



Tuesday, August 07, 2018

Karen Waters-Husted  
CH2M HILL Plateau Remediation Company  
825 Jadwin Avenue  
Richland, WA 99352

Re: ALS Workorder: 1807322  
Project Name: SURV, May 2018  
Project Number: S18-005

Dear Ms. Waters-Husted:

One water sample was received from CH2M HILL Plateau Remediation Company, on 7/17/2018. The sample was scheduled for the following analysis:

Technetium-99

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the method employed.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

ALS Environmental  
Katie M. O'Brien  
Project Manager

We certify that this data package is in compliance with the SOW, both technically and for completeness, including a full description of, explanation of, and corrective actions for, any and all deviations, from either the analyses requested or the case narrative requested. Release of the data contained in this hard copy data package has been authorized by the Laboratory Analytical Manager (or designee) and the laboratory's client services representative as verified by their signatures on this report.

# ALS -- Fort Collins

## Sample Number(s) Cross-Reference Table

---

**OrderNum:** 1807322

**Client Name:** CH2M HILL Plateau Remediation Company

**Client Project Name:** SURV, May 2018

**Client Project Number:** S18-005

**Client PO Number:** BOA 54854

---

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
B3J5K4	1807322-1		WATER	12-Jul-18	11:59

<b>CH2M Hill Plateau Remediation Company</b>		<b>CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST</b>		C.O.C.# <b>S18-005-721</b> Page 1 of 1
<b>Collector:</b> <i>Kathy Turner</i> S18-005	<b>Contact/Requester:</b> Karen Waters-Husted	<b>Telephone No.:</b> 509-376-4650		
<b>SAF No.:</b> SURV, May 2018	<b>Sampling Origin:</b> Hanford Site	<b>Purchase Order/Charge Code:</b> 300071		
<b>Project Title:</b> SURV, May 2018	<b>Logbook No.:</b> HNF-N-506 -102	<b>Ice Chest No.:</b> 605-595		
<b>Shipped To (Lab):</b> ALS Environmental Ft. Collins	<b>Method of Shipment:</b> Commercial Carrier	<b>Bill of Lading/Air Bill No.:</b> 712718546082		
<b>Protocol:</b> SURV	<b>Priority:</b> 30 Days	<b>Offsite Property No.:</b> 9695		
<b>POSSIBLE SAMPLE HAZARDS/REMARK</b> ** ** Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1				
<b>SPECIAL INSTRUCTIONS</b> N/A				
<b>Sample No.</b> B3J5K4	<b>Filter</b> N	<b>Date</b> 7/12/18	<b>Time</b> 1159	<b>No/Type Container</b> 1x500-mL G/P
			<b>TC99_SEP_ISC:</b> COMMON	<b>Sample Analysis</b>
			<b>Holding Time</b> 6 Months	<b>Preservative</b> HCl to pH <2

<b>Relinquished By:</b> <i>Kathy Turner</i> Print First and Last Name	JUL 12 2018	SSU-1	JUL 12 2018	Received By:	JUL 12 2018	Matrix *
Signature	Date/Time	Signature	Date/Time	Print First and Last Name	Signature	DS = Drum Solids DL = Drum Liquids S = Soil SE = Sediment SO = Solid SL = Sludge W = Water O = Oil A = Air
<b>Relinquished By:</b>	JUL 16 2018	SSU-1	JUL 16 2018	Received By:	JUL 16 2018	T = Tissue WI = Wipe L = Liquid V = Vegetation X = Other
Signature	Date/Time	Signature	Date/Time	Print First and Last Name	Signature	
<b>Relinquished By:</b>	JUL 16 2018	FEDEX	JUL 16 2018	Received By:	JUL 16 2018	
Signature	Date/Time	Signature	Date/Time	Print First and Last Name	Signature	
<b>Relinquished By:</b>	JUL 16 2018	Julie Ellings	JUL 16 2018	Received By:	JUL 16 2018	
Signature	Date/Time	Signature	Date/Time	Print First and Last Name	Signature	
<b>FINAL SAMPLE DISPOSITION</b>	Disposal Method (e.g., Return to customer, per lab procedure, used in process):	Disposed By:	Date/Time:			



