	**Reviewer Name:**	Eric Lawson
LRC Date:	2016-11-16 00:00:00		

Was the number of standards recommended in the method used for all analytes?	X				
Were all points generated between the lowest and highest standard used to calculate the curve?	X				
Are ICAL data available for all instruments used?	X				
Has the initial calibration curve been verified using an appropriate second source standard?	X				
Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?	X				
Were percent differences for each analyte within the method-required QC limits?	X				
Was the ICAL curve verified for each analyte?	X				
Was the absolute value of the analyte concentration in the inorganic CCB < MDL?			X		
Mass spectral tuning					
Was the appropriate compound for the method used for tuning?	X				
Were ion abundance data within the method-required QC limits?	X				
Internal standards (IS)					
Were IS area counts and retention times within the method-required QC limits?	X				
Raw data (NELAC Section 5.5.10)					
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
Were data associated with manual integrations flagged on the raw data?	X				
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			X		
Tentatively identified compounds (TICs)					
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
Interference Check Sample (ICS) results					
Were percent recoveries within method QC limits?			X		
Serial dilutions, post digestion spikes, and method of standard additions					
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
Method detection limit (MDL) studies					

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L16110420
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG591037	**Reviewer Name:**	Eric Lawson
LRC Date:	2016-11-16 00:00:00		

Was a MDL study performed for each reported analyte?	X				
Is the MDL either adjusted or supported by the analysis of DCSs?	X				
Proficiency test reports					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?	X				
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5?	X				
Is documentation of the analyst's competency up-to-date and on file?	X				
Verification/validation documentation for methods (NELAC Chapter 5)					
Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
Laboratory standard operating procedures (SOPs)					
Are laboratory SOPs current and on file for each method performed	X				

1. Items identified by the letter “R” must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter “S” should be retained and made available upon request for the appropriate retention period;

2. O = organic analyses; I = inorganic analyses (and general chemistry, when applicable);

3. NA = Not applicable;

4. NR = Not reviewed;

5. ER# = Exception Report identification number (an Exception Report should be completed for an item if “NR” or “No” is checked).

The Exception Report for each “No” or “Not Reviewed (NR)” item in Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L16110420
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG591037	**Reviewer Name:**	Eric Lawson
LRC Date:	2016-11-16 00:00:00		

below, I affirm to the best of my knowledge all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [ ] This laboratory meets an exception under 30 TAC §25.6 and was last inspection by [ ] TCEQ or [ ] _____ on **(enter date of last inspection**). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Exceptions Report

There are no exceptions.

1.2 Certificate of Analysis

Microbac

Lab Report #: L16110420
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L16110420-01	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	PW111-110716	**Prep Method:**	6850	**Prep Date:**	11/10/2016 10:30
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	05/03/2016 17:18
Workgroup #:	WG591037	**Analyst:**	JWR	**Run Date:**	11/10/2016 17:36
Collect Date:	11/07/2016 09:00	**Dilution:**	1	**File ID:**	1LM.LM37596
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.200	U	0.400	0.200	0.100

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L16110420
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L16110420-02	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	PW112-110716	**Prep Method:**	6850	**Prep Date:**	11/10/2016 10:30
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	05/03/2016 17:18
Workgroup #:	WG591037	**Analyst:**	JWR	**Run Date:**	11/10/2016 19:30
Collect Date:	11/07/2016 10:20	**Dilution:**	1	**File ID:**	1LM.LM37602
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.200	U	0.400	0.200	0.100

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L16110420
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L16110420-03	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	PW112MS-110716	**Prep Method:**	6850	**Prep Date:**	11/10/2016 10:30
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	05/03/2016 17:18
Workgroup #:	WG591037	**Analyst:**	JWR	**Run Date:**	11/10/2016 19:49
Collect Date:	11/07/2016 10:20	**Dilution:**	1	**File ID:**	1LM.LM37603
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.180	J	0.400	0.200	0.100

J	Estimated value ; the analyte concentration was less than the LOQ.

Microbac

Lab Report #: L16110420
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L16110420-04	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	PW112MSD-110716	**Prep Method:**	6850	**Prep Date:**	11/10/2016 10:30
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	05/03/2016 17:18
Workgroup #:	WG591037	**Analyst:**	JWR	**Run Date:**	11/10/2016 20:07
Collect Date:	11/07/2016 10:20	**Dilution:**	1	**File ID:**	1LM.LM37604
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.186	J	0.400	0.200	0.100

J	Estimated value ; the analyte concentration was less than the LOQ.

Microbac

Lab Report #: L16110420
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L16110420-05	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	PW110-110716	**Prep Method:**	6850	**Prep Date:**	11/10/2016 10:30
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	05/03/2016 17:18
Workgroup #:	WG591037	**Analyst:**	JWR	**Run Date:**	11/10/2016 17:55
Collect Date:	11/07/2016 11:35	**Dilution:**	1	**File ID:**	1LM.LM37597
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.200	U	0.400	0.200	0.100

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L16110420
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L16110420-06	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	PW110FD-110716	**Prep Method:**	6850	**Prep Date:**	11/10/2016 10:30
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	05/03/2016 17:18
Workgroup #:	WG591037	**Analyst:**	JWR	**Run Date:**	11/10/2016 18:14
Collect Date:	11/07/2016 11:35	**Dilution:**	1	**File ID:**	1LM.LM37598
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.200	U	0.400	0.200	0.100

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L16110420
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

2.0 Full Sample Data Package

2.1 General Chromatography Data

2.1.1 6850 LC/MS Data

2.1.1.1 Summary Data

Microbac

Lab Report #: L16110420
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L16110420-01	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	PW111-110716	**Prep Method:**	6850	**Prep Date:**	11/10/2016 10:30
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	05/03/2016 17:18
Workgroup #:	WG591037	**Analyst:**	JWR	**Run Date:**	11/10/2016 17:36
Collect Date:	11/07/2016 09:00	**Dilution:**	1	**File ID:**	1LM.LM37596
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.200	U	0.400	0.200	0.100

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L16110420
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L16110420-02	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	PW112-110716	**Prep Method:**	6850	**Prep Date:**	11/10/2016 10:30
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	05/03/2016 17:18
Workgroup #:	WG591037	**Analyst:**	JWR	**Run Date:**	11/10/2016 19:30
Collect Date:	11/07/2016 10:20	**Dilution:**	1	**File ID:**	1LM.LM37602
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.200	U	0.400	0.200	0.100

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L16110420
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L16110420-03	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	PW112MS-110716	**Prep Method:**	6850	**Prep Date:**	11/10/2016 10:30
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	05/03/2016 17:18
Workgroup #:	WG591037	**Analyst:**	JWR	**Run Date:**	11/10/2016 19:49
Collect Date:	11/07/2016 10:20	**Dilution:**	1	**File ID:**	1LM.LM37603
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.180	J	0.400	0.200	0.100

J	Estimated value ; the analyte concentration was less than the LOQ.

Microbac

Lab Report #: L16110420
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L16110420-04	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	PW112MSD-110716	**Prep Method:**	6850	**Prep Date:**	11/10/2016 10:30
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	05/03/2016 17:18
Workgroup #:	WG591037	**Analyst:**	JWR	**Run Date:**	11/10/2016 20:07
Collect Date:	11/07/2016 10:20	**Dilution:**	1	**File ID:**	1LM.LM37604
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.186	J	0.400	0.200	0.100

J	Estimated value ; the analyte concentration was less than the LOQ.

Microbac

Lab Report #: L16110420
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L16110420-05	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	PW110-110716	**Prep Method:**	6850	**Prep Date:**	11/10/2016 10:30
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	05/03/2016 17:18
Workgroup #:	WG591037	**Analyst:**	JWR	**Run Date:**	11/10/2016 17:55
Collect Date:	11/07/2016 11:35	**Dilution:**	1	**File ID:**	1LM.LM37597
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.200	U	0.400	0.200	0.100

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L16110420
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L16110420-06	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	PW110FD-110716	**Prep Method:**	6850	**Prep Date:**	11/10/2016 10:30
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	05/03/2016 17:18
Workgroup #:	WG591037	**Analyst:**	JWR	**Run Date:**	11/10/2016 18:14
Collect Date:	11/07/2016 11:35	**Dilution:**	1	**File ID:**	1LM.LM37598
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.200	U	0.400	0.200	0.100

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L16110420
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

2.1.1.2 QC Summary Data

Example Calculation 6850 - Perchlorate

Concentration from Linear Regression

Step 1: Retrieve Curve Data From Plot, y = mx + b

y = response ratio = response of analyte / response of internal standard (IS) = Rx/Ristd

x = amount ratio = concentration analyte/concentration internal standard (IS) = Cx / Cistd

m = slope from curve (1.45)

b = intercept from curve (-0.00242)

y = 1.45x + -0.00242

Step 2: Substitute the value for y

where y = 12600/226000 = 0.055752

Step 3: Solve for x

x = (y - b)/m = 0.0040119

Step 4: Solve for analyte concentration Cx

Cx = (Cis)(x) = (5 ug/L)(0.040119) = 0.200594 ug/L

Example Calculation - Water:

Slope from curve, m:	1.45
Intercept from curve, b:	-0.00242
Response of analyte, Rx:	12600
Response of Internal Standard , Ristd:	226000
Concentration of IS, Cistd (ug/L):	5.00
Response Ratio:	0.05575
Amount Ratio:	0.04012
Analyte Concentration, Cx (ug/L) :	0.200594

Example Calculation - Soil:

Analyte Concentration, Cx (ug/L):	0.20059
Amount of soil extracted (g):	5.00
Final volume of extract (mL):	50.00
Percent solids (Pct wt.)	100
Concentration in soil (ug/kg):	2.005938

Perchlorate Conductivity Check
(perchlorate1)

Conductivity Probe Calibration Check: 1402 /1410 µs/cm

Working MCT Level: 10,000 µs/cm

Sample	Conductivity (µs/cm)	Pretreatment or Dilution Needed
MCT	10,010.	
Blank	0.36	
LCS	0.48	
L16110321-01	2,770.	
-02	1,311.	
-03	1,309.	
-04 RS	1,549.	
-05 MS	1,563.	
-06 MSD	1,561.	
-07	8,800.	
-08	1,976.	
-09	3,670.	
-10	1,115.	
-11	2,680.	
L16110420-01	1,997.	
-02 RS	5,970.	
-03 MS	6,020.	
-04 MSD	6,040.	
-05	6,540.	
-06	6,530.	
L16110421-01	2,360.	

Analyst: John Richards

Date/Time: 11/10/16 / 1400

DCN#122114

Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 050316_JWR.TXT
Analyst1: JWR Analyst2: NA
Method: 6850 SOP: HPLC06 Rev: 8

Maintenance Log ID: Syringe Filter Lot#: 151125254
Eluent ID#:

Workgroups: Column 1 ID: KP-RPPX250 Column 2 ID: NA
Analytical WG567013 (soils)

Internal STD: COA18071 Surrogate STD: NA Calibration STD STD75510 (05/03/2016)
CCV STD: STD75510 LCS STD: STD75512 MS/MSD STD: STD75512

Comments: ICAL WG567320 : Alternate Source STD75512
Analytical Column : RPPX 5um (250x4.6mm)
K'Prime S/N RPPX250-02115

Samples L16041363(-05 and -10) were analyzed at dilutions based on their pre-run screen results.

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	1LM.LM34686	WG567320-01 CCB	1	1		05/03/16 15:06
2	1LM.LM34687	WG567320-02 STD (0.1 ug/L)	1	1	STD75510	05/03/16 15:25
3	1LM.LM34688	WG567320-03 STD (0.2 ug/L)	1	1	STD75510	05/03/16 15:43
4	1LM.LM34689	WG567320-04 STD (0.5 ug/L)	1	1	STD75510	05/03/16 16:02
5	1LM.LM34690	WG567320-05 STD (1.0 ug/L)	1	1	STD75510	05/03/16 16:21
6	1LM.LM34691	WG567320-06 STD (2.0 ug/L)	1	1	STD75510	05/03/16 16:40
7	1LM.LM34692	WG567320-07 STD (5.0 ug/L)	1	1	STD75510	05/03/16 16:59
8	1LM.LM34693	WG567320-08 STD (10 ug/L)	1	1	STD75510	05/03/16 17:18
9	1LM.LM34694	WG567320-09 SSCV (1.0 ug/L)	1	1	STD75512	05/03/16 17:37
10	1LM.LM34695	WG567321-01 CCB	1	1		05/03/16 17:56
11	1LM.LM34696	WG567321-02 CCV (1.0ug/L)	1	1	STD75510	05/03/16 18:15
12	1LM.LM34697	WG567013-07 MRL (2.0ug/kg)	7	1	STD75510	05/03/16 18:34
13	1LM.LM34698	WG567013-01 MCT (2.0ug/kg)	7	1	STD75512	05/03/16 18:53
14	1LM.LM34699	WG567013-02 BLANK	7	1		05/03/16 19:12
15	1LM.LM34700	WG567013-03 LCS (2.0ug/kg)	7	1	STD75512	05/03/16 19:31
16	1LM.LM34701	L16041363-07 RS	7	1		05/03/16 19:50
17	1LM.LM34702	L16041363-08 MS	7	1	STD75512	05/03/16 20:09
18	1LM.LM34703	L16041363-09 MSD	7	1	STD75512	05/03/16 20:28
19	1LM.LM34704	L16041363-01	7	1		05/03/16 20:46
20	1LM.LM34705	L16041363-02	7	1		05/03/16 21:05
21	1LM.LM34706	L16041363-03	7	1		05/03/16 21:24
22	1LM.LM34707	L16041363-04	7	1		05/03/16 21:43
23	1LM.LM34708	WG567321-03 CCV (1.0ug/L)	1	1	STD75510	05/03/16 22:02
24	1LM.LM34709	WG567013-08 MRL (2.0ug/kg)	7	1	STD75510	05/03/16 22:21
25	1LM.LM34710	WG567321-04 CCB	1	1		05/03/16 22:40
26	1LM.LM34711	L16041363-05 (5x)	7	5		05/03/16 22:59
27	1LM.LM34712	L16041363-06	7	1		05/03/16 23:18
28	1LM.LM34713	L16041363-10 (5x)	7	5		05/03/16 23:37
29	1LM.LM34714	WG567321-05 CCV (1.0ug/L)	1	1	STD75510	05/03/16 23:56
30	1LM.LM34715	WG567013-09 MRL (2.0ug/kg)	7	1	STD75510	05/04/16 00:15
31	1LM.LM34716	WG567321-06 CCB	1	1		05/04/16 00:34

Comments

Page: 1 Approved: 05-MAY-16

Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 050316_JWR.TXT

Analyst1: JWR Analyst2: NA

Method: 6850 SOP: HPLC06 Rev: 8

Maintenance Log ID: Syringe Filter Lot#: 151125254

Eluent ID#:

Workgroups: Column 1 ID: KP-RPPX250 Column 2 ID: NA

Analytical WG567013 (soils)

Internal STD: COA18071 Surrogate STD: NA STD75510 (05/03/2016)

CCV STD: STD75510 LCS STD: STD75512 STD75512

Comments

Seq.	Rerun	Dil.	Reason	Analytes
17				
	L16041363-08 MS : The MS %Rec is 129%. This is above the advisory limit of 120%. The parent sample to this MS had responses that passed the ion-ratio criteria, but had a quantified value below the method's detection limit, resulting in an assigned value of zero. If the quantified value for the parent sample were used in the %Rec calculation, the MS %Rec would be 93.9%.			
18				
	L16041363-09 MSD : The MSD %Rec is 131%. This is above the advisory limit of 120%. The parent sample to this MSD had responses that passed the ion-ratio criteria, but had a quantified value below the method's detection limit, resulting in an assigned value of zero. If the quantified value for the parent sample were used in the %Rec calculation, the MSD %Rec would be 95.4%.			

Page: 2 Approved: 05-MAY-16

Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 111016_JWR.TXT
Analyst1: JWR Analyst2: NA
Method: 6850 SOP: HPLC06 Rev: 8

Maintenance Log ID: Syringe Filter Lot#: 160109254
Eluent ID#:

Workgroups: Column 1 ID: KP-RPPX250 Column 2 ID: NA
Analytical WG591037 (waters)

Internal STD: STD18071 Surrogate STD: NA Calibration STD STD75510 (05/03/2016)
CCV STD: STD78249 LCS STD: STD78251 MS/MSD STD: STD78251

Comments: Sample L16110421-01 was analyzed at a dilution based on its historical results.

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	1LM.LM37574	WG591040-01 CCB	1	1		11/10/16 10:39
2	1LM.LM37575	WG591040-02 CCV (1.0ug/L)	1	1	STD78249	11/10/16 10:58
3	1LM.LM37576	WG591037-10 MRL (0.2ug/L)	1	1	STD78249	11/10/16 11:17
4	1LM.LM37577	WG591037-01 MCT (0.2ug/L)	1	1	STD78251	11/10/16 11:36
5	1LM.LM37578	WG591037-02 BLANK	1	1		11/10/16 11:55
6	1LM.LM37579	WG591037-03 LCS (0.2ug/L)	1	1	STD78251	11/10/16 12:14
7	1LM.LM37580	L16110321-04 RS	1	1		11/10/16 12:33
8	1LM.LM37581	L16110321-05 MS	1	1	STD78251	11/10/16 12:52
9	1LM.LM37582	L16110321-06 MSD	1	1	STD78251	11/10/16 13:11
10	1LM.LM37583	L16110321-01	1	1		11/10/16 13:30
11	1LM.LM37584	L16110321-02	1	1		11/10/16 13:49
12	1LM.LM37585	L16110321-03	1	1		11/10/16 14:08
13	1LM.LM37586	L16110321-07	1	1		11/10/16 14:27
14	1LM.LM37587	WG591040-03 CCV (1.0ug/L)	1	1	STD78249	11/10/16 14:46
15	1LM.LM37588	WG591037-11 MRL (0.2ug/L)	1	1	STD78249	11/10/16 15:04
16	1LM.LM37589	WG591040-04 CCB	1	1		11/10/16 15:23
17	1LM.LM37590	L16110321-08	1	1		11/10/16 15:42
18	1LM.LM37591	L16110321-08 10x (NR)	1	10		11/10/16 16:01
19	1LM.LM37592	L16110321-09	1	1		11/10/16 16:20
20	1LM.LM37593	L16110321-10	1	1		11/10/16 16:39
21	1LM.LM37594	L16110321-11	1	1		11/10/16 16:58
22	1LM.LM37595	L16110421-01 (10,000x)	1	10000		11/10/16 17:17
23	1LM.LM37596	L16110420-01	1	1		11/10/16 17:36
24	1LM.LM37597	L16110420-05	1	1		11/10/16 17:55
25	1LM.LM37598	L16110420-06	1	1		11/10/16 18:14
26	1LM.LM37599	WG591040-05 CCV (1.0ug/L)	1	1	STD78249	11/10/16 18:33
27	1LM.LM37600	WG591037-12 MRL (0.2ug/L)	1	1	STD78249	11/10/16 18:52
28	1LM.LM37601	WG591040-06 CCB	1	1		11/10/16 19:11
29	1LM.LM37602	L16110420-02 RS	1	1		11/10/16 19:30
30	1LM.LM37603	L16110420-03 MS	1	1	STD78251	11/10/16 19:49
31	1LM.LM37604	L16110420-04 MSD	1	1	STD78251	11/10/16 20:07
32	1LM.LM37605	WG591040-07 CCV (1.0ug/L)	1	1	STD78249	11/10/16 20:26
33	1LM.LM37606	WG591037-13 MRL (0.2ug/L)	1	1	STD78249	11/10/16 20:45

Page: 1 Approved: 11-NOV-16



Microbac

Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 111016_JWR.TXT

Analyst1: JWR Analyst2: NA

Method: 6850 SOP: HPLC06 Rev: 8

Maintenance Log ID: Syringe Filter Lot#: 160109254

Eluent ID#:

Column 1 ID: KP-RPPX250 Column 2 ID: NA

Workgroups: Analytical WG591037 (waters)

Internal STD: STD18071 Surrogate STD: NA STD75510 (05/03/2016)

CCV STD: STD78249 LCS STD: STD78251 STD78251

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
34	1LM.LM37607	WG591040-08 CCB	1	1		11/10/16 21:04

Comments

Seq.	Rerun	Dil.	Reason	Analytes
18			Analyzed too dilute	
	L16110321-08 10x (NR) : The results for this sample dilution are not needed.			

Page: 2 Approved: 11-NOV-16

Microbac Laboratories Inc.

Data Checklist

Date: 03-MAY-2016
Analyst: JWR
Analyst: NA
Method: 6850
Instrument: LCMS1
Curve Workgroup: WG567320
Runlog ID: 74891
Analytical Workgroups: L16041363 (SOILS)

ANALYTICAL	
System Performance Check	NA
DFTPP (GCMS)	NA
Endrin/DDT breakdown (8081/GCMS)	NA
Pentachlorophenol/benzidine tailing (GCMS)	NA
Eluent check (IC)/system pressure (HPLC)	NA
Window standard (FID)	NA
Initial Calibration	X
Average RF	NA
Linear regression or higher order curve	X
Alternate source standard (ICV) % Difference	X
Continuing Calibration (CCV)	X
% D/% Drift	X
Minimum response factors (GCMS)	X
Continuing calibration blank (CCB) (IC/LCMS)	X
Limit of quantitation verification (LOQV) (LCMS)	X
Special standards	NA
Blanks	X
TCL hits	ND
Surrogate recoveries	NA
LCS/LCSD (Laboratory Control Sample)	X
Recoveries	X
Surrogate recoveries	NA
MS/MSD/Sample duplicates	X
Recoveries	X
%RPD	X
Interference check sample (ICS) (LCMS)	MCT
Samples	X
TCL hits	X
Mass spectra (MS/HPLC)/2nd column confirmations (ECD/FID/HPLC)	NA
Surrogate recoveries	NA
Internal standard areas (MS)	X
Library searches (GCMS)	NA
Calculations & correct factors	X
Compounds above calibration range	NA
Reruns	NA
Manual integrations	NA
Project/client specific requirements	X
REPORTING	
Upload batch form	X
KOBRA workgroup data/forms/bench sheets	X
Case narratives	
Check for completeness	X
Primary Reviewer	JWR
SUPERVISORY/SECONDARY REVIEW	
Check for compliance with method and project specific requirements	X
Check the completeness/accuracy of reported information	X
Data qualifiers	X
Secondary Reviewer	WTD

Primary Reviewer:
04-MAY-2016

John Richards

Secondary Reviewer:
05-MAY-2016

Wade D

CHECKLIST1 - Modified 03/05/2008
Generated: MAY-05-2016 16:23:46

Microbac Laboratories Inc.

Data Checklist

Date: 10-NOV-2016
Analyst: JWR
Analyst: NA
Method: 6850
Instrument: LCMS1
Curve Workgroup: NA
Runlog ID: 78656
Analytical Workgroups: L16110321, L16110420, L16110421

ANALYTICAL	
System Performance Check	NA
DFTPP (GCMS)	NA
Endrin/DDT breakdown (8081/GCMS)	NA
Pentachlorophenol/benzidine tailing (GCMS)	NA
Eluent check (IC)/system pressure (HPLC)	NA
Window standard (FID)	NA
Initial Calibration	NA
Average RF	NA
Linear regression or higher order curve	NA
Alternate source standard (ICV) % Difference	NA
Continuing Calibration (CCV)	X
% D/% Drift	X
Minimum response factors (GCMS)	X
Continuing calibration blank (CCB) (IC/LCMS)	X
Limit of quantitation verification (LOQV) (LCMS)	X
Special standards	NA
Blanks	X
TCL hits	ND
Surrogate recoveries	NA
LCS/LCSD (Laboratory Control Sample)	X
Recoveries	X
Surrogate recoveries	NA
MS/MSD/Sample duplicates	X
Recoveries	X
%RPD	X
Interference check sample (ICS) (LCMS)	MCT
Samples	X
TCL hits	X
Mass spectra (MS/HPLC)/2nd column confirmations (ECD/FID/HPLC)	NA
Surrogate recoveries	NA
Internal standard areas (MS)	X
Library searches (GCMS)	NA
Calculations & correct factors	X
Compounds above calibration range	NA
Reruns	NA
Manual integrations	NA
Project/client specific requirements	X
REPORTING	
Upload batch form	X
KOBRA workgroup data/forms/bench sheets	X
Case narratives	
Check for completeness	X
Primary Reviewer	JWR
SUPERVISORY/SECONDARY REVIEW	
Check for compliance with method and project specific requirements	X
Check the completeness/accuracy of reported information	X
Data qualifiers	X
Secondary Reviewer	ECL

Primary Reviewer:
11-NOV-2016

John Richards

Secondary Reviewer:
11-NOV-2016

Eric C. Zimmerman

CHECKLIST1 - Modified 03/05/2008
Generated: NOV-11-2016 16:20:24

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 6850 AAB#: WG591037

Login Number: L16110420

Client ID	ID	Date Collected	TCLP Date	Time Held	Max Hold	Q	Extract Date	Time Held	Max Hold	Q	Run Date	Time Held	Max Hold	Q
PW111-110716	01	11/07/16					11/10/2016	3.1	28		11/10/16	.3	28	
PW112-110716	02	11/07/16					11/10/2016	3	28		11/10/16	.4	28	
PW112MS-110716	03	11/07/16					11/10/2016	3	28		11/10/16	.4	28	
PW112MSD-110716	04	11/07/16					11/10/2016	3	28		11/10/16	.4	28	
PW110-110716	05	11/07/16					11/10/2016	3	28		11/10/16	.3	28	
PW110FD-110716	06	11/07/16					11/10/2016	3	28		11/10/16	.3	28	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5019470
Report generated 11/16/2016 08:15

METHOD BLANK SUMMARY

Login Number: L16110420
Work Group: WG591037
Blank File ID: 1LM.LM37578
Blank Sample ID: WG591037-02
Prep Date: 11/10/16 10:30
Instrument ID: LCMS1
Analyzed Date: 11/10/16 11:55
Method: 6850
Analyst: JWR

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
QCMRL	WG591037-10	1LM.LM37576	11/10/16 11:17	01
MCT	WG591037-01	1LM.LM37577	11/10/16 11:36	01
LCS	WG591037-03	1LM.LM37579	11/10/16 12:14	01
QCMRL	WG591037-11	1LM.LM37588	11/10/16 15:04	01
PW111-110716	L16110420-01	1LM.LM37596	11/10/16 17:36	01
PW110-110716	L16110420-05	1LM.LM37597	11/10/16 17:55	01
PW110FD-110716	L16110420-06	1LM.LM37598	11/10/16 18:14	01
QCMRL	WG591037-12	1LM.LM37600	11/10/16 18:52	01
PW112-110716	L16110420-02	1LM.LM37602	11/10/16 19:30	01
PW112MS-110716	L16110420-03	1LM.LM37603	11/10/16 19:49	01
PW112MSD-110716	L16110420-04	1LM.LM37604	11/10/16 20:07	01
QCMRL	WG591037-13	1LM.LM37606	11/10/16 20:45	01

Report Name: BLANK_SUMMARY
PDF File ID: 5019471
Report generated 11/16/2016 08:15

Microbac Laboratories Inc.
METHOD BLANK REPORT

Login Number: L16110420 Prep Date: 11/10/16 10:30 Sample ID: WG591037-02
Instrument ID: LCMS1 Run Date: 11/10/16 11:55 Prep Method: 6850
File ID: 1LM.LM37578 Analyst: JWR Method: 6850
Workgroup (AAB#): WG591037 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-03-MAY-16

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
Perchlorate	0.100	0.400	0.100	1	U

DL Method Detection Limit
LOQ Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > 1/2 RL

Report Name:BLANK
PDF ID: 5019472
16-NOV-2016 08:15

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L16110420 **Run Date:** 11/10/2016 **Sample ID:** WG591037-03
Instrument ID: LCMS1 **Run Time:** 12:14 **Prep Method:** 6850
File ID: 1LM.LM37579 **Analyst:** JWR **Method:** 6850
Workgroup (AAB#): WG591037 **Matrix:** Water **Units:** ug/L
QC Key: DOD4 **Lot#:** STD78251 **Cal ID:** LCMS1-03-MAY-16

Analytes	Expected	Found	% Rec	LCS Limits	Q
Perchlorate	0.200	0.192	96.0	80 - 120	

LCS - Modified 03/06/2008
PDF File ID: 5019473
Report generated: 11/16/2016 08:15

Microbac Laboratories Inc.

MS/MSD REPORT

Loginnum:L16110420 Cal ID:LCMS1- 03-MAY-16 Worknum:WG591037

Instrument ID:LCMS1 Contract #: Prep Method:6850

Parent ID:L16110420-02 File ID:1LM.LM37602 Dil:1 Method:6850

Sample ID:L16110420-03 MS File ID:1LM.LM37603 Dil:1 Matrix:Water

Sample ID:L16110420-04 MSD File ID:1LM.LM37604 Dil:1 Units:ug/L

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Perchlorate	U	0.200	0.180	90	0.200	0.186	93	3.28	80 - 120	15	

* FAILS %REC LIMIT

FAILS RPD LIMIT

MS_MSD - Modified 03/06/2008

PDF File ID: 5019474

Report generated 11/16/2016 08:15

Microbac Laboratories Inc.
INITIAL CALIBRATION SUMMARY

Login Number: L16110420
Analytical Method: 6850
ICAL Workgroup: WG567320

Instrument ID: LCMS1
Initial Calibration Date: 03-MAY-16 17:18
Column ID: F

Analyte		AVG RF	% RSD	LINEAR (R)	QUAD (R^2)
Perchlorate		1.699	4.81	1.00000	

R = Correlation coefficient; 0.995 minimum
R^2 = Coefficient of determination; 0.99 minimum

INT_CAL - Modified 03/06/2008
PDF File ID: 5025173
Report generated 11/16/2016 08:15

Login Number: L16110420
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 03-MAY-16 17:18
Column ID: F

Analyte	WG567320-02			WG567320-03			WG567320-04		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Perchlorate	0.100	17900.0000	1.792	0.200	34100.0000	1.718	0.500	82200.0000	1.637

INT_CAL - Modified 03/06/2008
PDF File ID: 5025173
Report generated 11/16/2016 08:15

Login Number: L16110420
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 03-MAY-16 17:18
Column ID: F

Analyte	WG567320-05			WG567320-06			WG567320-07		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Perchlorate	1.00	168000.000	1.697	2.00	330000.000	1.672	5.00	810000.000	1.695

INT_CAL - Modified 03/06/2008
PDF File ID: 5025173
Report generated 11/16/2016 08:15

Login Number: L16110420
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 03-MAY-16 17:18
Column ID: F

Analyte	WG567320-08		
	CONC	RESP	RF
Perchlorate	10.0	1530000.00	1.680

INT_CAL - Modified 03/06/2008
PDF File ID: 5025173
Report generated 11/16/2016 08:15

Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L16110420 Run Date: 05/03/2016 Sample ID: WG567320-09
Instrument ID: LCMS1 Run Time: 17:37 Method: 6850
File ID: 1LM.LM34694 Analyst: JWR QC Key: DOD4
ICal Workgroup: WG567320 Cal ID: LCMS1 - 03-MAY-16

Analyte		Expected	Found	Units	RF	%D	UCL	Q
Perchlorate		1.00	0.985	ug/L	1.66	1.50	15	

* Exceeds %D Limit

ALT - Modified 09/06/2007
Version 1.5 PDF File ID: 5025174
Report generated 11/16/2016 08:15

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L16110420 | Run Date: 11/10/2016 | Sample ID: WG591040-01
Instrument ID: LCMS1 | Run Time: 10:39 | Method: 6850
File ID: 1LM.LM37574 | Analyst: JWR | Units: ug/L
Workgroup (AAB#): WG591037 | Cal ID: LCMS1 - 03-MAY-16
Matrix: WATER | QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Perchlorate	0.100	0.400	0.100	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 5019477
Report generated 11/16/2016 08:15

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L16110420	**Run Date:**	11/10/2016	**Sample ID:**	WG591040-04
Instrument ID:	LCMS1	**Run Time:**	15:23	**Method:**	6850
File ID:	1LM.LM37589	**Analyst:**	JWR	**Units:**	ug/L
Workgroup (AAB#):	WG591037	**Cal ID:**	LCMS1 - 03-MAY-16		
Matrix:	WATER	**QAPP:**	DOD4		

Analytes	MDL	RDL	Concentration	Qualifier
Perchlorate	0.100	0.400	0.100	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 5019477
Report generated 11/16/2016 08:15

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L16110420	**Run Date:**	11/10/2016	**Sample ID:**	WG591040-06
Instrument ID:	LCMS1	**Run Time:**	19:11	**Method:**	6850
File ID:	1LM.LM37601	**Analyst:**	JWR	**Units:**	ug/L
Workgroup (AAB#):	WG591037	**Cal ID:**	LCMS1 - 03-MAY-16		
Matrix:	WATER	**QAPP:**	DOD4		

Analytes	MDL	RDL	Concentration	Qualifier
Perchlorate	0.100	0.400	0.100	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 5019477
Report generated 11/16/2016 08:15

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number: L16110420 | Run Date: 11/10/2016 | Sample ID: WG591040-08
Instrument ID: LCMS1 | Run Time: 21:04 | Method: 6850
File ID: 1LM.LM37607 | Analyst: JWR | Units: ug/L
Workgroup (AAB#): WG591037 | Cal ID: LCMS1 - 03-MAY-16
Matrix: WATER | QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Perchlorate	0.100	0.400	0.100	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 5019477
Report generated 11/16/2016 08:15

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L16110420 Run Date: 11/10/2016 Sample ID: WG591040-02

Instrument ID: LCMS1 Run Time: 10:58 Method: 6850

File ID: 1LM.LM37575 Analyst: JWR QC Key: DOD4

Workgroup (AAB#): WG591037 Cal ID: LCMS1 - 03-MAY-16

Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	0.982	ug/L	1.66	1.80	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008

PDF File ID: 5019476

Report generated 11/16/2016 08:15

Login Number: L16110420 Run Date: 11/10/2016 Sample ID: WG591040-03
Instrument ID: LCMS1 Run Time: 14:46 Method: 6850
File ID: 1LM.LM37587 Analyst: JWR QC Key: DOD4
Workgroup (AAB#): WG591037 Cal ID: LCMS1 - 03-MAY-16
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	0.946	ug/L	1.60	5.40	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 5019476
Report generated 11/16/2016 08:15

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L16110420 Run Date: 11/10/2016 Sample ID: WG591040-05

Instrument ID: LCMS1 Run Time: 18:33 Method: 6850

File ID: 1LM.LM37599 Analyst: JWR QC Key: DOD4

Workgroup (AAB#): WG591037 Cal ID: LCMS1 - 03-MAY-16

Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	0.960	ug/L	1.62	4.00	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008

PDF File ID: 5019476

Report generated 11/16/2016 08:15

Login Number: L16110420 Run Date: 11/10/2016 Sample ID: WG591040-07
Instrument ID: LCMS1 Run Time: 20:26 Method: 6850
File ID: 1LM.LM37605 Analyst: JWR QC Key: DOD4
Workgroup (AAB#): WG591037 Cal ID: LCMS1 - 03-MAY-16
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	0.960	ug/L	1.62	4.00	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 5019476
Report generated 11/16/2016 08:15

Login Number: L16110420 Run Date: 11/10/2016 Sample ID: WG591037-10
Instrument ID: LCMS1 Run Time: 11:17 Prep Method: 6850
File ID: 1LM.LM37576 Analyst: JWR Method: 6850
Workgroup (AAB#): WG591037 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-03-MAY-16

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.199	99.5	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 5019475
Report generated 11/16/2016 08:15

Login Number: L16110420 Run Date: 11/10/2016 Sample ID: WG591037-11
Instrument ID: LCMS1 Run Time: 15:04 Prep Method: 6850
File ID: 1LM.LM37588 Analyst: JWR Method: 6850
Workgroup (AAB#): WG591037 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-03-MAY-16

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.202	101	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 5019475
Report generated 11/16/2016 08:15

Login Number: L16110420 Run Date: 11/10/2016 Sample ID: WG591037-12
Instrument ID: LCMS1 Run Time: 18:52 Prep Method: 6850
File ID: 1LM.LM37600 Analyst: JWR Method: 6850
Workgroup (AAB#): WG591037 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-03-MAY-16

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.205	103	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 5019475
Report generated 11/16/2016 08:15

Login Number: L16110420 Run Date: 11/10/2016 Sample ID: WG591037-13
Instrument ID: LCMS1 Run Time: 20:45 Prep Method: 6850
File ID: 1LM.LM37606 Analyst: JWR Method: 6850
Workgroup (AAB#): WG591037 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-03-MAY-16

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.201	101	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 5019475
Report generated 11/16/2016 08:15

Microbac Laboratories Inc.
INTERNAL STANDARD AREA SUMMARY
(COMPARED TO AVERAGE OF ICAL)

Login Number:L16110420
Instrument ID:LCMS1
Workgroup (AAB#):WG591037

ICAL CCV Number:WG567320-05
CAL ID: LCMS1-03-MAY-16
Matrix:WATER

Sample Number	Dilution	Tag	IS-1
WG567320	NA	NA	489000
Upper Limit	NA	NA	733500
Lower Limit	NA	NA	244500
L16110420-01	1.00	01	354000
L16110420-02	1.00	01	404000
L16110420-03	1.00	01	418000
L16110420-04	1.00	01	434000
L16110420-05	1.00	01	389000
L16110420-06	1.00	01	413000
WG591037-02	1.00	01	424000
WG591037-03	1.00	01	425000

IS-1 - O18LP

Underline = Response outside limits

INTERNAL_STD_AVG_ICAL - Modified 03/10/2010
PDF File ID: 5019478
Report generated 11/16/2016 08:15

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16110420	**Prep Method:**	6850	**Samplenum:**	L16110420-01
Instrument:	LCMS1	**Prep Date:**	11/10/2016 10:30	**File ID:**	1LM.LM37596
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG591037	**Analysis Date:**	11/10/2016 17:36	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	765	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16110420	**Prep Method:**	6850	**Samplenum:**	L16110420-02
Instrument:	LCMS1	**Prep Date:**	11/10/2016 10:30	**File ID:**	1LM.LM37602
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG591037	**Analysis Date:**	11/10/2016 19:30	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	683	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16110420	**Prep Method:**	6850	**Samplenum:**	L16110420-03
Instrument:	LCMS1	**Prep Date:**	11/10/2016 10:30	**File ID:**	1LM.LM37603
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG591037	**Analysis Date:**	11/10/2016 19:49	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	25800	8650	2.98	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16110420	**Prep Method:**	6850	**Samplenum:**	L16110420-04
Instrument:	LCMS1	**Prep Date:**	11/10/2016 10:30	**File ID:**	1LM.LM37604
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG591037	**Analysis Date:**	11/10/2016 20:07	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	27800	9140	3.04	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16110420	**Prep Method:**	6850	**Samplenum:**	L16110420-05
Instrument:	LCMS1	**Prep Date:**	11/10/2016 10:30	**File ID:**	1LM.LM37597
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG591037	**Analysis Date:**	11/10/2016 17:55	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	0.000	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16110420	**Prep Method:**	6850	**Samplenum:**	L16110420-06
Instrument:	LCMS1	**Prep Date:**	11/10/2016 10:30	**File ID:**	1LM.LM37598
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG591037	**Analysis Date:**	11/10/2016 18:14	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	0.000	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16110420	**Prep Method:**		**Samplenum:**	WG567320-02
Instrument:	LCMS1	**Prep Date:**	05/03/2016 15:25	**File ID:**	1LM.LM34687
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG591037	**Analysis Date:**	05/03/2016 15:25	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	17900	6950	2.58	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16110420	**Prep Method:**		**Samplenum:**	WG567320-03
Instrument:	LCMS1	**Prep Date:**	05/03/2016 15:43	**File ID:**	1LM.LM34688
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG591037	**Analysis Date:**	05/03/2016 15:43	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	34100	11900	2.87	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16110420	**Prep Method:**		**Samplenum:**	WG567320-04
Instrument:	LCMS1	**Prep Date:**	05/03/2016 16:02	**File ID:**	1LM.LM34689
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG591037	**Analysis Date:**	05/03/2016 16:02	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	82200	29400	2.80	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16110420	**Prep Method:**		**Samplenum:**	WG567320-05
Instrument:	LCMS1	**Prep Date:**	05/03/2016 16:21	**File ID:**	1LM.LM34690
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG591037	**Analysis Date:**	05/03/2016 16:21	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	168000	56600	2.97	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16110420	**Prep Method:**		**Samplenum:**	WG567320-06
Instrument:	LCMS1	**Prep Date:**	05/03/2016 16:40	**File ID:**	1LM.LM34691
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG591037	**Analysis Date:**	05/03/2016 16:40	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	330000	108000	3.06	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16110420	**Prep Method:**		**Samplenum:**	WG567320-07
Instrument:	LCMS1	**Prep Date:**	05/03/2016 16:59	**File ID:**	1LM.LM34692
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG591037	**Analysis Date:**	05/03/2016 16:59	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	810000	269000	3.01	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16110420	**Prep Method:**		**Samplenum:**	WG567320-08
Instrument:	LCMS1	**Prep Date:**	05/03/2016 17:18	**File ID:**	1LM.LM34693
Analyst:	WTD	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG591037	**Analysis Date:**	05/03/2016 17:18	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	1530000	512000	2.99	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16110420	**Prep Method:**		**Samplenum:**	WG567320-09
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM34694
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG591037	**Analysis Date:**	05/03/2016 17:37	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	169000	56300	3.00	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16110420	**Prep Method:**	6850	**Samplenum:**	WG591037-01
Instrument:	LCMS1	**Prep Date:**	11/10/2016 10:30	**File ID:**	1LM.LM37577
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG591037	**Analysis Date:**	11/10/2016 11:36	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	27900	8870	3.15	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16110420	**Prep Method:**	6850	**Samplenum:**	WG591037-02
Instrument:	LCMS1	**Prep Date:**	11/10/2016 10:30	**File ID:**	1LM.LM37578
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG591037	**Analysis Date:**	11/10/2016 11:55	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	0.000	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16110420	**Prep Method:**	6850	**Samplenum:**	WG591037-03
Instrument:	LCMS1	**Prep Date:**	11/10/2016 10:30	**File ID:**	1LM.LM37579
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG591037	**Analysis Date:**	11/10/2016 12:14	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	28000	9640	2.90	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16110420	**Prep Method:**	6850	**Samplenum:**	WG591037-10
Instrument:	LCMS1	**Prep Date:**	11/10/2016 10:30	**File ID:**	1LM.LM37576
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG591037	**Analysis Date:**	11/10/2016 11:17	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	27900	9610	2.90	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16110420	**Prep Method:**	6850	**Samplenum:**	WG591037-11
Instrument:	LCMS1	**Prep Date:**	11/10/2016 10:30	**File ID:**	1LM.LM37588
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG591037	**Analysis Date:**	11/10/2016 15:04	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	32800	11500	2.85	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16110420	**Prep Method:**	6850	**Samplenum:**	WG591037-12
Instrument:	LCMS1	**Prep Date:**	11/10/2016 10:30	**File ID:**	1LM.LM37600
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG591037	**Analysis Date:**	11/10/2016 18:52	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	34300	11900	2.88	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16110420	**Prep Method:**	6850	**Samplenum:**	WG591037-13
Instrument:	LCMS1	**Prep Date:**	11/10/2016 10:30	**File ID:**	1LM.LM37606
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG591037	**Analysis Date:**	11/10/2016 20:45	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	34400	11900	2.89	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16110420	**Prep Method:**		**Samplenum:**	WG591040-01
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM37574
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG591037	**Analysis Date:**	11/10/2016 10:39	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	0.000	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16110420	**Prep Method:**		**Samplenum:**	WG591040-02
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM37575
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG591037	**Analysis Date:**	11/10/2016 10:58	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	135000	46500	2.90	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16110420	**Prep Method:**		**Samplenum:**	WG591040-03
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM37587
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG591037	**Analysis Date:**	11/10/2016 14:46	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	147000	50300	2.92	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16110420	**Prep Method:**		**Samplenum:**	WG591040-04
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM37589
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG591037	**Analysis Date:**	11/10/2016 15:23	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	380	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16110420	**Prep Method:**		**Samplenum:**	WG591040-05
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM37599
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG591037	**Analysis Date:**	11/10/2016 18:33	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	152000	50800	2.99	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16110420	**Prep Method:**		**Samplenum:**	WG591040-06
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM37601
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG591037	**Analysis Date:**	11/10/2016 19:11	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	0.000	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16110420	**Prep Method:**		**Samplenum:**	WG591040-07
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM37605
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG591037	**Analysis Date:**	11/10/2016 20:26	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	155000	52400	2.96	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16110420	**Prep Method:**		**Samplenum:**	WG591040-08
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM37607
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG591037	**Analysis Date:**	11/10/2016 21:04	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	0.000	0.000	2.3	3.8	*

2.1.1.3 Sample Data

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Data File	LM37596.wiff	**Result Table**	111016_JWR.rdb
Acquisition Date	11/10/2016 5:36:30 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

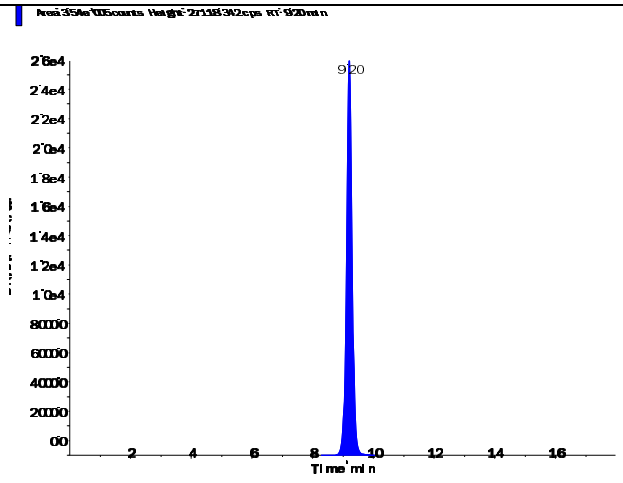
Sample Name	L16110420-01	**Injection Vial**	20.00
Data File	LM37596.wiff	**Injection Volume**	10.00
Acquisition Date	11/10/2016 5:36:30 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	111016_JWR.rdb
Sample ID	L16110420-01	**Dilution Factor**	1.00
Sample Comment	1,1 (Hist)	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.540e+05	9.20	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	0.000e+00	0.00	N/A	No Peak
Perchlorate conf	7.650e+02	9.16	N/A	< 0

O18LP (Internal Standard)

RT (Exp. RT): 9.20(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



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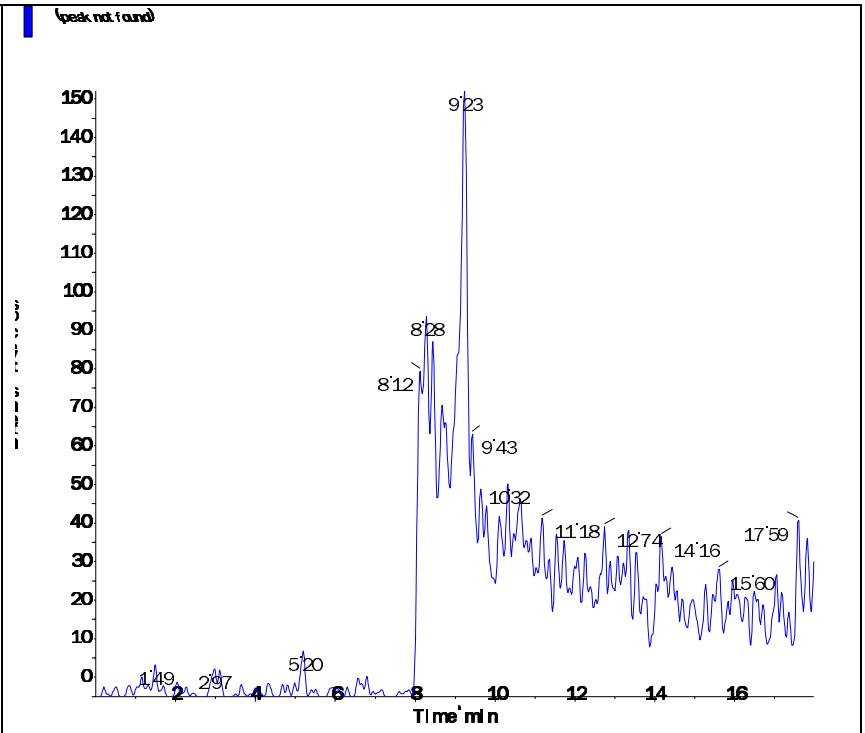
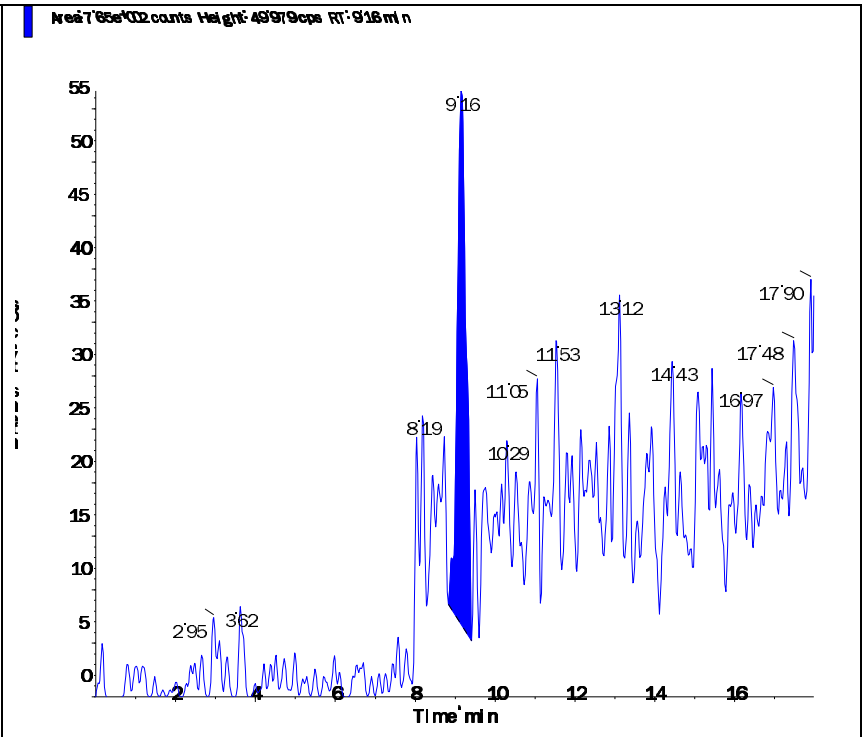
Printed: 11/11/2016 11:35 AM

Perchlorate (98.8/83.3 amu)	
RT (Exp. RT): 0.00 (9.84) min Calculated conc: No Peak ng/ml Area Ratio: 0.00 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu)	
RT (Exp. RT): 9.16 (9.84) min Calculated conc: < 0 ng/ml Area Ratio: 0.002 Sample Type: (Unknown)	

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Printed: 11/11/2016 11:37 AM

Data File	LM37602.wiff	**Result Table**	111016_JWR.rdb
Acquisition Date	11/10/2016 7:30:06 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

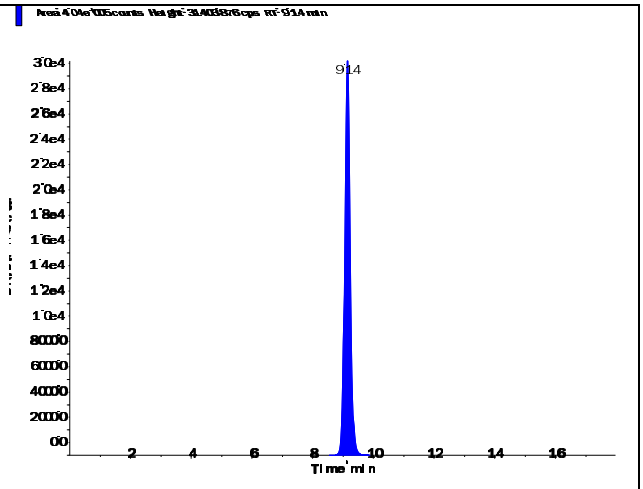
Sample Name	L16110420-02 RS	**Injection Vial**	23.00
Data File	LM37602.wiff	**Injection Volume**	10.00
Acquisition Date	11/10/2016 7:30:06 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	111016_JWR.rdb
Sample ID	WG591037-07	**Dilution Factor**	1.00
Sample Comment	1,1 (Hist)	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.040e+05	9.14	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	0.000e+00	0.00	N/A	No Peak
Perchlorate conf	6.830e+02	9.08	N/A	< 0

O18LP (Internal Standard)

RT (Exp. RT): 9.14(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



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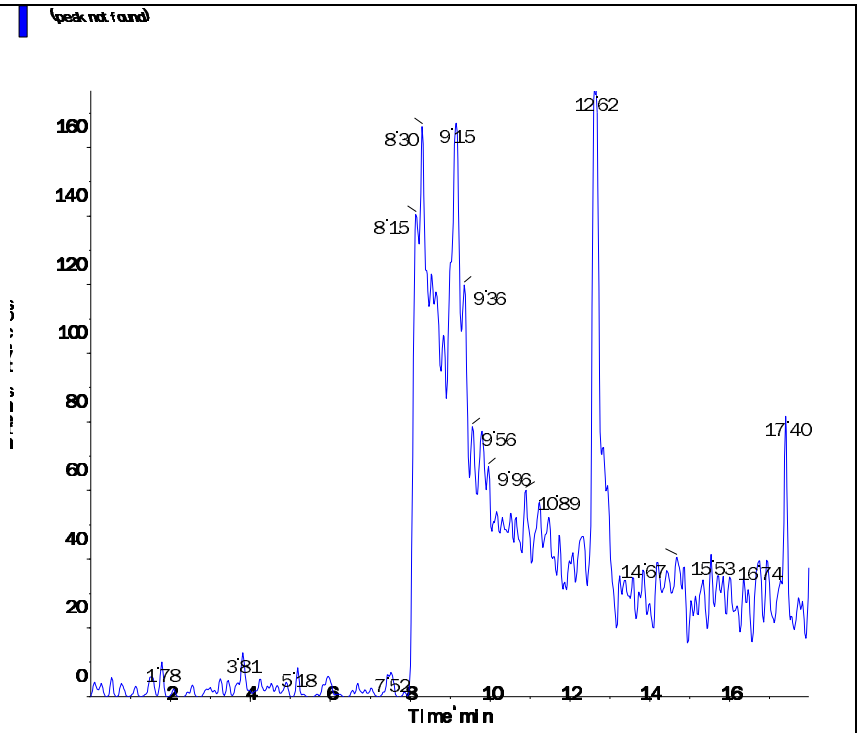
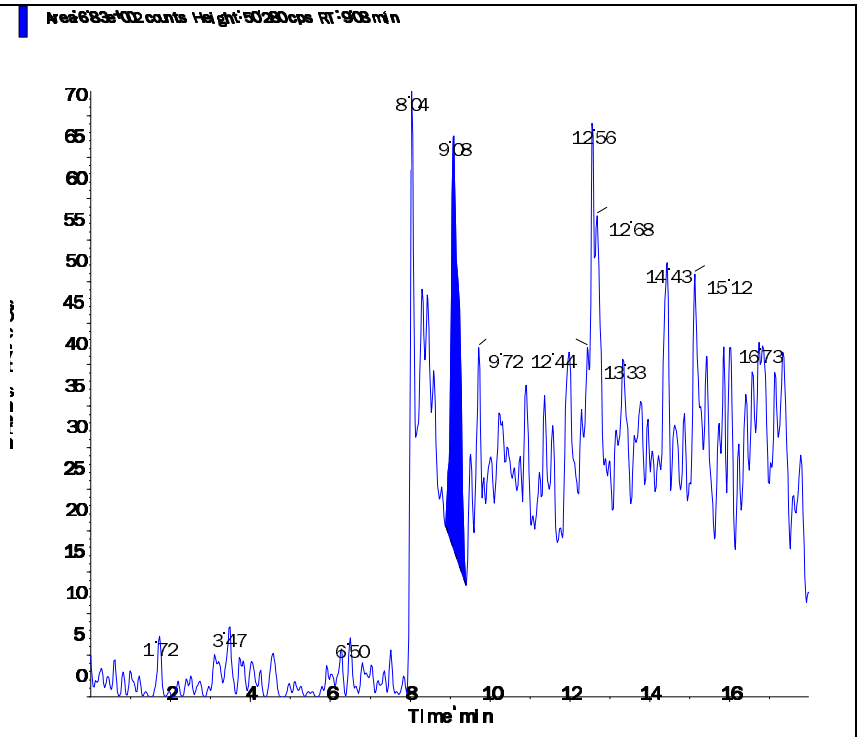
Perchlorate (98.8/83.3 amu)	
RT (Exp. RT):	0.00 (9.84) min
Calculated conc:	No Peak ng/ml
Area Ratio:	0.00
Sample Type:	(Unknown)



Perchlorate conf (100.8/85.2 amu)	
RT (Exp. RT):	9.08 (9.84) min
Calculated conc:	< 0 ng/ml
Area Ratio:	0.002
Sample Type:	(Unknown)



s.dataFile Page 2 of 2

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Data File	LM37603.wiff	**Result Table**	111016_JWR.rdb
Acquisition Date	11/10/2016 7:49:01 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

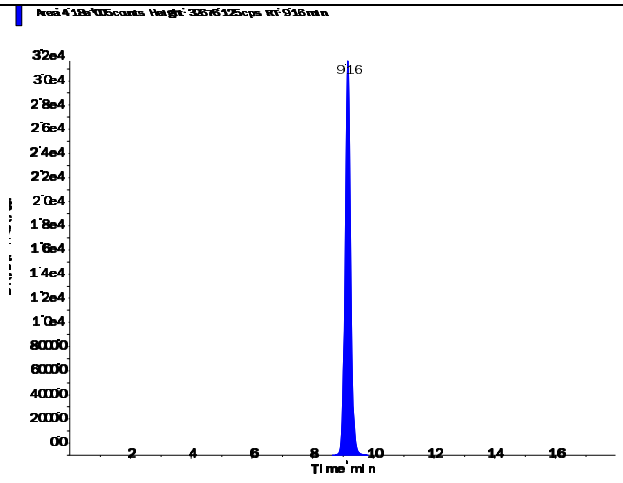
Sample Name	L16110420-03 MS	**Injection Vial**	24.00
Data File	LM37603.wiff	**Injection Volume**	10.00
Acquisition Date	11/10/2016 7:49:01 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	111016_JWR.rdb
Sample ID	WG591037-08	**Dilution Factor**	1.00
Sample Comment	1,1 STD78251	**Weight to Volume**	0.00

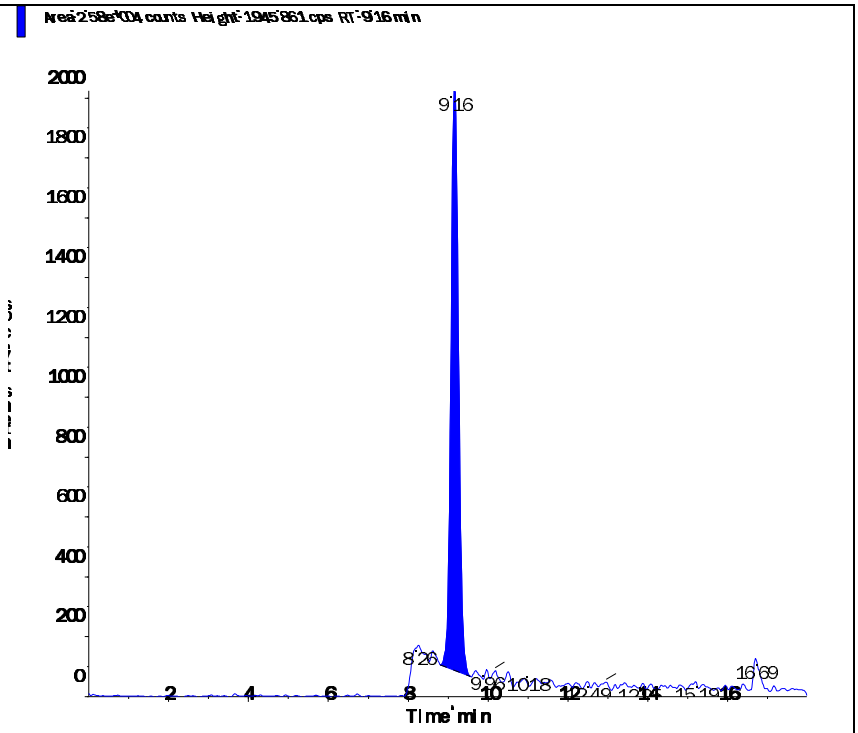
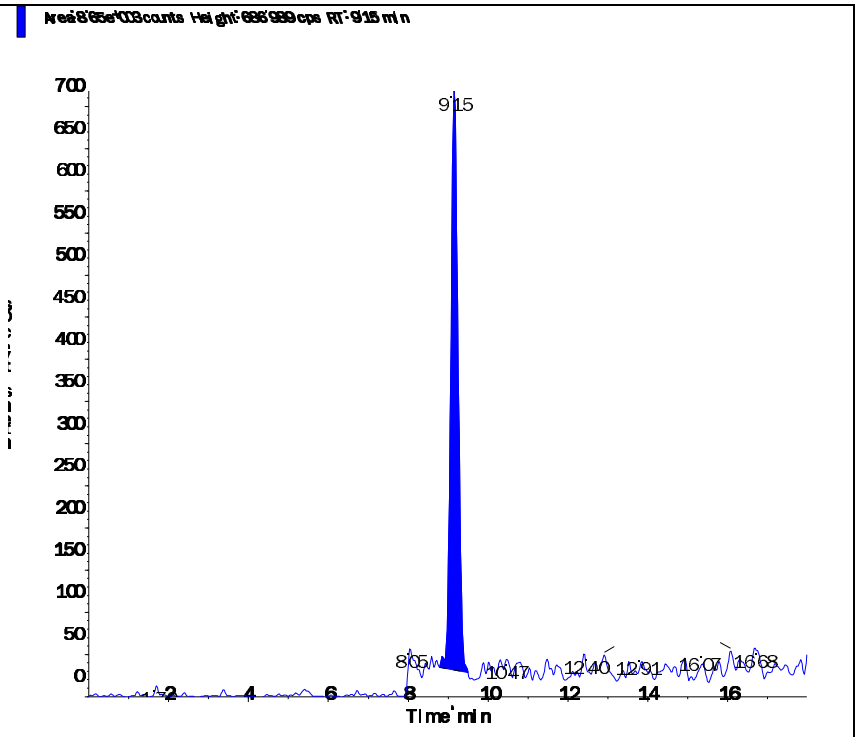
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.180e+05	9.16	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	2.580e+04	9.16	N/A	0.18
Perchlorate conf	8.650e+03	9.15	N/A	0.165

O18LP (Internal Standard)

RT (Exp. RT): 9.16(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.16 (9.84) min Calculated conc: 0.18 ng/ml Area Ratio: 0.062 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.15 (9.84) min Calculated conc: 0.165 ng/ml Area Ratio: 0.021 Sample Type: (Unknown)	

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Data File	LM37604.wiff	**Result Table**	111016_JWR.rdb
Acquisition Date	11/10/2016 8:07:58 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

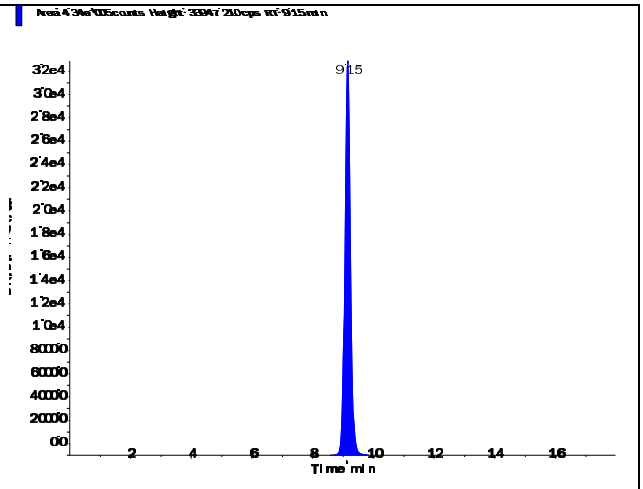
Sample Name	L16110420-04 MSD	**Injection Vial**	25.00
Data File	LM37604.wiff	**Injection Volume**	10.00
Acquisition Date	11/10/2016 8:07:58 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	111016_JWR.rdb
Sample ID	WG591037-09	**Dilution Factor**	1.00
Sample Comment	1,1 STD78251	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.340e+05	9.15	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	2.780e+04	9.16	N/A	0.186
Perchlorate conf	9.140e+03	9.14	N/A	0.168

O18LP (Internal Standard)

RT (Exp. RT): 9.15(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



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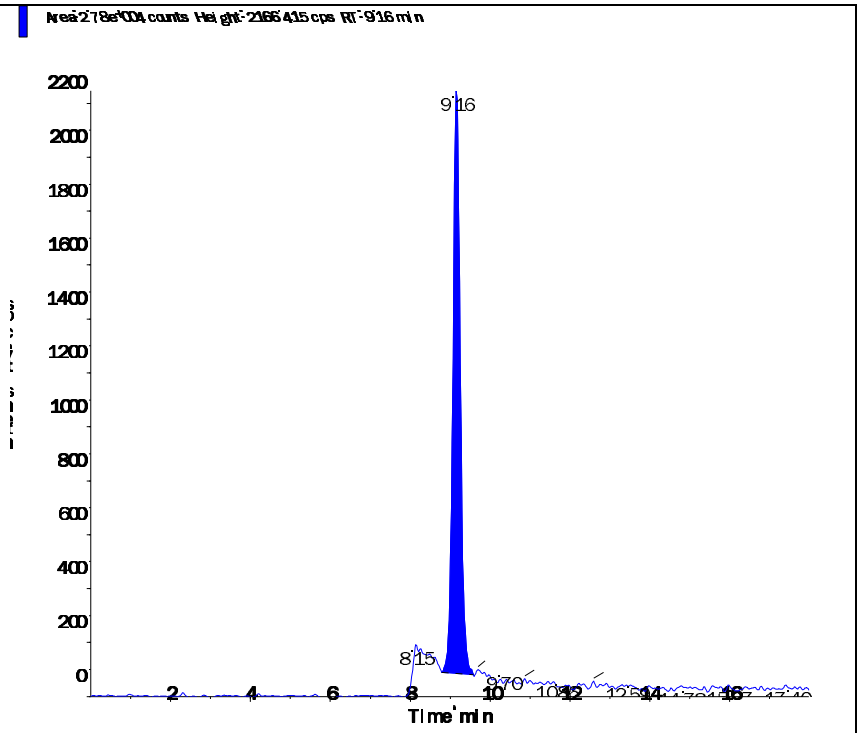
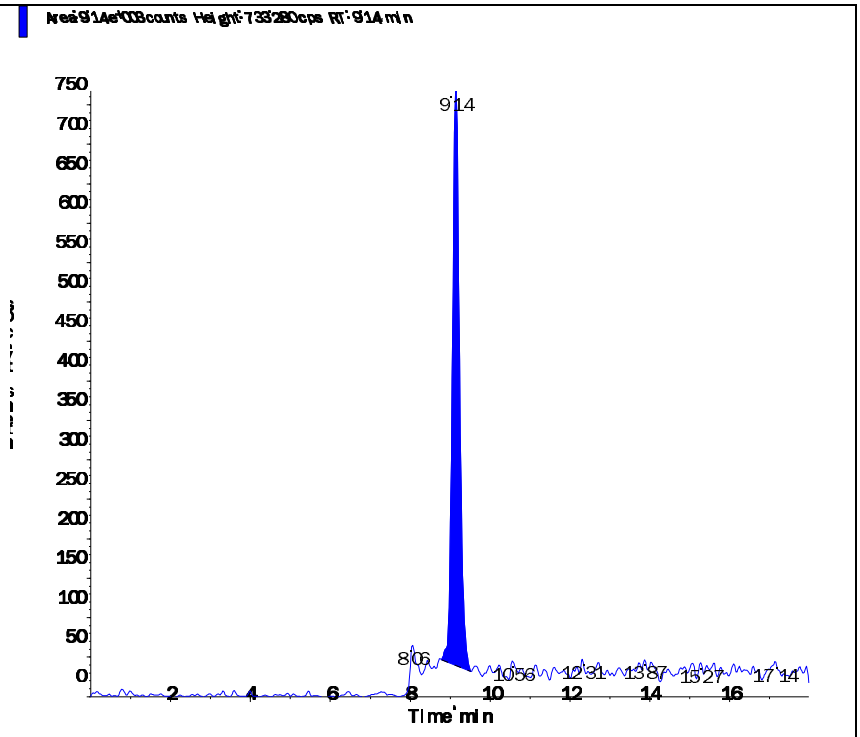
Perchlorate (98.8/83.3 amu)	
RT (Exp. RT):	9.16 (9.84) min
Calculated conc:	0.186 ng/ml
Area Ratio:	0.064
Sample Type:	(Unknown)



Perchlorate conf (100.8/85.2 amu)	
RT (Exp. RT):	9.14 (9.84) min
Calculated conc:	0.168 ng/ml
Area Ratio:	0.021
Sample Type:	(Unknown)



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Printed: 11/11/2016 11:36 AM

Data File	LM37597.wiff	**Result Table**	111016_JWR.rdb
Acquisition Date	11/10/2016 5:55:26 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

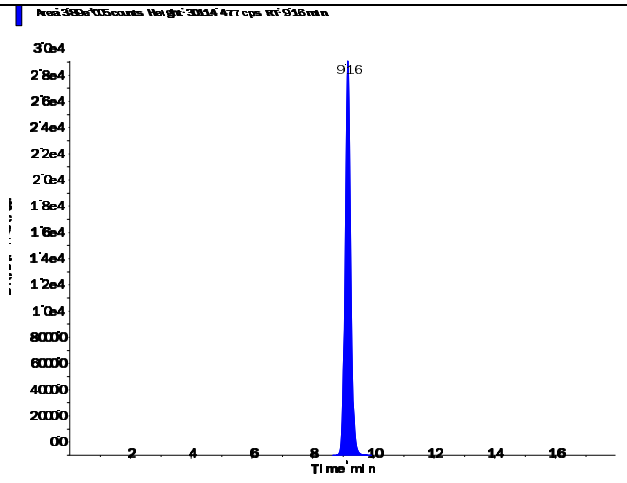
Sample Name	L16110420-05	**Injection Vial**	21.00
Data File	LM37597.wiff	**Injection Volume**	10.00
Acquisition Date	11/10/2016 5:55:26 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	111016_JWR.rdb
Sample ID	L16110420-05	**Dilution Factor**	1.00
Sample Comment	1,1 (Hist)	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.890e+05	9.16	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	0.000e+00	0.00	N/A	No Peak
Perchlorate conf	0.000e+00	0.00	N/A	No Peak

O18LP (Internal Standard)

RT (Exp. RT): 9.16(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



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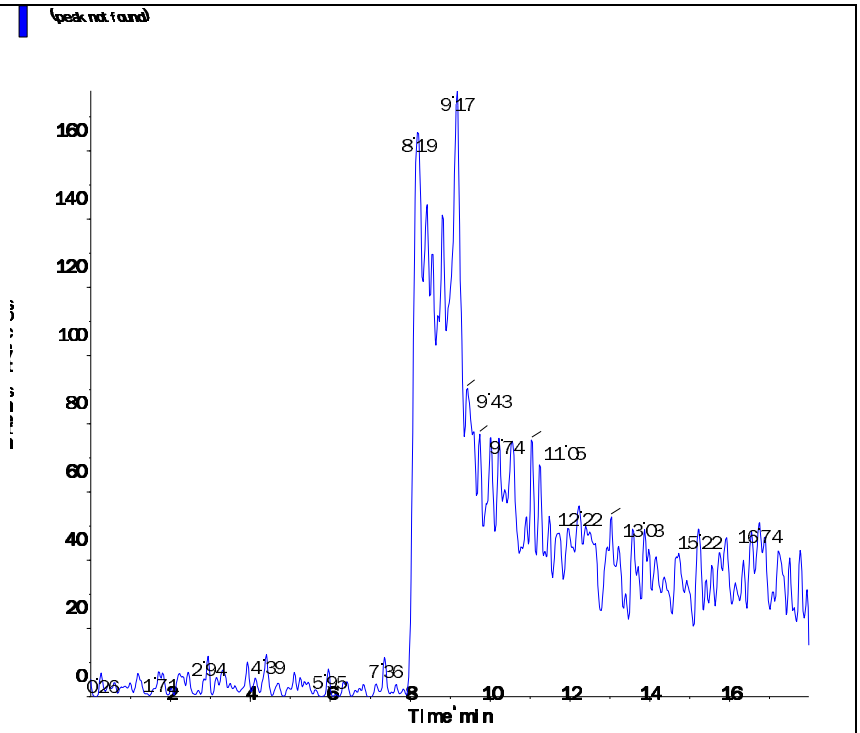
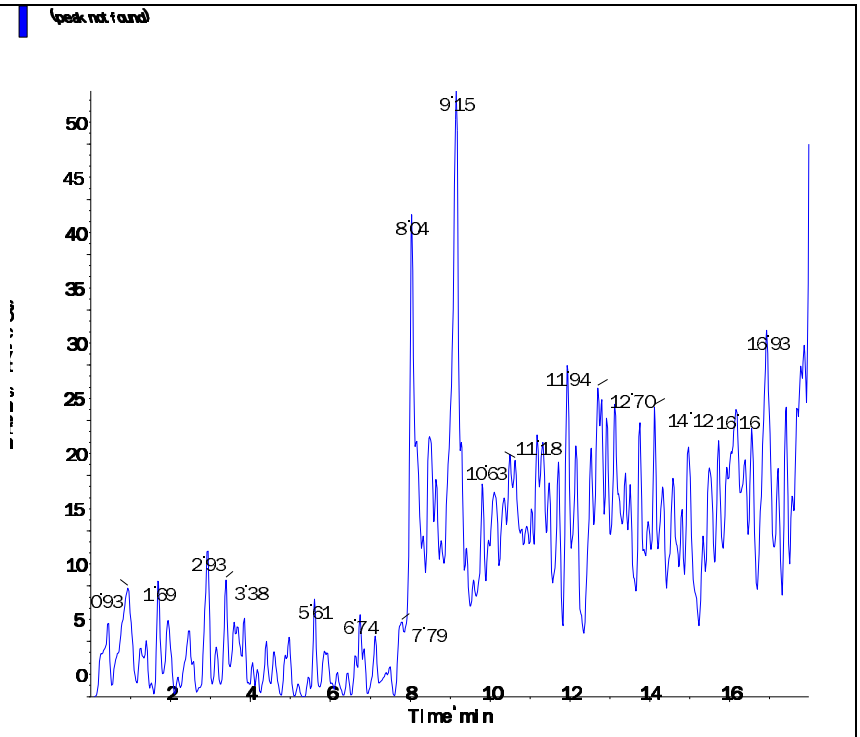
Printed: 11/11/2016 11:36 AM

Perchlorate (98.8/83.3 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	0.00 (9.84) min No Peak ng/ml 0.00 (Unknown)



Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	0.00 (9.84) min No Peak ng/ml 0.00 (Unknown)



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Printed: 11/11/2016 11:36 AM

Data File	LM37598.wiff	**Result Table**	111016_JWR.rdb
Acquisition Date	11/10/2016 6:14:23 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

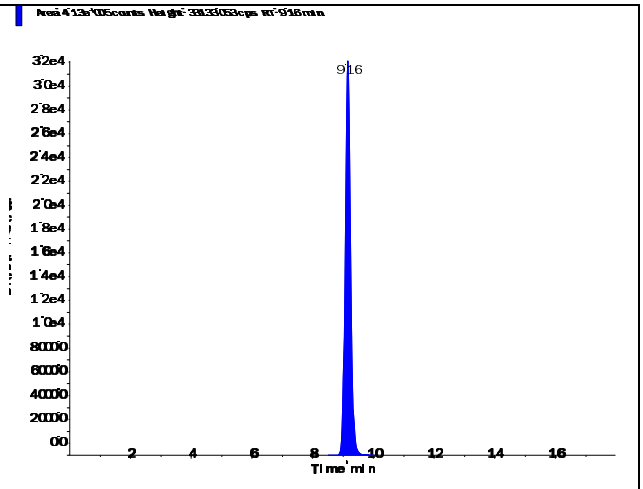
Sample Name	L16110420-06	**Injection Vial**	22.00
Data File	LM37598.wiff	**Injection Volume**	10.00
Acquisition Date	11/10/2016 6:14:23 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	111016_JWR.rdb
Sample ID	L16110420-06	**Dilution Factor**	1.00
Sample Comment	1,1 (Hist)	**Weight to Volume**	0.00

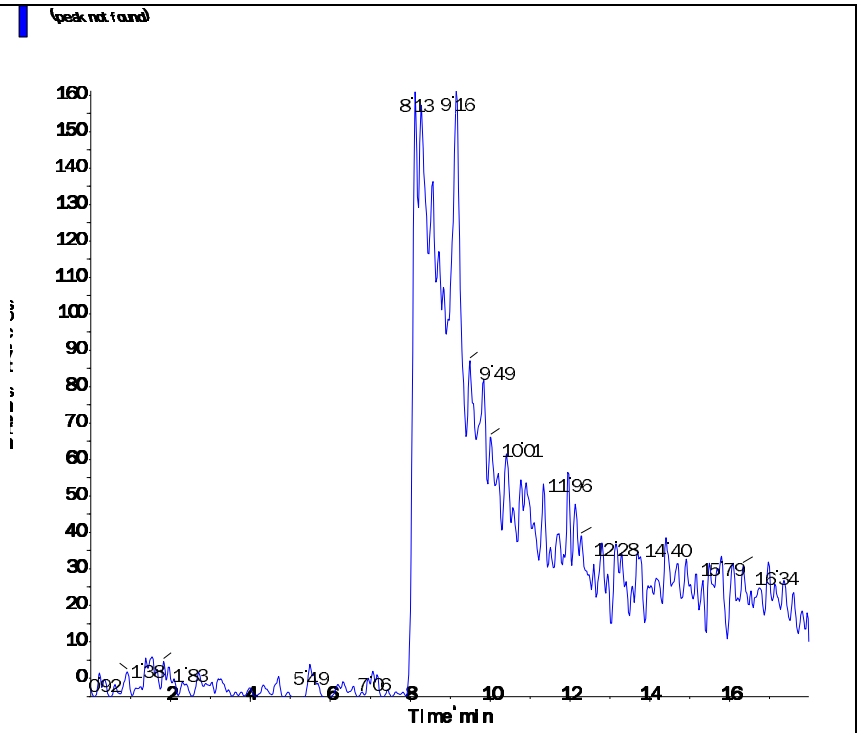
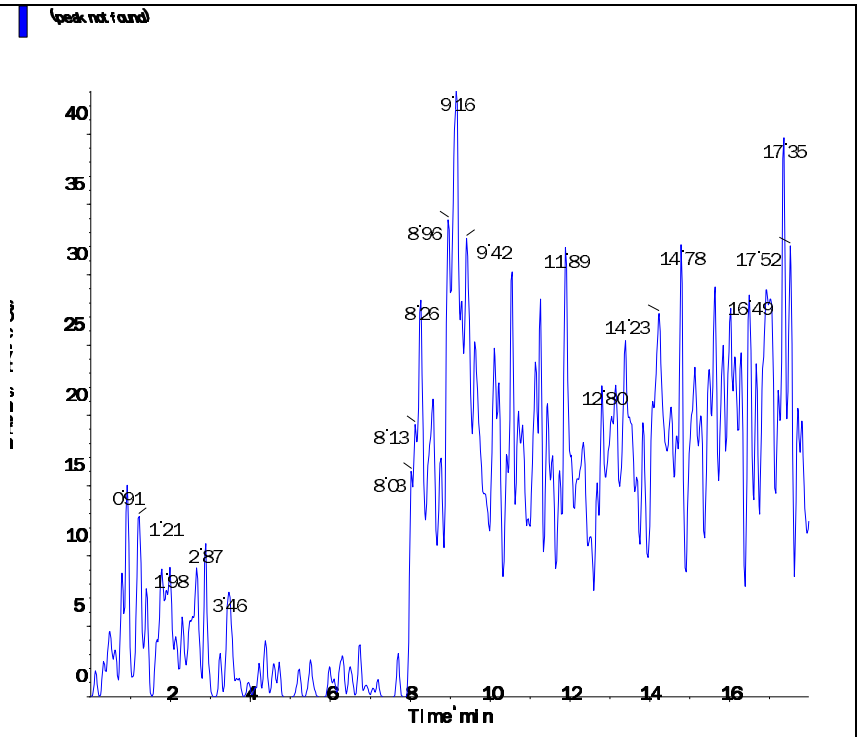
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.130e+05	9.16	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	0.000e+00	0.00	N/A	No Peak
Perchlorate conf	0.000e+00	0.00	N/A	No Peak

O18LP (Internal Standard)

RT (Exp. RT): 9.16(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 0.00 (9.84) min Calculated conc: No Peak ng/ml Area Ratio: 0.00 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 0.00 (9.84) min Calculated conc: No Peak ng/ml Area Ratio: 0.00 Sample Type: (Unknown)	

2.1.1.4 Standards Data

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Data File	LM34686.wiff	**Result Table**	111016_JWR.rdb
Acquisition Date	5/3/2016 3:06:05 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

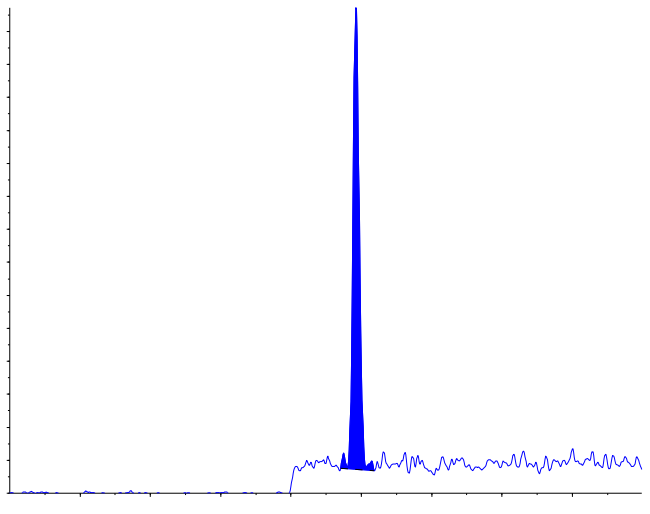
Sample Name	WG567320-01 CCB	**Injection Vial**	1.00
Data File	LM34686.wiff	**Injection Volume**	10.00
Acquisition Date	5/3/2016 3:06:05 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	111016_JWR.rdb
Sample ID	WG567320-01	**Dilution Factor**	1.00
Sample Comment	11.00	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	5.020e+05	9.84	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	0.000e+00	0.00	N/A	No Peak
Perchlorate conf	0.000e+00	0.00	N/A	No Peak

O18LP (Internal Standard)

RT (Exp. RT): 9.84(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



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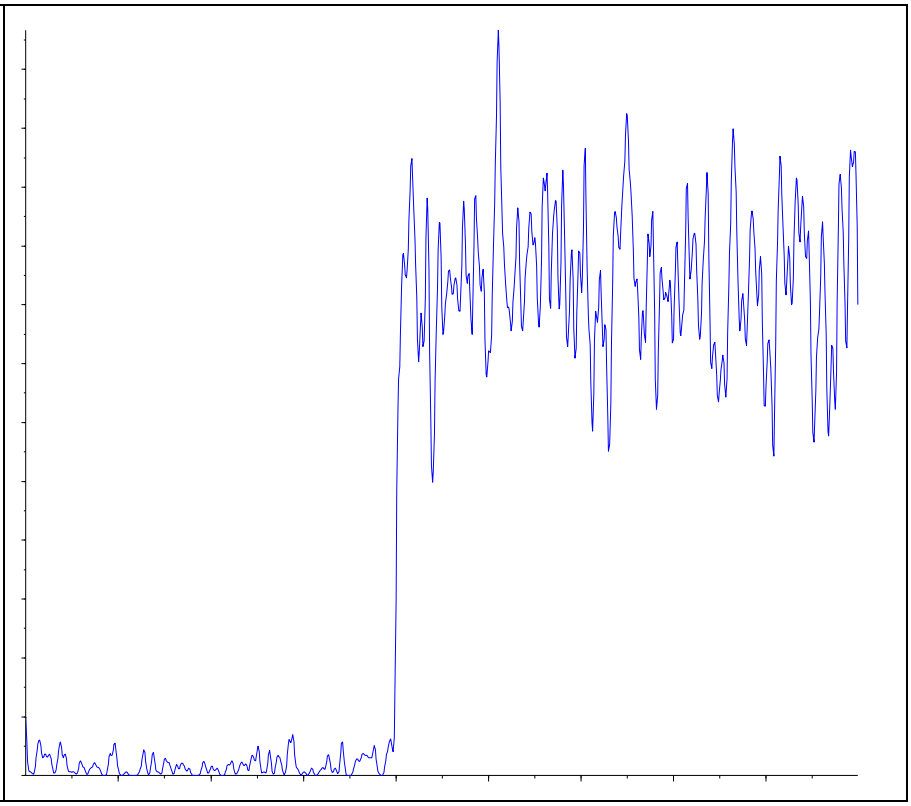
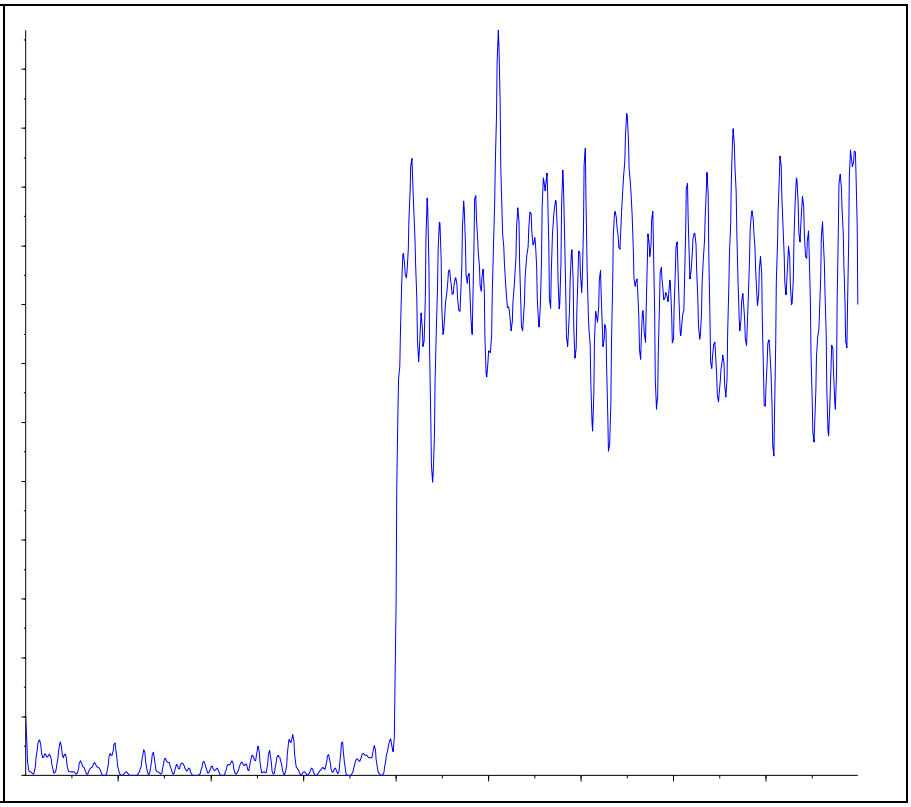
Perchlorate (98.8/83.3 amu)

RT (Exp. RT):	0.00 (9.84) min
Calculated conc:	No Peak ng/ml
Area Ratio:	0.00
Sample Type:	(Unknown)



Perchlorate conf (100.8/85.2 amu)

RT (Exp. RT):	0.00 (9.84) min
Calculated conc:	No Peak ng/ml
Area Ratio:	0.00
Sample Type:	(Unknown)



