

## CHAAP Data Verification

Laboratory and SDG#: TADenver 280-134268

AECOM Chemist: Jared DeSadier

Date Verified: 3/25/2020

AECOM ITR: Savannah Wolfe

Guidance: DoD QSM Version 5.1 (January 2017)

Applicable QAPP: Cornhusker Army Ammunition Plant QAPP (Brice and AECOM, October 2018)

Applicable Analytical Methods: 8330A, 353.2, 350.1, 351.2, RSK-175, 9060A, 2320B, 9056A, 9034

Sample Identification #	Date Collected	Date Received	Matrix	Analysis
NW062-2	3/3/2020	3/4/2020	Water	Explosives (8330A), Nitrate, Nitrite (353.2), Ammonia (350.1), TKN (351.2), MEE (RSK-175), DOC (9060A), Sulfate (9056A) Sulfide (9034), Alkalinity (2320B)
G0080-2	3/3/2020	3/4/2020	Water	Explosives (8330A), Nitrate, Nitrite (353.2), Ammonia (350.1), TKN (351.2), MEE (RSK-175), DOC (9060A), Sulfate (9056A) Sulfide (9034), Alkalinity (2320B)
NW070-2	3/3/2020	3/4/2020	Water	Explosives (8330A), Nitrate, Nitrite (353.2), Ammonia (350.1), TKN (351.2), MEE (RSK-175), DOC (9060A), Sulfate (9056A) Sulfide (9034), Alkalinity (2320B)
NW071-2	3/3/2020	3/4/2020	Water	Explosives (8330A), Nitrate, Nitrite (353.2), Ammonia (350.1), TKN (351.2), MEE (RSK-175), DOC (9060A), Sulfate (9056A) Sulfide (9034), Alkalinity (2320B)
NW080R-2	3/3/2020	3/4/2020	Water	Explosives (8330A), Nitrate, Nitrite (353.2), Ammonia (350.1), TKN (351.2), MEE (RSK-175), DOC (9060A), Sulfate (9056A) Sulfide (9034), Alkalinity (2320B)
NW081R-2	3/3/2020	3/4/2020	Water	Explosives (8330A), Nitrate, Nitrite (353.2), Ammonia (350.1), TKN (351.2), MEE (RSK-175), DOC (9060A), Sulfate (9056A) Sulfide (9034), Alkalinity (2320B)
CA210-2	3/3/2020	3/4/2020	Water	Explosives (8330A), Nitrate, Nitrite (353.2), Ammonia (350.1), TKN (351.2), MEE (RSK-175), DOC (9060A), Sulfate (9056A) Sulfide (9034), Alkalinity (2320B)
CA212-2	3/3/2020	3/4/2020	Water	Explosives (8330A), Nitrate, Nitrite (353.2), Ammonia (350.1), TKN (351.2), MEE (RSK-175), DOC (9060A), Sulfate (9056A) Sulfide (9034), Alkalinity (2320B)
CA211-2	3/3/2020	3/4/2020	Water	Explosives (8330A), Nitrate, Nitrite (353.2), Ammonia (350.1), TKN (351.2), MEE (RSK-175), DOC (9060A), Sulfate (9056A) Sulfide (9034), Alkalinity (2320B)
PZ019-2	3/3/2020	3/4/2020	Water	Explosives (8330A), Nitrate, Nitrite (353.2), Ammonia (350.1), TKN (351.2), MEE (RSK-175), DOC (9060A), Sulfate (9056A) Sulfide (9034), Alkalinity (2320B)

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## 1.0 Laboratory Case Narrative \ Cooler Receipt Form

Verification Criteria	Yes	No	N/A
Were any DoD QSM deviations noted in the laboratory case narrative?	X		
Were DoD QSM corrective actions followed if deviations were noted?	X		
Were any issues noted in the cooler receipt form?	X		

The case narrative indicated that some surrogate, LCS/LCSD, and MS/MSD recoveries were outside evaluation criteria. These issues are discussed further in the ADR report.

The case narrative also indicated that some analytes were detected in blank samples. This issue is discussed further in Section 6.0.

