Radiochemistry Expert Committee (REC) Meeting Summary

November 23, 2016

1. Roll Call and Minutes:

Bob Shannon, Chair, called the meeting to order at 1pm Eastern on November 23, 2016 by teleconference. Attendance is recorded in Attachment A – there were 7 members present. Associate Members: Carl Kircher and Bill Ray.

The October 26, 2016 minutes were distributed by email for review. If there are no comments by next Monday, they are considered approved and will be posted on the TNI website.

2. Meeting

There are no special plans for Houston. Bob will be checking in on who will be in Houston to decide whether to do a meeting. People planning to attend: Larry, Carl. People planning not to attend: Carolyn. Bob will check in with Jerry to see if a phone might be available.

3. Subcommittee Updates

Laboratory/Assessor Training

This subcommittee is on hold as per the discussion last month.

Small Laboratory Handbook

Dave noted that he still needs examples. He can split the Handbook into six sessions and assign each to an individual to come up with examples.

- 1. 1.4, 1.5.1, 1.5.2 Method Selection and Validation
- 2. 1.5.3 1.5.5 Precision and Bias, Selectivity
- 3. 1.6 Demonstration of Capability
- 4. 1.7.1 Instrument set-up, Calibration, Verification
- 5. 1.72 Quality Control

6. 1.7.3 – Data Evaluation and Sample Handling

Tom said he would take 1.7.1 on Instrumentation. Carolyn will do 1.7.2 – Quality Control

Tom asked if adding examples is a problem because it makes the document even longer. It is not a problem and forms would be placed into an attachment. Bob and Ilona reminded everyone that the format the committee is using is fine.

Dave will follow-up with committee members to get more volunteers for sections.

Checklist

Larry summarized the process. The most recent DRAFT is the 7/27/16 version. He has gotten comments from Carolyn, Bob and Virgene. Larry asked if there were any more comments. Ilona asked if Larry had a chance to review last months meeting about the table. He is planning to address the table comments in the next version of the checklist. He will emphasize that the methods can be changed to accommodate the needs of the assessment.

Vas noted that the use of a checklist is not mandatory. Ilona affirmed this statement. Larry stated that he would indicate this on the checklist appropriately.

Larry proceeded to go through the checklist and make updates as needed to the checklist during the meeting. These changes are included in Attachment D.

Carl asked about whether he can provide comments on the checklist at a later date because Jerry talked to him about putting a 2016 Checklist together. Bob was concerned about a duplication of effort. Ilona will talk to Jerry to make sure he is aware of the efforts of this committee on a checklist and that the committee would prefer that the work committee does be reviewed and incorporated into the 2016 Checklist. The committee is trying to make a Checklist that makes assessment more effective and does not go beyond the Standard. We are hoping that people will want to use our checklist, but we know that ABs are not required to use a specific checklist.

Larry will clean-up the checklist and provide a new document for use at the next meeting.

4. New Business

1. Vas had raised a question about Standard Methods and their use as they are updated. His state tries to steer labs to use the new method, but some have issues with contracts. As he was looking into it he found that a non-NELAP state, South Carolina, recently sent a note to their labs requiring use of the most recent Standard Method for DW analysis beginning in January 2017. He found this interesting and thinks other states may do something similar.

Bob mentioned that Cincinnati is also looking at this. They will be identifying methods they think are sub-standard rather than just eliminate all old methods. Bill Ray noted that some of this depends on how the state includes methods in their regulations. If they reference CFR then the updates would happen as CFR is updated.

2. Vas asked about California adopting the 2016 Standard. He asked about whether the NELAP AC has accepted the Standard. Ilona noted that the CSDP has accepted/approved the 2016 Standard and it is now in review by the NELAP AC to adopt it for NELAP. There are a few issues being discussed and the Standard may need some editorial changes before it is accepted. California is not a NELAP AB and they can adopt the Standard at anytime. NELAP ABs won't adopt the Standard until it is accepted by the NELAP AC. Bill Ray commented that California is looking at accepting the 2016 Standard with some modifications that they can make as a non-NELAP AB.

5. Action Items

A summary of action items can be found in Attachment B.

6. Next Meeting and Close

The next meeting is scheduled for December 28, 2016 at 1pm Eastern. Bob will check-in with people to make sure members can attend between the holidays.

A summary of action items and backburner/reminder items can be found in Attachment B and C.

The meeting was adjourned 2:42 pm Eastern.