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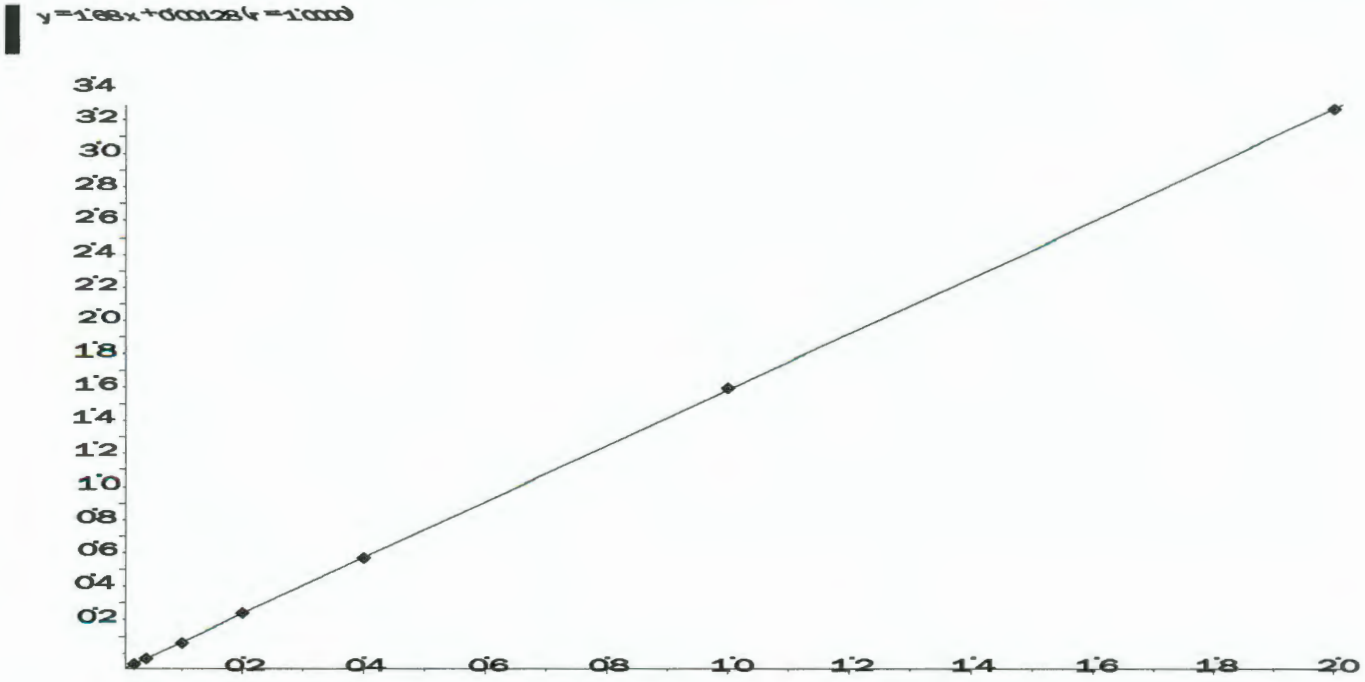
Analyte Name: **Perchlorate**
Internal Standard: O18LP

Data File	LM34686.wiff	**Result Table**	050316_JWR.rdb
Acquisition Date	5/3/2016 3:06:05 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

Regression Equation: y = 1.68 x + 0.00128 (r = 1.0000)

Expected Concentration	Number of Values	Mean Calculated Concentration	% Accuracy	Std. Deviation	%CV
0.10	1	0.10	102.8	N/A	N/A
0.20	1	0.20	100.3	N/A	N/A
0.50	1	0.48	96.6	N/A	N/A
1.00	1	1.01	100.5	N/A	N/A
2.00	1	1.99	99.3	N/A	N/A
5.00	1	5.04	100.7	N/A	N/A
10.00	1	9.99	99.9	N/A	N/A



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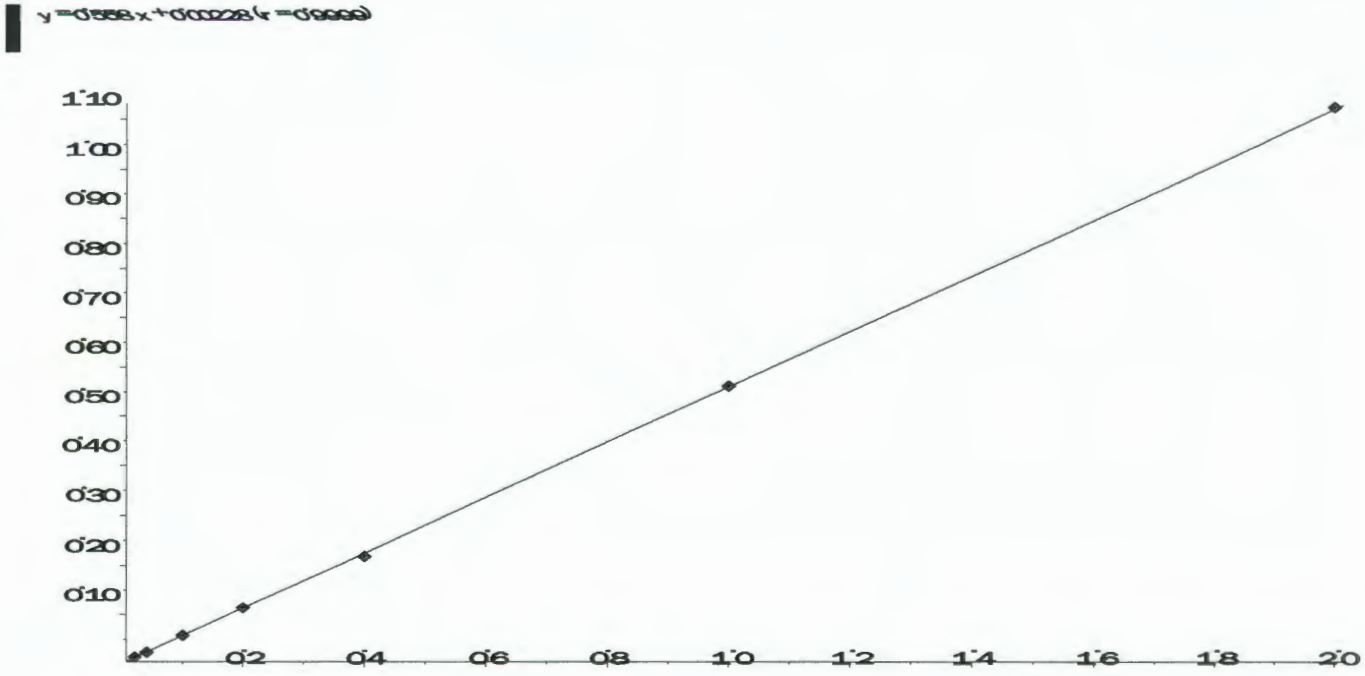
Printed: 5/4/2016 1:20 PM

Analyte Name: **Perchlorate conf**
Internal Standard: O18LP

Data File	LM34686.wiff	**Result Table**	050316_JWR.rdb
Acquisition Date	5/3/2016 3:06:05 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

Regression Equation: y = 0.558 x + 0.00228 (r = 0.9999)

Expected Concentration	Number of Values	Mean Calculated Concentration	% Accuracy	Std. Deviation	%CV
0.10	1	0.10	104.3	N/A	N/A
0.20	1	0.19	96.8	N/A	N/A
0.50	1	0.50	100.6	N/A	N/A
1.00	1	1.00	100.5	N/A	N/A
2.00	1	1.94	97.2	N/A	N/A
5.00	1	5.02	100.4	N/A	N/A
10.00	1	10.03	100.3	N/A	N/A



Page 2 of 2

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Data File	LM34687.wiff	**Result Table**	111016_JWR.rdb
Acquisition Date	5/3/2016 3:25:04 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

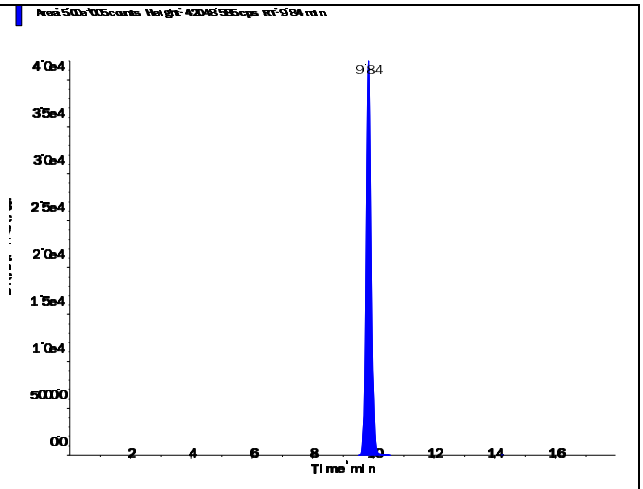
Sample Name	WG567320-02 STD (0.1 ug/L)	**Injection Vial**	2.00
Data File	LM34687.wiff	**Injection Volume**	10.00
Acquisition Date	5/3/2016 3:25:04 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Standard
Instrument Name	API 4000	**Result Table**	111016_JWR.rdb
Sample ID	WG567320-02	**Dilution Factor**	1.00
Sample Comment	1,1 STD75510	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	5.000e+05	9.84	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.790e+04	9.85	0.10	0.103
Perchlorate conf	6.950e+03	9.83	0.10	0.104

O18LP (Internal Standard)

RT (Exp. RT): 9.84(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Standard)



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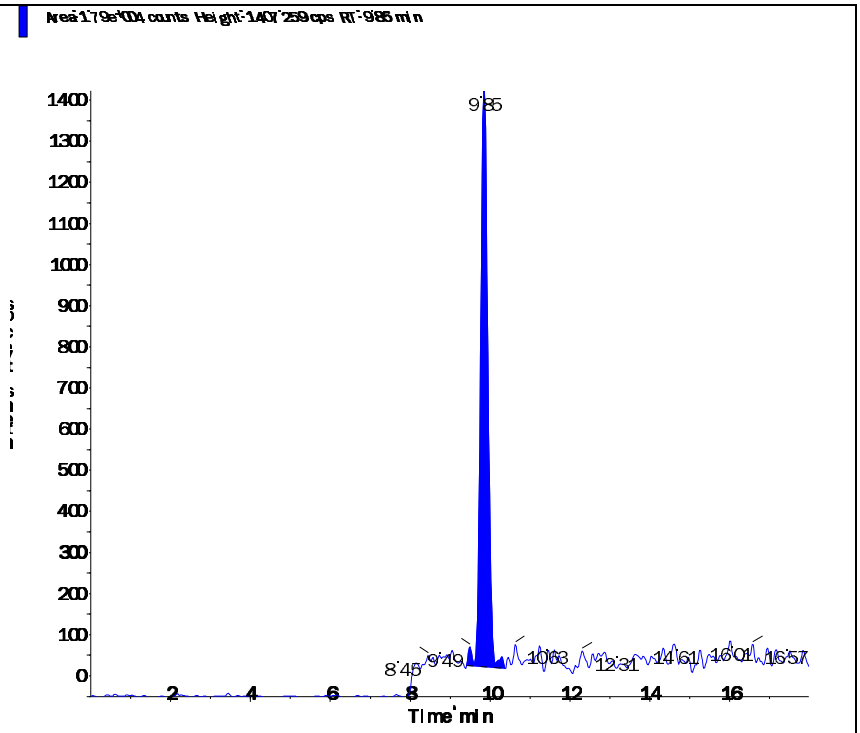
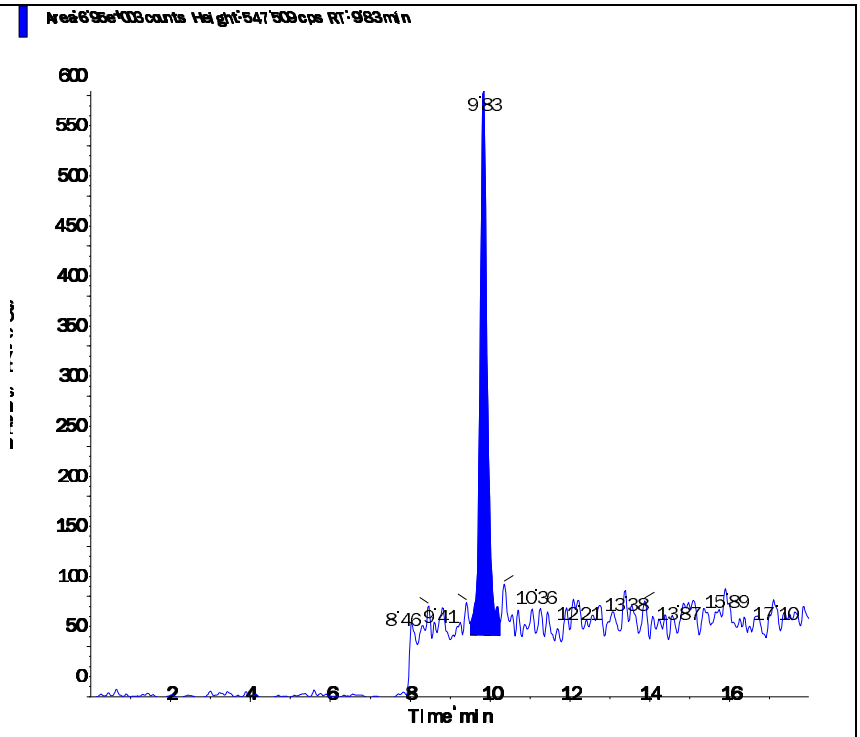
Perchlorate (98.8/83.3 amu)	
RT (Exp. RT):	9.85 (9.84) min
Calculated conc:	0.103 ng/ml
Area Ratio:	0.036
Sample Type:	(Standard)



Perchlorate conf (100.8/85.2 amu)	
RT (Exp. RT):	9.83 (9.84) min
Calculated conc:	0.104 ng/ml
Area Ratio:	0.014
Sample Type:	(Standard)



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Data File	LM34688.wiff	**Result Table**	111016_JWR.rdb
Acquisition Date	5/3/2016 3:43:59 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

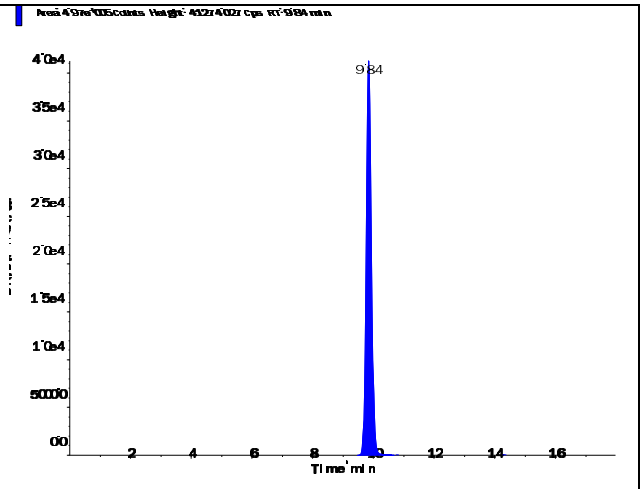
Sample Name	WG567320-03 STD (0.2 ug/L)	**Injection Vial**	3.00
Data File	LM34688.wiff	**Injection Volume**	10.00
Acquisition Date	5/3/2016 3:43:59 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Standard
Instrument Name	API 4000	**Result Table**	111016_JWR.rdb
Sample ID	WG567320-03	**Dilution Factor**	1.00
Sample Comment	1,1 STD75510	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.970e+05	9.84	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	3.410e+04	9.85	0.20	0.201
Perchlorate conf	1.190e+04	9.84	0.20	0.194

O18LP (Internal Standard)

RT (Exp. RT): 9.84(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Standard)



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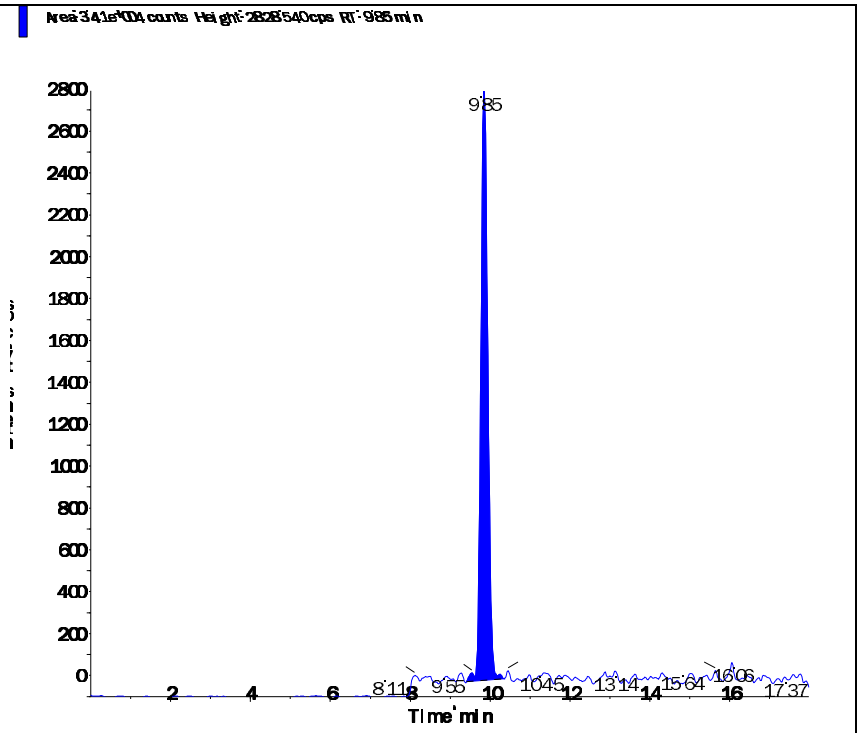
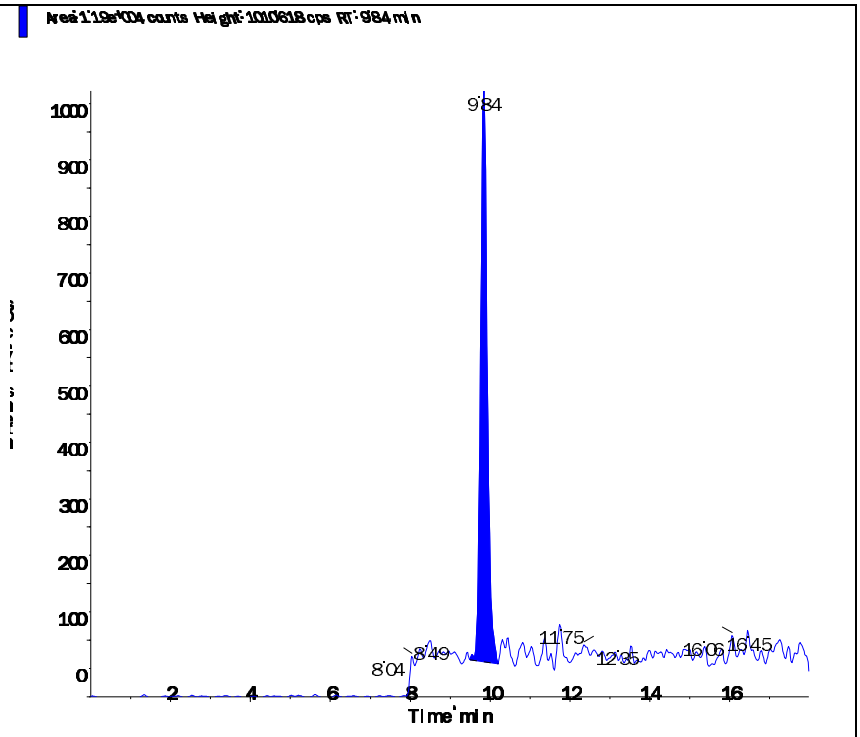
Perchlorate (98.8/83.3 amu)	
RT (Exp. RT):	9.85 (9.84) min
Calculated conc:	0.201 ng/ml
Area Ratio:	0.069
Sample Type:	(Standard)



Perchlorate conf (100.8/85.2 amu)	
RT (Exp. RT):	9.84 (9.84) min
Calculated conc:	0.194 ng/ml
Area Ratio:	0.024
Sample Type:	(Standard)



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Data File	LM34689.wiff	**Result Table**	111016_JWR.rdb
Acquisition Date	5/3/2016 4:02:52 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

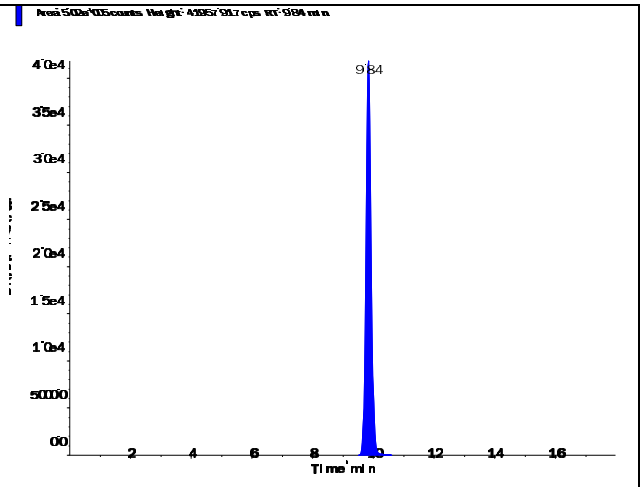
Sample Name	WG567320-04 STD (0.5 ug/L)	**Injection Vial**	4.00
Data File	LM34689.wiff	**Injection Volume**	10.00
Acquisition Date	5/3/2016 4:02:52 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Standard
Instrument Name	API 4000	**Result Table**	111016_JWR.rdb
Sample ID	WG567320-04	**Dilution Factor**	1.00
Sample Comment	1,1 STD75510	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	5.020e+05	9.84	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	8.220e+04	9.85	0.50	0.483
Perchlorate conf	2.940e+04	9.84	0.50	0.503

O18LP (Internal Standard)

RT (Exp. RT): 9.84(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Standard)



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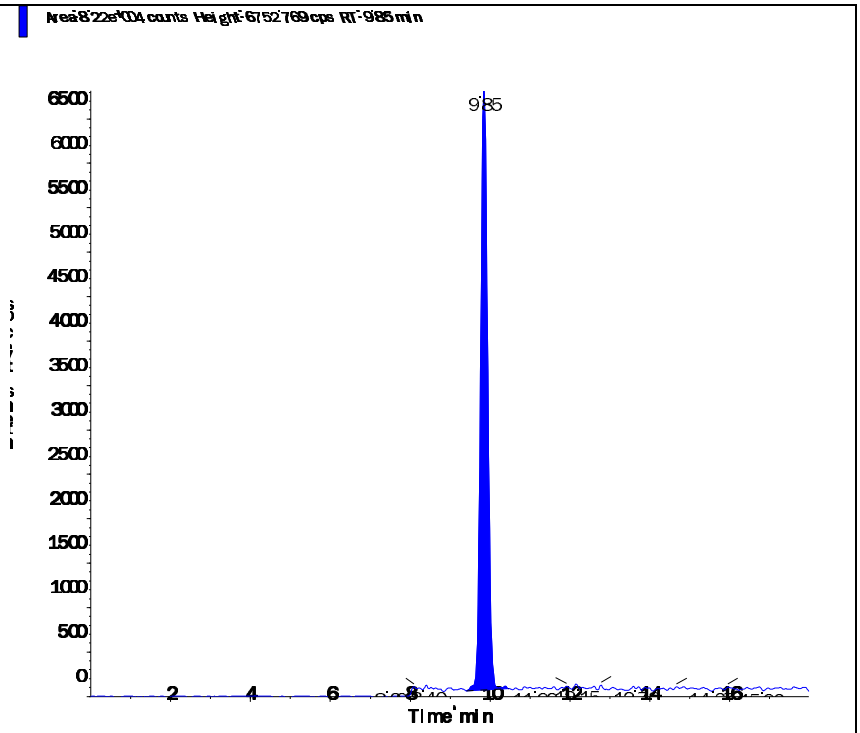
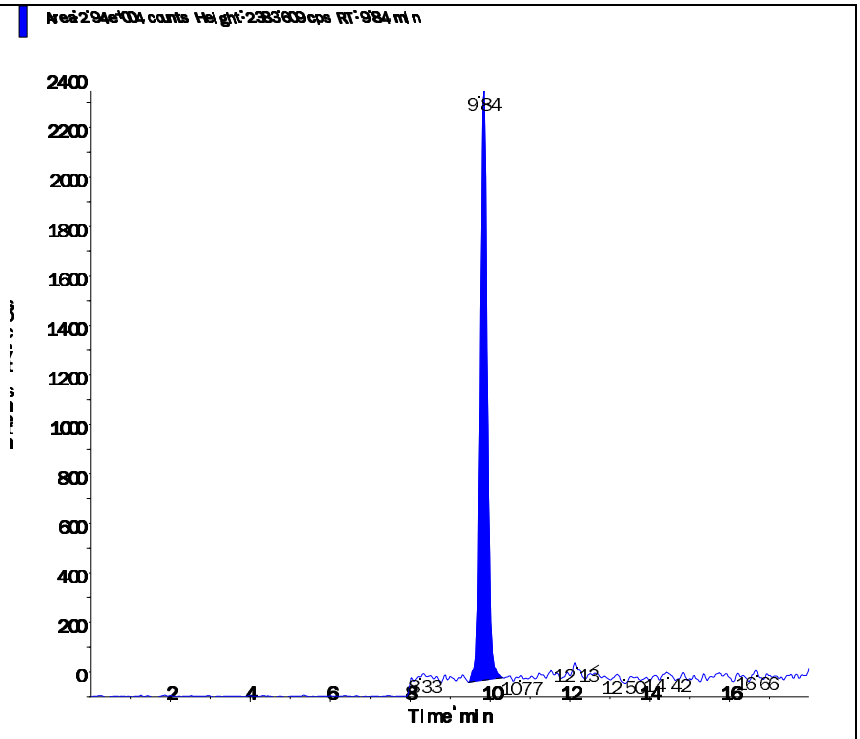
Perchlorate (98.8/83.3 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	9.85 (9.84) min 0.483 ng/ml 0.164 (Standard)



Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	9.84 (9.84) min 0.503 ng/ml 0.058 (Standard)



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Data File	LM34690.wiff	**Result Table**	111016_JWR.rdb
Acquisition Date	5/3/2016 4:21:49 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

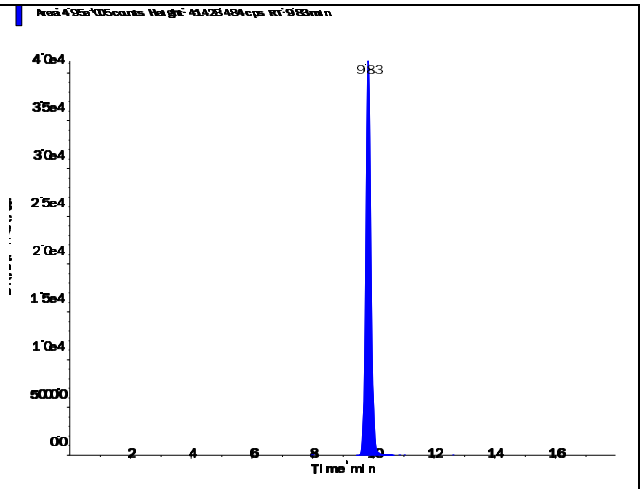
Sample Name	WG567320-05 STD (1.0 ug/L)	**Injection Vial**	5.00
Data File	LM34690.wiff	**Injection Volume**	10.00
Acquisition Date	5/3/2016 4:21:49 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Standard
Instrument Name	API 4000	**Result Table**	111016_JWR.rdb
Sample ID	WG567320-05	**Dilution Factor**	1.00
Sample Comment	1,1 STD75510	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.950e+05	9.83	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.680e+05	9.84	1.00	1.01
Perchlorate conf	5.660e+04	9.83	1.00	1.00

O18LP (Internal Standard)

RT (Exp. RT): 9.83(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Standard)



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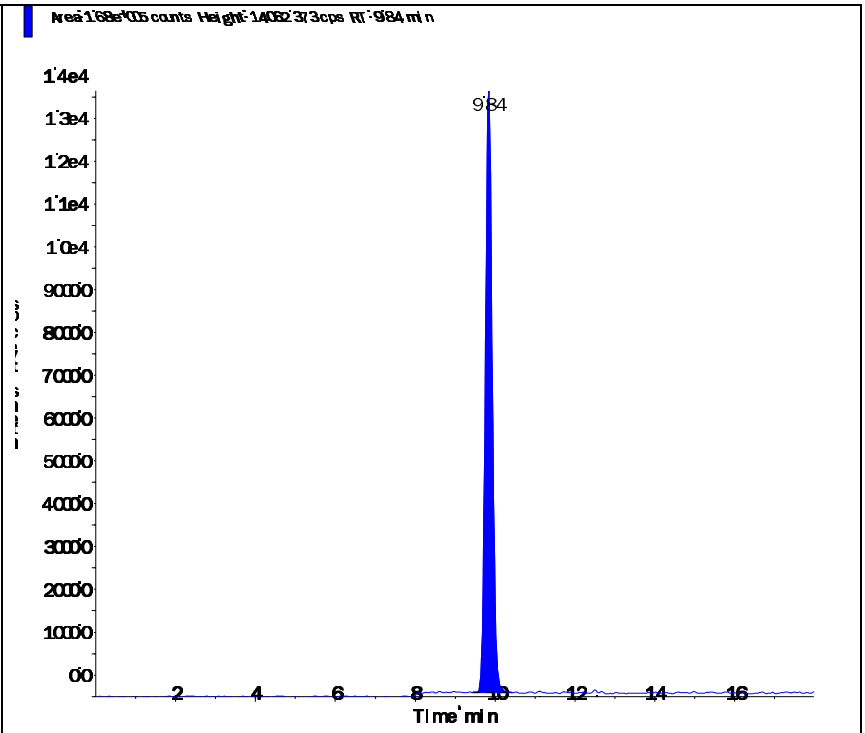
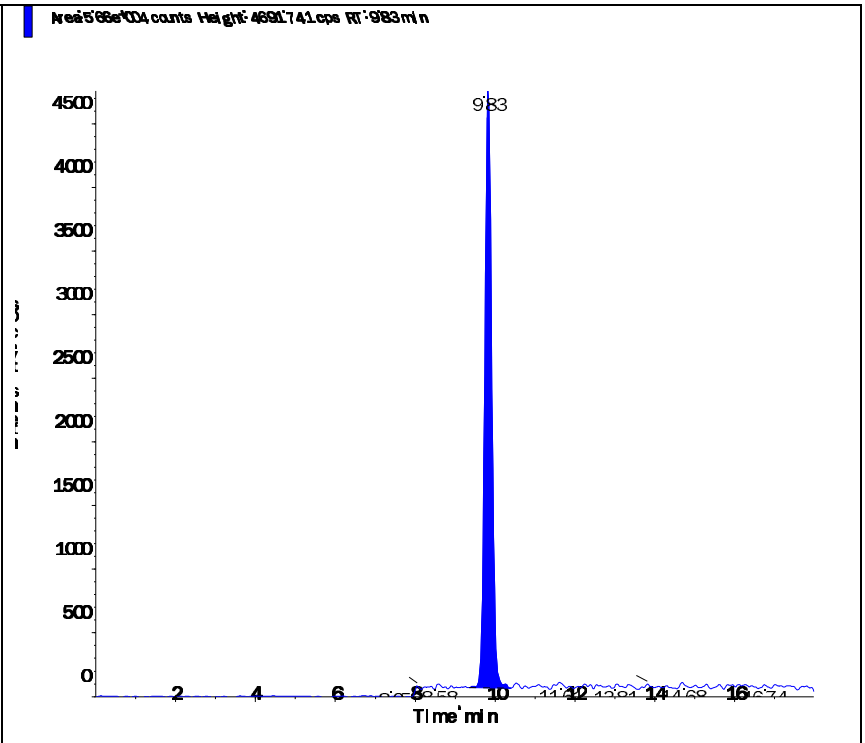
Perchlorate (98.8/83.3 amu)	
RT (Exp. RT): 9.84 (9.84) min	
Calculated conc: 1.01 ng/ml	
Area Ratio: 0.339	
Sample Type: (Standard)	

Perchlorate conf (100.8/85.2 amu)	
RT (Exp. RT): 9.83 (9.84) min	
Calculated conc: 1.00 ng/ml	
Area Ratio: 0.114	
Sample Type: (Standard)	

s.dataFile Page 2 of 2

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Data File	LM34691.wiff	**Result Table**	111016_JWR.rdb
Acquisition Date	5/3/2016 4:40:45 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

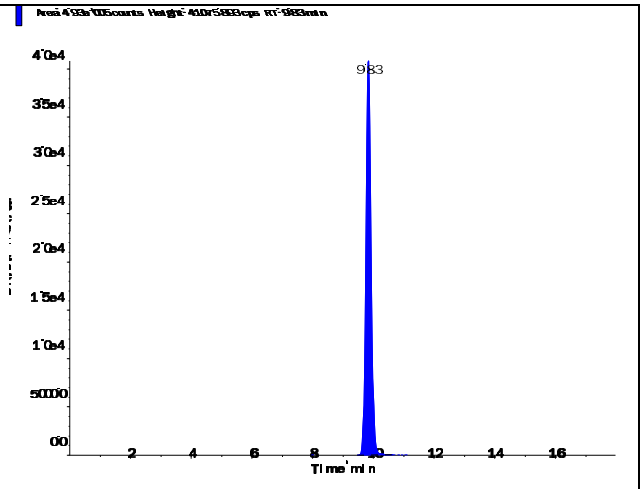
Sample Name	WG567320-06 STD (2.0 ug/L)	**Injection Vial**	6.00
Data File	LM34691.wiff	**Injection Volume**	10.00
Acquisition Date	5/3/2016 4:40:45 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Standard
Instrument Name	API 4000	**Result Table**	111016_JWR.rdb
Sample ID	WG567320-06	**Dilution Factor**	1.00
Sample Comment	1,1 STD75510	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.930e+05	9.83	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	3.300e+05	9.84	2.00	1.99
Perchlorate conf	1.080e+05	9.83	2.00	1.94

O18LP (Internal Standard)

RT (Exp. RT): 9.83(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Standard)



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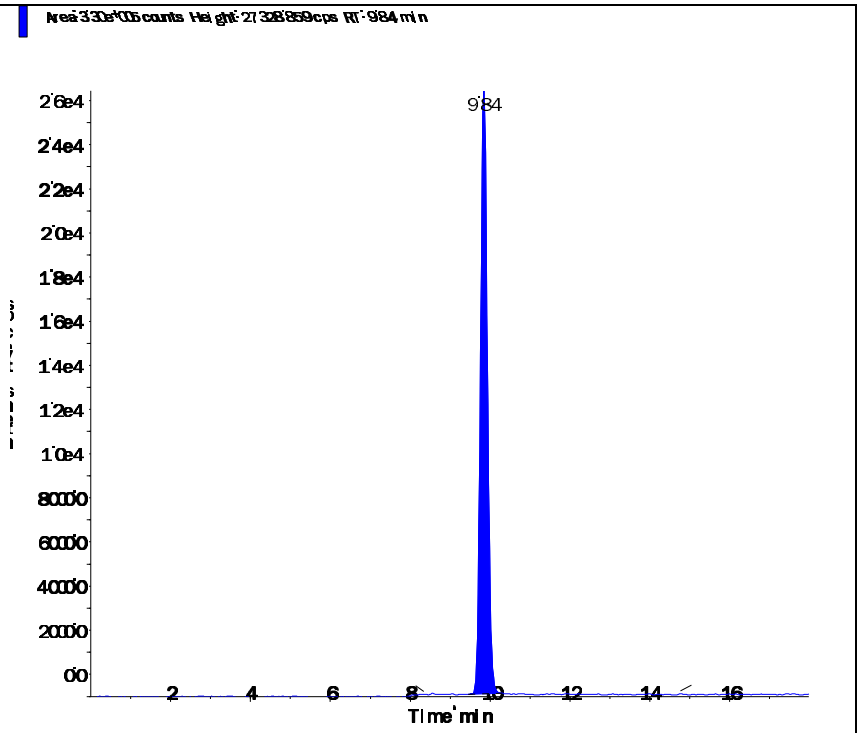
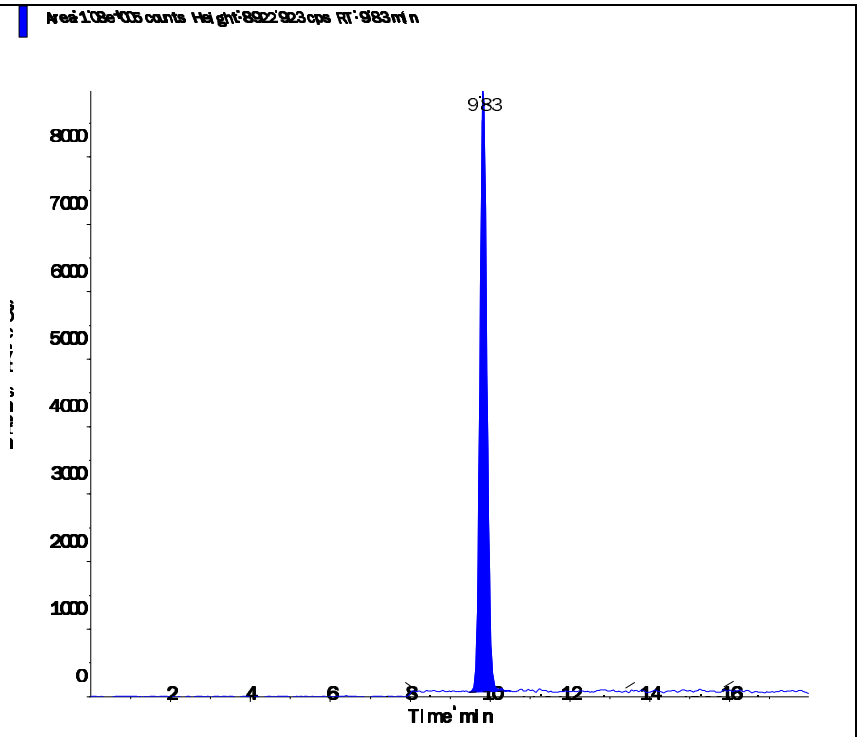
Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.84 (9.84) min Calculated conc: 1.99 ng/ml Area Ratio: 0.669 Sample Type: (Standard)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.83 (9.84) min Calculated conc: 1.94 ng/ml Area Ratio: 0.219 Sample Type: (Standard)	

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Data File	LM34692.wiff	**Result Table**	111016_JWR.rdb
Acquisition Date	5/3/2016 4:59:42 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

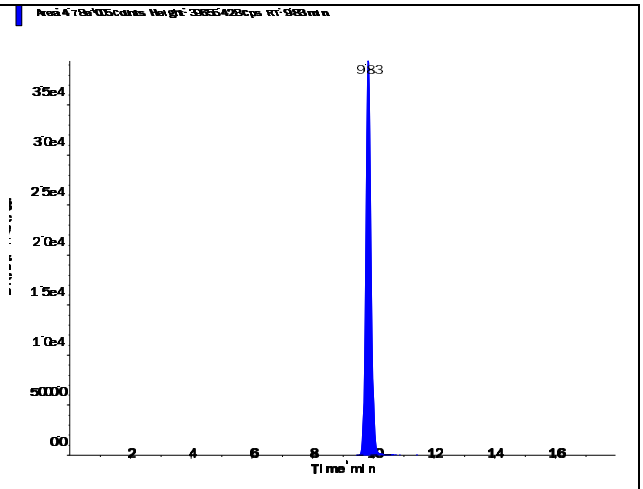
Sample Name	WG567320-07 STD (5.0 ug/L)	**Injection Vial**	7.00
Data File	LM34692.wiff	**Injection Volume**	10.00
Acquisition Date	5/3/2016 4:59:42 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Standard
Instrument Name	API 4000	**Result Table**	111016_JWR.rdb
Sample ID	WG567320-07	**Dilution Factor**	1.00
Sample Comment	1,1 STD75510	**Weight to Volume**	0.00

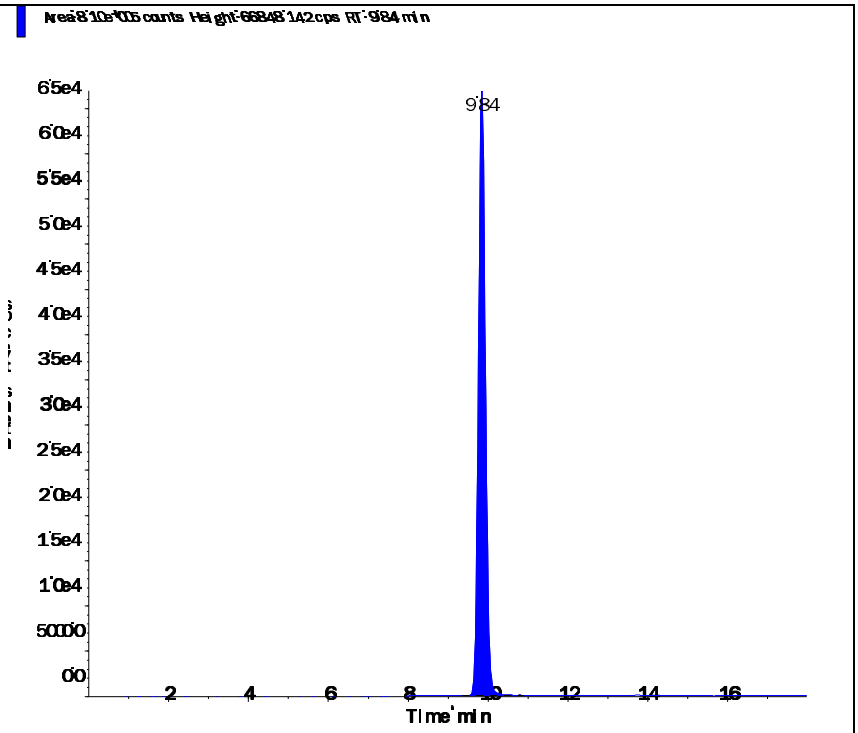
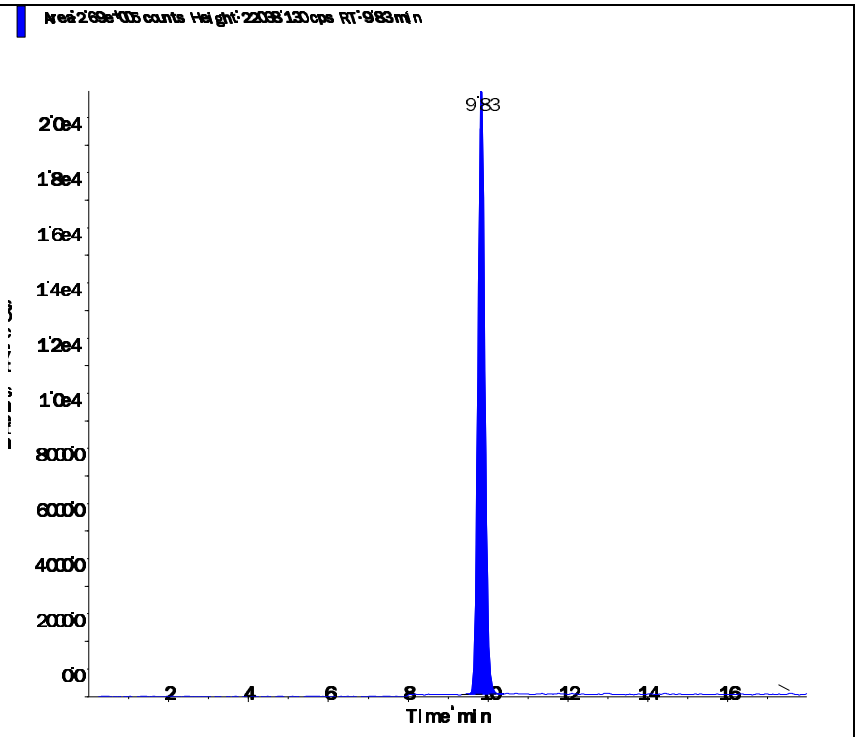
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.780e+05	9.83	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	8.100e+05	9.84	5.00	5.04
Perchlorate conf	2.690e+05	9.83	5.00	5.02

O18LP (Internal Standard)

RT (Exp. RT): 9.83(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Standard)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.84 (9.84) min Calculated conc: 5.04 ng/ml Area Ratio: 1.695 Sample Type: (Standard)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.83 (9.84) min Calculated conc: 5.02 ng/ml Area Ratio: 0.562 Sample Type: (Standard)	

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Data File	LM34693.wiff	**Result Table**	111016_JWR.rdb
Acquisition Date	5/3/2016 5:18:37 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

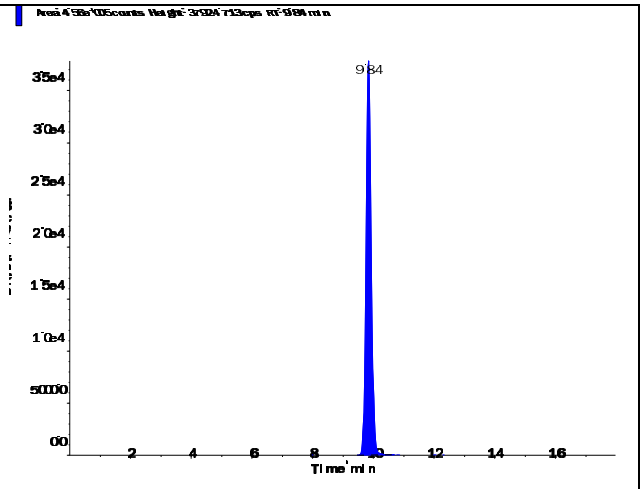
Sample Name	WG567320-08 STD (10 ug/L)	**Injection Vial**	8.00
Data File	LM34693.wiff	**Injection Volume**	10.00
Acquisition Date	5/3/2016 5:18:37 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Standard
Instrument Name	API 4000	**Result Table**	111016_JWR.rdb
Sample ID	WG567320-08	**Dilution Factor**	1.00
Sample Comment	1,1 STD75510	**Weight to Volume**	0.00

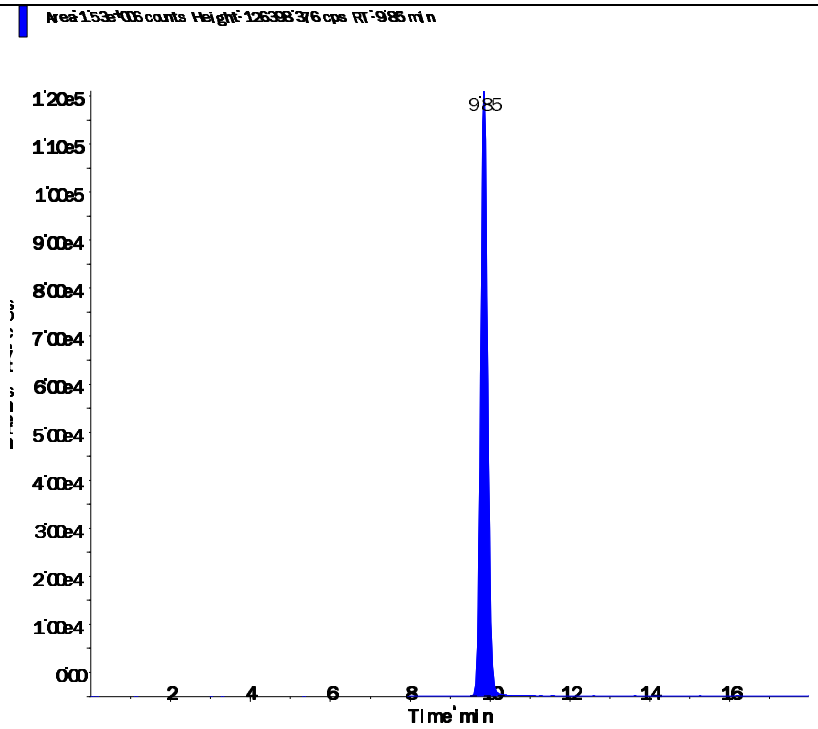
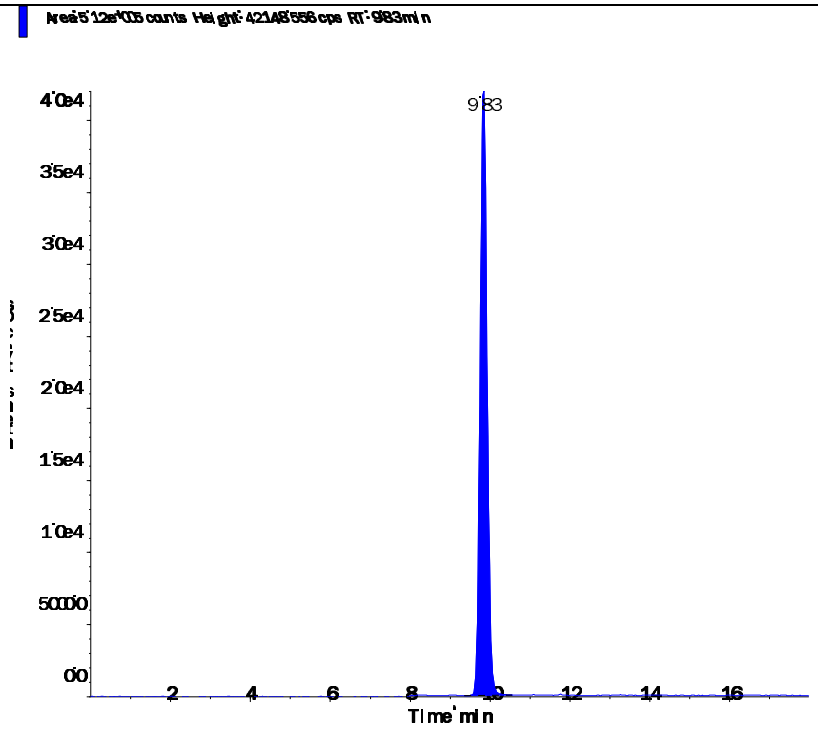
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.560e+05	9.84	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.530e+06	9.85	10.00	9.99
Perchlorate conf	5.120e+05	9.83	10.00	10.00

O18LP (Internal Standard)

RT (Exp. RT): 9.84(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Standard)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.85 (9.84) min Calculated conc: 9.99 ng/ml Area Ratio: 3.36 Sample Type: (Standard)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.83 (9.84) min Calculated conc: 10.00 ng/ml Area Ratio: 1.122 Sample Type: (Standard)	

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Data File	LM34694.wiff	**Result Table**	050316_JWR.rdb
Acquisition Date	5/3/2016 5:37:34 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

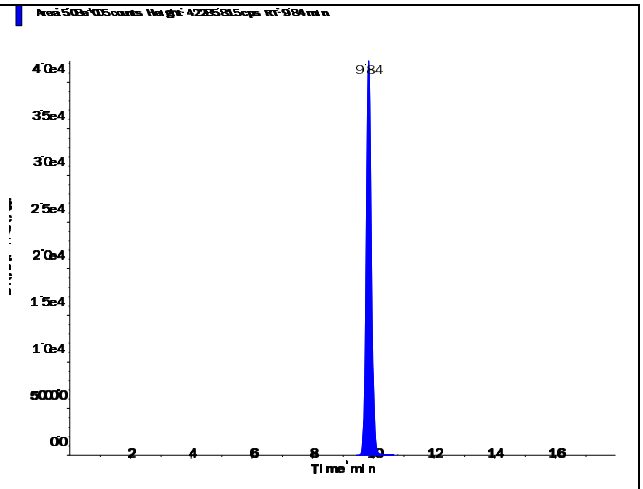
Sample Name	WG567320-09 SSCV (1.0 ug/L)	**Injection Vial**	9.00
Data File	LM34694.wiff	**Injection Volume**	10.00
Acquisition Date	5/3/2016 5:37:34 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Quality Control
Instrument Name	API 4000	**Result Table**	050316_JWR.rdb
Sample ID	WG567320-09	**Dilution Factor**	1.00
Sample Comment	1,1 STD75512	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	5.080e+05	9.84	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.690e+05	9.85	1.00	0.985
Perchlorate conf	5.630e+04	9.84	1.00	0.973

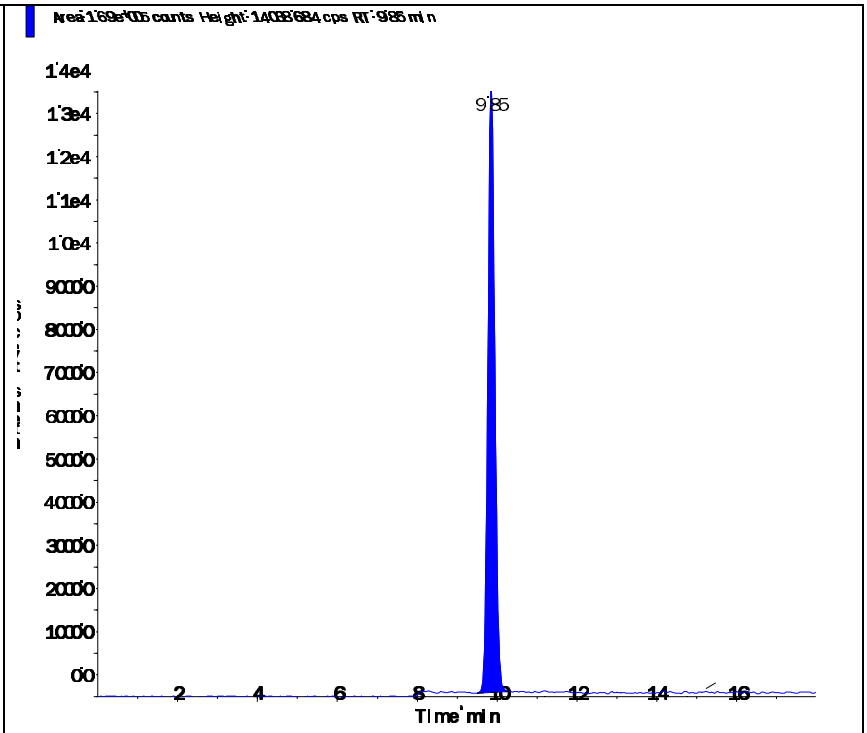
O18LP (Internal Standard)

RT (Exp. RT): 9.84(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Quality Control)



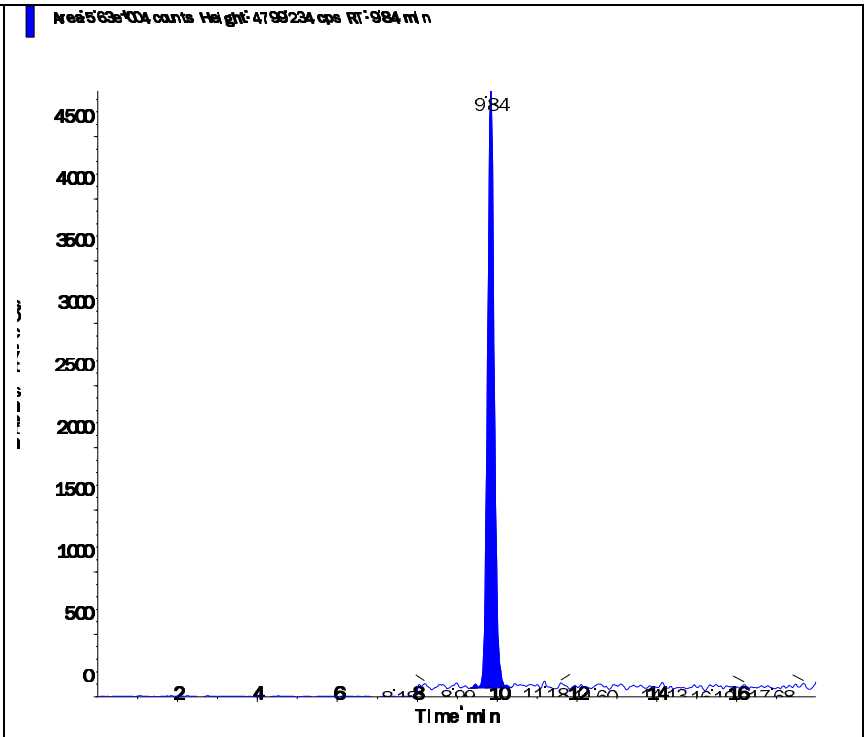
Perchlorate (98.8/83.3 amu)

RT (Exp. RT):	9.85 (9.84) min
Calculated conc:	0.985 ng/ml
Area Ratio:	0.332
Sample Type:	(Quality Control)



Perchlorate conf (100.8/85.2 amu)

RT (Exp. RT):	9.84 (9.84) min
Calculated conc:	0.973 ng/ml
Area Ratio:	0.111
Sample Type:	(Quality Control)



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Data File	LM37575.wiff	**Result Table**	111016_JWR.rdb
Acquisition Date	11/10/2016 10:58:48 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

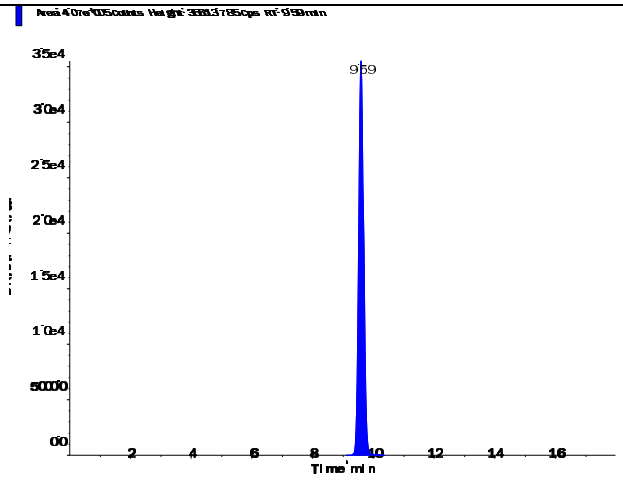
Sample Name	WG591040-02 CCV (1.0ug/L)	**Injection Vial**	3.00
Data File	LM37575.wiff	**Injection Volume**	10.00
Acquisition Date	11/10/2016 10:58:48 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Quality Control
Instrument Name	API 4000	**Result Table**	111016_JWR.rdb
Sample ID	WG591040-02	**Dilution Factor**	1.00
Sample Comment	1,1 STD78249	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.070e+05	9.59	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.350e+05	9.61	1.00	0.982
Perchlorate conf	4.650e+04	9.59	1.00	1.00

O18LP (Internal Standard)

RT (Exp. RT): 9.59(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Quality Control)



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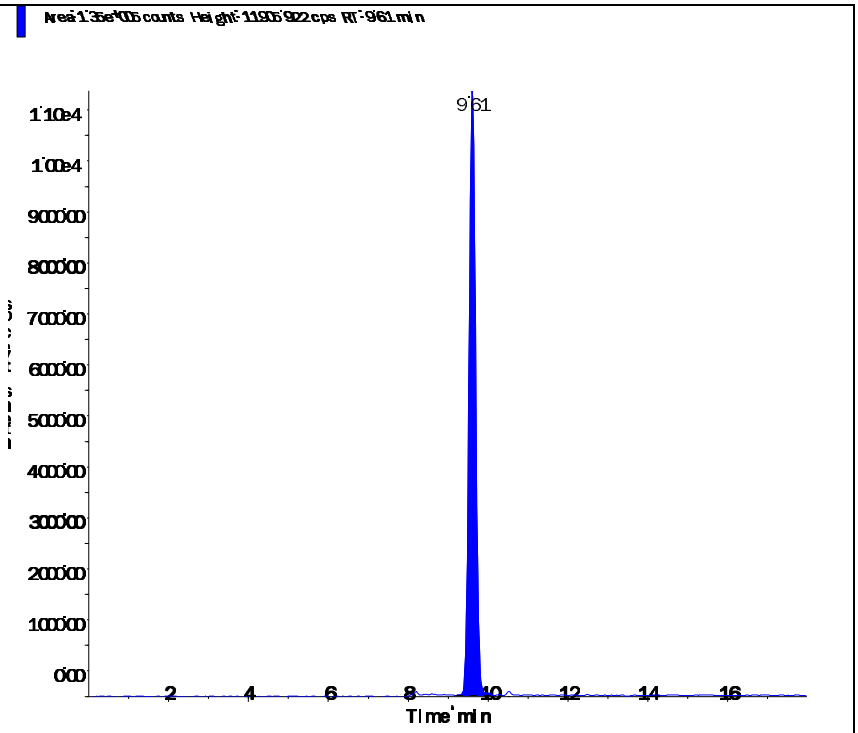
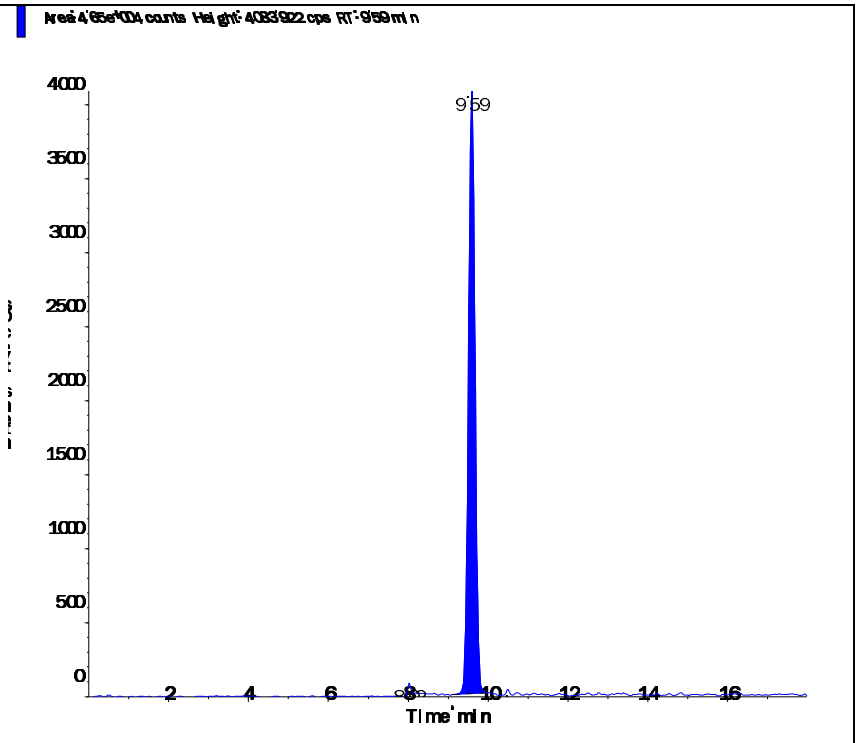
Perchlorate (98.8/83.3 amu)	
RT (Exp. RT):	9.61 (9.84) min
Calculated conc:	0.982 ng/ml
Area Ratio:	0.332
Sample Type:	(Quality Control)



Perchlorate conf (100.8/85.2 amu)	
RT (Exp. RT):	9.59 (9.84) min
Calculated conc:	1.00 ng/ml
Area Ratio:	0.114
Sample Type:	(Quality Control)



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Printed: 11/11/2016 11:32 AM

Data File	LM37587.wiff	**Result Table**	111016_JWR.rdb
Acquisition Date	11/10/2016 2:46:03 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

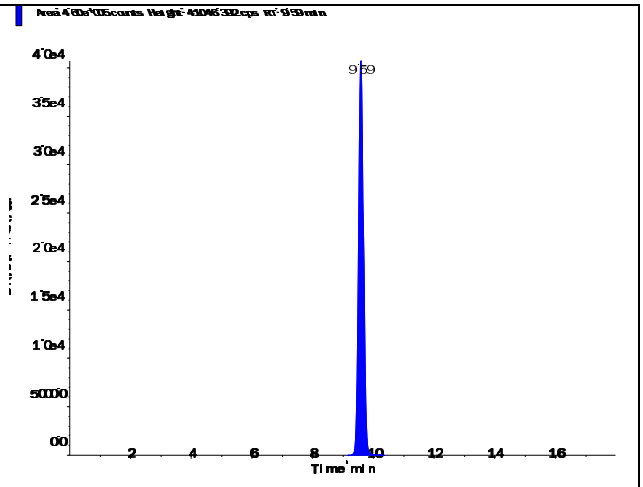
Sample Name	WG591040-03 CCV (1.0ug/L)	**Injection Vial**	3.00
Data File	LM37587.wiff	**Injection Volume**	10.00
Acquisition Date	11/10/2016 2:46:03 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Quality Control
Instrument Name	API 4000	**Result Table**	111016_JWR.rdb
Sample ID	WG591040-03	**Dilution Factor**	1.00
Sample Comment	1,1 STD78249	**Weight to Volume**	0.00

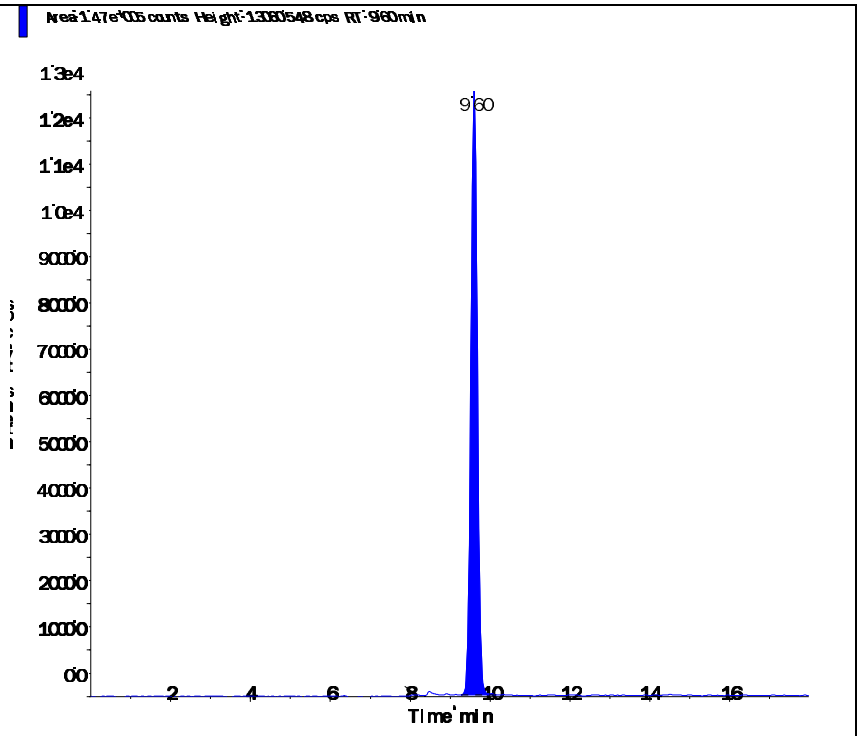
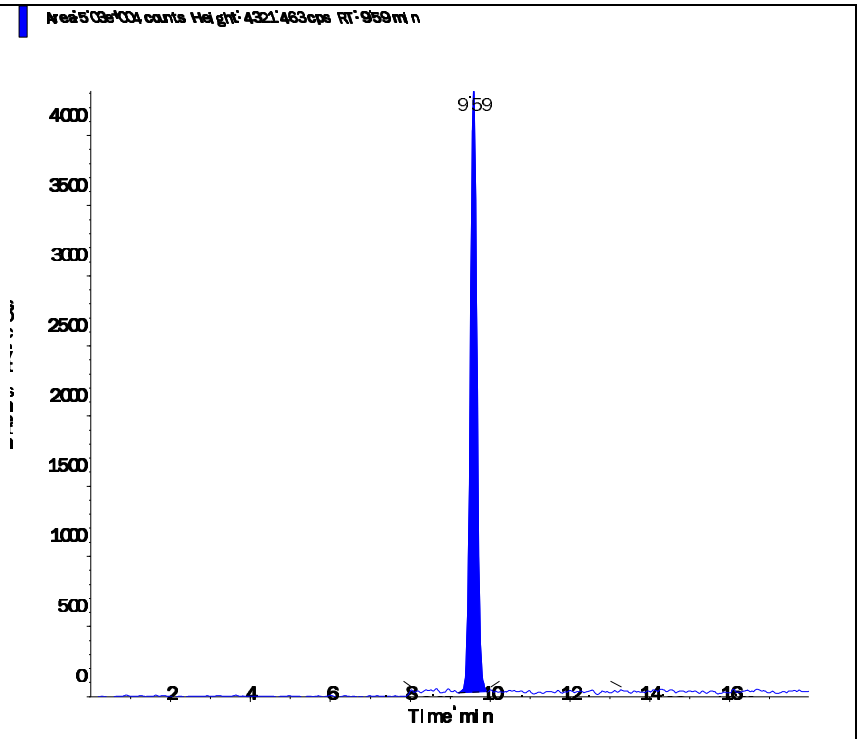
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.600e+05	9.59	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.470e+05	9.60	1.00	0.946
Perchlorate conf	5.030e+04	9.59	1.00	0.958

O18LP (Internal Standard)

RT (Exp. RT): 9.59(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Quality Control)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.60 (9.84) min Calculated conc: 0.946 ng/ml Area Ratio: 0.319 Sample Type: (Quality Control)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.59 (9.84) min Calculated conc: 0.958 ng/ml Area Ratio: 0.109 Sample Type: (Quality Control)	

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Data File	LM37599.wiff	**Result Table**	111016_JWR.rdb
Acquisition Date	11/10/2016 6:33:20 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

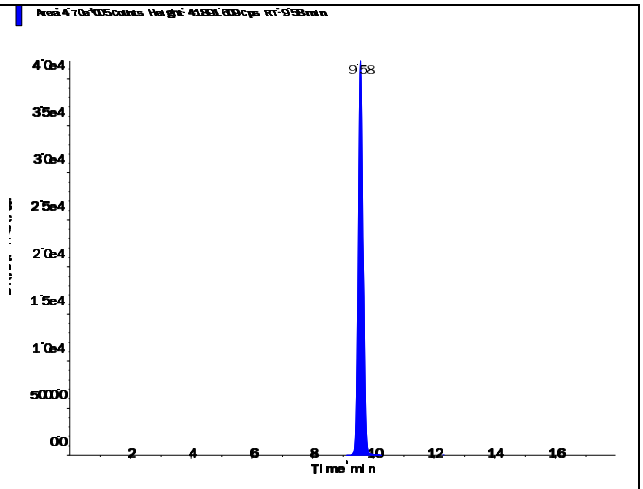
Sample Name	WG591040-05 CCV (1.0ug/L)	**Injection Vial**	3.00
Data File	LM37599.wiff	**Injection Volume**	10.00
Acquisition Date	11/10/2016 6:33:20 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Quality Control
Instrument Name	API 4000	**Result Table**	111016_JWR.rdb
Sample ID	WG591040-05	**Dilution Factor**	1.00
Sample Comment	1,1 STD78249	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.700e+05	9.58	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.520e+05	9.59	1.00	0.96
Perchlorate conf	5.080e+04	9.58	1.00	0.948

O18LP (Internal Standard)

RT (Exp. RT): 9.58(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Quality Control)



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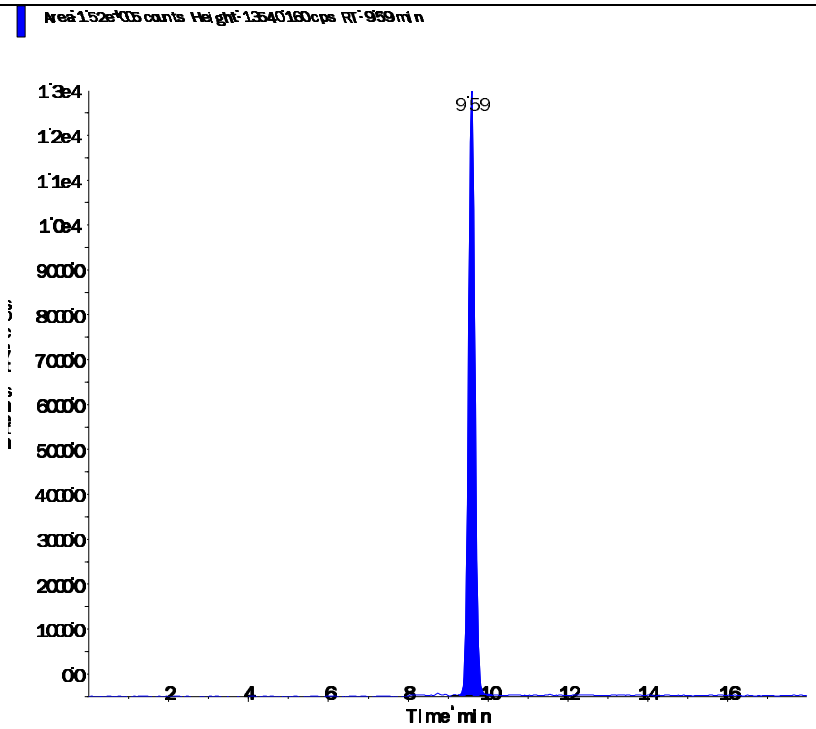
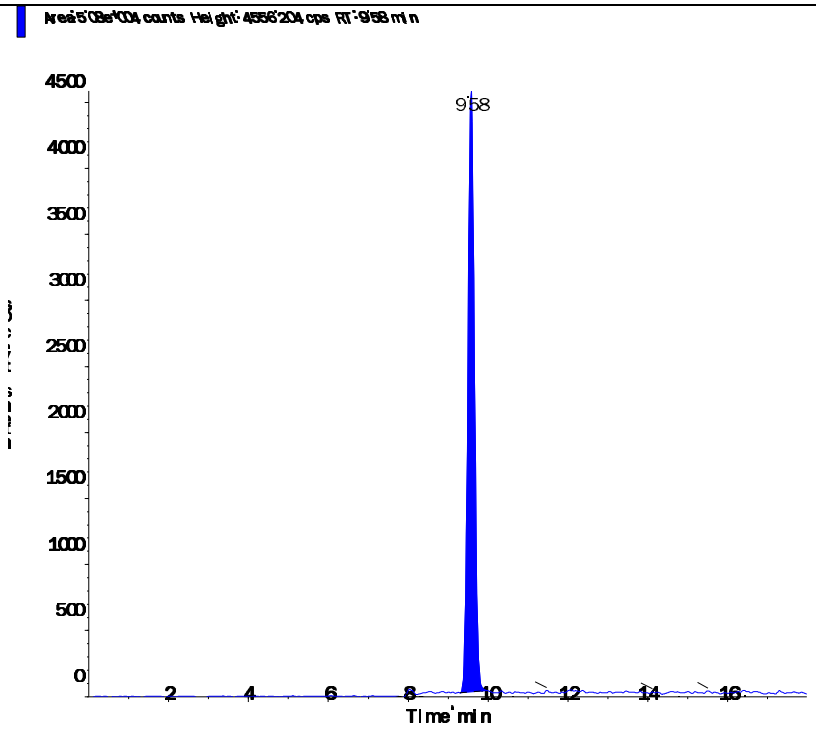
Printed: 11/11/2016 11:36 AM

Perchlorate (98.8/83.3 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	 9.59 (9.84) min 0.96 ng/ml 0.324 (Quality Control)



Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	 9.58 (9.84) min 0.948 ng/ml 0.108 (Quality Control)



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Printed: 11/11/2016 11:39 AM

Data File	LM37605.wiff	**Result Table**	111016_JWR.rdb
Acquisition Date	11/10/2016 8:26:54 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

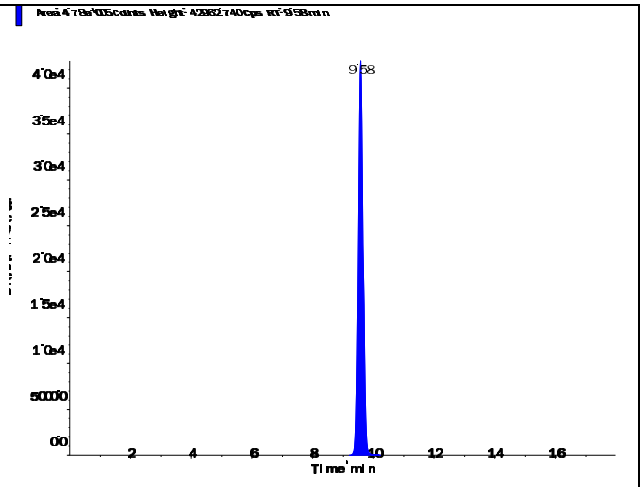
Sample Name	WG591040-07 CCV (1.0ug/L)	**Injection Vial**	3.00
Data File	LM37605.wiff	**Injection Volume**	10.00
Acquisition Date	11/10/2016 8:26:54 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Quality Control
Instrument Name	API 4000	**Result Table**	111016_JWR.rdb
Sample ID	WG591040-07	**Dilution Factor**	1.00
Sample Comment	1,1 STD78249	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.780e+05	9.58	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.550e+05	9.59	1.00	0.96
Perchlorate conf	5.240e+04	9.58	1.00	0.962

O18LP (Internal Standard)

RT (Exp. RT): 9.58(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Quality Control)



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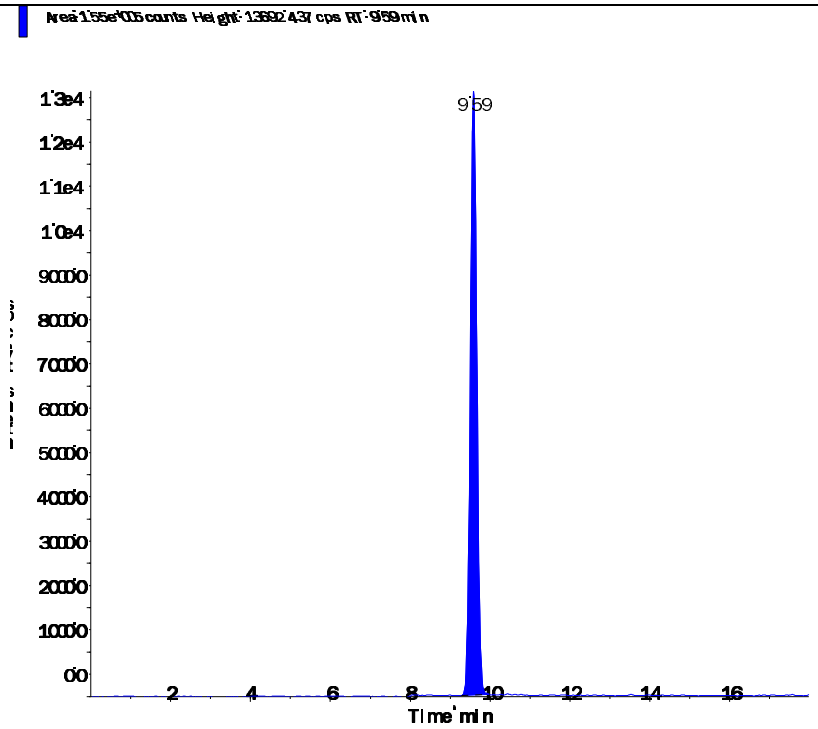
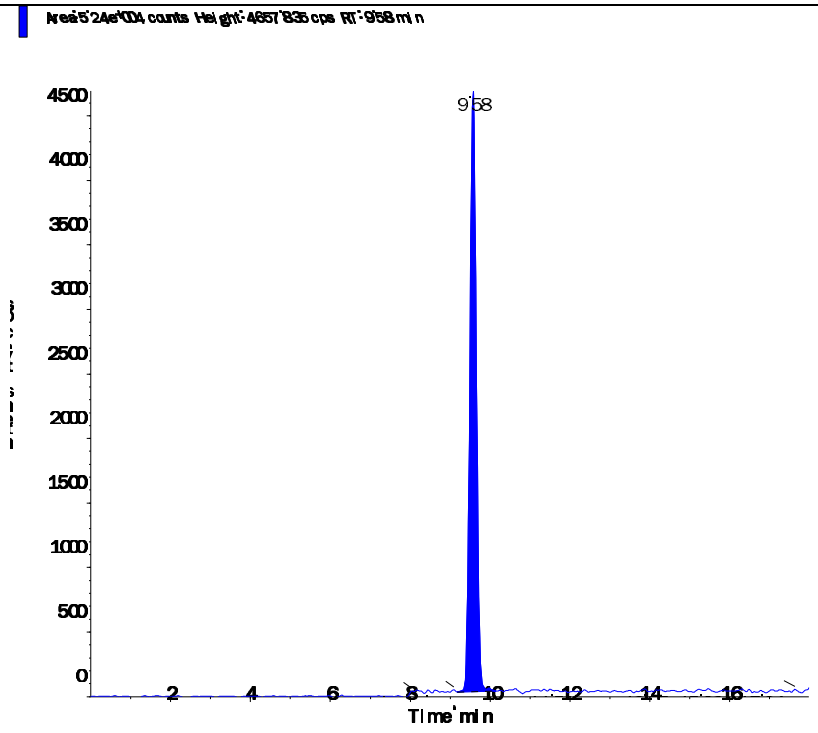
Perchlorate (98.8/83.3 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	 9.59 (9.84) min 0.96 ng/ml 0.324 (Quality Control)



Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	 9.58 (9.84) min 0.962 ng/ml 0.11 (Quality Control)



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Data File	LM37576.wiff	**Result Table**	111016_JWR.rdb
Acquisition Date	11/10/2016 11:17:44 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

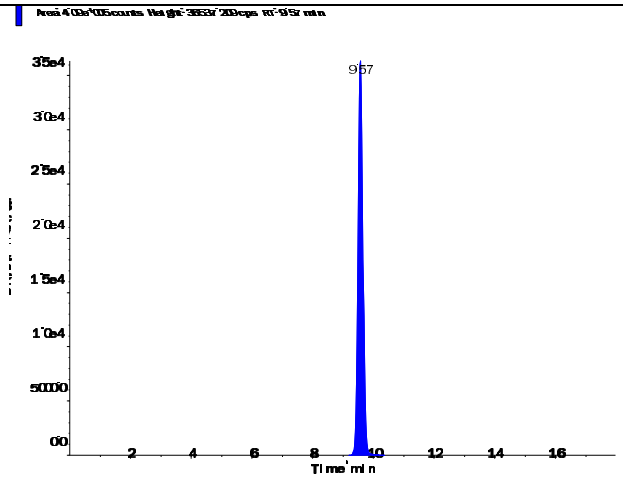
Sample Name	WG591037-10 MRL (0.2ug/L)	**Injection Vial**	2.00
Data File	LM37576.wiff	**Injection Volume**	10.00
Acquisition Date	11/10/2016 11:17:44 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	111016_JWR.rdb
Sample ID	WG591037-10	**Dilution Factor**	1.00
Sample Comment	1,1 STD78249	**Weight to Volume**	0.00

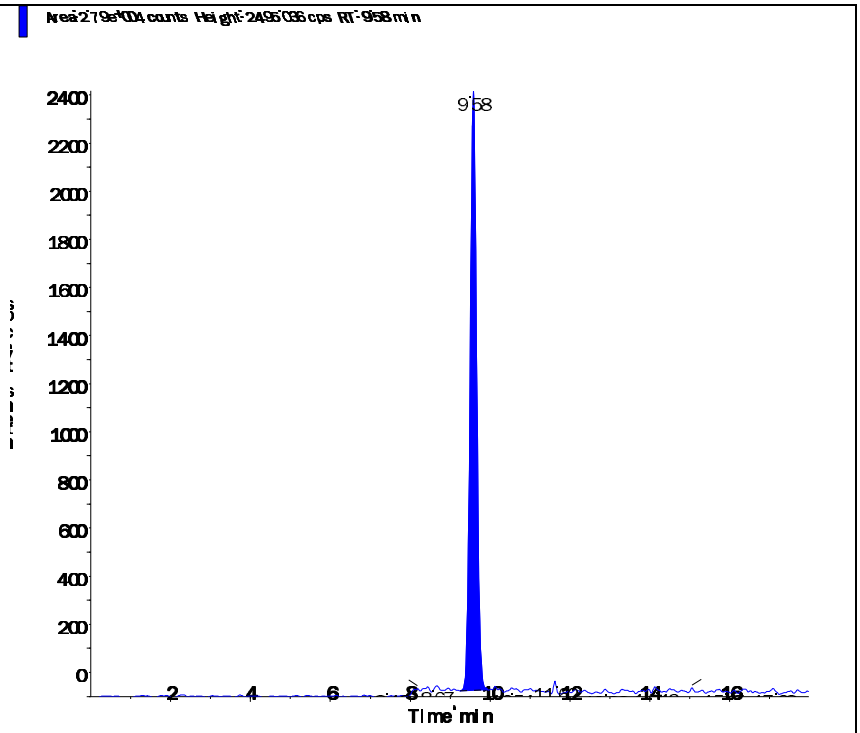
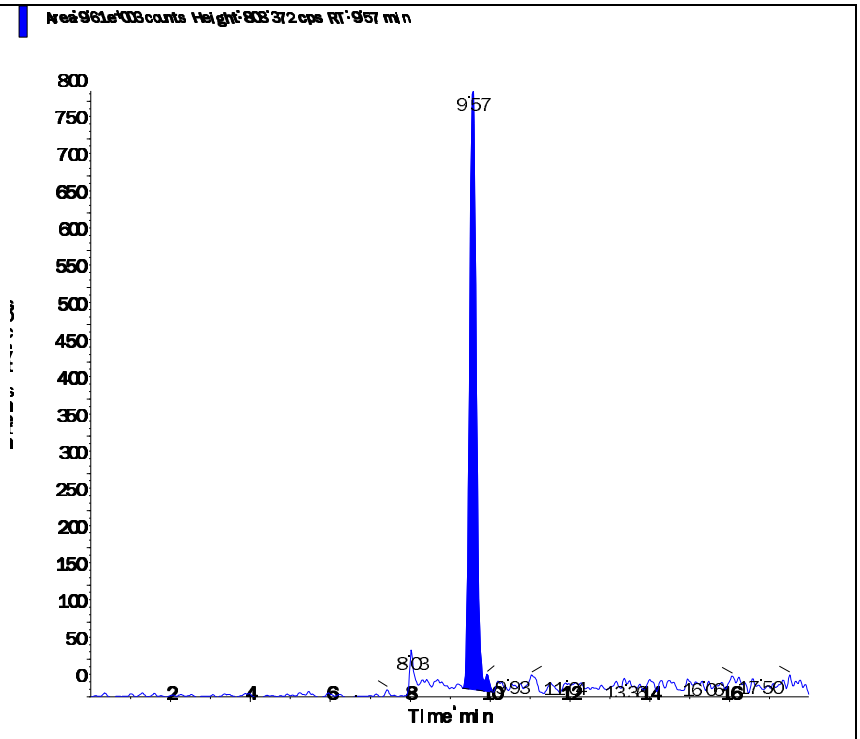
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.090e+05	9.57	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	2.790e+04	9.58	N/A	0.199
Perchlorate conf	9.610e+03	9.57	N/A	0.19

O18LP (Internal Standard)

RT (Exp. RT): 9.57(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.58 (9.84) min Calculated conc: 0.199 ng/ml Area Ratio: 0.068 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.57 (9.84) min Calculated conc: 0.19 ng/ml Area Ratio: 0.023 Sample Type: (Unknown)	

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Data File	LM37588.wiff	**Result Table**	111016_JWR.rdb
Acquisition Date	11/10/2016 3:04:58 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

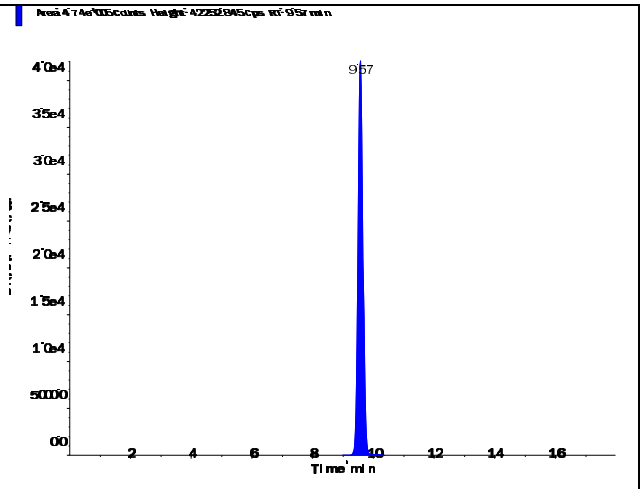
Sample Name	WG591037-11 MRL (0.2ug/L)	**Injection Vial**	2.00
Data File	LM37588.wiff	**Injection Volume**	10.00
Acquisition Date	11/10/2016 3:04:58 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	111016_JWR.rdb
Sample ID	WG591037-11	**Dilution Factor**	1.00
Sample Comment	1,1 STD78249	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.740e+05	9.57	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	3.280e+04	9.58	N/A	0.202
Perchlorate conf	1.150e+04	9.57	N/A	0.198

O18LP (Internal Standard)

RT (Exp. RT): 9.57(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



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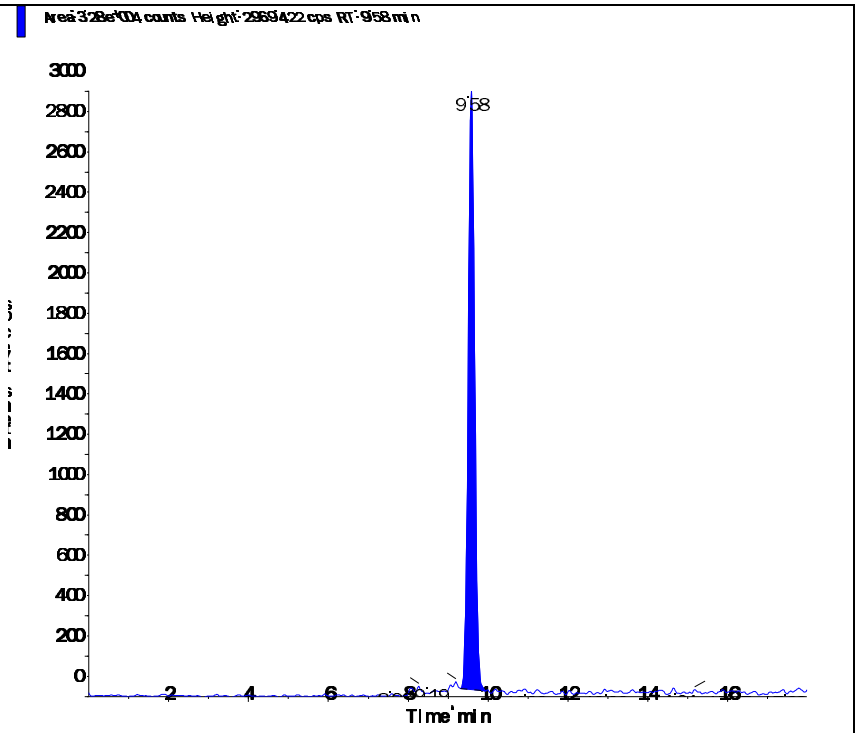
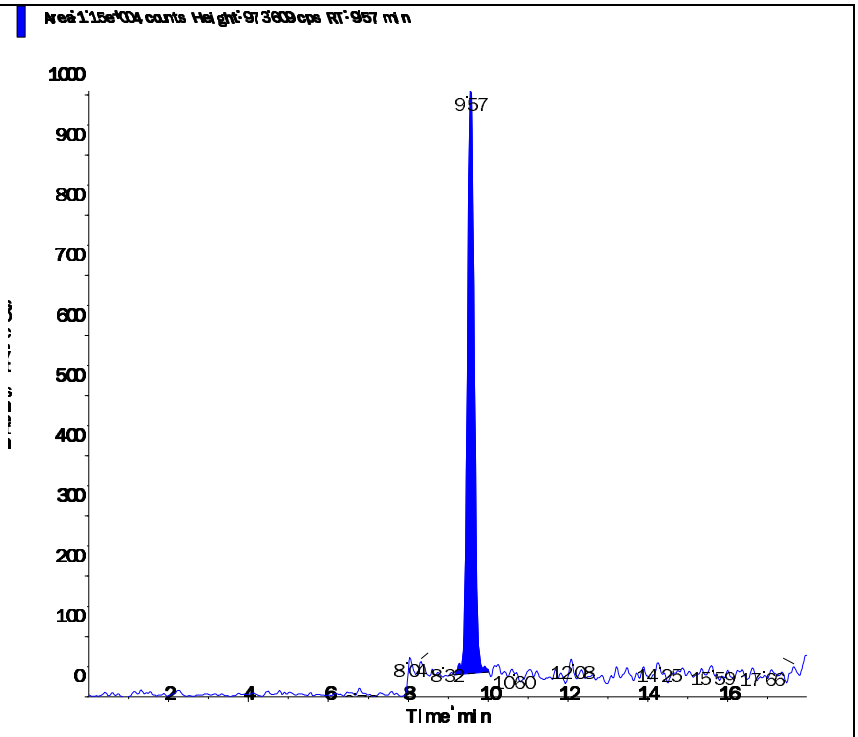
Printed: 11/11/2016 11:33 AM