The cooler receipt form indicated some discrepancies between the COC and some sample labels. This issue is discussed further in Section 2.0.

No other issues were noted in the case narrative or cooler receipt form.

## 2.0 Sample Documentation

Verification Criteria	Yes	No
Were all samples documented correctly on the chain-of-custody (COC) and samples labels?		X
Were all sample identifications (IDs) documented correctly on sample labels?		X
Did samples listed on COCs match the sample labels?		X
Were samples relinquished properly on the COC?	X	

The cooler receipt form indicated some discrepancies between the COC and some sample labels. Per the chemist, samples were logged via the COC and no qualification of data was required.

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### 3.0 Initial Calibration

Method 8330A Initial Calibration Criteria			
<b>Instrument:</b>	CHHPLC X3		
<b>Date of Calibration:</b>	3/4/2020		
	Yes	No	N/A
Was at least a five point calibration completed for all analytes prior to sample analysis and one option below?	X		
Option 1: RSD for each analyte $\leq 20\%$ ?	X		
Option 2: If linear least squares regression was used was the $r^2 \geq 0.99$ ?			X
Option 3: If non-linear regression was used was the coefficient of determination $r^2 \geq 0.99$ ?			X
If non-linear regression was used were 6 points used for second order and 7 points for third order?			X

Method 8330A Initial Calibration Criteria			
<b>Instrument:</b>	CHHPLC X3		
<b>Date of Calibration:</b>	3/4/2020		
	Yes	No	N/A
Was at least a five point calibration completed for all analytes prior to sample analysis and one option below?	X		
Option 1: RSD for each analyte $\leq 20\%$ ?	X		
Option 2: If linear least squares regression was used was the $r^2 \geq 0.99$ ?			X
Option 3: If non-linear regression was used was the coefficient of determination $r^2 \geq 0.99$ ?			X
If non-linear regression was used were 6 points used for second order and 7 points for third order?			X

Method 8330A Initial Calibration Criteria			
<b>Instrument:</b>	CHHPLC G2 LUNA		
<b>Date of Calibration:</b>	3/3/2020		
	Yes	No	N/A
Was at least a five point calibration completed for all analytes prior to sample analysis and one option below?	X		
Option 1: RSD for each analyte $\leq 20\%$ ?	X		
Option 2: If linear least squares regression was used was the $r^2 \geq 0.99$ ?			X
Option 3: If non-linear regression was used was the coefficient of determination $r^2 \geq 0.99$ ?			X
If non-linear regression was used were 6 points used for second order and 7 points for third order?			X

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Method 8330A Initial Calibration Criteria			
<b>Instrument:</b>	CHHPLC_G2_LUNA		
<b>Date of Calibration:</b>	3/3/2020		
	<b>Yes</b>	<b>No</b>	<b>N/A</b>
Was at least a five point calibration completed for all analytes prior to sample analysis and one option below?	X		
Option 1: RSD for each analyte $\leq 20\%$ ?	X		
Option 2: If linear least squares regression was used was the $r^2 \geq 0.99$ ?			X
Option 3: If non-linear regression was used was the coefficient of determination $r^2 \geq 0.99$ ?			X
If non-linear regression was used were 6 points used for second order and 7 points for third order?			X

Method RSK-175 Initial Calibration Criteria			
<b>Instrument:</b>	VGC_J		
<b>Date of Calibration:</b>	04/15/2019		
	<b>Yes</b>	<b>No</b>	<b>N/A</b>
Was at least a five point calibration completed for all analytes prior to sample analysis and one option below?	X		
Option 1: RSD for each analyte $\leq 25\%$ ?	X		
Option 2: If linear least squares regression was used was the $r^2 \geq 0.99$ ?	X		
Option 3: If non-linear regression was used was the coefficient of determination $r^2 \geq 0.99$ ?			X
If non-linear regression was used were 6 points used for second order and 7 points for third order?			X

Method 9056A Initial Calibration Criteria			
<b>Instrument:</b>	WC_IonChrom11		
<b>Date of Calibration:</b>	2/20/2020		
	<b>Yes</b>	<b>No</b>	<b>N/A</b>
Was a minimum of three standards and a calibration blank used for ICAL?	X		
Was $r^2 \geq 0.99$ ?	X		