ALS Environmental - Fort Collins  
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: CHPRC Workorder No: 1807322  
Project Manager: KMO Initials: JE Date: 7-17-18

1. Are airbills / shipping documents present and/or removable?	DROP OFF	<input checked="" type="radio"/> YES	<input type="radio"/> NO				
2. Are custody seals on <b>shipping</b> containers intact?	NONE	<input checked="" type="radio"/> YES	<input type="radio"/> NO				
3. Are custody seals on <b>sample</b> containers intact?	NONE	<input checked="" type="radio"/> YES	<input type="radio"/> NO				
4. Is there a COC (chain-of-custody) present?		<input checked="" type="radio"/> YES	<input type="radio"/> NO				
5. Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)		<input checked="" type="radio"/> YES	<input type="radio"/> NO				
6. Are short-hold samples present?		<input checked="" type="radio"/> YES	<input checked="" type="radio"/> NO				
7. Are all samples within holding times for the requested analyses?		<input checked="" type="radio"/> YES	<input type="radio"/> NO				
8. Were all sample containers received intact? (not broken or leaking)		<input checked="" type="radio"/> YES	<input type="radio"/> NO				
9. Is there sufficient sample for the requested analyses?		<input checked="" type="radio"/> YES	<input type="radio"/> NO				
10. Are all samples in the proper containers for the requested analyses?		<input checked="" type="radio"/> YES	<input type="radio"/> NO				
11. Are all aqueous samples preserved correctly, if required? (excluding volatiles)	N/A	<input checked="" type="radio"/> YES	<input type="radio"/> NO				
12. Are all aqueous non-preserved samples pH 4-9?	<input checked="" type="radio"/> N/A	<input type="radio"/> YES	<input type="radio"/> NO				
13. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, Rx CN/S, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)	<input checked="" type="radio"/> N/A	<input type="radio"/> YES	<input type="radio"/> NO				
14. Were the samples shipped on ice?		<input checked="" type="radio"/> YES	<input type="radio"/> NO				
15. Were cooler temperatures measured at 0.1-6.0°C?	IR gun used*:	#1	#3	<input checked="" type="radio"/> #4	RAD ONLY	<input checked="" type="radio"/> YES	<input type="radio"/> NO
Cooler #: <u>1</u>							
Temperature (°C): <u>2.8</u>							
No. of custody seals on cooler: <u>2</u>							
External µR/hr reading: <u>13</u>							
Background µR/hr reading: <u>12</u>							
Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? YES / NO / NA (If no, see Form 008.)							

**Additional Information:** Please provide details here for any NO responses to gray-shaded boxes above, or any other issues noted:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

If applicable, was the client contacted? YES / NO / NA Contact: \_\_\_\_\_ Date/Time: \_\_\_\_\_  
Project Manager Signature / Date: [Signature] 7/18/18

1807322

ORIGIN IDPSCA (509) 528-9426  
LESLY WALL  
CH2M  
6267 LATAH ST.  
6269 LATAH ST.  
RICHLAND WA 99354  
UNITED STATES US