Perchlorate (98.8/83.3 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	 9.58 (9.84) min 0.202 ng/ml 0.069 (Unknown)



Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	 9.57 (9.84) min 0.198 ng/ml 0.024 (Unknown)



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Data File	LM37600.wiff	**Result Table**	111016_JWR.rdb
Acquisition Date	11/10/2016 6:52:15 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

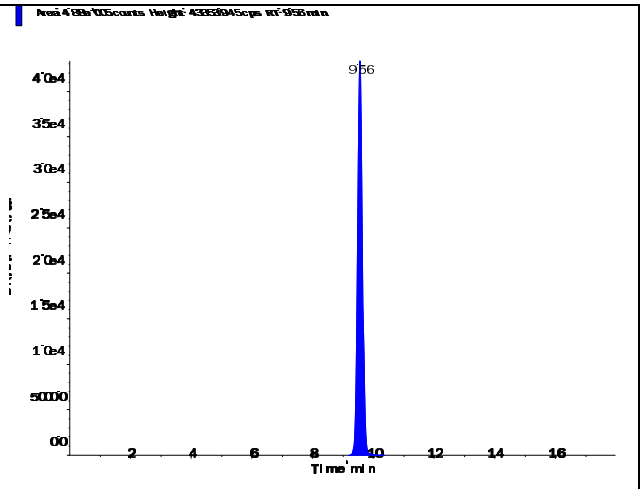
Sample Name	WG591037-12 MRL (0.2ug/L)	**Injection Vial**	2.00
Data File	LM37600.wiff	**Injection Volume**	10.00
Acquisition Date	11/10/2016 6:52:15 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	111016_JWR.rdb
Sample ID	WG591037-12	**Dilution Factor**	1.00
Sample Comment	1,1 STD78249	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.880e+05	9.56	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	3.430e+04	9.57	N/A	0.205
Perchlorate conf	1.190e+04	9.56	N/A	0.199

O18LP (Internal Standard)

RT (Exp. RT): 9.56(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



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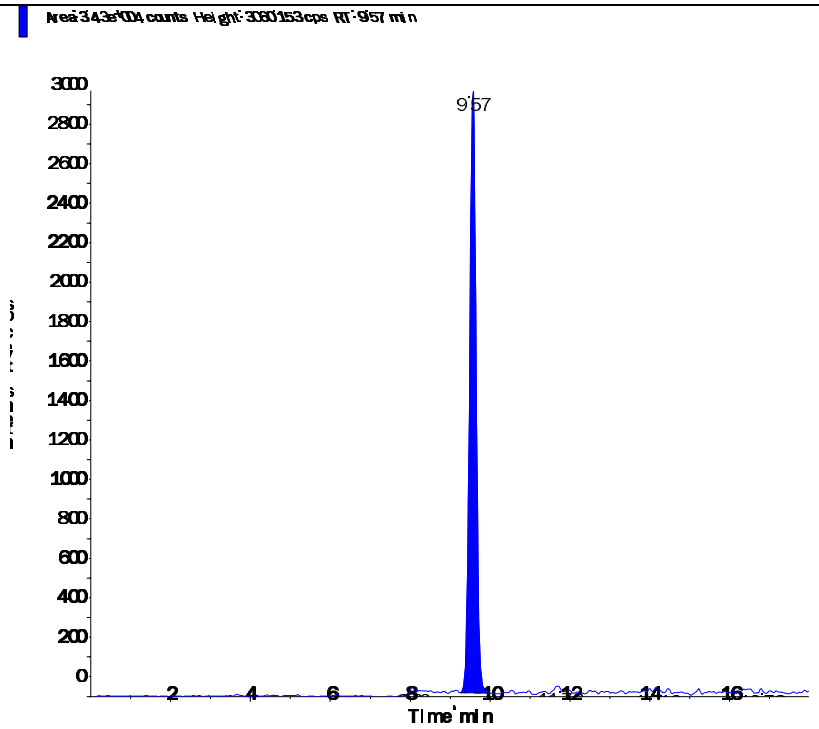
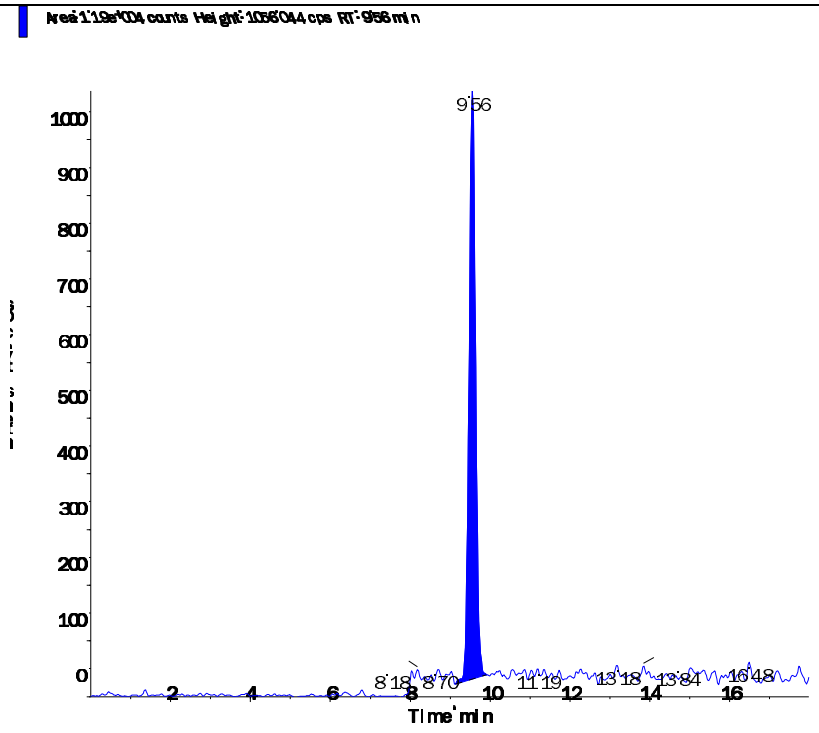
Perchlorate (98.8/83.3 amu)	
RT (Exp. RT):	9.57 (9.84) min
Calculated conc:	0.205 ng/ml
Area Ratio:	0.07
Sample Type:	(Unknown)



Perchlorate conf (100.8/85.2 amu)	
RT (Exp. RT):	9.56 (9.84) min
Calculated conc:	0.199 ng/ml
Area Ratio:	0.024
Sample Type:	(Unknown)



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Data File	LM37606.wiff	**Result Table**	111016_JWR.rdb
Acquisition Date	11/10/2016 8:45:49 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

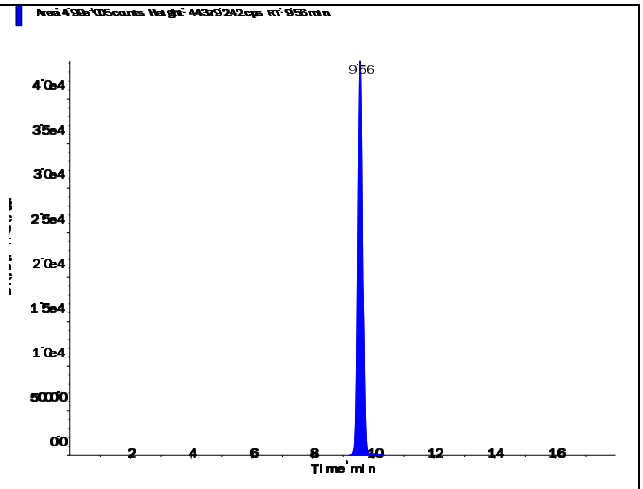
Sample Name	WG591037-13 MRL (0.2ug/L)	**Injection Vial**	2.00
Data File	LM37606.wiff	**Injection Volume**	10.00
Acquisition Date	11/10/2016 8:45:49 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	111016_JWR.rdb
Sample ID	WG591037-13	**Dilution Factor**	1.00
Sample Comment	1,1 STD78249	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.990e+05	9.56	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	3.440e+04	9.58	N/A	0.201
Perchlorate conf	1.190e+04	9.56	N/A	0.194

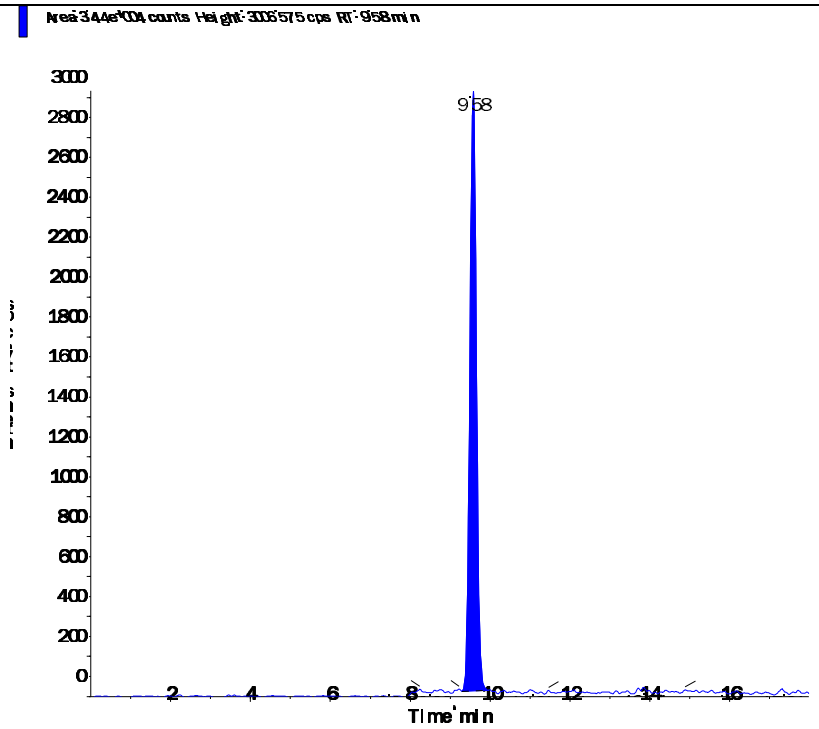
O18LP (Internal Standard)

RT (Exp. RT): 9.56(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



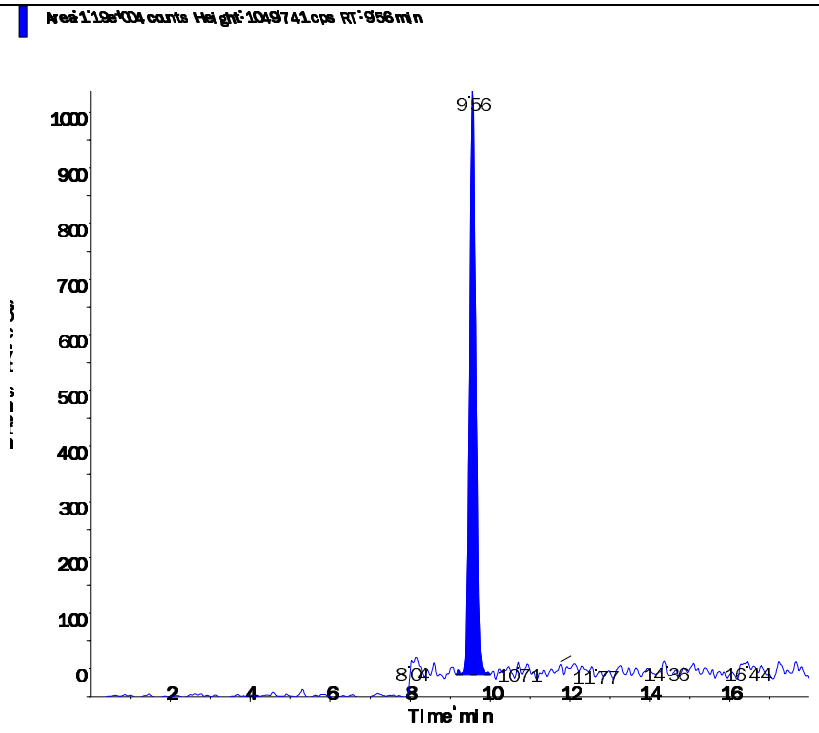
Perchlorate (98.8/83.3 amu)

RT (Exp. RT):	9.58 (9.84) min
Calculated conc:	0.201 ng/ml
Area Ratio:	0.069
Sample Type:	(Unknown)



Perchlorate conf (100.8/85.2 amu)

RT (Exp. RT):	9.56 (9.84) min
Calculated conc:	0.194 ng/ml
Area Ratio:	0.024
Sample Type:	(Unknown)



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Data File	LM37574.wiff	**Result Table**	111016_JWR.rdb
Acquisition Date	11/10/2016 10:39:53 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

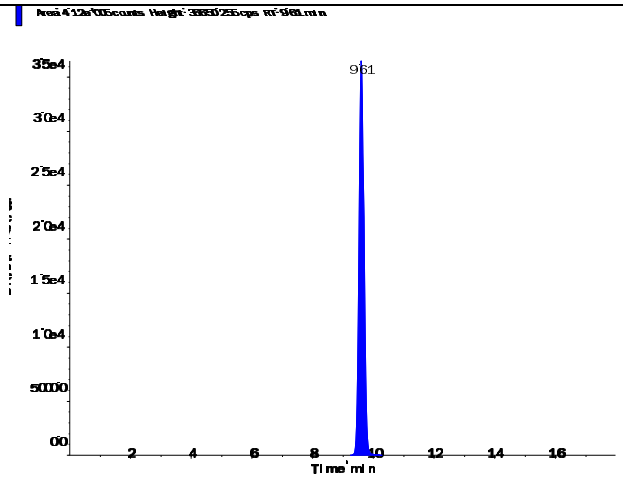
Sample Name	WG591040-01 CCB	**Injection Vial**	1.00
Data File	LM37574.wiff	**Injection Volume**	10.00
Acquisition Date	11/10/2016 10:39:53 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	111016_JWR.rdb
Sample ID	WG591040-01	**Dilution Factor**	1.00
Sample Comment	11.00	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.120e+05	9.61	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	0.000e+00	0.00	N/A	No Peak
Perchlorate conf	0.000e+00	0.00	N/A	No Peak

O18LP (Internal Standard)

RT (Exp. RT): 9.61(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



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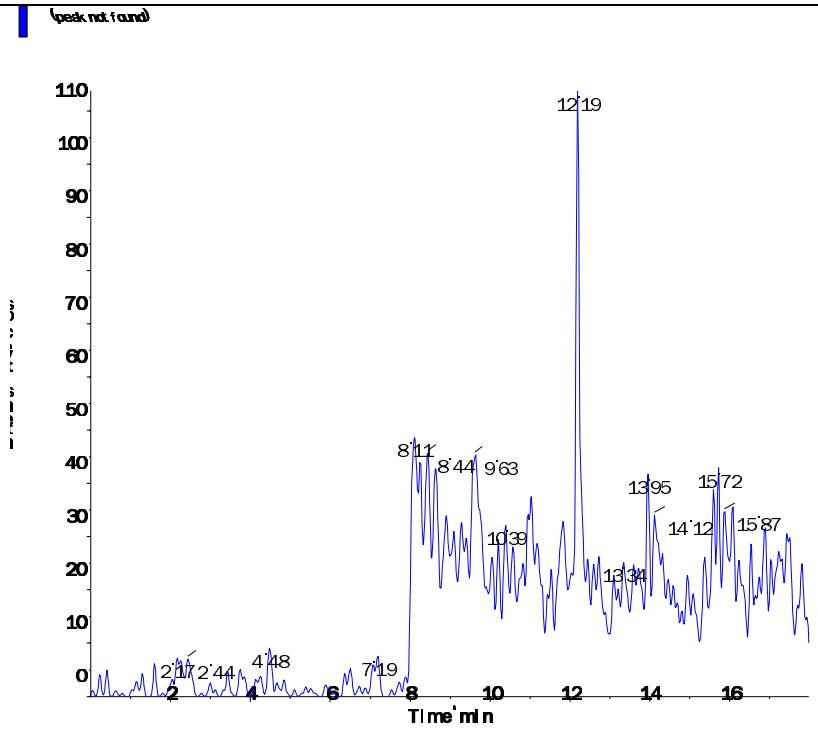
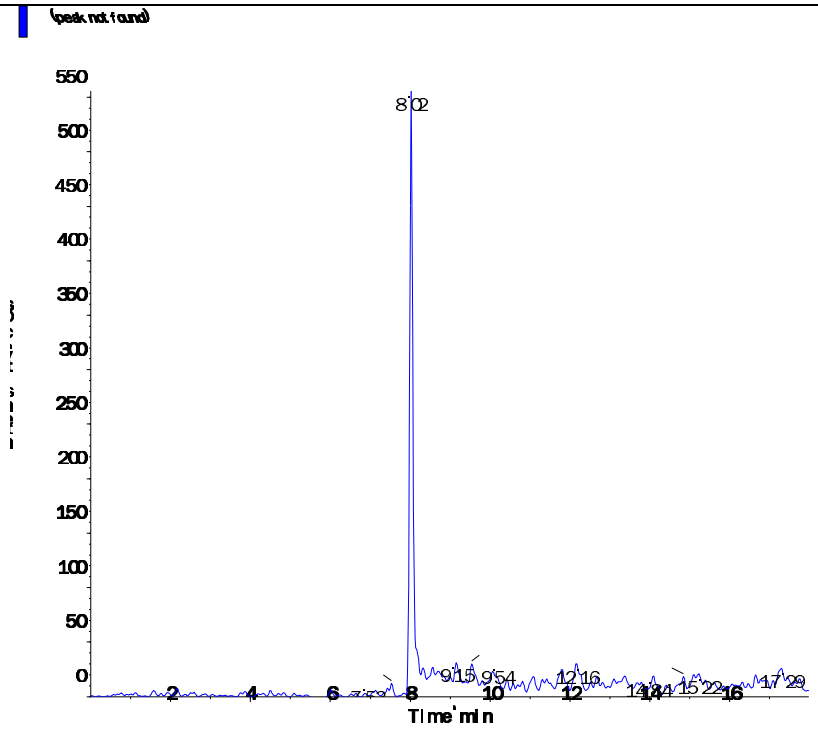
Perchlorate (98.8/83.3 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	 0.00 (9.84) min No Peak ng/ml 0.00 (Unknown)



Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	 0.00 (9.84) min No Peak ng/ml 0.00 (Unknown)



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Printed: 11/11/2016 11:33 AM

Data File	LM37589.wiff	**Result Table**	111016_JWR.rdb
Acquisition Date	11/10/2016 3:23:54 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

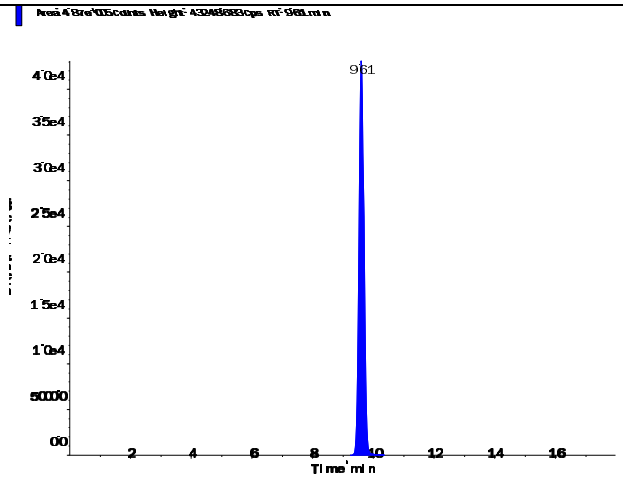
Sample Name	WG591040-04 CCB	**Injection Vial**	1.00
Data File	LM37589.wiff	**Injection Volume**	10.00
Acquisition Date	11/10/2016 3:23:54 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	111016_JWR.rdb
Sample ID	WG591040-04	**Dilution Factor**	1.00
Sample Comment	11.00	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.870e+05	9.61	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	0.000e+00	0.00	N/A	No Peak
Perchlorate conf	3.800e+02	9.56	N/A	< 0

O18LP (Internal Standard)

RT (Exp. RT): 9.61(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



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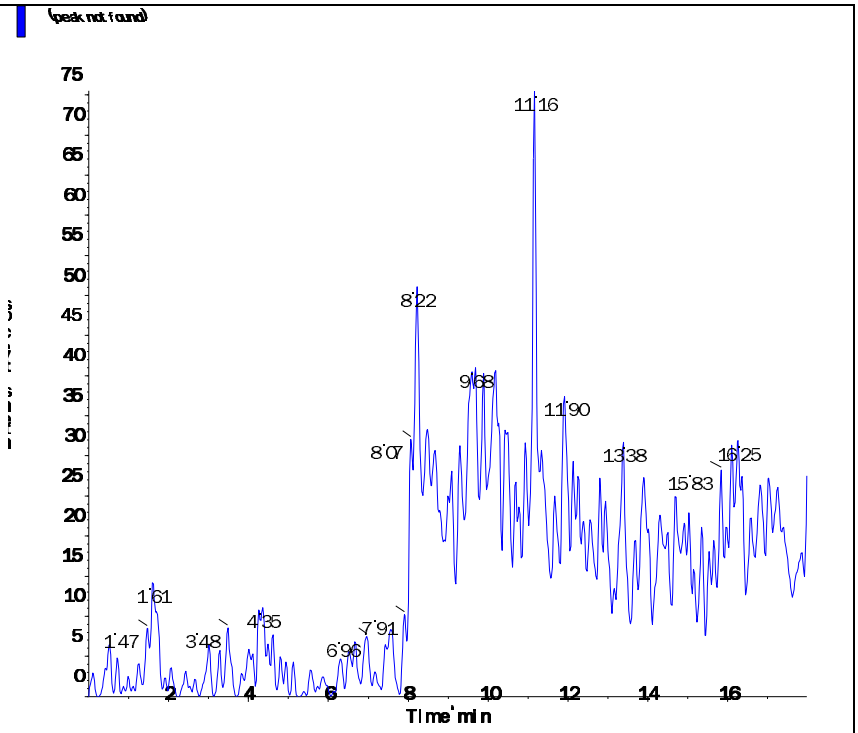
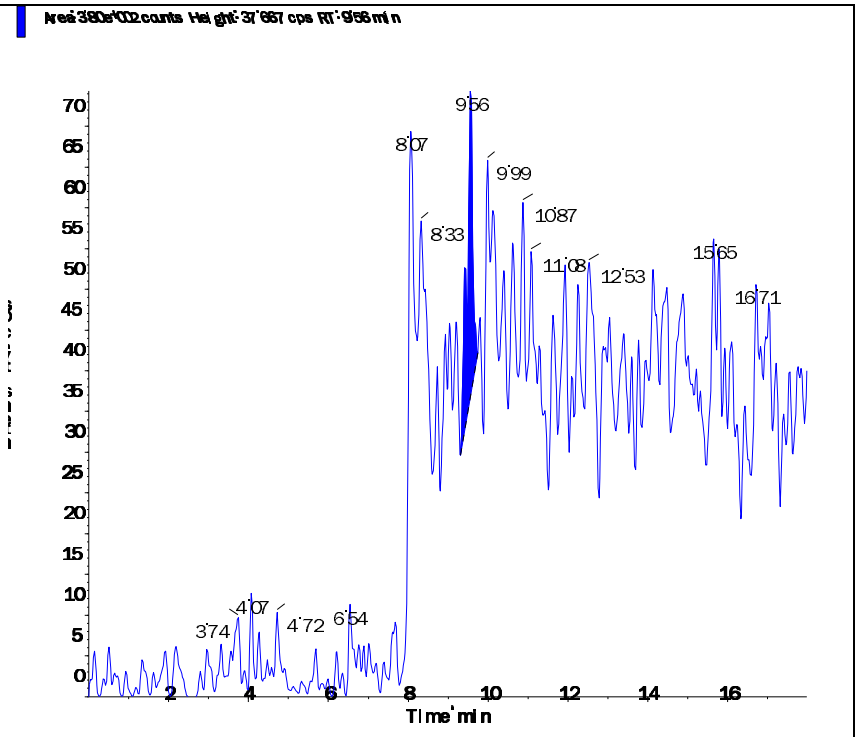
Perchlorate (98.8/83.3 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	 0.00 (9.84) min No Peak ng/ml 0.00 (Unknown)



Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	 9.56 (9.84) min < 0 ng/ml 0.001 (Unknown)



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Printed: 11/11/2016 11:37 AM

Data File	LM37601.wiff	**Result Table**	111016_JWR.rdb
Acquisition Date	11/10/2016 7:11:11 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

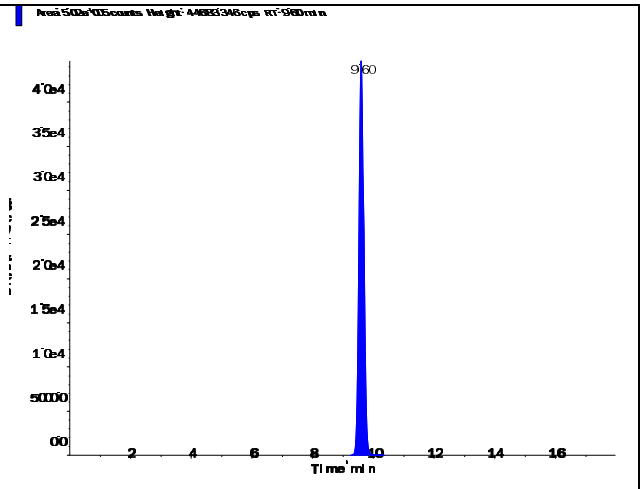
Sample Name	WG591040-06 CCB	**Injection Vial**	1.00
Data File	LM37601.wiff	**Injection Volume**	10.00
Acquisition Date	11/10/2016 7:11:11 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	111016_JWR.rdb
Sample ID	WG591040-06	**Dilution Factor**	1.00
Sample Comment	11.00	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	5.020e+05	9.60	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	0.000e+00	0.00	N/A	No Peak
Perchlorate conf	0.000e+00	0.00	N/A	No Peak

O18LP (Internal Standard)

RT (Exp. RT): 9.60(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



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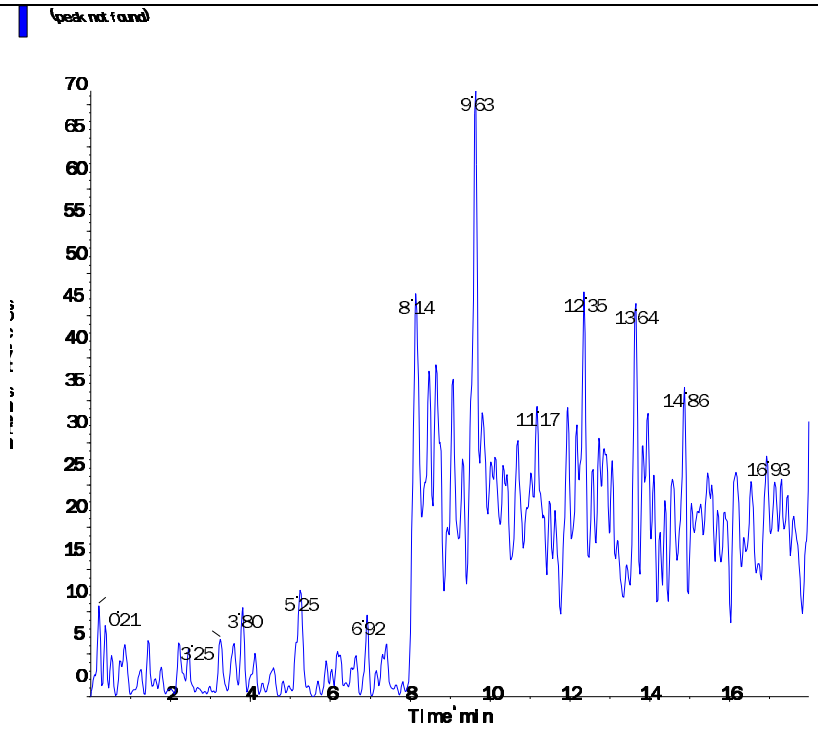
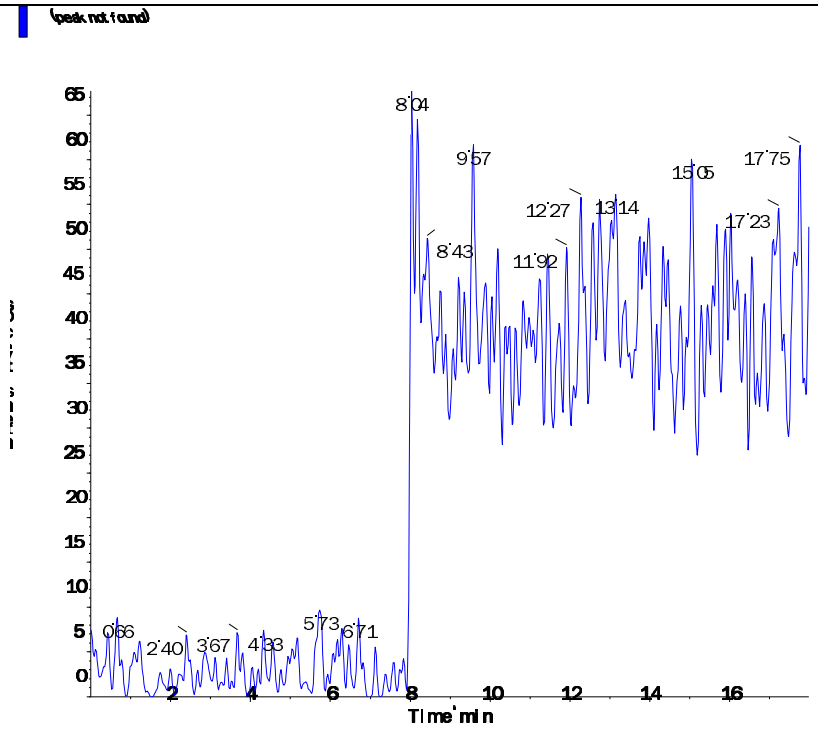
Perchlorate (98.8/83.3 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	 0.00 (9.84) min No Peak ng/ml 0.00 (Unknown)



Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	 0.00 (9.84) min No Peak ng/ml 0.00 (Unknown)



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Printed: 11/11/2016 11:39 AM

Data File	LM37607.wiff	**Result Table**	111016_JWR.rdb
Acquisition Date	11/10/2016 9:04:45 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

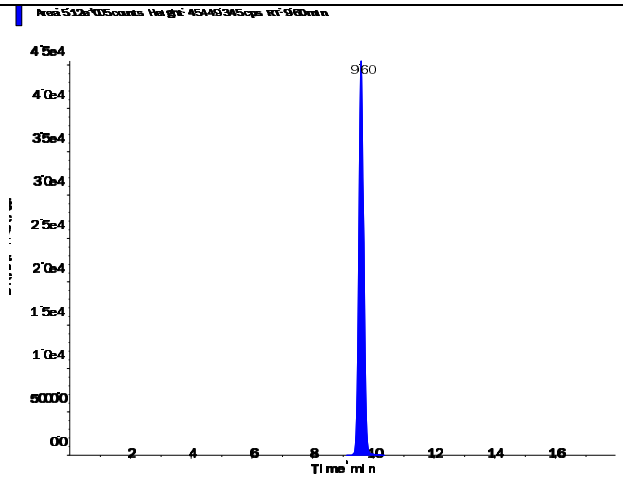
Sample Name	WG591040-08 CCB	**Injection Vial**	1.00
Data File	LM37607.wiff	**Injection Volume**	10.00
Acquisition Date	11/10/2016 9:04:45 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	111016_JWR.rdb
Sample ID	WG591040-08	**Dilution Factor**	1.00
Sample Comment	11.00	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	5.120e+05	9.60	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	0.000e+00	0.00	N/A	No Peak
Perchlorate conf	0.000e+00	0.00	N/A	No Peak

O18LP (Internal Standard)

RT (Exp. RT): 9.60(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



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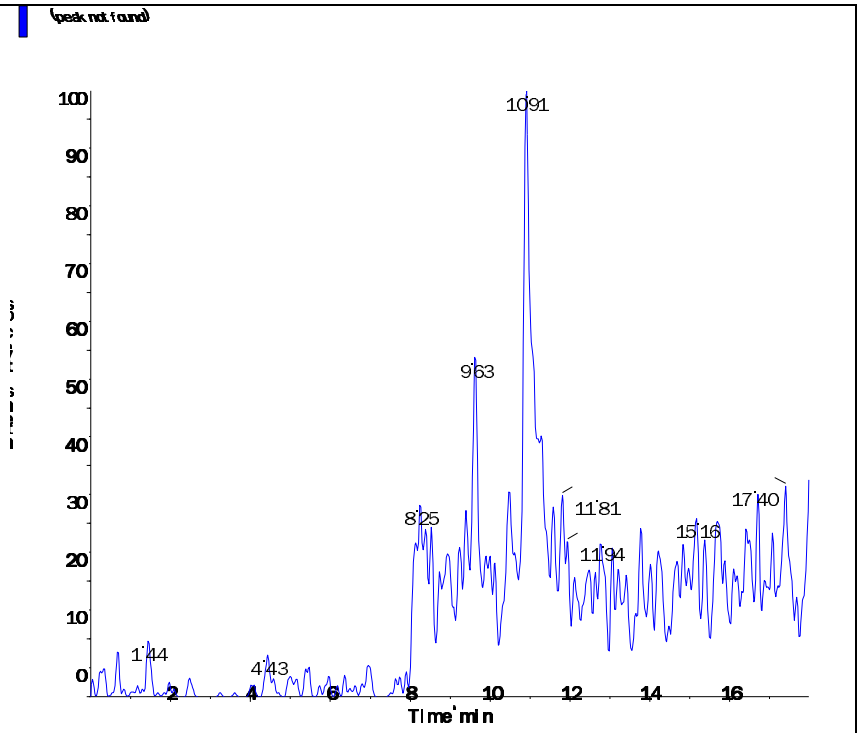
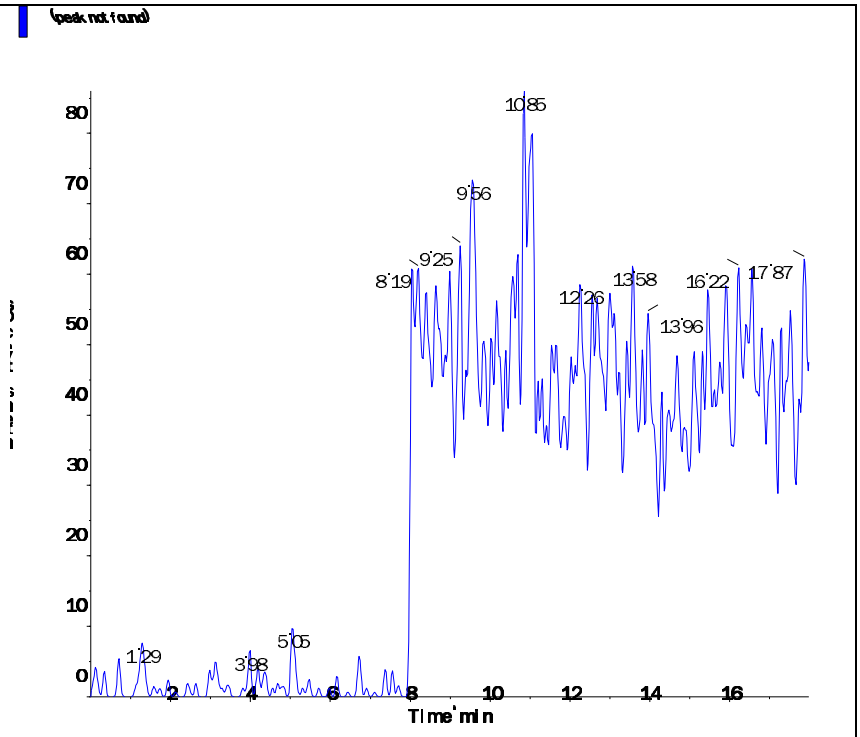
Perchlorate (98.8/83.3 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	0.00 (9.84) min No Peak ng/ml 0.00 (Unknown)



Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	0.00 (9.84) min No Peak ng/ml 0.00 (Unknown)



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Data File	LM37577.wiff	**Result Table**	111016_JWR.rdb
Acquisition Date	11/10/2016 11:36:40 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

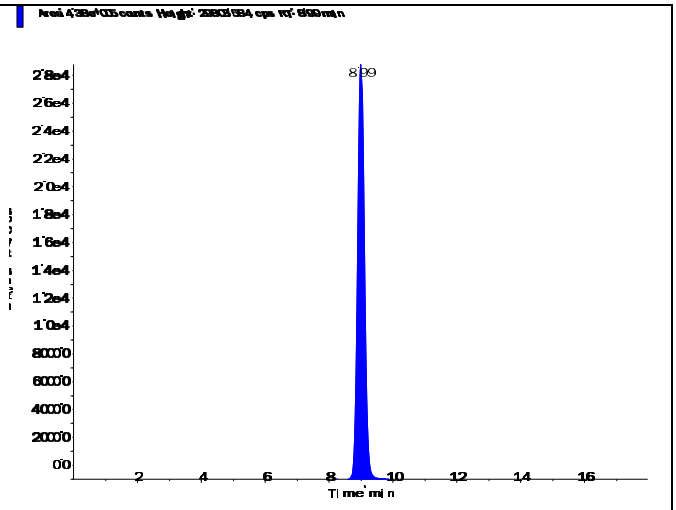
Sample Name	WG591037-01 MCT (0.2ug/L)	**Injection Vial**	4.00
Data File	LM37577.wiff	**Injection Volume**	10.00
Acquisition Date	11/10/2016 11:36:40 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	111016_JWR.rdb
Sample ID	WG591037-01	**Dilution Factor**	1.00
Sample Comment	1,1 STD78251	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.380e+05	8.99	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	2.790e+04	9.00	N/A	0.186
Perchlorate conf	8.870e+03	8.99	N/A	0.161

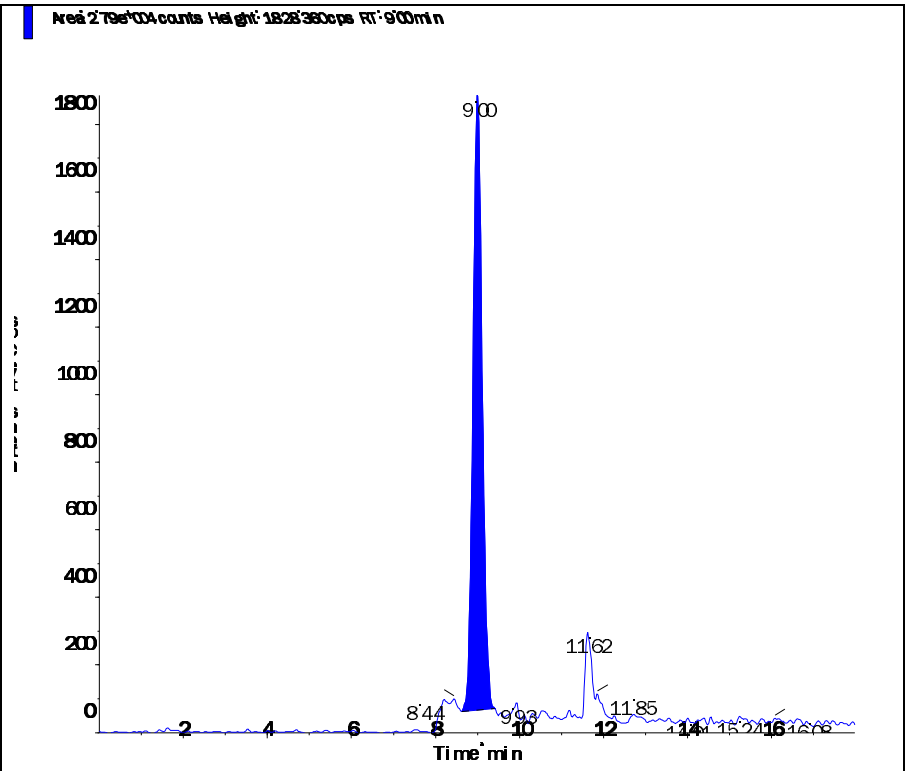
O18LP (Internal Standard)

RT (Exp. RT): 8.99(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



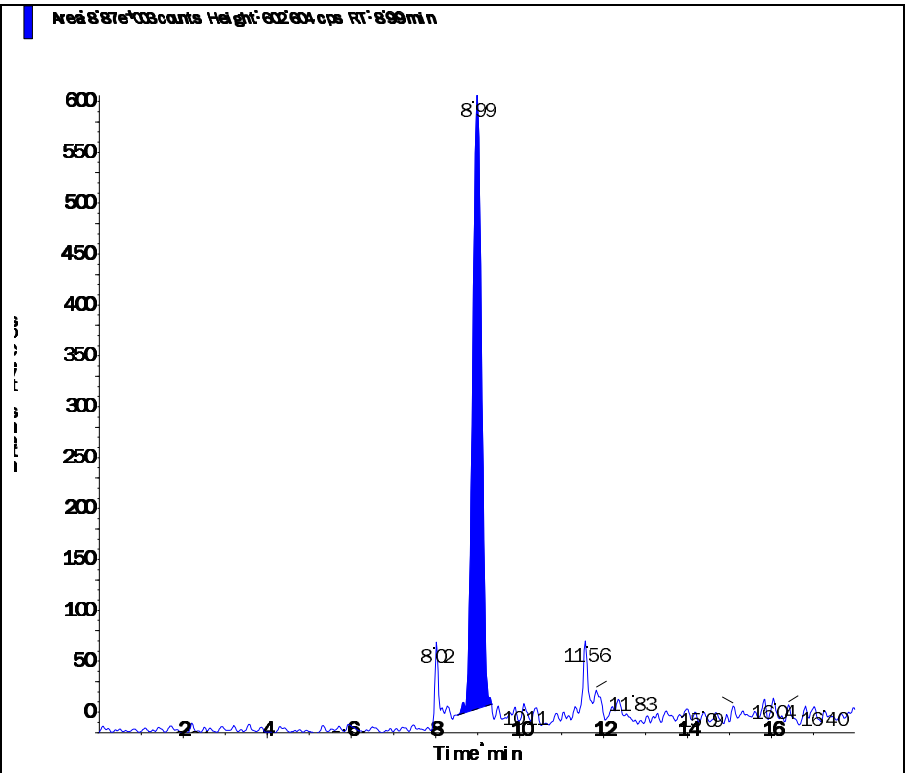
Perchlorate (98.8/83.3 amu)

RT (Exp. RT):	9.00 (9.84) min
Calculated conc:	0.186 ng/ml
Area Ratio:	0.064
Sample Type:	(Unknown)



Perchlorate conf (100.8/85.2 amu)

RT (Exp. RT):	8.99 (9.84) min
Calculated conc:	0.161 ng/ml
Area Ratio:	0.02
Sample Type:	(Unknown)



2.1.1.5 Raw QC Data

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Data File	LM37578.wiff	**Result Table**	111016_JWR.rdb
Acquisition Date	11/10/2016 11:55:37 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

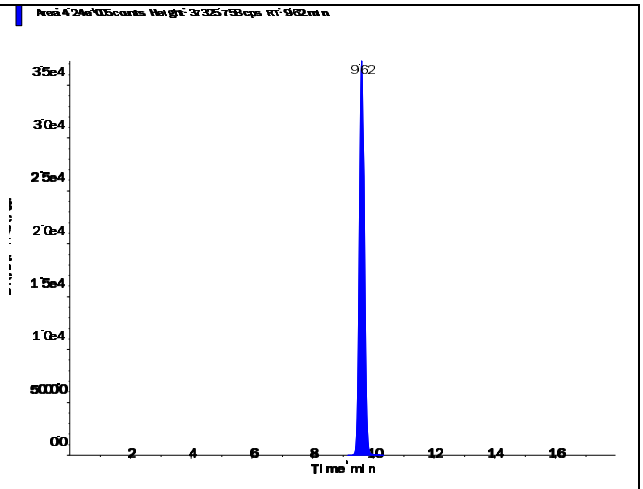
Sample Name	WG591037-02 BLANK	**Injection Vial**	5.00
Data File	LM37578.wiff	**Injection Volume**	10.00
Acquisition Date	11/10/2016 11:55:37 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	111016_JWR.rdb
Sample ID	WG591037-02	**Dilution Factor**	1.00
Sample Comment	11.00	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.240e+05	9.62	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	0.000e+00	0.00	N/A	No Peak
Perchlorate conf	0.000e+00	0.00	N/A	No Peak

O18LP (Internal Standard)

RT (Exp. RT): 9.62(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



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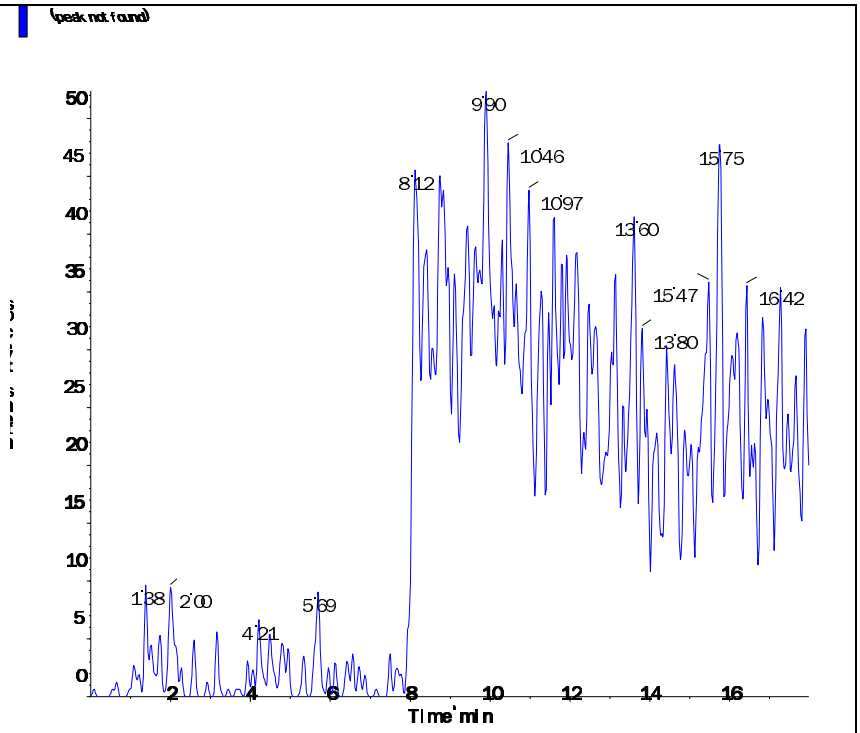
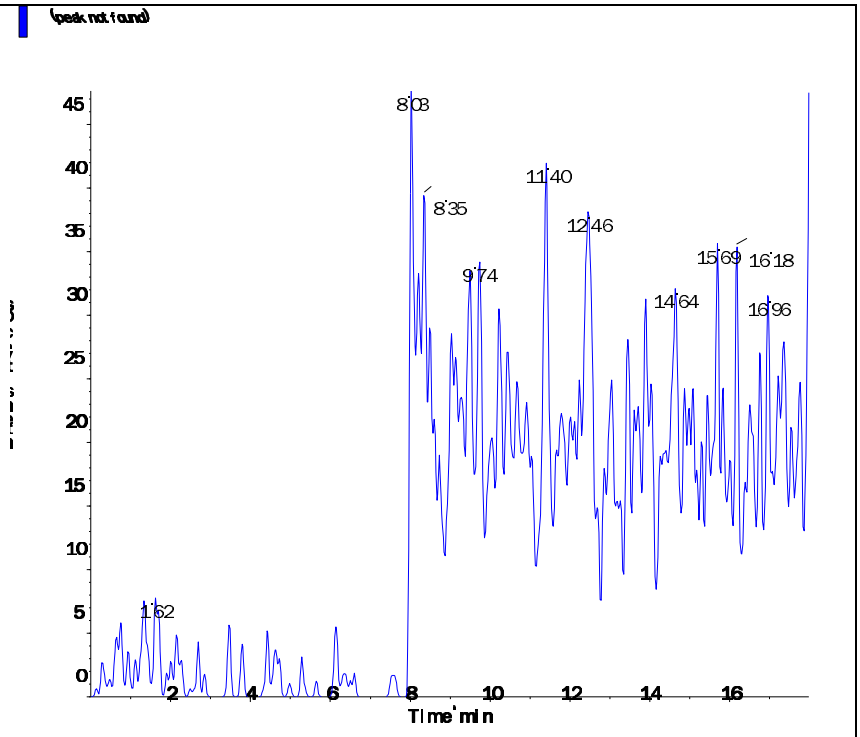
Printed: 11/11/2016 11:29 AM

Perchlorate (98.8/83.3 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	0.00 (9.84) min No Peak ng/ml 0.00 (Unknown)



Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	0.00 (9.84) min No Peak ng/ml 0.00 (Unknown)



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Data File	LM37579.wiff	**Result Table**	111016_JWR.rdb
Acquisition Date	11/10/2016 12:14:33 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

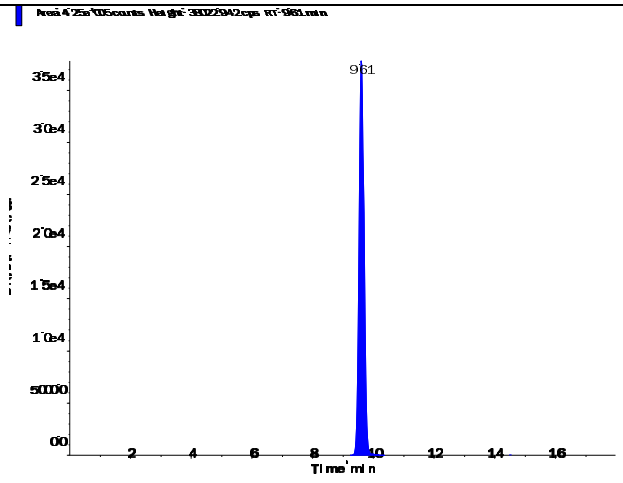
Sample Name	WG591037-03 LCS (0.2ug/L)	**Injection Vial**	6.00
Data File	LM37579.wiff	**Injection Volume**	10.00
Acquisition Date	11/10/2016 12:14:33 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	111016_JWR.rdb
Sample ID	WG591037-03	**Dilution Factor**	1.00
Sample Comment	1,1 STD78251	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	4.250e+05	9.61	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	2.800e+04	9.62	N/A	0.192
Perchlorate conf	9.640e+03	9.60	N/A	0.183

O18LP (Internal Standard)

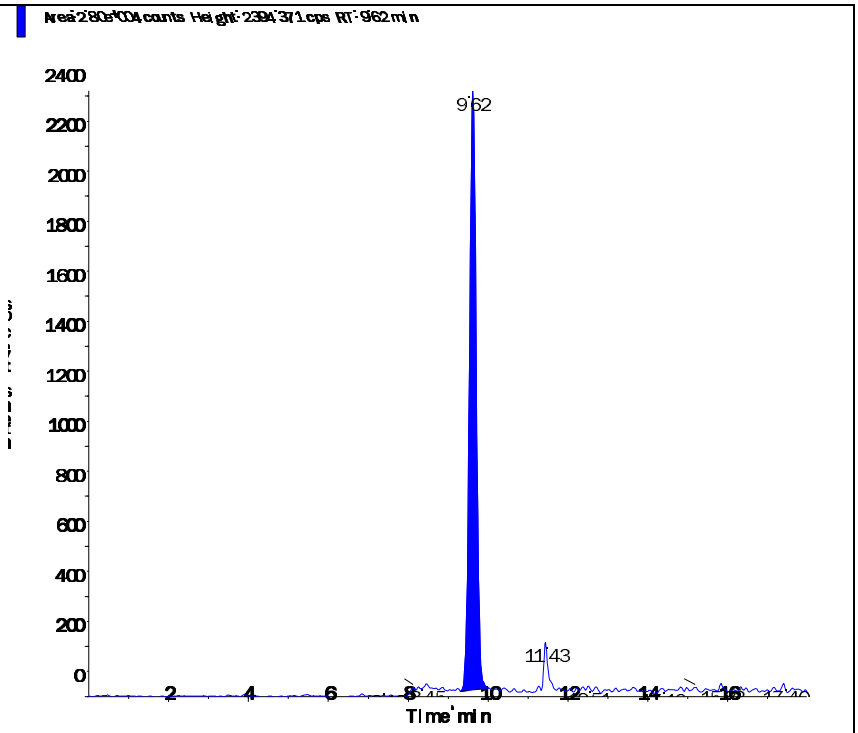
RT (Exp. RT): 9.61(9.84) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



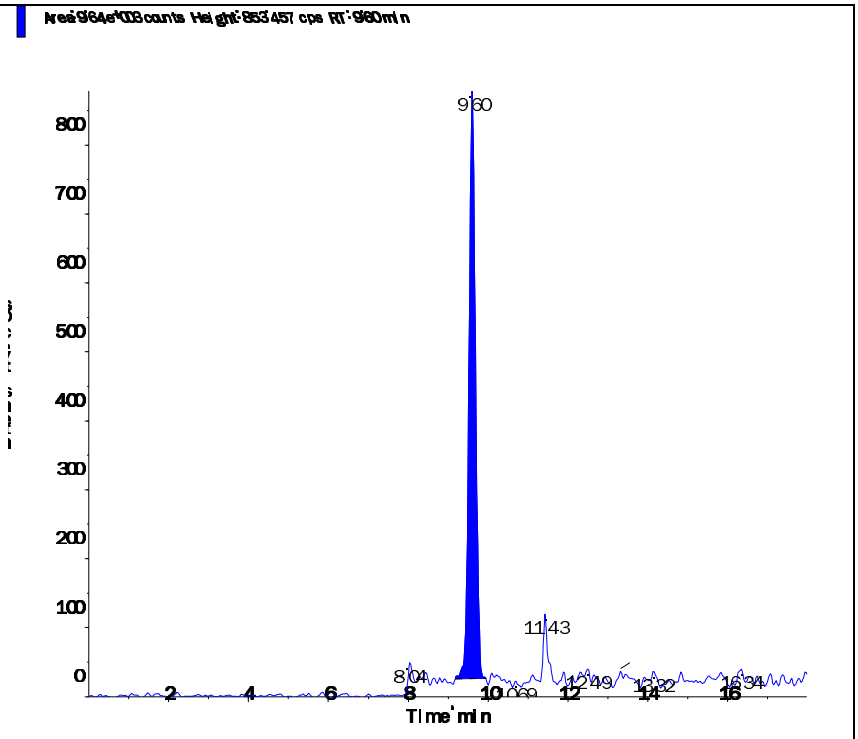
Applied Biosystems | MDS SCIEX

Created with Analyst Reporter
Printed: 11/11/2016 11:29 AM

Perchlorate (98.8/83.3 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	 9.62 (9.84) min 0.192 ng/ml 0.066 (Unknown)



Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	 9.60 (9.84) min 0.183 ng/ml 0.023 (Unknown)



3.0 Attachments

Microbac Laboratories Inc.
Ohio Valley Division Analyst List
November 18, 2016

---

001 – BIO-CHEM TESTING WVDEP 220
002 – REIC Consultants, Inc. WVDEP 060
003 – Sturm Environmental
004 – MICROBAC PITTSBURGH
005 – ES LABORATORIES
006 – ALCOSAN LABORATORIES
007 – ALS LABORATORIES
008 – BENCHMARK LABORATORIES
010 – MICROBAC CHICAGOLAND
AC – AMBER R. CARMICHAEL
ADC – ANTHONY D. CANTER
ADG – APRIL D. GREENE
AED – ALLEN E. DAVIS
ALS – ADRIANE L. STEED
AMA – ALEXANDRA M. ALFRED
AWE – ANDREW W. ESSIG
AZH – AFTER HOURS
BJO – BRIAN J. OGDEN
BKT – BRENDAN TORRENCE
BLG – BRENDA L. GREENWALT
BNB – Brandi N. Bentley
BRG – BRENDA R. GREGORY
CAA – CASSIE A. AUGENSTEIN
CAF – CHERYL A. FLOWERS
CAS – Craig A. Smith
CEB – CHAD E. BARNES
CJQ – Cameron J. Quick
CLC – CHRYS L. CRAWFORD
CLS – CARA L. STRICKLER
CLW – CHARISSA L. WINTERS
CPD – CHAD P. DAVIS
CRW – CHRISTINA R. WILSON
CSH – CHRIS S. HILL
CV – Carl Volkman
DAK – DEAN A. KETELSEN
DCM – DAVID C. MERCKLE
DEV – DAVID E. VANDENBERG
DIH – DEANNA I. HESSON
DLB – DAVID L. BUMGARNER
DLP – DOROTHY L. PAYNE
DSM – DAVID S. MOSSOR
DTG – DOMINIC T. GEHRET
ECL – ERIC C. LAWSON
EMW – ERIC M. WILKEN
ENY – EMILY N. YOAK
ERP – ERIN R. PORTER
FJB – FRANCES J. BOLDEN
HDD – HANAH D. DAWKINS
JDH – JUSTIN D. HESSON
JDS – JARED D. SMITH
JKP – JACQUELINE K. PARSONS
JLD – JESSICA L. DELONG
JLL – JOHN L. LENT
JMW – JEANA M. WHITE
JTP – JOSHUA T. PEMBERTON
JWR – JOHN W. RICHARDS
JWS – JACK W. SHEAVES
JYH – JI Y. HU
KAK – KATHY A. KIRBY
KAT – KATHY A. TUCKER
KDD – Katelyn D. Daley
KDW – KATHRYN D. WELCH
KEB – KATIE E. BARNES
KHR – KIM H. RHODES
KKB – KERRI K. BUCK
KRA – KATHY R. ALBERTSON
KRB – KAELY R. BECKER
KRP – KATHY R. PARSONS
LJH – Lacey J. Hendershot
LKN – LINDA K. NEDEFF
LLS – LARRY L. STEPHENS
LSB – LESLIE S. BUCINA
LSJ – LAURA S. JONES
MAP – MARLA A. PORTER
MBK – MORGAN B. KNOWLTON
MDA – MIKE D. ALBERTSON
MDC – MIKE D. COCHRAN
MES – MARY E. SCHILLING
MMB – MAREN M. BEERY
MRT – MICHELLE R. TAYLOR
MSW – MATT S. WILSON
NPH – Natalie P. Hart
PDM – PIERCE D. MORRIS
PIT – MICROBAC WARRENDALE
QX – QIN XU
RAH – ROY A. HALSTEAD
REK – BOB E. KYER
RLB – BOB BUCHANAN
RNP – RICK N. PETTY
SAV – SARAH A. VANDENBERG
SCB – SARAH C. BOGOLIN
SDC – SHALYN D. CONLEY
SLM – STEPHANIE L. MOSSBURG
SLP – SHERI L. PFALZGRAF
TB – TODD BOYLE
TGF – TIM G. FELTON
TMB – TIFFANY M. BAILEY
TMM – TAMMY M. MORRIS
VC – VICKI COLLIER
WJB – WILL J. BEASLEY
WTD – WADE T. DELONG
XXX – UNAVAILABLE OR SUBCONTRACT

Microbac Laboratories Inc.
List of Valid Qualifiers
November 18, 2016

Qualkey: DOD

Qualifier	Description
*	Surrogate or spike compound out of range
+	Correlation coefficient for the MSA is less than 0.995
<	Result is less than the associated numerical value.
>	Greater than
>,H1	Result is greater than the associated numerical value. Sample analysis performed past holding time.
A	See the report narrative
B	The reported result is associated with a contaminated method blank.
B,H1	Analyte present in method blank. Sample analysis performed past holding time.
B1	Target analyte detected in method blank at or above the method reporting limit
B3	Target analyte detected in calibration blank at or above the method reporting limit
B4	The BOD unseeded dilution water blank exceeded 0.2 mg/L
C	Confirmed by GC/MS
CG	Confluent growth
CT1	Cooler temperature at sample reciept exceeded regulatory limit.
DL	Surrogate or spike compound was diluted out
E	Estimated concentration due to sample matrix interference
E,CT1	Estimated results. The cooler temperature at receipt exceeded regulatory guidelines for requested testing.
EDL	Elevated sample reporting limits, presence of non-target analytes
EMPC	Estimated Maximum Possible Concentration
F, S	Estimated result below quantitation limit; method of standard additions(MSA)
F,CT1	Estimated value; the analyte concentration was less than the RL/LOQ. The cooler temperature at receipt exceeded regula
FL	Free Liquid
FP1	Did not ignite.
H1	Sample analysis performed past holding time.
H1,CT1	Sample analysis performed past holding time. The cooler temperature at receipt exceeded regulatory guidelines for reque
I	Semiquantitative result (out of instrument calibration range)
J	Estimated concentration; sample matrix interference.
J	Estimated value ; the analyte concentration was greater than the highest standard
J	Estimated value ; the analyte concentration was less than the LOQ.
J	The reported result is an estimated value.
J,B	Analyte detected in both the method blank and sample above the MDL.
J,CT1	Estimated value ; the analyte concentration was less than the LOQ. Cooler temperature at sample reciept exceeded regu
J,H1	Estimated value ; the analyte concentration was less than the LOQ. Sample analysis performed past holding time.
J,H1	The reported result is an estimated value. Sample was analyzed past holding time.
J,P	Estimate; columns don't agree to within 40%
J,S	Estimated concentration; analyzed by method of standard addition (MSA)
JB	The reported result is an estimated value. The reported result is also associated with a contaminated method blank.
JQ	The reported result is an estimated value and one or more quality control criteria failed. See narrative.
L	Sample reporting limits elevated due to matrix interference
L1	The associated blank spike (LCS) recovery was above the laboratory acceptance limits.
L2	The associated blank spike (LCS) recovery was below the laboratory acceptance limits.
M	Matrix effect; the concentration is an estimate due to matrix effect.
N	Nontarget analyte; the analyte is a tentativlely identified compound (TIC) by GC/MS
NA	Not applicable
ND	Not detected at or above the reporting limit (RL)
ND, B	Not detected at or above the reporting limit (RL). Analyte present in method blank.
ND, CT1	Analyte was not detected. The concentration is below the reported LOD. The cooler temperature at receipt exceeded reg
ND, L	Not detected; sample reporting limit (RL) elevated due to interference
ND, S	Not detected; analyzed by method of standard addition (MSA)
ND,H1	Not detected; Sample analysis performed past holding time.
ND,H1,CT1	Not detected; Sample analysis performed past holding time. The cooler temperature at receipt exceeded regulatory guide
NF	Not found by library search
NFL	No free liquid
NI	Non-ignitable
NR	Analyte is not required to be analyzed
NS	Not spiked
P	Concentrations >40% difference between the two GC columns
Q	One or more quality control criteria failed. See narrative.
Q,H1	One or more quality control criteria failed. Sample analyzed past holding time. See narrative.
QNS	Quantity of sample not sufficient to perform analysis
RA	Reanalysis confirms reported results
RE	Reanalysis confirms sample matrix interference
S	Analyzed by method of standard addition (MSA)
SMI	Sample matrix interference on surrogate
SP	Reported results are for spike compounds only
T5	Laboratory not licensed for this parameter
TIC	Library Search Compound

Microbac Laboratories Inc.
List of Valid Qualifiers
November 18, 2016

Qualkey: DOD

TNTC	Too numerous to count
TNTC, B	Too numerous to count. Analyte present in method blank.
TNTC,CT1	Too numerous to count. The cooler temperature at receipt exceeded regulatory guidelines for requested testing.
TNTC,H1	Too numerous to count. Sample analysis performed past holding time.
U	Analyte was not detected. The concentration is below the reported LOD.
U,CT1	Analyte was not detected. The concentration is below the reported LOD. Cooler temperature at sample reciept exceeded
U,H1	Not detected; Sample analysis performed past holding time.
UJ	Undetected; the MDL and RL are estimated due to quality control discrepancies.
UQ	Undetected; the analyte was analyzed for, but not detected.
W	Post-digestion spike for furnace AA out of control limits
X	Exceeds regulatory limit
X, S	Exceeds regulatory limit; method of standard additions (MSA)
Z	Cannot be resolved from isomer - see below

AECOM

Chain of Custody Record

COC Number:

Laboratory: Microbac POC: Stephanie Mossburg	Project Manager: Mark Heaston	Mail to: Linda Raabe	
Address: 158 Starlite Drive	Phone/Fax Number: 210-296-2000	112 East Pecan STE. 400	
Marietta, OH 45750	Sampler (print): Scott Beesinger	San Antonio, TX 78205	
Phone: 1-800-373-4071		210-296-2000	
Client: AECOM	Signature: Scott Beesinger	Fed Ex Airbill No:	
Address: 112 East Pecan Ste. 400			
San Antonio, TX 78205	pH:	Program:	
Turn Around Time: STANDARD			
Project Name/Location: Longhorn			
Project Number: 60256135.0009AA			

Site Name	Sample ID/Location ID	SBD	SED	Date	Time	Comp-	Grab	Matrix	Number of Containers	PERCHLORATE	SA CODE	Cooler ID	LOT CONTROL NUMBERS ABLOT	EBLOT	TBLOT
											ERPIMS REQUIRED FIELDS				
PERIMETER WELLS	PW111-110716			11/7/16	0900		X	W	1	X					
	PW112-110716			11/7/16	1020		X	W	1	X					
	PW112MS-110716			11/7/16	1020		X	W	1	X					
	PW112MSD-110716			11/7/16	1020		X	W	1	X					
	PW110-110716			11/7/16	1135		X	W	1	X					
	PW110FD-110716			11/7/16	1135		X	W	1	X					

Microbac OVD
Received: 11/08/2016 11:16
By: BRENDA GREENWALT
221000093252
Brenda Greenwalt

Comments: **STANDARD TAT**

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Received by: (Signature)	Date	Time	Relinquished by: (Signature)
Scott Beesinger	11/7/16	1500					
Relinquished by: (Signature)	Date	Time	Received for Laboratory by: (Signature)	Date	Time		Remarks:

*Homogenize all composite samples prior to analysis

Distribution: White to Laboratory, Canary to Project Manager, Pink QA/QC Manager

MICROBAC

COOLER TEMP >6° C LOG

Cooler ID 3252

SAMPLE ID	Bottle 1 °C	Bottle 2 °C	Bottle 3 °C	Bottle 4 °C	Bottle 5 °C	Bottle 6 °C

11/8/16 BG

pH Exceptions

pH Lot # HC681919

SAMPLE ID	Bottle 1	Bottle 2	Bottle 3	Bottle 4	Bottle 5	Bottle 6

11/8/16 BG

PRESERVATIVE EXCEPTIONS

✓ NONE

_ AS NOTED

BG 11/8/16

Document Control # 1957
Last 10-07-2016

Issued to: Document Master File

Microbac Laboratories Inc.

Internal Chain of Custody Report

Login: L16110420
Account: 2551
Project: 2551.096
Samples: 6
Due Date: 18-NOV-2016

Samplenum	Container ID	Products
L16110420-01	827038	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	08-NOV-2016 16:00	BRG		
2	ANALYZ	W1	SEM	09-NOV-2016 15:01	JWR	BRG	
3	STORE	SEM	A1	11-NOV-2016 16:36	BRG	JWR	

Samplenum	Container ID	Products
L16110420-02	827039	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	08-NOV-2016 16:00	BRG		
2	ANALYZ	W1	SEM	09-NOV-2016 15:01	JWR	BRG	
3	STORE	SEM	A1	11-NOV-2016 16:36	BRG	JWR	

Samplenum	Container ID	Products
L16110420-03	827040	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	08-NOV-2016 16:00	BRG		
2	ANALYZ	W1	SEM	09-NOV-2016 15:01	JWR	BRG	
3	STORE	SEM	A1	11-NOV-2016 16:36	BRG	JWR	

Samplenum	Container ID	Products
L16110420-04	827041	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	08-NOV-2016 16:00	BRG		
2	ANALYZ	W1	SEM	09-NOV-2016 15:01	JWR	BRG	
3	STORE	SEM	A1	11-NOV-2016 16:36	BRG	JWR	

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login

Microbac Laboratories Inc.

Internal Chain of Custody Report

Login: L16110420
Account: 2551
Project: 2551.096
Samples: 6
Due Date: 18-NOV-2016

Samplenum	Container ID	Products
L16110420-05	827042	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	08-NOV-2016 16:00	BRG		
2	ANALYZ	W1	SEM	09-NOV-2016 15:01	JWR	BRG	
3	STORE	SEM	A1	11-NOV-2016 16:36	BRG	JWR	

Samplenum	Container ID	Products
L16110420-06	827043	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	08-NOV-2016 16:00	BRG		
2	ANALYZ	W1	SEM	09-NOV-2016 15:01	JWR	BRG	
3	STORE	SEM	A1	11-NOV-2016 16:36	BRG	JWR	

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login

NELAP Addendum - January 4, 2016

Non-NELAP LIMS Product and Description

The following is a list of those tests that are not included in the Microbac – OVD NELAP Scope of Accreditation:

Heat of Combustion (BTU)
Total Halide by Bomb Combustion (TX)
Particle Sizing - 200 Mesh (PS200)
Specific Gravity/Density (SPGRAV)
Total Residual Chlorine (CL-TRL)
Total Volatile Solids (all forms) (TVS)
Total Coliform Bacteria (all methods)
Fecal Coliform Bacteria (all methods)
Sulfite (SO3)
Propionaldehyde (HPLC-UV)

SOLID AND HAZARDOUS CHEMICALS
Nitrogen, Ammonia by Method 350.1
Chromium, Hexavalent, Leachable by SM3500 Cr-B 2009
Phenolics, Total by Method 420.1
ASTM D3987-06

NELAP Accreditation by Laboratory SOP

NONPOTABLE WATER

OVD HPLC02/HPLC-UV

Nitroglycerin
Acetic acid
Butyric acid
Lactic acid
Propionic acid
Pyruvic acid

OVD MSS01/GC-MS

1,4-Phenylenediamine
1-Methylnaphthalene
1,4-Dioxane
Atrazine
Benzaldehyde
Biphenyl
Caprolactam
Hexamethylphosphoramide (HMPA)
Pentachlorobenzene
Pentachloroethane

NELAP Accreditation by Laboratory SOP

NONPOTABLE WATER

OVD MSV01/GC-MS

1, 1, 2-Trichloro-1,2,2-trifluoroethane
1,3-Butadiene
Cyclohexane
Cyclohexanone
Dimethyl disulfide
Dimethylsulfide
Ethyl-t-butylether (ETBE)
Isoprene
Methylacetate
Methylcyclohexane
T-amylmethylether (TAME)
Tetrahydrofuran (THF)

OVD HPLC07/HPLC-MS-MS

Hexamethylphosphoramide (XMPA-LCMS)

OVD HPLC12/HPLC/UV

Acetate
Formate

OVD RSK01/GC-FID

Acetylene
Propane

OVD K9305/ISE

Fluoroborate

SOLID AND HAZARDOUS CHEMICALS

OVD MSS0I/GC-MS

1-Methylnaphthalene
Benzaldehyde
Biphenyl
Caprolactam
Pentachloroethane

NELAP Accreditation by Laboratory SOP

SOLID AND HAZARDOUS CHEMICALS

OVD MSV0I/GC-MS

1.3-Butadiene
Cyclohexane
Cyclohexanone
Dimethyl disulfide
Dimethylsulfide
Ethyl-t-butylether (ETBE)
Isoprene
Methylacetate
Methylcyclohexane
n-Hexane
T-amylmethylether (TAME)

Microbac

Laboratory Report Number: L16120281

Kayla Teague
AECOM Technical Services, Inc.
1950 N Stemmons FWY
Dallas, TX 75207

Please find enclosed the analytical results for the samples you submitted to Microbac Laboratories. Review and compilation of your report was completed by Microbac's Ohio Valley Division (OVD). If you have any questions, comments, or require further assistance regarding this report, please contact your service representative listed below.

Laboratory Contact:
Adriane Steed – Client Services Specialist
(740) 373-4071
Adriane.Steed@microbac.com

I certify that all test results meet all of the requirements of the DoD QSM and other applicable contract terms and conditions. Any exceptions are attached to this cover page or addressed in the method narratives presented in the report. All results for soil samples are reported on a 'dry-weight' basis unless specified otherwise. Analytical results for water and wastes are reported on a 'as received' basis unless specified otherwise. A statement of uncertainty for each analysis is available upon request. This laboratory report shall not be reproduced, except in full, without the written approval of Microbac Laboratories, DoD ELAP certification number 2936.01. The reported results are related only to the samples analyzed as received.

This report was certified on December 19 2016

Leslie Bucina – Managing Director

State of Origin: TX
Accrediting Authority: Texas Commission on Environmental Quality ID:T104704252-07-TX
QAPP: DOD Ver 4.1

Microbac

Lab Report #: L16120281
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Record of Sample Receipt and Inspection

Comments/Discrepancies

This is the record of the shipment conditions and the inspection records for the samples received and reported as a sample delivery group (SDG). All of the samples were inspected and observed to conform to our receipt policies, except as noted below.

There were no discrepancies.

Discrepancy	Resolution

Coolers

Cooler #	Temperature Gun	Temperature	COC #	Airbill #	Temp Required?
00114098	I	0.0		J4616882989	X

Inspection Checklist

#	Question	Result
1	Were shipping coolers sealed?	Yes
2	Were custody seals intact?	Yes
3	Were cooler temperatures in range of 0-6?	Yes
4	Was ice present?	Yes
5	Were COC's received/information complete/signed and dated?	Yes
6	Were sample containers intact and match COC?	Yes
7	Were sample labels intact and match COC?	Yes
8	Were the correct containers and volumes received?	Yes
9	Were samples received within EPA hold times?	Yes
10	Were correct preservatives used? (water only)	Yes
11	Were pH ranges acceptable? (voa's excluded)	Yes
12	Were VOA samples free of headspace (less than 6mm)?	NA

Microbac

Lab Report #: L16120281
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Samples Received

Client ID	Laboratory ID	Date Collected	Date Received
PW134-120216	L16120281-01	12/02/2016 08:05	12/06/2016 09:56
PW134MS-120216	L16120281-02	12/02/2016 08:05	12/06/2016 09:56
PW134MSD-120216	L16120281-03	12/02/2016 08:05	12/06/2016 09:56
PW133-120216	L16120281-04	12/02/2016 09:40	12/06/2016 09:56
PW133FD-120216	L16120281-05	12/02/2016 09:40	12/06/2016 09:56

Microbac REPORT L16120281
PREPARED FOR AECOM Technical Services, Inc.
WORK ID:

1.0 Summary Data 5
1.1 Narratives 6
1.2 Certificate of Analysis 13
2.0 Full Sample Data Package 16
2.1 General Chromatography Data 17
2.1.1 6850 LC/MS Data 18
2.1.1.1 Summary Data 19
2.1.1.2 QC Summary Data 22
2.1.1.3 Sample Data 74
2.1.1.4 Standards Data 85
2.1.1.5 Raw QC Data 128
3.0 Attachments 133

1.0 Summary Data

1.1 Narratives

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L16120281
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG595135	**Reviewer Name:**	Eric Lawson
LRC Date:	2016-12-19 00:00:00		

Laboratory Data Package Cover Page

	R1	Field chain-of-custody documentation;
	R2	Sample identification cross-reference;
	R3	Test reports (analytical data sheets) for each environmental sample that includes: (a) Items consistent with NELAC Chapter 5, (b) dilution factors, (c) preparation methods, (d) cleanup methods, and (e) a.if required for the project, tentatively identified compounds (TICs).
	R4	Surrogate recovery data including: (a) Calculated recovery (%R), and (b) the laboratory's surrogate QC limits.
	R5	Test reports/summary forms for blank samples;
	R6	Test reports/summary forms for laboratory control samples (LCSs) including: (a) LCS spiking amounts, (b) calculated %R for each analyte, and (c) the laboratory's LCS QC limits.
	R7	Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including: (a) samples associated with the MS/MSD clearly identified, (b) MS/MSD spiking compounds, (c) concentration of each MS/MSD analyte measured in the parent and spiked samples, (d) calculated %Rs and relative percent differences (RPDs), and (e) the laboratory's MS/MSD QC limits.
	R8	Laboratory analytical duplicate (if applicable) recovery and precision: (a) the amount of analyte measured in the duplicate, (b) the calculated RPD, and (c) the laboratory's QC limits for analytical duplicates.
	R9	List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
	R10	Other problems or anomalies.

Name (Printed)	Signature	Official Title (Printed)	Date
Eric Lawson		Chemist III	2016-12-19 16:34:14

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L16120281
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG595135	**Reviewer Name:**	Eric Lawson
LRC Date:	2016-12-19 00:00:00		

Description	Yes	No	NA	NR	ER#
Chain-of-custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
Were all departures from standard conditions described in an exception report?	X				
Sample and quality control (QC) identification	X				
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
Test reports					
Were all samples prepared and analyzed within holding times?	X				
Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
Were calculations checked by a peer or supervisor?	X				
Were all analyte identifications checked by a peer or supervisor?	X				
Were sample detection limits reported for all analytes not detected?	X				
Were all results for soil and sediment samples reported on a dry weight basis?			X		
Were % moisture (or solids) reported for all soil and sediment samples?			X		
Were bulk soils/solids samples for volatile analysis extracted with methanol per SW846 Method 5035?			X		
If required for the project, are TICs reported?			X		
Surrogate recovery data					
Were surrogates added prior to extraction?			X		
Were surrogate percent recoveries in all samples within the laboratory QC limits?			X		
Test reports/summary forms for blank samples	X				
Were appropriate type(s) of blanks analyzed?	X				
Were blanks analyzed at the appropriate frequency?	X				
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
Were blank concentrations < MQL?	X				
Laboratory control samples (LCS):					
Were all COCs included in the LCS?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L16120281
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG595135	**Reviewer Name:**	Eric Lawson
LRC Date:	2016-12-19 00:00:00		

Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
Were LCSs analyzed at the required frequency?	X				
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
Does the detectability check sample data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
Was the LCSD RPD within QC limits?			X		
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?	X				
Were MS/MSD analyzed at the appropriate frequency?	X				
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?	X				
Were MS/MSD RPDs within laboratory QC limits?	X				
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?			X		
Were analytical duplicates analyzed at the appropriate frequency?			X		
Were RPDs or relative standard deviations within the laboratory QC limits?			X		
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?	X				
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
Was applicable and available technology used to lower the SDL to minimize the matrix interference effects on the sample results?	X				
Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	X				
Initial calibration (ICAL)					
Were response factors and/or relative response factors for each analyte within QC limits?	X				
Were percent RSDs or correlation coefficient criteria met?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L16120281
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG595135	**Reviewer Name:**	Eric Lawson
LRC Date:	2016-12-19 00:00:00		

Was the number of standards recommended in the method used for all analytes?	X				
Were all points generated between the lowest and highest standard used to calculate the curve?	X				
Are ICAL data available for all instruments used?	X				
Has the initial calibration curve been verified using an appropriate second source standard?	X				
Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?	X				
Were percent differences for each analyte within the method-required QC limits?	X				
Was the ICAL curve verified for each analyte?	X				
Was the absolute value of the analyte concentration in the inorganic CCB < MDL?			X		
Mass spectral tuning					
Was the appropriate compound for the method used for tuning?	X				
Were ion abundance data within the method-required QC limits?	X				
Internal standards (IS)					
Were IS area counts and retention times within the method-required QC limits?	X				
Raw data (NELAC Section 5.5.10)					
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
Were data associated with manual integrations flagged on the raw data?	X				
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			X		
Tentatively identified compounds (TICs)					
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
Interference Check Sample (ICS) results					
Were percent recoveries within method QC limits?			X		
Serial dilutions, post digestion spikes, and method of standard additions					
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
Method detection limit (MDL) studies					

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L16120281
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG595135	**Reviewer Name:**	Eric Lawson
LRC Date:	2016-12-19 00:00:00		

Was a MDL study performed for each reported analyte?	X				
Is the MDL either adjusted or supported by the analysis of DCSs?	X				
Proficiency test reports					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?	X				
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5?	X				
Is documentation of the analyst's competency up-to-date and on file?	X				
Verification/validation documentation for methods (NELAC Chapter 5)					
Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
Laboratory standard operating procedures (SOPs)					
Are laboratory SOPs current and on file for each method performed	X				

1. Items identified by the letter “R” must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter “S” should be retained and made available upon request for the appropriate retention period;

2. O = organic analyses; I = inorganic analyses (and general chemistry, when applicable);

3. NA = Not applicable;

4. NR = Not reviewed;

5. ER# = Exception Report identification number (an Exception Report should be completed for an item if “NR” or “No” is checked).

The Exception Report for each “No” or “Not Reviewed (NR)” item in Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L16120281
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG595135	**Reviewer Name:**	Eric Lawson
LRC Date:	2016-12-19 00:00:00		

below, I affirm to the best of my knowledge all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [ ] This laboratory meets an exception under 30 TAC §25.6 and was last inspection by [ ] TCEQ or [ ] _____ on **(enter date of last inspection**). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Exceptions Report

There are no exceptions.

1.2 Certificate of Analysis

Microbac

Lab Report #: L16120281
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L16120281-01	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	PW134-120216	**Prep Method:**	6850	**Prep Date:**	12/16/2016 18:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	12/16/2016 23:37
Workgroup #:	WG595135	**Analyst:**	JWR	**Run Date:**	12/17/2016 05:18
Collect Date:	12/02/2016 08:05	**Dilution:**	1	**File ID:**	1LM.LM37790
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.947		0.400	0.200	0.100

Certificate of Analysis

Sample #:	L16120281-02	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	PW134MS-120216	**Prep Method:**	6850	**Prep Date:**	12/16/2016 18:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	12/16/2016 23:37
Workgroup #:	WG595135	**Analyst:**	JWR	**Run Date:**	12/17/2016 05:37
Collect Date:	12/02/2016 08:05	**Dilution:**	1	**File ID:**	1LM.LM37791
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	1.12		0.400	0.200	0.100

Certificate of Analysis

Sample #:	L16120281-03	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	PW134MSD-120216	**Prep Method:**	6850	**Prep Date:**	12/16/2016 18:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	12/16/2016 23:37
Workgroup #:	WG595135	**Analyst:**	JWR	**Run Date:**	12/17/2016 05:56
Collect Date:	12/02/2016 08:05	**Dilution:**	1	**File ID:**	1LM.LM37792
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	1.14		0.400	0.200	0.100

Certificate of Analysis

Microbac

Lab Report #: L16120281
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Sample #:	L16120281-04	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	PW133-120216	**Prep Method:**	6850	**Prep Date:**	12/16/2016 18:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	12/16/2016 23:37
Workgroup #:	WG595135	**Analyst:**	JWR	**Run Date:**	12/17/2016 06:15
Collect Date:	12/02/2016 09:40	**Dilution:**	1	**File ID:**	1LM.LM37793
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.513		0.400	0.200	0.100

Certificate of Analysis

Sample #:	L16120281-05	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	PW133FD-120216	**Prep Method:**	6850	**Prep Date:**	12/16/2016 18:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	12/16/2016 23:37
Workgroup #:	WG595135	**Analyst:**	JWR	**Run Date:**	12/17/2016 06:34
Collect Date:	12/02/2016 09:40	**Dilution:**	1	**File ID:**	1LM.LM37794
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.522		0.400	0.200	0.100

2.0 Full Sample Data Package

2.1 General Chromatography Data

2.1.1 6850 LC/MS Data

2.1.1.1 Summary Data

Microbac

Lab Report #: L16120281
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #: L16120281-01 **PrePrep Method:** N/A **Instrument:** LCMS1
Client ID: PW134-120216 **Prep Method:** 6850 **Prep Date:** 12/16/2016 18:00
Matrix: Water **Analytical Method:** 6850 **Cal Date:** 12/16/2016 23:37
Workgroup #: WG595135 **Analyst:** JWR **Run Date:** 12/17/2016 05:18
Collect Date: 12/02/2016 08:05 **Dilution:** 1 **File ID:** 1LM.LM37790
Sample Tag: 01 **Units:** ug/L

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.947		0.400	0.200	0.100

Certificate of Analysis

Sample #: L16120281-02 **PrePrep Method:** N/A **Instrument:** LCMS1
Client ID: PW134MS-120216 **Prep Method:** 6850 **Prep Date:** 12/16/2016 18:00
Matrix: Water **Analytical Method:** 6850 **Cal Date:** 12/16/2016 23:37
Workgroup #: WG595135 **Analyst:** JWR **Run Date:** 12/17/2016 05:37
Collect Date: 12/02/2016 08:05 **Dilution:** 1 **File ID:** 1LM.LM37791
Sample Tag: 01 **Units:** ug/L

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	1.12		0.400	0.200	0.100

Certificate of Analysis

Sample #: L16120281-03 **PrePrep Method:** N/A **Instrument:** LCMS1
Client ID: PW134MSD-120216 **Prep Method:** 6850 **Prep Date:** 12/16/2016 18:00
Matrix: Water **Analytical Method:** 6850 **Cal Date:** 12/16/2016 23:37
Workgroup #: WG595135 **Analyst:** JWR **Run Date:** 12/17/2016 05:56
Collect Date: 12/02/2016 08:05 **Dilution:** 1 **File ID:** 1LM.LM37792
Sample Tag: 01 **Units:** ug/L

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	1.14		0.400	0.200	0.100

Certificate of Analysis

Microbac

Lab Report #: L16120281
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Sample #: L16120281-04 | **PrePrep Method:** N/A | **Instrument:** LCMS1
Client ID: PW133-120216 | **Prep Method:** 6850 | **Prep Date:** 12/16/2016 18:00
Matrix: Water | **Analytical Method:** 6850 | **Cal Date:** 12/16/2016 23:37
Workgroup #: WG595135 | **Analyst:** JWR | **Run Date:** 12/17/2016 06:15
Collect Date: 12/02/2016 09:40 | **Dilution:** 1 | **File ID:** 1LM.LM37793
Sample Tag: 01 | **Units:** ug/L

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.513		0.400	0.200	0.100

Certificate of Analysis

Sample #: L16120281-05 | **PrePrep Method:** N/A | **Instrument:** LCMS1
Client ID: PW133FD-120216 | **Prep Method:** 6850 | **Prep Date:** 12/16/2016 18:00
Matrix: Water | **Analytical Method:** 6850 | **Cal Date:** 12/16/2016 23:37
Workgroup #: WG595135 | **Analyst:** JWR | **Run Date:** 12/17/2016 06:34
Collect Date: 12/02/2016 09:40 | **Dilution:** 1 | **File ID:** 1LM.LM37794
Sample Tag: 01 | **Units:** ug/L

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.522		0.400	0.200	0.100

2.1.1.2 QC Summary Data

Example Calculation 6850 - Perchlorate

Concentration from Linear Regression

Step 1: Retrieve Curve Data From Plot, y = mx + b

y = response ratio = response of analyte / response of internal standard (IS) = Rx/Ristd

x = amount ratio = concentration analyte/concentration internal standard (IS) = Cx / Cistd

m = slope from curve (1.45)

b = intercept from curve (-0.00242)

y = 1.45x + -0.00242

Step 2: Substitute the value for y

where y = 12600/226000 = 0.055752

Step 3: Solve for x

x = (y - b)/m = 0.0040119

Step 4: Solve for analyte concentration Cx

Cx = (Cis)(x) = (5 ug/L)(0.040119) = 0.200594 ug/L

Example Calculation - Water:

Slope from curve, m:	1.45
Intercept from curve, b:	-0.00242
Response of analyte, Rx:	12600
Response of Internal Standard , Ristd:	226000
Concentration of IS, Cistd (ug/L):	5.00
Response Ratio:	0.05575
Amount Ratio:	0.04012
Analyte Concentration, Cx (ug/L) :	0.200594

Example Calculation - Soil:

Analyte Concentration, Cx (ug/L):	0.20059
Amount of soil extracted (g):	5.00
Final volume of extract (mL):	50.00
Percent solids (Pct wt.)	100
Concentration in soil (ug/kg):	2.005938

Perchlorate Conductivity Check
(perchlorate1)

Conductivity Probe Calibration Check: 1402 /1410 µs/cm

Working MCT Level: 10,000 µs/cm

Sample	Conductivity (µs/cm)	Pretreatment or Dilution Needed
WG595135-01 MCT	9,950.	
-02 Blk	0.32	
-03 LCS	0.29	
L16111326-01	149.7	
-02	105.8	
-03	105.8	
-04	53.5	
-05	52.9	
L16120274-01	2,650.	
L16120275-01	1,635.	
L16120281-01 RS	89.3	
-02 MS	89.6	
-03 MSD	89.5	
-04	173.3	
-05	175.9	

Analyst: John Richards

Date/Time: 12/17/16 1720

DCN#122798

Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 121716_JWR.TXT
Analyst1: JWR Analyst2: NA
Method: 6850 SOP: HPLC06 Rev: 8

Maintenance Log ID: Syringe Filter Lot#: 160109254
Eluent ID#:

Workgroups: Column 1 ID: KP-RPPX250 Column 2 ID: NA
Analytical WG595135 (waters)
Internal STD: STD18071 Surrogate STD: NA Calibration STD STD78249 (12/16/2016)
CCV STD: STD78249 LCS STD: STD78251 MS/MSD STD: STD78251

Comments: ICAL WG595346 : Alternate Source STD78251
Analytical Column : RPPX 5um (250x4.6mm)
K'Prime S/N RPPX250-02115

Sample L16120275-01 was analyzed at a dilution based on its historical results.