Method 350.1 Initial Calibration Criteria			
<b>Instrument:</b>	WC_Alp 3		
<b>Date of Calibration:</b>	3/18/2020		
	<b>Yes</b>	<b>No</b>	<b>N/A</b>
Was a minimum of three standards and a calibration blank used for ICAL?	X		
Was $r^2 \geq 0.99$ ?	X		

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Method 350.1 Initial Calibration Criteria			
Instrument:	WC Alp 3		
Date of Calibration:	3/20/2020		
	Yes	No	N/A
Was a minimum of three standards and a calibration blank used for ICAL?	X		
Was $r^2 \geq 0.99$ ?	X		

Method 353.2 Initial Calibration Criteria			
Instrument:	WC Alp 2		
Date of Calibration:	3/10/2020		
	Yes	No	N/A
Was a minimum of three standards and a calibration blank used for ICAL?	X		
Was $r^2 \geq 0.99$ ?	X		

Method 351.2 Initial Calibration Criteria			
Instrument:	WC Astoria		
Date of Calibration:	3/11/2020		
	Yes	No	N/A
Was a minimum of three standards and a calibration blank used for ICAL?	X		
Was $r^2 \geq 0.99$ ?	X		

Method 9060A Initial Calibration Criteria			
Instrument:	WC SHI3		
Date of Calibration:	3/17/2020		
	Yes	No	N/A
Was a minimum of three standards and a calibration blank used for ICAL?	X		
Was $r^2 \geq 0.99$ ?	X		

Method 9060A Initial Calibration Criteria			
Instrument:	WC SHI3		
Date of Calibration:	3/19/2020		
	Yes	No	N/A
Was a minimum of three standards and a calibration blank used for ICAL?	X		
Was $r^2 \geq 0.99$ ?	X		

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### 4.0 Initial Calibration Verification [(ICV) Second Source]

<b>Method 8330A ICV Criteria (Filename)</b>	<b>03040015.D</b>		
<b>Instrument:</b>	<b>CHHPLC_X3</b>		
<b>Date of Initial Calibration Verification:</b>	<b>3/4/2020</b>		
	<b>Yes</b>	<b>No</b>	<b>N/A</b>
Was the ICV analyzed after each calibration?	X		
Was the ICV for all analytes within $\pm 15\%$ of the true value?	X		

<b>Method 8330A ICV Criteria (Filename)</b>	<b>03040033.D</b>		
<b>Instrument:</b>	<b>CHHPLC_X3</b>		
<b>Date of Initial Calibration Verification:</b>	<b>3/4/2020</b>		
	<b>Yes</b>	<b>No</b>	<b>N/A</b>
Was the ICV analyzed after each calibration?	X		
Was the ICV for all analytes within $\pm 15\%$ of the true value?	X		

<b>Method 8330A ICV Criteria (Filename)</b>	<b>03030015.D</b>		
<b>Instrument:</b>	<b>CHHPLC_G2-LUNA</b>		
<b>Date of Initial Calibration Verification:</b>	<b>3/3/2020</b>		
	<b>Yes</b>	<b>No</b>	<b>N/A</b>
Was the ICV analyzed after each calibration?	X		
Was the ICV for all analytes within $\pm 15\%$ of the true value?	X		

<b>Method 8330A ICV Criteria (Filename)</b>	<b>03030024.D</b>		
<b>Instrument:</b>	<b>CHHPLC_G2-LUNA</b>		
<b>Date of Initial Calibration Verification:</b>	<b>3/4/2020</b>		
	<b>Yes</b>	<b>No</b>	<b>N/A</b>
Was the ICV analyzed after each calibration?	X		
Was the ICV for all analytes within $\pm 15\%$ of the true value?	X		

<b>Method RSK-175 ICV Criteria (Filename)</b>	<b>04151911.D</b>		
<b>Instrument:</b>	<b>VGC_J</b>		
<b>Date of Initial Calibration Verification:</b>	<b>4/15/2019</b>		
	<b>Yes</b>	<b>No</b>	<b>N/A</b>
Was the ICV analyzed after each calibration?	X		
Was the ICV for all analytes within $\pm 25\%$ of the true value?	X		