SHIP DATE: 16JUL18  
ACTWGT: 45.00 LB  
CAD: 10706605/INET3980  
BILL THIRD PARTY

TO JULIE ELLINGSON  
ALS GLOBAL  
225 COMMERCE DRIVE

13-2

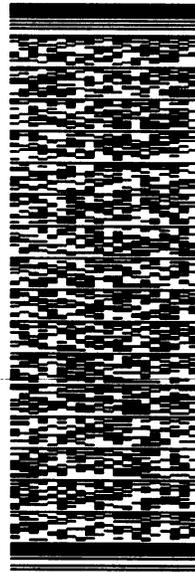
FORT COLLINS CO 80524

REF: PTR6935/COOLERN#GWS-595

2.8

PO

DEPT



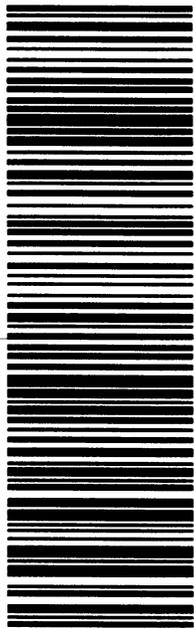
J18111801289111

TRK# 7727 1854 6082  
0201

TUE - 17 JUL 10:30A  
PRIORITY OVERNIGHT  
DSR

XH FTCA

CO-US DEN  
80524



**After printing this label:**

1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

**Warning:** Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.

Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on [fedex.com](http://fedex.com). FedEx will not be responsible for any claim in excess of \$100 per package, whether the result of loss, damage, delay, non-delivery, misdelivery, or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim. Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental, consequential, or special is limited to the greater of \$100 or the authorized declared value. Recovery cannot exceed actual documented loss. Maximum for items of extraordinary value is \$1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our Service Guide. Written claims must be filed within strict time limits, see current FedEx Service Guide.



# Technetium-99

## Case Narrative

---

### CH2M HILL Plateau Remediation Company

SURV, May 2018 – S18-005

Work Order Number: 1807322

1. The sample was prepared according to the current revision of SOP 755, with procedure modifications outlined in QASS 378635 and 378636.
2. This sample was analyzed for the presence of <sup>99</sup>Tc according to the current revision of SOP 704. The analysis was completed on 07/31/2018.
3. The analysis results for this sample are reported in units of pCi/L. The sample was not filtered prior to analysis.
4. The duplicate of sample 1807320-1 shared for this work order. The duplicate was performed on a CH2M HILL Plateau Remediation Company sample. The results can be found in the following report.
5. In accordance with project specific instructions, the evaluation threshold for Relative Percent Difference (RPD) has been set at 20%. RPD is defined as:

$$RPD = \frac{|S - D|}{(S + D)/2} * 100$$

Where: S = sample activity result and D = duplicate activity result. RPD is not evaluated for sample/duplicate pairs where the reported activity for either is less than 5 times the sample specific MDC. These samples are identified with an "NC" flag on the Duplicate Sample Results (RPD) page.

6. The requested detection limit was not met for sample 1807322-1. However, the observed activity for these samples is above the achieved detection limit, as indicated on the final reports by an 'X' qualifier. Results are submitted without further qualification



- 7. No further anomalous situations were encountered during the preparation or analysis of this sample. All quality control criteria were met.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Pik Yee Yuen  
Pik Yee Yuen  
Radiochemistry Primary Data Reviewer

8/6/18  
Date

Kath M. W.  
Radiochemistry Final Data Reviewer

8/7/18  
Date

# Technetium-99 by Liquid Scintillation

PAI 704\_Tc99 Rev 11

## Method Blank Results

Lab Name: ALS -- Fort Collins

Work Order Number: 1807322

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: SURV, May 2018 S18-005

Lab ID: TC180725-1MB

Sample Matrix: WATER

Prep Batch: TC180725-1

Final Aliquot: 250 ml

Prep SOP: PAI 755 Rev 12

QCBatchID: TC180725-1-2

Result Units: pCi/l

Date Collected: 25-Jul-18

Run ID: TC180725-1A

File Name: Manual Entry

Date Prepared: 25-Jul-18

Count Time: 60 minutes

Date Analyzed: 31-Jul-18

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14133-76-7	Tc-99	2.07E+00 +/- 4.43E+00	7.31E+00	2.00E+01	NA	U

### Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Tc-99m	4.540E+03	4.32E+03	Pci	95.2	40 - 110 %	

### Comments:

#### Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

#### Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

M - Requested MDC not met.