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	1LM.LM37765	WG595346-01 CCB	1	1		12/16/16 21:25
2	1LM.LM37766	WG595346-02 STD (0.1 ug/L)	1	1	STD78249	12/16/16 21:44
3	1LM.LM37767	WG595346-03 STD (0.2 ug/L)	1	1	STD78249	12/16/16 22:02
4	1LM.LM37768	WG595346-04 STD (0.5 ug/L)	1	1	STD78249	12/16/16 22:21
5	1LM.LM37769	WG595346-05 STD (1.0 ug/L)	1	1	STD78249	12/16/16 22:40
6	1LM.LM37770	WG595346-06 STD (2.0 ug/L)	1	1	STD78249	12/16/16 22:59
7	1LM.LM37771	WG595346-07 STD (5.0 ug/L)	1	1	STD78249	12/16/16 23:18
8	1LM.LM37772	WG595346-08 STD (10 ug/L)	1	1	STD78249	12/16/16 23:37
9	1LM.LM37773	WG595346-09 SSCV (1.0 ug/L)	1	1	STD78251	12/16/16 23:56
10	1LM.LM37774	WG595142-01 CCB	1	1		12/17/16 00:15
11	1LM.LM37775	WG595142-02 CCV (1.0ug/L)	1	1	STD78249	12/17/16 00:34
12	1LM.LM37776	WG595135-07 MRL (0.2ug/L)	1	1	STD78249	12/17/16 00:53
13	1LM.LM37777	WG595135-01 MCT (0.2ug/L)	1	1	STD78251	12/17/16 01:12
14	1LM.LM37778	WG595135-02 BLANK	1	1		12/17/16 01:31
15	1LM.LM37779	WG595135-03 LCS (0.2ug/L)	1	1	STD78251	12/17/16 01:50
16	1LM.LM37780	L16111326-01	1	1		12/17/16 02:09
17	1LM.LM37781	L16111326-02	1	1		12/17/16 02:28
18	1LM.LM37782	L16111326-03	1	1		12/17/16 02:47
19	1LM.LM37783	L16111326-04	1	1		12/17/16 03:05
20	1LM.LM37784	L16111326-05	1	1		12/17/16 03:24
21	1LM.LM37785	L16120274-01	1	1		12/17/16 03:43
22	1LM.LM37786	L16120274-01 (100x) (NR)	1	100		12/17/16 04:02
23	1LM.LM37787	WG595142-03 CCV (1.0ug/L)	1	1	STD78249	12/17/16 04:21
24	1LM.LM37788	WG595135-08 MRL (0.2ug/L)	1	1	STD78249	12/17/16 04:40
25	1LM.LM37789	WG595142-04 CCB	1	1		12/17/16 04:59
26	1LM.LM37790	L16120281-01 RS	1	1		12/17/16 05:18
27	1LM.LM37791	L16120281-02 MS	1	1	STD78251	12/17/16 05:37
28	1LM.LM37792	L16120281-03 MSD	1	1	STD78251	12/17/16 05:56
29	1LM.LM37793	L16120281-04	1	1		12/17/16 06:15
30	1LM.LM37794	L16120281-05	1	1		12/17/16 06:34
31	1LM.LM37795	L16120275-01 (10,000x)	1	10000		12/17/16 06:53
32	1LM.LM37796	WG595142-05 CCV (1.0ug/L)	1	1	STD78249	12/17/16 07:12

Page: 1 Approved: 19-DEC-16

Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 121716_JWR.TXT

Analyst1: JWR Analyst2: NA

Method: 6850 SOP: HPLC06 Rev: 8

Maintenance Log ID: Syringe Filter Lot#: 160109254

Eluent ID#:

Column 1 ID: KP-RPPX250 Column 2 ID: NA

Workgroups: Analytical WG595135 (waters)

Internal STD: STD18071 Surrogate STD: NA STD78249 (12/16/2016)

CCV STD: STD78249 LCS STD: STD78251 STD78251

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
33	1LM.LM37797	WG595135-09 MRL (0.2ug/L)	1	1	STD78249	12/17/16 07:31
34	1LM.LM37798	WG595142-06 CCB	1	1		12/17/16 07:49

Comments

Seq.	Rerun	Dil.	Reason	Analytes

Page: 2 Approved: 19-DEC-16

Microbac Laboratories Inc.

Data Checklist

Date: 17-DEC-2016
Analyst: JWR
Analyst: NA
Method: 6850
Instrument: LCMS1
Curve Workgroup: WG595346
Runlog ID: 79296
Analytical Workgroups: L16111326 L16120274, 0275, 0281 (WATERS)

ANALYTICAL	
System Performance Check	NA
DFTPP (GCMS)	NA
Endrin/DDT breakdown (8081/GCMS)	NA
Pentachlorophenol/benzidine tailing (GCMS)	NA
Eluent check (IC)/system pressure (HPLC)	NA
Window standard (FID)	NA
Initial Calibration	16-DEC-2016 @23:37
Average RF	NA
Linear regression or higher order curve	X
Alternate source standard (ICV) % Difference	X
Continuing Calibration (CCV)	X
% D/% Drift	X
Minimum response factors (GCMS)	X
Continuing calibration blank (CCB) (IC/LCMS)	X
Limit of quantitation verification (LOQV) (LCMS)	X
Special standards	NA
Blanks	X
TCL hits	ND
Surrogate recoveries	NA
LCS/LCSD (Laboratory Control Sample)	X
Recoveries	X
Surrogate recoveries	NA
MS/MSD/Sample duplicates	X
Recoveries	X
%RPD	X
Interference check sample (ICS) (LCMS)	MCT
Samples	X
TCL hits	X
Mass spectra (MS/HPLC)/2nd column confirmations (ECD/FID/HPLC)	NA
Surrogate recoveries	NA
Internal standard areas (MS)	X
Library searches (GCMS)	NA
Calculations & correct factors	X
Compounds above calibration range	NA
Reruns	NA
Manual integrations	MCT-ONLY
Project/client specific requirements	X
REPORTING	
Upload batch form	X
KOBRA workgroup data/forms/bench sheets	X
Case narratives	
Check for completeness	X
Primary Reviewer	JWR
SUPERVISORY/SECONDARY REVIEW	
Check for compliance with method and project specific requirements	X
Check the completeness/accuracy of reported information	X
Data qualifiers	X
Secondary Reviewer	MES

Primary Reviewer: 17-DEC-2016 John Richards

Secondary Reviewer: 19-DEC-2016 Mary Shilling

CHECKLIST1 - Modified 03/05/2008
Generated: DEC-19-2016 09:45:36

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 6850 AAB#: WG595135

Login Number: L16120281

Client ID	ID	Date Collected	TCLP Date	Time Held	Max Hold	Q	Extract Date	Time Held	Max Hold	Q	Run Date	Time Held	Max Hold	Q
PW134-120216	01	12/02/16					12/16/2016	14.4	28		12/17/16	.5	28	
PW134MS-120216	02	12/02/16					12/16/2016	14.4	28		12/17/16	.5	28	
PW134MSD-120216	03	12/02/16					12/16/2016	14.4	28		12/17/16	.5	28	
PW133-120216	04	12/02/16					12/16/2016	14.3	28		12/17/16	.5	28	
PW133FD-120216	05	12/02/16					12/16/2016	14.3	28		12/17/16	.5	28	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5069850
Report generated 12/19/2016 10:12

METHOD BLANK SUMMARY

Login Number: L16120281
Blank File ID: 1LM.LM37778
Prep Date: 12/16/16 18:00
Analyzed Date: 12/17/16 01:31
Analyst: JWR

Work Group: WG595135
Blank Sample ID: WG595135-02
Instrument ID: LCMS1
Method: 6850

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
QCMRL	WG595135-07	1LM.LM37776	12/17/16 00:53	01
MCT	WG595135-01	1LM.LM37777	12/17/16 01:12	01
LCS	WG595135-03	1LM.LM37779	12/17/16 01:50	01
QCMRL	WG595135-08	1LM.LM37788	12/17/16 04:40	01
PW134-120216	L16120281-01	1LM.LM37790	12/17/16 05:18	01
PW134MS-120216	L16120281-02	1LM.LM37791	12/17/16 05:37	01
PW134MSD-120216	L16120281-03	1LM.LM37792	12/17/16 05:56	01
PW133-120216	L16120281-04	1LM.LM37793	12/17/16 06:15	01
PW133FD-120216	L16120281-05	1LM.LM37794	12/17/16 06:34	01
QCMRL	WG595135-09	1LM.LM37797	12/17/16 07:31	01

Report Name: BLANK_SUMMARY
PDF File ID: 5069851
Report generated 12/19/2016 10:12

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number: L16120281 Prep Date: 12/16/16 18:00 Sample ID: WG595135-02
Instrument ID: LCMS1 Run Date: 12/17/16 01:31 Prep Method: 6850
File ID: 1LM.LM37778 Analyst: JWR Method: 6850
Workgroup (AAB#): WG595135 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-16-DEC-16

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
Perchlorate	0.100	0.400	0.100	1	U

DL Method Detection Limit
LOQ Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > 1/2 RL

Report Name:BLANK
PDF ID: 5069852
19-DEC-2016 10:12

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L16120281 **Run Date:** 12/17/2016 **Sample ID:** WG595135-03
Instrument ID: LCMS1 **Run Time:** 01:50 **Prep Method:** 6850
File ID: 1LM.LM37779 **Analyst:** JWR **Method:** 6850
Workgroup (AAB#): WG595135 **Matrix:** Water **Units:** ug/L
QC Key: DOD4 **Lot#:** STD78251 **Cal ID:** LCMS1-16-DEC-16

Analytes	Expected	Found	% Rec	LCS Limits	Q
Perchlorate	0.200	0.200	100	80 - 120	

LCS - Modified 03/06/2008
PDF File ID: 5069853
Report generated: 12/19/2016 10:12

Microbac Laboratories Inc.

MS/MSD REPORT

Loginnum:L16120281 Cal ID:LCMS1- 16-DEC-16 Worknum:WG595135

Instrument ID:LCMS1 Contract #: Prep Method:6850

Parent ID:L16120281-01 File ID:1LM.LM37790 Dil:1 Method:6850

Sample ID:L16120281-02 MS File ID:1LM.LM37791 Dil:1 Matrix:Water

Sample ID:L16120281-03 MSD File ID:1LM.LM37792 Dil:1 Units:ug/L

Analyte	Parent	MS Spiked	MS Found	MS %Rec	MSD Spiked	MSD Found	MSD %Rec	%RPD	%Rec Limits	RPD Limit	Q
Perchlorate	0.947	0.200	1.12	86.5	0.200	1.14	96.5	1.77	80 - 120	15	

* FAILS %REC LIMIT

FAILS RPD LIMIT

MS_MSD - Modified 03/06/2008

PDF File ID: 5069854

Report generated 12/19/2016 10:12

Microbac Laboratories Inc.
INITIAL CALIBRATION SUMMARY

Login Number: L16120281
Analytical Method: 6850
ICAL Workgroup: WG595346

Instrument ID: LCMS1
Initial Calibration Date: 16-DEC-16 23:37
Column ID: F

Analyte		AVG RF	% RSD	LINEAR (R)	QUAD (R^2)
Perchlorate		1.691	3.94	1.00000	

R = Correlation coefficient; 0.995 minimum
R^2 = Coefficient of determination; 0.99 minimum

INT_CAL - Modified 03/06/2008
PDF File ID: 5070851
Report generated 12/19/2016 10:12

Login Number: L16120281
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 16-DEC-16 23:37
Column ID: F

Analyte	WG595346-02			WG595346-03			WG595346-04		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Perchlorate	0.100	10900.0000	1.729	0.200	21400.0000	1.692	0.500	54100.0000	1.728

INT_CAL - Modified 03/06/2008
PDF File ID: 5070851
Report generated 12/19/2016 10:12

Login Number: L16120281
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 16-DEC-16 23:37
Column ID: F

Analyte	WG595346-05			WG595346-06			WG595346-07		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Perchlorate	1.00	106000.000	1.685	2.00	206000.000	1.675	5.00	505000.000	1.663

INT_CAL - Modified 03/06/2008
PDF File ID: 5070851
Report generated 12/19/2016 10:12

Login Number: L16120281
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 16-DEC-16 23:37
Column ID: F

Analyte	WG595346-08		
	CONC	RESP	RF
Perchlorate	10.0	978000.000	1.668

INT_CAL - Modified 03/06/2008
PDF File ID: 5070851
Report generated 12/19/2016 10:12

Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L16120281 Run Date: 12/16/2016 Sample ID: WG595346-09
Instrument ID: LCMS1 Run Time: 23:56 Method: 6850
File ID: 1LM.LM37773 Analyst: JWR QC Key: DOD4
ICal Workgroup: WG595346 Cal ID: LCMS1 - 16-DEC-16

Analyte		Expected	Found	Units	RF	%D	UCL	Q
Perchlorate		1.00	1.04	ug/L	1.74	4.00	15	

* Exceeds %D Limit

ALT - Modified 09/06/2007
Version 1.5 PDF File ID: 5070852
Report generated 12/19/2016 10:12

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L16120281	**Run Date:**	12/17/2016	**Sample ID:**	WG595142-01
Instrument ID:	LCMS1	**Run Time:**	00:15	**Method:**	6850
File ID:	1LM.LM37774	**Analyst:**	JWR	**Units:**	ug/L
Workgroup (AAB#):	WG595135	**Cal ID:**	LCMS1 - 16-DEC-16		
Matrix:	WATER	**QAPP:**	DOD4		

Analytes	MDL	RDL	Concentration	Qualifier
Perchlorate	0.100	0.400	0.100	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 5069857
Report generated 12/19/2016 10:12

Microbac Laboratories Inc.

CONTINUING CALIBRATION BLANK (CCB)

Login Number: L16120281 Run Date: 12/17/2016 Sample ID: WG595142-04
Instrument ID: LCMS1 Run Time: 04:59 Method: 6850
File ID: 1LM.LM37789 Analyst: JWR Units: ug/L
Workgroup (AAB#): WG595135 Cal ID: LCMS1 - 16-DEC-16
Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Perchlorate	0.100	0.400	0.100	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 5069857
Report generated 12/19/2016 10:12

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L16120281	**Run Date:**	12/17/2016	**Sample ID:**	WG595142-06
Instrument ID:	LCMS1	**Run Time:**	07:49	**Method:**	6850
File ID:	1LM.LM37798	**Analyst:**	JWR	**Units:**	ug/L
Workgroup (AAB#):	WG595135	**Cal ID:**	LCMS1 - 16-DEC-16		
Matrix:	WATER	**QAPP:**	DOD4		

Analytes	MDL	RDL	Concentration	Qualifier
Perchlorate	0.100	0.400	0.100	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 5069857
Report generated 12/19/2016 10:12

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L16120281 Run Date: 12/17/2016 Sample ID: WG595142-02

Instrument ID: LCMS1 Run Time: 00:34 Method: 6850

File ID: 1LM.LM37775 Analyst: JWR QC Key: DOD4

Workgroup (AAB#): WG595135 Cal ID: LCMS1 - 16-DEC-16

Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	0.981	ug/L	1.64	1.90	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008

PDF File ID: 5069856

Report generated 12/19/2016 10:12

Login Number: L16120281 Run Date: 12/17/2016 Sample ID: WG595142-03
Instrument ID: LCMS1 Run Time: 04:21 Method: 6850
File ID: 1LM.LM37787 Analyst: JWR QC Key: DOD4
Workgroup (AAB#): WG595135 Cal ID: LCMS1 - 16-DEC-16
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	0.970	ug/L	1.63	3.00	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 5069856
Report generated 12/19/2016 10:12

Microbac Laboratories Inc.

CONTINUING CALIBRATION VERIFICATION (CCV)

Login Number: L16120281 Run Date: 12/17/2016 Sample ID: WG595142-05

Instrument ID: LCMS1 Run Time: 07:12 Method: 6850

File ID: 1LM.LM37796 Analyst: JWR QC Key: DOD4

Workgroup (AAB#): WG595135 Cal ID: LCMS1 - 16-DEC-16

Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	0.996	ug/L	1.67	0.400	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008

PDF File ID: 5069856

Report generated 12/19/2016 10:12

Login Number: L16120281 Run Date: 12/17/2016 Sample ID: WG595135-07
Instrument ID: LCMS1 Run Time: 00:53 Prep Method: 6850
File ID: 1LM.LM37776 Analyst: JWR Method: 6850
Workgroup (AAB#): WG595135 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-16-DEC-16

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.199	99.5	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 5069855
Report generated 12/19/2016 10:12

Login Number: L16120281 Run Date: 12/17/2016 Sample ID: WG595135-08
Instrument ID: LCMS1 Run Time: 04:40 Prep Method: 6850
File ID: 1LM.LM37788 Analyst: JWR Method: 6850
Workgroup (AAB#): WG595135 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-16-DEC-16

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.196	98.0	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 5069855
Report generated 12/19/2016 10:12

Login Number: L16120281 Run Date: 12/17/2016 Sample ID: WG595135-09
Instrument ID: LCMS1 Run Time: 07:31 Prep Method: 6850
File ID: 1LM.LM37797 Analyst: JWR Method: 6850
Workgroup (AAB#): WG595135 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-16-DEC-16

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.193	96.5	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 5069855
Report generated 12/19/2016 10:12

Microbac Laboratories Inc.

INTERNAL STANDARD AREA SUMMARY
(COMPARED TO AVERAGE OF ICAL)

Login Number: L16120281
Instrument ID: LCMS1
Workgroup (AAB#): WG595135

ICAL CCV Number: WG595346-05
CAL ID: LCMS1-16-DEC-16
Matrix: WATER

Sample Number	Dilution	Tag	IS-1
WG595346	NA	NA	309000
Upper Limit	NA	NA	463500
Lower Limit	NA	NA	154500
WG595135-03	1.00	01	330000

IS-1 - O18LP

Underline = Response outside limits

INTERNAL_STD_AVG_ICAL - Modified 03/10/2010
PDF File ID: 5069858
Report generated 12/19/2016 10:12

Microbac Laboratories Inc.
INTERNAL STANDARD AREA SUMMARY
(COMPARED TO AVERAGE OF ICAL)

Login Number:L16120281
Instrument ID:LCMS1
Workgroup (AAB#):WG595135

ICAL CCV Number:WG595346-05
CAL ID: LCMS1-16-DEC-16
Matrix:WATER

Sample Number	Dilution	Tag	IS-1
WG595346	NA	NA	309000
Upper Limit	NA	NA	463500
Lower Limit	NA	NA	154500
L16120281-01	1.00	01	317000
L16120281-02	1.00	01	330000
L16120281-03	1.00	01	332000
L16120281-04	1.00	01	318000
L16120281-05	1.00	01	315000
WG595135-02	1.00	01	338000

IS-1 - O18LP

Underline = Response outside limits

INTERNAL_STD_AVG_ICAL - Modified 03/10/2010
PDF File ID: 5069858
Report generated 12/19/2016 10:12

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16120281	**Prep Method:**	6850	**Samplenum:**	L16120281-01
Instrument:	LCMS1	**Prep Date:**	12/16/2016 18:00	**File ID:**	1LM.LM37790
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/17/2016 05:18	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	101000	35100	2.88	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16120281	**Prep Method:**	6850	**Samplenum:**	L16120281-02
Instrument:	LCMS1	**Prep Date:**	12/16/2016 18:00	**File ID:**	1LM.LM37791
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/17/2016 05:37	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	124000	42400	2.92	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16120281	**Prep Method:**	6850	**Samplenum:**	L16120281-03
Instrument:	LCMS1	**Prep Date:**	12/16/2016 18:00	**File ID:**	1LM.LM37792
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/17/2016 05:56	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	127000	42700	2.97	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16120281	**Prep Method:**	6850	**Samplenum:**	L16120281-04
Instrument:	LCMS1	**Prep Date:**	12/16/2016 18:00	**File ID:**	1LM.LM37793
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/17/2016 06:15	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	55000	18200	3.02	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16120281	**Prep Method:**	6850	**Samplenum:**	L16120281-05
Instrument:	LCMS1	**Prep Date:**	12/16/2016 18:00	**File ID:**	1LM.LM37794
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/17/2016 06:34	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	55300	18100	3.06	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16120281	**Prep Method:**	6850	**Samplenum:**	WG595135-01
Instrument:	LCMS1	**Prep Date:**	12/16/2016 18:00	**File ID:**	1LM.LM37777
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/17/2016 01:12	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	20500	7290	2.81	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16120281	**Prep Method:**	6850	**Samplenum:**	WG595135-02
Instrument:	LCMS1	**Prep Date:**	12/16/2016 18:00	**File ID:**	1LM.LM37778
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/17/2016 01:31	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	199	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16120281	**Prep Method:**	6850	**Samplenum:**	WG595135-03
Instrument:	LCMS1	**Prep Date:**	12/16/2016 18:00	**File ID:**	1LM.LM37779
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/17/2016 01:50	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	22600	8110	2.79	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16120281	**Prep Method:**	6850	**Samplenum:**	WG595135-07
Instrument:	LCMS1	**Prep Date:**	12/16/2016 18:00	**File ID:**	1LM.LM37776
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/17/2016 00:53	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	21500	7030	3.06	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16120281	**Prep Method:**	6850	**Samplenum:**	WG595135-08
Instrument:	LCMS1	**Prep Date:**	12/16/2016 18:00	**File ID:**	1LM.LM37788
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/17/2016 04:40	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	21700	8020	2.71	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16120281	**Prep Method:**	6850	**Samplenum:**	WG595135-09
Instrument:	LCMS1	**Prep Date:**	12/16/2016 18:00	**File ID:**	1LM.LM37797
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/17/2016 07:31	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	22500	7620	2.95	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16120281	**Prep Method:**		**Samplenum:**	WG595142-01
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM37774
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/17/2016 00:15	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	0.000	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16120281	**Prep Method:**		**Samplenum:**	WG595142-02
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM37775
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/17/2016 00:34	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	100000	33400	2.99	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16120281	**Prep Method:**		**Samplenum:**	WG595142-03
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM37787
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/17/2016 04:21	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	106000	37100	2.86	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16120281	**Prep Method:**		**Samplenum:**	WG595142-04
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM37789
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/17/2016 04:59	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	0.000	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16120281	**Prep Method:**		**Samplenum:**	WG595142-05
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM37796
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/17/2016 07:12	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	109000	37700	2.89	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16120281	**Prep Method:**		**Samplenum:**	WG595142-06
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM37798
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/17/2016 07:49	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	0.000	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16120281	**Prep Method:**		**Samplenum:**	WG595346-02
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM37766
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/16/2016 21:44	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	10900	3720	2.93	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16120281	**Prep Method:**		**Samplenum:**	WG595346-03
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM37767
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/16/2016 22:02	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	21400	7850	2.73	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16120281	**Prep Method:**		**Samplenum:**	WG595346-04
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM37768
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/16/2016 22:21	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	54100	19300	2.80	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16120281	**Prep Method:**		**Samplenum:**	WG595346-05
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM37769
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/16/2016 22:40	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	106000	36100	2.94	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16120281	**Prep Method:**		**Samplenum:**	WG595346-06
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM37770
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/16/2016 22:59	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	206000	70700	2.91	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16120281	**Prep Method:**		**Samplenum:**	WG595346-07
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM37771
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/16/2016 23:18	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	505000	170000	2.97	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16120281	**Prep Method:**		**Samplenum:**	WG595346-08
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM37772
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/16/2016 23:37	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	978000	326000	3.00	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16120281	**Prep Method:**		**Samplenum:**	WG595346-09
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM37773
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/16/2016 23:56	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	107000	36700	2.92	2.3	3.8	

2.1.1.3 Sample Data

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Data File	LM37790.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/17/2016 5:18:29 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

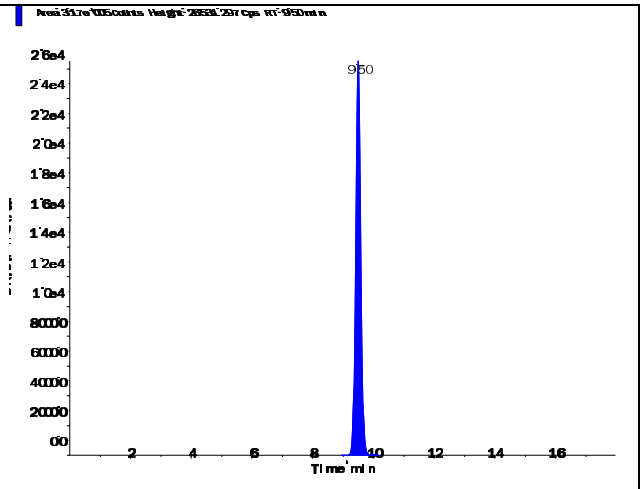
Sample Name	L16120281-01 RS	**Injection Vial**	20.00
Data File	LM37790.wiff	**Injection Volume**	10.00
Acquisition Date	12/17/2016 5:18:29 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	WG595135-04	**Dilution Factor**	1.00
Sample Comment	1,1 (Hist)	**Weight to Volume**	0.00

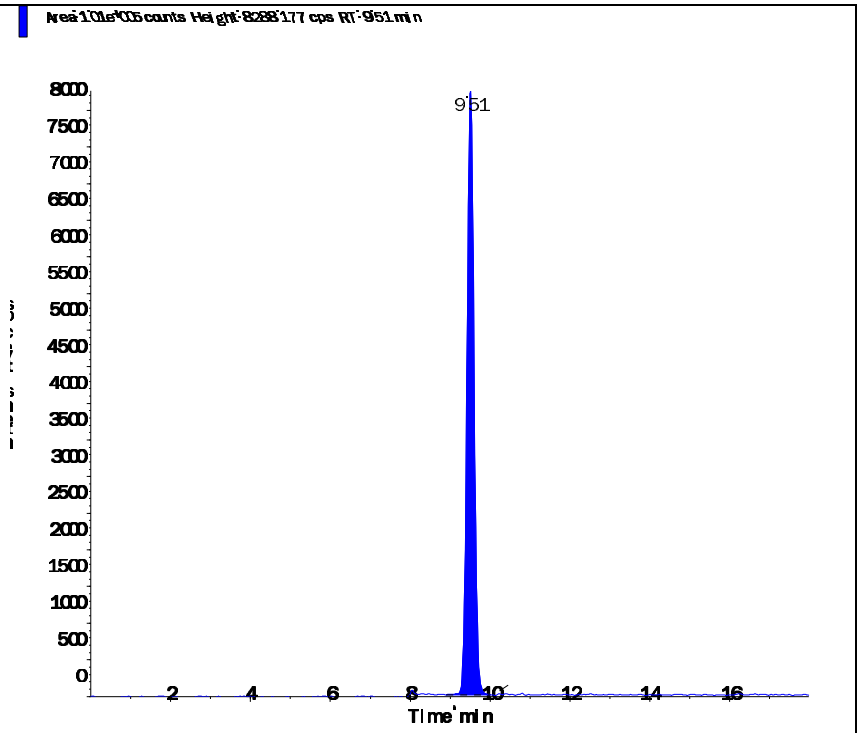
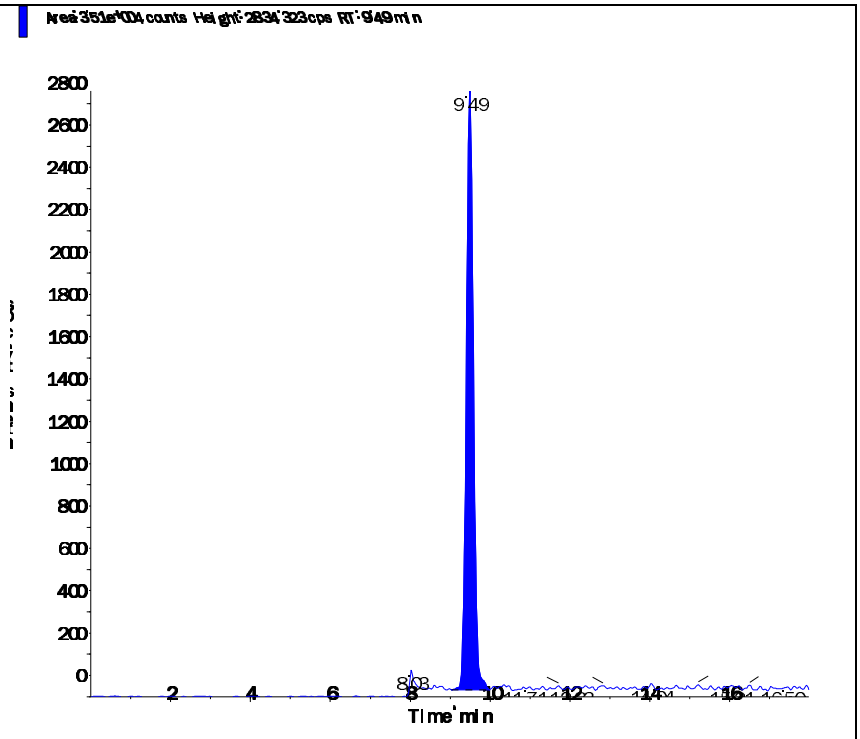
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.170e+05	9.50	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.010e+05	9.51	N/A	0.947
Perchlorate conf	3.510e+04	9.49	N/A	0.973

O18LP (Internal Standard)

RT (Exp. RT): 9.50(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.51 (9.56) min Calculated conc: 0.947 ng/ml Area Ratio: 0.317 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.49 (9.56) min Calculated conc: 0.973 ng/ml Area Ratio: 0.111 Sample Type: (Unknown)	

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Data File	LM37791.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/17/2016 5:37:24 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

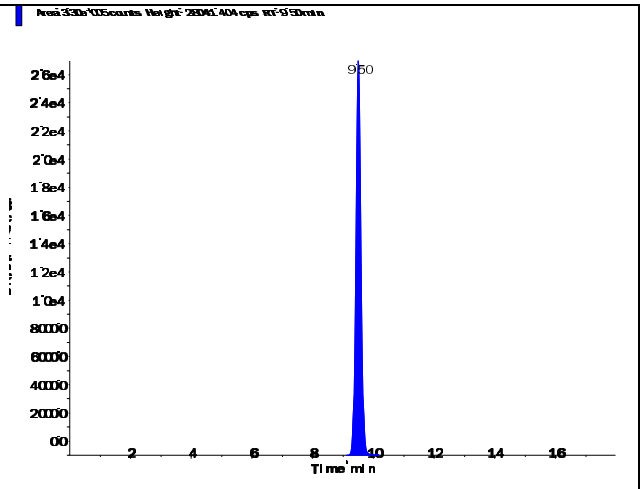
Sample Name	L16120281-02 MS	**Injection Vial**	21.00
Data File	LM37791.wiff	**Injection Volume**	10.00
Acquisition Date	12/17/2016 5:37:24 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	WG595135-05	**Dilution Factor**	1.00
Sample Comment	1,1 STD78251	**Weight to Volume**	0.00

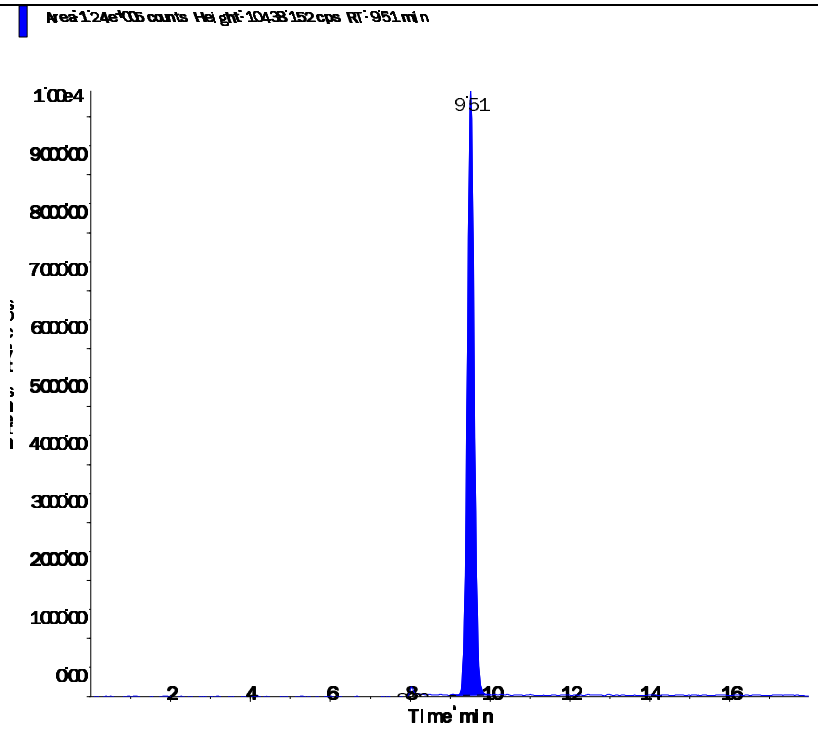
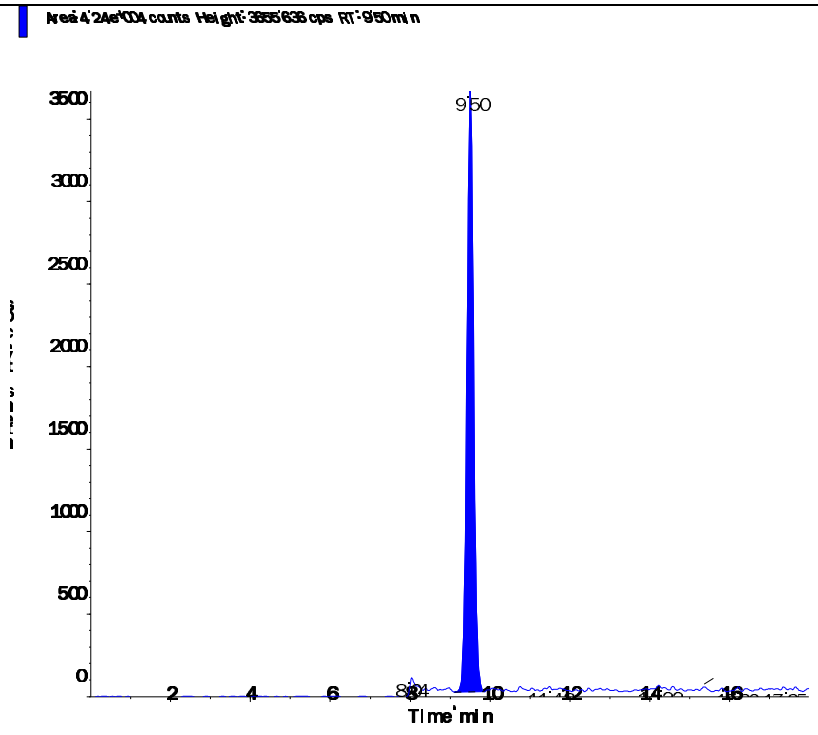
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.300e+05	9.50	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.240e+05	9.51	N/A	1.12
Perchlorate conf	4.240e+04	9.50	N/A	1.13

O18LP (Internal Standard)

RT (Exp. RT): 9.50(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.51 (9.56) min Calculated conc: 1.12 ng/ml Area Ratio: 0.376 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.50 (9.56) min Calculated conc: 1.13 ng/ml Area Ratio: 0.128 Sample Type: (Unknown)	

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Data File	LM37792.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/17/2016 5:56:19 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

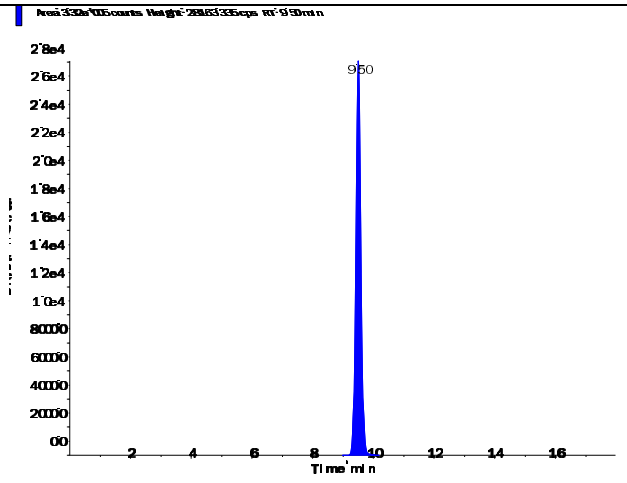
Sample Name	L16120281-03 MSD	**Injection Vial**	22.00
Data File	LM37792.wiff	**Injection Volume**	10.00
Acquisition Date	12/17/2016 5:56:19 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	WG595135-06	**Dilution Factor**	1.00
Sample Comment	1,1 STD78251	**Weight to Volume**	0.00

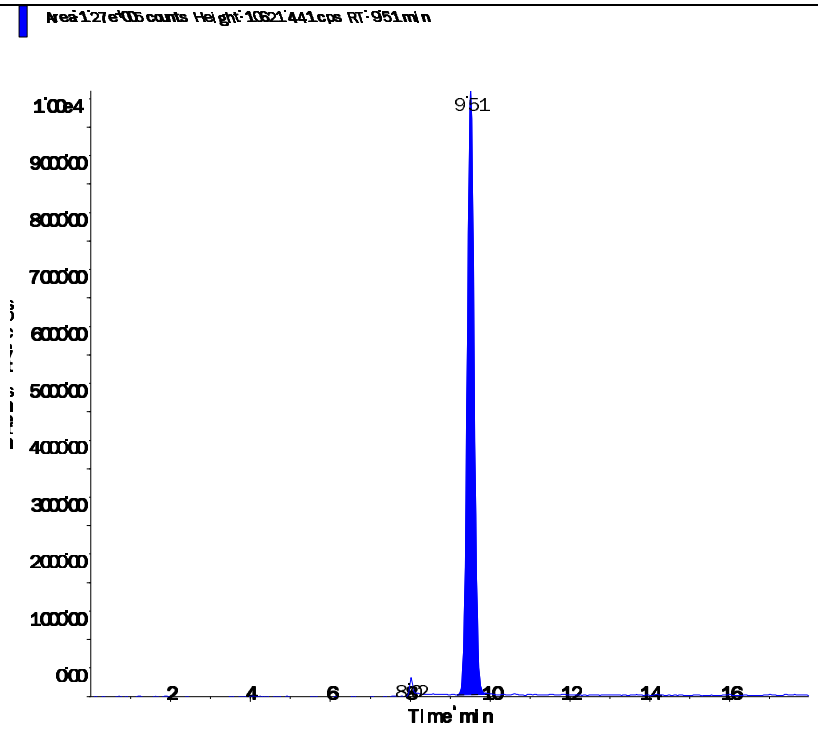
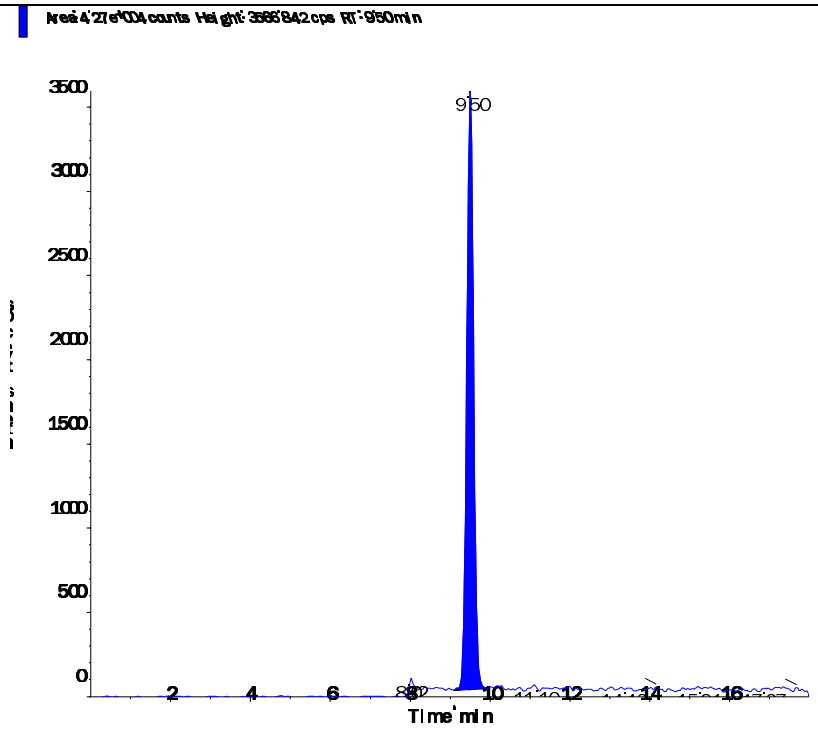
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.320e+05	9.50	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.270e+05	9.51	N/A	1.14
Perchlorate conf	4.270e+04	9.50	N/A	1.13

O18LP (Internal Standard)

RT (Exp. RT): 9.50(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.51 (9.56) min Calculated conc: 1.14 ng/ml Area Ratio: 0.382 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.50 (9.56) min Calculated conc: 1.13 ng/ml Area Ratio: 0.129 Sample Type: (Unknown)	

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Data File	LM37793.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/17/2016 6:15:16 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

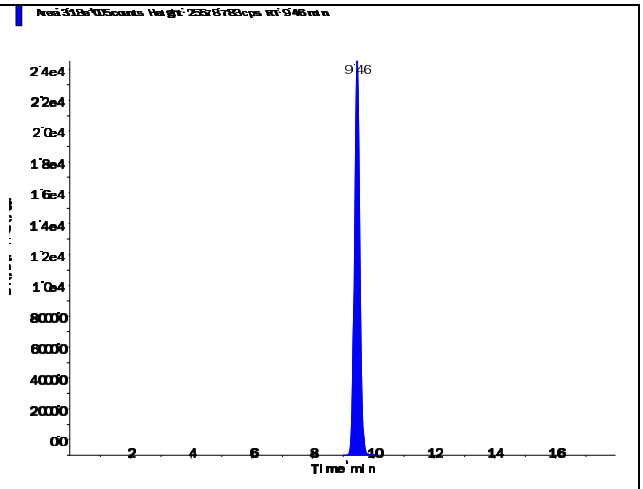
Sample Name	L16120281-04	**Injection Vial**	23.00
Data File	LM37793.wiff	**Injection Volume**	10.00
Acquisition Date	12/17/2016 6:15:16 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	L16120281-04	**Dilution Factor**	1.00
Sample Comment	1,1 (Hist)	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.180e+05	9.46	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	5.500e+04	9.48	N/A	0.513
Perchlorate conf	1.820e+04	9.46	N/A	0.494

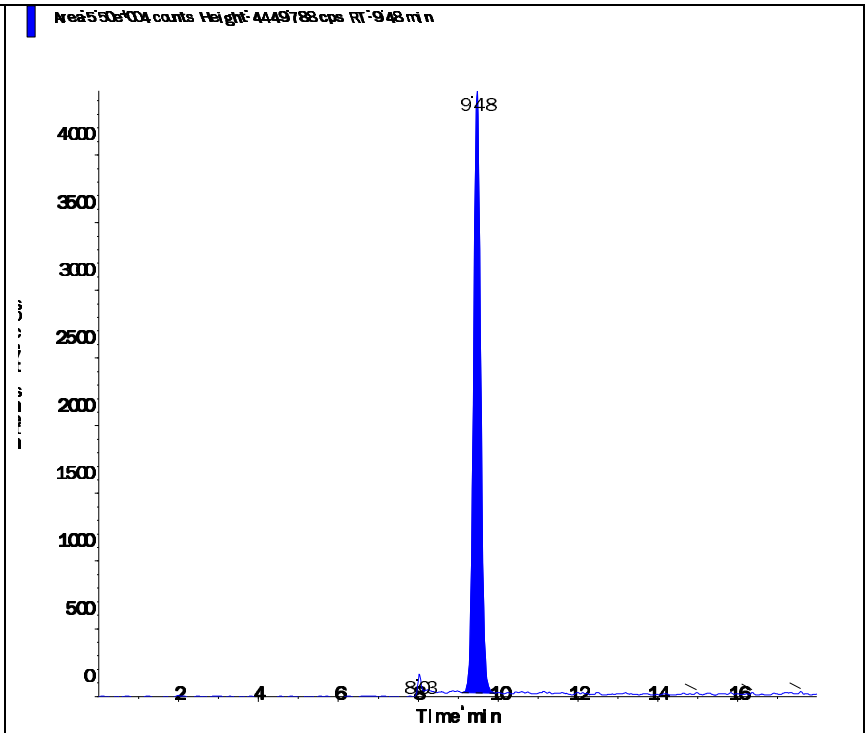
O18LP (Internal Standard)

RT (Exp. RT): 9.46(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



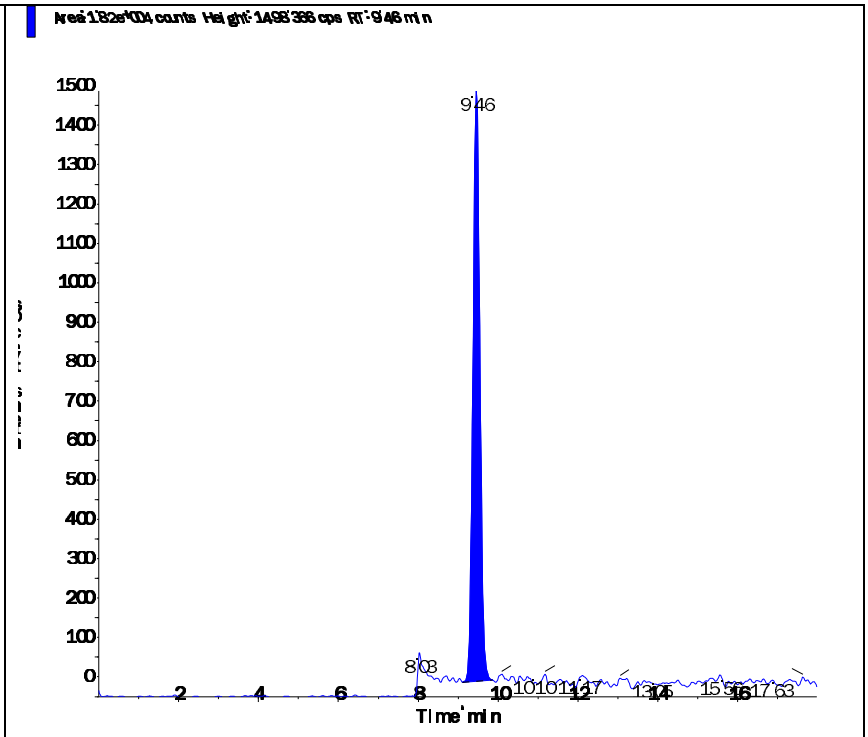
Perchlorate (98.8/83.3 amu)

RT (Exp. RT):	9.48 (9.56) min
Calculated conc:	0.513 ng/ml
Area Ratio:	0.173
Sample Type:	(Unknown)



Perchlorate conf (100.8/85.2 amu)

RT (Exp. RT):	9.46 (9.56) min
Calculated conc:	0.494 ng/ml
Area Ratio:	0.057
Sample Type:	(Unknown)



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Data File	LM37794.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/17/2016 6:34:13 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

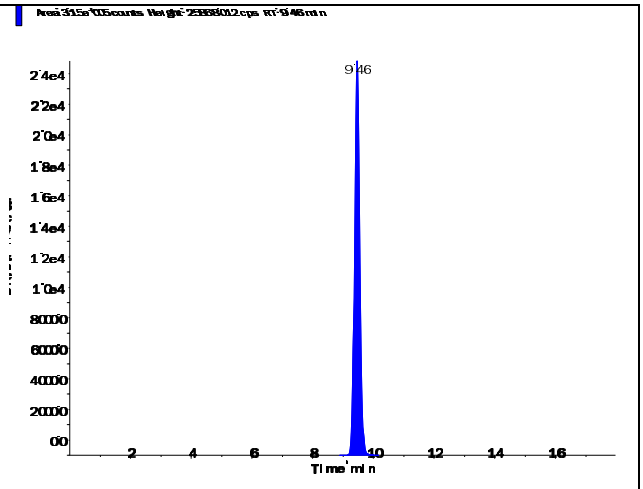
Sample Name	L16120281-05	**Injection Vial**	24.00
Data File	LM37794.wiff	**Injection Volume**	10.00
Acquisition Date	12/17/2016 6:34:13 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	L16120281-05	**Dilution Factor**	1.00
Sample Comment	1,1 (Hist)	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.150e+05	9.46	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	5.530e+04	9.47	N/A	0.522
Perchlorate conf	1.810e+04	9.46	N/A	0.497

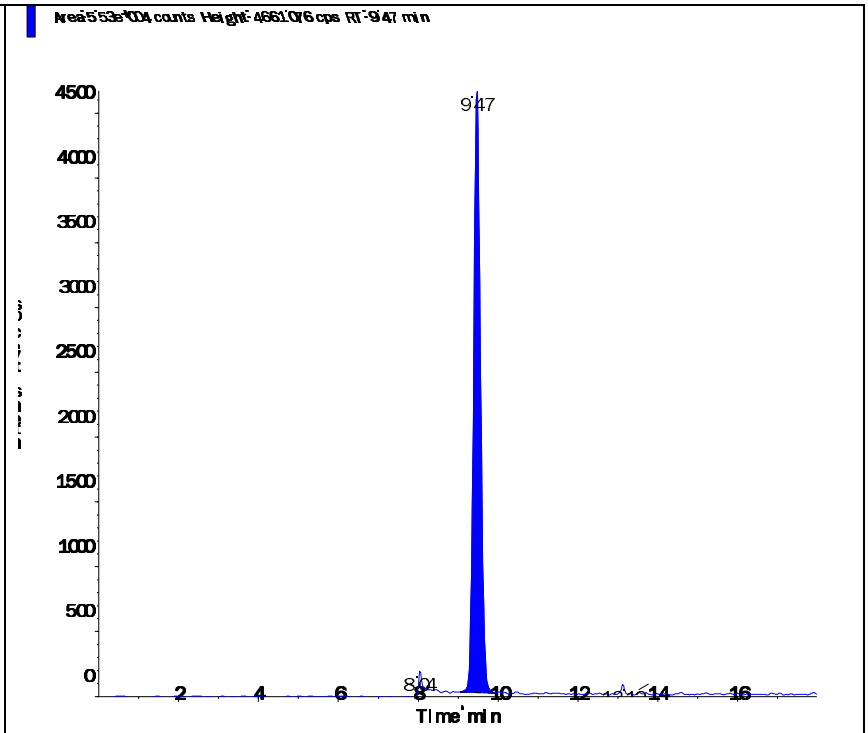
O18LP (Internal Standard)

RT (Exp. RT): 9.46(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



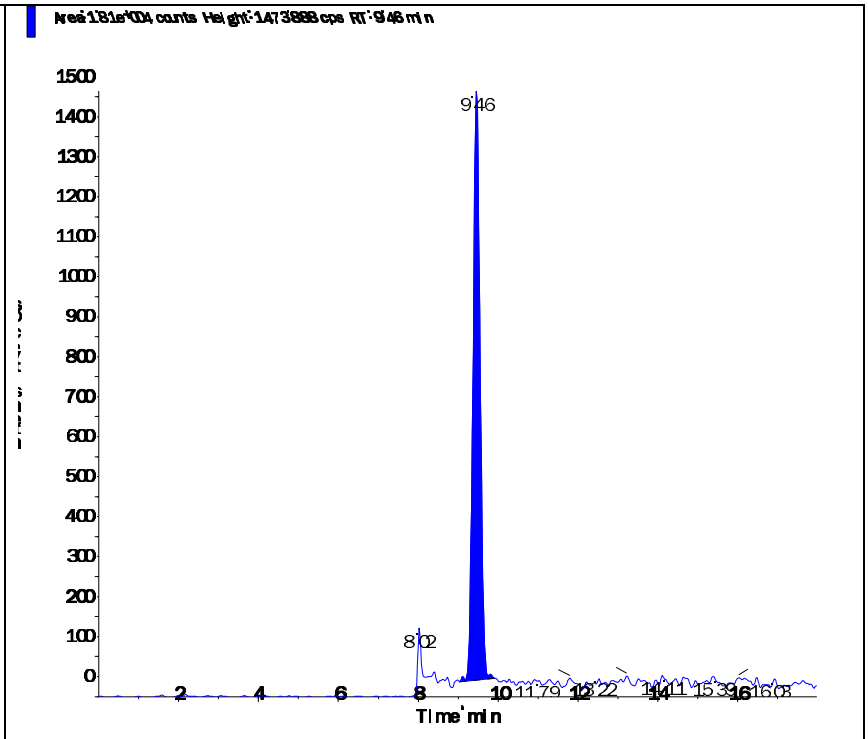
Perchlorate (98.8/83.3 amu)

RT (Exp. RT):	9.47 (9.56) min
Calculated conc:	0.522 ng/ml
Area Ratio:	0.176
Sample Type:	(Unknown)



Perchlorate conf (100.8/85.2 amu)

RT (Exp. RT):	9.46 (9.56) min
Calculated conc:	0.497 ng/ml
Area Ratio:	0.057
Sample Type:	(Unknown)



2.1.1.4 Standards Data

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Data File	LM37765.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/16/2016 9:25:07 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

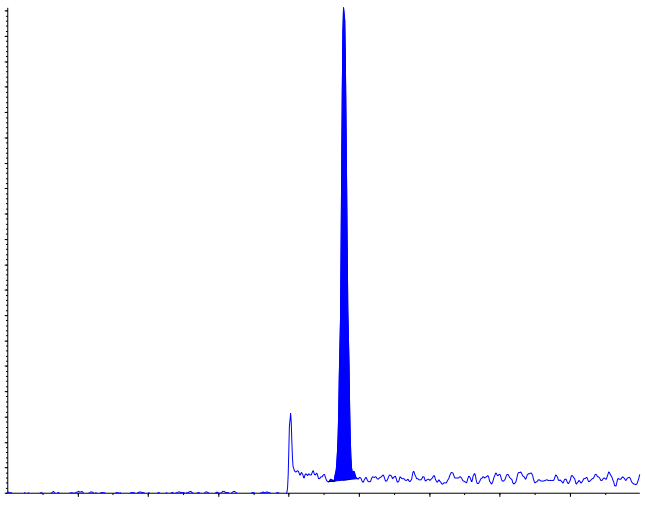
Sample Name	WG595346-01 CCB	**Injection Vial**	1.00
Data File	LM37765.wiff	**Injection Volume**	10.00
Acquisition Date	12/16/2016 9:25:07 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	WG595346-01	**Dilution Factor**	1.00
Sample Comment	11.00	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.090e+05	9.56	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	0.000e+00	0.00	N/A	No Peak
Perchlorate conf	0.000e+00	0.00	N/A	No Peak

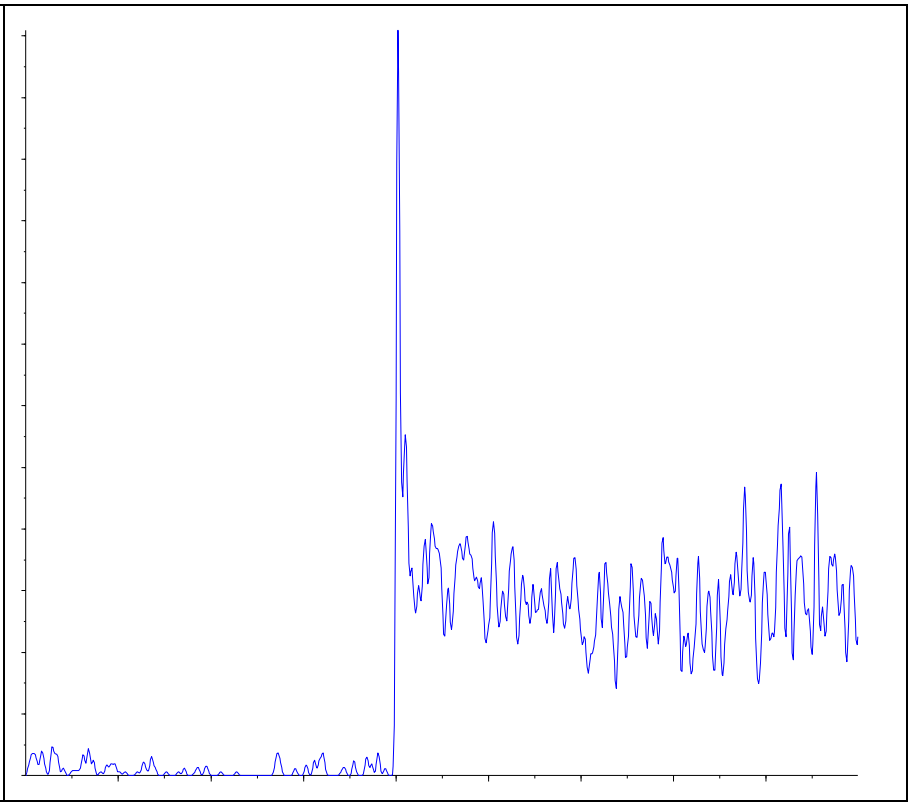
O18LP (Internal Standard)

RT (Exp. RT): 9.56(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



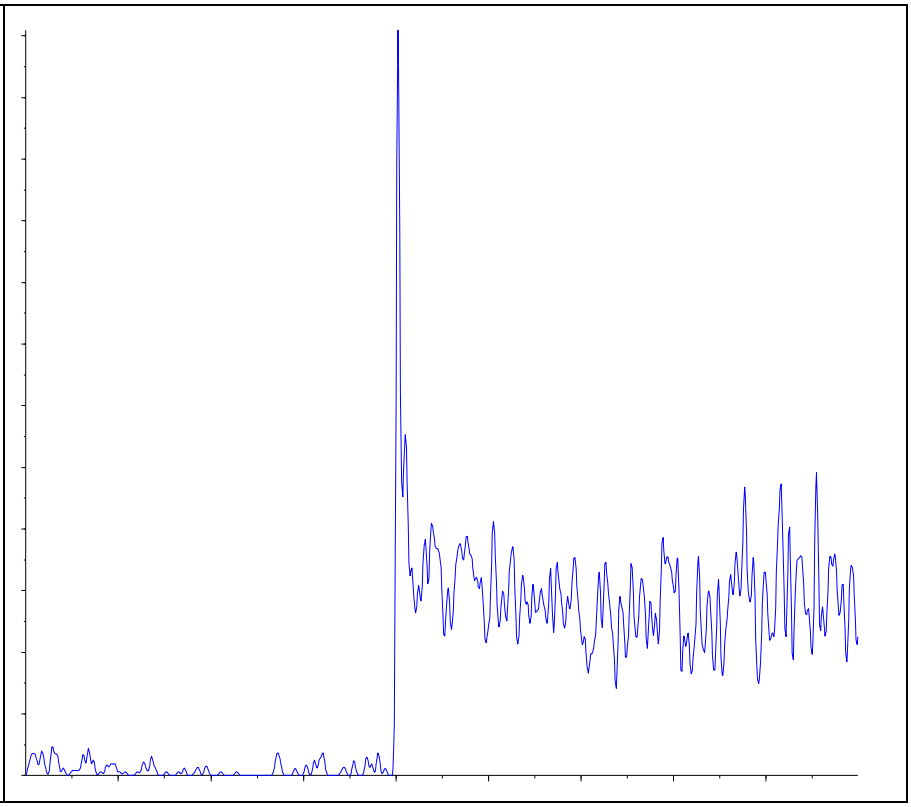
Perchlorate (98.8/83.3 amu)

RT (Exp. RT):	0.00 (9.56) min
Calculated conc:	No Peak ng/ml
Area Ratio:	0.00
Sample Type:	(Unknown)



Perchlorate conf (100.8/85.2 amu)

RT (Exp. RT):	0.00 (9.56) min
Calculated conc:	No Peak ng/ml
Area Ratio:	0.00
Sample Type:	(Unknown)



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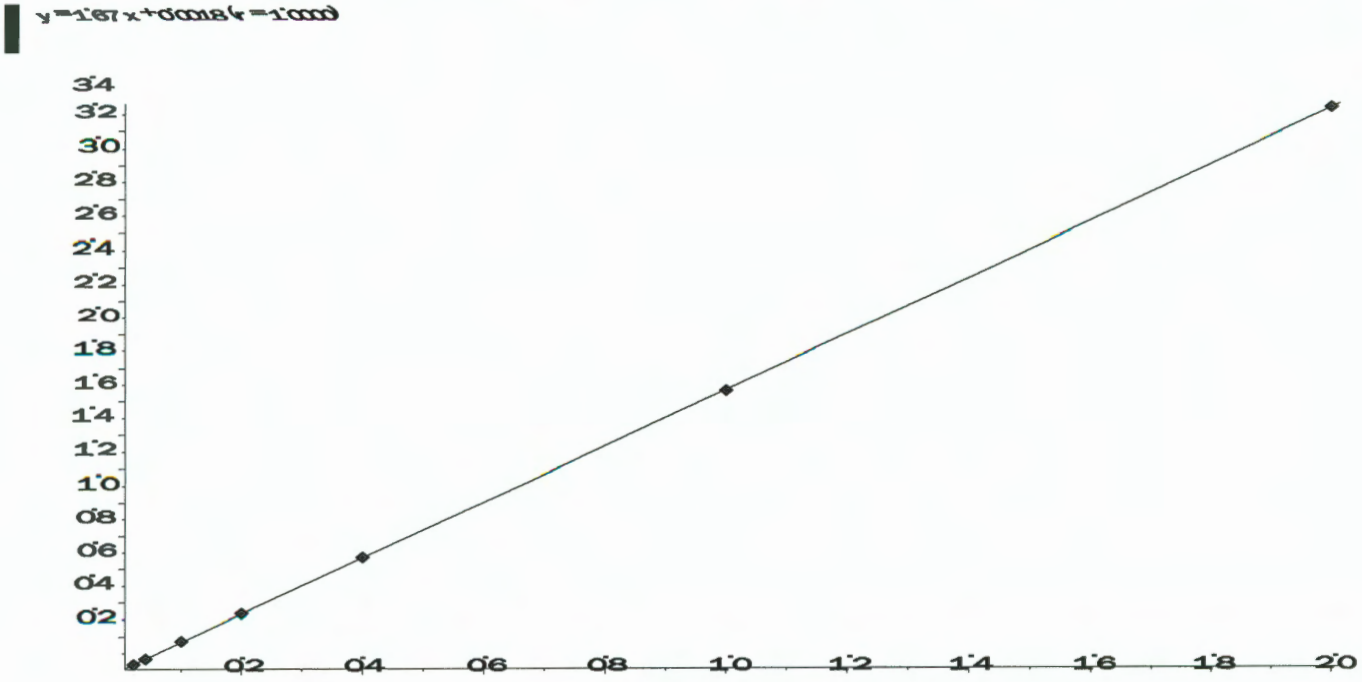
Analyte Name: **Perchlorate**
Internal Standard: O18LP

Data File	LM37765.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/16/2016 9:25:07 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

Regression Equation: y = 1.67 x + 0.0018 (r = 1.0000)

Expected Concentration	Number of Values	Mean Calculated Concentration	% Accuracy	Std. Deviation	%CV
0.10	1	0.10	98.3	N/A	N/A
0.20	1	0.20	98.8	N/A	N/A
0.50	1	0.51	102.5	N/A	N/A
1.00	1	1.01	100.5	N/A	N/A
2.00	1	2.00	100.2	N/A	N/A
5.00	1	4.98	99.6	N/A	N/A
10.00	1	10.00	100.0	N/A	N/A



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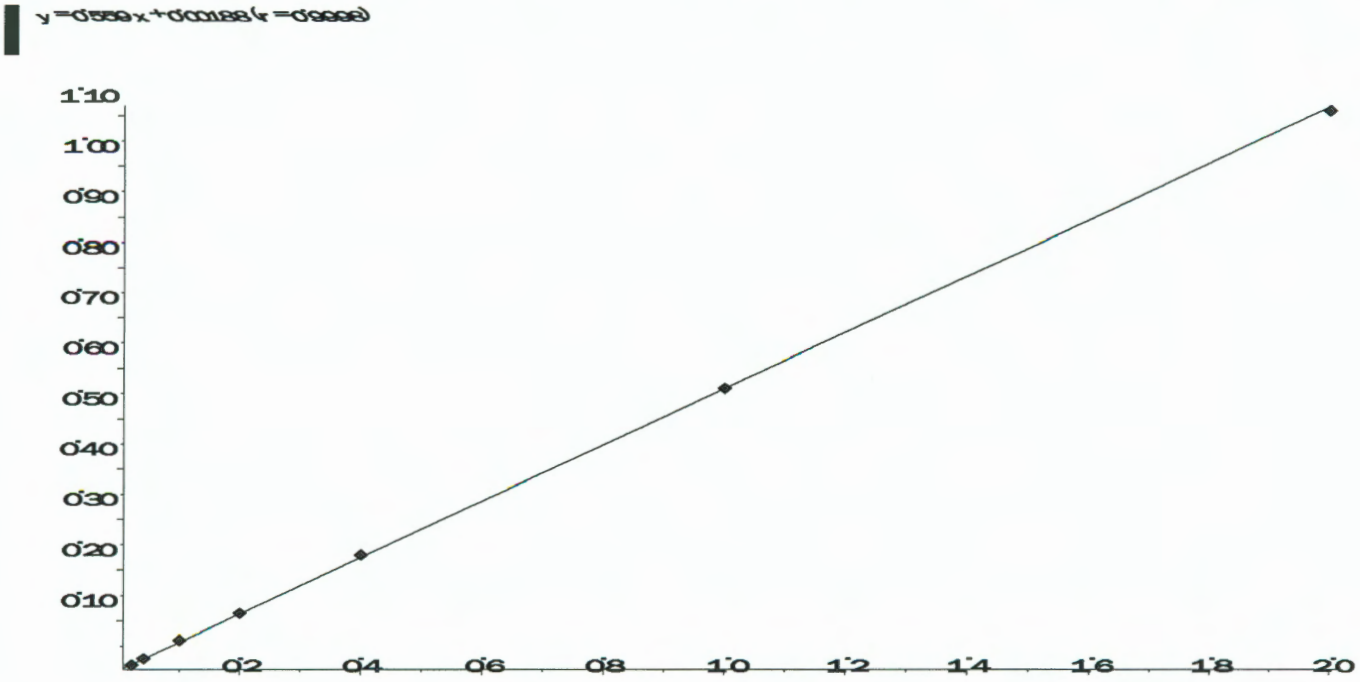
Created with Analyst Reporter
Printed: 12/17/2016 2:09 PM

Analyte Name: **Perchlorate conf**
Internal Standard: O18LP

Data File	LM37765.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/16/2016 9:25:07 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

Regression Equation: y = 0.559 x + 0.00188 (r = 0.9998)

Expected Concentration	Number of Values	Mean Calculated Concentration	% Accuracy	Std. Deviation	%CV
0.10	1	0.09	88.5	N/A	N/A
0.20	1	0.21	102.5	N/A	N/A
0.50	1	0.53	106.8	N/A	N/A
1.00	1	1.01	100.9	N/A	N/A
2.00	1	2.04	102.0	N/A	N/A
5.00	1	5.00	100.1	N/A	N/A
10.00	1	9.92	99.2	N/A	N/A



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Data File	LM37766.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/16/2016 9:44:02 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

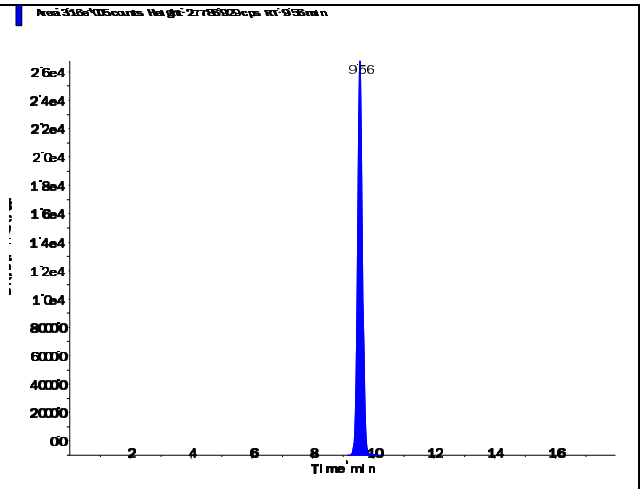
Sample Name	WG595346-02 STD (0.1 ug/L)	**Injection Vial**	2.00
Data File	LM37766.wiff	**Injection Volume**	10.00
Acquisition Date	12/16/2016 9:44:02 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Standard
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	WG595346-02	**Dilution Factor**	1.00
Sample Comment	1,1 STD78249	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.160e+05	9.56	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.090e+04	9.56	0.10	0.0983
Perchlorate conf	3.720e+03	9.55	0.10	0.0885

O18LP (Internal Standard)

RT (Exp. RT): 9.56(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Standard)



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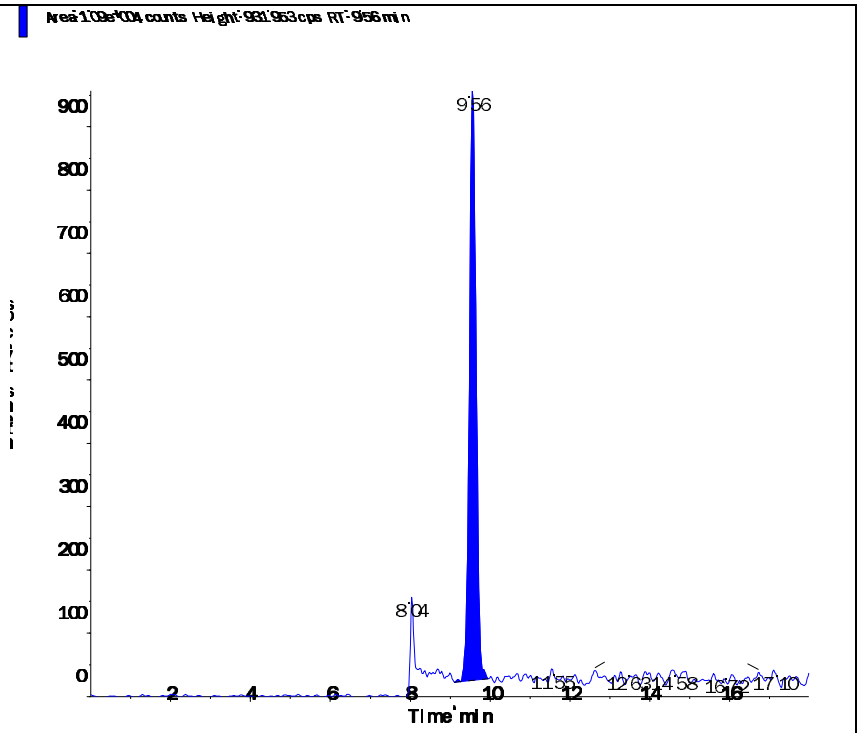
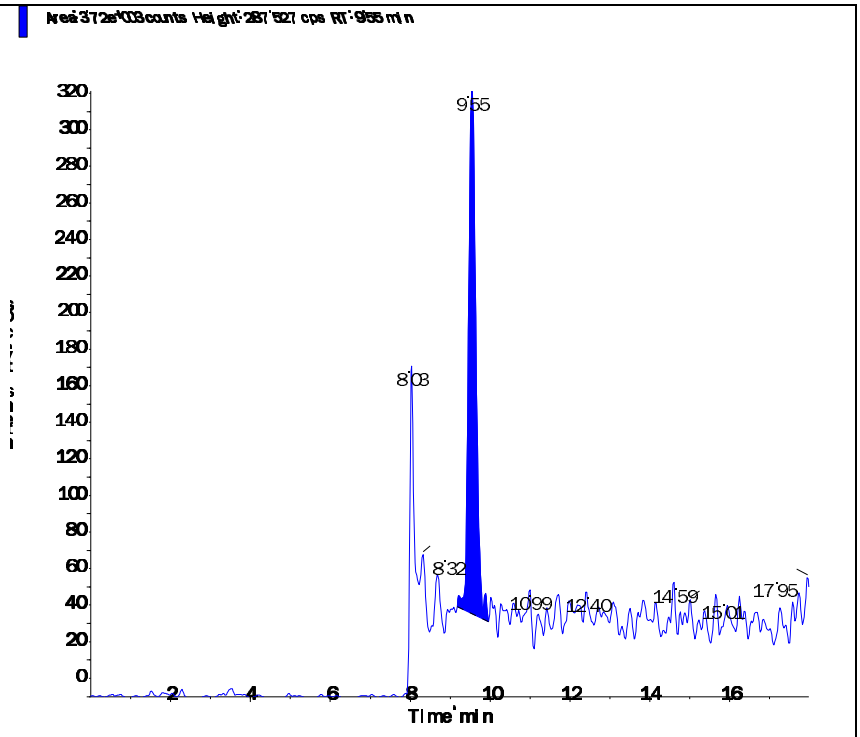
Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.56 (9.56) min Calculated conc: 0.0983 ng/ml Area Ratio: 0.035 Sample Type: (Standard)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.55 (9.56) min Calculated conc: 0.0885 ng/ml Area Ratio: 0.012 Sample Type: (Standard)	

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Data File	LM37767.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/16/2016 10:02:59 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

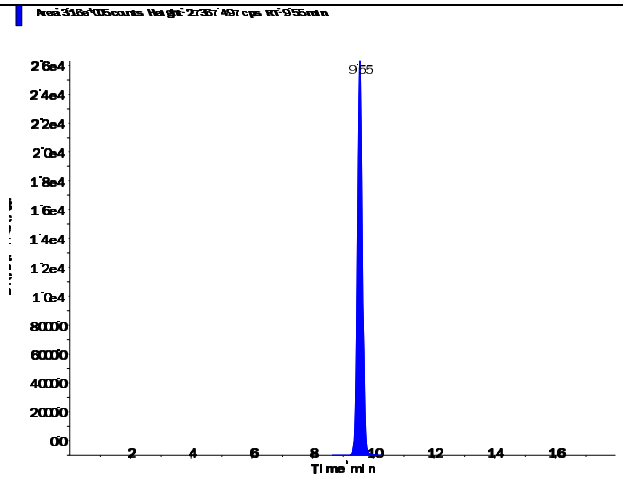
Sample Name	WG595346-03 STD (0.2 ug/L)	**Injection Vial**	3.00
Data File	LM37767.wiff	**Injection Volume**	10.00
Acquisition Date	12/16/2016 10:02:59 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Standard
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	WG595346-03	**Dilution Factor**	1.00
Sample Comment	1,1 STD78249	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.160e+05	9.55	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	2.140e+04	9.56	0.20	0.198
Perchlorate conf	7.850e+03	9.55	0.20	0.205

O18LP (Internal Standard)

RT (Exp. RT): 9.55(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Standard)



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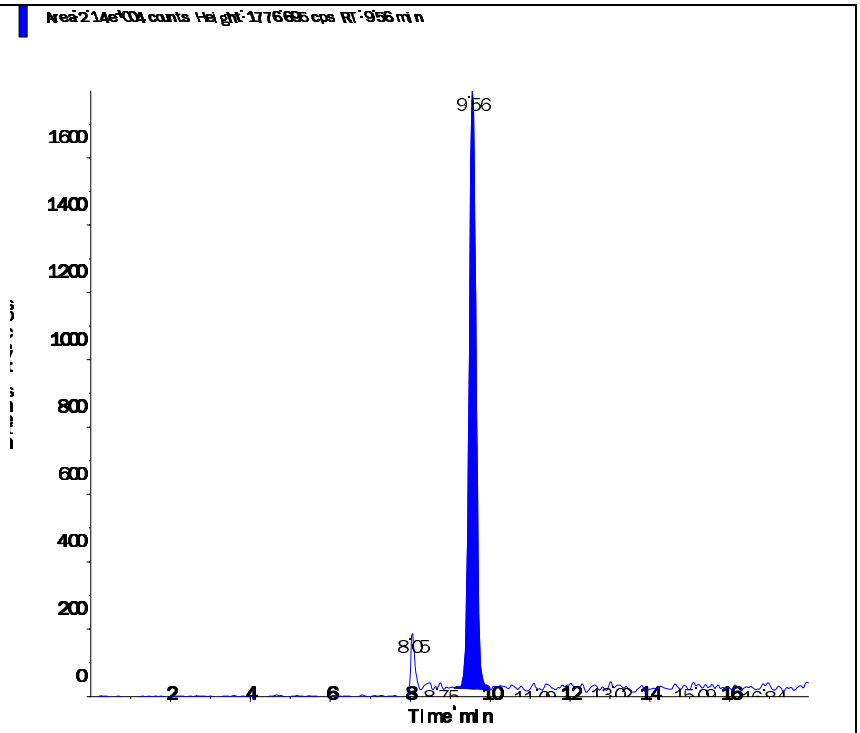
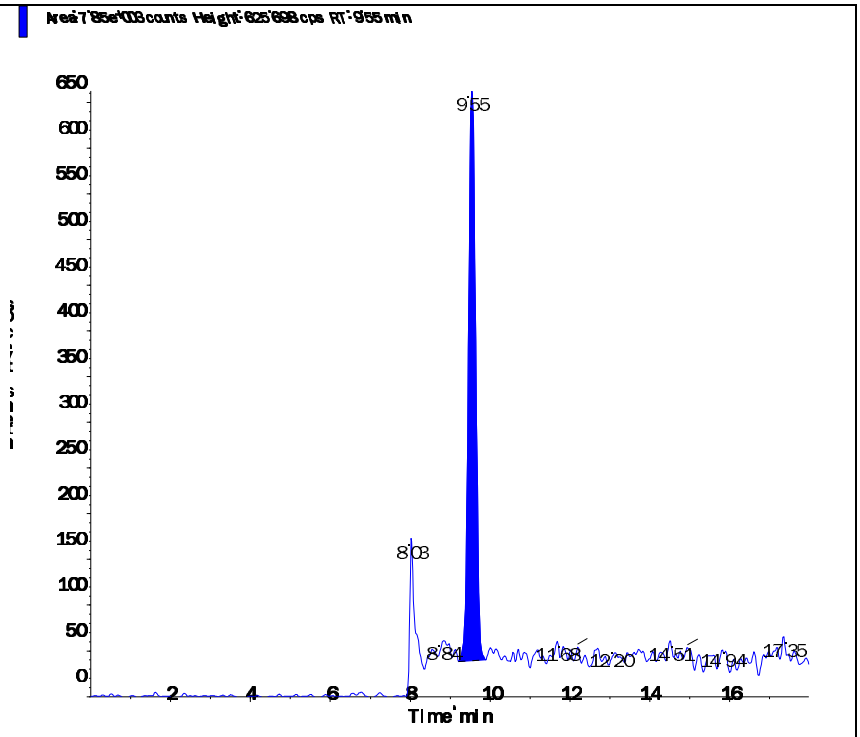
Perchlorate (98.8/83.3 amu)	
RT (Exp. RT):	9.56 (9.56) min
Calculated conc:	0.198 ng/ml
Area Ratio:	0.068
Sample Type:	(Standard)



Perchlorate conf (100.8/85.2 amu)	
RT (Exp. RT):	9.55 (9.56) min
Calculated conc:	0.205 ng/ml
Area Ratio:	0.025
Sample Type:	(Standard)



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Data File	LM37768.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/16/2016 10:21:55 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

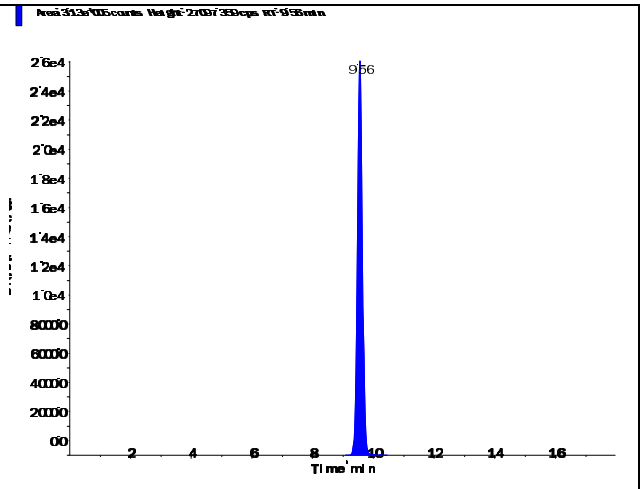
Sample Name	WG595346-04 STD (0.5 ug/L)	**Injection Vial**	4.00
Data File	LM37768.wiff	**Injection Volume**	10.00
Acquisition Date	12/16/2016 10:21:55 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Standard
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	WG595346-04	**Dilution Factor**	1.00
Sample Comment	1,1 STD78249	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.130e+05	9.56	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	5.410e+04	9.57	0.50	0.513
Perchlorate conf	1.930e+04	9.55	0.50	0.534

O18LP (Internal Standard)

RT (Exp. RT): 9.56(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Standard)



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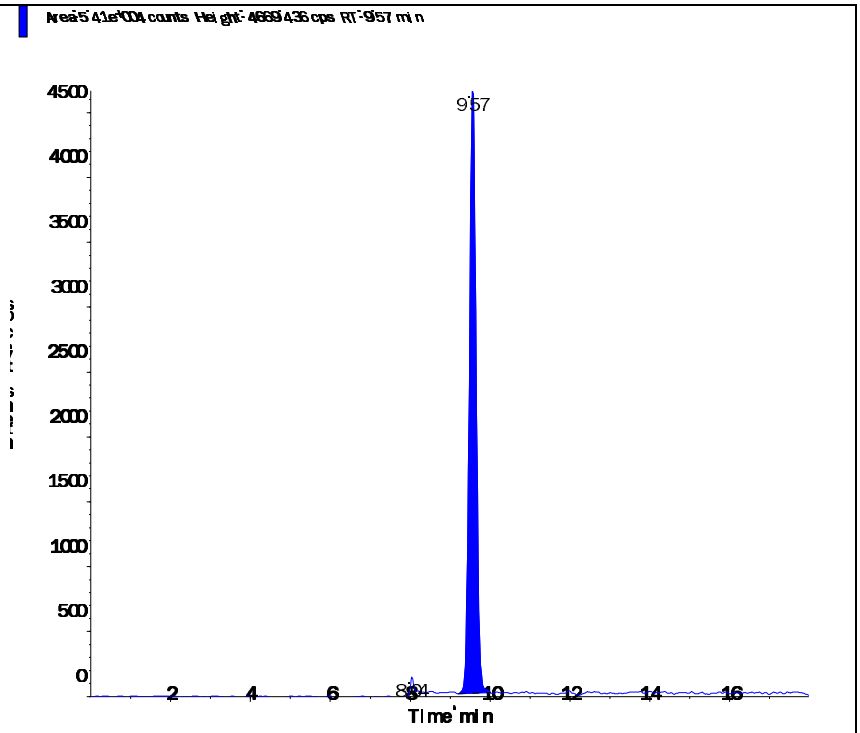
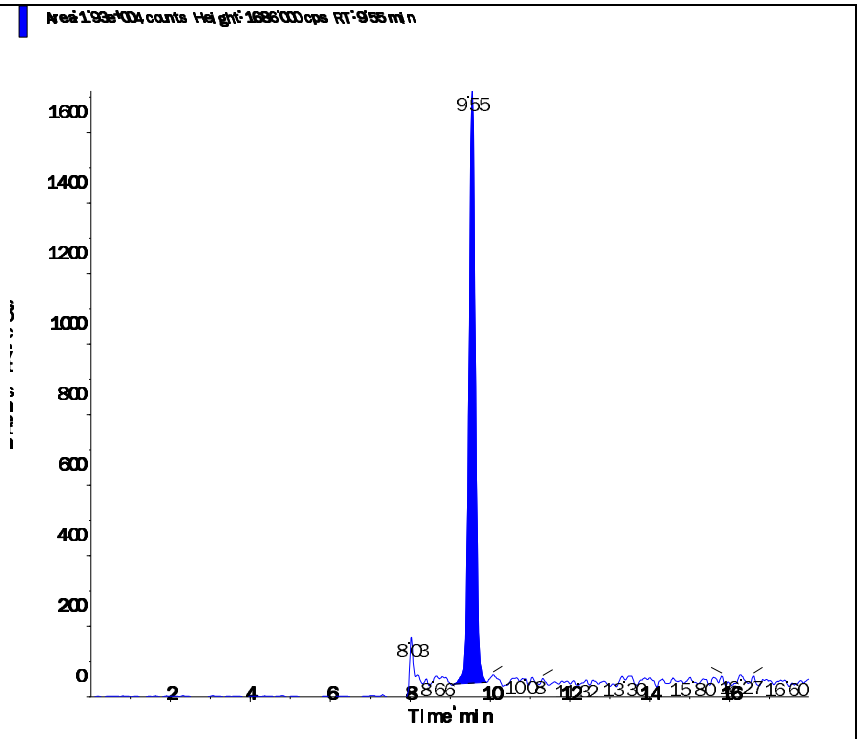
Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.57 (9.56) min Calculated conc: 0.513 ng/ml Area Ratio: 0.173 Sample Type: (Standard)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.55 (9.56) min Calculated conc: 0.534 ng/ml Area Ratio: 0.062 Sample Type: (Standard)	

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Data File	LM37769.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/16/2016 10:40:50 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

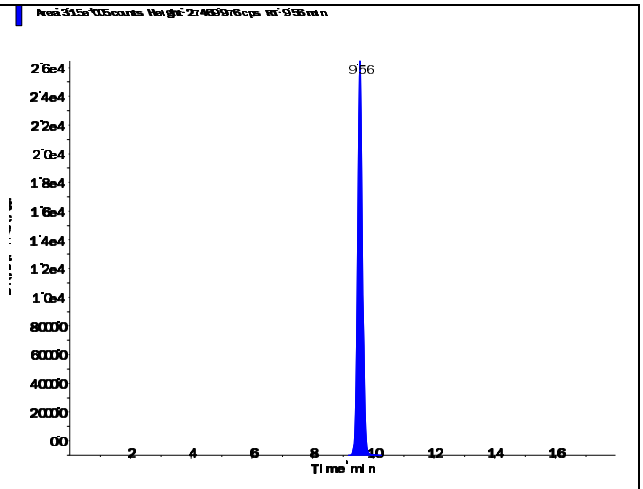
Sample Name	WG595346-05 STD (1.0 ug/L)	**Injection Vial**	5.00
Data File	LM37769.wiff	**Injection Volume**	10.00
Acquisition Date	12/16/2016 10:40:50 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Standard
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	WG595346-05	**Dilution Factor**	1.00
Sample Comment	1,1 STD78249	**Weight to Volume**	0.00

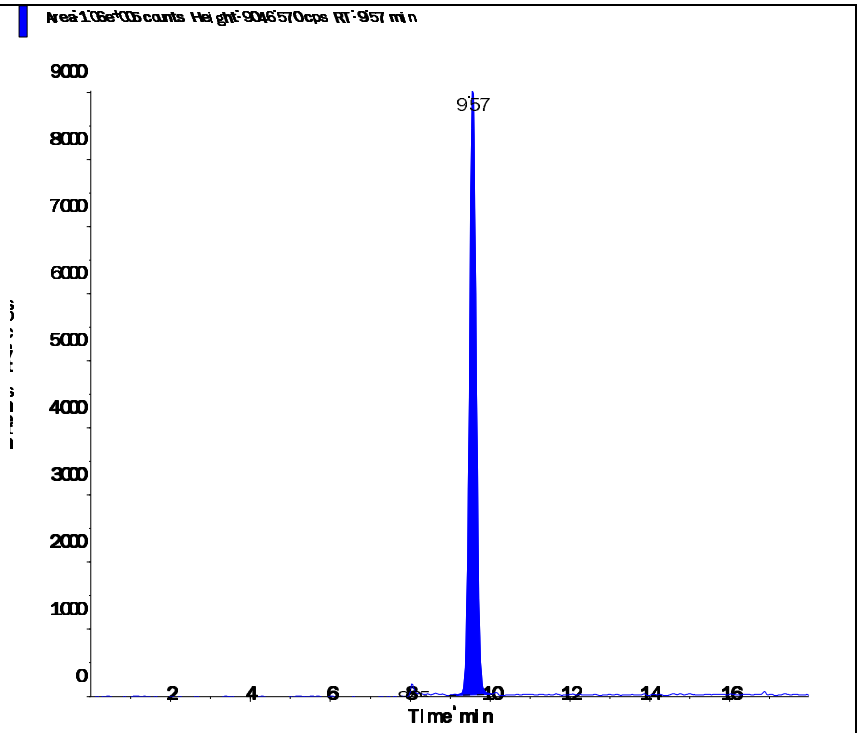
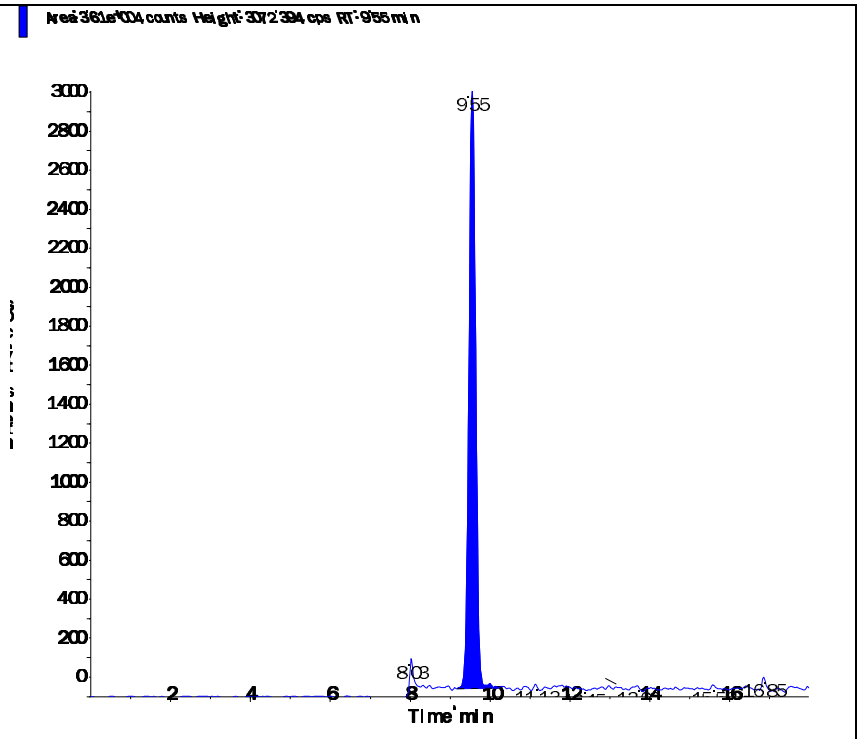
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.150e+05	9.56	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.060e+05	9.57	1.00	1.01
Perchlorate conf	3.610e+04	9.55	1.00	1.01