<b>Method 9056A ICV</b>	<b>WC_IonChrom11</b>		
<b>Date of Initial Calibration Verification:</b>	<b>2/20/2020</b>		
	<b>Yes</b>	<b>No</b>	<b>N/A</b>
Was the ICV analyzed after each ICAL, prior to the beginning of a sample analysis?	X		
Was the ICV for all analytes within $\pm 10\%$ of the true value?	X		

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Method 350.1 ICV Criteria	WC Alp 3		
Date of Initial Calibration Verification:	3/18/2020		
	Yes	No	N/A
Was the ICV analyzed after each ICAL, prior to the beginning of a sample analysis?	X		
Was the ICV for all analytes within $\pm 10\%$ of the true value?	X		

Method 350.1 ICV Criteria	WC Alp 3		
Date of Initial Calibration Verification:	3/20/2020		
	Yes	No	N/A
Was the ICV analyzed after each ICAL, prior to the beginning of a sample analysis?	X		
Was the ICV for all analytes within $\pm 10\%$ of the true value?	X		

Method 353.2 ICV Criteria	WC Alp 2		
Date of Initial Calibration Verification:	3/10/2020		
	Yes	No	N/A
Was the ICV analyzed after each ICAL, prior to the beginning of a sample analysis?	X		
Was the ICV for all analytes within $\pm 10\%$ of the true value?	X		

Method 351.2 ICV Criteria	WC Astoria		
Date of Initial Calibration Verification:	3/11/2020		
	Yes	No	N/A
Was the ICV analyzed after each ICAL, prior to the beginning of a sample analysis?	X		
Was the ICV for all analytes within $\pm 10\%$ of the true value?	X		

Method 9060A ICV Criteria	WC SHI3		
Date of Initial Calibration Verification:	3/17/2020		
	Yes	No	N/A
Was the ICV analyzed after each ICAL, prior to the beginning of a sample analysis?	X		
Was the ICV for all analytes within $\pm 10\%$ of the true value?	X		

Method 9060A ICV Criteria	WC SHI3		
Date of Initial Calibration Verification:	3/19/2020		
	Yes	No	N/A
Was the ICV analyzed after each ICAL, prior to the beginning of a sample analysis?	X		
Was the ICV for all analytes within $\pm 10\%$ of the true value?	X		

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### 5.0 Continuing Calibration Verification (CCV)

<b>Method 8330A CCV Criteria (Filename)</b>	<b>03100020_2D</b>		
<b>Instrument:</b>	<b>CHHPLC_X3</b>		
<b>Date of Calibration Verification:</b>	<b>3/11/2020</b>		
	<b>Yes</b>	<b>No</b>	<b>N/A</b>
Was the CCV analyzed daily before sample analysis?	X		
Was the CCV analyzed every 10 field samples and at the end of the analysis sequence?	X		
Was the CCV for all analytes within $\pm 15\%$ of the true value?	X		

<b>Method 8330A CCV Criteria (Filename)</b>	<b>03100033_5.D</b>		
<b>Instrument:</b>	<b>CHHPLC_X3</b>		
<b>Date of Calibration Verification:</b>	<b>3/11/2020</b>		
	<b>Yes</b>	<b>No</b>	<b>N/A</b>
Was the CCV analyzed daily before sample analysis?	X		
Was the CCV analyzed every 10 field samples and at the end of the analysis sequence?	X		
Was the CCV for all analytes within $\pm 15\%$ of the true value?	X		

<b>Method 8330A CCV Criteria (Filename)</b>	<b>0310038_40.D</b>		
<b>Instrument:</b>	<b>CHHPLC_X3</b>		
<b>Date of Calibration Verification:</b>	<b>3/11/2020</b>		
	<b>Yes</b>	<b>No</b>	<b>N/A</b>
Was the CCV analyzed daily before sample analysis?	X		
Was the CCV analyzed every 10 field samples and at the end of the analysis sequence?	X		
Was the CCV for all analytes within $\pm 15\%$ of the true value?	X		