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

DL - Decision Level

Data Package ID: TC1807322-1

# Technetium-99 by Liquid Scintillation

PAI 704\_Tc99 Rev 11

## Laboratory Control Sample(s)

Lab Name: ALS -- Fort Collins

Work Order Number: 1807322

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: SURV, May 2018 S18-005

Lab ID: TC180725-1LCS

Sample Matrix: WATER

Prep Batch: TC180725-1

Final Aliquot: 250 ml

Prep SOP: PAI 755 Rev 12

QCBatchID: TC180725-1-2

Result Units: pCi/l

Date Collected: 25-Jul-18

Run ID: TC180725-1A

File Name: Manual Entry

Date Prepared: 25-Jul-18

Count Time: 37.45 minutes

Date Analyzed: 31-Jul-18

CASNO	Target Nuclide	Results +/- 2s TPU	MDC	Spike Added	% Rec	Control Limits	Lab Qualifier
14133-76-7	Tc-99	9.78E+02 +/- 1.57E+02	9.75E+00	9.110E+02	107	75 - 125	

### Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Tc-99m	4.540E+03	4.18E+03	Pci	92.2	40 - 110 %	

### Comments:

#### Qualifiers/Flags:

U - Result is less than the sample specific MDC.  
 LT - Result is less than Requested MDC, greater than sample specific MDC.  
 Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.  
 Y2 - Chemical Yield outside default limits.  
 L - LCS Recovery below lower control limit.  
 H - LCS Recovery above upper control limit.  
 P - LCS Recovery within control limits.  
 M - The requested MDC was not met.  
 M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

#### Abbreviations:

TPU - Total Propagated Uncertainty  
 MDC - Minimum Detectable Concentration

Data Package ID: TC1807322-1

# Technetium-99 by Liquid Scintillation

PAI 704\_Tc99 Rev 11

## Duplicate Sample Results (DER)

Lab Name: ALS -- Fort Collins

Work Order Number: 1807322

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: SURV, May 2018 S18-005

Field ID:	Shared QC
Lab ID:	1807320-1DUP

Sample Matrix: WATER

Prep SOP: PAI 755 Rev 12

Date Collected: 13-Jul-18

Date Prepared: 25-Jul-18

Date Analyzed: 31-Jul-18

Prep Batch: TC180725-1

QCBatchID: TC180725-1-2

Run ID: TC180725-1A

Count Time: 60 minutes

Report Basis: Unfiltered

Final Aliquot: 250 ml

Prep Basis: Unfiltered

Moisture(%): NA

Result Units: pCi/l

File Name: Manual Entry

CASNO	Analyte	Sample				Duplicate				DER	DER Lim
		Result +/-	2 s TPU	MDC	Flags	Result +/-	2 s TPU	MDC	Flags		
14133-76-7	Tc-99	2.61E+01 +/-	6.57E+00	7.63E+00		2.16E+01 +/-	5.82E+00	7.11E+00		1.02	3