O18LP (Internal Standard)

RT (Exp. RT): 9.56(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Standard)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.57 (9.56) min Calculated conc: 1.01 ng/ml Area Ratio: 0.337 Sample Type: (Standard)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.55 (9.56) min Calculated conc: 1.01 ng/ml Area Ratio: 0.115 Sample Type: (Standard)	

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Data File	LM37770.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/16/2016 10:59:46 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

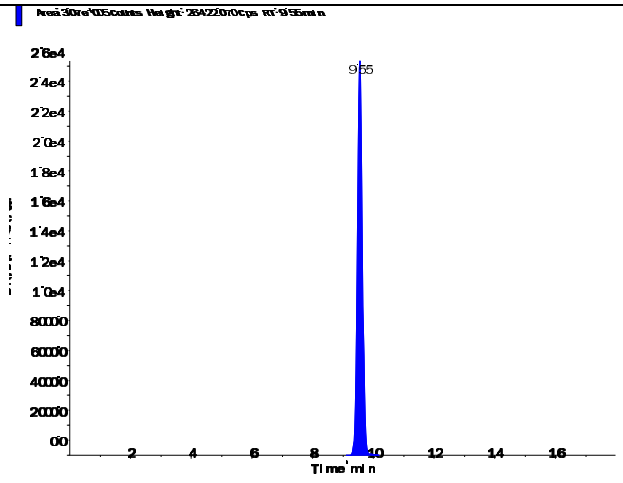
Sample Name	WG595346-06 STD (2.0 ug/L)	**Injection Vial**	6.00
Data File	LM37770.wiff	**Injection Volume**	10.00
Acquisition Date	12/16/2016 10:59:46 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Standard
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	WG595346-06	**Dilution Factor**	1.00
Sample Comment	1,1 STD78249	**Weight to Volume**	0.00

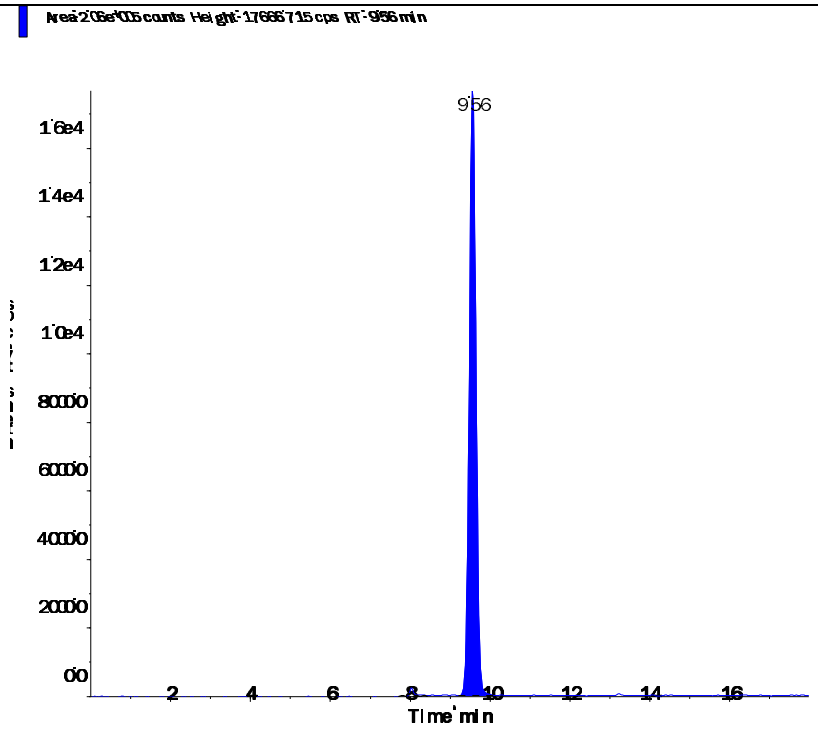
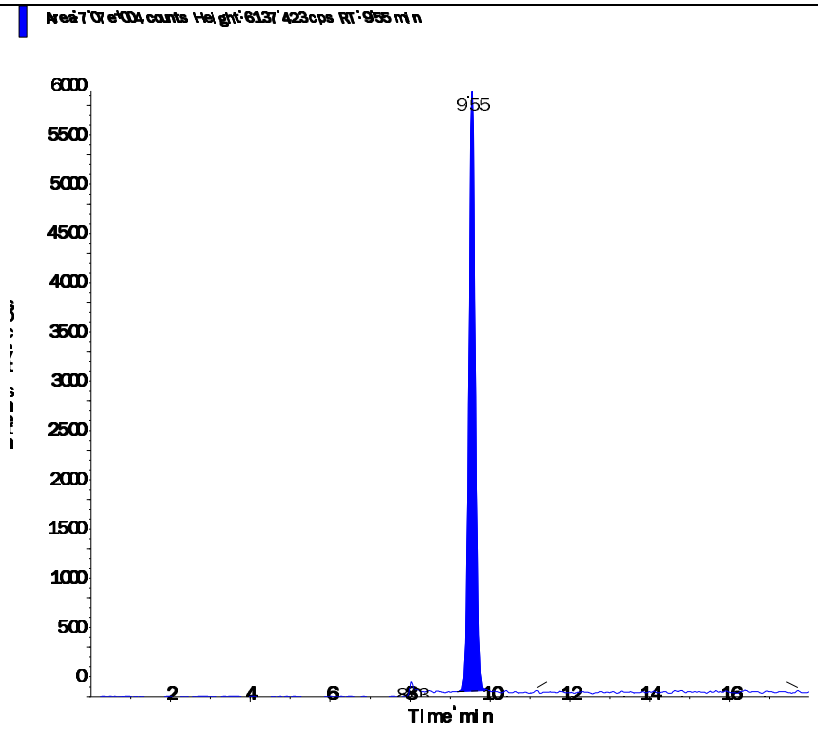
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.070e+05	9.55	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	2.060e+05	9.56	2.00	2.00
Perchlorate conf	7.070e+04	9.55	2.00	2.04

O18LP (Internal Standard)

RT (Exp. RT): 9.55(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Standard)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.56 (9.56) min Calculated conc: 2.00 ng/ml Area Ratio: 0.67 Sample Type: (Standard)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.55 (9.56) min Calculated conc: 2.04 ng/ml Area Ratio: 0.23 Sample Type: (Standard)	

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Data File	LM37771.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/16/2016 11:18:41 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

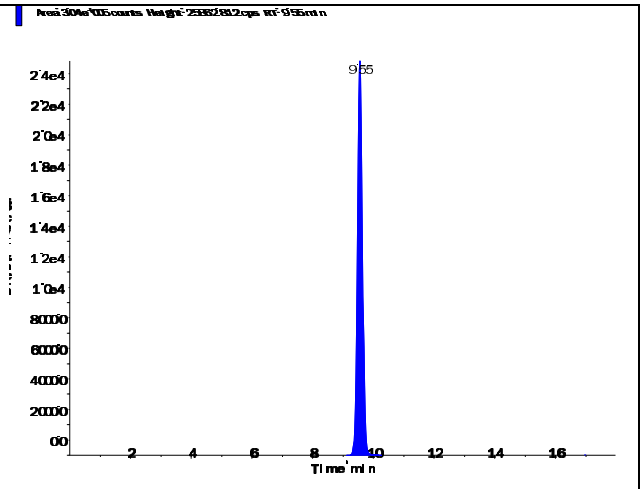
Sample Name	WG595346-07 STD (5.0 ug/L)	**Injection Vial**	7.00
Data File	LM37771.wiff	**Injection Volume**	10.00
Acquisition Date	12/16/2016 11:18:41 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Standard
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	WG595346-07	**Dilution Factor**	1.00
Sample Comment	1,1 STD78249	**Weight to Volume**	0.00

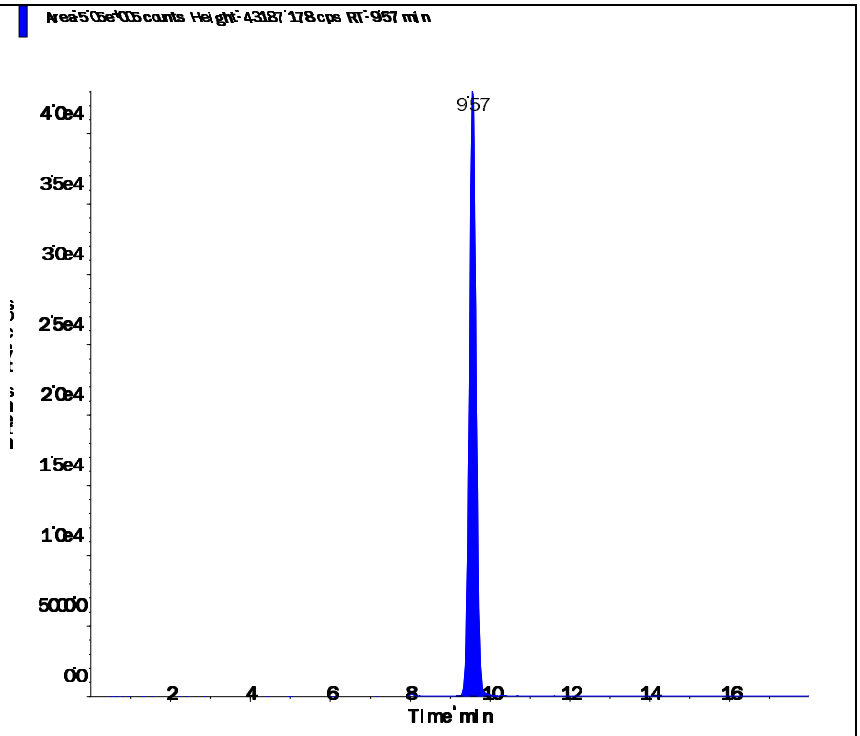
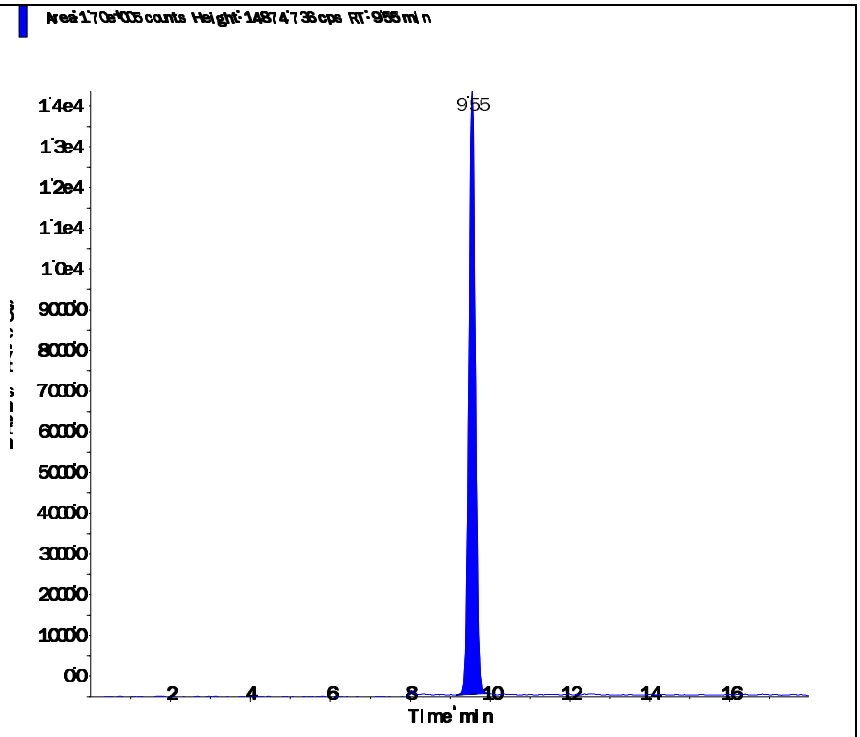
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.040e+05	9.55	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	5.050e+05	9.57	5.00	4.98
Perchlorate conf	1.700e+05	9.55	5.00	5.00

O18LP (Internal Standard)

RT (Exp. RT): 9.55(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Standard)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.57 (9.56) min Calculated conc: 4.98 ng/ml Area Ratio: 1.663 Sample Type: (Standard)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.55 (9.56) min Calculated conc: 5.00 ng/ml Area Ratio: 0.561 Sample Type: (Standard)	

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Data File	LM37772.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/16/2016 11:37:36 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

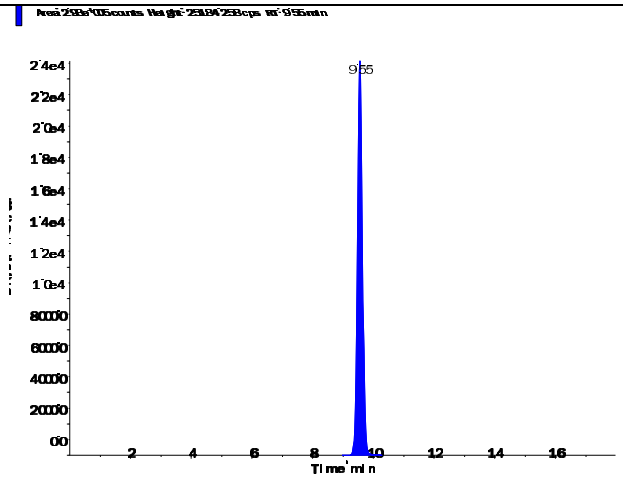
Sample Name	WG595346-08 STD (10 ug/L)	**Injection Vial**	8.00
Data File	LM37772.wiff	**Injection Volume**	10.00
Acquisition Date	12/16/2016 11:37:36 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Standard
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	WG595346-08	**Dilution Factor**	1.00
Sample Comment	1,1 STD78249	**Weight to Volume**	0.00

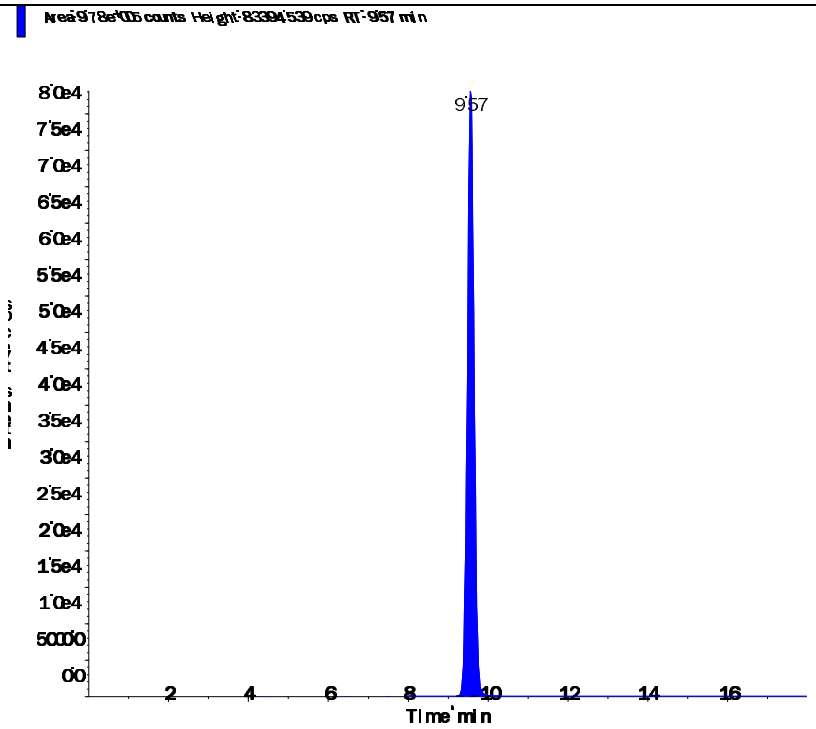
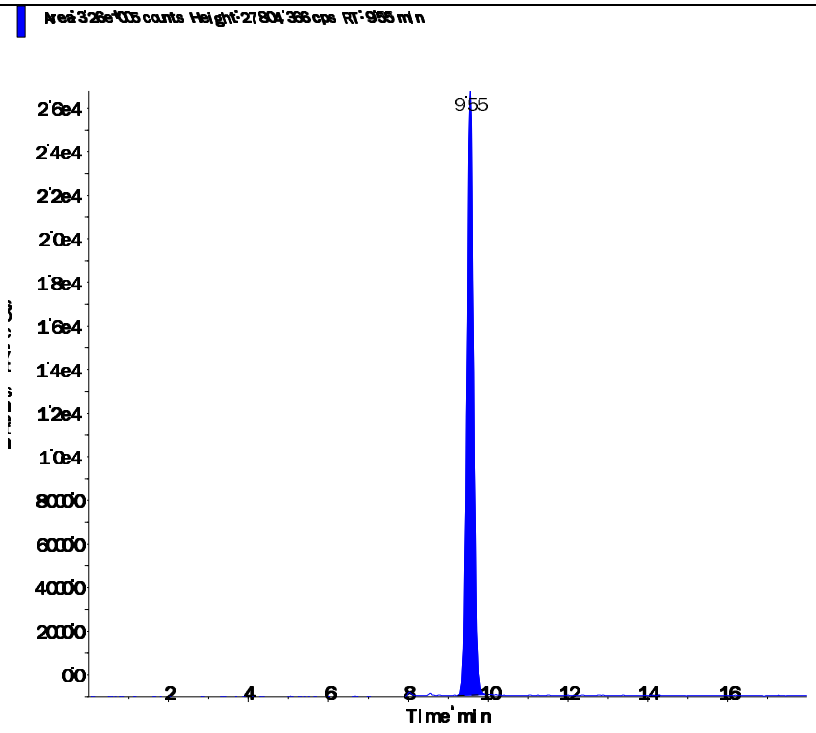
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	2.930e+05	9.55	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	9.780e+05	9.57	10.00	10.00
Perchlorate conf	3.260e+05	9.55	10.00	9.92

O18LP (Internal Standard)

RT (Exp. RT): 9.55(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Standard)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.57 (9.56) min Calculated conc: 10.00 ng/ml Area Ratio: 3.336 Sample Type: (Standard)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.55 (9.56) min Calculated conc: 9.92 ng/ml Area Ratio: 1.111 Sample Type: (Standard)	

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Data File	LM37773.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/16/2016 11:56:32 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

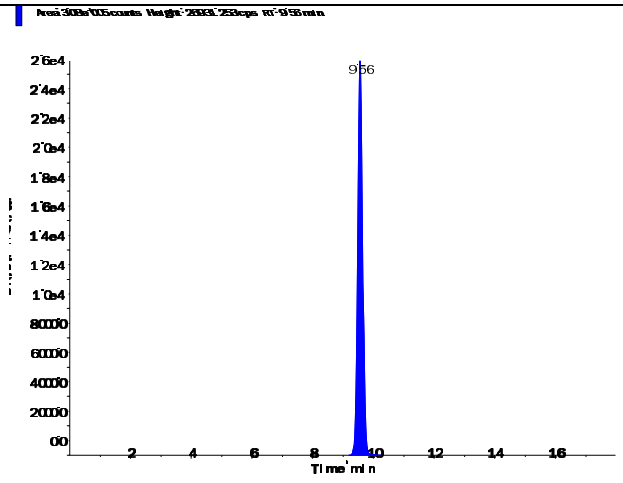
Sample Name	WG595346-09 SSCV (1.0 ug/L)	**Injection Vial**	9.00
Data File	LM37773.wiff	**Injection Volume**	10.00
Acquisition Date	12/16/2016 11:56:32 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Quality Control
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	WG595346-09	**Dilution Factor**	1.00
Sample Comment	1,1 STD78251	**Weight to Volume**	0.00

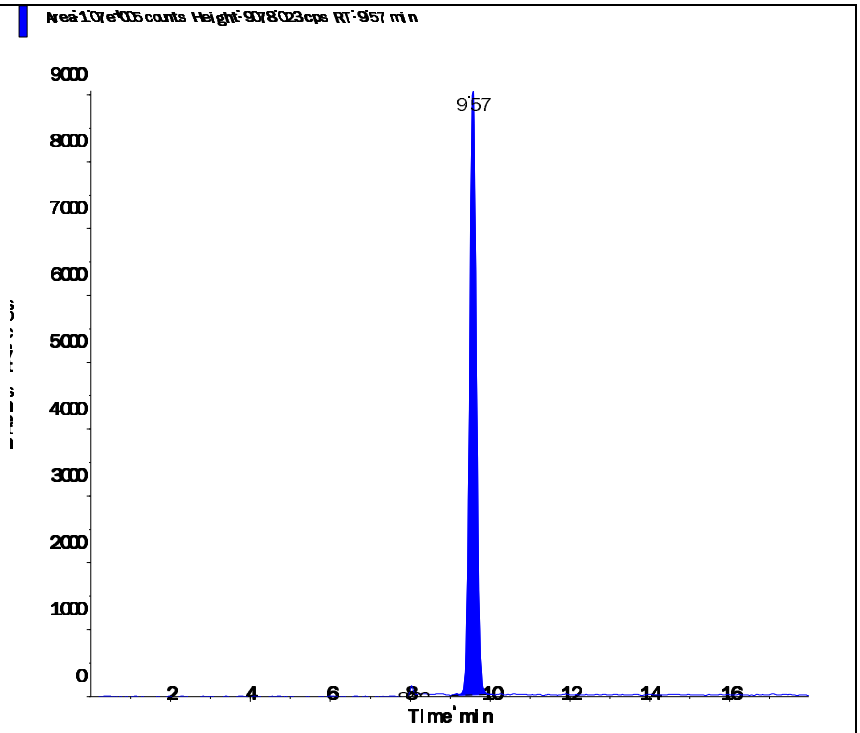
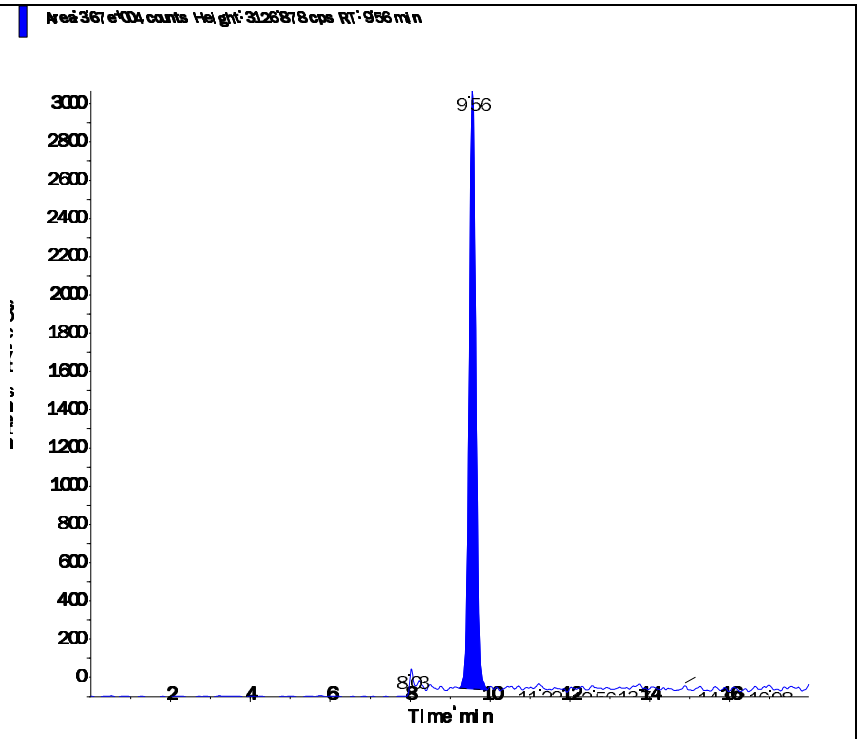
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.080e+05	9.56	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.070e+05	9.57	1.00	1.04
Perchlorate conf	3.670e+04	9.56	1.00	1.05

O18LP (Internal Standard)

RT (Exp. RT): 9.56(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Quality Control)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.57 (9.56) min Calculated conc: 1.04 ng/ml Area Ratio: 0.348 Sample Type: (Quality Control)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.56 (9.56) min Calculated conc: 1.05 ng/ml Area Ratio: 0.119 Sample Type: (Quality Control)	

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Data File	LM37775.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/17/2016 12:34:25 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

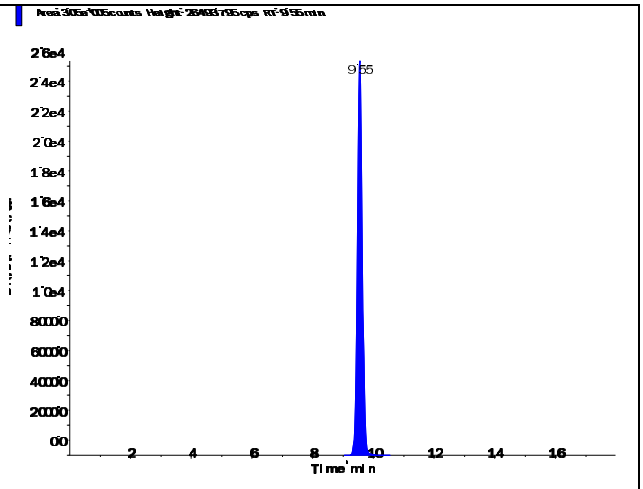
Sample Name	WG595142-02 CCV (1.0ug/L)	**Injection Vial**	5.00
Data File	LM37775.wiff	**Injection Volume**	10.00
Acquisition Date	12/17/2016 12:34:25 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Quality Control
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	WG595142-02	**Dilution Factor**	1.00
Sample Comment	1,1 STD78249	**Weight to Volume**	0.00

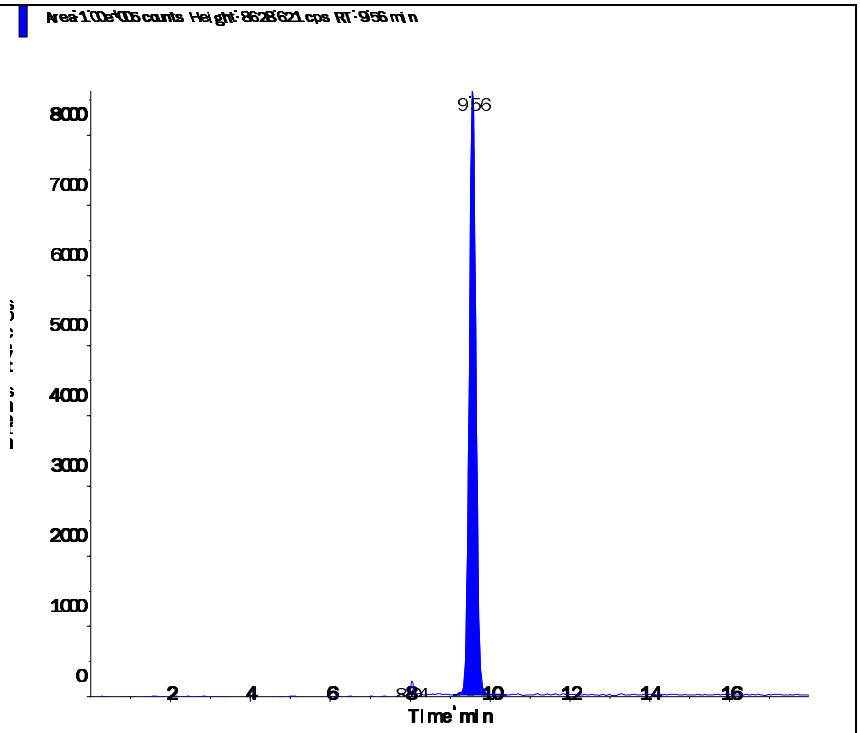
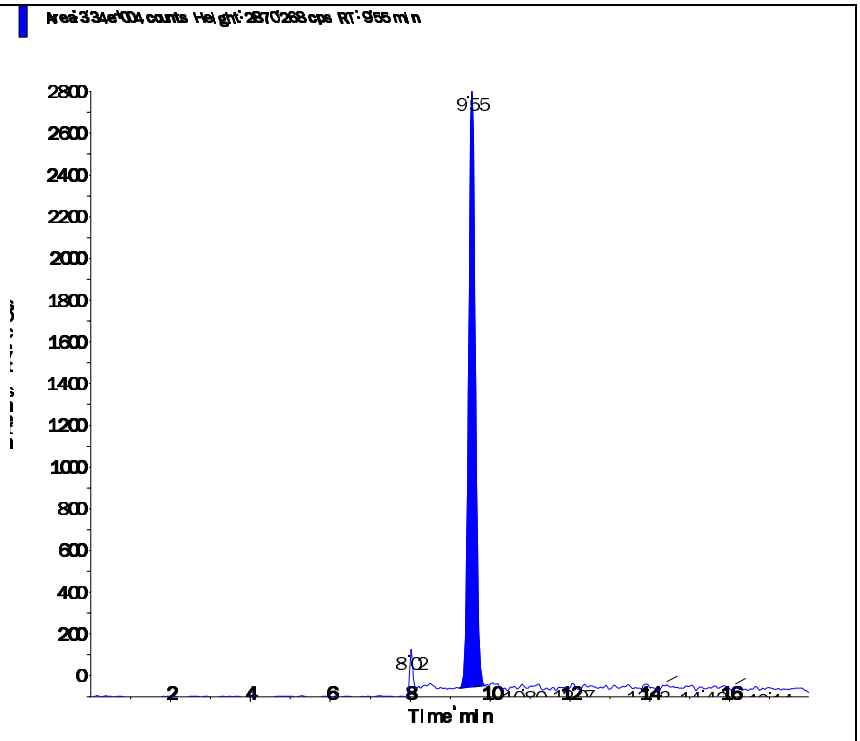
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.050e+05	9.55	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.000e+05	9.56	1.00	0.981
Perchlorate conf	3.340e+04	9.55	1.00	0.964

O18LP (Internal Standard)

RT (Exp. RT): 9.55(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Quality Control)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.56 (9.56) min Calculated conc: 0.981 ng/ml Area Ratio: 0.329 Sample Type: (Quality Control)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.55 (9.56) min Calculated conc: 0.964 ng/ml Area Ratio: 0.11 Sample Type: (Quality Control)	

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Data File	LM37787.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/17/2016 4:21:40 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

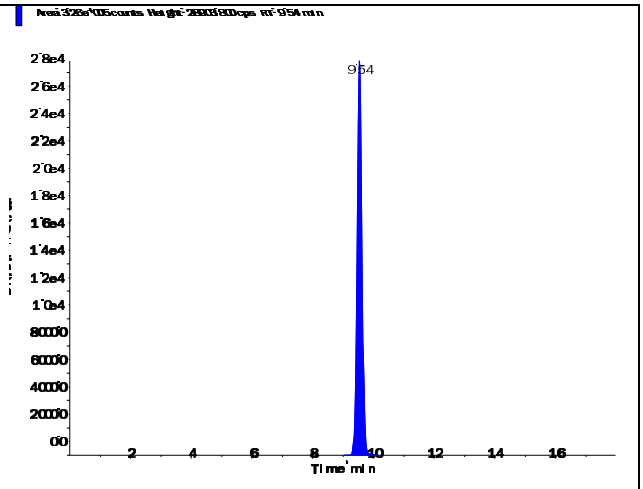
Sample Name	WG595142-03 CCV (1.0ug/L)	**Injection Vial**	5.00
Data File	LM37787.wiff	**Injection Volume**	10.00
Acquisition Date	12/17/2016 4:21:40 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Quality Control
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	WG595142-03	**Dilution Factor**	1.00
Sample Comment	1,1 STD78249	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.260e+05	9.54	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.060e+05	9.55	1.00	0.97
Perchlorate conf	3.710e+04	9.54	1.00	1.00

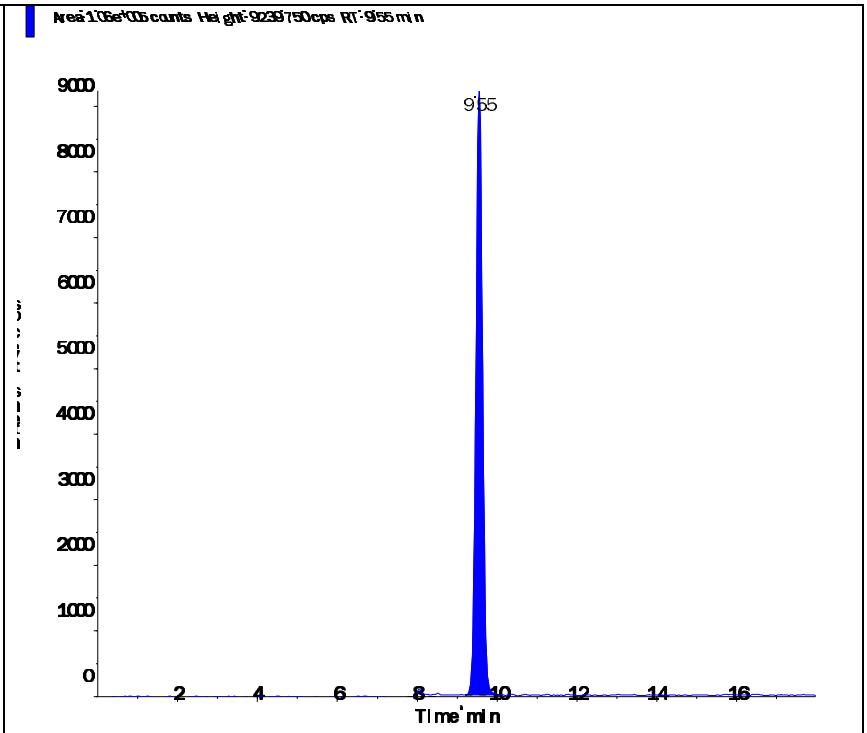
O18LP (Internal Standard)

RT (Exp. RT): 9.54(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Quality Control)



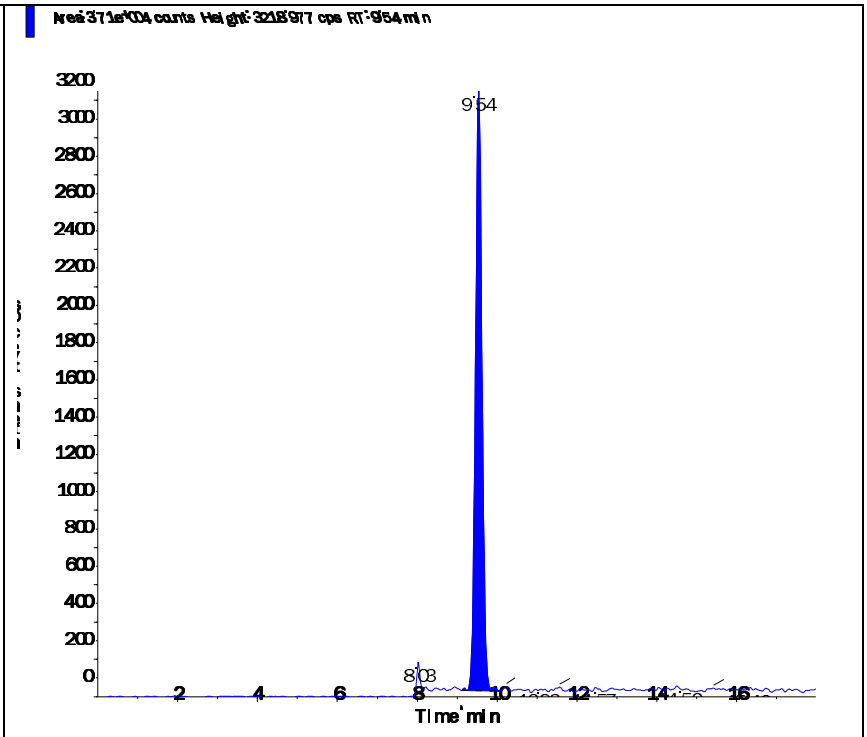
Perchlorate (98.8/83.3 amu)

RT (Exp. RT):	9.55 (9.56) min
Calculated conc:	0.97 ng/ml
Area Ratio:	0.325
Sample Type:	(Quality Control)



Perchlorate conf (100.8/85.2 amu)

RT (Exp. RT):	9.54 (9.56) min
Calculated conc:	1.00 ng/ml
Area Ratio:	0.114
Sample Type:	(Quality Control)



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Data File	LM37796.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/17/2016 7:12:04 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

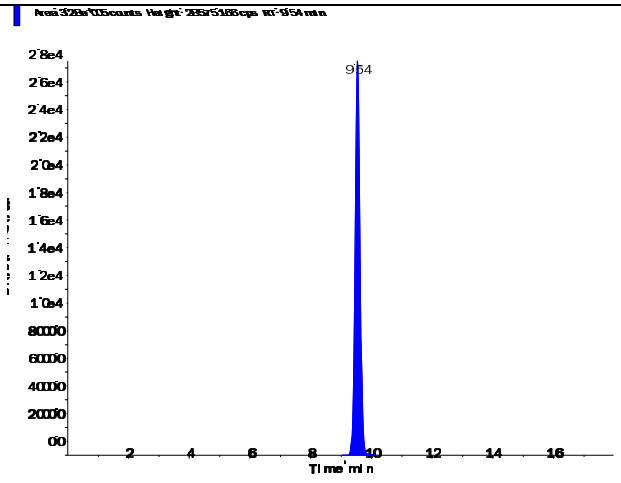
Sample Name	WG595142-05 CCV (1.0ug/L)	**Injection Vial**	5.00
Data File	LM37796.wiff	**Injection Volume**	10.00
Acquisition Date	12/17/2016 7:12:04 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Quality Control
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	WG595142-05	**Dilution Factor**	1.00
Sample Comment	1,1 STD78249	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.280e+05	9.54	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.090e+05	9.56	1.00	0.996
Perchlorate conf	3.770e+04	9.54	1.00	1.01

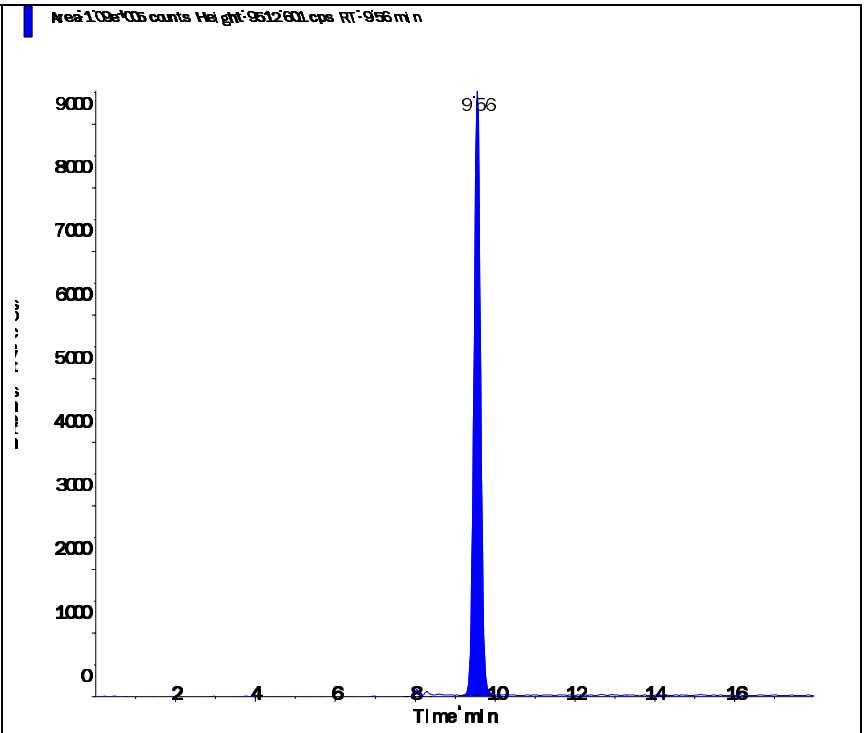
O18LP (Internal Standard)

RT (Exp. RT): 9.54(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Quality Control)



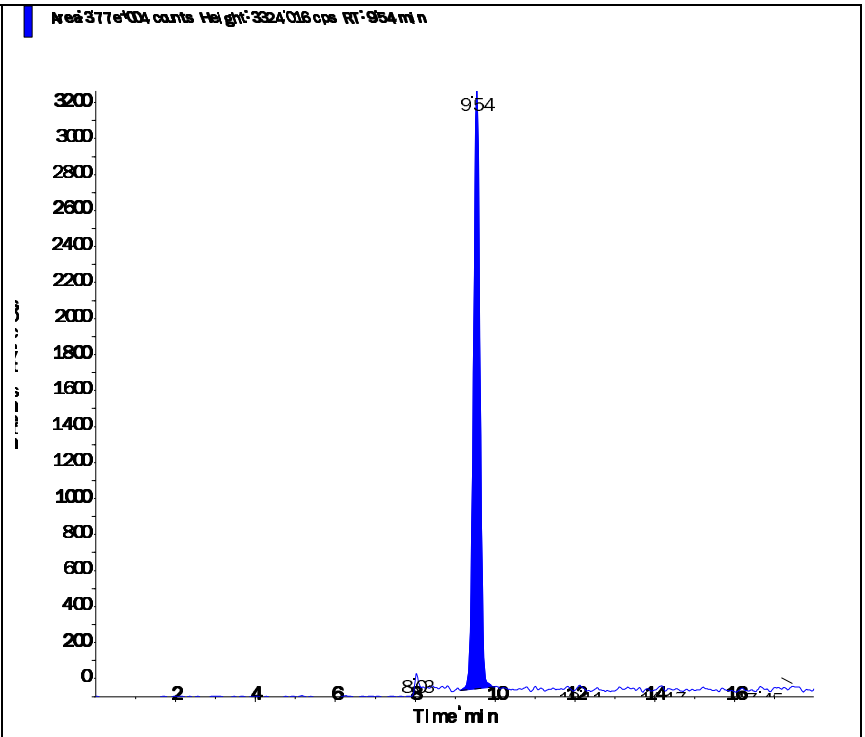
Perchlorate (98.8/83.3 amu)

RT (Exp. RT):	9.56 (9.56) min
Calculated conc:	0.996 ng/ml
Area Ratio:	0.334
Sample Type:	(Quality Control)



Perchlorate conf (100.8/85.2 amu)

RT (Exp. RT):	9.54 (9.56) min
Calculated conc:	1.01 ng/ml
Area Ratio:	0.115
Sample Type:	(Quality Control)



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Data File	LM37776.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/17/2016 12:53:22 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

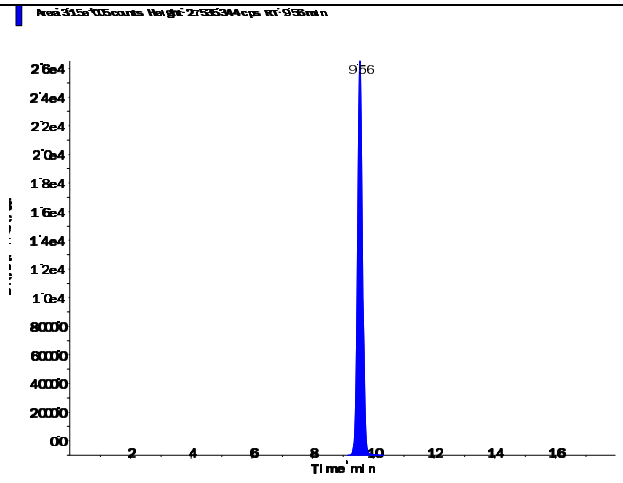
Sample Name	WG595135-07 MRL (0.2ug/L)	**Injection Vial**	3.00
Data File	LM37776.wiff	**Injection Volume**	10.00
Acquisition Date	12/17/2016 12:53:22 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	WG595135-07	**Dilution Factor**	1.00
Sample Comment	1,1 STD78249	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.150e+05	9.56	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	2.150e+04	9.56	N/A	0.199
Perchlorate conf	7.030e+03	9.54	N/A	0.183

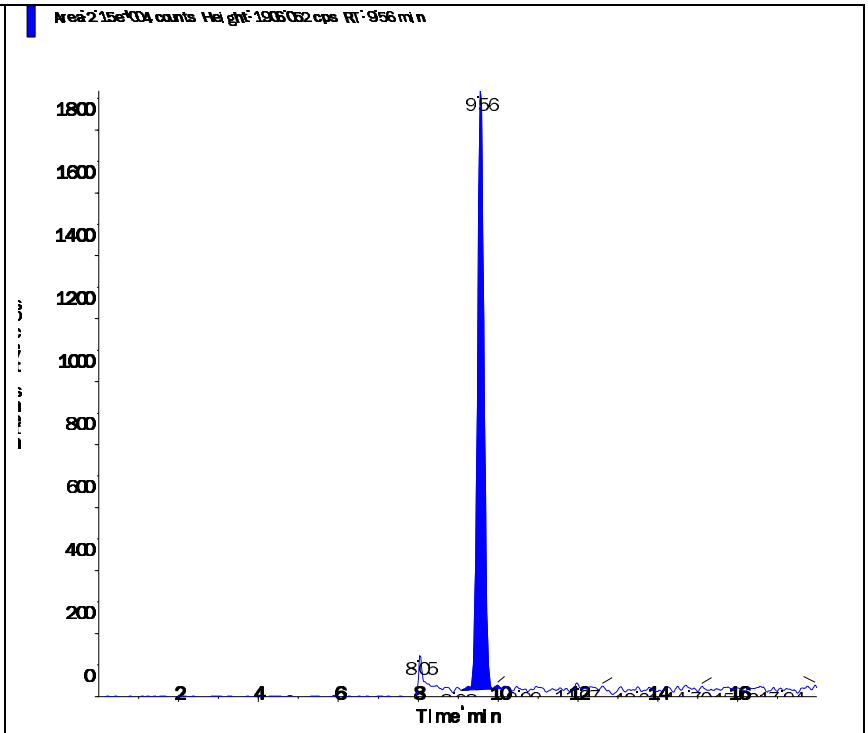
O18LP (Internal Standard)

RT (Exp. RT): 9.56(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



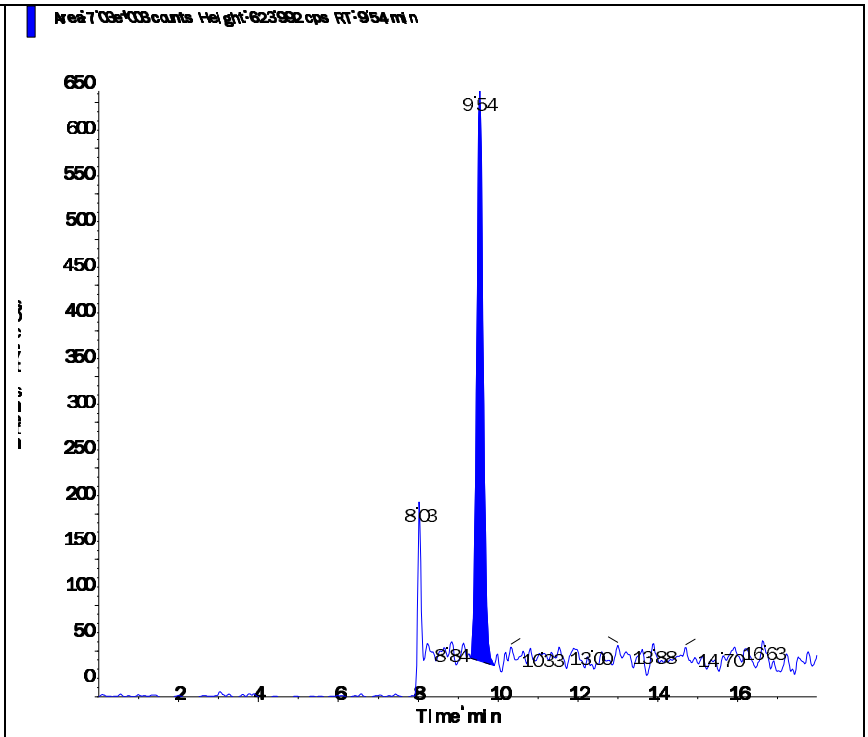
Perchlorate (98.8/83.3 amu)

RT (Exp. RT):	9.56 (9.56) min
Calculated conc:	0.199 ng/ml
Area Ratio:	0.068
Sample Type:	(Unknown)



Perchlorate conf (100.8/85.2 amu)

RT (Exp. RT):	9.54 (9.56) min
Calculated conc:	0.183 ng/ml
Area Ratio:	0.022
Sample Type:	(Unknown)



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Data File	LM37788.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/17/2016 4:40:37 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

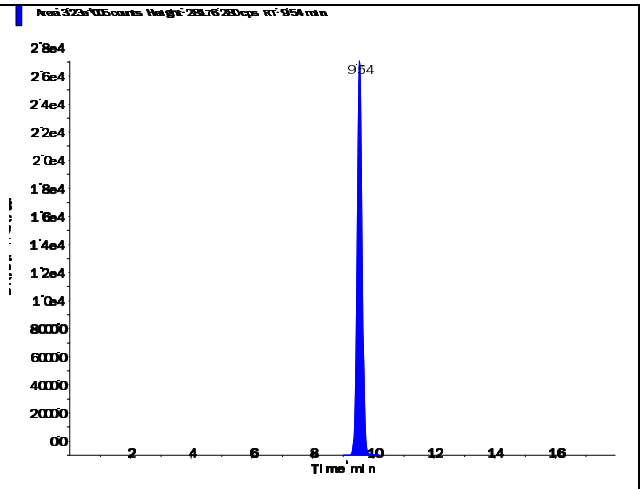
Sample Name	WG595135-08 MRL (0.2ug/L)	**Injection Vial**	3.00
Data File	LM37788.wiff	**Injection Volume**	10.00
Acquisition Date	12/17/2016 4:40:37 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	WG595135-08	**Dilution Factor**	1.00
Sample Comment	1,1 STD78249	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.230e+05	9.54	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	2.170e+04	9.56	N/A	0.196
Perchlorate conf	8.020e+03	9.54	N/A	0.205

O18LP (Internal Standard)

RT (Exp. RT): 9.54(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



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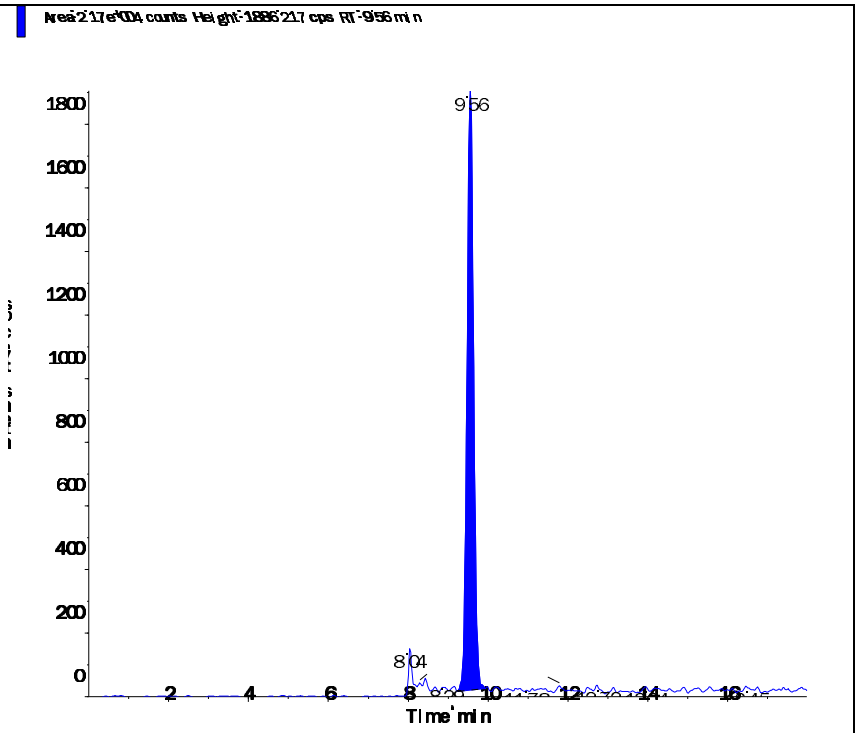
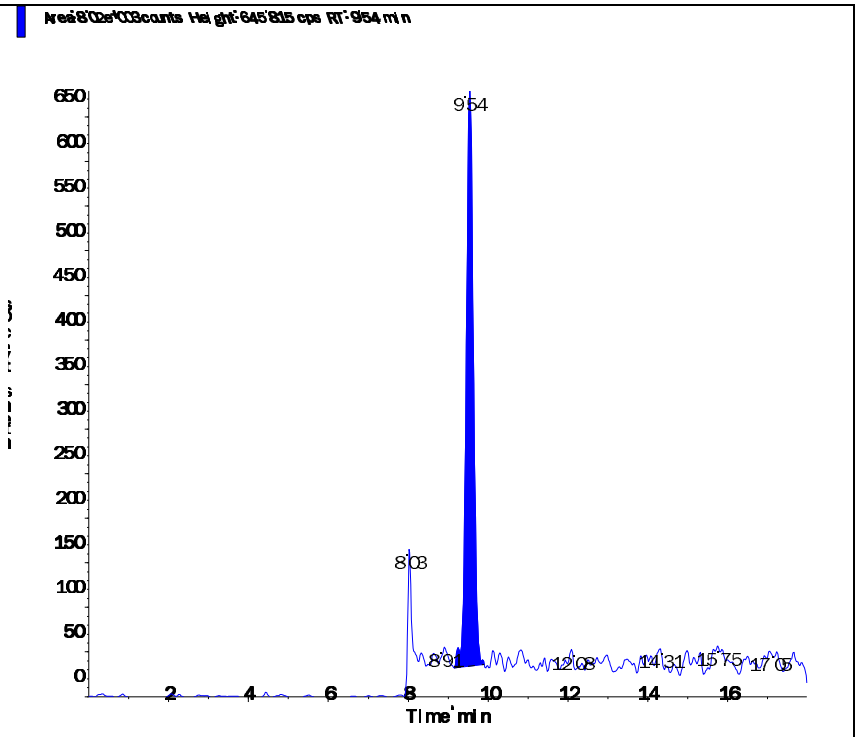
Perchlorate (98.8/83.3 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	 9.56 (9.56) min 0.196 ng/ml 0.067 (Unknown)



Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	 9.54 (9.56) min 0.205 ng/ml 0.025 (Unknown)



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Data File	LM37797.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/17/2016 7:31:00 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

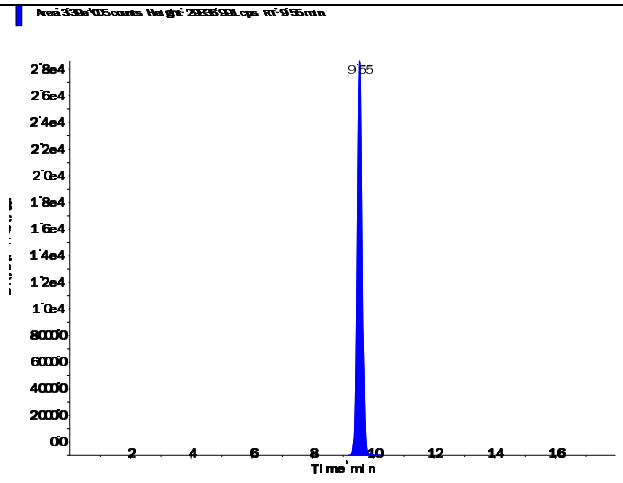
Sample Name	WG595135-09 MRL (0.2ug/L)	**Injection Vial**	3.00
Data File	LM37797.wiff	**Injection Volume**	10.00
Acquisition Date	12/17/2016 7:31:00 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	WG595135-09	**Dilution Factor**	1.00
Sample Comment	1,1 STD78249	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.390e+05	9.55	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	2.250e+04	9.56	N/A	0.193
Perchlorate conf	7.620e+03	9.55	N/A	0.184

O18LP (Internal Standard)

RT (Exp. RT): 9.55(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



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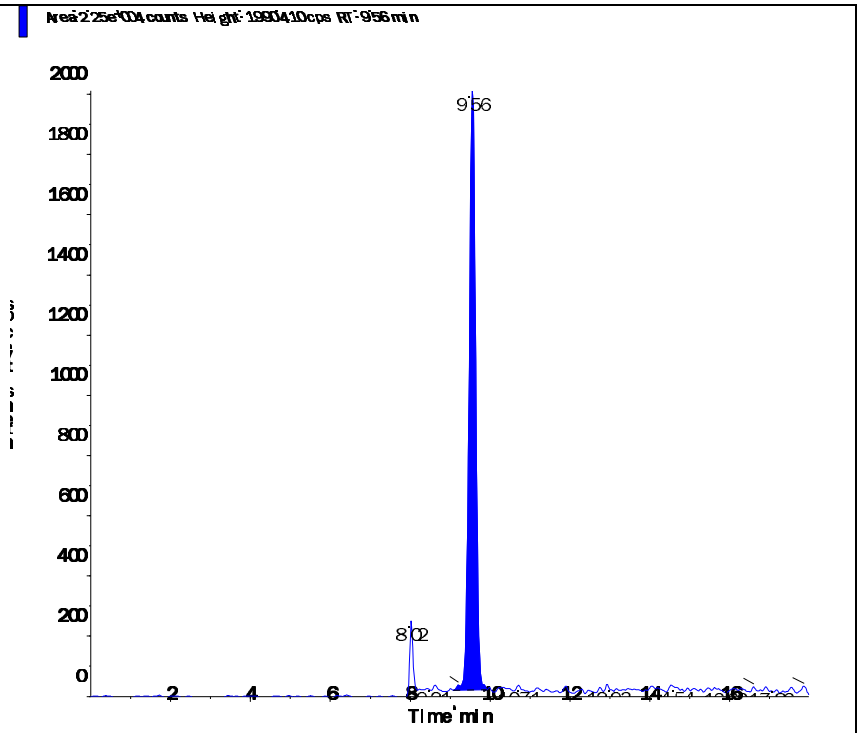
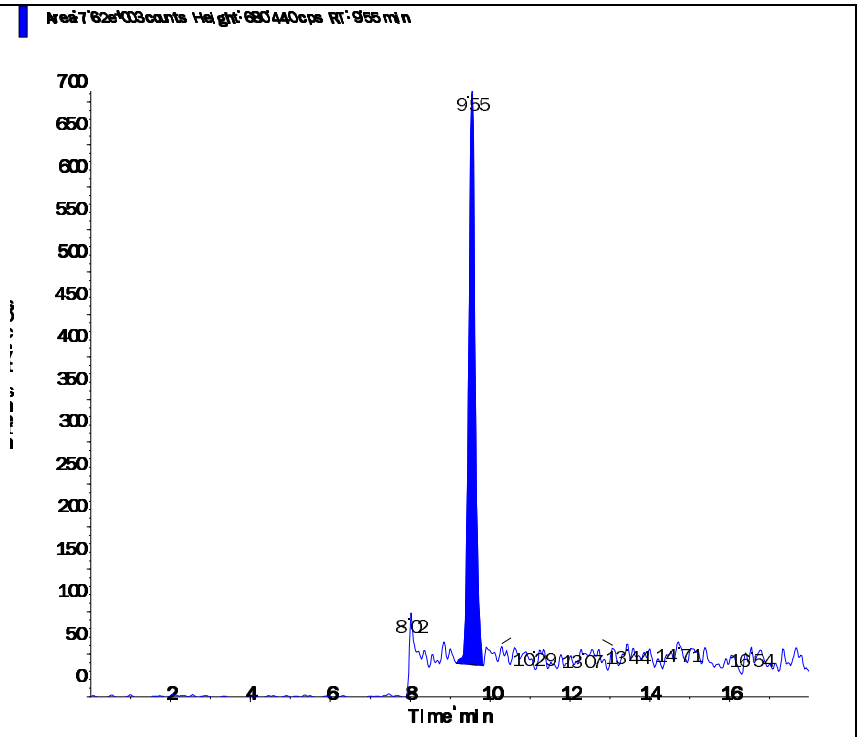
Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.56 (9.56) min Calculated conc: 0.193 ng/ml Area Ratio: 0.066 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.55 (9.56) min Calculated conc: 0.184 ng/ml Area Ratio: 0.022 Sample Type: (Unknown)	

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Data File	LM37774.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/17/2016 12:15:30 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

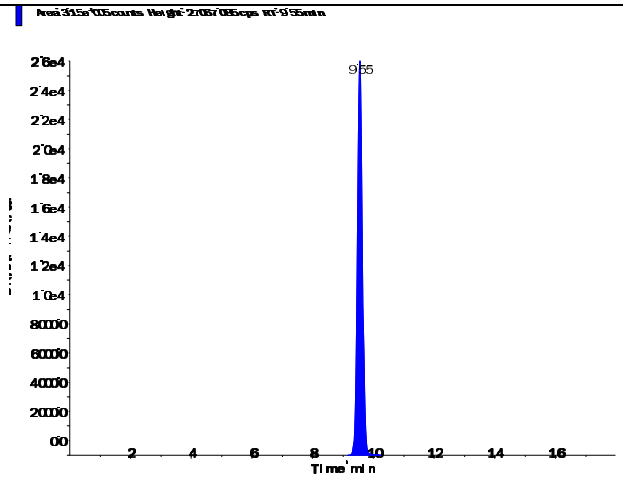
Sample Name	WG595142-01 CCB	**Injection Vial**	1.00
Data File	LM37774.wiff	**Injection Volume**	10.00
Acquisition Date	12/17/2016 12:15:30 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	WG595142-01	**Dilution Factor**	1.00
Sample Comment	11.00	**Weight to Volume**	0.00

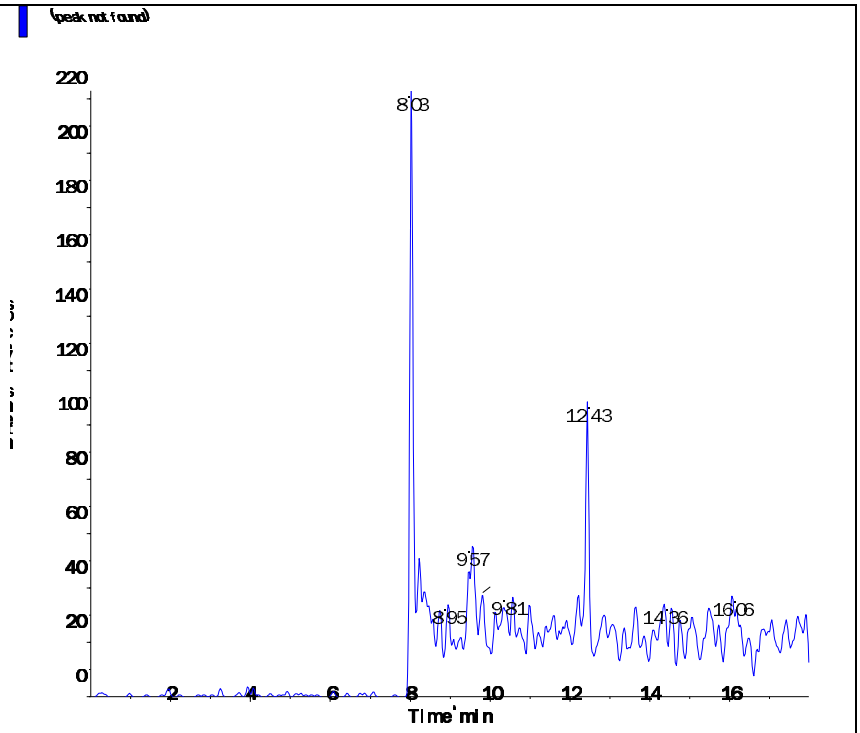
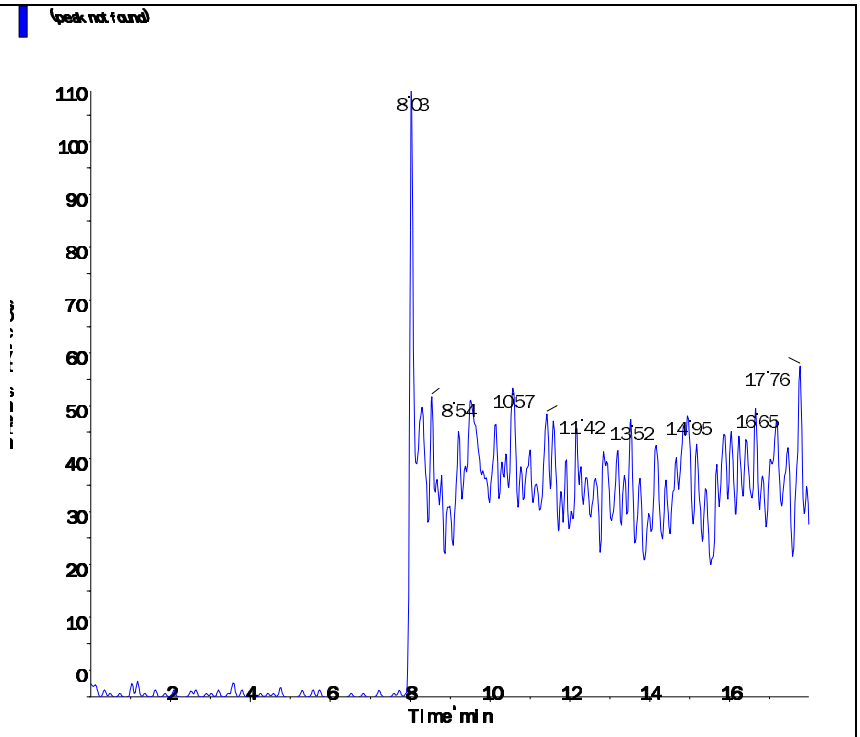
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.150e+05	9.55	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	0.000e+00	0.00	N/A	No Peak
Perchlorate conf	0.000e+00	0.00	N/A	No Peak

O18LP (Internal Standard)

RT (Exp. RT): 9.55(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 0.00 (9.56) min Calculated conc: No Peak ng/ml Area Ratio: 0.00 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 0.00 (9.56) min Calculated conc: No Peak ng/ml Area Ratio: 0.00 Sample Type: (Unknown)	

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Data File	LM37789.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/17/2016 4:59:32 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

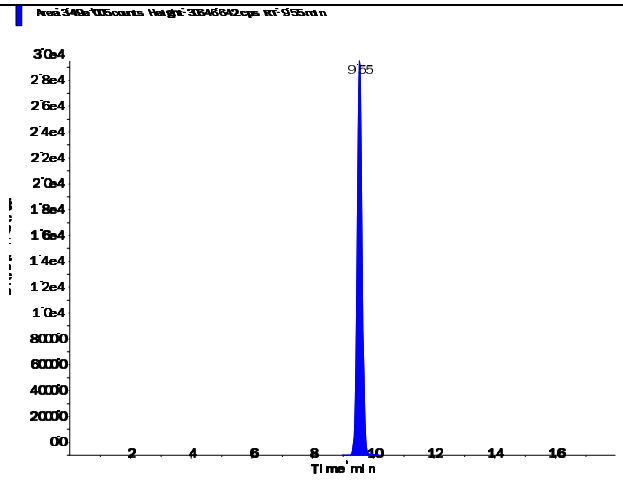
Sample Name	WG595142-04 CCB	**Injection Vial**	1.00
Data File	LM37789.wiff	**Injection Volume**	10.00
Acquisition Date	12/17/2016 4:59:32 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	WG595142-04	**Dilution Factor**	1.00
Sample Comment	11.00	**Weight to Volume**	0.00

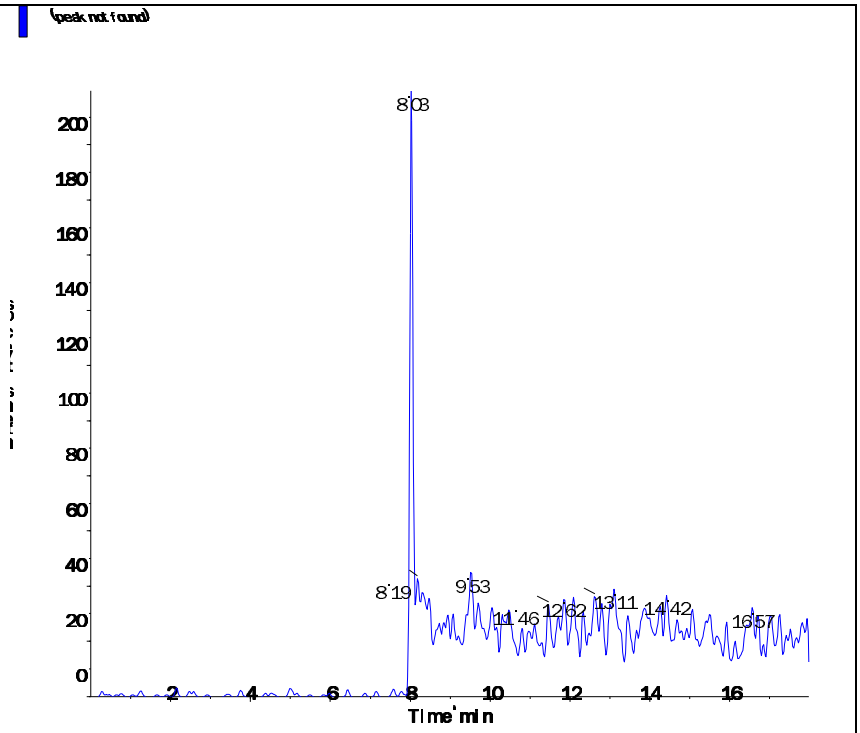
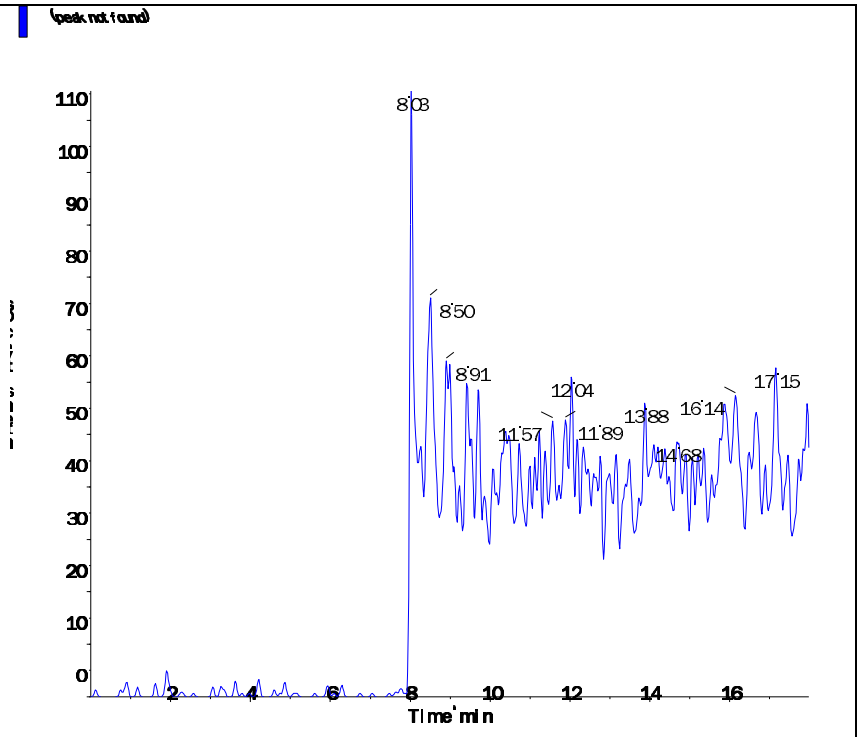
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.490e+05	9.55	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	0.000e+00	0.00	N/A	No Peak
Perchlorate conf	0.000e+00	0.00	N/A	No Peak

O18LP (Internal Standard)

RT (Exp. RT): 9.55(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 0.00 (9.56) min Calculated conc: No Peak ng/ml Area Ratio: 0.00 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 0.00 (9.56) min Calculated conc: No Peak ng/ml Area Ratio: 0.00 Sample Type: (Unknown)	

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Data File	LM37798.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/17/2016 7:49:55 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

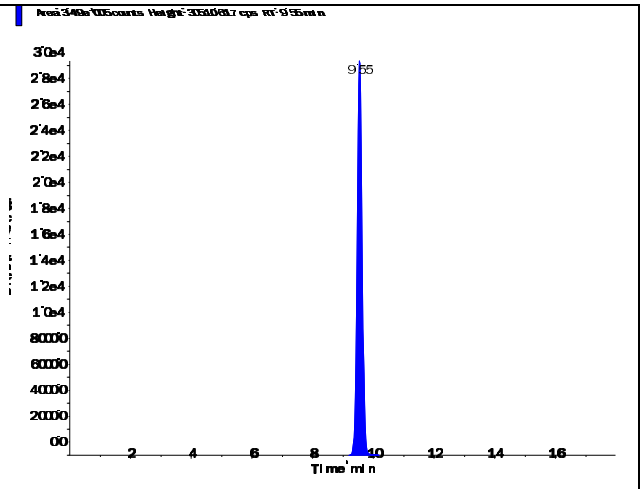
Sample Name	WG595142-06 CCB	**Injection Vial**	1.00
Data File	LM37798.wiff	**Injection Volume**	10.00
Acquisition Date	12/17/2016 7:49:55 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	WG595142-06	**Dilution Factor**	1.00
Sample Comment	11.00	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.490e+05	9.55	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	0.000e+00	0.00	N/A	No Peak
Perchlorate conf	0.000e+00	0.00	N/A	No Peak

O18LP (Internal Standard)

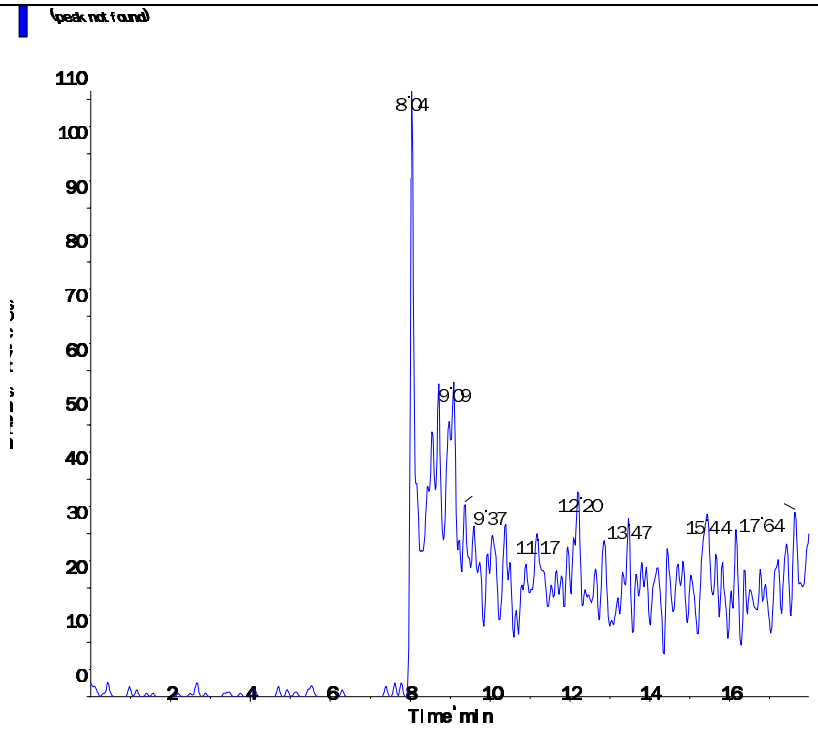
RT (Exp. RT): 9.55(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



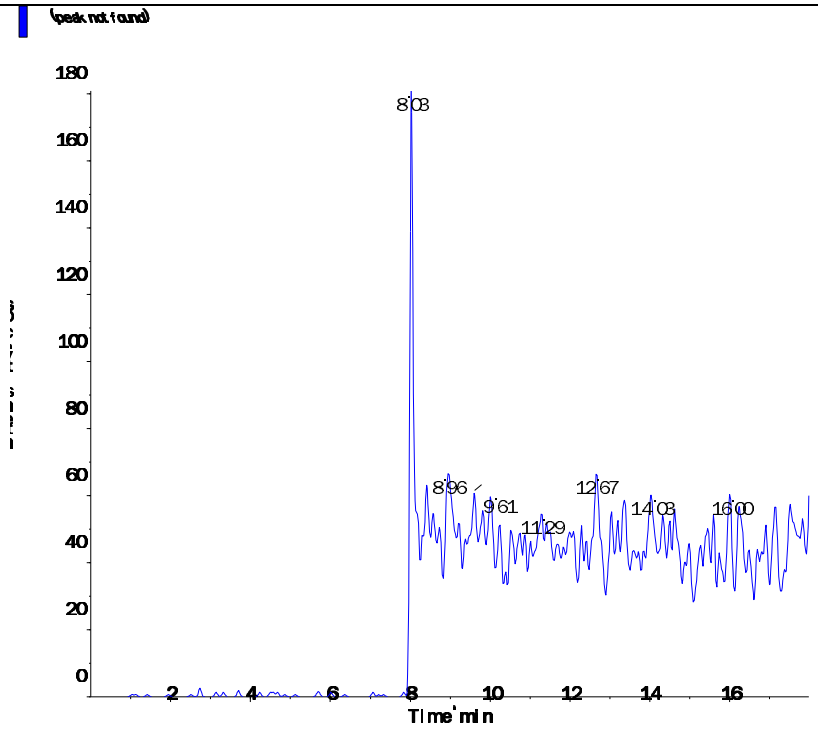
Applied Biosystems | MDS SCIEX

Created with Analyst Reporter
Printed: 12/17/2016 2:22 PM

Perchlorate (98.8/83.3 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	 0.00 (9.56) min No Peak ng/ml 0.00 (Unknown)



Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	 0.00 (9.56) min No Peak ng/ml 0.00 (Unknown)



Applied Biosystems | MDS SCIEX

Created with Analyst Reporter
Printed: 12/17/2016 2:15 PM

Data File	LM37777.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/17/2016 1:12:17 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

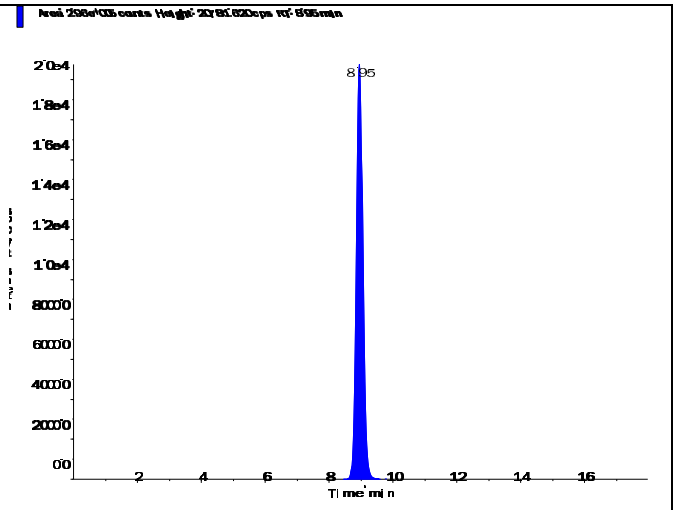
Sample Name	WG595135-01 MCT (0.2ug/L)	**Injection Vial**	10.00
Data File	LM37777.wiff	**Injection Volume**	10.00
Acquisition Date	12/17/2016 1:12:17 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	WG595135-01	**Dilution Factor**	1.00
Sample Comment	1,1 STD78251	**Weight to Volume**	0.00

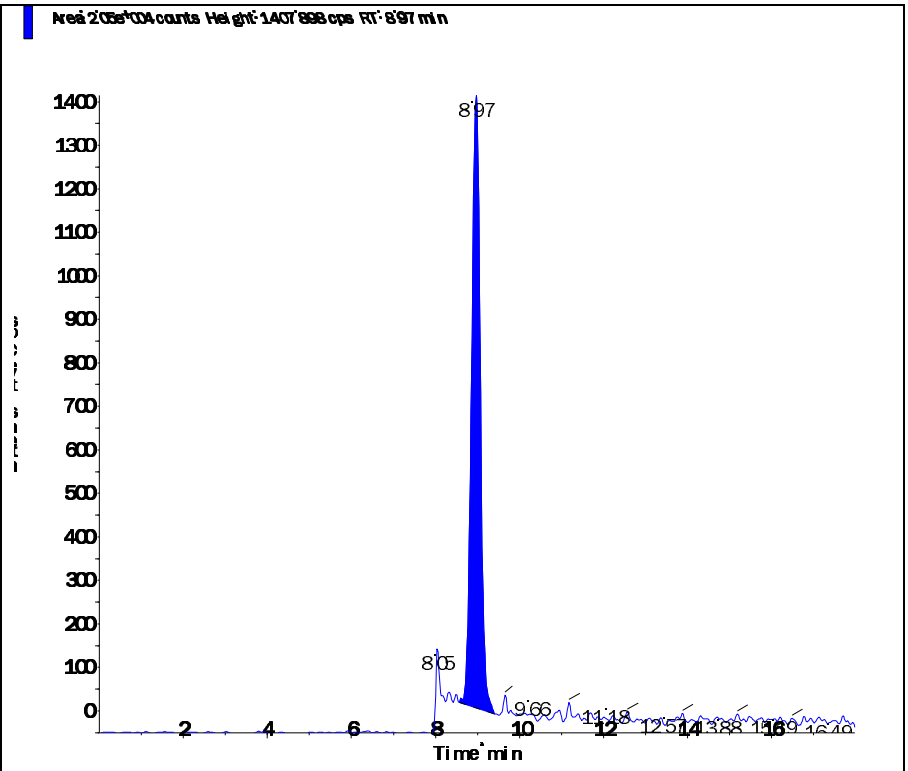
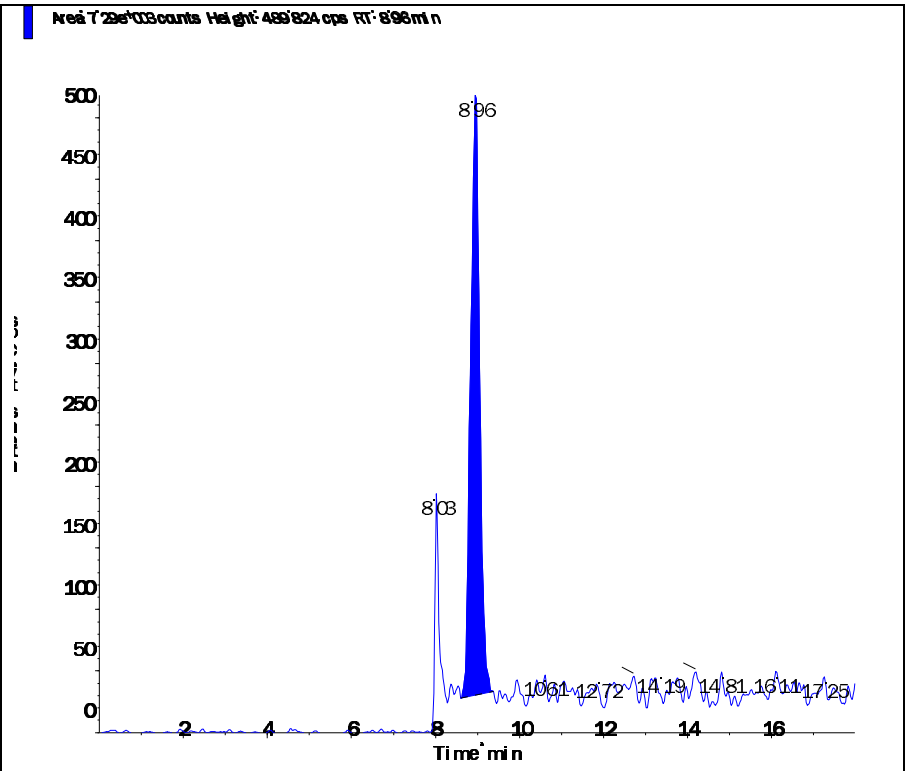
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	2.960e+05	8.95	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	2.050e+04	8.97	N/A	0.202
Perchlorate conf	7.290e+03	8.96	N/A	0.204

O18LP (Internal Standard)

RT (Exp. RT): 8.95(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)

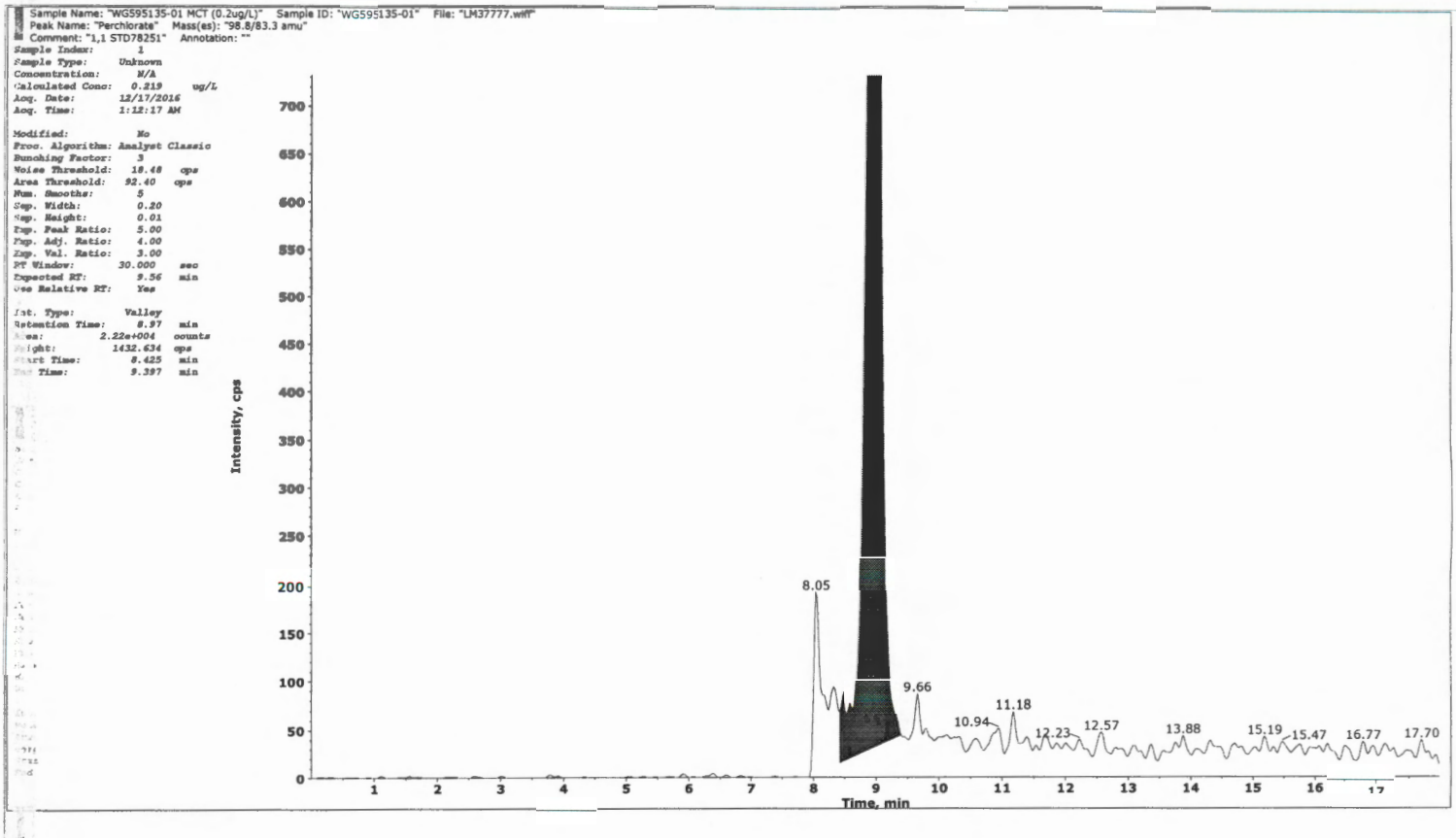


Perchlorate (98.8/83.3 amu) RT (Exp. RT): 8.97 (9.56) min Calculated conc: 0.202 ng/ml Area Ratio: 0.069 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 8.96 (9.56) min Calculated conc: 0.204 ng/ml Area Ratio: 0.025 Sample Type: (Unknown)	