<b>Method 8330A CCV Criteria (Filename)</b>	<b>03160019_20.D</b>		
<b>Instrument:</b>	<b>CHHPLC_G2_LUNA</b>		
<b>Date of Calibration Verification:</b>	<b>3/16/2020</b>		
	<b>Yes</b>	<b>No</b>	<b>N/A</b>
Was the CCV analyzed daily before sample analysis?	X		
Was the CCV analyzed every 10 field samples and at the end of the analysis sequence?	X		
Was the CCV for all analytes within $\pm 15\%$ of the true value?	X		

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Method 8330A CCV Criteria (Filename)	03160026_7.D		
Instrument:	CHHPLC_G2_LUNA		
Date of Calibration Verification:	3/17/2020		
	Yes	No	N/A
Was the CCV analyzed daily before sample analysis?	X		
Was the CCV analyzed every 10 field samples and at the end of the analysis sequence?	X		
Was the CCV for all analytes within $\pm 15\%$ of the true value?	X		

Method RSK-175 CCV Criteria (Filename)	034F2701.D		
Instrument:	VGC J		
Date of Calibration Verification:	3/9/2020		
	Yes	No	N/A
Was the CCV analyzed daily before sample analysis?	X		
Was the CCV analyzed every 10 field samples and at the end of the analysis sequence?	X		
Was the CCV for all analytes within $\pm 25\%$ of the true value?	X		

Method RSK-175 CCV Criteria (Filename)	051F4401.D		
Instrument:	VGC J		
Date of Calibration Verification:	3/9/2020		
	Yes	No	N/A
Was the CCV analyzed daily before sample analysis?	X		
Was the CCV analyzed every 10 field samples and at the end of the analysis sequence?	X		
Was the CCV for all analytes within $\pm 25\%$ of the true value?	X		

Method RSK-175 CCV Criteria (Filename)	063F5601.D		
Instrument:	VGC J		
Date of Calibration Verification:	3/10/2020		
	Yes	No	N/A
Was the CCV analyzed daily before sample analysis?	X		
Was the CCV analyzed every 10 field samples and at the end of the analysis sequence?	X		
Was the CCV for all analytes within $\pm 25\%$ of the true value?	X		

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<b>Method RSK-175 CCV Criteria (Filename)</b>	<b>047F4301.D</b>		
<b>Instrument:</b>	<b>VGC J</b>		
<b>Date of Calibration Verification:</b>	<b>3/10/2020</b>		
	<b>Yes</b>	<b>No</b>	<b>N/A</b>
Was the CCV analyzed daily before sample analysis?	X		
Was the CCV analyzed every 10 field samples and at the end of the analysis sequence?	X		
Was the CCV for all analytes within $\pm 25\%$ of the true value?	X		

<b>Method RSK-175 CCV Criteria (Filename)</b>	<b>059F5501.D</b>		
<b>Instrument:</b>	<b>VGC J</b>		
<b>Date of Calibration Verification:</b>	<b>3/10/2020</b>		
	<b>Yes</b>	<b>No</b>	<b>N/A</b>
Was the CCV analyzed daily before sample analysis?	X		
Was the CCV analyzed every 10 field samples and at the end of the analysis sequence?	X		
Was the CCV for all analytes within $\pm 25\%$ of the true value?	X		

<b>Method 9056A, Instrument: WC_IonChrom11, All CCVs on 3/17/2020</b>	<b>Yes</b>	<b>No</b>
Was a CCV analyzed after every 10 field samples and at the end of the analysis sequence?	X	
Were the CCVs for all analytes within $\pm 10\%$ of the true value?	X	

<b>Method 350.1, Instrument: WC_Alp 3, All CCVs on 3/8/2020</b>	<b>Yes</b>	<b>No</b>
Was a CCV analyzed after every 10 field samples and at the end of the analysis sequence?	X	
Were the CCVs for all analytes within $\pm 10\%$ of the true value?	X	

<b>Method 350.1, Instrument: WC_Alp 3, All CCVs on 3/20/2020</b>	<b>Yes</b>	<b>No</b>
Was a CCV analyzed after every 10 field samples and at the end of the analysis sequence?	X	
Were the CCVs for all analytes within $\pm 10\%$ of the true value?	X	