### Comments:

#### Duplicate Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

D - DER is greater than Control Limit of 3

LT - Result is less than Request MDC, greater than sample specific MDC

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

#### Abbreviations:

TPU - Total Propagated Uncertainty

DER - Duplicate Error Ratio

BDL - Below Detection Limit

NR - Not Reported

Data Package ID: TC1807322-1

# Technetium-99 by Liquid Scintillation

PAI 704\_Tc99 Rev 11

## Duplicate Sample Results (RPD)

Lab Name: ALS -- Fort Collins

Work Order Number: 1807322

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: SURV, May 2018 S18-005

Field ID:	Shared QC
Lab ID:	1807320-1DUP

Sample Matrix: WATER

Prep SOP: PAI 755 Rev 12

Date Collected: 13-Jul-18

Date Prepared: 25-Jul-18

Date Analyzed: 31-Jul-18

Prep Batch: TC180725-1

QCBatchID: TC180725-1-2

Run ID: TC180725-1A

Count Time: 60 minutes

Report Basis: Unfiltered

Final Aliquot: 250 ml

Prep Basis: Unfiltered

Moisture(%): NA

Result Units: pCi/l

File Name: Manual Entry

CASNO	Analyte	Sample				Duplicate				RPD	RPD Lim
		Result +/-	2 s TPU	MDC	Flags	Result +/-	2 s TPU	MDC	Flags		
14133-76-7	Tc-99	2.61E+01 +/- 6.57E+00		7.63E+00		2.16E+01 +/- 5.82E+00		7.11E+00		NC	20

### Comments:

#### Qualifiers/Flags:

+ - Duplicate RPD not within limits.  
 LT - Result is less than Request MDC, greater than sample specific MDC  
 U - Result is less than the sample specific MDC.  
 Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.  
 Y2 - Chemical Yield outside default limits.  
 M - Requested MDC not met.  
 M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.  
 L - LCS Recovery below lower control limit.  
 H - LCS Recovery above upper control limit.  
 P - LCS, Matrix Spike Recovery within control limits.  
 N - Matrix Spike Recovery outside control limits  
 NC - Not Calculated for duplicate results less than 5 times MDC

#### Abbreviations:

TPU - Total Propagated Uncertainty  
 BDL - Below Detection Limit  
 NR - Not Reported

Data Package ID: TC1807322-1

# Technetium-99 by Liquid Scintillation

PAI 704\_Tc99 Rev 11

## Sample Results

Lab Name: ALS -- Fort Collins

Work Order Number: 1807322

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: SURV, May 2018 S18-005

Field ID:	Shared QC
Lab ID:	1807320-1

Sample Matrix: WATER

Prep SOP: PAI 755 Rev 12

Date Collected: 13-Jul-18

Date Prepared: 25-Jul-18

Date Analyzed: 31-Jul-18

Prep Batch: TC180725-1

QCBatchID: TC180725-1-2

Run ID: TC180725-1A

Count Time: 60 minutes

Report Basis: Unfiltered

Final Aliquot: 250 ml

Prep Basis: Unfiltered

Moisture(%): NA

Result Units: pCi/l

File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14133-76-7	Tc-99	2.61E+01 +/- 6.57E+00	7.63E+00	2E+01	NA	

## Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Tc-99m	4.540E+03	4.14E+03	Pci	91.2	40 - 110 %	

### Comments:

#### Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

#### Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: TC1807322-1

# Technetium-99 by Liquid Scintillation

PAI 704\_Tc99 Rev 11

## Sample Duplicate Results

Lab Name: ALS -- Fort Collins

Work Order Number: 1807322

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: SURV, May 2018 S18-005

Field ID:	Shared QC
Lab ID:	1807320-1DUP

Sample Matrix: WATER

Prep SOP: PAI 755 Rev 12

Date Collected: 13-Jul-18

Date Prepared: 25-Jul-18

Date Analyzed: 31-Jul-18

Prep Batch: TC180725-1

QCBatchID: TC180725-1-2

Run ID: TC180725-1A

Count Time: 60 minutes

Report Basis: Unfiltered

Final Aliquot: 250 ml

Prep Basis: Unfiltered

Moisture(%): NA

Result Units: pCi/l

File Name: Manual Entry

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14133-76-7	Tc-99	2.16E+01 +/- 5.82E+00	7.11E+00	2E+01	NA	

### Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Tc-99m	4.540E+03	4.46E+03	Pci	98.4	40 - 110 %	

### Comments:

#### Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M - The requested MDC was not met.

M3 - The requested MDC was not met, but thereported activity is greater than the reported MDC.