Printing Time: 1:16:02 PM
Printing Date: Saturday, December 17, 2016

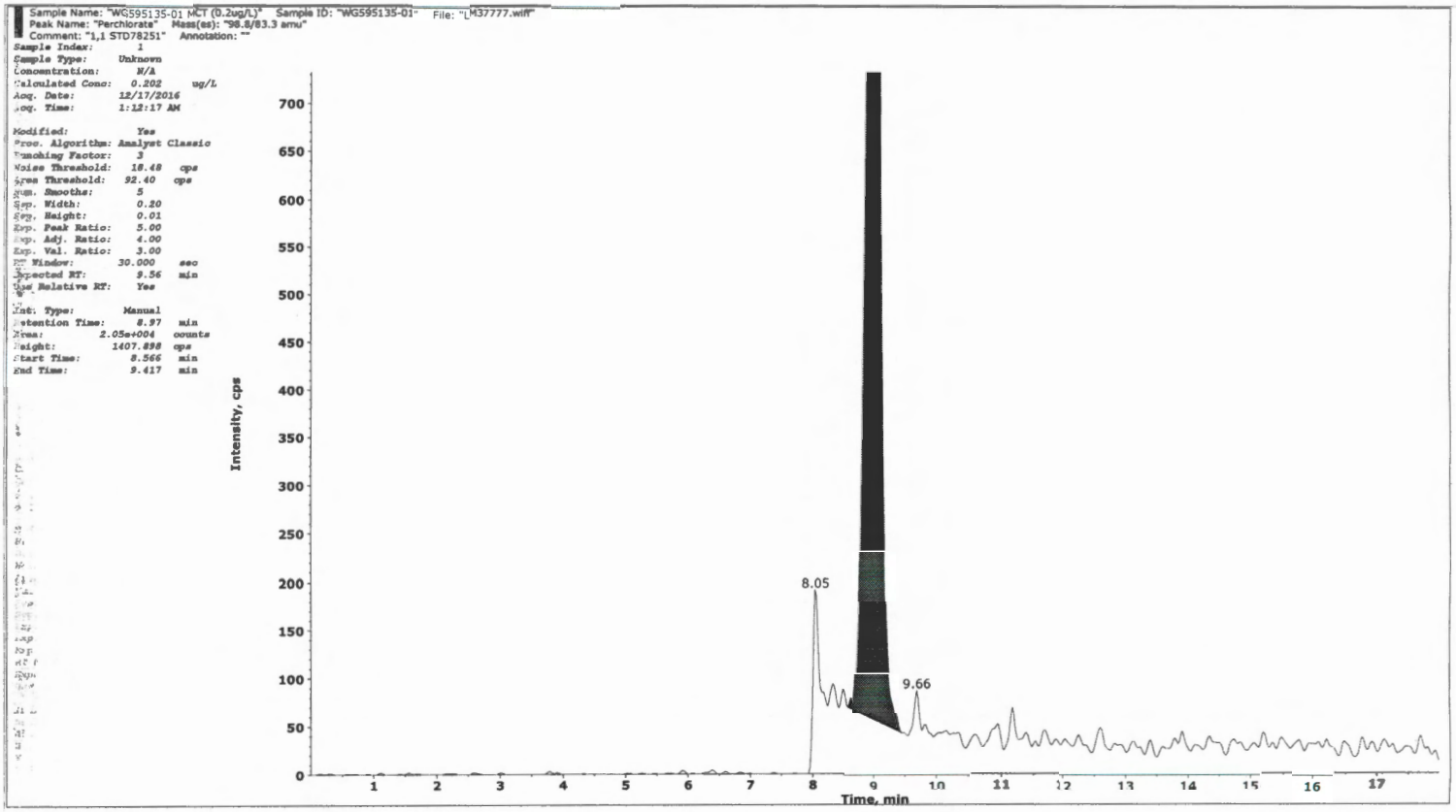
Sample Name: "WG595135-01 MCT (0.2ug/L)" Sample ID: "WG595135-01" File: "LM37777.wiff"
Peak Name: "Perchlorate" Mass(es): "98.8/83.3 amu"
Comment: "1,1 STD78251" Annotation: ""

Sample Index:	1
Sample Type:	Unknown
Concentration:	N/A
Calculated Conc:	0.219 ug/L
Acq. Date:	12/17/2016
Acq. Time:	1:12:17 AM
Modified:	No
Proc. Algorithm:	Analyst Classic
Bunching Factor:	3
Noise Threshold:	18.48 cps
Area Threshold:	92.40 cps
Num. Smooths:	5
Exp. Width:	0.20
Exp. Height:	0.01
Exp. Peak Ratio:	5.00
Exp. Adj. Ratio:	4.00
Exp. Val. Ratio:	3.00
RT Window:	30.000 sec
Expected RT:	9.56 min
Use Relative RT:	Yes
Int. Type:	Valley
Retention Time:	8.97 min
Area:	2.22e+004 counts
Height:	1432.634 cps
Start Time:	8.425 min
End Time:	9.397 min



Collected by: N/A
Electronic Signature: no
Operator: lcms1

Printing Time: 1:18:33 PM
Printing Date: Saturday, December 17, 2016



#4
JWR/12/17/16
12.19.16

Collected by: N/A
Electronic Signature: no
Operator: lcms1

2.1.1.5 Raw QC Data

Applied Biosystems | MDS SCIEX

Created with Analyst Reporter
Printed: 12/17/2016 2:16 PM

Data File	LM37778.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/17/2016 1:31:16 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

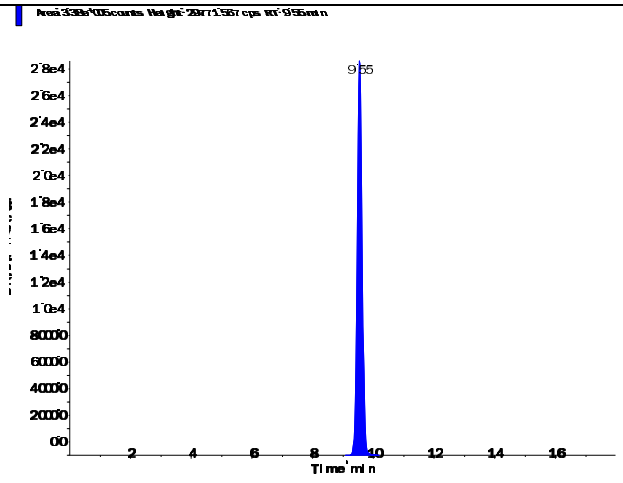
Sample Name	WG595135-02 BLANK	**Injection Vial**	11.00
Data File	LM37778.wiff	**Injection Volume**	10.00
Acquisition Date	12/17/2016 1:31:16 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	WG595135-02	**Dilution Factor**	1.00
Sample Comment	11.00	**Weight to Volume**	0.00

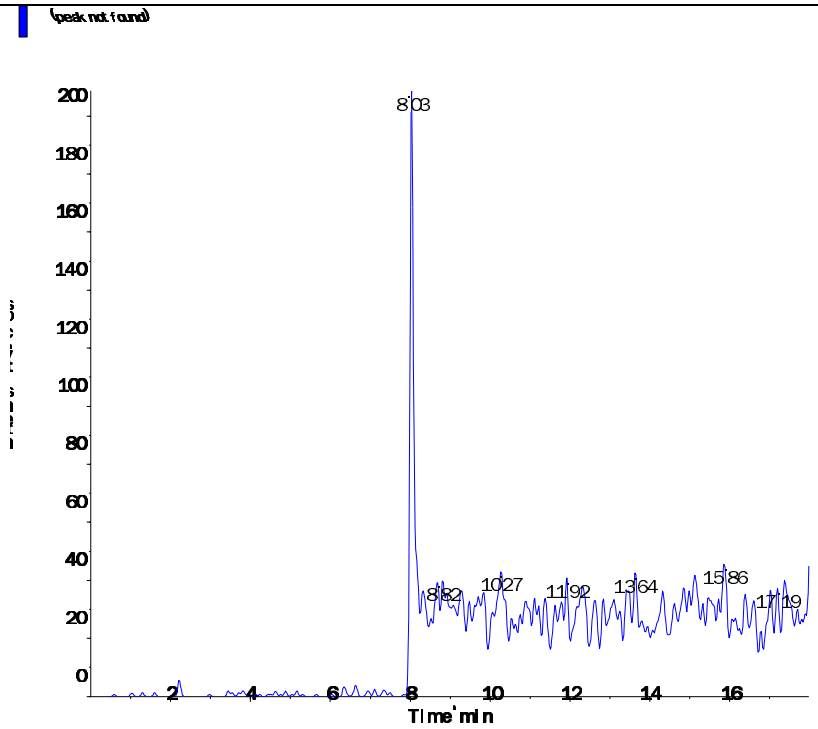
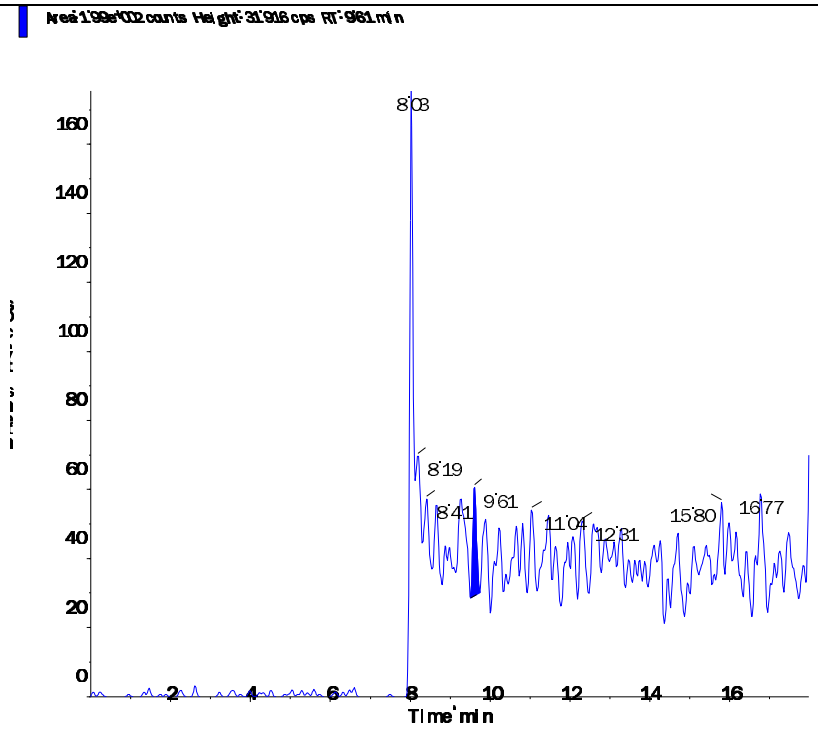
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.380e+05	9.55	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	0.000e+00	0.00	N/A	No Peak
Perchlorate conf	1.990e+02	9.61	N/A	< 0

O18LP (Internal Standard)

RT (Exp. RT): 9.55(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 0.00 (9.56) min Calculated conc: No Peak ng/ml Area Ratio: 0.00 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.61 (9.56) min Calculated conc: < 0 ng/ml Area Ratio: 0.001 Sample Type: (Unknown)	

Applied Biosystems | MDS SCIEX

Created with Analyst Reporter
Printed: 12/17/2016 2:16 PM

Data File	LM37779.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/17/2016 1:50:11 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

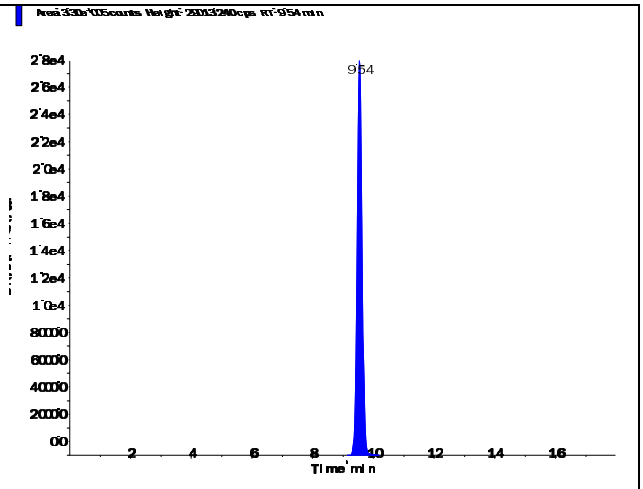
Sample Name	WG595135-03 LCS (0.2ug/L)	**Injection Vial**	12.00
Data File	LM37779.wiff	**Injection Volume**	10.00
Acquisition Date	12/17/2016 1:50:11 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	WG595135-03	**Dilution Factor**	1.00
Sample Comment	1,1 STD78251	**Weight to Volume**	0.00

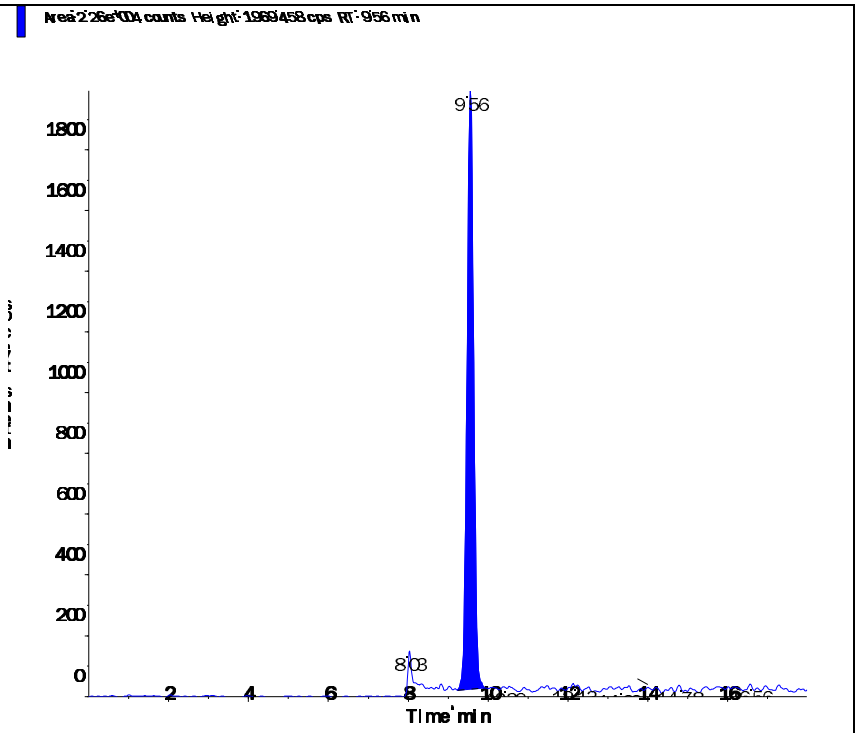
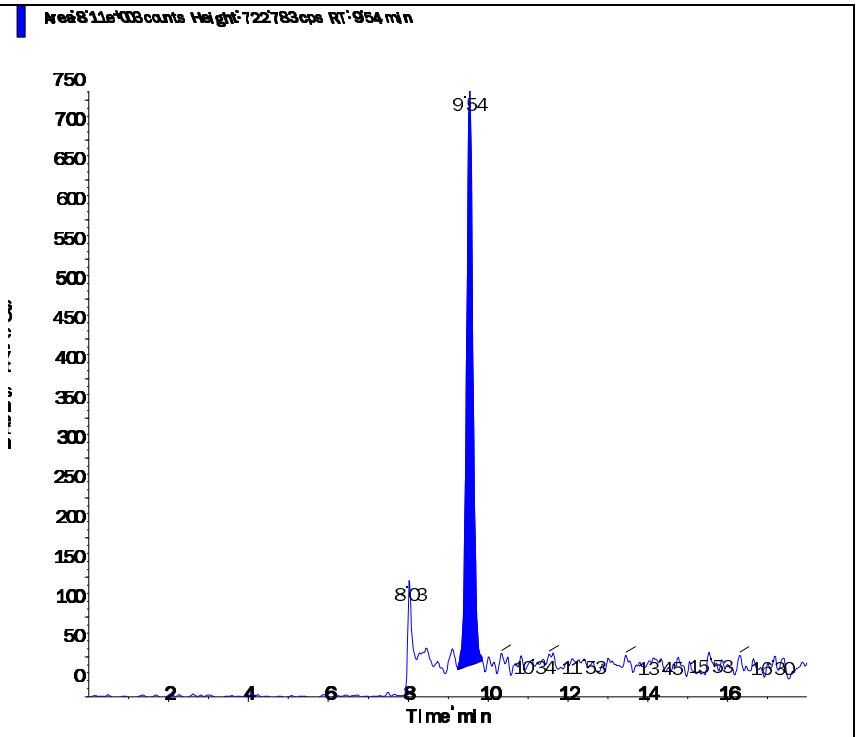
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.300e+05	9.54	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	2.260e+04	9.56	N/A	0.20
Perchlorate conf	8.110e+03	9.54	N/A	0.203

O18LP (Internal Standard)

RT (Exp. RT): 9.54(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.56 (9.56) min Calculated conc: 0.20 ng/ml Area Ratio: 0.069 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.54 (9.56) min Calculated conc: 0.203 ng/ml Area Ratio: 0.025 Sample Type: (Unknown)	

3.0 Attachments

Microbac Laboratories Inc.
Ohio Valley Division Analyst List
December 19, 2016

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001 – BIO-CHEM TESTING WVDEP 220	002 – REIC Consultants, Inc. WVDEP 060
003 – Sturm Environmental	004 – MICROBAC PITTSBURGH
005 – ES LABORATORIES	006 – ALCOSAN LABORATORIES
007 – ALS LABORATORIES	008 – BENCHMARK LABORATORIES
010 – MICROBAC CHICAGOLAND	AC – AMBER R. CARMICHAEL
ADC – ANTHONY D. CANTER	ADG – APRIL D. GREENE
AED – ALLEN E. DAVIS	ALS – ADRIANE L. STEED
AMA – ALEXANDRA M. ALFRED	AWE – ANDREW W. ESSIG
AZH – AFTER HOURS	BJO – BRIAN J. OGDEN
BKT – BRENDAN TORRENCE	BLG – BRENDA L. GREENWALT
BNB – Brandi N. Bentley	BRG – BRENDA R. GREGORY
CAA – CASSIE A. AUGENSTEIN	CAF – CHERYL A. FLOWERS
CAS – Craig A. Smith	CEB – CHAD E. BARNES
CJQ – Cameron J. Quick	CLC – CHRYS L. CRAWFORD
CLS – CARA L. STRICKLER	CLW – CHARISSA L. WINTERS
CPD – CHAD P. DAVIS	CRW – CHRISTINA R. WILSON
CSH – CHRIS S. HILL	CV – Carl Volkman
DAK – DEAN A. KETELSEN	DCM – DAVID C. MERCKLE
DEV – DAVID E. VANDENBERG	DIH – DEANNA I. HESSON
DLB – DAVID L. BUMGARNER	DLP – DOROTHY L. PAYNE
DSM – DAVID S. MOSSOR	DTG – DOMINIC T. GEHRET
ECL – ERIC C. LAWSON	EMW – ERIC M. WILKEN
ENY – EMILY N. YOAK	ERP – ERIN R. PORTER
FJB – FRANCES J. BOLDEN	HDD – HANAH D. DAWKINS
JDH – JUSTIN D. HESSON	JDS – JARED D. SMITH
JKP – JACQUELINE K. PARSONS	JLD – JESSICA L. DELONG
JLL – JOHN L. LENT	JMW – JEANA M. WHITE
JTP – JOSHUA T. PEMBERTON	JWR – JOHN W. RICHARDS
JWS – JACK W. SHEAVES	JYH – JI Y. HU
KAK – KATHY A. KIRBY	KAT – KATHY A. TUCKER
KDD – Katelyn D. Daley	KDW – KATHRYN D. WELCH
KEB – KATIE E. BARNES	KHR – KIM H. RHODES
KKB – KERRI K. BUCK	KRA – KATHY R. ALBERTSON
KRB – KAELY R. BECKER	KRP – KATHY R. PARSONS
LJH – Lacey J. Hendershot	LKN – LINDA K. NEDEFF
LLS – LARRY L. STEPHENS	LSB – LESLIE S. BUCINA
LSJ – LAURA S. JONES	MAP – MARLA A. PORTER
MBK – MORGAN B. KNOWLTON	MDA – MIKE D. ALBERTSON
MDC – MIKE D. COCHRAN	MES – MARY E. SCHILLING
MMB – MAREN M. BEERY	MRT – MICHELLE R. TAYLOR
MSW – MATT S. WILSON	NPH – Natalie P. Hart
PDM – PIERCE D. MORRIS	PIT – MICROBAC WARRENDALE
QX – QIN XU	RAH – ROY A. HALSTEAD
REK – BOB E. KYER	RLB – BOB BUCHANAN
RNP – RICK N. PETTY	SAV – SARAH A. VANDENBERG
SCB – SARAH C. BOGOLIN	SDC – SHALYN D. CONLEY
SLM – STEPHANIE L. MOSSBURG	SLP – SHERI L. PFALZGRAF
TB – TODD BOYLE	TGF – TIM G. FELTON
TMB – TIFFANY M. BAILEY	TMM – TAMMY M. MORRIS
VC – VICKI COLLIER	WJB – WILL J. BEASLEY
WTD – WADE T. DELONG	XXX – UNAVAILABLE OR SUBCONTRACT

Microbac Laboratories Inc.
List of Valid Qualifiers
December 19, 2016

Qualkey: DOD

Qualifier	Description
*	Surrogate or spike compound out of range
+	Correlation coefficient for the MSA is less than 0.995
<	Result is less than the associated numerical value.
>	Greater than
>,H1	Result is greater than the associated numerical value. Sample analysis performed past holding time.
A	See the report narrative
B	The reported result is associated with a contaminated method blank.
B,H1	Analyte present in method blank. Sample analysis performed past holding time.
B1	Target analyte detected in method blank at or above the method reporting limit
B3	Target analyte detected in calibration blank at or above the method reporting limit
B4	The BOD unseeded dilution water blank exceeded 0.2 mg/L
C	Confirmed by GC/MS
CG	Confluent growth
CT1	Cooler temperature at sample reciept exceeded regulatory limit.
DL	Surrogate or spike compound was diluted out
E	Estimated concentration due to sample matrix interference
E,CT1	Estimated results. The cooler temperature at receipt exceeded regulatory guidelines for requested testing.
EDL	Elevated sample reporting limits, presence of non-target analytes
EMPC	Estimated Maximum Possible Concentration
F, S	Estimated result below quantitation limit; method of standard additions(MSA)
F,CT1	Estimated value; the analyte concentration was less than the RL/LOQ. The cooler temperature at receipt exceeded regula
FL	Free Liquid
FP1	Did not ignite.
H1	Sample analysis performed past holding time.
H1,CT1	Sample analysis performed past holding time. The cooler temperature at receipt exceeded regulatory guidelines for reque
I	Semiquantitative result (out of instrument calibration range)
J	Estimated concentration; sample matrix interference.
J	Estimated value ; the analyte concentration was greater than the highest standard
J	Estimated value ; the analyte concentration was less than the LOQ.
J	The reported result is an estimated value.
J,B	Analyte detected in both the method blank and sample above the MDL.
J,CT1	Estimated value ; the analyte concentration was less than the LOQ. Cooler temperature at sample reciept exceeded regu
J,H1	Estimated value ; the analyte concentration was less than the LOQ. Sample analysis performed past holding time.
J,H1	The reported result is an estimated value. Sample was analyzed past holding time.
J,P	Estimate; columns don't agree to within 40%
J,S	Estimated concentration; analyzed by method of standard addition (MSA)
JB	The reported result is an estimated value. The reported result is also associated with a contaminated method blank.
JQ	The reported result is an estimated value and one or more quality control criteria failed. See narrative.
L	Sample reporting limits elevated due to matrix interference
L1	The associated blank spike (LCS) recovery was above the laboratory acceptance limits.
L2	The associated blank spike (LCS) recovery was below the laboratory acceptance limits.
M	Matrix effect; the concentration is an estimate due to matrix effect.
N	Nontarget analyte; the analyte is a tentativlely identified compound (TIC) by GC/MS
NA	Not applicable
ND	Not detected at or above the reporting limit (RL)
ND, B	Not detected at or above the reporting limit (RL). Analyte present in method blank.
ND, CT1	Analyte was not detected. The concentration is below the reported LOD. The cooler temperature at receipt exceeded reg
ND, L	Not detected; sample reporting limit (RL) elevated due to interference
ND, S	Not detected; analyzed by method of standard addition (MSA)
ND,H1	Not detected; Sample analysis performed past holding time.
ND,H1,CT1	Not detected; Sample analysis performed past holding time. The cooler temperature at receipt exceeded regulatory guide
NF	Not found by library search
NFL	No free liquid
NI	Non-ignitable
NR	Analyte is not required to be analyzed
NS	Not spiked
P	Concentrations >40% difference between the two GC columns
Q	One or more quality control criteria failed. See narrative.
Q,H1	One or more quality control criteria failed. Sample analyzed past holding time. See narrative.
QNS	Quantity of sample not sufficient to perform analysis
RA	Reanalysis confirms reported results
RE	Reanalysis confirms sample matrix interference
S	Analyzed by method of standard addition (MSA)
SMI	Sample matrix interference on surrogate
SP	Reported results are for spike compounds only
T5	Laboratory not licensed for this parameter
TIC	Library Search Compound

Microbac Laboratories Inc.
List of Valid Qualifiers
December 19, 2016

Qualkey: DOD

TNTC	Too numerous to count
TNTC, B	Too numerous to count. Analyte present in method blank.
TNTC,CT1	Too numerous to count. The cooler temperature at receipt exceeded regulatory guidelines for requested testing.
TNTC,H1	Too numerous to count. Sample analysis performed past holding time.
U	Analyte was not detected. The concentration is below the reported LOD.
U,CT1	Analyte was not detected. The concentration is below the reported LOD. Cooler temperature at sample reciept exceeded
U,H1	Not detected; Sample analysis performed past holding time.
UJ	Undetected; the MDL and RL are estimated due to quality control discrepancies.
UQ	Undetected; the analyte was analyzed for, but not detected.
W	Post-digestion spike for furnace AA out of control limits
X	Exceeds regulatory limit
X, S	Exceeds regulatory limit; method of standard additions (MSA)
Z	Cannot be resolved from isomer - see below

AECOM

Chain of Custody Record

COC Number:

Laboratory: Microbac POC: Stephanie Mossburg	Project Manager: Debra Richmann	Mail to: Linda Raabe	
Address: 158 Starlite Drive	Phone/Fax Number: 210-296-2000	112 East Pecan STE. 400	
Marietta, OH 45750	Sampler (print): Scott Beesinger	San Antonio, TX 78205	
Phone: 1-800-373-4071		210-296-2000	
Client: AECOM	Signature: Scott Beesinger	Fed Ex Airbill No:	
Address: 112 East Pecan Ste. 400			
San Antonio, TX 78205			
Turn Around Time: STANDARD	pH:	Program:	
Project Name/Location: Longhorn			
Project Number: 60256135.0009AA			

Site Name	Sample ID/Location ID	SBD	SED	Date	Time	Comp*	Grab	Matrix	Number of Containers	PERCHLORATE	SA CODE	Cooler ID	LOT CONTROL NUMBERS ABLOT	EBLOT	TBLOT
PERIMETER WELLS	PW134-120216			12/2/16	0805		X	W	1	X					
	PW134MS-120216			12/2/16	0805		X	W	1	X					
	PW134MSD-120216			12/2/16	0805		X	W	1	X					
	PW133-120216			12/2/16	0940		X	W	1	X					
	PW133FD-120216			12/2/16	0940		X	W	1	X					

ERPIMS REQUIRED FIELDS

Comments: **STANDARD TAT**

	Date	Time		
Relinquished by: (Signature) Scott Beesinger	12/5/16	1400	Received by: (Signature)	hed by: (Signature)
Relinquished by: (Signature)	Date	Time	Received for Laboratory by: (Signature)	anager

Microbac OVD
Received: 12/06/2016 09:56
By: BRENDA GREGORY
221000094272
Brenda Gregory

*Homogenize all composite samples prior to analysis

Distribu

00840960

MICROBAC

Cooler ID 4272

COOLER TEMP >6° C LOG

SAMPLE ID	Bottle 1 °C	Bottle 2 °C	Bottle 3 °C	Bottle 4 °C	Bottle 5 °C	Bottle 6 °C

12/6/14

bg

pH Lot # HC93124

pH Exceptions

SAMPLE ID	Bottle 1	Bottle 2	Bottle 3	Bottle 4	Bottle 5	Bottle 6

12/6/14

bg

PRESERVATIVE EXCEPTIONS

__NONE

__AS NOTED

bg 12/6/14

Document Control # 1957
Last 10-07-2016

Issued to: Document Master File

Microbac Laboratories Inc.

Internal Chain of Custody Report

Login: L16120281
Account: 2551
Project: 2551.096
Samples: 5
Due Date: 16-DEC-2016

Samplenum	Container ID	Products
L16120281-01	837250	

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	06-DEC-2016 14:25	BRG		
2	ANALYZ	W1	SEM	15-DEC-2016 14:34	JWR	BRG	
Comments:Products cancelled.							
3	STORE	SEM	A1	17-DEC-2016 18:31	AZH	JWR	
Comments:Products cancelled.							

Samplenum	Container ID	Products
L16120281-01	842048	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	15-DEC-2016 13:31	BRG		

Samplenum	Container ID	Products
L16120281-02	842049	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	15-DEC-2016 13:31	BRG		
2	ANALYZ	W1	SEM	15-DEC-2016 14:34	JWR	BRG	
3	STORE	SEM	A1	17-DEC-2016 18:31	AZH	JWR	

Samplenum	Container ID	Products
L16120281-03	842050	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	15-DEC-2016 13:31	BRG		
2	ANALYZ	W1	SEM	15-DEC-2016 14:34	JWR	BRG	
3	STORE	SEM	A1	17-DEC-2016 18:31	AZH	JWR	

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login

Microbac Laboratories Inc.

Internal Chain of Custody Report

Login: L16120281
Account: 2551
Project: 2551.096
Samples: 5
Due Date: 16-DEC-2016

Samplenum	Container ID	Products
L16120281-04	842051	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	15-DEC-2016 13:31	BRG		
2	ANALYZ	W1	SEM	15-DEC-2016 14:34	JWR	BRG	
3	STORE	SEM	A1	17-DEC-2016 18:31	AZH	JWR	

Samplenum	Container ID	Products
L16120281-05	842052	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	15-DEC-2016 13:31	BRG		
2	ANALYZ	W1	SEM	15-DEC-2016 14:34	JWR	BRG	
3	STORE	SEM	A1	17-DEC-2016 18:31	AZH	JWR	

Samplenum	Container ID	Products
L16120281-22	837251	

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	06-DEC-2016 14:25	BRG		

Samplenum	Container ID	Products
L16120281-23	837252	

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	06-DEC-2016 14:25	BRG		

Samplenum	Container ID	Products
L16120281-24	837253	

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	06-DEC-2016 14:25	BRG		

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login

Microbac Laboratories Inc.

Internal Chain of Custody Report

Login: L16120281
Account: 2551
Project: 2551.096
Samples: 5
Due Date: 16-DEC-2016

Samplenum	Container ID	Products
L16120281-25	837254	

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	06-DEC-2016 14:25	BRG		

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login

NELAP Addendum - January 4, 2016

Non-NELAP LIMS Product and Description

The following is a list of those tests that are not included in the Microbac – OVD NELAP Scope of Accreditation:

Heat of Combustion (BTU)
Total Halide by Bomb Combustion (TX)
Particle Sizing - 200 Mesh (PS200)
Specific Gravity/Density (SPGRAV)
Total Residual Chlorine (CL-TRL)
Total Volatile Solids (all forms) (TVS)
Total Coliform Bacteria (all methods)
Fecal Coliform Bacteria (all methods)
Sulfite (SO3)
Propionaldehyde (HPLC-UV)

SOLID AND HAZARDOUS CHEMICALS
Nitrogen, Ammonia by Method 350.1
Chromium, Hexavalent, Leachable by SM3500 Cr-B 2009
Phenolics, Total by Method 420.1
ASTM D3987-06

NELAP Accreditation by Laboratory SOP

NONPOTABLE WATER

OVD HPLC02/HPLC-UV

Nitroglycerin
Acetic acid
Butyric acid
Lactic acid
Propionic acid
Pyruvic acid

OVD MSS01/GC-MS

1,4-Phenylenediamine
1-Methylnaphthalene
1,4-Dioxane
Atrazine
Benzaldehyde
Biphenyl
Caprolactam
Hexamethylphosphoramide (HMPA)
Pentachlorobenzene
Pentachloroethane

NELAP Accreditation by Laboratory SOP

NONPOTABLE WATER

OVD MSV01/GC-MS

1, 1, 2-Trichloro-1,2,2-trifluoroethane
1,3-Butadiene
Cyclohexane
Cyclohexanone
Dimethyl disulfide
Dimethylsulfide
Ethyl-t-butylether (ETBE)
Isoprene
Methylacetate
Methylcyclohexane
T-amylmethylether (TAME)
Tetrahydrofuran (THF)

OVD HPLC07/HPLC-MS-MS

Hexamethylphosphoramide (XMPA-LCMS)

OVD HPLC12/HPLC/UV

Acetate
Formate

OVD RSK01/GC-FID

Acetylene
Propane

OVD K9305/ISE

Fluoroborate

SOLID AND HAZARDOUS CHEMICALS

OVD MSS0I/GC-MS

1-Methylnaphthalene
Benzaldehyde
Biphenyl
Caprolactam
Pentachloroethane

NELAP Accreditation by Laboratory SOP

SOLID AND HAZARDOUS CHEMICALS

OVD MSV0I/GC-MS

1.3-Butadiene
Cyclohexane
Cyclohexanone
Dimethyl disulfide
Dimethylsulfide
Ethyl-t-butylether (ETBE)
Isoprene
Methylacetate
Methylcyclohexane
n-Hexane
T-amylmethylether (TAME)

Microbac

Laboratory Report Number: L16111326

Kayla Teague
AECOM Technical Services, Inc.
1950 N Stemmons FWY
Dallas, TX 75207

Please find enclosed the analytical results for the samples you submitted to Microbac Laboratories. Review and compilation of your report was completed by Microbac's Ohio Valley Division (OVD). If you have any questions, comments, or require further assistance regarding this report, please contact your service representative listed below.

Laboratory Contact:
Adriane Steed – Client Services Specialist
(740) 373-4071
Adriane.Steed@microbac.com

I certify that all test results meet all of the requirements of the DoD QSM and other applicable contract terms and conditions. Any exceptions are attached to this cover page or addressed in the method narratives presented in the report. All results for soil samples are reported on a 'dry-weight' basis unless specified otherwise. Analytical results for water and wastes are reported on a 'as received' basis unless specified otherwise. A statement of uncertainty for each analysis is available upon request. This laboratory report shall not be reproduced, except in full, without the written approval of Microbac Laboratories, DoD ELAP certification number 2936.01. The reported results are related only to the samples analyzed as received.

This report was certified on December 19 2016

Leslie Bucina – Managing Director

State of Origin: TX
Accrediting Authority: Texas Commission on Environmental Quality ID:T104704252-07-TX
QAPP: DOD Ver 4.1

Microbac

Lab Report #: L16111326
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Record of Sample Receipt and Inspection

Comments/Discrepancies

This is the record of the shipment conditions and the inspection records for the samples received and reported as a sample delivery group (SDG). All of the samples were inspected and observed to conform to our receipt policies, except as noted below.

The following discrepancies were noted:

Discrepancy	Resolution
Sample ID per COC: GPW 1-112916 (11/29 @ 08:58). Time on label reads: 09:10. BRG Sample ID per COC: GPW 3-112916 (11/29 @ 09:10). Time on label reads: 08:58. BRG	Per the client please log per the labels ALS

Coolers

Cooler #	Temperature Gun	Temperature	COC #	Airbill #	Temp Required?
00114110	I	2.0		J4616883031	X

Inspection Checklist

#	Question	Result
1	Were shipping coolers sealed?	Yes
2	Were custody seals intact?	Yes
3	Were cooler temperatures in range of 0-6?	Yes
4	Was ice present?	Yes
5	Were COC's received/information complete/signed and dated?	Yes
6	Were sample containers intact and match COC?	Yes
7	Were sample labels intact and match COC?	No
8	Were the correct containers and volumes received?	Yes
9	Were samples received within EPA hold times?	Yes
10	Were correct preservatives used? (water only)	Yes
11	Were pH ranges acceptable? (voa's excluded)	Yes
12	Were VOA samples free of headspace (less than 6mm)?	NA

Microbac

Lab Report #: L16111326
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Samples Received

Client ID	Laboratory ID	Date Collected	Date Received
HBW 7 - 112916	L16111326-01	11/29/2016 08:13	11/30/2016 09:32
HBW 10 - 112916	L16111326-02	11/29/2016 08:27	11/30/2016 09:32
HBW 1 - 112916	L16111326-03	11/29/2016 08:35	11/30/2016 09:32
GPW 1 - 112916	L16111326-04	11/29/2016 09:10	11/30/2016 09:32
GPW 3 - 112916	L16111326-05	11/29/2016 08:58	11/30/2016 09:32

Microbac REPORT L16111326
PREPARED FOR AECOM Technical Services, Inc.
WORK ID:

1.0 Summary Data 5
1.1 Narratives 6
1.2 Certificate of Analysis 13
2.0 Full Sample Data Package 19
2.1 General Chromatography Data 20
2.1.1 6850 LC/MS Data 21
2.1.1.1 Summary Data 22
2.1.1.2 QC Summary Data 28
2.1.1.3 Sample Data 79
2.1.1.4 Standards Data 90
2.1.1.5 Raw QC Data 133
3.0 Attachments 138

1.0 Summary Data

1.1 Narratives

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L16111326
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG595135	**Reviewer Name:**	Eric Lawson
LRC Date:	2016-12-19 00:00:00		

Laboratory Data Package Cover Page

	R1	Field chain-of-custody documentation;
	R2	Sample identification cross-reference;
	R3	Test reports (analytical data sheets) for each environmental sample that includes: (a) Items consistent with NELAC Chapter 5, (b) dilution factors, (c) preparation methods, (d) cleanup methods, and (e) a.if required for the project, tentatively identified compounds (TICs).
	R4	Surrogate recovery data including: (a) Calculated recovery (%R), and (b) the laboratory's surrogate QC limits.
	R5	Test reports/summary forms for blank samples;
	R6	Test reports/summary forms for laboratory control samples (LCSs) including: (a) LCS spiking amounts, (b) calculated %R for each analyte, and (c) the laboratory's LCS QC limits.
	R7	Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including: (a) samples associated with the MS/MSD clearly identified, (b) MS/MSD spiking compounds, (c) concentration of each MS/MSD analyte measured in the parent and spiked samples, (d) calculated %Rs and relative percent differences (RPDs), and (e) the laboratory's MS/MSD QC limits.
	R8	Laboratory analytical duplicate (if applicable) recovery and precision: (a) the amount of analyte measured in the duplicate, (b) the calculated RPD, and (c) the laboratory's QC limits for analytical duplicates.
	R9	List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.
	R10	Other problems or anomalies.

Name (Printed)	Signature	Official Title (Printed)	Date
Eric Lawson		Chemist III	2016-12-19 16:25:53

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L16111326
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG595135	**Reviewer Name:**	Eric Lawson
LRC Date:	2016-12-19 00:00:00		

Description	Yes	No	NA	NR	ER#
Chain-of-custody (C-O-C)					
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
Were all departures from standard conditions described in an exception report?	X				
Sample and quality control (QC) identification	X				
Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
Test reports					
Were all samples prepared and analyzed within holding times?	X				
Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
Were calculations checked by a peer or supervisor?	X				
Were all analyte identifications checked by a peer or supervisor?	X				
Were sample detection limits reported for all analytes not detected?	X				
Were all results for soil and sediment samples reported on a dry weight basis?			X		
Were % moisture (or solids) reported for all soil and sediment samples?			X		
Were bulk soils/solids samples for volatile analysis extracted with methanol per SW846 Method 5035?			X		
If required for the project, are TICs reported?			X		
Surrogate recovery data					
Were surrogates added prior to extraction?			X		
Were surrogate percent recoveries in all samples within the laboratory QC limits?			X		
Test reports/summary forms for blank samples	X				
Were appropriate type(s) of blanks analyzed?	X				
Were blanks analyzed at the appropriate frequency?	X				
Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
Were blank concentrations < MQL?	X				
Laboratory control samples (LCS):					
Were all COCs included in the LCS?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L16111326
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG595135	**Reviewer Name:**	Eric Lawson
LRC Date:	2016-12-19 00:00:00		

Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
Were LCSs analyzed at the required frequency?	X				
Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
Does the detectability check sample data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
Was the LCSD RPD within QC limits?			X		
Matrix spike (MS) and matrix spike duplicate (MSD) data					
Were the project/method specified analytes included in the MS and MSD?			X		
Were MS/MSD analyzed at the appropriate frequency?			X		
Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?			X		
Were MS/MSD RPDs within laboratory QC limits?			X		
Analytical duplicate data					
Were appropriate analytical duplicates analyzed for each matrix?			X		
Were analytical duplicates analyzed at the appropriate frequency?			X		
Were RPDs or relative standard deviations within the laboratory QC limits?			X		
Method quantitation limits (MQLs):					
Are the MQLs for each method analyte included in the laboratory data package?	X				
Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
Other problems/anomalies					
Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
Was applicable and available technology used to lower the SDL to minimize the matrix interference effects on the sample results?	X				
Is the laboratory NELAC-accredited under the Texas Laboratory Accreditation Program for the analytes, matrices and methods associated with this laboratory data package?	X				
Initial calibration (ICAL)					
Were response factors and/or relative response factors for each analyte within QC limits?	X				
Were percent RSDs or correlation coefficient criteria met?	X				

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L16111326
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG595135	**Reviewer Name:**	Eric Lawson
LRC Date:	2016-12-19 00:00:00		

Was the number of standards recommended in the method used for all analytes?	X				
Were all points generated between the lowest and highest standard used to calculate the curve?	X				
Are ICAL data available for all instruments used?	X				
Has the initial calibration curve been verified using an appropriate second source standard?	X				
Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB):					
Was the CCV analyzed at the method-required frequency?	X				
Were percent differences for each analyte within the method-required QC limits?	X				
Was the ICAL curve verified for each analyte?	X				
Was the absolute value of the analyte concentration in the inorganic CCB < MDL?			X		
Mass spectral tuning					
Was the appropriate compound for the method used for tuning?	X				
Were ion abundance data within the method-required QC limits?	X				
Internal standards (IS)					
Were IS area counts and retention times within the method-required QC limits?	X				
Raw data (NELAC Section 5.5.10)					
Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
Were data associated with manual integrations flagged on the raw data?	X				
Dual column confirmation					
Did dual column confirmation results meet the method-required QC?			X		
Tentatively identified compounds (TICs)					
If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
Interference Check Sample (ICS) results					
Were percent recoveries within method QC limits?			X		
Serial dilutions, post digestion spikes, and method of standard additions					
Were percent differences, recoveries, and the linearity within the QC limits specified in the method?			X		
Method detection limit (MDL) studies					

Microbac

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L16111326
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG595135	**Reviewer Name:**	Eric Lawson
LRC Date:	2016-12-19 00:00:00		

Was a MDL study performed for each reported analyte?	X				
Is the MDL either adjusted or supported by the analysis of DCSs?	X				
Proficiency test reports					
Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
Standards documentation					
Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
Compound/analyte identification procedures					
Are the procedures for compound/analyte identification documented?	X				
Demonstration of analyst competency (DOC)					
Was DOC conducted consistent with NELAC Chapter 5?	X				
Is documentation of the analyst's competency up-to-date and on file?	X				
Verification/validation documentation for methods (NELAC Chapter 5)					
Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
Laboratory standard operating procedures (SOPs)					
Are laboratory SOPs current and on file for each method performed	X				

1. Items identified by the letter “R” must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter “S” should be retained and made available upon request for the appropriate retention period;

2. O = organic analyses; I = inorganic analyses (and general chemistry, when applicable);

3. NA = Not applicable;

4. NR = Not reviewed;

5. ER# = Exception Report identification number (an Exception Report should be completed for an item if “NR” or “No” is checked).

The Exception Report for each “No” or “Not Reviewed (NR)” item in Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes, and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the Exception Reports. By my signature

Texas Risk Reduction Program (TRRP) Checklist

Laboratory Name:	Microbac OVD	**Laboratory Log Number:**	L16111326
Project Name:		**Method:**	6850
Prep Batch Number(s):	WG595135	**Reviewer Name:**	Eric Lawson
LRC Date:	2016-12-19 00:00:00		

below, I affirm to the best of my knowledge all problems/anomalies observed by the laboratory have been identified in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [ ] This laboratory meets an exception under 30 TAC §25.6 and was last inspection by [ ] TCEQ or [ ] _____ on **(enter date of last inspection**). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Exceptions Report

There are no exceptions.

1.2 Certificate of Analysis

Microbac

Lab Report #: L16111326
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L16111326-01	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	HBW 7 - 112916	**Prep Method:**	6850	**Prep Date:**	12/16/2016 18:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	12/16/2016 23:37
Workgroup #:	WG595135	**Analyst:**	JWR	**Run Date:**	12/17/2016 02:09
Collect Date:	11/29/2016 08:13	**Dilution:**	1	**File ID:**	1LM.LM37780
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.318	J	0.400	0.200	0.100

J	Estimated value ; the analyte concentration was less than the LOQ.

Microbac

Lab Report #: L16111326
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L16111326-02	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	HBW 10 - 112916	**Prep Method:**	6850	**Prep Date:**	12/16/2016 18:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	12/16/2016 23:37
Workgroup #:	WG595135	**Analyst:**	JWR	**Run Date:**	12/17/2016 02:28
Collect Date:	11/29/2016 08:27	**Dilution:**	1	**File ID:**	1LM.LM37781
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.200	U	0.400	0.200	0.100

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L16111326
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L16111326-03	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	HBW 1 - 112916	**Prep Method:**	6850	**Prep Date:**	12/16/2016 18:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	12/16/2016 23:37
Workgroup #:	WG595135	**Analyst:**	JWR	**Run Date:**	12/17/2016 02:47
Collect Date:	11/29/2016 08:35	**Dilution:**	1	**File ID:**	1LM.LM37782
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.200	U	0.400	0.200	0.100

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L16111326
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L16111326-04	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	GPW 1 - 112916	**Prep Method:**	6850	**Prep Date:**	12/16/2016 18:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	12/16/2016 23:37
Workgroup #:	WG595135	**Analyst:**	JWR	**Run Date:**	12/17/2016 03:05
Collect Date:	11/29/2016 09:10	**Dilution:**	1	**File ID:**	1LM.LM37783
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.301	J	0.400	0.200	0.100

J	Estimated value ; the analyte concentration was less than the LOQ.

Microbac

Lab Report #: L16111326
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L16111326-05	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	GPW 3 - 112916	**Prep Method:**	6850	**Prep Date:**	12/16/2016 18:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	12/16/2016 23:37
Workgroup #:	WG595135	**Analyst:**	JWR	**Run Date:**	12/17/2016 03:24
Collect Date:	11/29/2016 08:58	**Dilution:**	1	**File ID:**	1LM.LM37784
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.563		0.400	0.200	0.100

2.0 Full Sample Data Package

2.1 General Chromatography Data

2.1.1 6850 LC/MS Data

2.1.1.1 Summary Data

Microbac

Lab Report #: L16111326
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L16111326-01	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	HBW 7 - 112916	**Prep Method:**	6850	**Prep Date:**	12/16/2016 18:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	12/16/2016 23:37
Workgroup #:	WG595135	**Analyst:**	JWR	**Run Date:**	12/17/2016 02:09
Collect Date:	11/29/2016 08:13	**Dilution:**	1	**File ID:**	1LM.LM37780
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.318	J	0.400	0.200	0.100

J	Estimated value ; the analyte concentration was less than the LOQ.

Microbac

Lab Report #: L16111326
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L16111326-02	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	HBW 10 - 112916	**Prep Method:**	6850	**Prep Date:**	12/16/2016 18:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	12/16/2016 23:37
Workgroup #:	WG595135	**Analyst:**	JWR	**Run Date:**	12/17/2016 02:28
Collect Date:	11/29/2016 08:27	**Dilution:**	1	**File ID:**	1LM.LM37781
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.200	U	0.400	0.200	0.100

U	Analyte was not detected. The concentration is below the reported LOD.

Microbac

Lab Report #: L16111326
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L16111326-03	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	HBW 1 - 112916	**Prep Method:**	6850	**Prep Date:**	12/16/2016 18:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	12/16/2016 23:37
Workgroup #:	WG595135	**Analyst:**	JWR	**Run Date:**	12/17/2016 02:47
Collect Date:	11/29/2016 08:35	**Dilution:**	1	**File ID:**	1LM.LM37782
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.200	U	0.400	0.200	0.100

U	Analyte was not detected. The concentration is below the reported LOD.

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Lab Report #: L16111326
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L16111326-04	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	GPW 1 - 112916	**Prep Method:**	6850	**Prep Date:**	12/16/2016 18:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	12/16/2016 23:37
Workgroup #:	WG595135	**Analyst:**	JWR	**Run Date:**	12/17/2016 03:05
Collect Date:	11/29/2016 09:10	**Dilution:**	1	**File ID:**	1LM.LM37783
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.301	J	0.400	0.200	0.100

J	Estimated value ; the analyte concentration was less than the LOQ.

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Lab Report #: L16111326
Lab Project #: 2551.096
Project Name: Longhorn Army Ammunition
Lab Contact: Adriane Steed

Certificate of Analysis

Sample #:	L16111326-05	**PrePrep Method:**	N/A	**Instrument:**	LCMS1
Client ID:	GPW 3 - 112916	**Prep Method:**	6850	**Prep Date:**	12/16/2016 18:00
Matrix:	Water	**Analytical Method:**	6850	**Cal Date:**	12/16/2016 23:37
Workgroup #:	WG595135	**Analyst:**	JWR	**Run Date:**	12/17/2016 03:24
Collect Date:	11/29/2016 08:58	**Dilution:**	1	**File ID:**	1LM.LM37784
Sample Tag:	01	**Units:**	ug/L		

Analyte	CAS #	Result	Qual	LOQ	LOD	DL
Perchlorate	14797-73-0	0.563		0.400	0.200	0.100

2.1.1.2 QC Summary Data

Example Calculation 6850 - Perchlorate

Concentration from Linear Regression

Step 1: Retrieve Curve Data From Plot, y = mx + b

y = response ratio = response of analyte / response of internal standard (IS) = Rx/Ristd

x = amount ratio = concentration analyte/concentration internal standard (IS) = Cx / Cistd

m = slope from curve (1.45)

b = intercept from curve (-0.00242)

y = 1.45x + -0.00242

Step 2: Substitute the value for y

where y = 12600/226000 = 0.055752

Step 3: Solve for x

x = (y - b)/m = 0.0040119

Step 4: Solve for analyte concentration Cx

Cx = (Cis)(x) = (5 ug/L)(0.040119) = 0.200594 ug/L

Example Calculation - Water:

Slope from curve, m:	1.45
Intercept from curve, b:	-0.00242
Response of analyte, Rx:	12600
Response of Internal Standard , Ristd:	226000
Concentration of IS, Cistd (ug/L):	5.00
Response Ratio:	0.05575
Amount Ratio:	0.04012
Analyte Concentration, Cx (ug/L) :	0.200594

Example Calculation - Soil:

Analyte Concentration, Cx (ug/L):	0.20059
Amount of soil extracted (g):	5.00
Final volume of extract (mL):	50.00
Percent solids (Pct wt.)	100
Concentration in soil (ug/kg):	2.005938

Perchlorate Conductivity Check
(perchlorate1)

Conductivity Probe Calibration Check: 1402 /1410 µs/cm

Working MCT Level: 10,000 µs/cm

Sample	Conductivity (µs/cm)	Pretreatment or Dilution Needed
WG595135-01 MCT	9,950.	
-02 Blk	0.32	
-03 LCS	0.29	
L16111326-01	149.7	
-02	105.8	
-03	105.8	
-04	53.5	
-05	52.9	
L16120274-01	2,650.	
L16120275-01	1,635.	
L16120281-01 RS	89.3	
-02 MS	89.6	
-03 MSD	89.5	
-04	173.3	
-05	175.9	

Analyst: John Richards

Date/Time: 12/17/16 1720

DCN#122798

Microbac Laboratories Inc.

Instrument Run Log

Instrument: LCMS1 Dataset: 121716_JWR.TXT
Analyst1: JWR Analyst2: NA
Method: 6850 SOP: HPLC06 Rev: 8

Maintenance Log ID: Syringe Filter Lot#: 160109254
Eluent ID#:

Workgroups: Column 1 ID: KP-RPPX250 Column 2 ID: NA
Analytical WG595135 (waters)
Internal STD: STD18071 Surrogate STD: NA Calibration STD STD78249 (12/16/2016)
CCV STD: STD78249 LCS STD: STD78251 MS/MSD STD: STD78251

Comments: ICAL WG595346 : Alternate Source STD78251
Analytical Column : RPPX 5um (250x4.6mm)
K'Prime S/N RPPX250-02115

Sample L16120275-01 was analyzed at a dilution based on its historical results.

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
1	1LM.LM37765	WG595346-01 CCB	1	1		12/16/16 21:25
2	1LM.LM37766	WG595346-02 STD (0.1 ug/L)	1	1	STD78249	12/16/16 21:44
3	1LM.LM37767	WG595346-03 STD (0.2 ug/L)	1	1	STD78249	12/16/16 22:02
4	1LM.LM37768	WG595346-04 STD (0.5 ug/L)	1	1	STD78249	12/16/16 22:21
5	1LM.LM37769	WG595346-05 STD (1.0 ug/L)	1	1	STD78249	12/16/16 22:40
6	1LM.LM37770	WG595346-06 STD (2.0 ug/L)	1	1	STD78249	12/16/16 22:59
7	1LM.LM37771	WG595346-07 STD (5.0 ug/L)	1	1	STD78249	12/16/16 23:18
8	1LM.LM37772	WG595346-08 STD (10 ug/L)	1	1	STD78249	12/16/16 23:37
9	1LM.LM37773	WG595346-09 SSCV (1.0 ug/L)	1	1	STD78251	12/16/16 23:56
10	1LM.LM37774	WG595142-01 CCB	1	1		12/17/16 00:15
11	1LM.LM37775	WG595142-02 CCV (1.0ug/L)	1	1	STD78249	12/17/16 00:34
12	1LM.LM37776	WG595135-07 MRL (0.2ug/L)	1	1	STD78249	12/17/16 00:53
13	1LM.LM37777	WG595135-01 MCT (0.2ug/L)	1	1	STD78251	12/17/16 01:12
14	1LM.LM37778	WG595135-02 BLANK	1	1		12/17/16 01:31
15	1LM.LM37779	WG595135-03 LCS (0.2ug/L)	1	1	STD78251	12/17/16 01:50
16	1LM.LM37780	L16111326-01	1	1		12/17/16 02:09
17	1LM.LM37781	L16111326-02	1	1		12/17/16 02:28
18	1LM.LM37782	L16111326-03	1	1		12/17/16 02:47
19	1LM.LM37783	L16111326-04	1	1		12/17/16 03:05
20	1LM.LM37784	L16111326-05	1	1		12/17/16 03:24
21	1LM.LM37785	L16120274-01	1	1		12/17/16 03:43
22	1LM.LM37786	L16120274-01 (100x) (NR)	1	100		12/17/16 04:02
23	1LM.LM37787	WG595142-03 CCV (1.0ug/L)	1	1	STD78249	12/17/16 04:21
24	1LM.LM37788	WG595135-08 MRL (0.2ug/L)	1	1	STD78249	12/17/16 04:40
25	1LM.LM37789	WG595142-04 CCB	1	1		12/17/16 04:59
26	1LM.LM37790	L16120281-01 RS	1	1		12/17/16 05:18
27	1LM.LM37791	L16120281-02 MS	1	1	STD78251	12/17/16 05:37
28	1LM.LM37792	L16120281-03 MSD	1	1	STD78251	12/17/16 05:56
29	1LM.LM37793	L16120281-04	1	1		12/17/16 06:15
30	1LM.LM37794	L16120281-05	1	1		12/17/16 06:34
31	1LM.LM37795	L16120275-01 (10,000x)	1	10000		12/17/16 06:53
32	1LM.LM37796	WG595142-05 CCV (1.0ug/L)	1	1	STD78249	12/17/16 07:12

Page: 1 Approved: 19-DEC-16



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Instrument Run Log

Instrument: LCMS1 Dataset: 121716_JWR.TXT

Analyst1: JWR Analyst2: NA

Method: 6850 SOP: HPLC06 Rev: 8

Maintenance Log ID: Syringe Filter Lot#: 160109254

Eluent ID#:

Column 1 ID: KP-RPPX250 Column 2 ID: NA

Workgroups: Analytical WG595135 (waters)

Internal STD: STD18071 Surrogate STD: NA STD78249 (12/16/2016)

CCV STD: STD78249 LCS STD: STD78251 STD78251

Seq.	File ID	Sample Information	Mat	Dil	Reference	Date/Time
33	1LM.LM37797	WG595135-09 MRL (0.2ug/L)	1	1	STD78249	12/17/16 07:31
34	1LM.LM37798	WG595142-06 CCB	1	1		12/17/16 07:49

Comments

Seq.	Rerun	Dil.	Reason	Analytes

Page: 2 Approved: 19-DEC-16

Microbac Laboratories Inc.

Data Checklist

Date: 17-DEC-2016
Analyst: JWR
Analyst: NA
Method: 6850
Instrument: LCMS1
Curve Workgroup: WG595346
Runlog ID: 79296
Analytical Workgroups: L16111326 L16120274, 0275, 0281 (WATERS)

ANALYTICAL	
System Performance Check	NA
DFTPP (GCMS)	NA
Endrin/DDT breakdown (8081/GCMS)	NA
Pentachlorophenol/benzidine tailing (GCMS)	NA
Eluent check (IC)/system pressure (HPLC)	NA
Window standard (FID)	NA
Initial Calibration	16-DEC-2016 @23:37
Average RF	NA
Linear regression or higher order curve	X
Alternate source standard (ICV) % Difference	X
Continuing Calibration (CCV)	X
% D/% Drift	X
Minimum response factors (GCMS)	X
Continuing calibration blank (CCB) (IC/LCMS)	X
Limit of quantitation verification (LOQV) (LCMS)	X
Special standards	NA
Blanks	X
TCL hits	ND
Surrogate recoveries	NA
LCS/LCSD (Laboratory Control Sample)	X
Recoveries	X
Surrogate recoveries	NA
MS/MSD/Sample duplicates	X
Recoveries	X
%RPD	X
Interference check sample (ICS) (LCMS)	MCT
Samples	X
TCL hits	X
Mass spectra (MS/HPLC)/2nd column confirmations (ECD/FID/HPLC)	NA
Surrogate recoveries	NA
Internal standard areas (MS)	X
Library searches (GCMS)	NA
Calculations & correct factors	X
Compounds above calibration range	NA
Reruns	NA
Manual integrations	MCT-ONLY
Project/client specific requirements	X
REPORTING	
Upload batch form	X
KOBRA workgroup data/forms/bench sheets	X
Case narratives	
Check for completeness	X
Primary Reviewer	JWR
SUPERVISORY/SECONDARY REVIEW	
Check for compliance with method and project specific requirements	X
Check the completeness/accuracy of reported information	X
Data qualifiers	X
Secondary Reviewer	MES

Primary Reviewer: 17-DEC-2016 John Richards

Secondary Reviewer: 19-DEC-2016 Mary Shilling

CHECKLIST1 - Modified 03/05/2008
Generated: DEC-19-2016 09:45:36

Microbac Laboratories Inc.

HOLDING TIMES
EQUIVALENT TO AFCEE FORM 9

Analytical Method: 6850 AAB#: WG595135

Login Number: L16111326

Client ID	ID	Date Collected	TCLP Date	Time Held	Max Hold	Q	Extract Date	Time Held	Max Hold	Q	Run Date	Time Held	Max Hold	Q
HBW 7 - 112916	01	11/29/16					12/16/2016	17.4	28		12/17/16	.3	28	
HBW 10 - 112916	02	11/29/16					12/16/2016	17.4	28		12/17/16	.4	28	
HBW 1 - 112916	03	11/29/16					12/16/2016	17.4	28		12/17/16	.4	28	
GPW 1 - 112916	04	11/29/16					12/16/2016	17.4	28		12/17/16	.4	28	
GPW 3 - 112916	05	11/29/16					12/16/2016	17.4	28		12/17/16	.4	28	

* = SEE PROJECT QAPP REQUIREMENTS

HOLD_TIMES - Modified 03/06/2008
PDF File ID: 5069824
Report generated 12/19/2016 10:10

METHOD BLANK SUMMARY

Login Number: L16111326
Blank File ID: 1LM.LM37778
Prep Date: 12/16/16 18:00
Analyzed Date: 12/17/16 01:31
Analyst: JWR

Work Group: WG595135
Blank Sample ID: WG595135-02
Instrument ID: LCMS1
Method: 6850

This Method Blank Applies To The Following Samples:

Client ID	Lab Sample ID	Lab File ID	Time Analyzed	TAG
QCMRL	WG595135-07	1LM.LM37776	12/17/16 00:53	01
MCT	WG595135-01	1LM.LM37777	12/17/16 01:12	01
LCS	WG595135-03	1LM.LM37779	12/17/16 01:50	01
HBW 7 - 112916	L16111326-01	1LM.LM37780	12/17/16 02:09	01
HBW 10 - 112916	L16111326-02	1LM.LM37781	12/17/16 02:28	01
HBW 1 - 112916	L16111326-03	1LM.LM37782	12/17/16 02:47	01
GPW 1 - 112916	L16111326-04	1LM.LM37783	12/17/16 03:05	01
GPW 3 - 112916	L16111326-05	1LM.LM37784	12/17/16 03:24	01
QCMRL	WG595135-08	1LM.LM37788	12/17/16 04:40	01
QCMRL	WG595135-09	1LM.LM37797	12/17/16 07:31	01

Report Name: BLANK_SUMMARY
PDF File ID: 5069825
Report generated 12/19/2016 10:10

Microbac Laboratories Inc.

METHOD BLANK REPORT

Login Number:L16111326 Prep Date:12/16/16 18:00 Sample ID:WG595135-02
Instrument ID:LCMS1 Run Date:12/17/16 01:31 Prep Method:6850
File ID:1LM.LM37778 Analyst:JWR Method:6850
Workgroup (AAB#):WG595135 Matrix:Water Units:ug/L
Contract #: Cal ID: LCMS1-16-DEC-16

Analytes	DL	LOQ	Concentration	Dilution	Qualifier
Perchlorate	0.100	0.400	0.100	1	U

DL Method Detection Limit
LOQ Reporting/Practical Quantitation Limit
ND Analyte Not detected at or above reporting limit
* |Analyte concentration| > 1/2 RL

Report Name:BLANK
PDF ID: 5069826
19-DEC-2016 10:10

Microbac Laboratories Inc.
LABORATORY CONTROL SAMPLE (LCS)

Login Number: L16111326 **Run Date:** 12/17/2016 **Sample ID:** WG595135-03
Instrument ID: LCMS1 **Run Time:** 01:50 **Prep Method:** 6850
File ID: 1LM.LM37779 **Analyst:** JWR **Method:** 6850
Workgroup (AAB#): WG595135 **Matrix:** Water **Units:** ug/L
QC Key: DOD4 **Lot#:** STD78251 **Cal ID:** LCMS1-16-DEC-16

Analytes	Expected	Found	% Rec	LCS Limits	Q
Perchlorate	0.200	0.200	100	80 - 120	

LCS - Modified 03/06/2008
PDF File ID: 5069827
Report generated: 12/19/2016 10:10

Microbac Laboratories Inc.
INITIAL CALIBRATION SUMMARY

Login Number: L16111326
Analytical Method: 6850
ICAL Workgroup: WG595346

Instrument ID: LCMS1
Initial Calibration Date: 16-DEC-16 23:37
Column ID: F

Analyte		AVG RF	% RSD	LINEAR (R)	QUAD (R^2)
Perchlorate		1.691	3.94	1.00000	

R = Correlation coefficient; 0.995 minimum
R^2 = Coefficient of determination; 0.99 minimum

INT_CAL - Modified 03/06/2008
PDF File ID: 5069829
Report generated 12/19/2016 10:10

Login Number: L16111326
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 16-DEC-16 23:37
Column ID: F

Analyte	WG595346-02			WG595346-03			WG595346-04		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Perchlorate	0.100	10900.0000	1.729	0.200	21400.0000	1.692	0.500	54100.0000	1.728

INT_CAL - Modified 03/06/2008
PDF File ID: 5069829
Report generated 12/19/2016 10:10

Microbac Laboratories Inc.
INITIAL CALIBRATION DATA

Login Number: L16111326
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 16-DEC-16 23:37
Column ID: F

Analyte	WG595346-05			WG595346-06			WG595346-07		
	CONC	RESP	RF	CONC	RESP	RF	CONC	RESP	RF
Perchlorate	1.00	106000.000	1.685	2.00	206000.000	1.675	5.00	505000.000	1.663

INT_CAL - Modified 03/06/2008
PDF File ID: 5069829
Report generated 12/19/2016 10:10

Login Number: L16111326
Analytical Method: 6850
Instrument ID: LCMS1
Initial Calibration Date: 16-DEC-16 23:37
Column ID: F

Analyte	WG595346-08		
	CONC	RESP	RF
Perchlorate	10.0	978000.000	1.668

INT_CAL - Modified 03/06/2008
PDF File ID: 5069829
Report generated 12/19/2016 10:10

Microbac Laboratories Inc.
ALTERNATE SOURCE CALIBRATION REPORT

Login Number: L16111326 Run Date: 12/16/2016 Sample ID: WG595346-09
Instrument ID: LCMS1 Run Time: 23:56 Method: 6850
File ID: 1LM.LM37773 Analyst: JWR QC Key: DOD4
ICal Workgroup: WG595346 Cal ID: LCMS1 - 16-DEC-16

Analyte		Expected	Found	Units	RF	%D	UCL	Q
Perchlorate		1.00	1.04	ug/L	1.74	4.00	15	

* Exceeds %D Limit

ALT - Modified 09/06/2007
Version 1.5 PDF File ID: 5069830
Report generated 12/19/2016 10:10

Microbac Laboratories Inc.
CONTINUING CALIBRATION BLANK (CCB)

Login Number:	L16111326	**Run Date:**	12/17/2016	**Sample ID:**	WG595142-01
Instrument ID:	LCMS1	**Run Time:**	00:15	**Method:**	6850
File ID:	1LM.LM37774	**Analyst:**	JWR	**Units:**	ug/L
Workgroup (AAB#):	WG595135	**Cal ID:**	LCMS1 - 16-DEC-16		
Matrix:	WATER	**QAPP:**	DOD4		

Analytes	MDL	RDL	Concentration	Qualifier
Perchlorate	0.100	0.400	0.100	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 5069832
Report generated 12/19/2016 10:10

Microbac Laboratories Inc.

CONTINUING CALIBRATION BLANK (CCB)

Login Number: L16111326 Run Date: 12/17/2016 Sample ID: WG595142-04
Instrument ID: LCMS1 Run Time: 04:59 Method: 6850
File ID: 1LM.LM37789 Analyst: JWR Units: ug/L
Workgroup (AAB#): WG595135 Cal ID: LCMS1 - 16-DEC-16
Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Perchlorate	0.100	0.400	0.100	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 5069832
Report generated 12/19/2016 10:10

Microbac Laboratories Inc.

CONTINUING CALIBRATION BLANK (CCB)

Login Number: L16111326 Run Date: 12/17/2016 Sample ID: WG595142-06

Instrument ID: LCMS1 Run Time: 07:49 Method: 6850

File ID: 1LM.LM37798 Analyst: JWR Units: ug/L

Workgroup (AAB#): WG595135 Cal ID: LCMS1 - 16-DEC-16

Matrix: WATER QAPP: DOD4

Analytes	MDL	RDL	Concentration	Qualifier
Perchlorate	0.100	0.400	0.100	U

U = Result is less than MDL.
F = Result is between MDL and RL.
* = Result is above RL.

CCB - Modified 03/05/2008
PDF File ID: 5069832
Report generated 12/19/2016 10:10

Login Number: L16111326 Run Date: 12/17/2016 Sample ID: WG595142-02
Instrument ID: LCMS1 Run Time: 00:34 Method: 6850
File ID: 1LM.LM37775 Analyst: JWR QC Key: DOD4
Workgroup (AAB#): WG595135 Cal ID: LCMS1 - 16-DEC-16
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	0.981	ug/L	1.64	1.90	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 5069831
Report generated 12/19/2016 10:10

Login Number: L16111326 Run Date: 12/17/2016 Sample ID: WG595142-03
Instrument ID: LCMS1 Run Time: 04:21 Method: 6850
File ID: 1LM.LM37787 Analyst: JWR QC Key: DOD4
Workgroup (AAB#): WG595135 Cal ID: LCMS1 - 16-DEC-16
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	0.970	ug/L	1.63	3.00	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 5069831
Report generated 12/19/2016 10:10

Login Number: L16111326 Run Date: 12/17/2016 Sample ID: WG595142-05
Instrument ID: LCMS1 Run Time: 07:12 Method: 6850
File ID: 1LM.LM37796 Analyst: JWR QC Key: DOD4
Workgroup (AAB#): WG595135 Cal ID: LCMS1 - 16-DEC-16
Matrix: WATER

Analyte		Expected	Found	UNITS	RF	%D	UCL	Q
Perchlorate		1.00	0.996	ug/L	1.67	0.400	15	

* Exceeds %D Criteria

CCV - Modified 03/05/2008
PDF File ID: 5069831
Report generated 12/19/2016 10:10

Login Number: L16111326 Run Date: 12/17/2016 Sample ID: WG595135-07
Instrument ID: LCMS1 Run Time: 00:53 Prep Method: 6850
File ID: 1LM.LM37776 Analyst: JWR Method: 6850
Workgroup (AAB#): WG595135 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-16-DEC-16

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.199	99.5	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 5069828
Report generated 12/19/2016 10:10

Login Number: L16111326 Run Date: 12/17/2016 Sample ID: WG595135-08
Instrument ID: LCMS1 Run Time: 04:40 Prep Method: 6850
File ID: 1LM.LM37788 Analyst: JWR Method: 6850
Workgroup (AAB#): WG595135 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-16-DEC-16

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.196	98.0	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 5069828
Report generated 12/19/2016 10:10

Login Number: L16111326 Run Date: 12/17/2016 Sample ID: WG595135-09
Instrument ID: LCMS1 Run Time: 07:31 Prep Method: 6850
File ID: 1LM.LM37797 Analyst: JWR Method: 6850
Workgroup (AAB#): WG595135 Matrix: Water Units: ug/L
Contract #: Cal ID: LCMS1-16-DEC-16

Analytes	Expected	Found	% Rec	Limits	Q
Perchlorate	0.200	0.193	96.5	70 - 130	

QCMRL - Modified 03/06/2007
PDF File ID: 5069828
Report generated 12/19/2016 10:10

Microbac Laboratories Inc.
INTERNAL STANDARD AREA SUMMARY
(COMPARED TO AVERAGE OF ICAL)

Login Number: L16111326
Instrument ID: LCMS1
Workgroup (AAB#): WG595135

ICAL CCV Number: WG595346-05
CAL ID: LCMS1-16-DEC-16
Matrix: WATER

Sample Number	Dilution	Tag	IS-1
WG595346	NA	NA	309000
Upper Limit	NA	NA	463500
Lower Limit	NA	NA	154500
WG595135-03	1.00	01	330000

IS-1 - O18LP

Underline = Response outside limits

INTERNAL_STD_AVG_ICAL - Modified 03/10/2010
PDF File ID: 5069833
Report generated 12/19/2016 10:10

Microbac Laboratories Inc.
INTERNAL STANDARD AREA SUMMARY
(COMPARED TO AVERAGE OF ICAL)

Login Number: L16111326
Instrument ID: LCMS1
Workgroup (AAB#): WG595135

ICAL CCV Number: WG595346-05
CAL ID: LCMS1-16-DEC-16
Matrix: WATER

Sample Number	Dilution	Tag	IS-1
WG595346	NA	NA	309000
Upper Limit	NA	NA	463500
Lower Limit	NA	NA	154500
L16111326-01	1.00	01	245000
L16111326-02	1.00	01	289000
L16111326-03	1.00	01	304000
L16111326-04	1.00	01	307000
L16111326-05	1.00	01	313000
WG595135-02	1.00	01	338000

IS-1 - O18LP

Underline = Response outside limits

INTERNAL_STD_AVG_ICAL - Modified 03/10/2010
PDF File ID: 5069833
Report generated 12/19/2016 10:10

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16111326	**Prep Method:**	6850	**Samplenum:**	L16111326-01
Instrument:	LCMS1	**Prep Date:**	12/16/2016 18:00	**File ID:**	1LM.LM37780
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/17/2016 02:09	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	26400	8730	3.02	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16111326	**Prep Method:**	6850	**Samplenum:**	L16111326-02
Instrument:	LCMS1	**Prep Date:**	12/16/2016 18:00	**File ID:**	1LM.LM37781
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/17/2016 02:28	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	5030	1620	3.10	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16111326	**Prep Method:**	6850	**Samplenum:**	L16111326-03
Instrument:	LCMS1	**Prep Date:**	12/16/2016 18:00	**File ID:**	1LM.LM37782
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/17/2016 02:47	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	5140	1600	3.21	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16111326	**Prep Method:**	6850	**Samplenum:**	L16111326-04
Instrument:	LCMS1	**Prep Date:**	12/16/2016 18:00	**File ID:**	1LM.LM37783
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/17/2016 03:05	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	31400	11200	2.80	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16111326	**Prep Method:**	6850	**Samplenum:**	L16111326-05
Instrument:	LCMS1	**Prep Date:**	12/16/2016 18:00	**File ID:**	1LM.LM37784
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/17/2016 03:24	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	59200	19800	2.99	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16111326	**Prep Method:**	6850	**Samplenum:**	WG595135-01
Instrument:	LCMS1	**Prep Date:**	12/16/2016 18:00	**File ID:**	1LM.LM37777
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/17/2016 01:12	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	20500	7290	2.81	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16111326	**Prep Method:**	6850	**Samplenum:**	WG595135-02
Instrument:	LCMS1	**Prep Date:**	12/16/2016 18:00	**File ID:**	1LM.LM37778
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/17/2016 01:31	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	199	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16111326	**Prep Method:**	6850	**Samplenum:**	WG595135-03
Instrument:	LCMS1	**Prep Date:**	12/16/2016 18:00	**File ID:**	1LM.LM37779
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/17/2016 01:50	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	22600	8110	2.79	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16111326	**Prep Method:**	6850	**Samplenum:**	WG595135-07
Instrument:	LCMS1	**Prep Date:**	12/16/2016 18:00	**File ID:**	1LM.LM37776
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/17/2016 00:53	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	21500	7030	3.06	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16111326	**Prep Method:**	6850	**Samplenum:**	WG595135-08
Instrument:	LCMS1	**Prep Date:**	12/16/2016 18:00	**File ID:**	1LM.LM37788
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/17/2016 04:40	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	21700	8020	2.71	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16111326	**Prep Method:**	6850	**Samplenum:**	WG595135-09
Instrument:	LCMS1	**Prep Date:**	12/16/2016 18:00	**File ID:**	1LM.LM37797
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/17/2016 07:31	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	22500	7620	2.95	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16111326	**Prep Method:**		**Samplenum:**	WG595142-01
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM37774
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/17/2016 00:15	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	0.000	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16111326	**Prep Method:**		**Samplenum:**	WG595142-02
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM37775
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/17/2016 00:34	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	100000	33400	2.99	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16111326	**Prep Method:**		**Samplenum:**	WG595142-03
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM37787
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/17/2016 04:21	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	106000	37100	2.86	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16111326	**Prep Method:**		**Samplenum:**	WG595142-04
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM37789
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/17/2016 04:59	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	0.000	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16111326	**Prep Method:**		**Samplenum:**	WG595142-05
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM37796
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/17/2016 07:12	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	109000	37700	2.89	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16111326	**Prep Method:**		**Samplenum:**	WG595142-06
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM37798
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/17/2016 07:49	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	0.000	0.000	0.000	2.3	3.8	*

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16111326	**Prep Method:**		**Samplenum:**	WG595346-02
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM37766
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/16/2016 21:44	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	10900	3720	2.93	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16111326	**Prep Method:**		**Samplenum:**	WG595346-03
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM37767
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/16/2016 22:02	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	21400	7850	2.73	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16111326	**Prep Method:**		**Samplenum:**	WG595346-04
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM37768
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/16/2016 22:21	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	54100	19300	2.80	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16111326	**Prep Method:**		**Samplenum:**	WG595346-05
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM37769
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/16/2016 22:40	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	106000	36100	2.94	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16111326	**Prep Method:**		**Samplenum:**	WG595346-06
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM37770
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/16/2016 22:59	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	206000	70700	2.91	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16111326	**Prep Method:**		**Samplenum:**	WG595346-07
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM37771
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/16/2016 23:18	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	505000	170000	2.97	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16111326	**Prep Method:**		**Samplenum:**	WG595346-08
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM37772
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/16/2016 23:37	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	978000	326000	3.00	2.3	3.8	

Perchlorate Ion Ratios

Microbac Laboratories Inc.

