Laboratory and SDG#: TADenver 280-159234 AECOM Chemist: April McLeod Date Verified: 3/30/2022 AECOM ITR: Jared Grogan

Guidance: DoD QSM Version 5.1 (January 2017)

Sample Identification #	Date Collected	Date Received	Matrix	Analysis
NW020-8	2/28/2022	3/2/2022	Water	Explosives (8330A), Nitrate, Nitrite (353.2), Ammonia (350.1), TKN (351.2), Methane (RSK-175), DOC (9060A), Sulfate (9056A), Alkalinity (2320B), Sulfide (9034)
NW021-8	2/28/2022	3/2/2022	Water	Explosives (8330A), Nitrate, Nitrite (353.2), Ammonia (350.1), TKN (351.2), Methane (RSK-175), DOC (9060A), Sulfate (9056A), Alkalinity (2320B), Sulfide (9034)
NW022-8	2/28/2022	3/2/2022	Water	Explosives (8330A), Nitrate, Nitrite (353.2), Ammonia (350.1), TKN (351.2), Methane (RSK-175), DOC (9060A), Sulfate (9056A), Alkalinity (2320B), Sulfide (9034)
G0079-8	3/1/2022	3/2/2022	Water	Explosives (8330A), Nitrate, Nitrite (353.2), Ammonia (350.1), TKN (351.2), Methane (RSK-175), DOC (9060A), Sulfate (9056A), Alkalinity (2320B), Sulfide (9034)
G0075-8	3/1/2022	3/2/2022	Water	Explosives (8330A), Nitrate, Nitrite (353.2), Ammonia (350.1), TKN (351.2), Methane (RSK-175), DOC (9060A), Sulfate (9056A), Alkalinity (2320B), Sulfide (9034)
G0076-8	3/1/2022	3/2/2022	Water	Explosives (8330A), Nitrate, Nitrite (353.2), Ammonia (350.1), TKN (351.2), Methane (RSK-175), DOC (9060A), Sulfate (9056A), Alkalinity (2320B), Sulfide (9034)
G0070-8	3/1/2022	3/2/2022	Water	Explosives (8330A), Nitrate, Nitrite (353.2), Ammonia (350.1), TKN (351.2), Methane (RSK-175), DOC (9060A), Sulfate (9056A), Alkalinity (2320B), Sulfide (9034)
G0080-8	3/1/2022	3/2/2022	Water	Explosives (8330A), Nitrate, Nitrite (353.2), Ammonia (350.1), TKN (351.2), Methane (RSK-175), DOC (9060A), Sulfate (9056A), Alkalinity (2320B), Sulfide (9034)
G0087-8	3/1/2022	3/2/2022	Water	Explosives (8330A), Nitrate, Nitrite (353.2), Ammonia (350.1), TKN (351.2), Methane (RSK-175), DOC (9060A), Sulfate (9056A), Alkalinity (2320B), Sulfide (9034)
G0086-8	3/1/2022	3/2/2022	Water	Explosives (8330A), Nitrate, Nitrite (353.2), Ammonia (350.1), TKN (351.2), Methane (RSK-175), DOC (9060A), Sulfate (9056A), Alkalinity (2320B), Sulfide (9034)

Laboratory and SDG#: TADenver 280-159234 AECOM Chemist: April McLeod Date Verified: 3/30/2022 AECOM ITR: Jared Grogan

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Applicable QAPP: Cornhusker Army Ammunition Plant QAPP (Brice and AECOM, October 2019) Applicable Analytical Methods: 8330A, 353.2, 350.1, 351.2, RSK-175, 9060A, 2320B, 9056A, 9034

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 MS/MSD recoveries and surrogate recoveries were outside evaluation criteria. Some results were qualified due to method blank contamination. These issues are discussed further in the ADR report.

The case narrative also indicated that the RPD between the primary and confirmation column for some explosives samples was above evaluation criteria. This issue is discussed further in Section 7.0. Some samples were further preserved upon receipt. No qualification was required.

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?		
Did samples listed on COCs match the sample labels?	X	
Were samples relinquished properly on the COC?	X	

3.0 Initial Calibration

Method 8330A Initial Calibration Criteria				
Instrument:		CHHPLC X3		
Date of Calibration:		1/4/2022		
	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 ≤ 20%?	X			
Option 2: If linear least squares regression was used was the $r^2 \ge 0.99$?	X			
Option 3: If non-linear regression was used was the coefficient of determination $r^2 \ge 0.99$?			X	
If non-linear regression was used were 6 points used for second order and 7 points for third order?			X	

Laboratory and SDG#: TADenver 280-159234 AECOM Chemist: April McLeod Date Verified: 3/30/2022 AECOM ITR: Jared Grogan

Guidance: DoD QSM Version 5.1 (January 2017)

