Radiochemistry Expert Committee (REC)
Meeting Summary

July 26, 2023

1. Roll Call and Minutes:

Amanda Fehr, Vice-Chair, called the meeting to order at 1pm Eastern on July 26, 2023 by teleconference. Attendance is recorded in Attachment A – there were 9 voting members present. Associate members in attendance: Keith McCroan, Bob Shannon, and Mark McNeal.

2. Updates

Technology Workgroup

Jim has still not heard anything regarding the startup of this group.

3. Training Needs

Training Topics as related to Module 6 – See Attachment D. The group had commented that Module 6 information should also be part of the training.

Amanda asked if anything is missing from the previous 2 meetings. She is still looking for big picture comments. The first bullet part is really large when you get into the details. She let people know they can send her detailed comments too.

The group has spent time talking about the items in the first bullet, but not the other 3 bullets. Need to talk more about the correct breakout groups for training.

Chrystal noted that it is difficult to see the overall vision. Though we need to get into some details, the original vision was a broader scope to help people understand Radiochemistry.

Some of the items need to be clumped together. Next approach may be to decide how to facilitate this moving forward. What is the best approach?

Who is the target group? What is the need and who would be interested? There have been trainings in the past that we don't need to re-invent. This is supposed to continue the learning process.

Take a look in your areas of scope and see if there is a specific group or topic we should focus on first.

RRMC - Asked people to turn documents that really helped them when they got started. Helps people find the information they need. Should add this thought to the training to let people know how to find the references. Help people figure out what they need and how to use the references.

Chrystal asked if there is anything she should do while at the conference next week. Amanda thought asking people what they would like to see in the training would be helpful. Ilona noted that PTPEC may talk a little bit about Radiochemistry during their meeting.

Next Agenda topic - What is the first training and who is it directed towards. Bring NEMC meeting feedback to help with this topic.

4. QSM Draft Module 6.0

Bob provided comments on DoD's QSM and Amanda sent it to the group with the agenda. Comments were due last Monday.

Bob talked to Joe Padue. They are hoping to have a new version available for their Sept meeting. They seem determined to make it happen. We would like to talk about some collaboration in the future. Most is overlapped, but this is a longer term goal. This may prevent receiving information with little review time.

Terry may have also submitted some comments.

Ilona asked if the Committee should look at the comments submitted and determine whether some additional changes should be made to the final Standard. There are some differences. They are close, but not exact. This is something that should be discussed at the next meeting.

The technique specific section at the end has nothing to do with TNI. Too specific for Module 6, but worth looking at.

5. New Business

Standard Methods Committee

Bob is encouraging people to consider sitting on a Standard Methods Committee. He will put together a blurb to share with the members. He want more input from all over the industry.

6. Action Items

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

7. Next Meeting and Close

The next meeting will be August 23, 2023 at 1pm Eastern.

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

Amanda adjourned the meeting at 1:42pm Eastern.

Attachment A
Participants
Radiochemistry Expert Committee

Members	**Affiliation**		**Contact InAffirmativemation**
Terry Romanko Chair (2024) **Absent**	TestAmerica Laboratories, Inc.	Lab	Terry.romanko@testamericainc.com
Sherry Faye (2025) **Present**	Wadsworth Center, NY State DOH Albany, NY	Lab	sherry.faye@health.ny.gov
Velinda Herbert (2024) **Present**	National Analytical Environmental Laboratory	Lab	Herbert.velinda@epa.gov
Brian Miller (2024) **Present**	ERA	Other	bmiller@eraqc.com
Stan Stevens (2026) **Present**	Perma-Fix Environmental Services	Other	stanws@aol.com
Amanda Fehr (2026) **Present**	GEL	Lab	amanda.fehr@gel.com
Jim Chambers (2026) **Present**	Fluor-BWXT Portsmouth LLC	Other	jim.chambers@ports.pppo.gov
Patrick Garrity (2026*) Absent	Kentucky	AB	patrick.garrity@ky.gov
Greg Raspanti (2025) **Present**	New Jersey Department of Environmental Protection	AB	Greg.Raspanti@dep.nj.gov
Chrystal Sheaff (2024*) **Present**	Energy Laboratories, Inc.	Lab	csheaff@energylab.com
Mary Beth Gustafson (2024*) **Present**	Virginia	AB	mary.gustafson@dgs.virginia.gov
Ilona Taunton (Program Administrator) **Present**	The NELAC Institute	n/a	Ilona.taunton@nelac-institute.org