Attachment A Participants Radiochemistry Expert Committee

Members	Affiliation		Con	tact Information
	Anniation		Phone	<u>Email</u>
Bob Shannon (Chair) Present	QRS, LLC Grand Marais MN	Other	218-387-1100	BobShannon@boreal.org
Tom Semkow (Vice Chair) Present	Wadsworth Center, NY State DOH Albany, NY	AB	518-474-6071	thomas.semkow@health.ny .gov
Sreenivas (Vas) Komanduri	State of NJ Department of Environmental Protection	AB	609-984-0855	<u>Sreenivas.Komanduri@dep.</u> <u>state.nj.us</u>
Marty Johnson	US Army Aviation and Missile Command Nuclear Counting	Lab	865-712-0275	Mjohnson@tSC-tn.com
Dave Fauth	Redstone Arsenal, AL Consultant	Other	803-649-5268	dj1fauth@bellsouth.net
Carolyn Wong Present	Aiken, SC Lawrence Livermore National Laboratory	Lab	925-422-0398	CTWRACE@gmail.com
Keith McCroan Present	US EPA ORIA NAREL, Montgomery AL	Lab	334-270-3418	mccroan.keith@epa.gov
Nile Ludtke Absent	Dade-Moeller and Associates Oak Ridge, TN	Other	865-481-6050	nile.luedtke@moellerinc.co m
Larry Penfold Present	Test America Laboratories, Inc; Arvada, CO	Lab	303-736-0119	larry.penfold@testamericai nc.com
Richard Sheibley Absent	Sheibley Consulting, LLC	Other (Former AB)	651-485-1875	RHSHEIB111@yahoo.com
Ron Houck Absent	PA DEP/Bureau of Laboratories	AB	717-346-8210	<u>rhouck@pa.gov</u>
Ilona Taunton (Program Administrator) Present	The NELAC Institute	n/a	828-712-9242	<u>Ilona.taunton@nelac-</u> institute.org

Attachment B

Action Items – REC

	Action Item	Who	Target Completion	Completed
63	Send note to QS to ask them to consider making all references to "days" more clear by stating "calendar" days.	Bob	7/13/15	
68	Send common lab assessment findings to Dave for his use in preparing the chapter for the Small Lab Handbook.	All	10/20/15 Ongoing	
70	Send a request to get "Lesson Learned" ideas from committee and associate members.	Dave	11/17/15	
71	Follow-up with Ken and Shawn regarding PT Standard Issue.	Bob	11/17/15	
75	Prepare copy of Standard annotated with summary document language.	Carolyn	6/15/16	
78	Send Checklist Review requests in smaller chunks to make it easier and quicker to review.	Bob	Ongoing	Complete
79	Contact Linda at EPA about revising 900 Series methods and the committees role in this update.	Bob	11/22/16	
80	Combine recent work on Checklist and produce an updated copy of the Checklist.	Larry	12/28/16	

Attachment C	– Back	Burner /	Reminders
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	Item	Meeting Reference	Comments
1	Update charter in October 2016	n/a	Delayed due to new Charter format.
2	Issue of noting modifications to methods.	1/16/13	
4	Look at need to reference year for any standard references– which version is being referenced. Is this necessary?	5/22/13	
5	Form subcommittee of experts in MS and other atom counting techniques to see that these techniques are adequately addressed in the radiochemistry module.	9/24/14	

Attachment D

Guidance To Users Of This Checklist

- This checklist is a tool auxiliary to the TNI Standard. It is comprised of questions used to assess compliance with the 2015 TNI Standard, Volume 1, Module 6. The language in the checklist sometimes paraphrase the language in the Standard. If there are any apparent conflicts between checklist and the Standard, the original language in the Standard is primary.
- Where a "Clarification" is added to the checklist, this is added to help explain the item of inquiry, but it is not intended to change the meaning of the Standard.
- Where a "Note" is added to the checklist, it is a note taken directly from the Standard, and in accordance with TNI convention does not change the meaning or intent of the Standard.
- Where a declarative statement is added to the checklist without being identified as a "Clarification" or as a "Note," the language is taken verbatim from the Standard.

i

 Audit ID:
 Laboratory:
 Assessor:
 Date:

Methods Reviewed – *complete as appropriate*

Gross Alpha/Gross Beta	Strontium-89-90	Americium
□ 900.0, □ water	□ 905.0, □ water	□ Am-01-RC, □ solid
□ 7110B, □ water	□ Sr-03, □ water, □ solid, □ air	□ Am-04-RC, □ water, □ air
□ 9310, □ water, □ solid*, □ air*	□ Sr-04, □ water	
		Plutonium Isotopes
Total Radium	Tritium	□ Pu-01-RC, □ air
□ 903.0, □ water	□ 906.0, □ water	□ Pu-02-RC, □ solid
□ 903.1, □ water	□ H-02, □ water	□ Pu-03-RC, □ solid
□ 9315, □ water, □ solid*, □ air*	□ 7500-3H B, □ water	
	□ Sr-02, □ water	Uranium
Radium-226	□ 300 3H-04, □ water	□ 908.0, □ water
□ 903.2, □ water		□ 908.1, □ water
□ Ra-04, □ water	Carbon-14	□ 7500-U B □ water
□ 7500-Ra B, □ water	□ C-01, □ water	□ 7500-U C □ water
□ 7500-Ra C, □ water		□ U-02, □ water, □ solid, □ air
🗆 EMSL-19, 🛛 water, 🗆 solid, 🗆 air	Cesium-134/137	□ U-04, □ water, □ solid, □ air
	□ 901.0, □ water	
Radium-228		Gamma Emitters
□ 904.0, □ water	lodine-131	□ 901.1, □ water
□ Ra-05, □ water	□ 7500-I B, □ water	□ 902.0, □ water
□ 7500-Ra D, □ water	□ 7500-I C, □ water	□ Ga-01-R, □ water, □ solid, □ air
□ 9315 , □ water, □ solid, □ air		
□ 9320, □ water, □ solid		
Analytes:Lab SOP #	Analytes:Lab SOP # -	Analytes:Lab SOP #

Notes: Solids can include soils, sediments, sludges, vegetation, and other bulk materials

* EPA 9310 and/or 9315 modified to include solids and/or air

[The methods and matrices above are examples. Accreditation bodies and assessors should edit to list methods/matrices in their program.]