Login #:	L16111326	**Prep Method:**		**Samplenum:**	WG595346-09
Instrument:	LCMS1	**Prep Date:**		**File ID:**	1LM.LM37773
Analyst:	JWR	**Anal Method:**	6850	**Matrix:**	Water
Worknum:	WG595135	**Analysis Date:**	12/16/2016 23:56	**Units:**	ug/L

Analyte	Res #1	Res #2	Ratio	Lower	Upper	Q
PERCHLORATE	107000	36700	2.92	2.3	3.8	

2.1.1.3 Sample Data

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Printed: 12/17/2016 2:16 PM

Data File	LM37780.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/17/2016 2:09:07 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

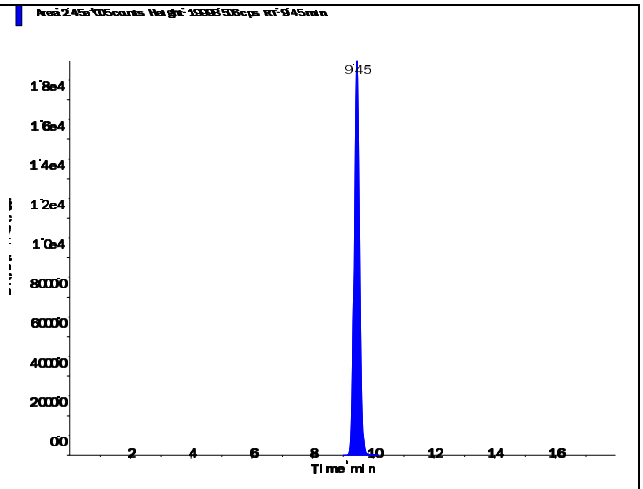
Sample Name	L16111326-01	**Injection Vial**	13.00
Data File	LM37780.wiff	**Injection Volume**	10.00
Acquisition Date	12/17/2016 2:09:07 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	L16111326-01	**Dilution Factor**	1.00
Sample Comment	1,1 (Hist)	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	2.450e+05	9.45	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	2.640e+04	9.47	N/A	0.318
Perchlorate conf	8.730e+03	9.45	N/A	0.302

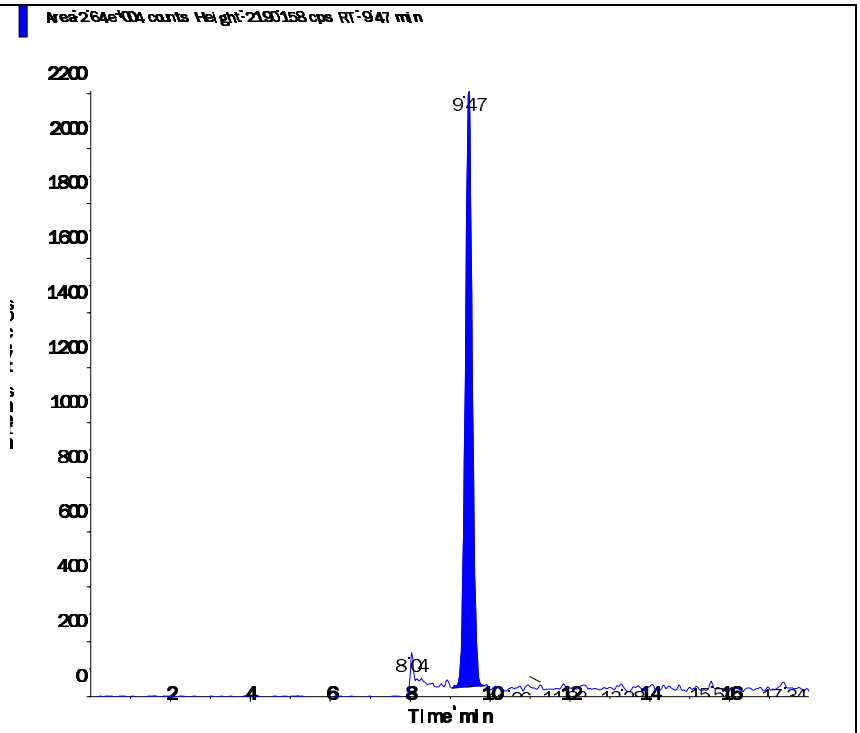
O18LP (Internal Standard)

RT (Exp. RT): 9.45(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



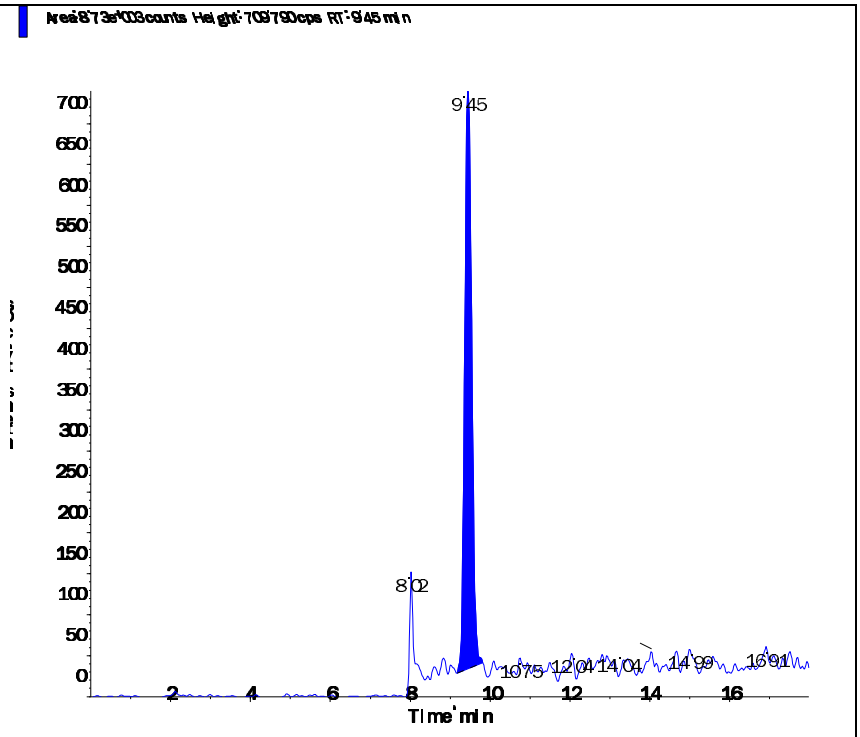
Perchlorate (98.8/83.3 amu)

RT (Exp. RT):	9.47 (9.56) min
Calculated conc:	0.318 ng/ml
Area Ratio:	0.108
Sample Type:	(Unknown)



Perchlorate conf (100.8/85.2 amu)

RT (Exp. RT):	9.45 (9.56) min
Calculated conc:	0.302 ng/ml
Area Ratio:	0.036
Sample Type:	(Unknown)



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Printed: 12/17/2016 2:17 PM

Data File	LM37781.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/17/2016 2:28:03 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

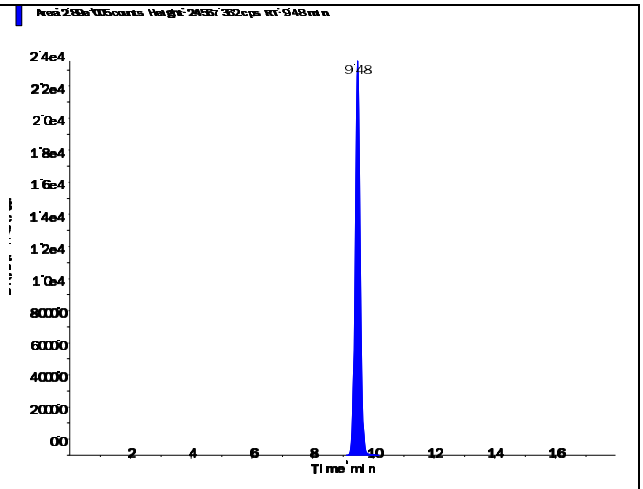
Sample Name	L16111326-02	**Injection Vial**	14.00
Data File	LM37781.wiff	**Injection Volume**	10.00
Acquisition Date	12/17/2016 2:28:03 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	L16111326-02	**Dilution Factor**	1.00
Sample Comment	1,1 (Hist)	**Weight to Volume**	0.00

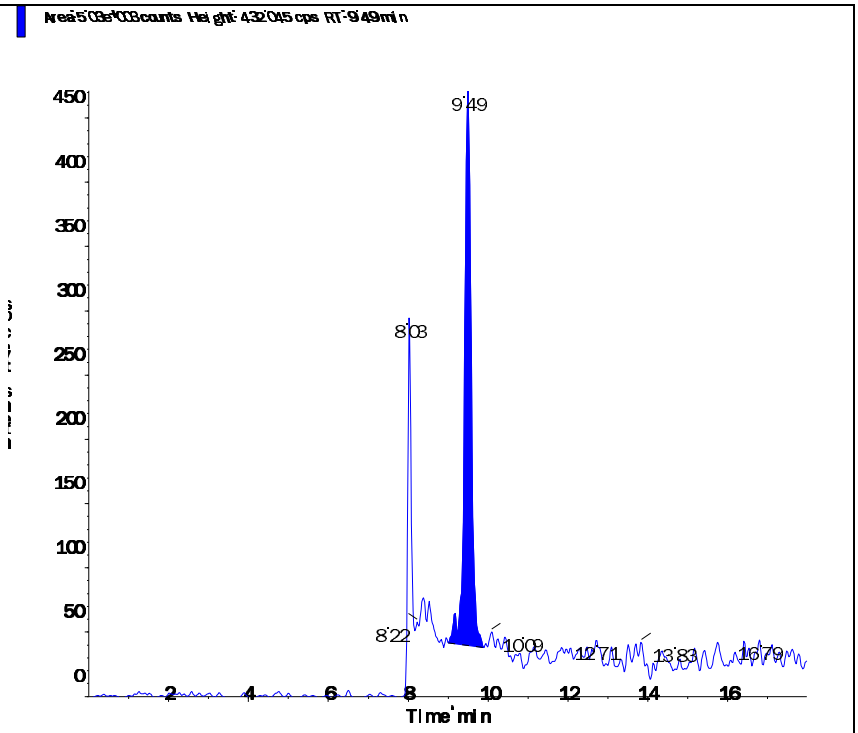
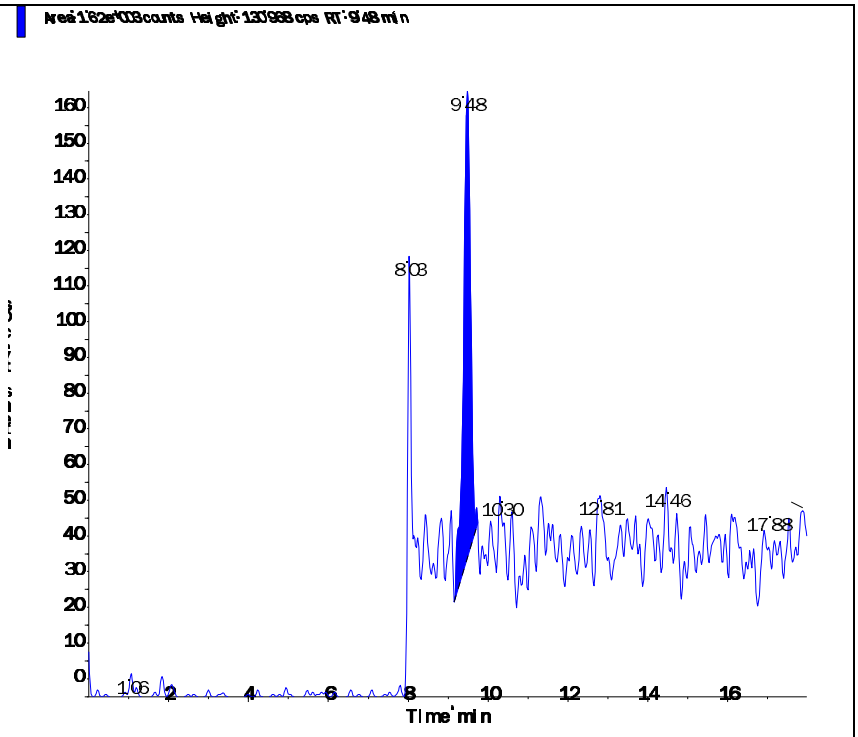
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	2.890e+05	9.48	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	5.030e+03	9.49	N/A	0.0468
Perchlorate conf	1.620e+03	9.48	N/A	0.0332

O18LP (Internal Standard)

RT (Exp. RT): 9.48(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.49 (9.56) min Calculated conc: 0.0468 ng/ml Area Ratio: 0.017 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.48 (9.56) min Calculated conc: 0.0332 ng/ml Area Ratio: 0.006 Sample Type: (Unknown)	

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Printed: 12/17/2016 2:17 PM

Data File	LM37782.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/17/2016 2:47:00 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

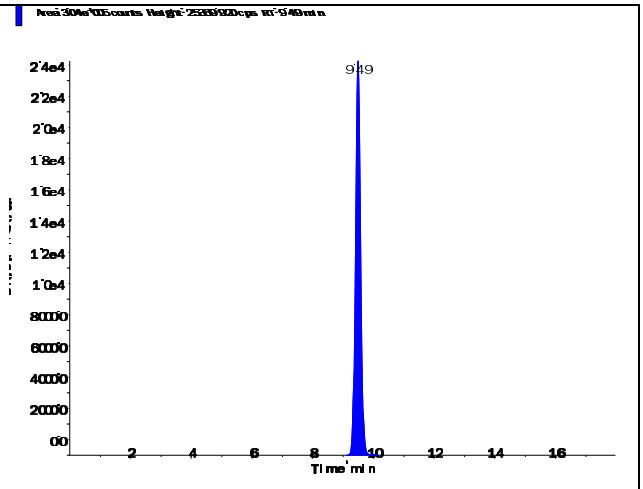
Sample Name	L16111326-03	**Injection Vial**	15.00
Data File	LM37782.wiff	**Injection Volume**	10.00
Acquisition Date	12/17/2016 2:47:00 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	L16111326-03	**Dilution Factor**	1.00
Sample Comment	1,1 (Hist)	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.040e+05	9.49	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	5.140e+03	9.49	N/A	0.0452
Perchlorate conf	1.600e+03	9.48	N/A	0.0301

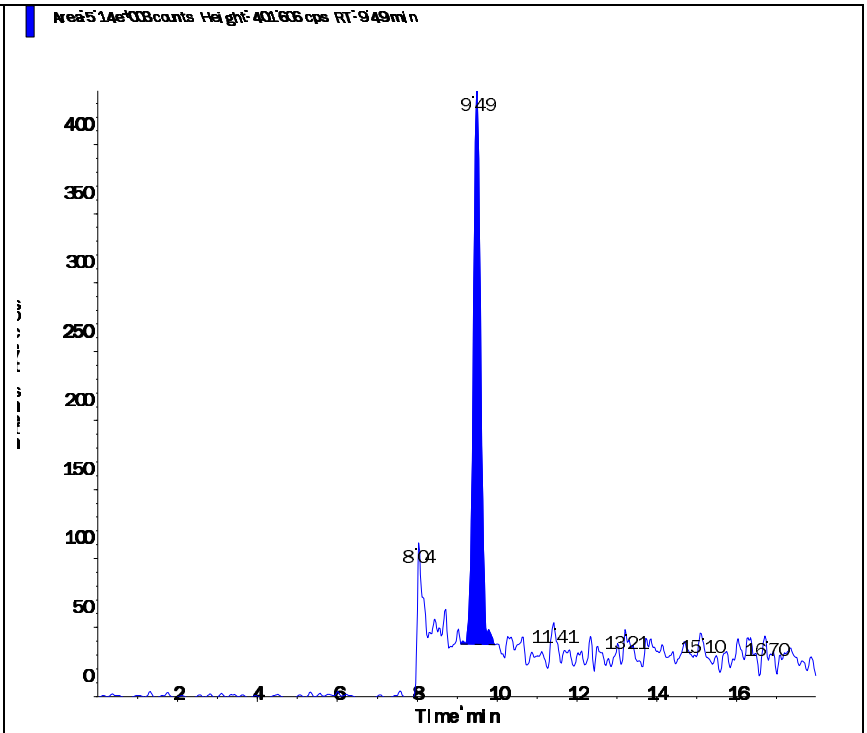
O18LP (Internal Standard)

RT (Exp. RT): 9.49(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



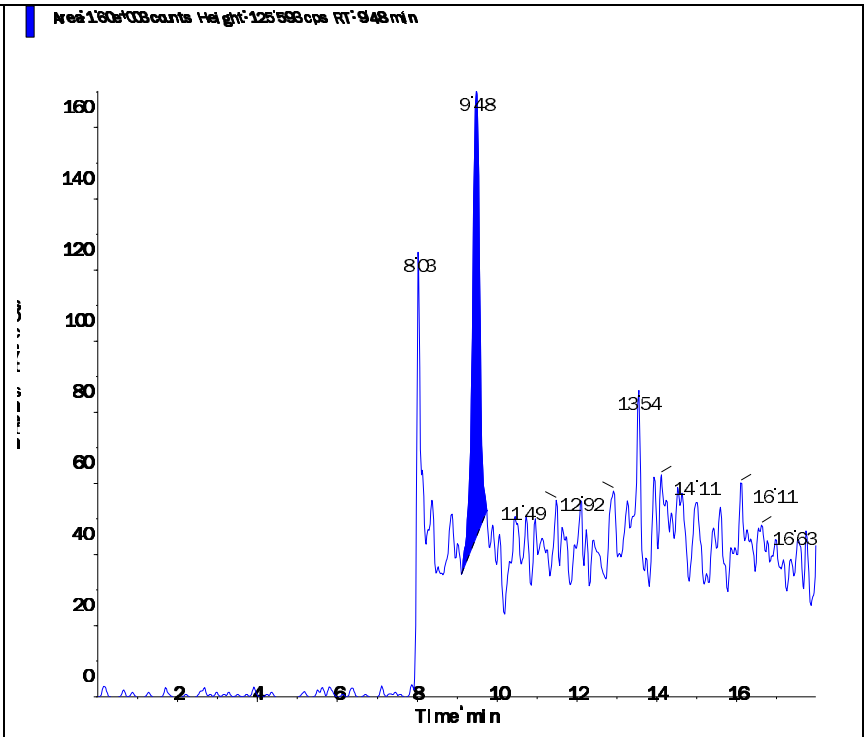
Perchlorate (98.8/83.3 amu)

RT (Exp. RT):	9.49 (9.56) min
Calculated conc:	0.0452 ng/ml
Area Ratio:	0.017
Sample Type:	(Unknown)



Perchlorate conf (100.8/85.2 amu)

RT (Exp. RT):	9.48 (9.56) min
Calculated conc:	0.0301 ng/ml
Area Ratio:	0.005
Sample Type:	(Unknown)



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Printed: 12/17/2016 2:17 PM

Data File	LM37783.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/17/2016 3:05:55 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

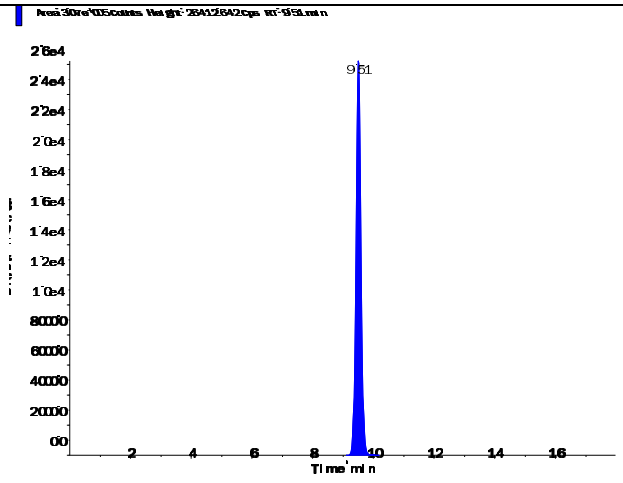
Sample Name	L16111326-04	**Injection Vial**	16.00
Data File	LM37783.wiff	**Injection Volume**	10.00
Acquisition Date	12/17/2016 3:05:55 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	L16111326-04	**Dilution Factor**	1.00
Sample Comment	1,1 (Hist)	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.070e+05	9.51	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	3.140e+04	9.52	N/A	0.301
Perchlorate conf	1.120e+04	9.50	N/A	0.311

O18LP (Internal Standard)

RT (Exp. RT): 9.51(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



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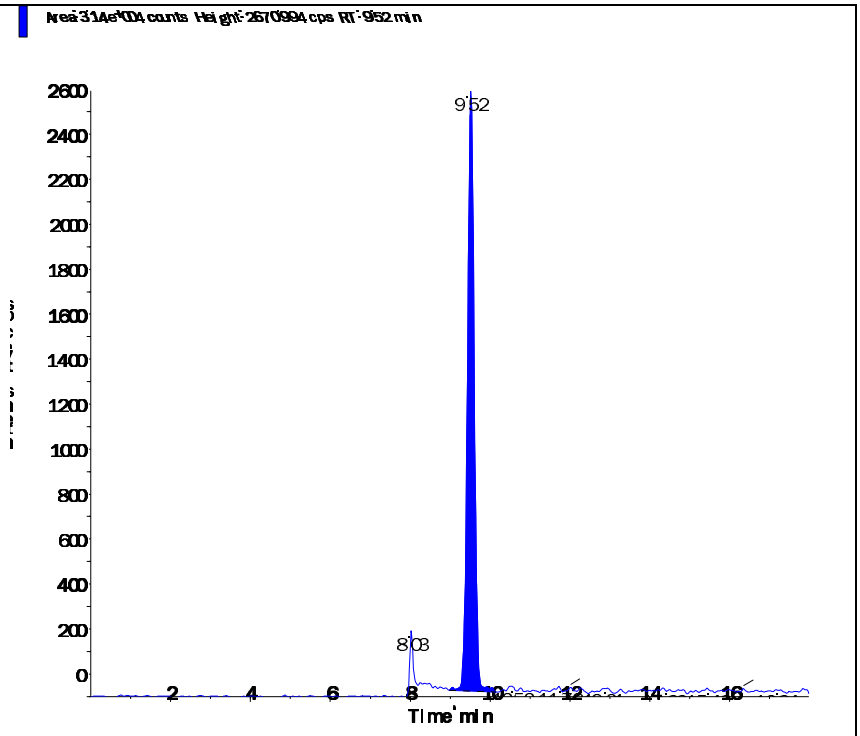
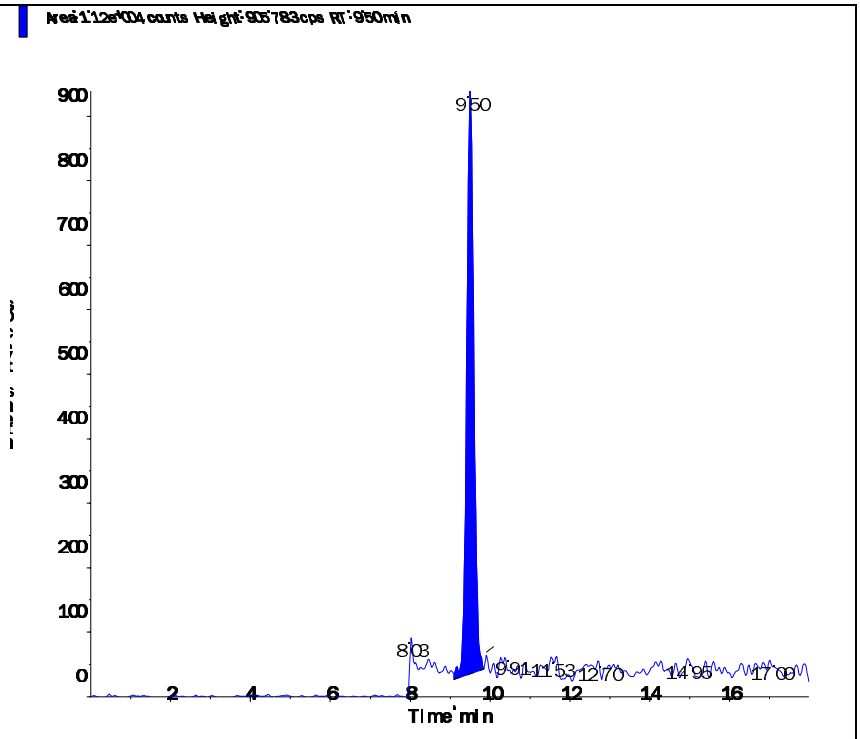
Perchlorate (98.8/83.3 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	 9.52 (9.56) min 0.301 ng/ml 0.102 (Unknown)



Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	 9.50 (9.56) min 0.311 ng/ml 0.037 (Unknown)



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Data File	LM37784.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/17/2016 3:24:51 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

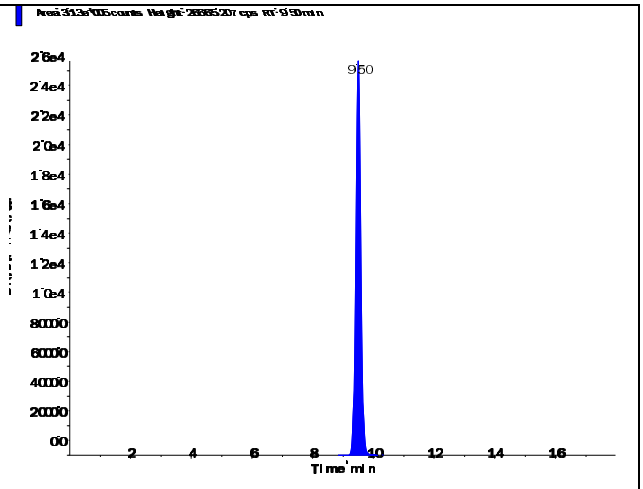
Sample Name	L16111326-05	**Injection Vial**	17.00
Data File	LM37784.wiff	**Injection Volume**	10.00
Acquisition Date	12/17/2016 3:24:51 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	L16111326-05	**Dilution Factor**	1.00
Sample Comment	1,1 (Hist)	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.130e+05	9.50	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	5.920e+04	9.52	N/A	0.563
Perchlorate conf	1.980e+04	9.50	N/A	0.549

O18LP (Internal Standard)

RT (Exp. RT): 9.50(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



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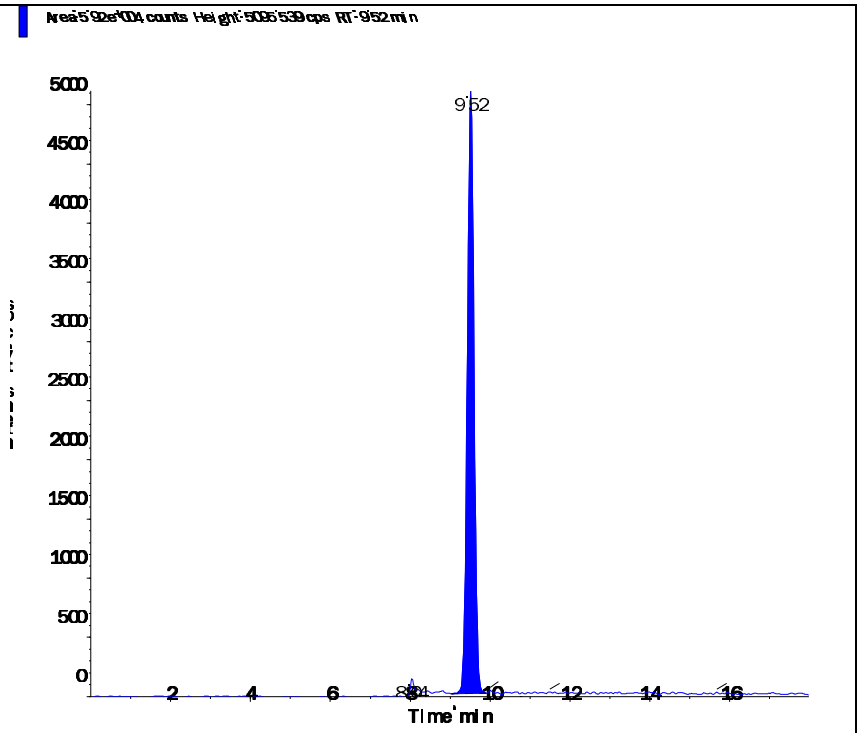
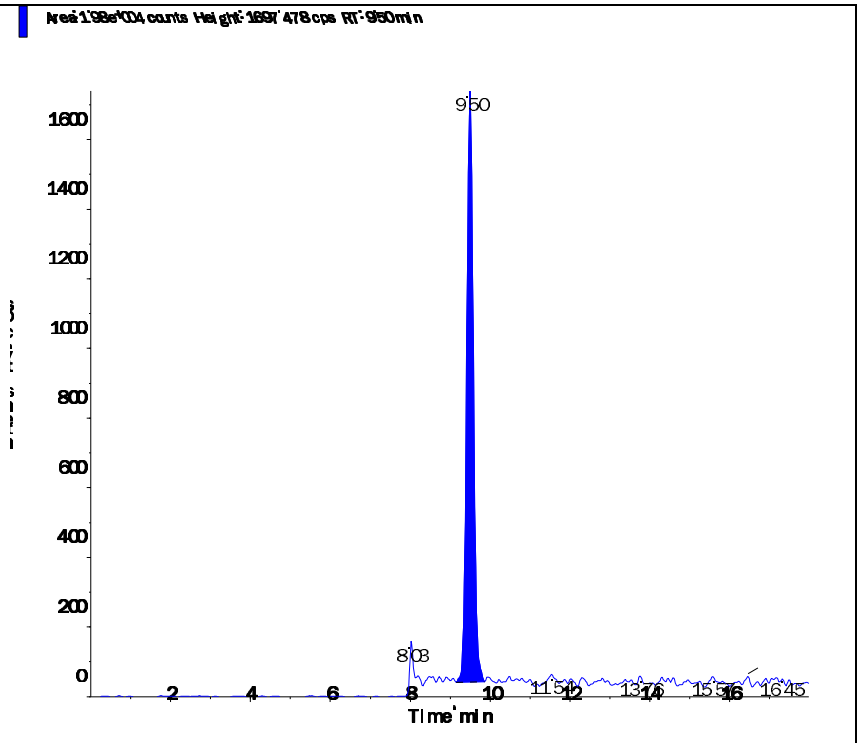
Printed: 12/17/2016 2:17 PM

Perchlorate (98.8/83.3 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	 9.52 (9.56) min 0.563 ng/ml 0.189 (Unknown)



Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	 9.50 (9.56) min 0.549 ng/ml 0.063 (Unknown)



2.1.1.4 Standards Data

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Data File	LM37765.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/16/2016 9:25:07 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

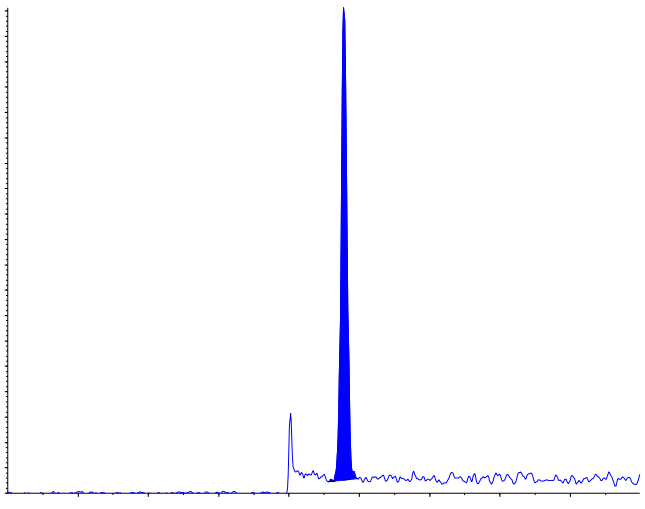
Sample Name	WG595346-01 CCB	**Injection Vial**	1.00
Data File	LM37765.wiff	**Injection Volume**	10.00
Acquisition Date	12/16/2016 9:25:07 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	WG595346-01	**Dilution Factor**	1.00
Sample Comment	11.00	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.090e+05	9.56	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	0.000e+00	0.00	N/A	No Peak
Perchlorate conf	0.000e+00	0.00	N/A	No Peak

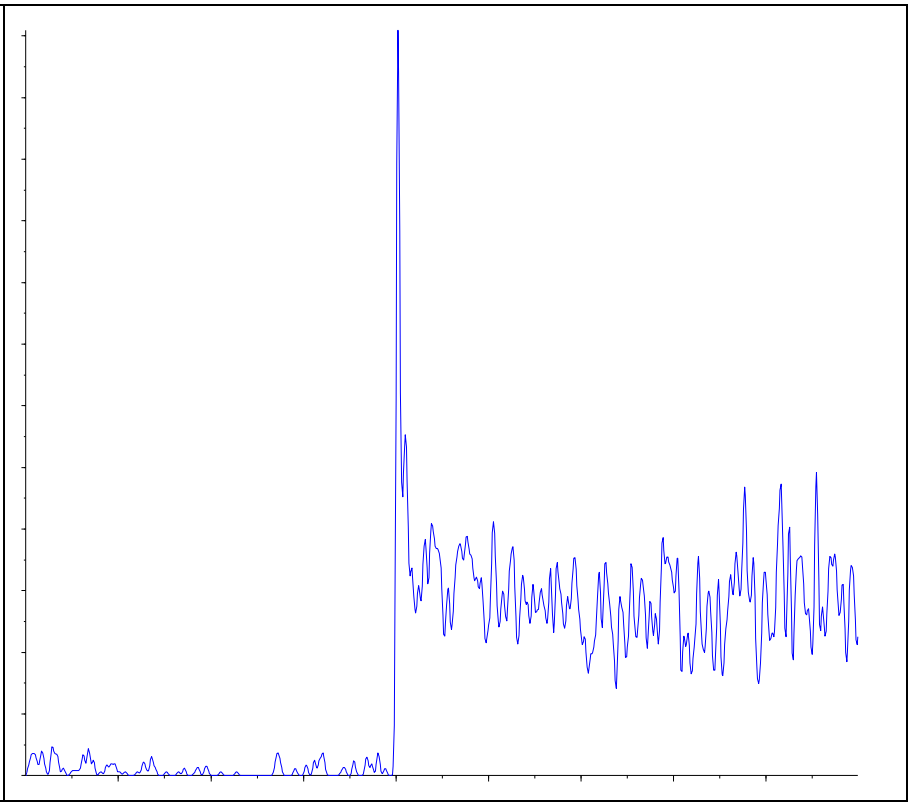
O18LP (Internal Standard)

RT (Exp. RT): 9.56(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



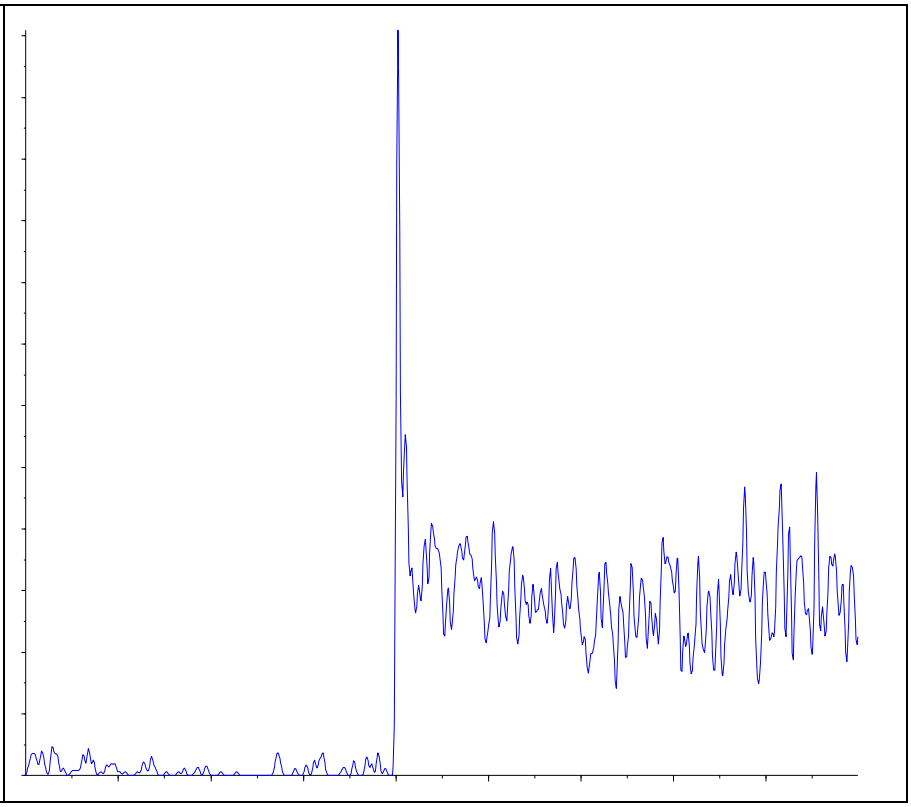
Perchlorate (98.8/83.3 amu)

RT (Exp. RT):	0.00 (9.56) min
Calculated conc:	No Peak ng/ml
Area Ratio:	0.00
Sample Type:	(Unknown)



Perchlorate conf (100.8/85.2 amu)

RT (Exp. RT):	0.00 (9.56) min
Calculated conc:	No Peak ng/ml
Area Ratio:	0.00
Sample Type:	(Unknown)



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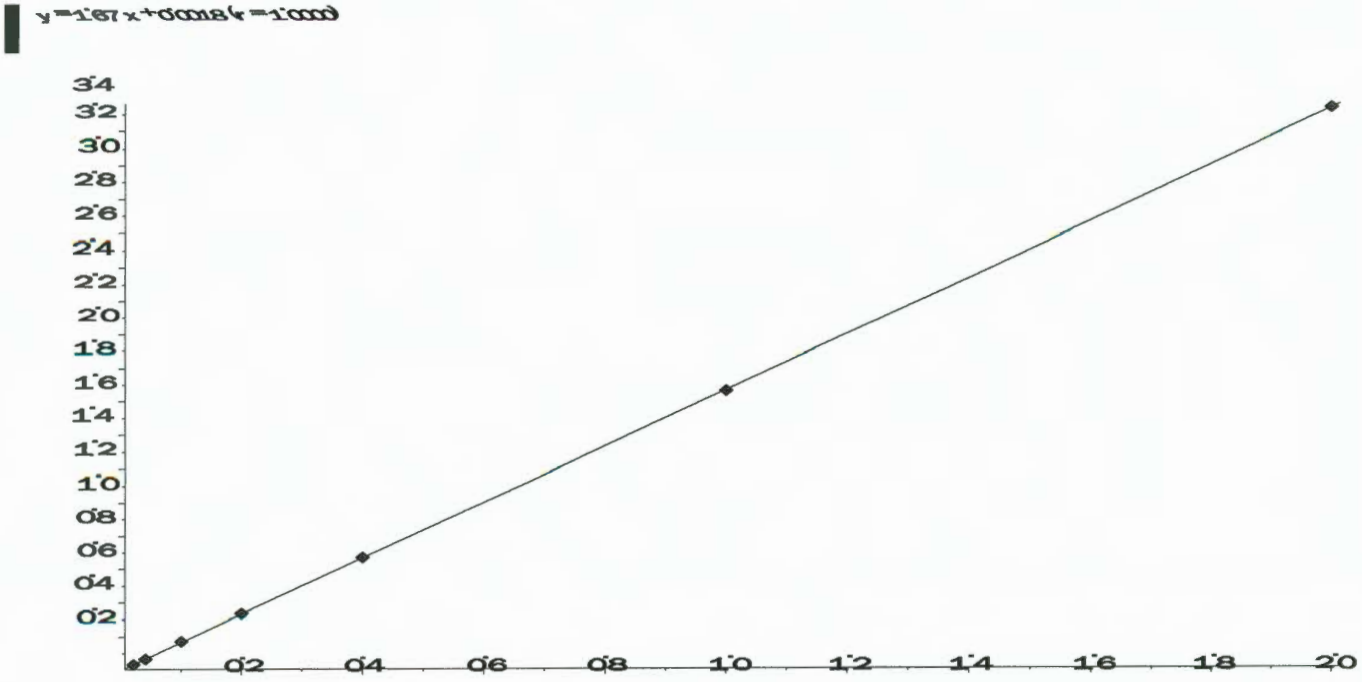
Analyte Name: **Perchlorate**
Internal Standard: O18LP

Data File	LM37765.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/16/2016 9:25:07 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

Regression Equation: y = 1.67 x + 0.0018 (r = 1.0000)

Expected Concentration	Number of Values	Mean Calculated Concentration	% Accuracy	Std. Deviation	%CV
0.10	1	0.10	98.3	N/A	N/A
0.20	1	0.20	98.8	N/A	N/A
0.50	1	0.51	102.5	N/A	N/A
1.00	1	1.01	100.5	N/A	N/A
2.00	1	2.00	100.2	N/A	N/A
5.00	1	4.98	99.6	N/A	N/A
10.00	1	10.00	100.0	N/A	N/A



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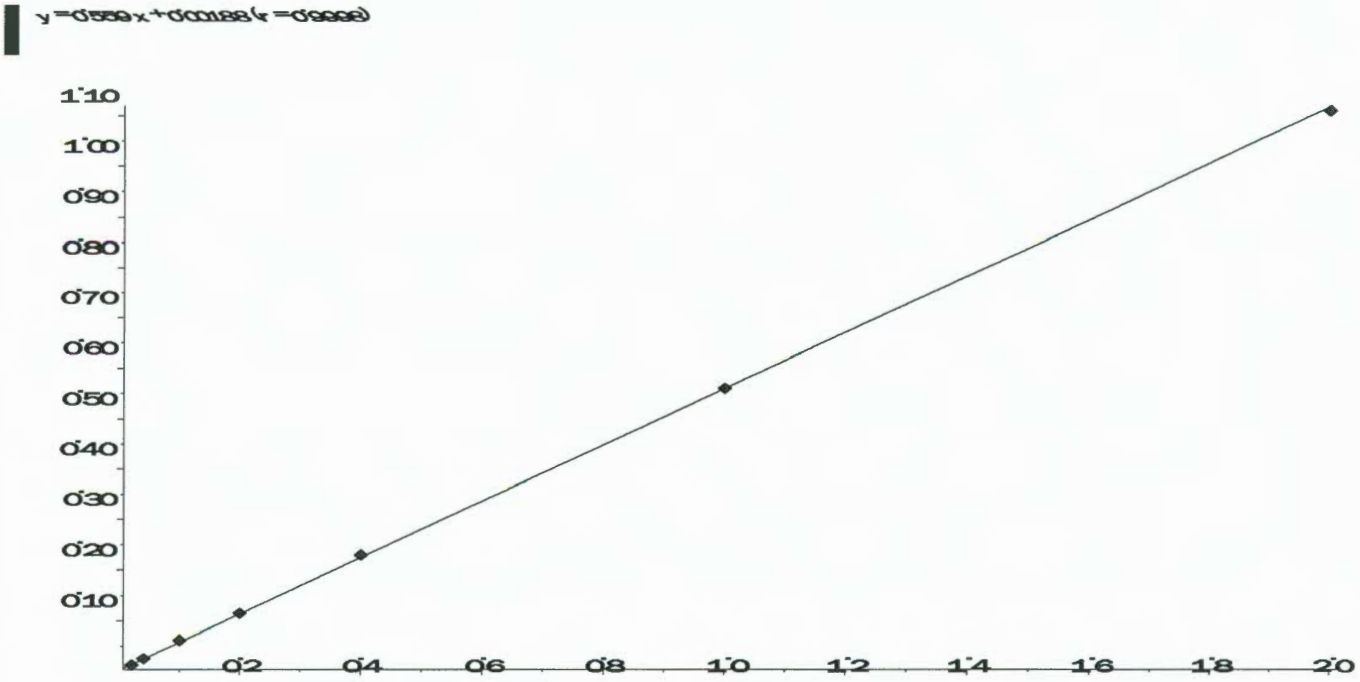
Created with Analyst Reporter
Printed: 12/17/2016 2:09 PM

Analyte Name: **Perchlorate conf**
Internal Standard: O18LP

Data File	LM37765.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/16/2016 9:25:07 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

Regression Equation: y = 0.559 x + 0.00188 (r = 0.9998)

Expected Concentration	Number of Values	Mean Calculated Concentration	% Accuracy	Std. Deviation	%CV
0.10	1	0.09	88.5	N/A	N/A
0.20	1	0.21	102.5	N/A	N/A
0.50	1	0.53	106.8	N/A	N/A
1.00	1	1.01	100.9	N/A	N/A
2.00	1	2.04	102.0	N/A	N/A
5.00	1	5.00	100.1	N/A	N/A
10.00	1	9.92	99.2	N/A	N/A



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Data File	LM37766.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/16/2016 9:44:02 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

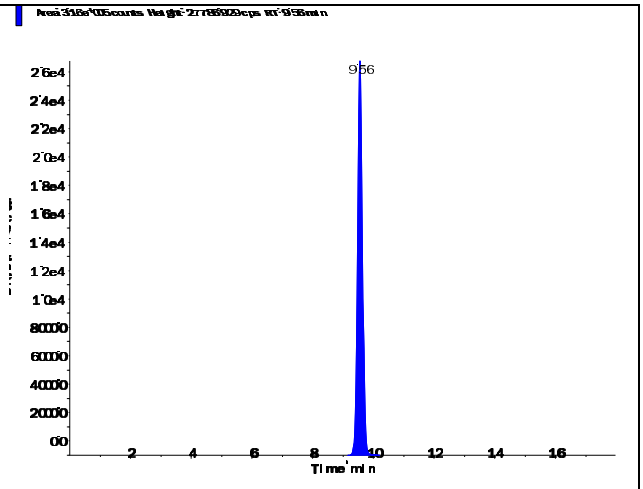
Sample Name	WG595346-02 STD (0.1 ug/L)	**Injection Vial**	2.00
Data File	LM37766.wiff	**Injection Volume**	10.00
Acquisition Date	12/16/2016 9:44:02 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Standard
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	WG595346-02	**Dilution Factor**	1.00
Sample Comment	1,1 STD78249	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.160e+05	9.56	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.090e+04	9.56	0.10	0.0983
Perchlorate conf	3.720e+03	9.55	0.10	0.0885

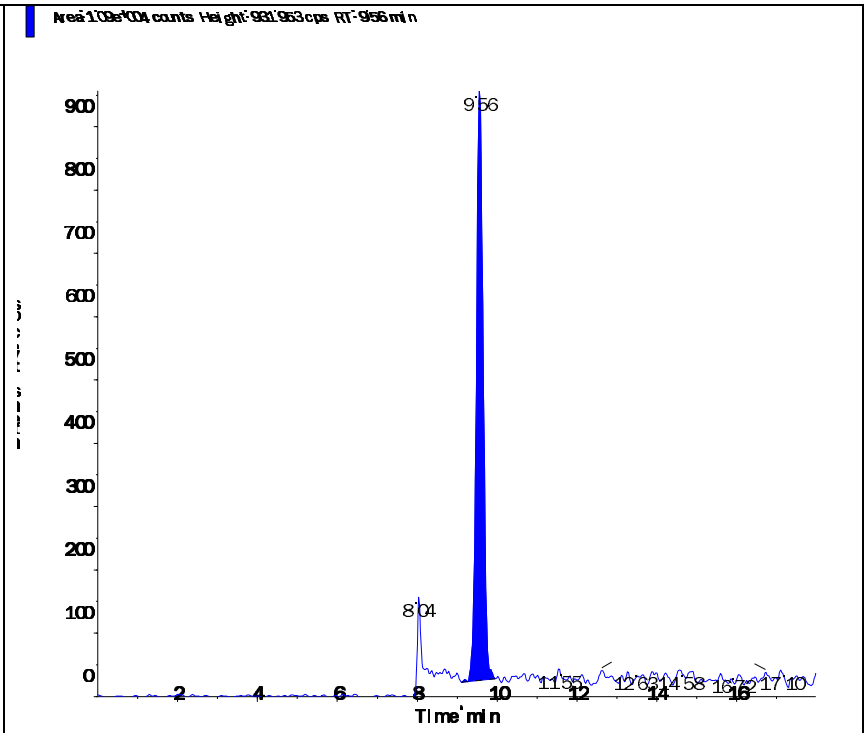
O18LP (Internal Standard)

RT (Exp. RT): 9.56(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Standard)



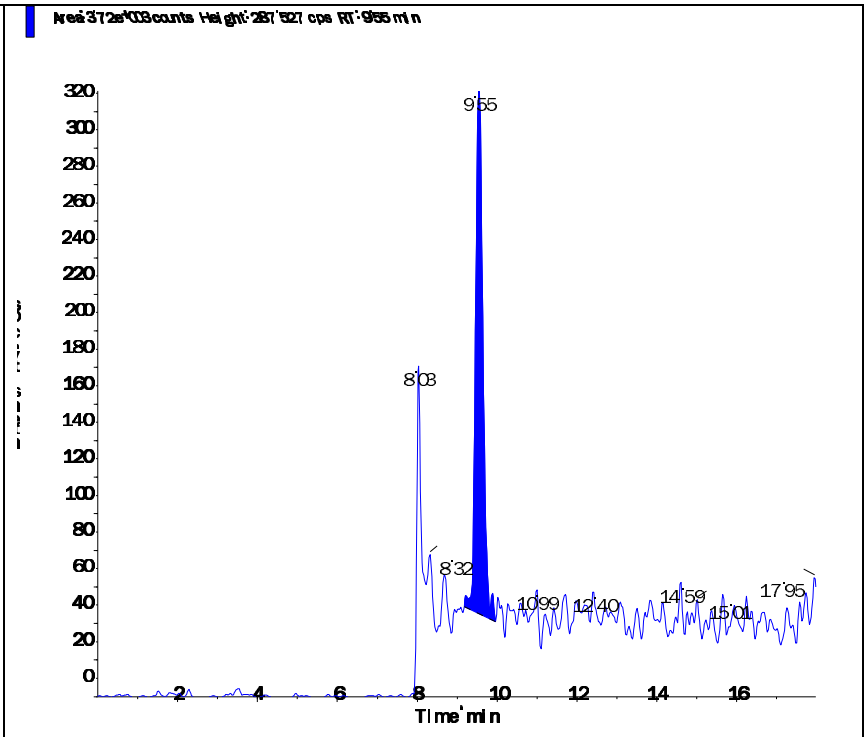
Perchlorate (98.8/83.3 amu)

RT (Exp. RT):	9.56 (9.56) min
Calculated conc:	0.0983 ng/ml
Area Ratio:	0.035
Sample Type:	(Standard)



Perchlorate conf (100.8/85.2 amu)

RT (Exp. RT):	9.55 (9.56) min
Calculated conc:	0.0885 ng/ml
Area Ratio:	0.012
Sample Type:	(Standard)



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Data File	LM37767.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/16/2016 10:02:59 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

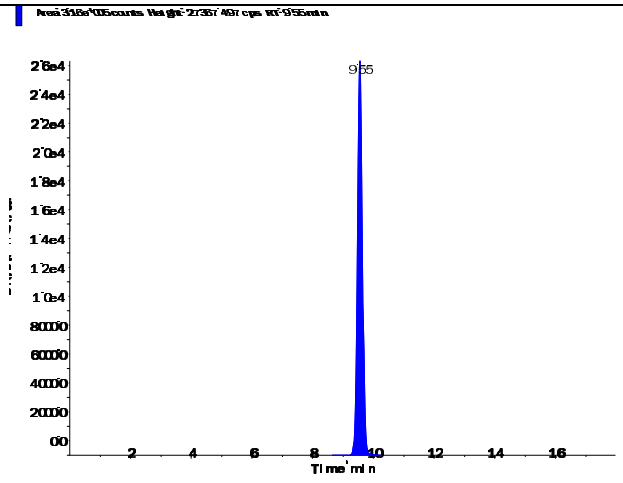
Sample Name	WG595346-03 STD (0.2 ug/L)	**Injection Vial**	3.00
Data File	LM37767.wiff	**Injection Volume**	10.00
Acquisition Date	12/16/2016 10:02:59 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Standard
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	WG595346-03	**Dilution Factor**	1.00
Sample Comment	1,1 STD78249	**Weight to Volume**	0.00

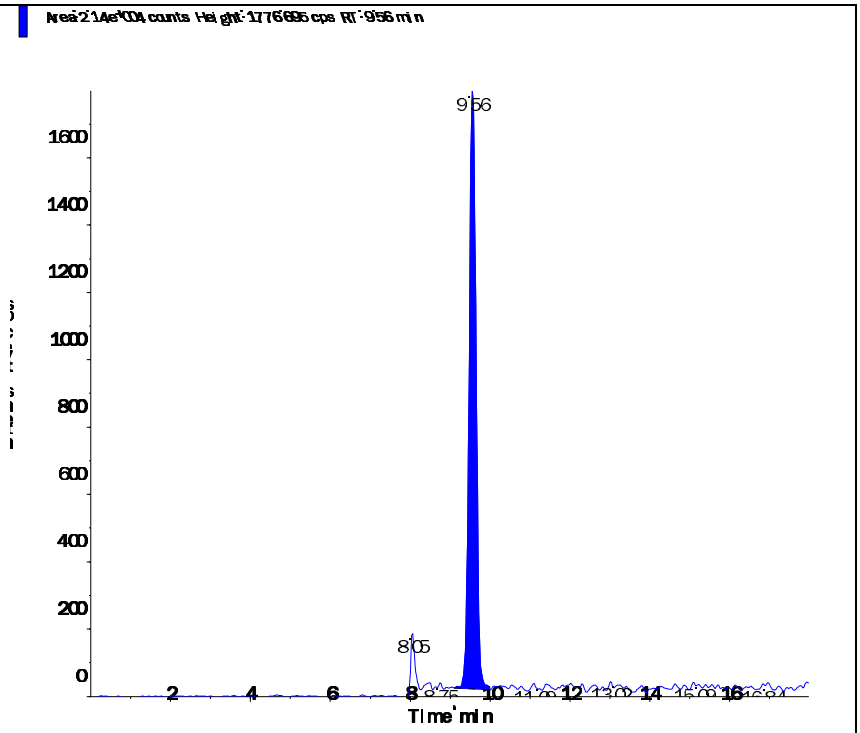
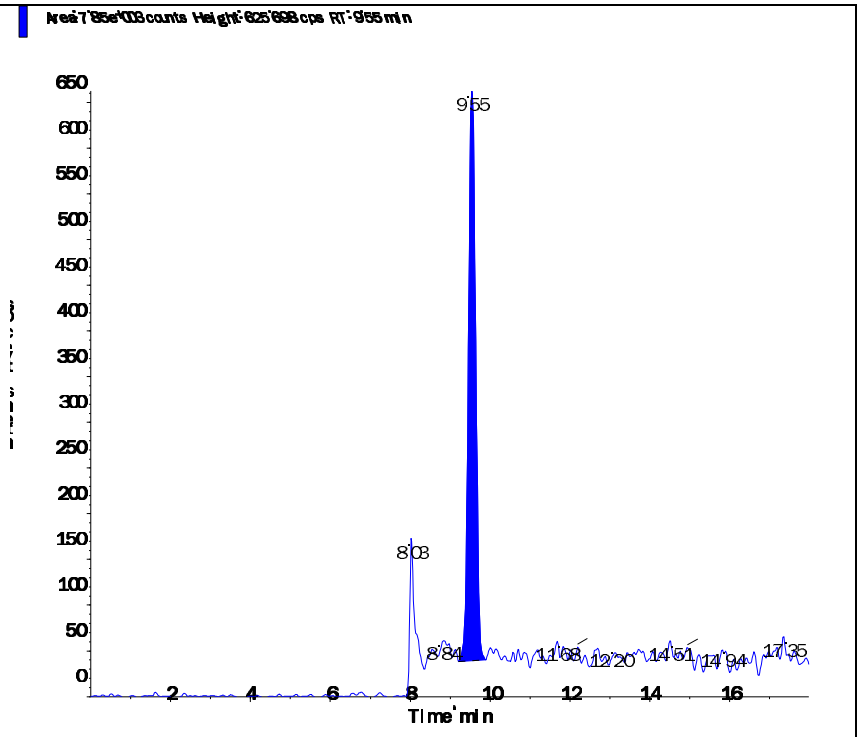
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.160e+05	9.55	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	2.140e+04	9.56	0.20	0.198
Perchlorate conf	7.850e+03	9.55	0.20	0.205

O18LP (Internal Standard)

RT (Exp. RT): 9.55(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Standard)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.56 (9.56) min Calculated conc: 0.198 ng/ml Area Ratio: 0.068 Sample Type: (Standard)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.55 (9.56) min Calculated conc: 0.205 ng/ml Area Ratio: 0.025 Sample Type: (Standard)	

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Data File	LM37768.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/16/2016 10:21:55 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

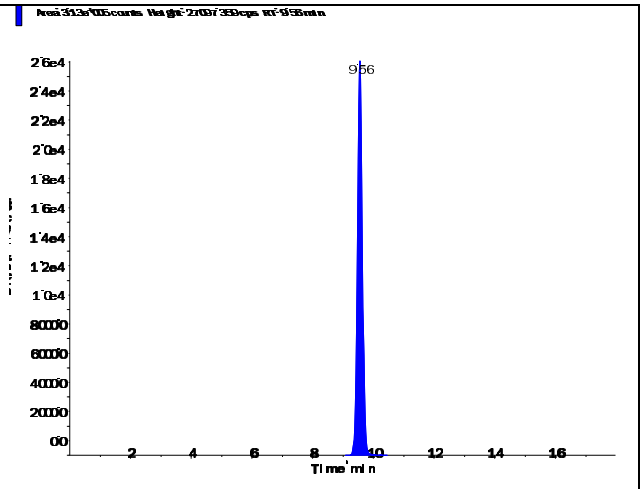
Sample Name	WG595346-04 STD (0.5 ug/L)	**Injection Vial**	4.00
Data File	LM37768.wiff	**Injection Volume**	10.00
Acquisition Date	12/16/2016 10:21:55 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Standard
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	WG595346-04	**Dilution Factor**	1.00
Sample Comment	1,1 STD78249	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.130e+05	9.56	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	5.410e+04	9.57	0.50	0.513
Perchlorate conf	1.930e+04	9.55	0.50	0.534

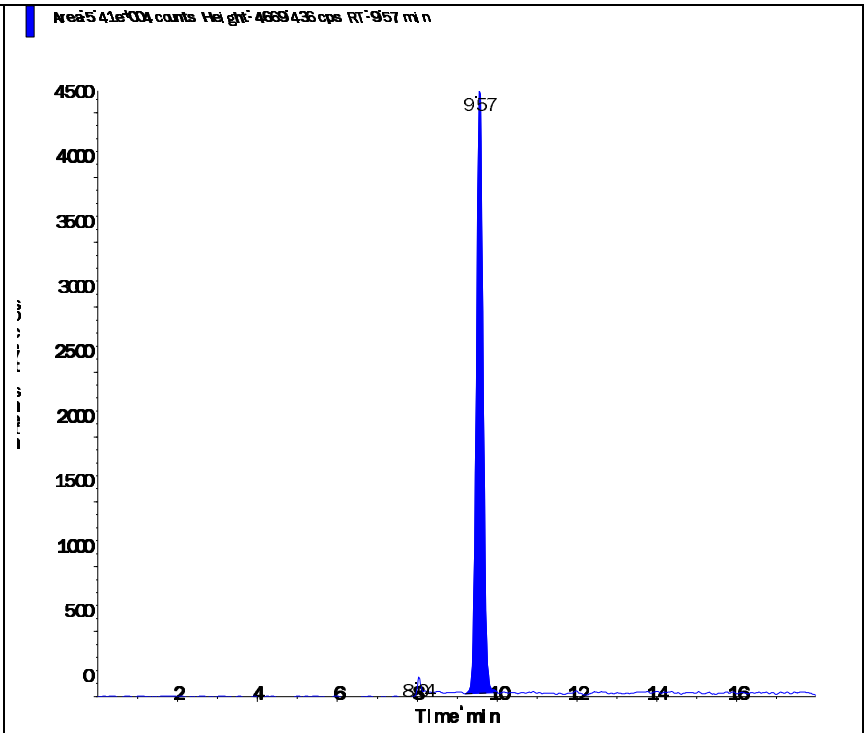
O18LP (Internal Standard)

RT (Exp. RT): 9.56(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Standard)



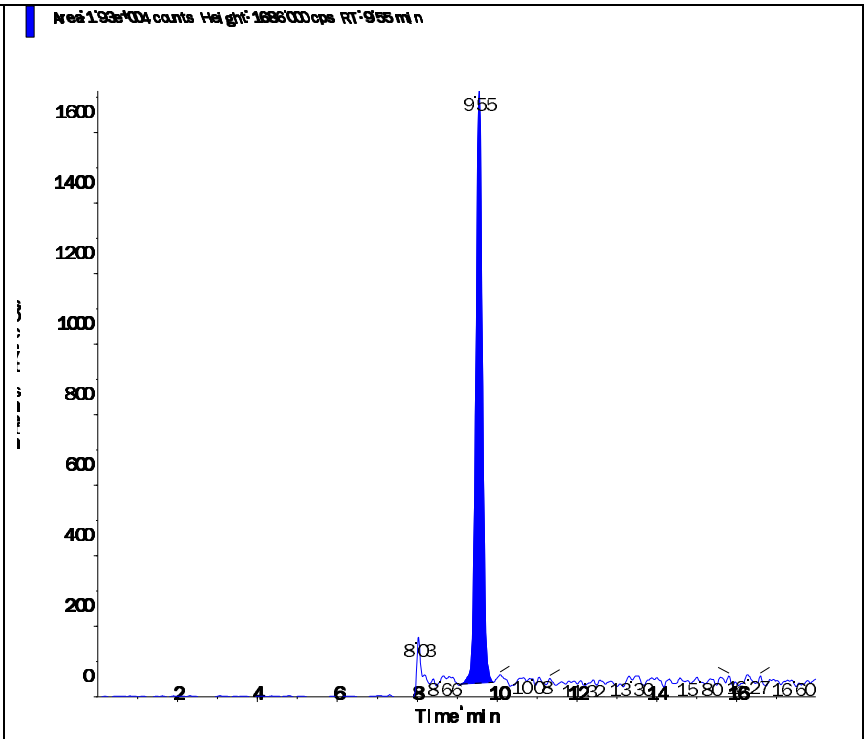
Perchlorate (98.8/83.3 amu)

RT (Exp. RT):	9.57 (9.56) min
Calculated conc:	0.513 ng/ml
Area Ratio:	0.173
Sample Type:	(Standard)



Perchlorate conf (100.8/85.2 amu)

RT (Exp. RT):	9.55 (9.56) min
Calculated conc:	0.534 ng/ml
Area Ratio:	0.062
Sample Type:	(Standard)



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Data File	LM37769.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/16/2016 10:40:50 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

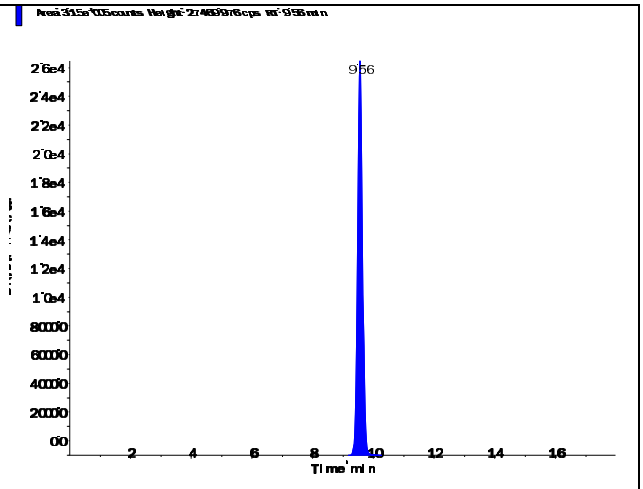
Sample Name	WG595346-05 STD (1.0 ug/L)	**Injection Vial**	5.00
Data File	LM37769.wiff	**Injection Volume**	10.00
Acquisition Date	12/16/2016 10:40:50 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Standard
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	WG595346-05	**Dilution Factor**	1.00
Sample Comment	1,1 STD78249	**Weight to Volume**	0.00

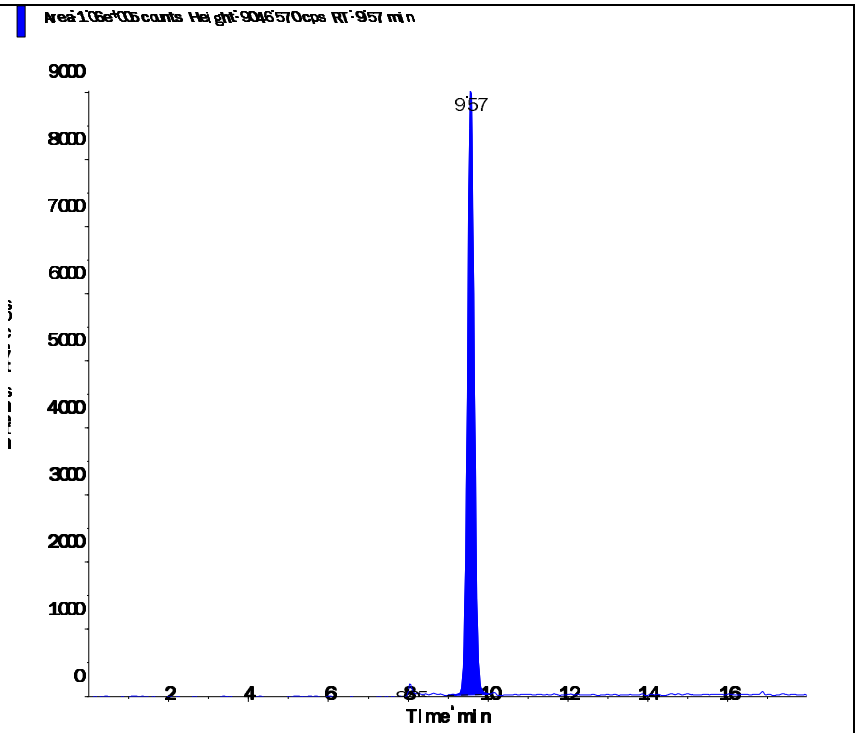
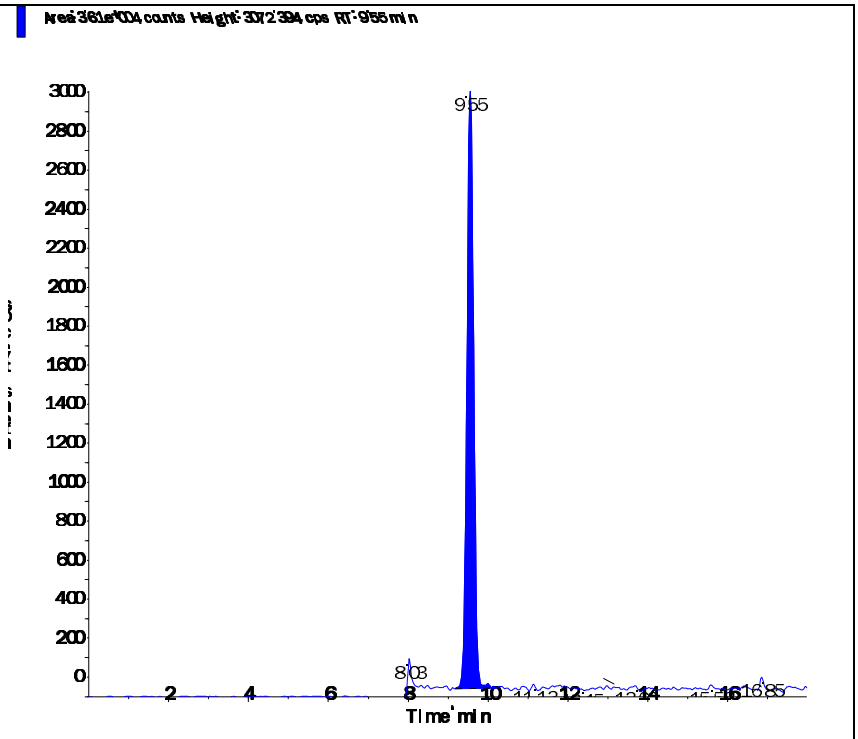
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.150e+05	9.56	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.060e+05	9.57	1.00	1.01
Perchlorate conf	3.610e+04	9.55	1.00	1.01

O18LP (Internal Standard)

RT (Exp. RT): 9.56(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Standard)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.57 (9.56) min Calculated conc: 1.01 ng/ml Area Ratio: 0.337 Sample Type: (Standard)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.55 (9.56) min Calculated conc: 1.01 ng/ml Area Ratio: 0.115 Sample Type: (Standard)	

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Data File	LM37770.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/16/2016 10:59:46 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

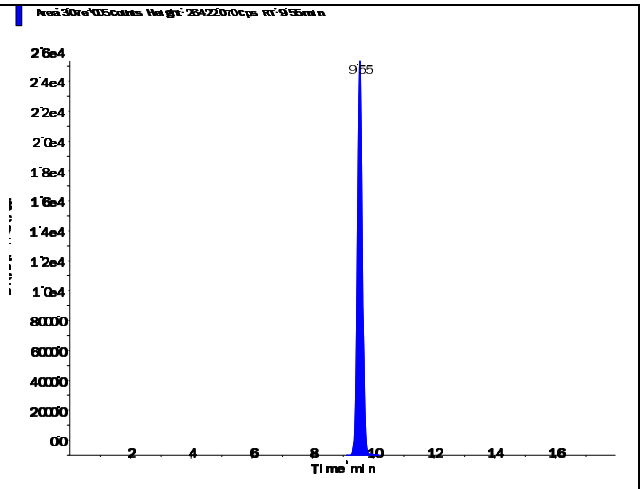
Sample Name	WG595346-06 STD (2.0 ug/L)	**Injection Vial**	6.00
Data File	LM37770.wiff	**Injection Volume**	10.00
Acquisition Date	12/16/2016 10:59:46 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Standard
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	WG595346-06	**Dilution Factor**	1.00
Sample Comment	1,1 STD78249	**Weight to Volume**	0.00

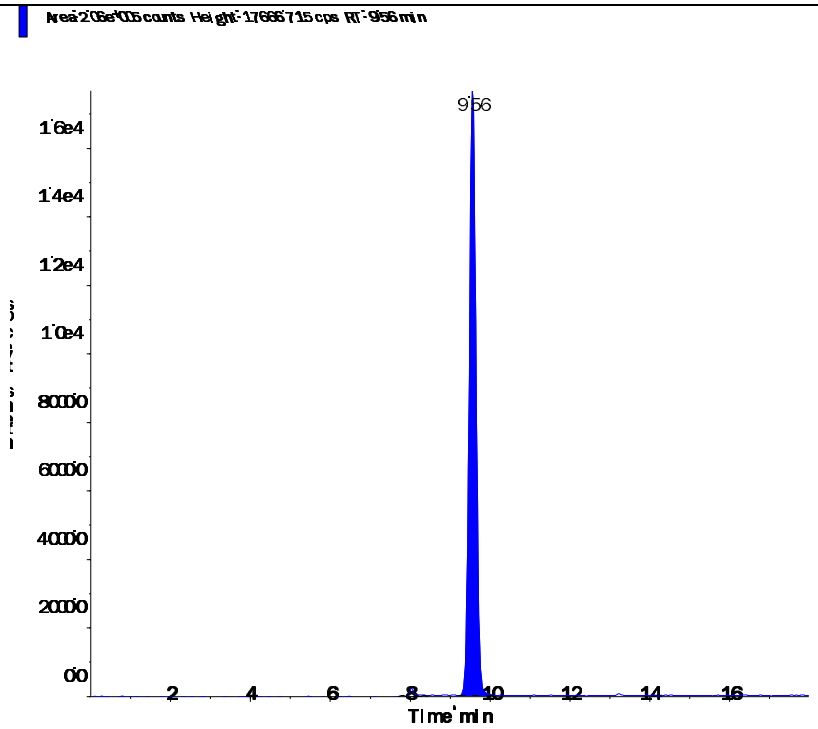
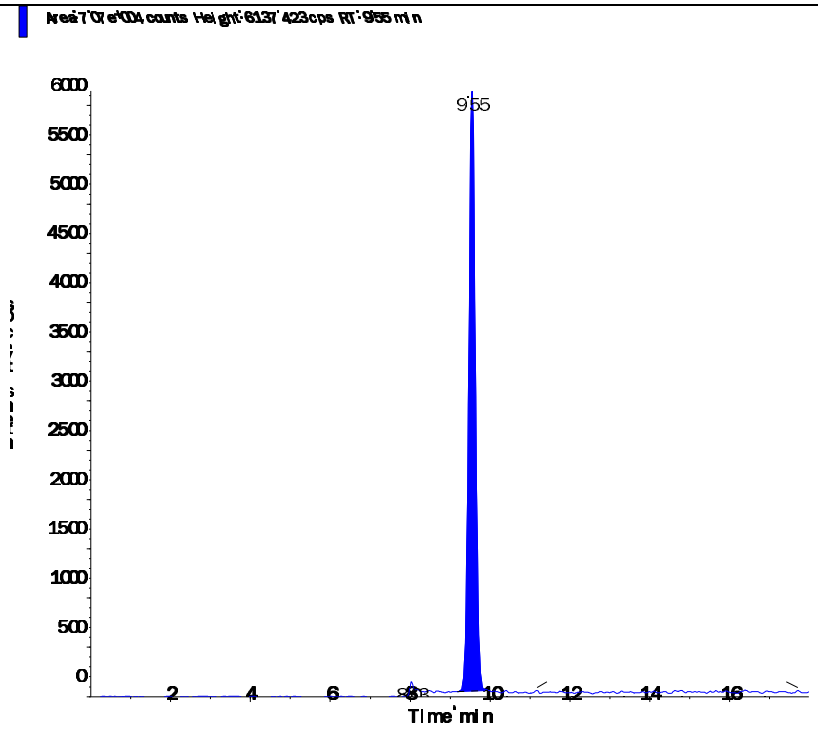
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.070e+05	9.55	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	2.060e+05	9.56	2.00	2.00
Perchlorate conf	7.070e+04	9.55	2.00	2.04

O18LP (Internal Standard)

RT (Exp. RT): 9.55(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Standard)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.56 (9.56) min Calculated conc: 2.00 ng/ml Area Ratio: 0.67 Sample Type: (Standard)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.55 (9.56) min Calculated conc: 2.04 ng/ml Area Ratio: 0.23 Sample Type: (Standard)	

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Data File	LM37771.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/16/2016 11:18:41 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

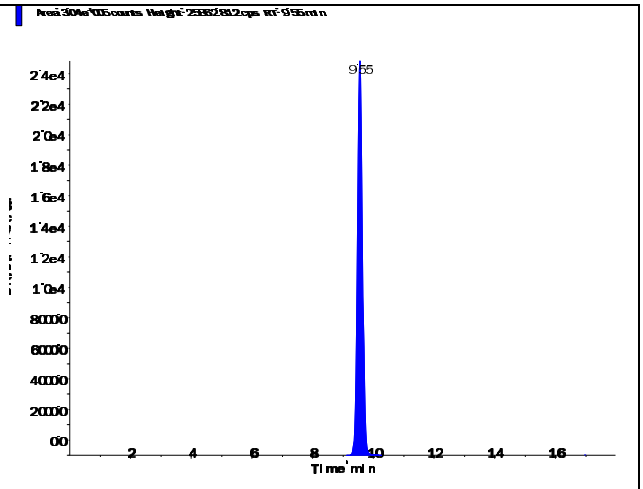
Sample Name	WG595346-07 STD (5.0 ug/L)	**Injection Vial**	7.00
Data File	LM37771.wiff	**Injection Volume**	10.00
Acquisition Date	12/16/2016 11:18:41 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Standard
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	WG595346-07	**Dilution Factor**	1.00
Sample Comment	1,1 STD78249	**Weight to Volume**	0.00

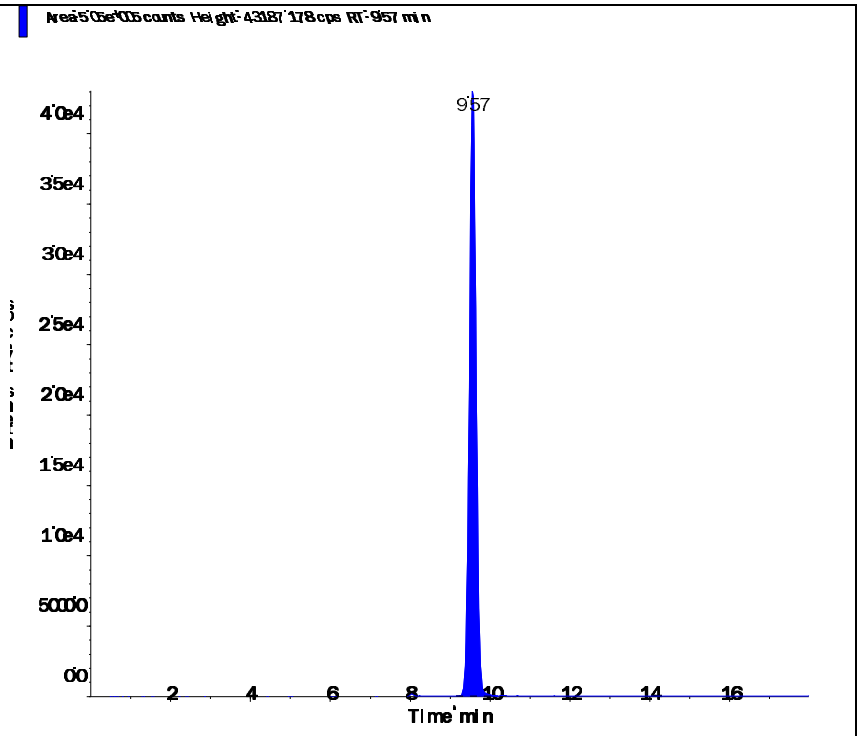
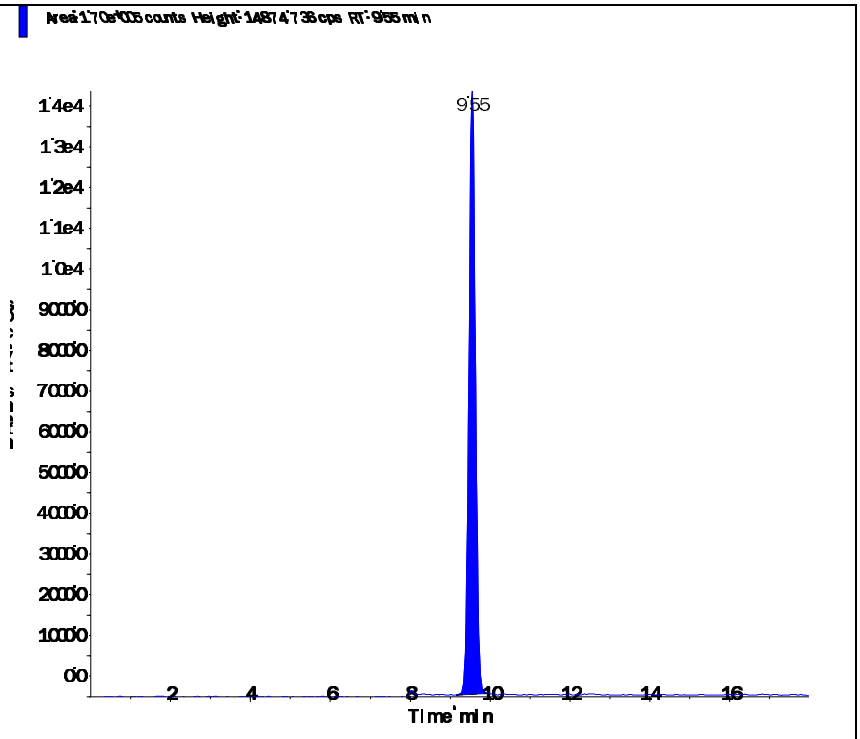
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.040e+05	9.55	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	5.050e+05	9.57	5.00	4.98
Perchlorate conf	1.700e+05	9.55	5.00	5.00

O18LP (Internal Standard)

RT (Exp. RT): 9.55(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Standard)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.57 (9.56) min Calculated conc: 4.98 ng/ml Area Ratio: 1.663 Sample Type: (Standard)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.55 (9.56) min Calculated conc: 5.00 ng/ml Area Ratio: 0.561 Sample Type: (Standard)	

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Data File	LM37772.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/16/2016 11:37:36 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

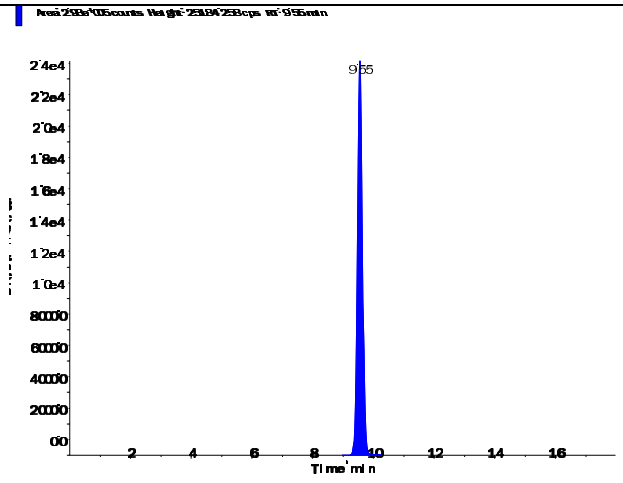
Sample Name	WG595346-08 STD (10 ug/L)	**Injection Vial**	8.00
Data File	LM37772.wiff	**Injection Volume**	10.00
Acquisition Date	12/16/2016 11:37:36 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Standard
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	WG595346-08	**Dilution Factor**	1.00
Sample Comment	1,1 STD78249	**Weight to Volume**	0.00

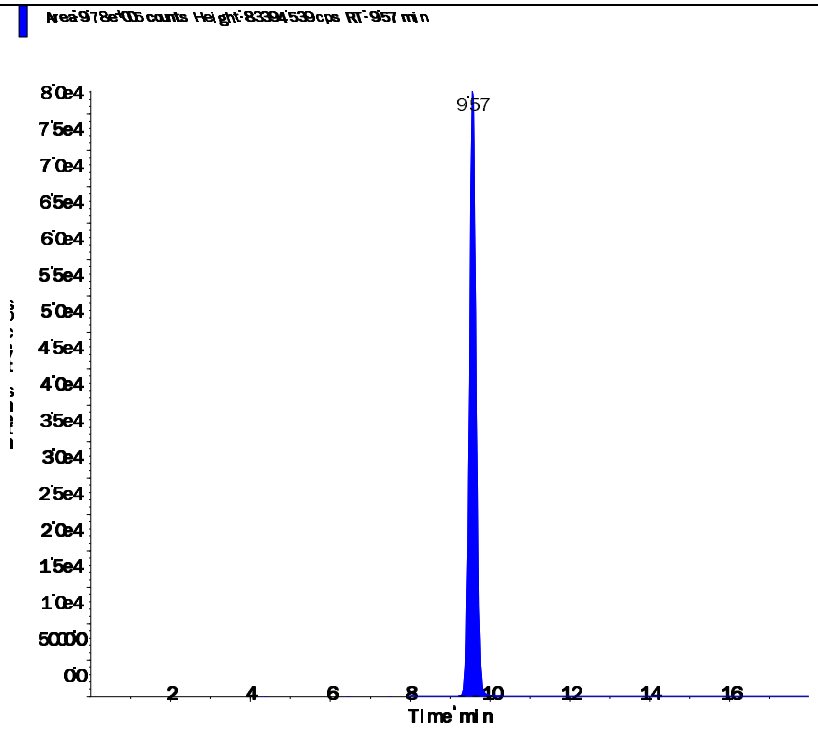
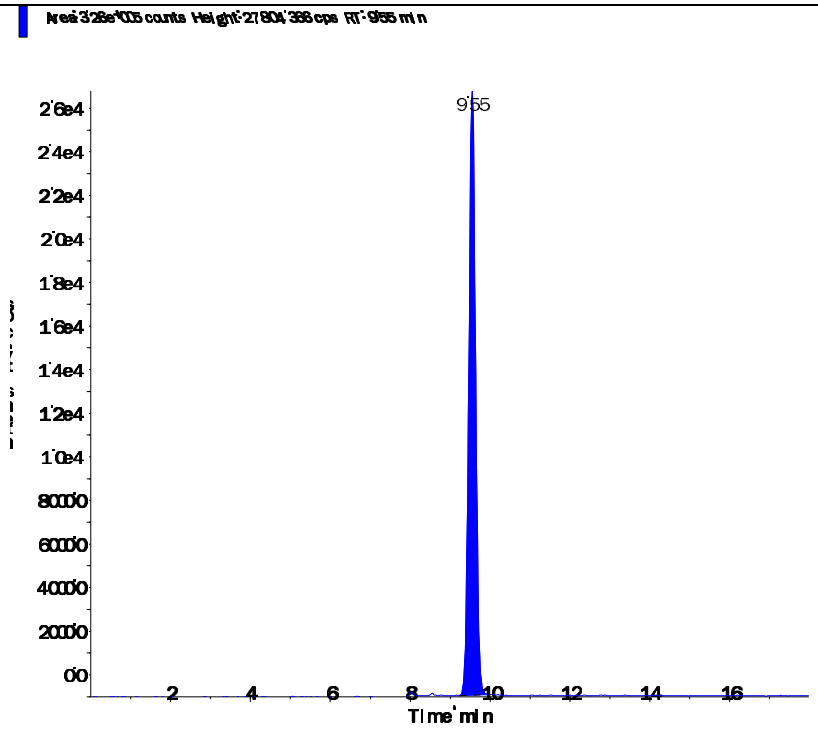
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	2.930e+05	9.55	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	9.780e+05	9.57	10.00	10.00
Perchlorate conf	3.260e+05	9.55	10.00	9.92

O18LP (Internal Standard)

RT (Exp. RT): 9.55(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Standard)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.57 (9.56) min Calculated conc: 10.00 ng/ml Area Ratio: 3.336 Sample Type: (Standard)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.55 (9.56) min Calculated conc: 9.92 ng/ml Area Ratio: 1.111 Sample Type: (Standard)	

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Data File	LM37773.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/16/2016 11:56:32 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

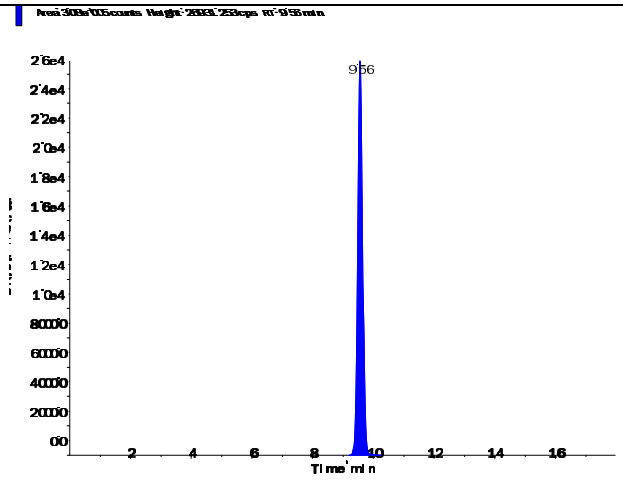
Sample Name	WG595346-09 SSCV (1.0 ug/L)	**Injection Vial**	9.00
Data File	LM37773.wiff	**Injection Volume**	10.00
Acquisition Date	12/16/2016 11:56:32 PM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Quality Control
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	WG595346-09	**Dilution Factor**	1.00
Sample Comment	1,1 STD78251	**Weight to Volume**	0.00

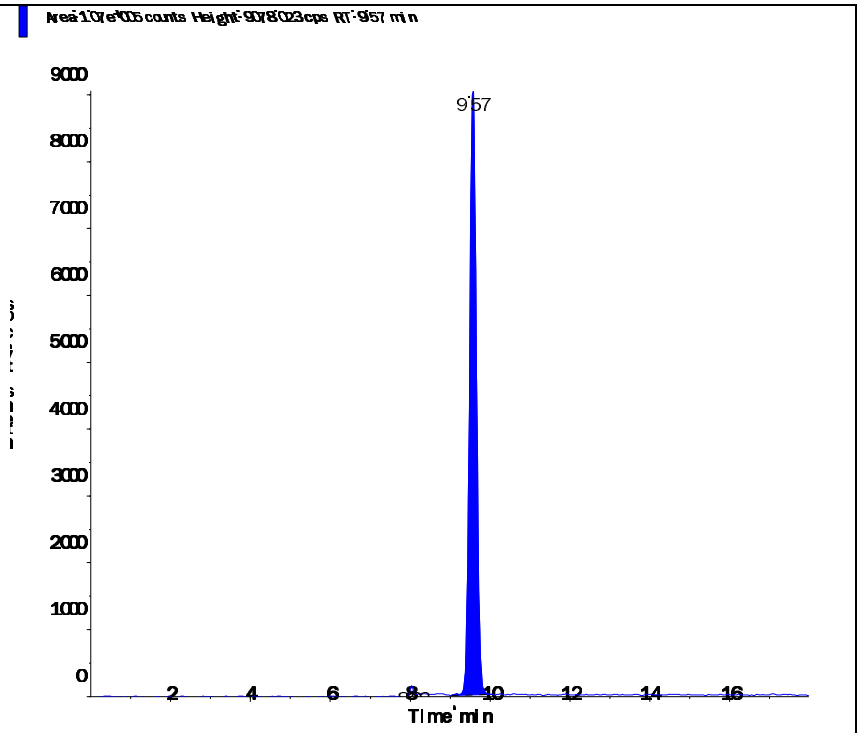
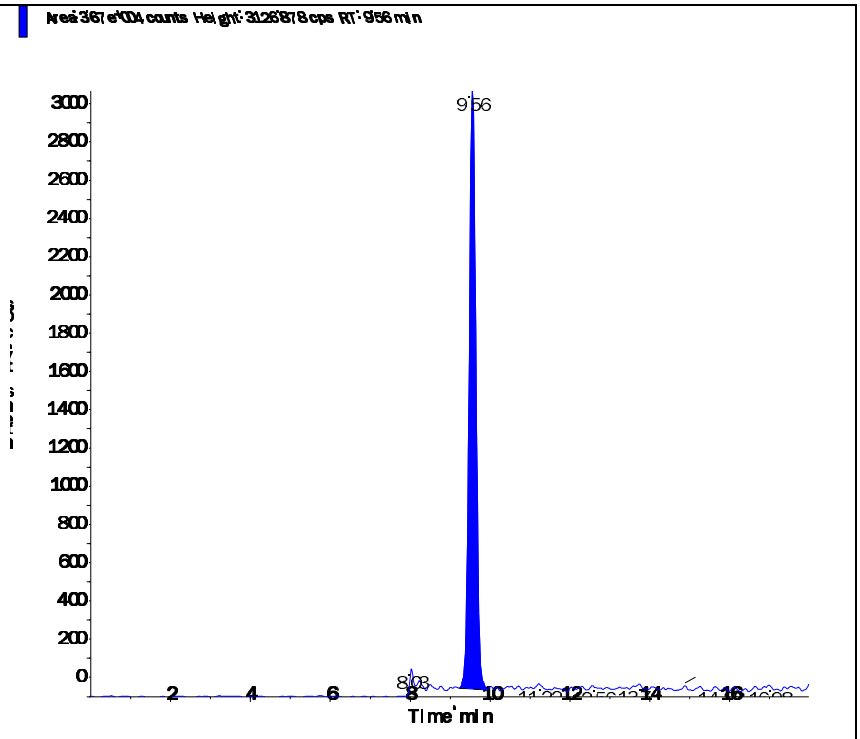
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.080e+05	9.56	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.070e+05	9.57	1.00	1.04
Perchlorate conf	3.670e+04	9.56	1.00	1.05

O18LP (Internal Standard)

RT (Exp. RT): 9.56(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Quality Control)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.57 (9.56) min Calculated conc: 1.04 ng/ml Area Ratio: 0.348 Sample Type: (Quality Control)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.56 (9.56) min Calculated conc: 1.05 ng/ml Area Ratio: 0.119 Sample Type: (Quality Control)	

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Data File	LM37775.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/17/2016 12:34:25 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

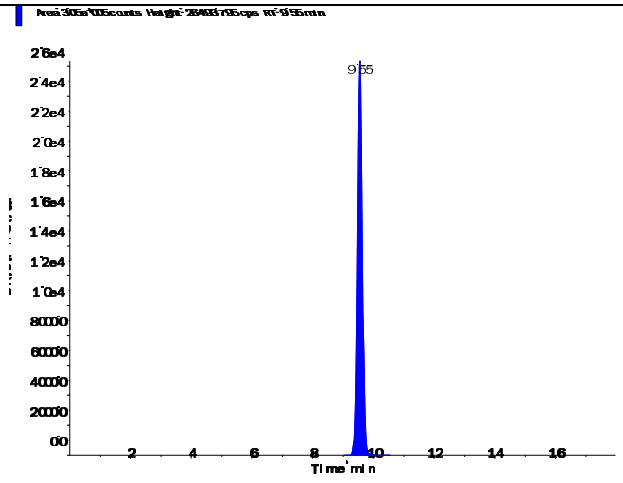
Sample Name	WG595142-02 CCV (1.0ug/L)	**Injection Vial**	5.00
Data File	LM37775.wiff	**Injection Volume**	10.00
Acquisition Date	12/17/2016 12:34:25 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Quality Control
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	WG595142-02	**Dilution Factor**	1.00
Sample Comment	1,1 STD78249	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.050e+05	9.55	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.000e+05	9.56	1.00	0.981
Perchlorate conf	3.340e+04	9.55	1.00	0.964

O18LP (Internal Standard)

RT (Exp. RT): 9.55(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Quality Control)



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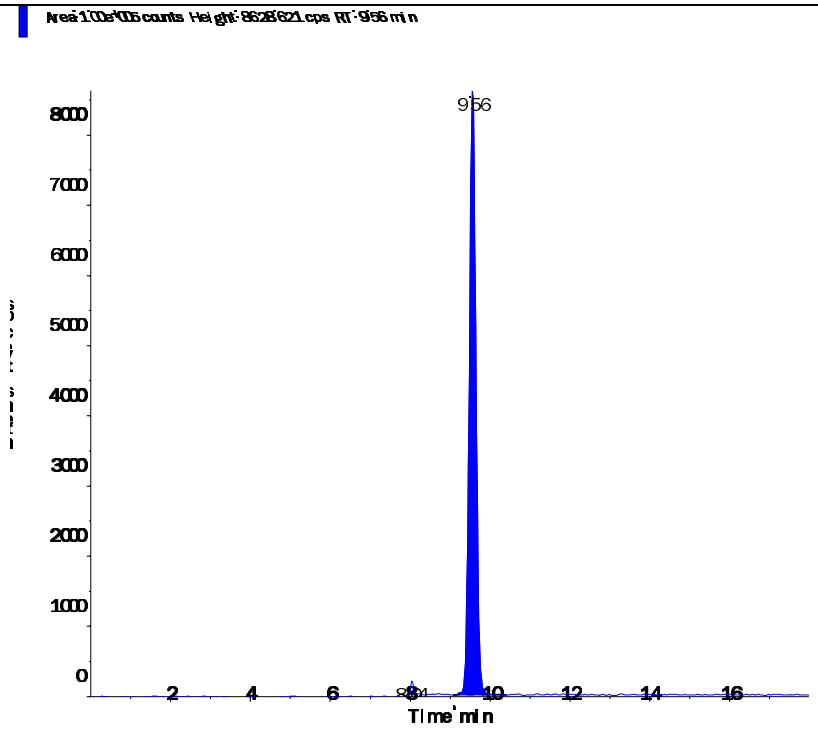
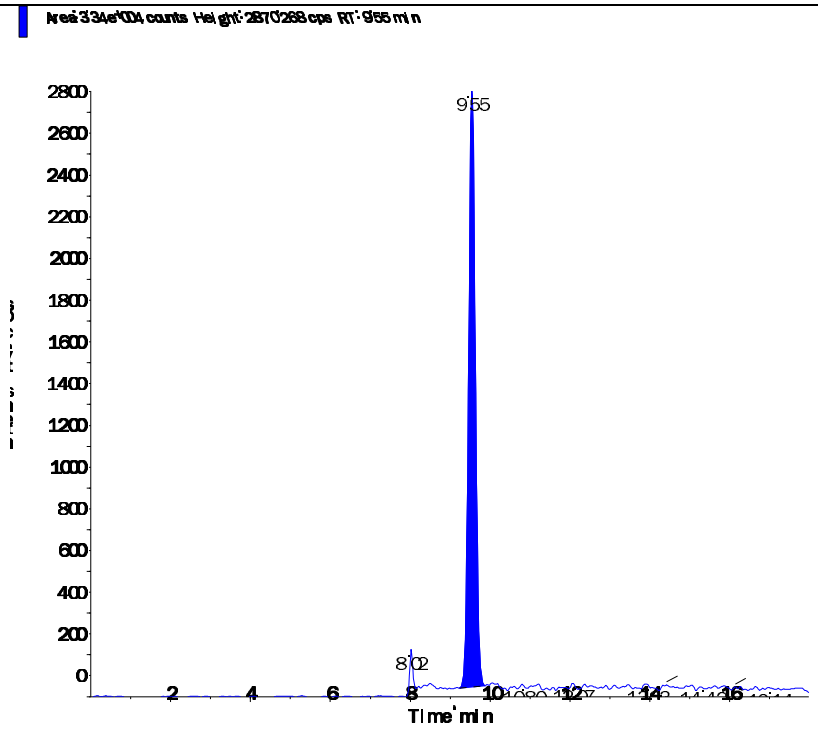
Printed: 12/17/2016 2:15 PM

Perchlorate (98.8/83.3 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	 9.56 (9.56) min 0.981 ng/ml 0.329 (Quality Control)



Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): Calculated conc: Area Ratio: Sample Type:	 9.55 (9.56) min 0.964 ng/ml 0.11 (Quality Control)



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Printed: 12/17/2016 2:19 PM

Data File	LM37787.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/17/2016 4:21:40 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

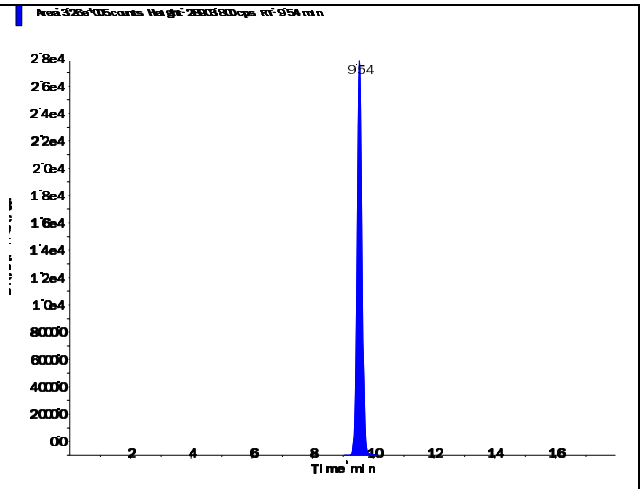
Sample Name	WG595142-03 CCV (1.0ug/L)	**Injection Vial**	5.00
Data File	LM37787.wiff	**Injection Volume**	10.00
Acquisition Date	12/17/2016 4:21:40 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Quality Control
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	WG595142-03	**Dilution Factor**	1.00
Sample Comment	1,1 STD78249	**Weight to Volume**	0.00

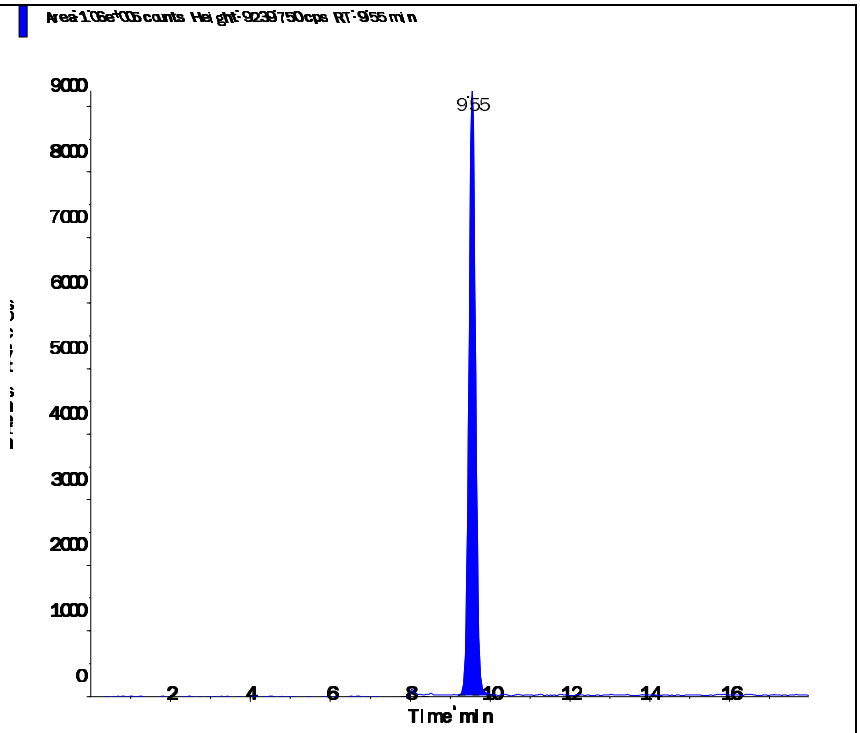
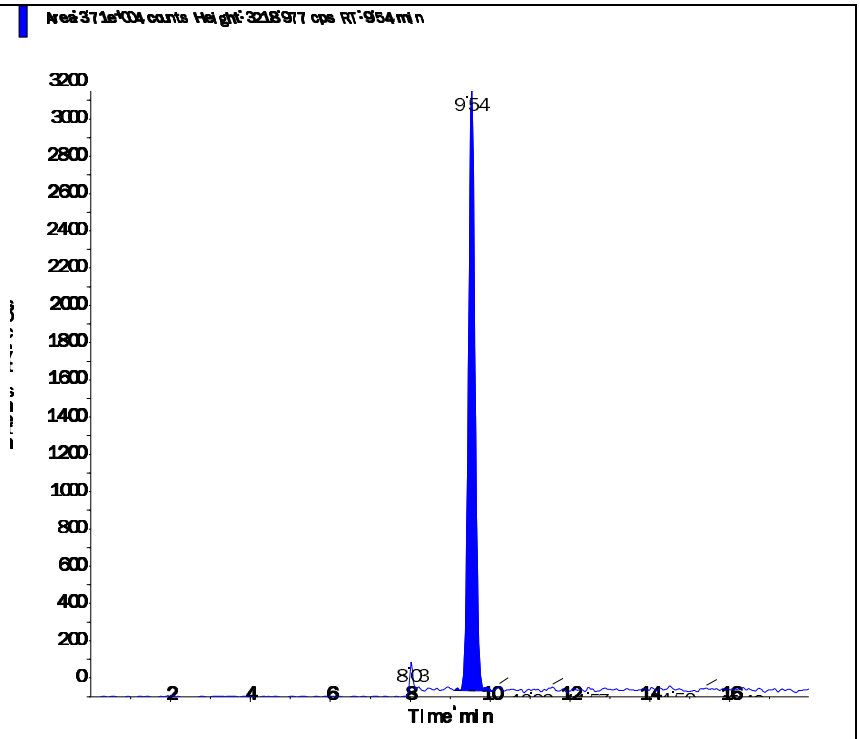
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.260e+05	9.54	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.060e+05	9.55	1.00	0.97
Perchlorate conf	3.710e+04	9.54	1.00	1.00