Method 8330A Initial Calibration Criteria				
Instrument:		CHHPLC X3		
Date of Calibration:		1/5/2022		
	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 ≤ 20%?	X			
Option 2: If linear least squares regression was used was the $r^2 \ge 0.99$?			X	
Option 3: If non-linear regression was used was the coefficient of determination $r^2 \ge 0.99$?			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				
Instrument:		CHHPLC_X5		
Date of Calibration:		3/2/2022		
	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 $\leq 20\%$?				
Option 2: If linear least squares regression was used was the $r^2 \ge 0.99$?	X			
Option 3: If non-linear regression was used was the coefficient of determination $r^2 \ge 0.99$?			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					
Instrument:		CHHPLC X5			
Date of Calibration:		3/3/2022			
	Yes	Yes No N			
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 $r^2 \ge 0.99$?			X		
Option 3: If non-linear regression was used was the coefficient of determination $r^2 \ge 0.99$?			X		
If non-linear regression was used were 6 points used for second order and 7 points for third order?			X		

Laboratory and SDG#: TADenver 280-159234 AECOM Chemist: April McLeod Date Verified: 3/30/2022 AECOM ITR: Jared Grogan

Guidance: DoD QSM Version 5.1 (January 2017)

Method RSK-175 Initial Calibration Criteria					
Instrument:		VGC J			
Date of Calibration:		9/24/2021			
	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 $\leq 25\%$?	X				
Option 2: If linear least squares regression was used was the $r^2 \ge 0.99$?	X				
Option 3: If non-linear regression was used was the coefficient of determination $r^2 \ge 0.99$?			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					
Instrument:	WC_IonChrom10				
Date of Calibration:	2/:	2/28/2022			
	Yes	No	N/A		
Was a minimum of three standards and a calibration blank used for ICAL?	X				
Was $r^2 \ge 0.99$?	X				

Method 9056A Initial Calibration Criteria				
Instrument: WC_IonCl			om13	
Date of Calibration:	3/16/2022		2	
	Yes	No	N/A	
Was a minimum of three standards and a calibration blank used for ICAL?	X			
Was $r^2 \ge 0.99$?	X			

Method 350.1 Initial Calibration Criteria					
Instrument: WC_A		/C_Alp	4		
Date of Calibration:	3/17/2022		22		
	Yes	No	N/A		
Was a minimum of three standards and a calibration blank used for ICAL?	X				
Was $r^2 \ge 0.99$?	X				

Method 353.2 Initial Calibration Criteria			
Instrument:		WC_Alp 2	
Date of Calibration:	3/13/2022		22
	Yes	No	N/A
Was a minimum of three standards and a calibration blank used for ICAL?	X		
Was $r^2 \ge 0.99$?	X		

Laboratory and SDG#: TADenver 280-159234 AECOM Chemist: April McLeod Date Verified: 3/30/2022 AECOM ITR: Jared Grogan

Guidance: DoD QSM Version 5.1 (January 2017)

Applicable QAPP: Cornhusker Army Ammunition Plant QAPP (Brice and AECOM, October 2019) Applicable Analytical Methods: 8330A, 353.2, 350.1, 351.2, RSK-175, 9060A, 2320B, 9056A, 9034

Method 351.2 Initial Calibration Criteria			
Instrument:	W	C_GA	L1
Date of Calibration:	2.	2/22/2022	
	Yes	No	N/A
Was a minimum of three standards and a calibration blank used for ICAL?	X		
Was $r^2 \ge 0.99$?	X		

Method 9060A Initial Calibration Criteria			
Instrument:	W	C_SH	15
Date of Calibration:	3/14/2022		22
	Yes	No	N/A
Was a minimum of three standards and a calibration blank used for ICAL?	X		
Was $r^2 \ge 0.99$?	X		

4.0 Initial Calibration Verification [(ICV) Second Source]

Method 8330A ICV Criteria (Filename)	01	01040020.D		
Instrument:	CH	CHHPLC_X3		
Date of Initial Calibration Verification:	1	1/4/2022		
	Yes	No	N/A	
Was the ICV analyzed after each calibration?	X			
Was the ICV for all analytes within \pm 15% of the true value?	X			

Method 8330A ICV Criteria (Filename)	01	01040038.D		
Instrument:	СН	CHHPLC_X3		
Date of Initial Calibration Verification:	1	1/5/2022		
	Yes	No	N/A	
Was the ICV analyzed after each calibration?	X			
Was the ICV for all analytes within \pm 15% of the true value?	X			

Method 8330A ICV Criteria (Filename)	03020019.D			
Instrument:	СН	CHHPLC_X5		
Date of Initial Calibration Verification:	3	3/3/2022		
	Yes	No	N/A	
Was the ICV analyzed after each calibration?	X			
Was the ICV for all analytes within \pm 15% of the true value?	X			

Method 8330A ICV Criteria (Filename)	03020028.D		
Instrument:	CHHPLC_X5		
Date of Initial Calibration Verification:	3/3/2022		
	Yes	No	N/A
Was the ICV analyzed after each calibration?	X		
Was the ICV for all analytes within \pm 15% of the true value?	X		

Laboratory and SDG#: TADenver 280-159234 AECOM Chemist: April McLeod Date Verified: 3/30/2022 AECOM ITR: Jared Grogan

Guidance: DoD QSM Version 5.1 (January 2017)