Α	udit ID:	Laboratory: Assessor:				Date:	
ltem No.		Line of Inquiry	St Y	atus N r	n/a	Observations/Comments]
		Method Validation					-
Item		Line of Inquiry	St	atus		Observations/Comments	
No.			YI	N r	n/a		
		Technical Requirements (continued)					
		Does the laboratory perform radiation measurement systems calibrations				Why is section 1,7.1.2 a) split between item	
26	V1M6,	prior to initial use and when any of the following conditions occur				25 and 26.	
	1.7.1.2 a)	 when instrument performance checks exceed predetermined 					Bob Shannon 8/11/2016 9:13 AM
	IV) — VI)	acceptance criteria (i.e., limit of a statistical or tolerance control chart or other QC parameters) indicating a change in instrument					Deleted: and are these criteria documented in a procedure:
		response since the initial calibration?					Bob Shannon 11/23/2016 12:25 PM
		 when indicated by corrective actions? 					Comment [3]: These could be put back together.
		when calibration is due according to a predetermined frequency?					
		Doos the laboratory define the precedures and documentation for initial					Dah Channan 8/11/2016 0:12 AM
		calibrations?					Formatted: Indent: Left: 0" Hanging:
		Does the laboratory perform multi-point calibrations, required, to correlate					0.5", No bullets or numbering
27	V1M6	parameters (other than activity) such as the following cases?					Bob Shannon 8/11/2016 9:15 AM
	1.7.1.2 b)	 channel-energy calibration of alpha or gamma spectrometers 					Formatted: Tabs:Not at 0.88"
		 energy-efficiency calibration of gamma spectrometers 					Bob Shannon 11/23/2016 12:28 PM
		 mass-efficiency (mass-attenuation) calibration of gas-flow proportional or x-ray detectors quench-efficiency calibration of liquid scintillation detectors mass-crosstalk calibration of gas-flow proportional: and 					Comment [1]: Suggest possibly combining 25 and 26. The weakness of the proposed language is that the requirement is that documentation is not limited to procedures as it would be as written here.
		 guench-crosstalk calibration of liquid scintillation detectors. 					Jennifer Wong 9/20/2016 6:51 PM
							Comment [2]: CTW: Agreed
							Bob Shannon 8/11/2016 9:15 AM
28	V1M6	Do instrument calibrations make use of reference standards based on					Deleted: .
	1.7.1.2 c)	physical measurements as defined in Section 1.7.2.6.c)?					Bob Shannon 8/11/2016 9:26 AM
		Do calibration standards have the same general physical characteristics					Comment [4]: including? Don't want to be too exclusive. CTW: Agreed
		match as closely as possible those of the samples to which the calibration will be applied [except as noted in Section 1.7.1.2 d)].					

Au	dit ID:	Laboratory: Assessor:				Date:	
							Bob Shannon 8/11/2016 9:40 AM
		acceptance criteria, does the laboratory perform corrective actions?					Deleted: Does the laboratory retain
		iv) Were sufficient raw data records available to permit reconstruction	of				Bob Shannon 8/11/2016 9:40 AM
		the initial instrument calibration					Formatted: List Paragraph, Indent: Left:
Item		Line of Inquiry		Stat	us	Observations/Comments	0", Hanging: 0.36", Space After: 0 pt,
No.				YN	n/a		+ Numbering Style: i, ii, iii, + Start at: 1
		Technical Requirements (continued)					+ Alignment: Left + Aligned at: -4.42" +
		Does the laboratory quantitate sample results only from initial instrume	nt				Indent at: -3.57"
31	V1M6	calibrations (unless otherwise allowed by regulation, method, or contract	:t <u>)</u> ?				Bob Shannon 8/11/2016 9:40 AM
	1.7.1.2 f)						Deleted:
	VANC	Are initial instrument calibrations verified with a reference standard from	<u>1 a</u>				Bob Shannon 8/11/2016 9:40 AM
27	17120	source or lot independent of that used for the initial calibration \underline{py} :					Formatted: Font:(Default) Arial, 10 pt
52	1.7.1.5 a)	 <u>Performing</u> a second set of calibration measurements to compare to compare to compare the second set of calibration measurements to calibration measurements t	ire,				Bob Shannon 8/11/2016 9:43 AM
		to the first_or					Deleted: the
		 <u>Quantifying</u> a set of prepared standards using the initial 					Bob Shannon 8/11/2016 9:46 AM
		calibration?					Deleted: the reference standard
	V1M6,	Does the laboratory have a procedure stating the maximum uncertainty	for				Bob Shannon 8/11/2016 9:47 AM
33	1.7.1.3	calibration verification, and was that criterion met?					Deleted: using either
	b) & c)						Bob Shannon 8/11/2016 9:49 AM
		Does the laboratory have a procedure with acceptance criteria for					Deleted: d
		calibration verification, and were those criteria met?					Bob Shannon 8/11/2016 9:50 AM
		Deep the laboratory perform corrective action if the criteria for colibration	n				Deleted: ,
		verification are not met?	11				Bob Shannon 8/11/2016 9:48 AM
							Deleted: quantifying
	V1M6,	Is the same check source used for ongoing performance checks as was	s				Bob Shannon 8/11/2016 9:52 AM
34	1.7.1.4 a)	used in the preparation of the tolerance or control charts?	-				Deleted:
	ii) & iii)	Are performance check sources prepared handled sealed and/or					Bob Shannon 8/11/2016 9:53 AM
		encapsulated to prevent damage. loss of activity and contamination?					Deleted: the one
							Bob Shannon 8/11/2016 9:56 AM
		Is the activity of performance check sources and the count duration			1		Deleted: Do the
	V1M6,	sufficient to provide adequate counting statistics over the life of the					Bob Shannon 8/11/2016 9:59 AM
35	1.7.1.4 a)	sources?,					Deleted: provide adequate counting stat [6]
	iv)						Bob Shannon 8/11/2016 9:59 AM
26	VIME	where significant, is radioactive decay of the check source taken into					Deleted:
30	17142	efficiency?					Bob Shannon 8/11/2016 10:00 AM
	v)		+				Deleted:
	.,						Bob Shannon 8/11/2016 10:00 AM
	•						Deleted:

Au	dit ID:	Laboratory: Assessor:				Date:	
							Bob Shannon 8/11/2016 9:40 AM
		acceptance criteria, does the laboratory perform corrective actions?					Deleted: Does the laboratory retain
		iv) Were sufficient raw data records available to permit reconstruction	of				Bob Shannon 8/11/2016 9:40 AM
		the initial instrument calibration					Formatted: List Paragraph, Indent: Left:
Item		Line of Inquiry		Stat	us	Observations/Comments	0", Hanging: 0.36", Space After: 0 pt,
No.				YN	n/a		+ Numbering Style: i, ii, iii, + Start at: 1
		Technical Requirements (continued)					+ Alignment: Left + Aligned at: -4.42" +
		Does the laboratory quantitate sample results only from initial instrume	nt				Indent at: -3.57"
31	V1M6	calibrations (unless otherwise allowed by regulation, method, or contract	:t <u>)</u> ?				Bob Shannon 8/11/2016 9:40 AM
	1.7.1.2 f)						Deleted:
	VANC	Are initial instrument calibrations verified with a reference standard from	<u>1 a</u>				Bob Shannon 8/11/2016 9:40 AM
27	17120	source or lot independent of that used for the initial calibration \underline{py} :					Formatted: Font:(Default) Arial, 10 pt
52	1.7.1.5 a)	 <u>Performing</u> a second set of calibration measurements to compare to compare to compare the second set of calibration measurements to calibration measurements t	ire,				Bob Shannon 8/11/2016 9:43 AM
		to the first_or					Deleted: the
		 <u>Quantifying</u> a set of prepared standards using the initial 					Bob Shannon 8/11/2016 9:46 AM
		calibration?					Deleted: the reference standard
	V1M6,	Does the laboratory have a procedure stating the maximum uncertainty	for				Bob Shannon 8/11/2016 9:47 AM
33	1.7.1.3	calibration verification, and was that criterion met?					Deleted: using either
	b) & c)						Bob Shannon 8/11/2016 9:49 AM
		Does the laboratory have a procedure with acceptance criteria for					Deleted: d
		calibration verification, and were those criteria met?					Bob Shannon 8/11/2016 9:50 AM
		Deep the laboratory perform corrective action if the criteria for colibration	n				Deleted: ,
		verification are not met?	11				Bob Shannon 8/11/2016 9:48 AM
							Deleted: quantifying
	V1M6,	Is the same check source used for ongoing performance checks as was	s				Bob Shannon 8/11/2016 9:52 AM
34	1.7.1.4 a)	used in the preparation of the tolerance or control charts?	-				Deleted:
	ii) & iii)	Are performance check sources prepared handled sealed and/or					Bob Shannon 8/11/2016 9:53 AM
		encapsulated to prevent damage. loss of activity and contamination?					Deleted: the one
							Bob Shannon 8/11/2016 9:56 AM
		Is the activity of performance check sources and the count duration			1		Deleted: Do the
	V1M6,	sufficient to provide adequate counting statistics over the life of the					Bob Shannon 8/11/2016 9:59 AM
35	1.7.1.4 a)	sources?,					Deleted: provide adequate counting stat [6]
	iv)						Bob Shannon 8/11/2016 9:59 AM
26	VIME	where significant, is radioactive decay of the check source taken into					Deleted:
30	17142	efficiency?					Bob Shannon 8/11/2016 10:00 AM
	v)		+				Deleted:
	.,						Bob Shannon 8/11/2016 10:00 AM
	•						Deleted:

Au	dit ID:	Laboratory: Assessor:			Date:	
Item		Line of Inquiry	Stat	us	Observations/Comments	
No.			Y N	n/a		
		Technical Requirements (continued)				
	V1M6,	Are instrument performance checks monitored using control or tolerance				Bob Shannon 8/11/2016 10:02 AM
27	1.7.1.4 a)	charts to ensure that performance has not changed significantly since				Deleted: Does the laboratory monitor
54						Bob Shannon 8/11/2016 10:07 AM
		Do laboratory procedures specify corrective actions to be taken when				Deleted: :
		performance check acceptance criteria are not met, and does the				Bob Shannon 8/11/2016 10:07 AM
		laboratory take corrective actions in accordance with those procedures?				Deleted: :
		Are performance checks conducted consistent with the minimum required				Bob Shannon 8/11/2016 10:08 AM
	V1M6,	frequency?				Deleted: :
30	1.7.1.4 b) & c)	For gamma spectrometry systems, are detector efficiency, energy				Bob Shannon 8/11/2016 10:08 AM
	5) & C)	calibration and peak resolution checked			/	Deleted: Alpha
		- Semiconductor detectors: twice weekly on non-consecutive days, or				Bob Shannon 8/11/2016 10:08 AM
		on day of use if the detector is not used continuously				Deleted: Calibration
		- Scintillation detectors (e.g., sodium iodide): each day of use				Bob Shannon 8/11/2016 10:08 AM
		For alpha spectrometry systems is,				Deleted: Efficiency
		- Energy calibration checked weekly				Bob Shannon 8/11/2016 10:08 AM
1 1		For gas-proportional and semiconductor alpha/beta detectors is			/	Deleted:
		- alpha and beta efficiency checked each day of use				Bob Shannon 8/11/2016 10:08 AM
		For liquid scintillation detectors is the:			J	Deleted: :
		- manufacturer system calibration checked at the frequency				Bob Shannon 8/11/2016 10:11 AM
		recommended by the manufacturer				Deleted:):
		- efficiency checked with unquenched, "H and "C standards, each day of			/	Bob Shannon 8/11/2016 10:11 AM
1		USe For solid-state scintillation detectors used for non-spectrometric				Deleted: E
		measurements (e.g. zinc sulfide) is				Bob Shannon 8/11/2016 10:13 AM
		- efficiency checked each day of use			/	Deleted: for individual Test Sources
		Eventions to minimum performance aback frequencies allow periods				Bob Shannon 8/11/2016 10:11 AM
		longer than the required interval include the following:				Deleted: ing
		i) To allow for completion of the test source count as long as instrument				Bob Shannon 8/11/2016 10:13 AM
'		performance checks performed at the beginning and end of the				Deleted:
		measurement period meet all acceptance criteria; and				Bob Shannon 8/11/2016 10:14 AM
		 To allow for completion of a Preparation Batch or Radiation Measurement Batch measured on an instrument with an automated sample changer, as long as the period between checks does not exceed seven (7) calendar days and checks are done at the beginning 			4-	Formatted: Indent: Left: 0", Hanging: 0.24", Space After: 0 pt, Line spacing: single, Numbered + Level: 1 + Numbering Style: i, ii, iii, + Start at: 1 + Alignment:

Au	dit ID:	Laboratory: Assessor:				Date:	
		and end of the measurement in question and meet all acceptance					7
ltem		criteria,		State	19	Observations/Comments	Bob Shannon 8/11/2016 10:14 AM
No.			Y	N	n/a		Deleted:
		Technical Requirements (continued)					Bob Shannon 8/11/2016 10:14 AM
	V1M6,	When detector systems are powered off between performance checks, are	:				Formatted: Font:(Default) Arial, 10 pt
39	1.7.1.4 d)	performance checks counted prior to the next Test Source measurement?					
40	V1M6, 1 7 1 5 d)	Does the laboratory have procedures for performing and evaluating subtraction background measurements that include the following:				This item should be relocated after item 42.	
40	1.7.1.5 <mark>d)</mark>	- Frequency and length of measurements?					Bob Shannon 11/23/2016 1:04 PM
		 Count times ≥ longest associated sample counting time Use of control or tolerance charts and acceptance criteria? Corrective action taken when accentance criteria are not met? 					Comment [8]: Add to b) - length ≥ sample
41	V1M6,	Are subtraction background measurements performed and evaluated separately for each detector and appropriate to the method?					
	1.7.1.5 a)	Are subtraction background measurements being collected before and				Although this is a good practice, I do not	
		after any counting chamber changes are made (i.e., cleaning, liner				believe it is part of the Standard.	Jennifer Wong 9/20/2016 7:03 PM
							Poh Shappan 11/22/2016 1:07 DM
40	VANG	Are subtraction background measurements conducted consistent with the					Comment [9]: c f with a)
42	1715c	alternatives:					
	1.7.1.0 0)	i) Paired measurements performed before and after each batch of Test					
		Source measurements (a batch could be as small as a single sample);					
		ii) Measurements performed at a fixed minimum frequency depending on					
		the detector technology:					
		Gamma spectrometry: Monthly					
		Alpha spectrometry: Monthly Cas propertional and comisenductor alpha/bata detectors:					
		Quarterly					
		 Liquid scintiliation detectors. Individual guenched background: Once per Proparation Batch 					
		 Quenched background curve: Per laboratory procedures 					
		Solid-state scintillation detectors (e.g., zinc sulfide) for non-					
		spectrometric measurements: Each day of use					
		iii) Composite measurements using combined background measurements					
		collected in a manner resulting in a representative determination with a					
		combined counting time at least as long as the longest associated Test					
1				1	I		