Attachment B

Action Items – REC

	Action Item	Who	Target Completion	Completed
90	Send note about method codes and concerns to the PT Expert Committee. Is there a way to limit the codes a lab can use to report PT data?	Bob	TBD	
116	Place comments into Comments Response Form/Table to prepare for final voting on comments. (SOP-2-100-Rev3.4-CSDP-StandardsDevelopment-ResponsetoCommentsForm)	Terry	9/20/22	
117	Send SIR 441 Response to LASEC.	Terry	10/25/22	X
118	Prepare SIR Review notification to the LASEC to confirm SIRs were reviewed in preparation for the Standard update.	Terry	TBD	
119	Establish a list of questions for the Radiochemistry training.	All	Ongoing	
120	Terry Contact Lem Walker clean water MQOs. Joe Pardue will provide Terry with DoD limits.	Terry Joe Pardue	April 2022	
121	Discuss whether to look at the comments submitted and determine whether some additional changes should be made to the final Standard.	All	TBD	

Attachment C – Back Burner / Reminders

	Item	Meeting Reference	Comments
5	Affirmativem 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	
6	From Action Item # 75: Prepare copy of Standard annotated with summary document language.		This is a project Carolyn was working on, but the committee decided it may duplicate the Small Lab Handbook. This project has been put on Hold.

Radiochemistry Training Topics
(as related to Module 6)

- Reporting, usability, and interpreting results
    - Preservation requirements
        - Acid preservation
        - Redox preservation
        - 5 day rule (program dependent)
            - Preserving at the lab, if not preserved in the field
            - Field filtering vs filtering at the laboratory
            - Bias of filtering at the laboratory
        - Frozen samples
        - Samples > 6°
    - Hold times
        - Related to half-life
    - Uncertainty
        - Counting
        - TPU
        - 1 sigma/2 sigma
    - MDC, critical level, decision level
    - Units
    - What does U qualifier mean (critical level)
        - additional qualifiers
    - Negative values
    - MDC Compliance limits
    - Explain MDC being sample specific
    - Why the need for U by metals (ICPMS)
    - QC criteria
        - What is required
        - What should be on report
        - RPD vs RER
        - Precision/Accuracy
    - Data Quality Objectives
    - Limitations on applicability

- Methodology
    - Volume
    - Decay and ingrowth
    - Count time

- TAT
- Method Specificities
  - Combined Ra226/228
  - Adjusted Gross Alpha
  - Gross Beta-K40
- Instrumentation

- Matrix and their challenges
  - TDS on Gross Alpha/Beta
    - Mass Attenuation Calibration (MAC)
    - Mass limits
    - Attenuation/self-absorption of Alpha emitters
    - TDS impact to other methods
  - Soils
  - Sediment

- How does the sample get processed through the lab (drinking waters)
  - Gross alpha/beta
  - Ra226 (gamma, GF, Lucas)
  - Ra228

<u>Presentation Topics:</u>

1. Primer Basics

2A. Methodology/Instrumentation-alpha spec/gamma

2B. Methodology/Instrumentation -LSC/GFPC/other miscellaneous

3. Data Quality Objectives-Reporting, usability, and interpreting results

- Data presentation on reports, calculations, QC types
- MDC, critical level, decision level
- RPD vs RER
- Uncertainty
- Qualifiers and flags