O18LP (Internal Standard)

RT (Exp. RT): 9.54(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Quality Control)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.55 (9.56) min Calculated conc: 0.97 ng/ml Area Ratio: 0.325 Sample Type: (Quality Control)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.54 (9.56) min Calculated conc: 1.00 ng/ml Area Ratio: 0.114 Sample Type: (Quality Control)	

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Data File	LM37796.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/17/2016 7:12:04 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

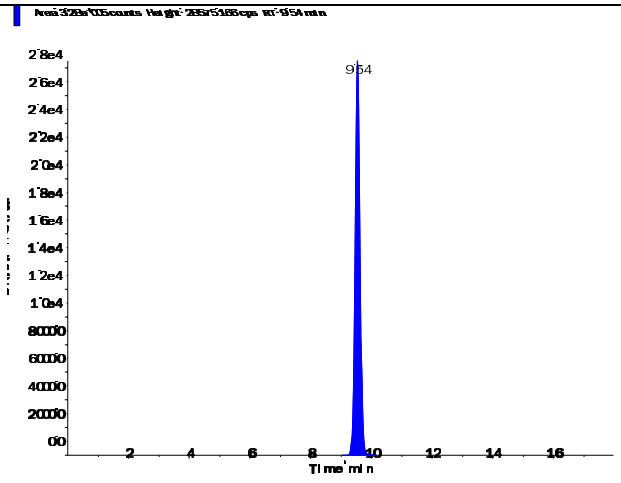
Sample Name	WG595142-05 CCV (1.0ug/L)	**Injection Vial**	5.00
Data File	LM37796.wiff	**Injection Volume**	10.00
Acquisition Date	12/17/2016 7:12:04 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Quality Control
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	WG595142-05	**Dilution Factor**	1.00
Sample Comment	1,1 STD78249	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.280e+05	9.54	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	1.090e+05	9.56	1.00	0.996
Perchlorate conf	3.770e+04	9.54	1.00	1.01

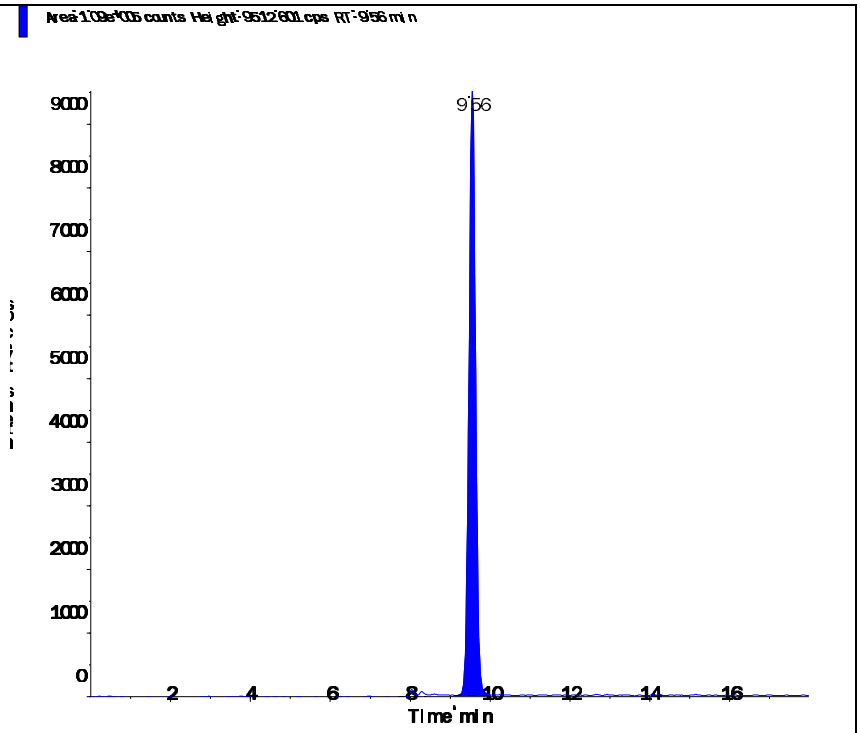
O18LP (Internal Standard)

RT (Exp. RT): 9.54(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Quality Control)



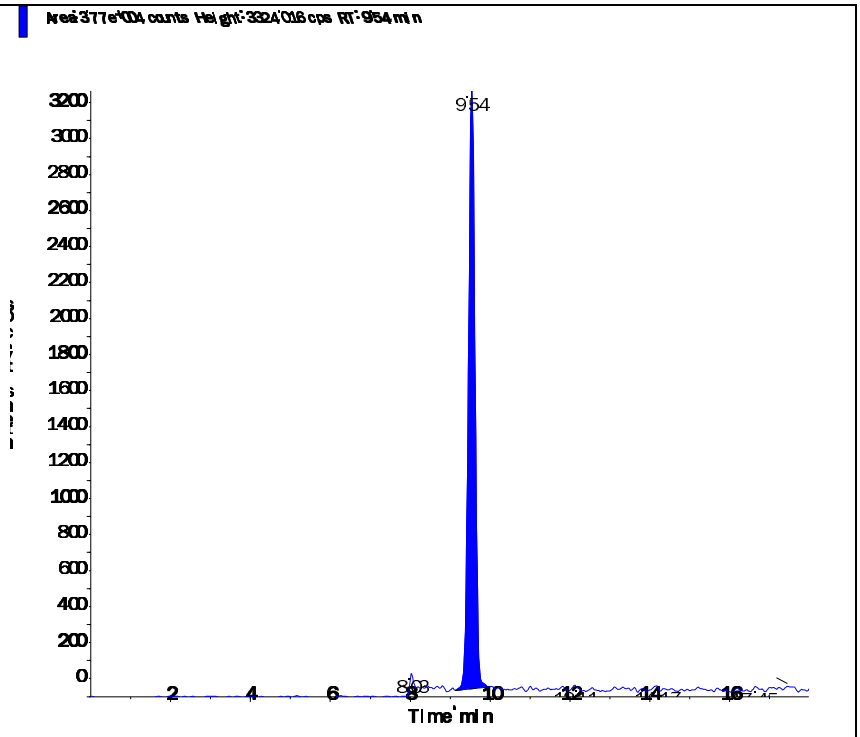
Perchlorate (98.8/83.3 amu)

RT (Exp. RT):	9.56 (9.56) min
Calculated conc:	0.996 ng/ml
Area Ratio:	0.334
Sample Type:	(Quality Control)



Perchlorate conf (100.8/85.2 amu)

RT (Exp. RT):	9.54 (9.56) min
Calculated conc:	1.01 ng/ml
Area Ratio:	0.115
Sample Type:	(Quality Control)



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Data File	LM37776.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/17/2016 12:53:22 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

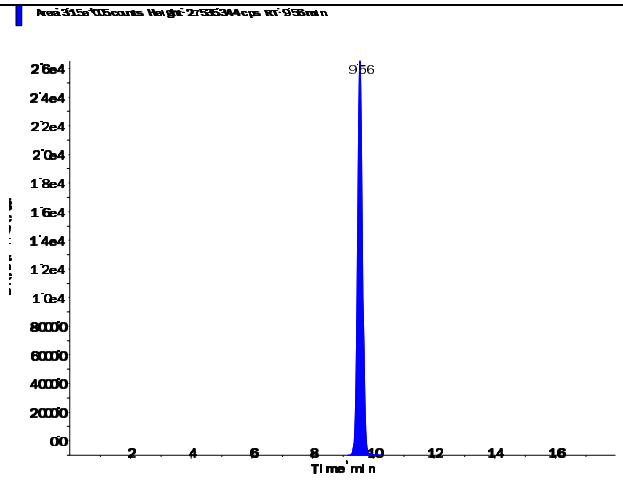
Sample Name	WG595135-07 MRL (0.2ug/L)	**Injection Vial**	3.00
Data File	LM37776.wiff	**Injection Volume**	10.00
Acquisition Date	12/17/2016 12:53:22 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	WG595135-07	**Dilution Factor**	1.00
Sample Comment	1,1 STD78249	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.150e+05	9.56	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	2.150e+04	9.56	N/A	0.199
Perchlorate conf	7.030e+03	9.54	N/A	0.183

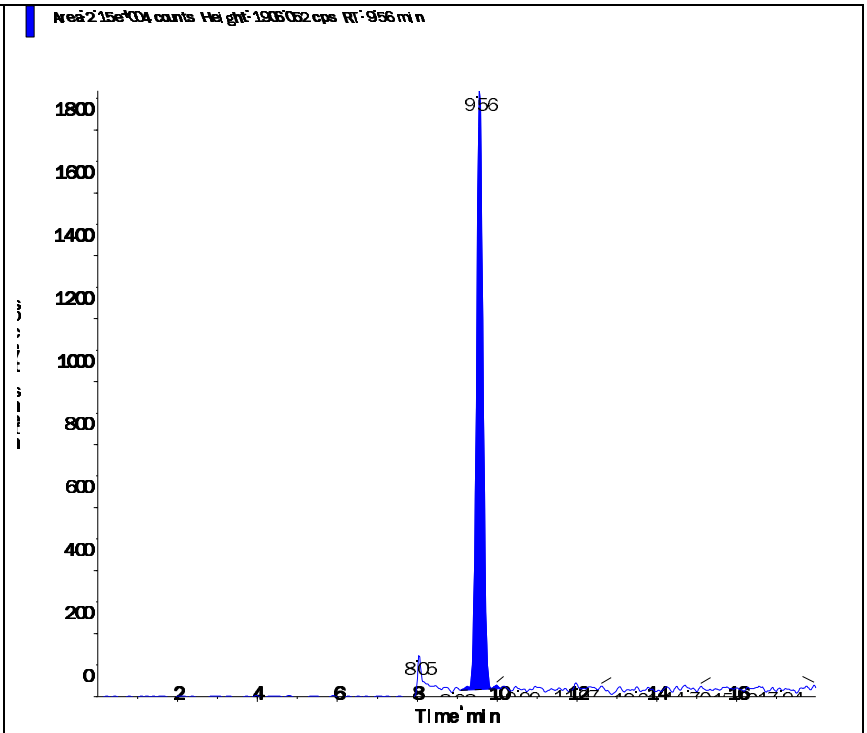
O18LP (Internal Standard)

RT (Exp. RT): 9.56(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



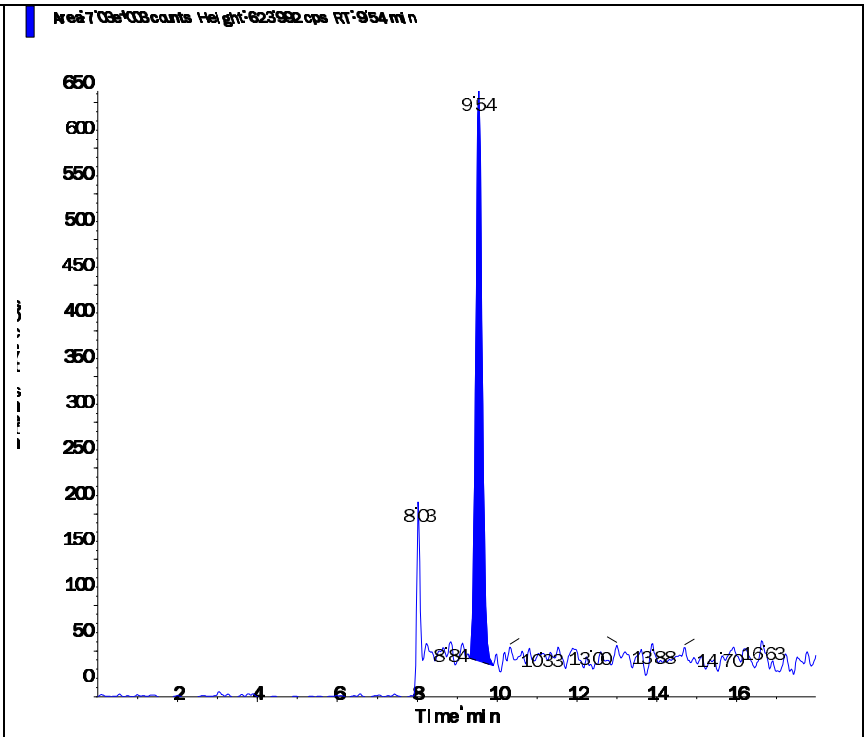
Perchlorate (98.8/83.3 amu)

RT (Exp. RT):	9.56 (9.56) min
Calculated conc:	0.199 ng/ml
Area Ratio:	0.068
Sample Type:	(Unknown)



Perchlorate conf (100.8/85.2 amu)

RT (Exp. RT):	9.54 (9.56) min
Calculated conc:	0.183 ng/ml
Area Ratio:	0.022
Sample Type:	(Unknown)



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Data File	LM37788.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/17/2016 4:40:37 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

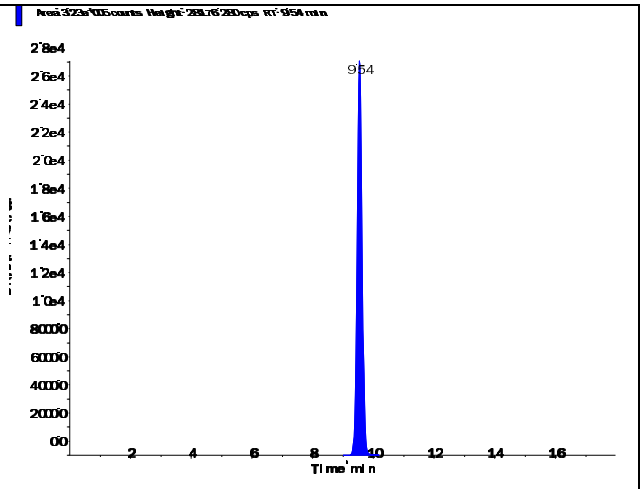
Sample Name	WG595135-08 MRL (0.2ug/L)	**Injection Vial**	3.00
Data File	LM37788.wiff	**Injection Volume**	10.00
Acquisition Date	12/17/2016 4:40:37 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	WG595135-08	**Dilution Factor**	1.00
Sample Comment	1,1 STD78249	**Weight to Volume**	0.00

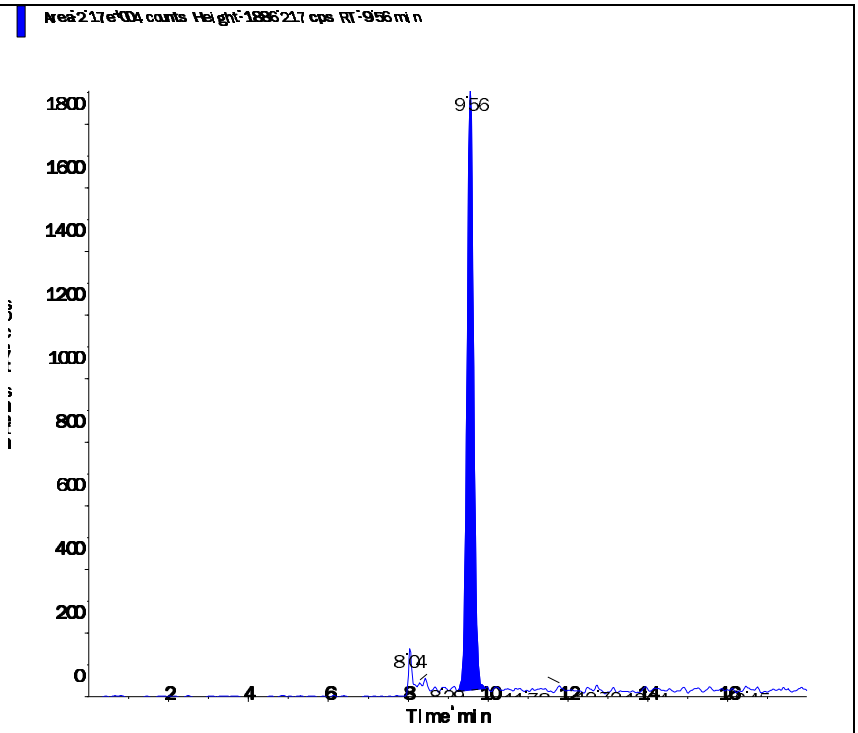
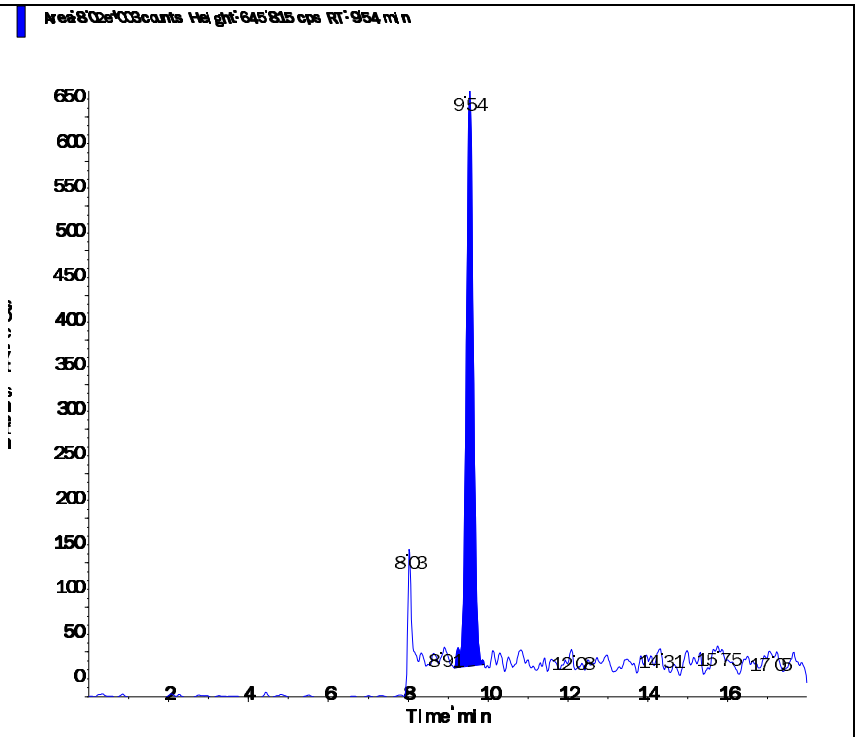
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.230e+05	9.54	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	2.170e+04	9.56	N/A	0.196
Perchlorate conf	8.020e+03	9.54	N/A	0.205

O18LP (Internal Standard)

RT (Exp. RT): 9.54(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.56 (9.56) min Calculated conc: 0.196 ng/ml Area Ratio: 0.067 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.54 (9.56) min Calculated conc: 0.205 ng/ml Area Ratio: 0.025 Sample Type: (Unknown)	

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Created with Analyst Reporter
Printed: 12/17/2016 2:21 PM

Data File	LM37797.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/17/2016 7:31:00 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

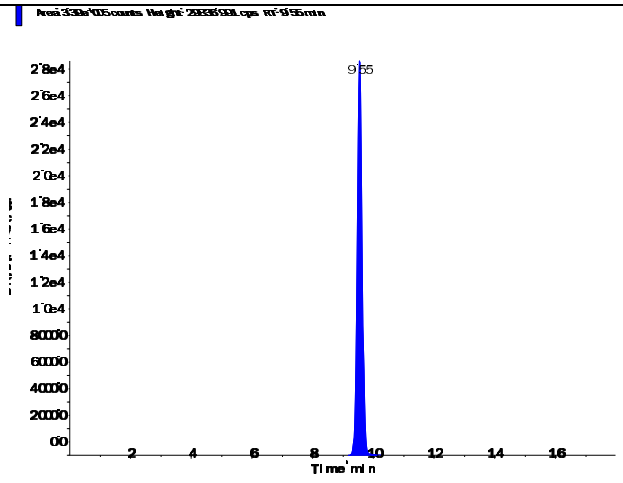
Sample Name	WG595135-09 MRL (0.2ug/L)	**Injection Vial**	3.00
Data File	LM37797.wiff	**Injection Volume**	10.00
Acquisition Date	12/17/2016 7:31:00 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	WG595135-09	**Dilution Factor**	1.00
Sample Comment	1,1 STD78249	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.390e+05	9.55	5.00	-

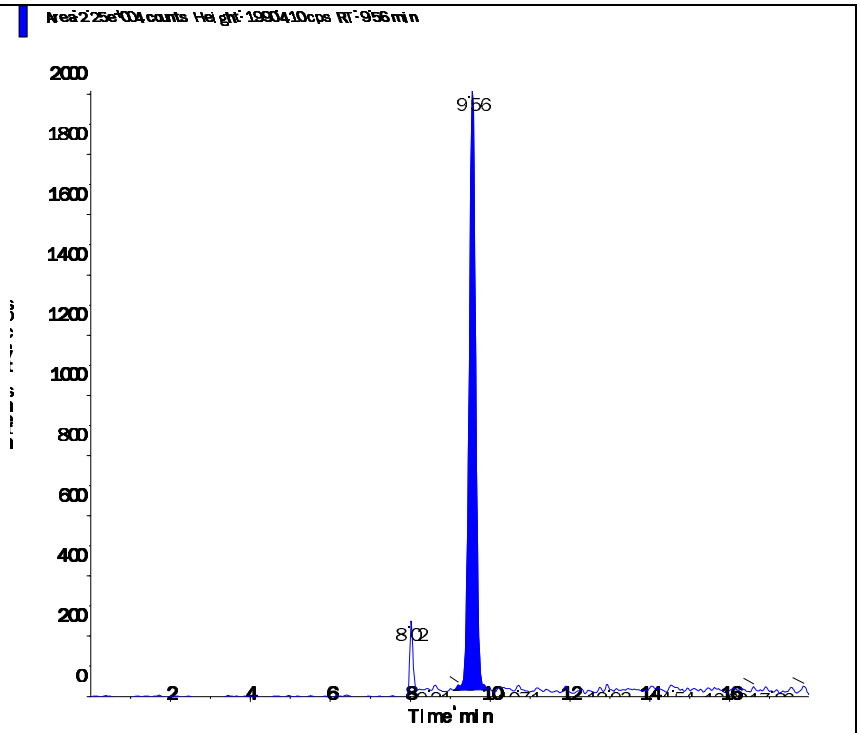
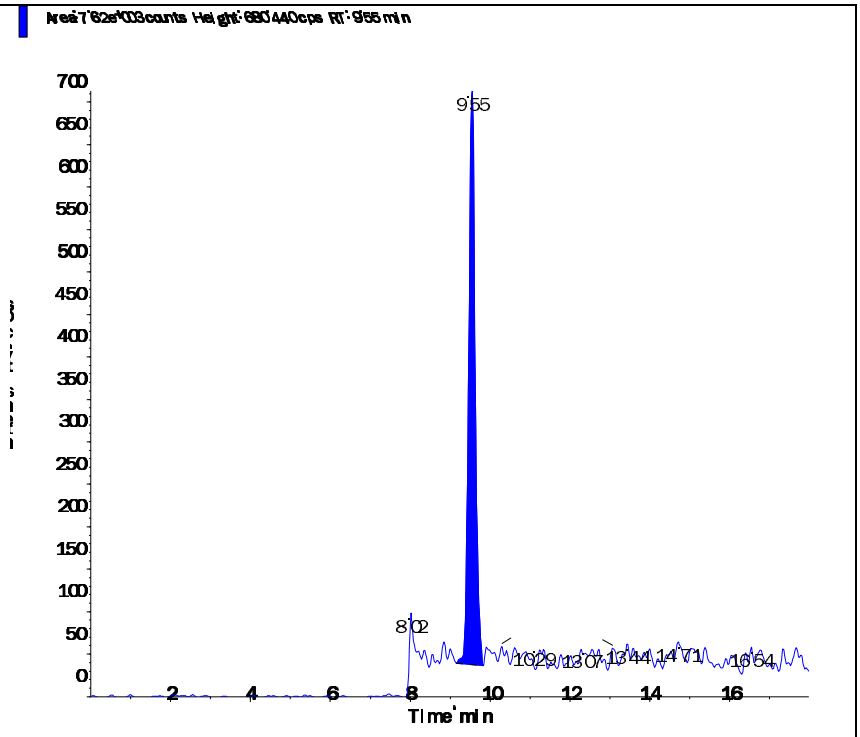
Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	2.250e+04	9.56	N/A	0.193
Perchlorate conf	7.620e+03	9.55	N/A	0.184

O18LP (Internal Standard)

RT (Exp. RT): 9.55(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



s.dataFile Page 1 of 2

Perchlorate (98.8/83.3 amu) RT (Exp. RT): 9.56 (9.56) min Calculated conc: 0.193 ng/ml Area Ratio: 0.066 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.55 (9.56) min Calculated conc: 0.184 ng/ml Area Ratio: 0.022 Sample Type: (Unknown)	

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Created with Analyst Reporter
Printed: 12/17/2016 2:15 PM

Data File	LM37774.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/17/2016 12:15:30 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

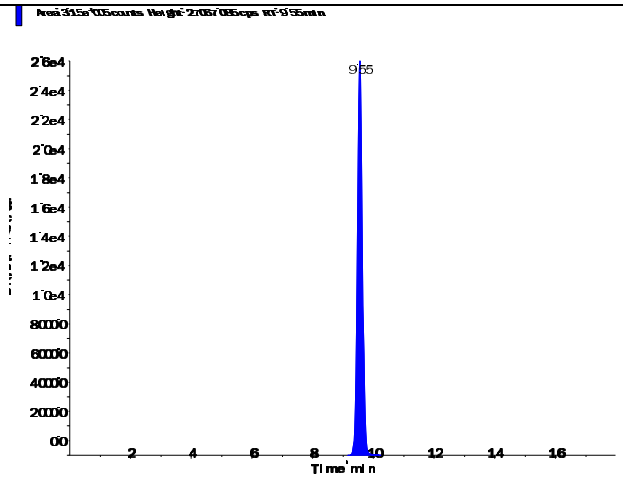
Sample Name	WG595142-01 CCB	**Injection Vial**	1.00
Data File	LM37774.wiff	**Injection Volume**	10.00
Acquisition Date	12/17/2016 12:15:30 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	WG595142-01	**Dilution Factor**	1.00
Sample Comment	11.00	**Weight to Volume**	0.00

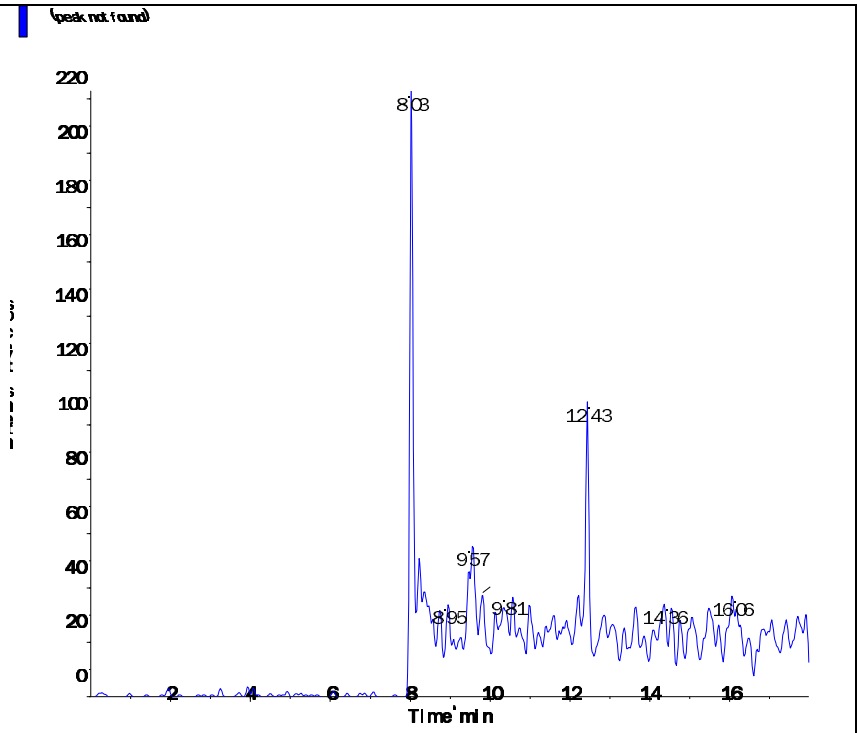
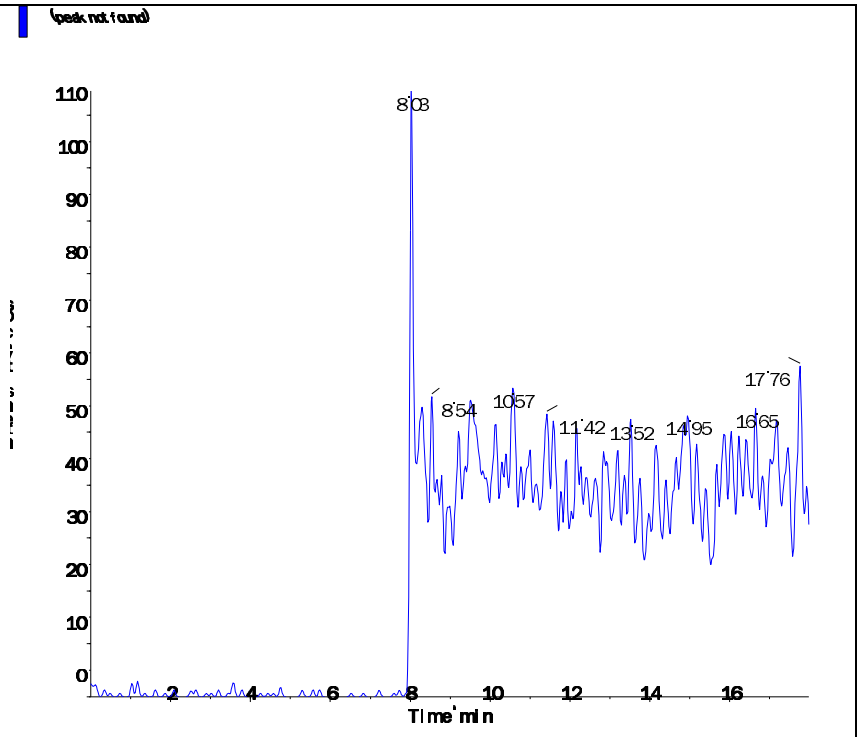
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.150e+05	9.55	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	0.000e+00	0.00	N/A	No Peak
Perchlorate conf	0.000e+00	0.00	N/A	No Peak

O18LP (Internal Standard)

RT (Exp. RT): 9.55(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 0.00 (9.56) min Calculated conc: No Peak ng/ml Area Ratio: 0.00 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 0.00 (9.56) min Calculated conc: No Peak ng/ml Area Ratio: 0.00 Sample Type: (Unknown)	

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Created with Analyst Reporter
Printed: 12/17/2016 2:19 PM

Data File	LM37789.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/17/2016 4:59:32 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

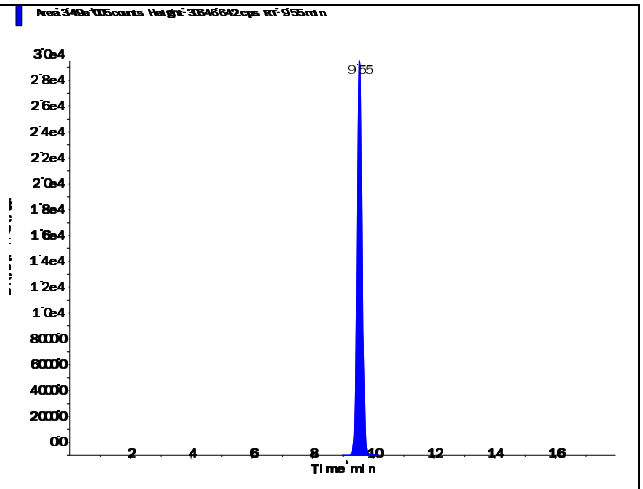
Sample Name	WG595142-04 CCB	**Injection Vial**	1.00
Data File	LM37789.wiff	**Injection Volume**	10.00
Acquisition Date	12/17/2016 4:59:32 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	WG595142-04	**Dilution Factor**	1.00
Sample Comment	11.00	**Weight to Volume**	0.00

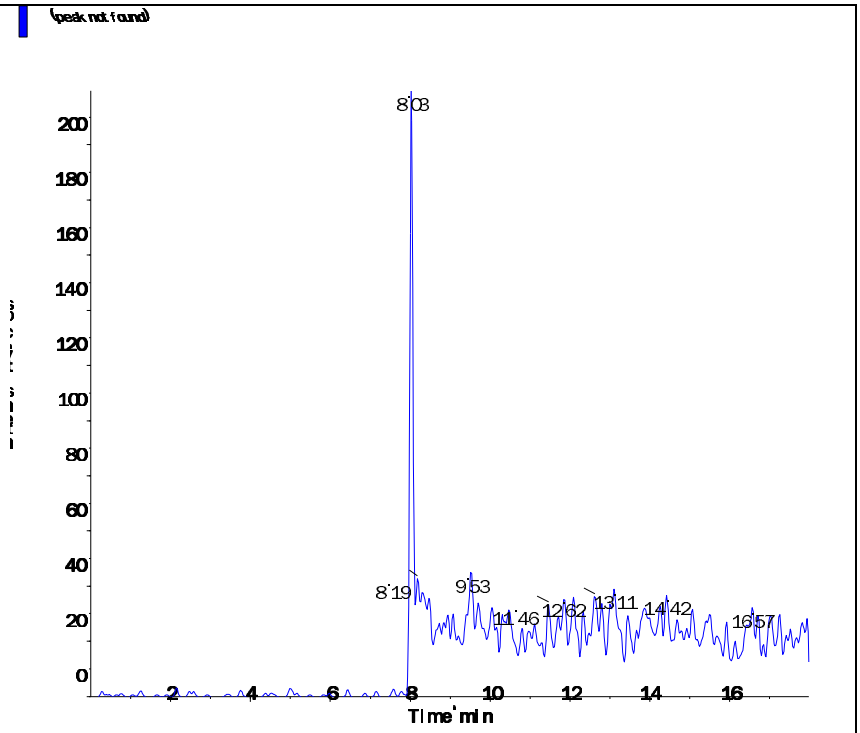
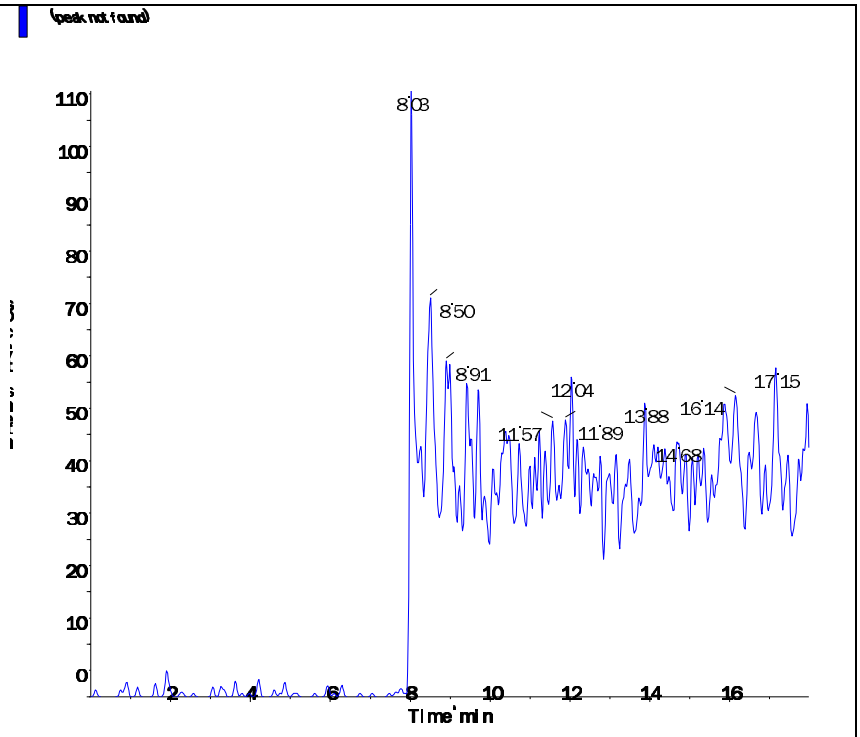
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.490e+05	9.55	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	0.000e+00	0.00	N/A	No Peak
Perchlorate conf	0.000e+00	0.00	N/A	No Peak

O18LP (Internal Standard)

RT (Exp. RT): 9.55(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 0.00 (9.56) min Calculated conc: No Peak ng/ml Area Ratio: 0.00 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 0.00 (9.56) min Calculated conc: No Peak ng/ml Area Ratio: 0.00 Sample Type: (Unknown)	

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Created with Analyst Reporter
Printed: 12/17/2016 2:22 PM

Data File	LM37798.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/17/2016 7:49:55 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

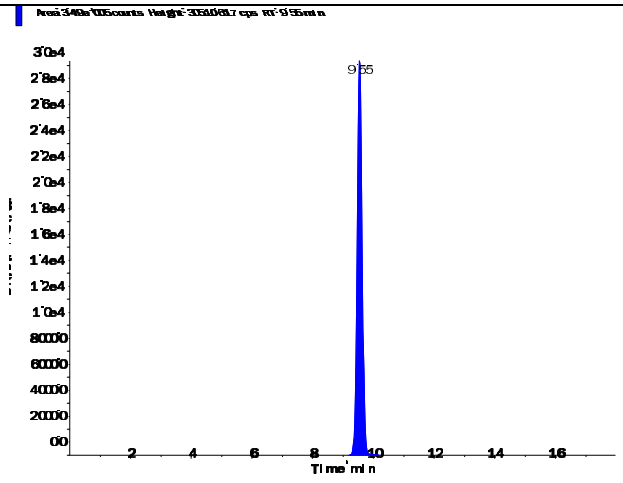
Sample Name	WG595142-06 CCB	**Injection Vial**	1.00
Data File	LM37798.wiff	**Injection Volume**	10.00
Acquisition Date	12/17/2016 7:49:55 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	WG595142-06	**Dilution Factor**	1.00
Sample Comment	11.00	**Weight to Volume**	0.00

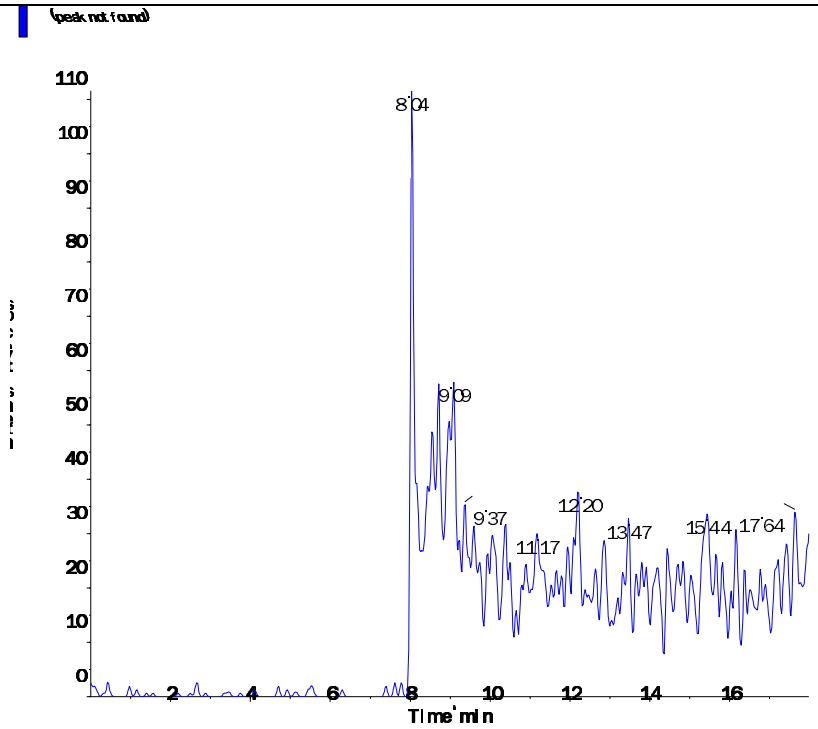
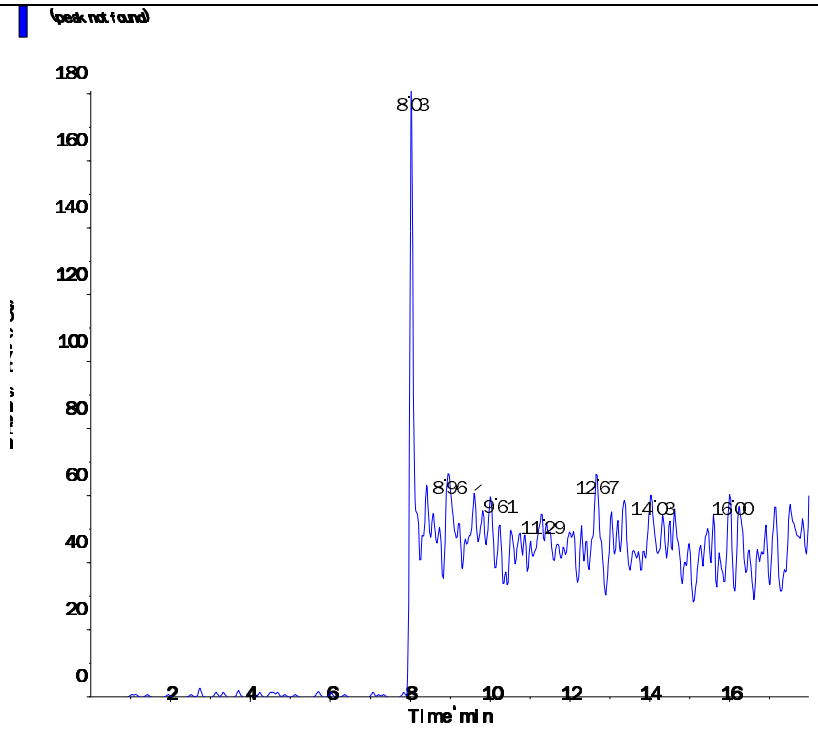
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.490e+05	9.55	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	0.000e+00	0.00	N/A	No Peak
Perchlorate conf	0.000e+00	0.00	N/A	No Peak

O18LP (Internal Standard)

RT (Exp. RT): 9.55(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 0.00 (9.56) min Calculated conc: No Peak ng/ml Area Ratio: 0.00 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 0.00 (9.56) min Calculated conc: No Peak ng/ml Area Ratio: 0.00 Sample Type: (Unknown)	

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Created with Analyst Reporter
Printed: 12/17/2016 2:15 PM

Data File	LM37777.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/17/2016 1:12:17 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

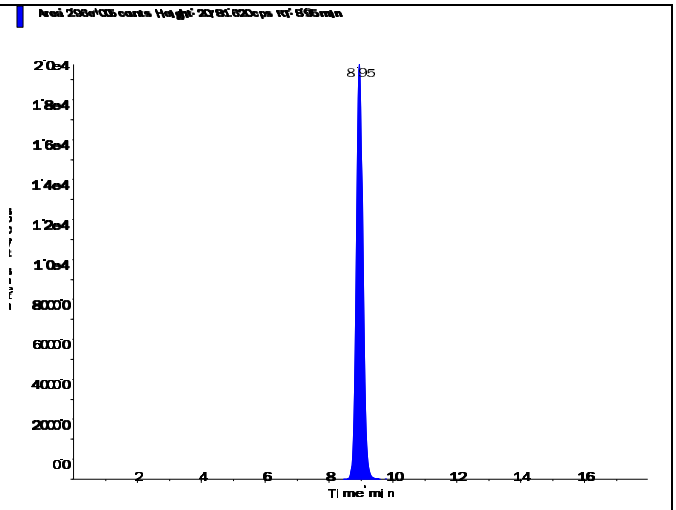
Sample Name	WG595135-01 MCT (0.2ug/L)	**Injection Vial**	10.00
Data File	LM37777.wiff	**Injection Volume**	10.00
Acquisition Date	12/17/2016 1:12:17 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	WG595135-01	**Dilution Factor**	1.00
Sample Comment	1,1 STD78251	**Weight to Volume**	0.00

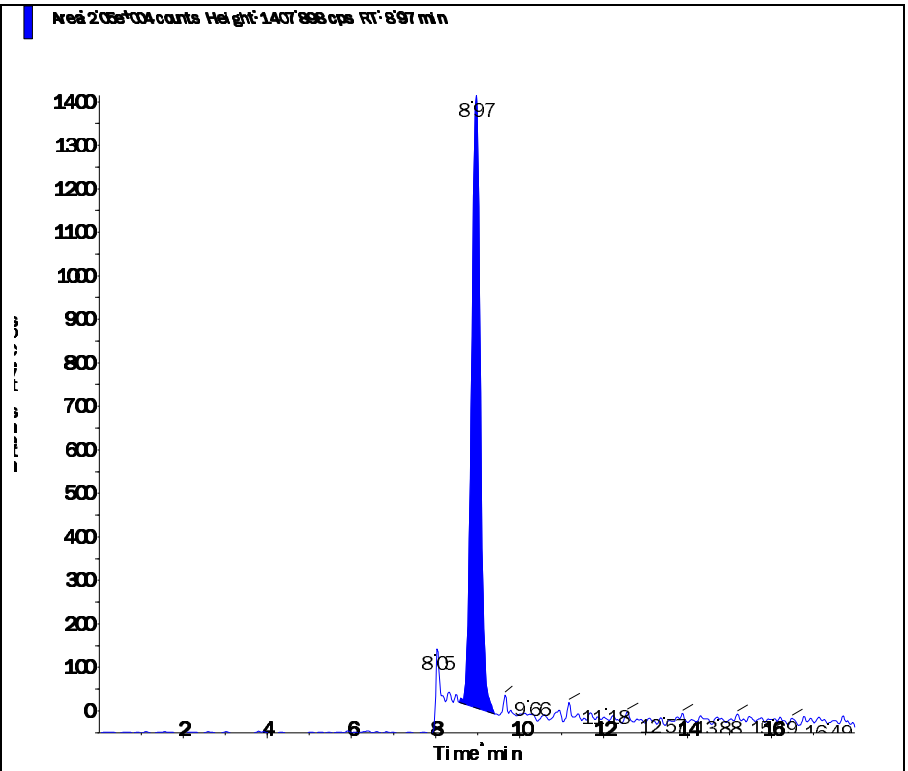
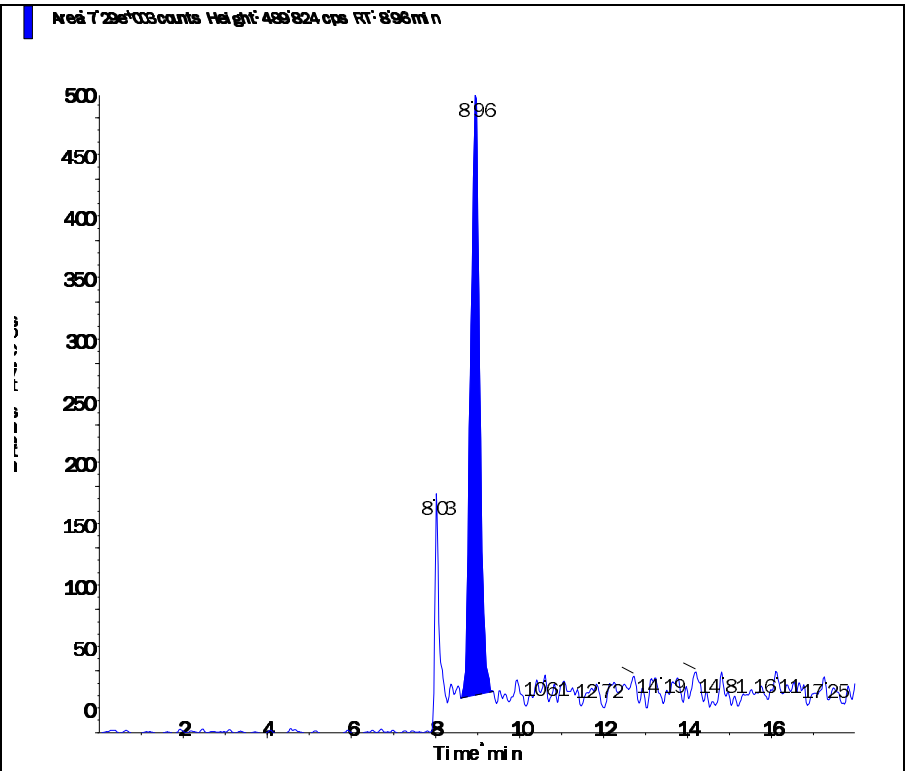
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	2.960e+05	8.95	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	2.050e+04	8.97	N/A	0.202
Perchlorate conf	7.290e+03	8.96	N/A	0.204

O18LP (Internal Standard)

RT (Exp. RT): 8.95(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)

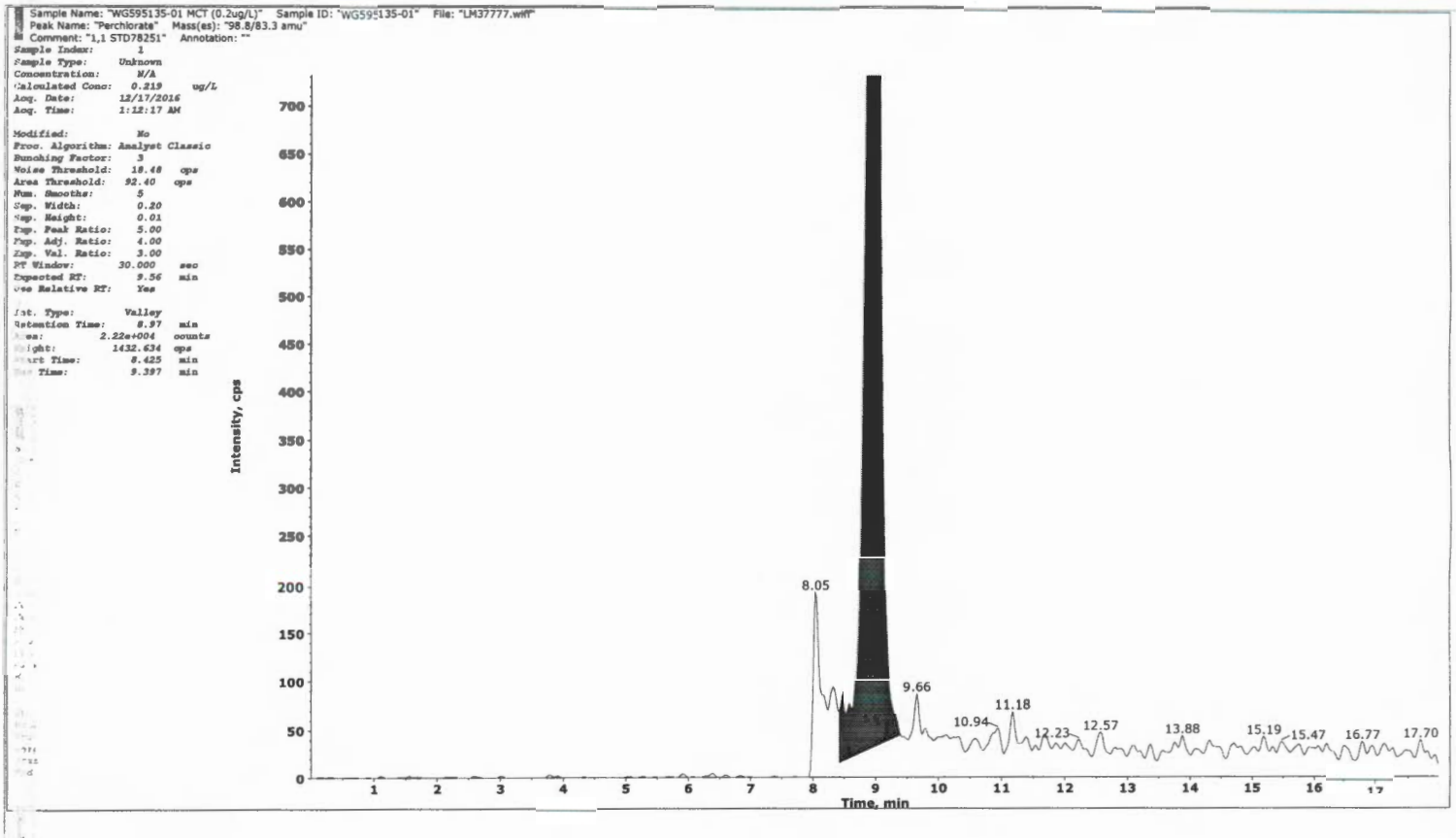


Perchlorate (98.8/83.3 amu) RT (Exp. RT): 8.97 (9.56) min Calculated conc: 0.202 ng/ml Area Ratio: 0.069 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 8.96 (9.56) min Calculated conc: 0.204 ng/ml Area Ratio: 0.025 Sample Type: (Unknown)	

Printing Time: 1:16:02 PM
Printing Date: Saturday, December 17, 2016

Sample Name: "WG595135-01 MCT (0.2ug/L)" Sample ID: "WG595135-01" File: "LM37777.wiff"
Peak Name: "Perchlorate" Mass(es): "98.8/83.3 amu"
Comment: "1,1 STD78251" Annotation: ""

Sample Index:	1
Sample Type:	Unknown
Concentration:	N/A
Calculated Conc:	0.219 ug/L
Acq. Date:	12/17/2016
Acq. Time:	1:12:17 AM
Modified:	No
Proc. Algorithm:	Analyst Classic
Bunching Factor:	3
Noise Threshold:	18.48 cps
Area Threshold:	92.40 cps
Num. Smooths:	5
Exp. Width:	0.20
Exp. Height:	0.01
Exp. Peak Ratio:	5.00
Exp. Adj. Ratio:	4.00
Exp. Val. Ratio:	3.00
RT Window:	30.000 sec
Expected RT:	9.56 min
Use Relative RT:	Yes
Int. Type:	Valley
Retention Time:	8.97 min
Area:	2.22e+004 counts
Height:	1432.634 cps
Start Time:	8.425 min
End Time:	9.397 min

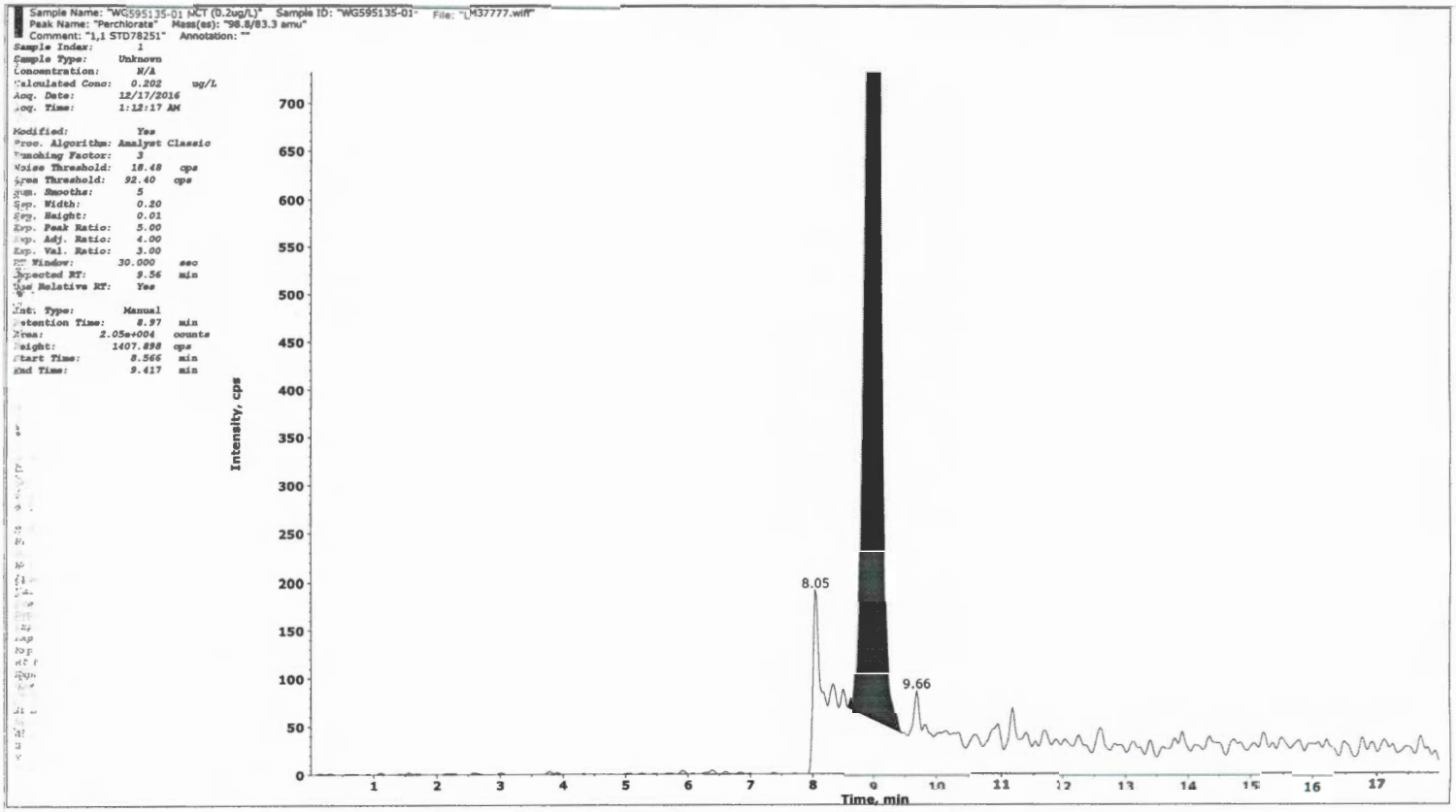


Collected by: N/A
Electronic Signature: no
Operator: lcms1

Printing Time: 1:18:33 PM
Printing Date: Saturday, December 17, 2016

Sample Name: "WG595135-01" MCT (0.2ug/L)" Sample ID: "WG595135-01" File: "L\M37777.wiff"
Peak Name: "Perchlorate" Mass(es): "98.8/83.3 amu"
Comment: "1,1 STD78251" Annotation: ""

Sample Index:	1	
Sample Type:	Unknown	
Concentration:	N/A	
Calculated Conc:	0.202	ug/L
Acq. Date:	12/17/2016	
Acq. Time:	1:12:17 AM	
Modified:	Yes	
Proc. Algorithm:	Analyst Classic	
Smoothing Factor:	3	
Noise Threshold:	18.48	cps
Area Threshold:	92.40	cps
Num. Smooths:	5	
Exp. Width:	0.20	
Exp. Height:	0.01	
Exp. Peak Ratio:	5.00	
Exp. Adj. Ratio:	4.00	
Exp. Val. Ratio:	3.00	
RT Window:	30.000	sec
Expected RT:	9.56	min
Use Relative RT:	Yes	
Int. Type:	Manual	
Retention Time:	8.97	min
Area:	2.05e+004	counts
Height:	1407.898	cps
Start Time:	8.566	min
End Time:	9.417	min



#4
JWR/12/17/16
12.19.16

Collected by: N/A
Electronic Signature: no
Operator: lcms1

2.1.1.5 Raw QC Data

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Created with Analyst Reporter
Printed: 12/17/2016 2:16 PM

Data File	LM37778.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/17/2016 1:31:16 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

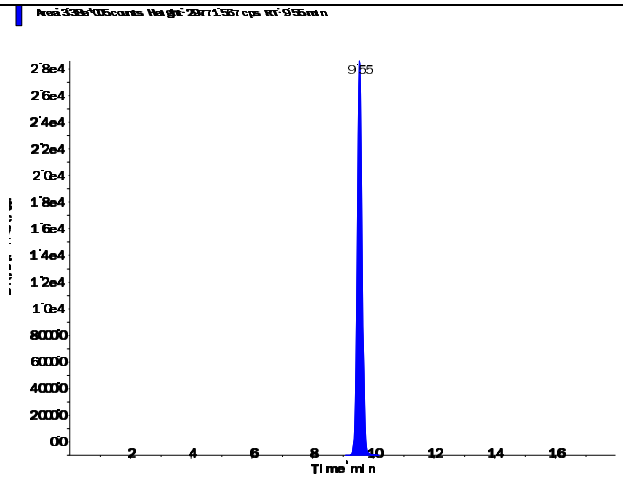
Sample Name	WG595135-02 BLANK	**Injection Vial**	11.00
Data File	LM37778.wiff	**Injection Volume**	10.00
Acquisition Date	12/17/2016 1:31:16 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	WG595135-02	**Dilution Factor**	1.00
Sample Comment	11.00	**Weight to Volume**	0.00

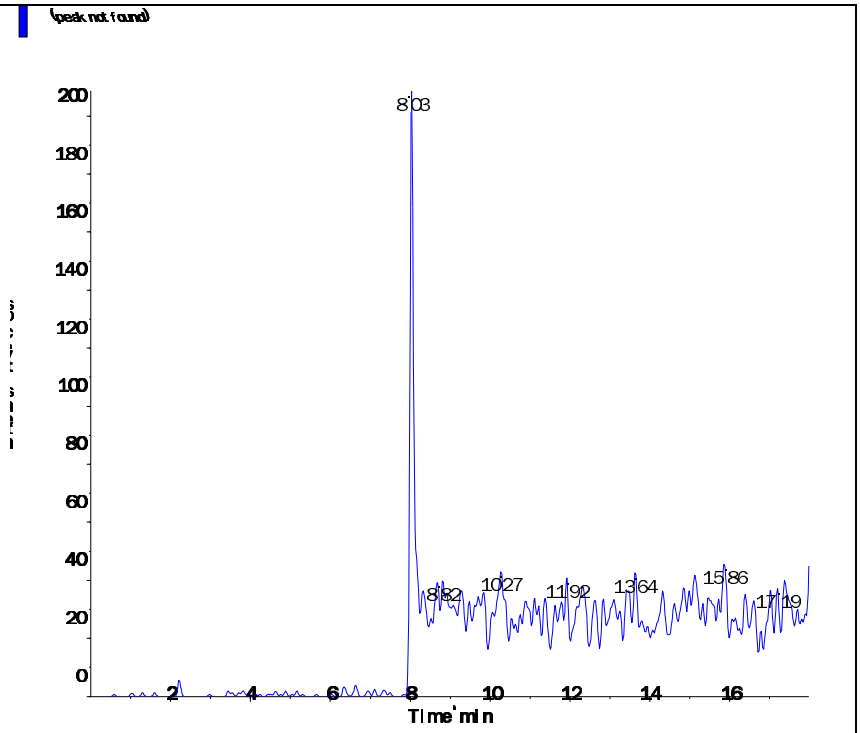
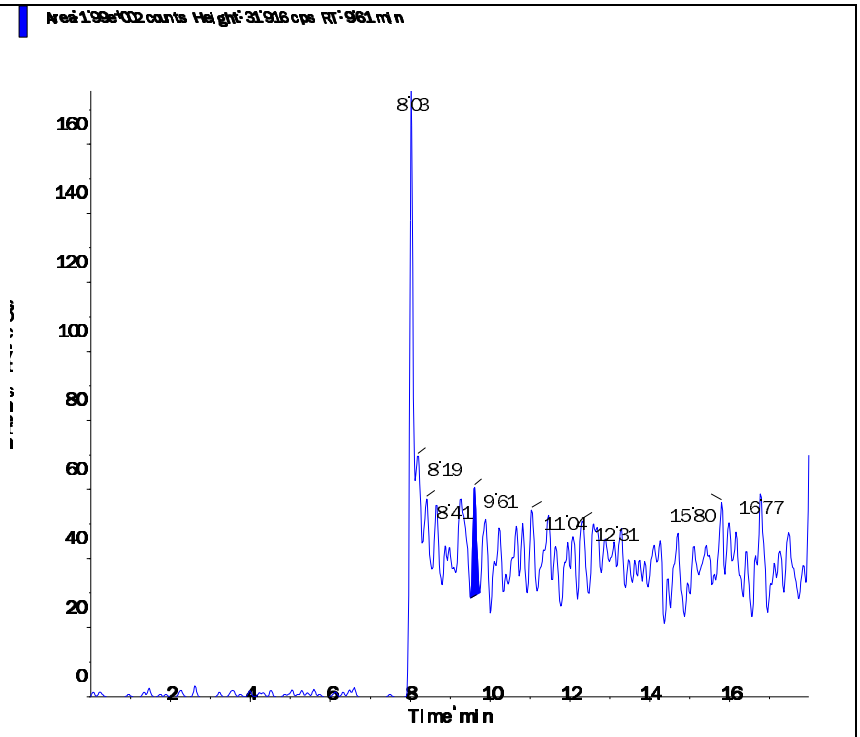
Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.380e+05	9.55	5.00	-

Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	0.000e+00	0.00	N/A	No Peak
Perchlorate conf	1.990e+02	9.61	N/A	< 0

O18LP (Internal Standard)

RT (Exp. RT): 9.55(9.56) min
Concentration: 5.00 ug/L
Sample Type: (Unknown)



Perchlorate (98.8/83.3 amu) RT (Exp. RT): 0.00 (9.56) min Calculated conc: No Peak ng/ml Area Ratio: 0.00 Sample Type: (Unknown)	
Perchlorate conf (100.8/85.2 amu) RT (Exp. RT): 9.61 (9.56) min Calculated conc: < 0 ng/ml Area Ratio: 0.001 Sample Type: (Unknown)	

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Data File	LM37779.wiff	**Result Table**	121716_JWR.rdb
Acquisition Date	12/17/2016 1:50:11 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Instrument Name**	API 4000
Project	Perchlorate\2009_07_22		

Sample Name	WG595135-03 LCS (0.2ug/L)	**Injection Vial**	12.00
Data File	LM37779.wiff	**Injection Volume**	10.00
Acquisition Date	12/17/2016 1:50:11 AM	**Algorithm Used**	Analyst Classic
Acquisition Method	062911.dam	**Sample Type**	Unknown
Instrument Name	API 4000	**Result Table**	121716_JWR.rdb
Sample ID	WG595135-03	**Dilution Factor**	1.00
Sample Comment	1,1 STD78251	**Weight to Volume**	0.00

Internal Standard	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
O18LP	3.300e+05	9.54	5.00	-

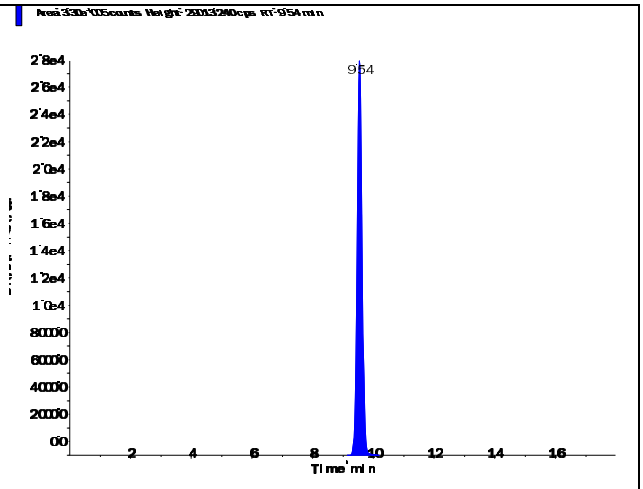
Target Analyte	Area (cps)	RT (min)	Target conc. (ug/L)	Calc. Conc. (ug/L)
Perchlorate	2.260e+04	9.56	N/A	0.20
Perchlorate conf	8.110e+03	9.54	N/A	0.203

O18LP (Internal Standard)

RT (Exp. RT): 9.54(9.56) min

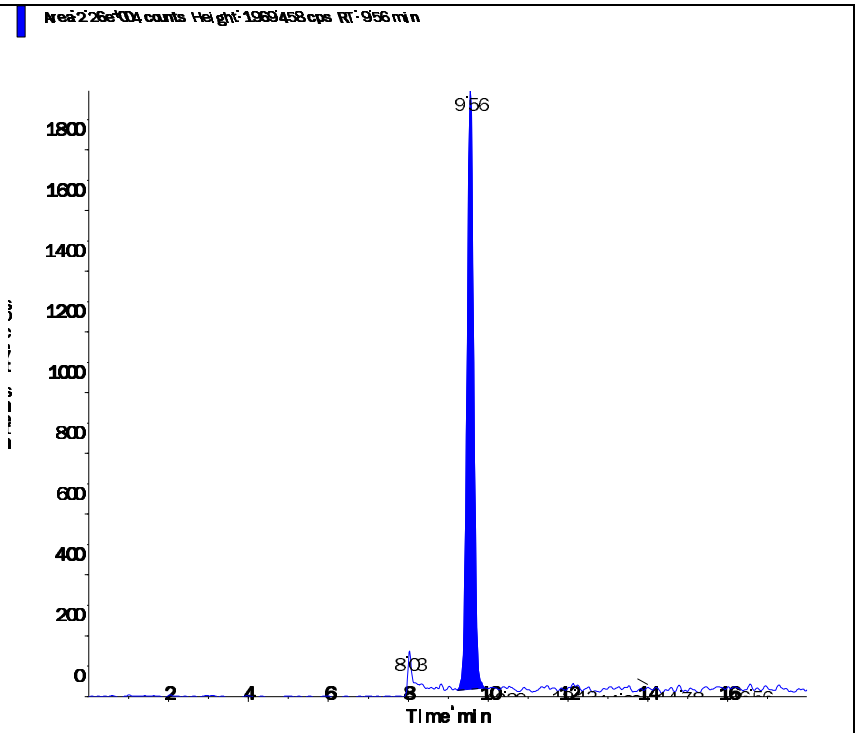
Concentration: 5.00 ug/L

Sample Type: (Unknown)



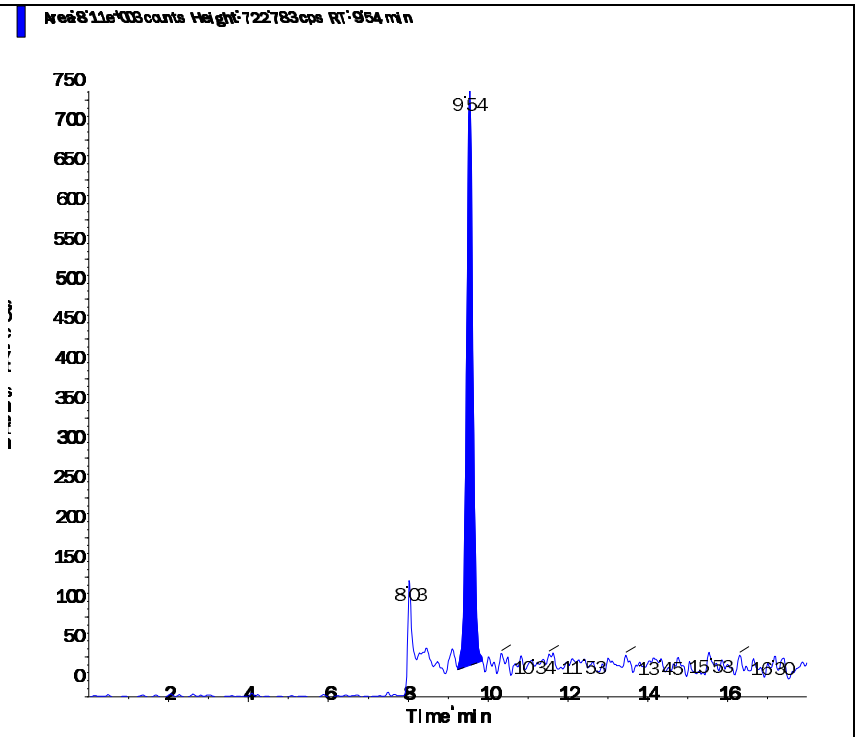
Perchlorate (98.8/83.3 amu)

RT (Exp. RT):	9.56 (9.56) min
Calculated conc:	0.20 ng/ml
Area Ratio:	0.069
Sample Type:	(Unknown)



Perchlorate conf (100.8/85.2 amu)

RT (Exp. RT):	9.54 (9.56) min
Calculated conc:	0.203 ng/ml
Area Ratio:	0.025
Sample Type:	(Unknown)



3.0 Attachments

Microbac Laboratories Inc.
Ohio Valley Division Analyst List
December 19, 2016

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001 – BIO-CHEM TESTING WVDEP 220	002 – REIC Consultants, Inc. WVDEP 060
003 – Sturm Environmental	004 – MICROBAC PITTSBURGH
005 – ES LABORATORIES	006 – ALCOSAN LABORATORIES
007 – ALS LABORATORIES	008 – BENCHMARK LABORATORIES
010 – MICROBAC CHICAGOLAND	AC – AMBER R. CARMICHAEL
ADC – ANTHONY D. CANTER	ADG – APRIL D. GREENE
AED – ALLEN E. DAVIS	ALS – ADRIANE L. STEED
AMA – ALEXANDRA M. ALFRED	AWE – ANDREW W. ESSIG
AZH – AFTER HOURS	BJO – BRIAN J. OGDEN
BKT – BRENDAN TORRENCE	BLG – BRENDA L. GREENWALT
BNB – Brandi N. Bentley	BRG – BRENDA R. GREGORY
CAA – CASSIE A. AUGENSTEIN	CAF – CHERYL A. FLOWERS
CAS – Craig A. Smith	CEB – CHAD E. BARNES
CJQ – Cameron J. Quick	CLC – CHRYS L. CRAWFORD
CLS – CARA L. STRICKLER	CLW – CHARISSA L. WINTERS
CPD – CHAD P. DAVIS	CRW – CHRISTINA R. WILSON
CSH – CHRIS S. HILL	CV – Carl Volkman
DAK – DEAN A. KETELSEN	DCM – DAVID C. MERCKLE
DEV – DAVID E. VANDENBERG	DIH – DEANNA I. HESSON
DLB – DAVID L. BUMGARNER	DLP – DOROTHY L. PAYNE
DSM – DAVID S. MOSSOR	DTG – DOMINIC T. GEHRET
ECL – ERIC C. LAWSON	EMW – ERIC M. WILKEN
ENY – EMILY N. YOAK	ERP – ERIN R. PORTER
FJB – FRANCES J. BOLDEN	HDD – HANAH D. DAWKINS
JDH – JUSTIN D. HESSON	JDS – JARED D. SMITH
JKP – JACQUELINE K. PARSONS	JLD – JESSICA L. DELONG
JLL – JOHN L. LENT	JMW – JEANA M. WHITE
JTP – JOSHUA T. PEMBERTON	JWR – JOHN W. RICHARDS
JWS – JACK W. SHEAVES	JYH – JI Y. HU
KAK – KATHY A. KIRBY	KAT – KATHY A. TUCKER
KDD – Katelyn D. Daley	KDW – KATHRYN D. WELCH
KEB – KATIE E. BARNES	KHR – KIM H. RHODES
KKB – KERRI K. BUCK	KRA – KATHY R. ALBERTSON
KRB – KAELY R. BECKER	KRP – KATHY R. PARSONS
LJH – Lacey J. Hendershot	LKN – LINDA K. NEDEFF
LLS – LARRY L. STEPHENS	LSB – LESLIE S. BUCINA
LSJ – LAURA S. JONES	MAP – MARLA A. PORTER
MBK – MORGAN B. KNOWLTON	MDA – MIKE D. ALBERTSON
MDC – MIKE D. COCHRAN	MES – MARY E. SCHILLING
MMB – MAREN M. BEERY	MRT – MICHELLE R. TAYLOR
MSW – MATT S. WILSON	NPH – Natalie P. Hart
PDM – PIERCE D. MORRIS	PIT – MICROBAC WARRENDALE
QX – QIN XU	RAH – ROY A. HALSTEAD
REK – BOB E. KYER	RLB – BOB BUCHANAN
RNP – RICK N. PETTY	SAV – SARAH A. VANDENBERG
SCB – SARAH C. BOGOLIN	SDC – SHALYN D. CONLEY
SLM – STEPHANIE L. MOSSBURG	SLP – SHERI L. PFALZGRAF
TB – TODD BOYLE	TGF – TIM G. FELTON
TMB – TIFFANY M. BAILEY	TMM – TAMMY M. MORRIS
VC – VICKI COLLIER	WJB – WILL J. BEASLEY
WTD – WADE T. DELONG	XXX – UNAVAILABLE OR SUBCONTRACT

Microbac Laboratories Inc.
List of Valid Qualifiers
December 19, 2016

Qualkey: DOD

Qualifier	Description
*	Surrogate or spike compound out of range
+	Correlation coefficient for the MSA is less than 0.995
<	Result is less than the associated numerical value.
>	Greater than
>,H1	Result is greater than the associated numerical value. Sample analysis performed past holding time.
A	See the report narrative
B	The reported result is associated with a contaminated method blank.
B,H1	Analyte present in method blank. Sample analysis performed past holding time.
B1	Target analyte detected in method blank at or above the method reporting limit
B3	Target analyte detected in calibration blank at or above the method reporting limit
B4	The BOD unseeded dilution water blank exceeded 0.2 mg/L
C	Confirmed by GC/MS
CG	Confluent growth
CT1	Cooler temperature at sample reciept exceeded regulatory limit.
DL	Surrogate or spike compound was diluted out
E	Estimated concentration due to sample matrix interference
E,CT1	Estimated results. The cooler temperature at receipt exceeded regulatory guidelines for requested testing.
EDL	Elevated sample reporting limits, presence of non-target analytes
EMPC	Estimated Maximum Possible Concentration
F, S	Estimated result below quantitation limit; method of standard additions(MSA)
F,CT1	Estimated value; the analyte concentration was less than the RL/LOQ. The cooler temperature at receipt exceeded regula
FL	Free Liquid
FP1	Did not ignite.
H1	Sample analysis performed past holding time.
H1,CT1	Sample analysis performed past holding time. The cooler temperature at receipt exceeded regulatory guidelines for reque
I	Semiquantitative result (out of instrument calibration range)
J	Estimated concentration; sample matrix interference.
J	Estimated value ; the analyte concentration was greater than the highest standard
J	Estimated value ; the analyte concentration was less than the LOQ.
J	The reported result is an estimated value.
J,B	Analyte detected in both the method blank and sample above the MDL.
J,CT1	Estimated value ; the analyte concentration was less than the LOQ. Cooler temperature at sample reciept exceeded regu
J,H1	Estimated value ; the analyte concentration was less than the LOQ. Sample analysis performed past holding time.
J,H1	The reported result is an estimated value. Sample was analyzed past holding time.
J,P	Estimate; columns don't agree to within 40%
J,S	Estimated concentration; analyzed by method of standard addition (MSA)
JB	The reported result is an estimated value. The reported result is also associated with a contaminated method blank.
JQ	The reported result is an estimated value and one or more quality control criteria failed. See narrative.
L	Sample reporting limits elevated due to matrix interference
L1	The associated blank spike (LCS) recovery was above the laboratory acceptance limits.
L2	The associated blank spike (LCS) recovery was below the laboratory acceptance limits.
M	Matrix effect; the concentration is an estimate due to matrix effect.
N	Nontarget analyte; the analyte is a tentativlely identified compound (TIC) by GC/MS
NA	Not applicable
ND	Not detected at or above the reporting limit (RL)
ND, B	Not detected at or above the reporting limit (RL). Analyte present in method blank.
ND, CT1	Analyte was not detected. The concentration is below the reported LOD. The cooler temperature at receipt exceeded reg
ND, L	Not detected; sample reporting limit (RL) elevated due to interference
ND, S	Not detected; analyzed by method of standard addition (MSA)
ND,H1	Not detected; Sample analysis performed past holding time.
ND,H1,CT1	Not detected; Sample analysis performed past holding time. The cooler temperature at receipt exceeded regulatory guide
NF	Not found by library search
NFL	No free liquid
NI	Non-ignitable
NR	Analyte is not required to be analyzed
NS	Not spiked
P	Concentrations >40% difference between the two GC columns
Q	One or more quality control criteria failed. See narrative.
Q,H1	One or more quality control criteria failed. Sample analyzed past holding time. See narrative.
QNS	Quantity of sample not sufficient to perform analysis
RA	Reanalysis confirms reported results
RE	Reanalysis confirms sample matrix interference
S	Analyzed by method of standard addition (MSA)
SMI	Sample matrix interference on surrogate
SP	Reported results are for spike compounds only
T5	Laboratory not licensed for this parameter
TIC	Library Search Compound

Microbac Laboratories Inc.
List of Valid Qualifiers
December 19, 2016

Qualkey: DOD

TNTC	Too numerous to count
TNTC, B	Too numerous to count. Analyte present in method blank.
TNTC,CT1	Too numerous to count. The cooler temperature at receipt exceeded regulatory guidelines for requested testing.
TNTC,H1	Too numerous to count. Sample analysis performed past holding time.
U	Analyte was not detected. The concentration is below the reported LOD.
U,CT1	Analyte was not detected. The concentration is below the reported LOD. Cooler temperature at sample reciept exceeded
U,H1	Not detected; Sample analysis performed past holding time.
UJ	Undetected; the MDL and RL are estimated due to quality control discrepancies.
UQ	Undetected; the analyte was analyzed for, but not detected.
W	Post-digestion spike for furnace AA out of control limits
X	Exceeds regulatory limit
X, S	Exceeds regulatory limit; method of standard additions (MSA)
Z	Cannot be resolved from isomer - see below

AECOM

Chain of Custody Record

COC Number:

Laboratory:	Microbac POC: Stephanie Mossburg	Project Manager:	Debra Richmann
Address:	158 Starlite Drive	Phone/Fax Number:	210-296-2000
	Marietta, OH 45750	Sampler (print):	Scott Beesinger
Phone:	1-800-373-4071		
Client:	AECOM	Signature:	
Address:	112 East Pecan Ste. 400		
	San Antonio, TX 78205		
Turn Around Time:	STANDARD	pH:	
Project Name/Location:	Longhorn		
Project Number:	60256135.0009AA		

Mail to: Linda Raabe, 112 East Pecan STE. 400, San Antonio, TX 78205, 210-296-2000

Fed Ex Airbill No:

Program:

ERPIMS REQUIRED FIELDS

Site Name	Sample ID/Location ID	SBD	SED	Date	Time	Comp	Grab	Matrix	Number of Containers	Perchlorate	SA CODE	Cooler ID	LOT CONTROL NUMBERS ABLOT	EBLOT	TBLOT
Harrison Bayou & Goose Prarie Creek	HBW 7 - 112916			11/29/16	8:13		X	W	1	X					
	HBW 10 - 112916			11/29/16	8:27		X	W	1	X					
	HBW 1 - 112916			11/29/16	8:35		X	W	1	X					
	GPW 1 - 112916			11/29/16	8:58		X	W	1	X					
	GPW 3 - 112916			11/29/16	9:10		X	W	1	X					

Comments: STANDARD TAT

Relinquished by: (Signature) Scott Beesinger	Date 11/29/16	Time 15:00	Received by: (Signature)	
Relinquished by: (Signature)	Date	Time	Received for Laboratory by: (Signature)	

Microbac OVD
Received: 11/30/2016 09:32
By: BRENDA GREGORY
221000094024
Brenda Gregory

•Homogenize all composite samples prior to analysis

Distribution: White

...ature)

...Manager

00841109

MICROBAC

Cooler ID 4024

COOLER TEMP >6° C LOG

SAMPLE ID	Bottle 1 °C	Bottle 2 °C	Bottle 3 °C	Bottle 4 °C	Bottle 5 °C	Bottle 6 °C

11/30/16 KBG

pH Lot # HC581117

pH Exceptions

SAMPLE ID	Bottle 1	Bottle 2	Bottle 3	Bottle 4	Bottle 5	Bottle 6

11/30/16 KBG

PRESERVATIVE EXCEPTIONS

NONE

AS NOTED

KBG 11/30/16

Document Control # 1957
Last 10-07-2016

Issued to: Document Master File

Microbac Laboratories Inc.

Internal Chain of Custody Report

Login: L16111326
Account: 2551
Project: 2551.096
Samples: 5
Due Date: 09-DEC-2016

Samplenum	Container ID	Products
L16111326-01	834862	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	30-NOV-2016 10:08	BRG		
2	ANALYZ	W1	SEM	15-DEC-2016 14:34	JWR	BRG	
3	STORE	SEM	A1	17-DEC-2016 18:31	AZH	JWR	

Samplenum	Container ID	Products
L16111326-02	834863	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	30-NOV-2016 10:08	BRG		
2	ANALYZ	W1	SEM	15-DEC-2016 14:34	JWR	BRG	
3	STORE	SEM	A1	17-DEC-2016 18:31	AZH	JWR	

Samplenum	Container ID	Products
L16111326-03	834864	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	30-NOV-2016 10:08	BRG		
2	ANALYZ	W1	SEM	15-DEC-2016 14:34	JWR	BRG	
3	STORE	SEM	A1	17-DEC-2016 18:31	AZH	JWR	

Samplenum	Container ID	Products
L16111326-04	834865	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	30-NOV-2016 10:08	BRG		
2	ANALYZ	W1	SEM	15-DEC-2016 14:34	JWR	BRG	
3	STORE	SEM	A1	17-DEC-2016 18:31	AZH	JWR	

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login

Microbac Laboratories Inc.

Internal Chain of Custody Report

Login: L16111326
Account: 2551
Project: 2551.096
Samples: 5
Due Date: 09-DEC-2016

Samplenum	Container ID	Products
L16111326-05	834866	6850

Bottle: 1

Seq.	Purpose	From	To	Date/Time	Accept	Relinquish	pH
1	LOGIN	COOLER	W1	30-NOV-2016 10:08	BRG		
2	ANALYZ	W1	SEM	15-DEC-2016 14:34	JWR	BRG	
3	STORE	SEM	A1	17-DEC-2016 18:31	AZH	JWR	

A1 - Sample Archive (COLD)
A2 - Sample Archive (AMBIENT)
F1 - Volatiles Freezer in Login
V1 - Volatiles Refrigerator in Login
W1 - Walkin Cooler in Login

NELAP Addendum - January 4, 2016

Non-NELAP LIMS Product and Description

The following is a list of those tests that are not included in the Microbac – OVD NELAP Scope of Accreditation:

Heat of Combustion (BTU)
Total Halide by Bomb Combustion (TX)
Particle Sizing - 200 Mesh (PS200)
Specific Gravity/Density (SPGRAV)
Total Residual Chlorine (CL-TRL)
Total Volatile Solids (all forms) (TVS)
Total Coliform Bacteria (all methods)
Fecal Coliform Bacteria (all methods)
Sulfite (SO3)
Propionaldehyde (HPLC-UV)

SOLID AND HAZARDOUS CHEMICALS
Nitrogen, Ammonia by Method 350.1
Chromium, Hexavalent, Leachable by SM3500 Cr-B 2009
Phenolics, Total by Method 420.1
ASTM D3987-06

NELAP Accreditation by Laboratory SOP

NONPOTABLE WATER

OVD HPLC02/HPLC-UV

Nitroglycerin
Acetic acid
Butyric acid
Lactic acid
Propionic acid
Pyruvic acid

OVD MSS01/GC-MS

1,4-Phenylenediamine
1-Methylnaphthalene
1,4-Dioxane
Atrazine
Benzaldehyde
Biphenyl
Caprolactam
Hexamethylphosphoramide (HMPA)
Pentachlorobenzene
Pentachloroethane

NELAP Accreditation by Laboratory SOP

NONPOTABLE WATER

OVD MSV01/GC-MS

1, 1, 2-Trichloro-1,2,2-trifluoroethane
1,3-Butadiene
Cyclohexane
Cyclohexanone
Dimethyl disulfide
Dimethylsulfide
Ethyl-t-butylether (ETBE)
Isoprene
Methylacetate
Methylcyclohexane
T-amylmethylether (TAME)
Tetrahydrofuran (THF)

OVD HPLC07/HPLC-MS-MS

Hexamethylphosphoramide (XMPA-LCMS)

OVD HPLC12/HPLC/UV

Acetate
Formate

OVD RSK01/GC-FID

Acetylene
Propane

OVD K9305/ISE

Fluoroborate

SOLID AND HAZARDOUS CHEMICALS

OVD MSS0I/GC-MS

1-Methylnaphthalene
Benzaldehyde
Biphenyl
Caprolactam
Pentachloroethane

NELAP Accreditation by Laboratory SOP

SOLID AND HAZARDOUS CHEMICALS

OVD MSV0I/GC-MS

1.3-Butadiene
Cyclohexane
Cyclohexanone
Dimethyl disulfide
Dimethylsulfide
Ethyl-t-butylether (ETBE)
Isoprene
Methylacetate
Methylcyclohexane
n-Hexane
T-amylmethylether (TAME)