Au	idit ID:		Laboratory:		Assessor:				Date:	
Item			Line of Inquiry				Stat	us	Observations/Comments	
No.						Y	Ν	n/a		
		Tech	nical Requirements (contin	lued)						

Page 3: [1] Comment [5]	11/23/16 12:47 PM	
Suggest deleting the note.	Although software has become more widely avaial	ole since it has been
integrated into a widely use	ed platform (Canberra), such techniques go back de	cades.

ge 3: [2] Formatted Bob Shannon		11/23/16 12:46 PM
AAA-Level1 Heading, Space After:	0 pt, Line spacing: single, Adj	ust space between Latin and
Asian text, Adjust space between	Asian text and numbers, Tabs:	0.63", Left + 1.13", Left

Page 3: [3] Delete	Bob Shannon	11/23/16 12:47 PM						
Note: Since Monte Carlo modeling techniques are relatively recent, the lab should have thorough								
documentation. T	ne modeling techniques not applicable for drinking water a	nalysis. [1]						

If this statement is included, it should be included as a comment within the LoI box.

Page 3: [4] Deleted	Bob Shannon	8/11/16 9:41 AM
for the acceptance of an initial inst	trument calibration	
Page 4: [5] Deleted	Bob Shannon	8/11/16 9:40 AM

Page 4: [6] Deleted	Bob Shannon	8/11/16 9:59 AM
provide adequate counting statis check source activity	tics for a relatively short count tim	e, with count duration and
Page 4: [7] Deleted	Bob Shannon	8/11/16 10:00 AM

Au	dit ID:	Laboratory: Assessor:				Date:	
Item		Line of Inquiry		Statu	s	Observations/Comments	
No.			Y	Ν	n/a		
		Technical Requirements (continued)					Rob Shappon 0/22/2016 10:42 AM
43	V1M6, 1.7.1.5 a)	Is the duration of the subtraction background measurement sufficient to quantify contamination that may affect routine sample measurements ?					Comment [1]: This seems to disconnect with the text in the standard Consider: Is a background appropriate to the method
		Are the counting rates from the "subtraction background measurements"					performed for each detector used.
44	V1M6, 1715	being subtracted from the total measured counting rates in Test Sources?					Bob Shannon 11/23/2016 1:13 PM
	1.7.1.5	Does the laboratory have a written procedure for performing short-term					Comment [2]: Remove this and check against previous section
45	V 11V10, 1716	i) Establishes control or tolerance charts and acceptance criteria					Bob Shannon 11/23/2016 1:08 PM
45	a) – d)	to monitor for significant changes;					Comment [3]: Reorder these into the order of the standard
		short-term background counts exceed established limits:					Penfold, Larry 7/27/2016 4:30 PM
		 Short-term unquenched background counts performed each day of use for liquid scintillation detectors. Ersource and leasth of checks, with pessible following. 					Deleted: (the count time for the background measurement shall be at least as long as the sample count time)
		iv) Frequency and length of checks, with possible following					Bob Shannon 9/22/2016 10:52 AM
		 a. An uninterrupted count of an individual Test Source may be longer than the required interval between background counts if successful short-term backgrounds are performed prior to and after counting the Test Source 					Comment [4]: What is the reference here? Would this connect with the "to produce unbiased results" kind of idea in e) Bob Shannon 11/23/2016 1:18 PM
		 b. An uninterrupted count of a group of Test Sources may also be longer than the required interval between 					Comment [5]: Is the "subtraction background" determined in 1.7.1.5. c. subtracted from the total measured count rates.
		(Prenaration or RMR) if the period between checks does					Bob Shannon 9/22/2016 10:57 AM
		not exceed seven (7) calendar days and successful checks are performed prior to and at the end of the measurement period.					Comment [6]: Shouldn't this specify frequency and duration of checks? Control charts would be the next item.
		Note: The frequency of subtraction background measurements may be					References do not crosscheck
		unacceptable data due to failure of a subtraction background					lii) monitor for compromising bias
		<u>measurement.</u>					should iv) be b) ?
46	V1M6, 1.7.1.7	radiation detectors have been contaminated, as determined by the subtraction background measurements, short-term background checks, or mothed blacks?					LSC is e)
							Bob Shannon 9/22/2016 10:58 AM
							Comment [7]: Are detectors used before corrective actions have been completed?