<b>Method 353.2, Instrument: WC_Alp 2, All CCVs on 3/10/2020</b>	<b>Yes</b>	<b>No</b>
Was a CCV analyzed after every 10 field samples and at the end of the analysis sequence?	X	
Were the CCVs for all analytes within $\pm 10\%$ of the true value?	X	

<b>Method 351.2, Instrument: WC_Astoria, All CCVs on 3/11/2020</b>	<b>Yes</b>	<b>No</b>
Was a CCV analyzed after every 10 field samples and at the end of the analysis sequence?	X	
Were the CCVs for all analytes within $\pm 10\%$ of the true value?	X	

<b>Method 9060A, Instrument: WC_SHI3, All CCVs on 3/17/2020</b>	<b>Yes</b>	<b>No</b>
Was a CCV analyzed after every 10 field samples and at the end of the analysis sequence?	X	
Were the CCVs for all analytes within $\pm 10\%$ of the true value?	X	

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Method 9060A, Instrument: WC_SHI3, All CCVs on 3/19/2020	Yes	No
Was a CCV analyzed after every 10 field samples and at the end of the analysis sequence?	X	
Were the CCVs for all analytes within $\pm 10\%$ of the true value?	X	

### 6.0 Blank Samples

Blank Criteria	Yes	No	N/A
Were method blanks analyzed with every preparatory batch?	X		
Were target analytes detected $> \frac{1}{2}$ the LOQ and $> \frac{1}{10}$ the amount measured in any sample or $\frac{1}{10}$ the regulatory limit (whichever is greater)?	X		
Were target analytes detected in method, trip or calibration blanks?	X		

Blank ID	Parameter	Analyte	Concentration	LOQ	Units
MB 280-489439/20	Ammonia	Ammonia	0.0320	0.10	mg/L
MB 280-488338/22	Anions	Nitrate-Nitrite	0.0478	0.10	mg/L
MB 280-487751/2-A	Sulfide	Sulfide	1.9	4.0	mg/L
MB 280-487821/2-A	Sulfide	Sulfide	0.800	4.0	mg/L
MB 280-488988/2-A	DOC	DOC	0.869	1.0	mg/L

Analytical data that required qualification based on blank contamination are included in the table below. Analytical data that were reported nondetect or at concentrations greater than five times (5X) the associated blank concentration did not require qualification.

Field ID	Parameter	Analyte	New LOQ	Qualification
CA210-2	Ammonia	Ammonia	-	U
CA211-2	Ammonia	Ammonia	-	U
CA212-2	Ammonia	Ammonia	-	U
NW080R-2	Ammonia	Ammonia	-	U
NW081R-2	Ammonia	Ammonia	-	U
CA211-2	Sulfide	Sulfide	-	U
NW062-2	Sulfide	Sulfide	-	U
NW080R-2	Sulfide	Sulfide	-	U

### 7.0 Sensitivity

Sensitivity Criteria	Yes	No	N/A
Was the laboratory sensitivity consistent with project (QAPP) requirements?	X		
Did all analytes meet sensitivity requirements?	X		

## CHAAP Data Verification

Laboratory and SDG#: TADenver 280-134268

AECOM Chemist: Jared DeSadier

Date Verified: 3/25/2020

AECOM ITR: Savannah Wolfe

Guidance: DoD QSM Version 5.1 (January 2017)

Applicable QAPP: Cornhusker Army Ammunition Plant QAPP (Brice and AECOM, October 2018)

Applicable Analytical Methods: 8330A, 353.2, 350.1, 351.2, RSK-175, 9060A, 2320B, 9056A, 9034

### 8.0 Additional Qualifications

Additional Qualification Criteria	Yes	No	N/A
Were common laboratory contaminants detected?		X	
Was professional judgment used to qualify data (if yes, list below)?			X

### 9.0 Completeness

Completeness Criteria	Yes	No	N/A
Were any data rejected during the verification process?		X	
Were any samples lost, broken, or in any other manner in not verified?		X	
Were requested sample analyses performed, the correct analyte lists used, and correct sample preparation and analyses methods and units utilized?	X		