D - DER is greater than Control Limit of 3

#### Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: TC1807322-1

Date Printed:

Friday, August 03, 2018

ALS -- Fort Collins

LIMS Version: 6.868

Page 1 of 1

# Technetium-99 by Liquid Scintillation

PAI 704\_Tc99 Rev 11

## Sample Results

Lab Name: ALS -- Fort Collins

Work Order Number: 1807322

Client Name: CH2M HILL Plateau Remediation Company

ClientProject ID: SURV, May 2018 S18-005

Field ID:	B3J5K4
Lab ID:	1807322-1

Sample Matrix: WATER

Prep SOP: PAI 755 Rev 12

Date Collected: 12-Jul-18

Date Prepared: 25-Jul-18

Date Analyzed: 31-Jul-18

Prep Batch: TC180725-1

QCBatchID: TC180725-1-2

Run ID: TC180725-1A

Count Time: 9.2 minutes

Report Basis: Unfiltered

Final Aliquot: 250 ml

Prep Basis: Unfiltered

Moisture(%): NA

Result Units: pCi/l

File Name: Manual Entry

Analysis ReqCode: TC99\_SEP\_LSC

CASNO	Target Nuclide	Result +/- 2 s TPU	MDC	Requested MDC	DL	Lab Qualifier
14133-76-7	Tc-99	1.08E+04 +/- 1.72E+03	2.02E+01	2E+01	NA	X

## Chemical Yield Summary

Carrier/Tracer	Amount Added	Result	Units	Yield	Control Limits	Flag
Tc-99m	4.540E+03	4.13E+03	Pci	91.1	40 - 110 %	

## Comments:

### Qualifiers/Flags:

U - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative Yield is assumed.

Y2 - Chemical Yield outside default limits.

LT - Result is less than Requested MDC, greater than sample specific MDC.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

M - The requested MDC was not met.

### Abbreviations:

TPU - Total Propagated Uncertainty

MDC - Sample specific Minimum Detectable Concentration

BDL - Below Detection Limit

DL - Decision Level

Data Package ID: TC1807322-1

**Prep Batch ID: TC180725-1**

Start Date: 07/25/18

End Date: 07/25/18

Concentration Method: NONE

Batch Created By: nrb

Start Time: 8:10

End Time: 8:10

Extract Method: PAI 75512

Date Created: 07/25/18

Prep Analyst: Nikki R. Brooks

Initial Volume Units: ml

Time Created: 8:11

**Comments:**

Final Volume Units: ml

Validated By: nrb

Date Validated: 07/26/18

Time Validated: 10:06

QC Batch ID: TC180725-1-2

Lab ID	QC Type	Field ID	Matrix	Date Collected	Initial Wt/Vol	Final Wt/Vol	Cleanup Method	Cleanup DF	Order Number
TC180725-1	MB	XXXXXX	WATER	XXXXXX	250	250	NONE	1	1807320
TC180725-1CB1	MB	XXXXXX	WATER	XXXXXX	250	250	NONE	1	1807320
TC180725-1CB2	MB	XXXXXX	WATER	XXXXXX	250	250	NONE	1	1807320
TC180725-1CB3	MB	XXXXXX	WATER	XXXXXX	250	250	NONE	1	1807320
TC180725-1	LCS	XXXXXX	WATER	XXXXXX	250	250	NONE	1	1807320
1807320-1	DUP	XXXXXX	WATER	XXXXXX	250	250	NONE	1	1807320
1807320-1	SMP	XXXXXX	WATER	XXXXXX	250	250	NONE	1	1807320
1807321-1	SMP	XXXXXX	WATER	XXXXXX	250	250	NONE	1	1807321
1807322-1	SMP	B3J5K4	WATER	7/12/2018	250	250	NONE	1	1807322
1807441-2	SMP	XXXXXX	WATER	XXXXXX	250	250	NONE	1	1807441
1807441-4	SMP	XXXXXX	WATER	XXXXXX	250	250	NONE	1	1807441
1807441-5	SMP	XXXXXX	WATER	XXXXXX	250	250	NONE	1	1807441
1807442-1	SMP	XXXXXX	WATER	XXXXXX	250	250	NONE	1	1807442