Au	dit ID:	Laboratory:	Assessor:				Date:		
ltem No.		Line of Inquiry		Y	Statu N	us n/a	Observations/Comments		
		Quality Control for Radiochemistry -	- General Requirements						
47	V1M6, 1.7.2.1 a)	Does the laboratory follow a documented QC assesses the performance of the laboratory's Does the laboratory, at a minimum, incorpora	program that monitors and analytical systems? te the QA program imposed						
		by regulation, method(s) and this Standard? Does the laboratory follow the imposed regula are more stringent than this Standard? (see N If it is not apparent which requirement is more	ations when the regulations Aodule 2, Section 5.9.3.c). e stringent, does the						
		Does the laboratory establish requirements in the guidelines of MARLAP Manual or other si organizations when there are no established	its quality system based on milar consensus standard guidelines?					Bob Shannon 9/22/207 Comment [8]: Not a cho supersedes Bob Shannon 9/22/207	6 11:01 AM ice – regulation 16 11:00 AM
48	V1M6 1.7.2.1 b)	Does the laboratory process batch and samp provide empirical evidence that demonstrate in control?	ble-specific quality controls to s that the analytical system is					Deleted: or the mandate	ed method
		Does the laboratory use the results for these quality of sample results produced by the an	controls to assess the data alytical system?						
49	V1M6 1.7.2.1 c)	Does the laboratory employ either a sample to determine the grouping of samples and as	Preparation Batch or a RMB signment of batch QC?						
50	V1M6 1.7.2.1	Does the laboratory initiate a Preparation Bat physical or chemical processing which affects	ch for samples that involves the outcome of the test?						
	c) i)	Does the laboratory prepare the QC samples preparation batch using the same process, per reagents?	together with the associated ersonnel, and lot(s) of						
Item		Line of Inquiry			Statu	IS	Observations/Comments	Deleted:	
No.		4 ,		Y	N	n/a		- sictor .	
		Quality Control for Radiochemistry -	- General Requirements (cor	ntinu	ed)				

A	udit ID:	Laboratory: Asses	ssor:				Date:		
51	V1M6 1.7.2.1 c) ii)	Does the laboratory initiate an RMB in lieu of preparation batch sample processing does not involve physical or chemical proce samples? (e.g., non-destructive gamma spectrometry, alpha/b counting of air filters, or swipes on gas proportional detectors). <u>Are</u> the samples and associated QC in the RMB similar in phys chemical parameters, and analytical configurations? (e.g., anal geometry, calibration, and background correction).	h where essing of the beta sical and llytes,						Penfold, Larry 7/27/2016 4:33 PM Deleted: Does
52	V1M6 1.7.2.1 c) iii)	Does the laboratory keep open the RMB for adding samples for not exceeding 14 calendar days from the start of the first samp or until twenty (20) environmental samples have been counted occurs first?	or a period ble counting d, whichever						Deleted: are
53	V1M6 1.7.2.1 c) iv)	Does the laboratory combine only such samples and associate an RMB that share a range of physical and chemical paramete analytical configurations (e.g., analytes, geometry, calibration, conform to the ranges of physical and chemical parameters, ar configurations demonstrated by method validation studies (see 1.5)?	ed QC within ers, and density) that nd analytical e Section						
I		performed, and how corrections are applied to physical calibrat	tion? (e.g.,						Bob Shannon 9/22/2016 11:08 AM
54	V1M6	Tor efficiency, density, cascade summing, and background) Does the laboratory's QC program document the frequency red	quired for		_			$\overline{}$	Deleted: es the
	1.7.2.1 d)	quality controls?							Deleted: documented
55 Item No.	V1M6 1.7.2.1 e)	the same conditions as the associated samples, and use the sign processes and procedures for preparation, analysis, data reduce reporting of results? Note: Although samples in a Preparation Batch must be preparated together, they need not be analyzed concurrently on a single disputer, rather they may be analyzed on different detection systems are calibrated for the technique if and instrument quality controls indicate that the systems are in Line of Inquiry	inction and under same inction and under same inction and under stems as in question in control.	St	tatu:	s n/a	Observations/Comments		Bob Shannon 9/22/2016 11:08 AM Deleted: that include
		Quality Control for Radiochemistry – General Requir	rements (contir	nued	d)				Deb Shannan 0/22/2046 44:40 AM
		Does the laboratory systematically or preferentially use specific	c detectors,					_	Deleted: not use

Au	udit ID:	Laboratory:	Assessor:				Date:	
56	V1M6 1.7.2.1 f)	equipment or glassware for the analysis of QC samples This <u>does</u> not preclude laboratories from segregating d equipment, or glassware to minimize the risk of cross- samples or equipment as long as the criteria for segreg equally to batch QC samples and samples.	etectors, ontamination of ation applies ce criteria for batch					Penfold, Larry 7/27/2016 5:34 PM Deleted: Note: Bob Shannon 9/22/2016 11:11 AM Deleted: should
57	V1M6 1.7.2.1 g)	CC samples, sample-specific QCs, and for the evaluation trends and the methods used to establish these criteria	ion of long-term ?					
58	V1M6 1.7.2.1 h)	Does the laboratory assess the results of the QC samp acceptance criteria documented in the QC program?	les against					
Ι		Does the laboratory develop acceptance criteria consist in MARLAP, or other consensus standards, or other crit statistical control charts developed by the laboratory will established criteria in regulations, the method, or contra	tent with guidelines eria such as here there are no act?					Penfold, Larry 7/27/2016 4:25 PM Deleted: ³
59	V1M6 1.7.2.1 i)	Does the laboratory track and trend the results of batch statistical or tolerance control charts?	n QC samples using					
60 	V1M6 1.7.2.1 j)	Does the laboratory investigate the cause when results acceptance criteria and take corrective actions to elimin minimize the magnitude of the problem? Does the laboratory consider samples associated with parameter as suspect and, wherever possible, reproce	do not meet nate the source or a failed QC ss such samples?					
		Does the laboratory report results with appropriate data reprocessing is not possible?	a qualifiers when					Bob Shannon 9/22/2016 11:13 AM Deleted: shall
		Does the laboratory note the occurrence of a failed QC associated actions in the laboratory report?	sample and any					
ltem No.		Line of Inquiry		St Y	tatus N	s n/a	Observations/Comments	
		Quality Control – Negative Control		<u> </u>				
61	V1M6	Does the laboratory employ a minimum of one Method	Blank (MB) per					