Method RSK-175 ICV Criteria (Filename)	014F1201.D		.D	
Instrument:		VGC_J		
Date of Initial Calibration Verification:	9	9/24/2021		
	Yes	No	N/A	
Was the ICV analyzed after each calibration?	X			
Was the ICV for all analytes within $\pm 25\%$ of the true value?	X			

Method 9056A ICV	WC_IonChrom10			
Date of Initial Calibration Verification:	2.	2/28/2022		
	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 9056A ICV	WC_IonChrom13		om13
Date of Initial Calibration Verification:	3/	3/16/2022	
	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 9056A ICV	WC_IonChrom13		om13	
Date of Initial Calibration Verification:	3/	3/17/2022		
	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 4		
Date of Initial Calibration Verification:	3/17/2022		
	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/	3/13/2022		
	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			

Laboratory and SDG#: TADenver 280-159234 AECOM Chemist: April McLeod Date Verified: 3/30/2022 AECOM ITR: Jared Grogan

Guidance: DoD QSM Version 5.1 (January 2017)

Applicable QAPP: Cornhusker Army Ammunition Plant QAPP (Brice and AECOM, October 2019) Applicable Analytical Methods: 8330A, 353.2, 350.1, 351.2, RSK-175, 9060A, 2320B, 9056A, 9034

Method 351.2 ICV Criteria	WC_GAL1		L 1
Date of Initial Calibration Verification:	2/22/2022		2
	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_SHI5		
Date of Initial Calibration Verification:	3/14/2022		
	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		

5.0 Continuing Calibration Verification (CCV)

Method 8330A CCV Criteria (Filename)	030	03080007_9.D		
Instrument:	CH	CHHPLC X3		
Date of Calibration Verification:		3/8/2022		
	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 8330A CCV Criteria (Filename)	03080021_3.D			
Instrument:	СН	CHHPLC_X3		
Date of Calibration Verification:	3	3/8/2022		
	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 8330A CCV Criteria (Filename)	03080034_6.D			
Instrument:	СН	CHHPLC_X3		
Date of Calibration Verification:	3	3/9/2022		
	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			

Laboratory and SDG#: TADenver 280-159234 AECOM Chemist: April McLeod Date Verified: 3/30/2022 AECOM ITR: Jared Grogan

Guidance: DoD QSM Version 5.1 (January 2017)

Method 8330A CCV Criteria (Filename)	03080007_8.D			
Instrument:	СН	CHHPLC_X5		
Date of Calibration Verification:	3	3/8/2022		
	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 8330A CCV Criteria (Filename)	03080020_21.D			
Instrument:	СН	CHHPLC_X5		
Date of Calibration Verification:	3	3/9/2022		
	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 8330A CCV Criteria (Filename)	03080032_33.D			
Instrument:	СН	CHHPLC_X5		
Date of Calibration Verification:	3	3/9/2022		
	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)	002F0201.D			
Instrument:		VGC_J		
Date of Calibration Verification:		3/3/2022		
	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			

Laboratory and SDG#: TADenver 280-159234 AECOM Chemist: April McLeod Date Verified: 3/30/2022 AECOM ITR: Jared Grogan

Guidance: DoD QSM Version 5.1 (January 2017)

Method RSK-175 CCV Criteria (Filename)	017F1701.D			
Instrument:		VGC_J		
Date of Calibration Verification:		3/3/2022		
	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 CCVRT Criteria (Filename)	002F0201.D			
Instrument:		VGC J		
Date of Calibration Verification:		3/4/2022		
	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)	0	019F1901.D	
Instrument:		VGC J	
Date of Calibration Verification:		3/4/2022	
	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 CCVRT Criteria (Filename)	026F2601.D		1.D		
Instrument:	VGC_J		J		
Date of Calibration Verification:	3/4/2022		3/4/2022		22
	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 9056A, Instrument: WC_IonChrom10, All CCVs on 3/17/2022		
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	

Method 9056A, Instrument: WC_IonChrom13, All CCVs on 3/16/2022		
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	

Laboratory and SDG#: TADenver 280-159234 AECOM Chemist: April McLeod Date Verified: 3/30/2022 AECOM ITR: Jared Grogan

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Method 9056A, Instrument: WC_IonChrom13, All CCVs on 3/17/2022			
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		

Method 350.1, Instrument: WC_Alp 4, All CCVs on 3/17/2022			
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		

Method 353.2, Instrument: WC_Alp 2, All CCVs on 3/13/2022			
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		

Method 351.2, Instrument: WC_GAL1, All CCVs on 3/9/2022			
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		

Method 9060A, Instrument: WC_SHI5, All CCVs on 3/14/2022			
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		

Method 9060A, Instrument: WC_SHI5, All CCVs on 3/15/2022			
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 Sensitivity

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

7.0 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		

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.

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Field ID	Parameter	Analyte	New LOQ	Qualification
G0076-8	General Chemistry	Sulfide	-	U
G0086-8	General Chemistry	Sulfide	-	U

The RPD between the primary and confirmation column for one explosives sample was above evaluation criteria. Qualification of data is shown in the table below; results were reported from primary column unless otherwise noted.

Sample ID	Analysis	Analyte	RPD	Qual
EW7-PM24A-8-25	Explosives	RDX	170.8	J

8.0 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		