**QC Types**

CAR	Carrier reference sample	DUP	Laboratory Duplicate
LCS	Laboratory Control Sample	LCSD	Laboratory Control Sample Duplicat
MB	Method Blank	MS	Laboratory Matrix Spike
MSD	Laboratory Matrix Spike Duplicate	REP	Sample replicate
RVS	Reporting Level Verification Standar	SMP	Field Sample
SYS	Sample Yield Spike		

ALS Laboratory Group - Fort Collins

QUALITY ASSURANCE SUMMARY SHEET

PAR W.O. #/ BATCH General  
 TEST Tc99  
 METHOD Prep  
 SOP/REV (PREP) 755  
 SOP/REV (ANAL) \_\_\_\_\_

Briefly document any QA or other problems or deviations associated with the analysis of samples. Problems could result from: log-in, color, odor, dilution, consistency, scheduling, equipment, or instrumentation, or may include documentation of minor deviations necessary due to unique DQO's or sample characteristics.

CLS 8/12/09

Tc99<sup>m</sup> 711.2613.17 was used as a tracer for this batch. It has a half-life of 6 hours and therefore must be delivered the day of prep and diluted to a working level solution. The procedure noted below is standard for all Tc99<sup>m</sup> dilutions.

1. Open the Pb shielded container and carefully remove the vial containing the Tc99<sup>m</sup> primary standard.
2. Withdraw a 1 mL aliquot of the Tc99<sup>m</sup> primary standard from the vial using a 10 mL syringe fitted with a hypodermic needle. Dispense the aliquot into a disposable beaker that contains ~100 mL of DI water. Cap and mix well. This intermediate solution is a 1/100x dilution of the primary standard.
3. Using a 10 mL syringe, transfer 10 mL of the intermediate solution prepared in step 2 into a disposable beaker that contains ~70 mL of DI water. Cap and mix well. This working standard solution is a 1/800x dilution of the primary standard.

CLS 8/12/09

CLS 8/12/09

Attach vendor label on the right side of page →

CLS 8/12/09

**CardinalHealth**  
 CARDINAL HEALTH 414, LLC  
 DENVER  
 10400 48TH AVE. STE 8  
 DENVER CO 80238  
 303.373.0578

**Rx# 635339**  
 Date Ordered : 25Jul2018  
 Date/Time Prepared : 26Jul2018 00:39 MT  
**ALS LABORATORY GROUP**  
 225 COMMERCE DR  
 FORT COLLINS CO 80524-2762  
 1 0359 Fort Collins

**Safetrac™**

CH102864

**CAUTION**  
 RADIOACTIVE MATERIALS

Not for Human Use For Calibration Use Only  
 Indication : **Calibration**  
 Dispense Date : 26Jul2018 Lot# : E18207-0002 Price(est) : N/A  
 Use By : 27Jul2018 00:39 MT Physician : Charles Orchard, RSO NPT :  
 Notes NDC : RPh : B. Young

Product : Tc-99m **Sodium Pertechnetate Unit Dose mCi (H<sub>2</sub>O)**  
 Disp Amt : 0.52 mCi Patient ID :  
 Calibration : 26Jul2018 10:00 MT Ordered Amount : 0.50 mCi  
 Volume : 10.00 mL  
 Conc : 0.05 mCi/mL

Caution: Federal law prohibits dispensing without a prescription - Rx only All Tc-99m drugs are below 0.15 uCi of Mo-99/mCi of Tc-99m at 8:00

TECHNICIAN/ANALYST Crystal Shreffler

DATE 8/12/09

DEPARTMENT MANAGER Jeffery Z

DATE 8/12/09

378636

FORM 302r6.doc (4/22/04)