Au	udit ID:	Laboratory:	Assessor:				Date:	
	1.7.2.2 a)	Preparation Batch or Radiation Measurement Batch?						
62	V1M6 1.7.2.2 b)	Are MBs prepared using a quality system matrix that is s free (to the extent possible), and using an aliquot of the that of routine samples?	sufficiently analyte- matrix similar to					
		If sample aliquot sizes vary, do method blank acceptanc compensate for those differences?	ce criteria					
63	V1M6 1.7.2.2 c)	Does the laboratory have procedures in place to determ are significantly different than zero or impacts sample an (e.g., MB > sample-specific MDA)?	ine if MB results nalytical results					
64	V1M6 1.7.2.2 d)	Is corrective action taken when a method blank (MB) re- different than zero and associated sample results are <	sult is significantly 5 * MB?					
65	V1M6 1.7.2.2 e)	Are method blank results monitored for long term trends possible contamination or interferences that may affect	s, absolute bias, sample results?					
66	V1M6	Are sample results being calculated without batch-speci subtraction?	fic MB					Penfold Larny 7/27/2016 4:36 PM
	1.7.2.2 f)	When historical values are used to determine the subtraction to laboratory account for the uncertainty of the subtracted value is uncertainty for the final result?	background, does the in its estimate of					Deleted: Batch-specific method blank (MB) results are not subtracted from sample results?
I		Note: Average historical activity of MBs may be subtracted with has been demonstrated. $_{\!$	hen systematic bias					
Item No.		Line of Inquiry		Y	Statu N	us n/a	Observations/Comments	Bob Shannon 9/22/2016 11:19 AM Deleted: The laboratory shall account for the uncertainty of the subtracted value in its
		Quality Control – Positive Control		-				estimate of uncertainty for the final result.
67	V1M6 1.7.2.3 a)	Does the laboratory employ a minimum of one Laborato (LCS) per Preparation Batch or Radiation Measurement	ory Control Sample t Batch (RMB)?					
		For RMBs, a calibration verification standard may be used in p	place of an LCS.					
Item		Line of Inquiry			Statu	IS	Observations/Comments	
No.				Υ	Ν	n/a		
		Quality Control – Positive Control (continued)			<u>г</u>			_
		Are LCSs prepared using a quality system matrix that is	sufficiently					

Α	udit ID:	Laboratory: Asses	sor:	Date:	
68 69 70	V1M6 1.7.2.3 b) V1M6 1.7.2.3 d) V1M6	 analyte-free (to the extent possible), and using an aliquot of the similar to that of routine samples? If sample aliquot sizes vary, do <u>LCS</u> acceptance criteria competitose differences? Are LCSs spiked at a level such that the uncertainty of the LCS < 1/3 * acceptance criteria? Do the standards used to prepare LCSs conform to the require reference standard provided in Section 1.7.2.6 c? 	e matrix ensate for s result is ments for		Bob Shannon 9/22/2016 11:21 AM Deleted: method blank
71	1.7.2.3 e) V1M6 1.7.2.3 e) i-iii	Do LCSs include all of the radionuclide(s) being determined wir following allowed exceptions: v) Y) Gross alpha or beta: A surrogate such as the radionus used to calibrate the detector vi) Alpha spectrometry: only one radionuclide, when the have similar chemical characteristics and are detended as involtance such as single measurement vii) Gamma-ray spectrometric radionuclides with similar energies or radionuclides that represent at least, thigh energy ranges used for analysis.	th the nuclide(s) e others rmined ar gamma he low and		Bob Shannon 9/22/2016 11:27 AM Deleted: radionuclide(s) Bob Shannon 9/22/2016 11:28 AM Deleted: (s) Bob Shannon 9/22/2016 11:26 AM Deleted: with Bob Shannon 9/22/2016 11:31 AM
72	V1M6 1.7.2.3 f) V1M6 1.7.2.3 g)	Are LCSs in each batch evaluated using a statistical technique comparison to the lab's established acceptance criteria?, Where more than one analyte is spiked in the LCS, is each ana evaluated against acceptance criteria?,	that allows a second se		Deleted: ing Bob Shannon 9/22/2016 11:30 AM Deleted: ends of the Bob Shannon 9/22/2016 11:32 AM Deleted: - Bob Shannon 9/22/2016 11:31 AM Deleted: -
					Bob Shannon 9/22/2016 11:32 AM

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Page 2: [1] Deleted	Bob Shannon	9/22/16 11:04 AM
Page 6: [2] Deleted	Bob Shannon	9/22/16 11:31 AM

Page 6: [3] Deleted	Bob Shannon	9/22/16 11:31 AM
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