ALS Laboratory Group - Fort Collins

QUALITY ASSURANCE SUMMARY SHEET

PAR W.O. # / BATCH Generic  
 TEST Tc99  
 METHOD Prep  
 SOP/REV (PREP) 755  
 SOP/REV (ANAL) \_\_\_\_\_

Briefly document any QA or other problems or deviations associated with the analysis of samples. Problems could result from: log-in, color, odor, dilution, consistency, scheduling, equipment, or instrumentation, or may include documentation of minor deviations necessary due to unique DQO's or sample characteristics.

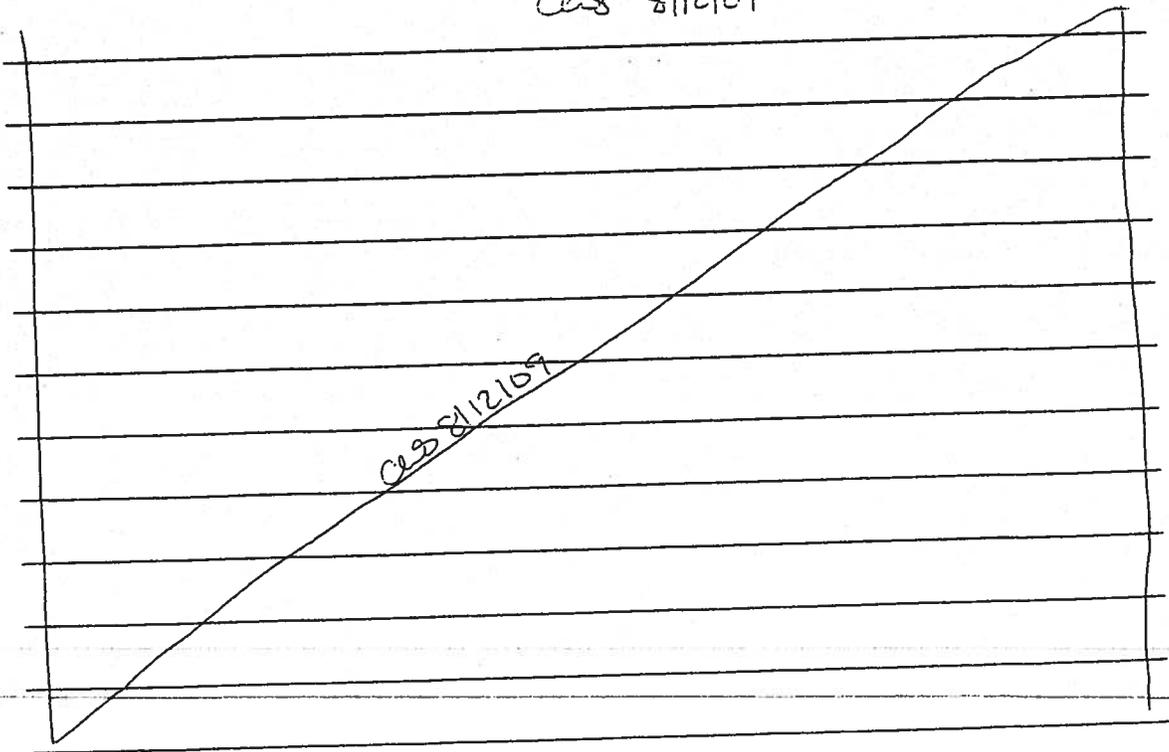
ces 8/12/09

ces 8/12/09

Due to possible matrix interference, a ferric hydroxide precipitation was performed on all samples per SOP 755, section 8.2.10

ces 8/12/09

ces 8/12/09



TECHNICIAN/ANALYST Crystal Shereff

DATE 8/12/09

DEPARTMENT MANAGER [Signature]

DATE 8/12/09

378635

FORM 302r6.doc (4/22/04)