Attachment E – Comments Submitted regarding DoD Standard – Bob Shannon

COMMENT AND RESOLUTION SHEET				
Document Title: QSM v6.0 Module 6: Quality Systems for Radiochemical Testing				
Commenting Individual: Robert Shannon – Quality Radioanalytical Support, LLC, Email: BobShannon@boreal.org Tel: 218-387-1100				
Section/Clause	Type*	Comment	Suggested Solution	Resolution of Comment
1.3.1 – critical level	M	Correct reference to confidence level	"…confidence (1 – α)…" should read "…confidence (1–α)…"	
1.3.1 – decision level	S	Decision Level is redundant. Decision and Critical Level are the same concept as defined under critical level.	Suggest just defining decision level as "See Critical Level"	
5.1.7	M	Incorrect references to "ANSI N42.22" and ISO Guide 34:2009	The 7 and 6 should be superscripted -- refers to footnotes 7 and 6 respectively.	
5.2.a	S	If leaving decision level above, it should be included here	If leaving decision level above, it should be included here	
5.2.1.e.	S	This section refers to a RL which is never defined. Reporting limits are often used to incorrectly censor results.	If including reporting limits (RLs), add to definitions. Also add that reporting limits may not be reported in lieu of a result and its associated uncertainty (i.e., used to censor the result) which should only and always be reported as-measured.	
5.2.3	M	The reference does not include the formula for the SDWA DL.	Add the general formula for the DL, analogous to that done above for similar parameters.	
5.2.1.f.i. and 5.2.1.f.ii.	S	Suggest being clearer that equations will need to be modified depending on the measurement technique in question	Add comment?	

5.0.0.f.ii.	S	As stated above, the MDA is an *a priori* concept. As such, it should not be compared to a measured value (after the fact). Here, using the uncertainty would suffice and will simplify implementation at labs.	Strongly suggest removing MDA and instead using only uncertainty	
5.3.4.c	M	Incorrect reference to footnote 3	3 should be superscripted -- refers to footnote 3	
5.4.1.a.	M	Incorrect reference to footnote 4	4 should be superscripted -- refers to footnote 4	
5.3.5.c	M	Incorrect reference to footnote 4	4 should be superscripted -- refers to footnote 4	
5.4.4.f.	S	Consider that the uncertainty of a count would be square root of one, but the uncertainty of a net count would have to propagate the uncertainty of the sample and background. Thus the uncertainty for a zero count background and sample would be 1.4 (square root of 2).	Consider making clarifying comment	
5.4.4.b., 5.4.5, 5.4.5.a, 5.4.6, 7.2.5.d.ii, 7.2.5.d.iii; 8.1.1.e; 8.1.1.f.ii; 8.1.1.f.iii;	S	Note that use of the word "error" for uncertainty is antiquated. Reserve "error" to refer to "decision error" (e.g., Type I or II errors)	Strongly suggest changing "error" to "uncertainty" as already appropriately defined in Section 3.1.	
7.1.54.a.viii.a	S	Strongly suggest the using the word "fails". This will undermine the legal defensibility of any measurement performed thereafter.	Suggest replacing the word "fails" with "falls outside acceptance criteria."	
7.1.2.b.	S	Consider that the sources themselves are quite often not traceable to NIST although they may be. .	It might be more accurate to say "…sources traceable to the SI via a National Metrology Institute (NMI) or prepared from materials that are traceable to the SI via and NMI."	

7.2.1.k	S	Suggest saying which of the two – customer or Appendix B – apply. This may not be a simple question since a lab should sometimes refuse to follow untenable or unethical requirements from a customer		
7.2.2.h	M	Does section even belong here ? A reagent blank is not a QC sample and should never be used in lieu of an independent batch blank. That said, there is no result the batch blank cannot be added to a group of historical blanks used to generate a subtraction that could be applied to the batch as described in the section on background subtraction.	Clarify that the reagent blank is not a QC sample and that independent blank QC is needed for each batch.	
7.2.2.i.ii	M	Filter material will vary significantly from lot to lot even when it is "chemically and physically identical".	Suggest including that the filter material must be from the sample production lot number.	
7.3.3.a.x.a	M	ZDup should read Z_{Dup} and the absolute value of Z_{dup} and of the difference in the numerator are missing from the formula.	Correct subscript and formula	
7.2.4.a.vii	M	Incorrect reference to footnote 3	3 should be superscripted -- refers to footnote 3	
7.3.1.d. 7.3.1.e	M	ZBlank should read Z_{Blank} and uc(x) should read $u_c(x)$	Correct subscripts	
7.3.2.c	M	ZLCS should read Z_{LCS}	Correct subscript	
7.3.3.a.x.a	M	ZDup should read Z_{Dup}	Correct subscript	
7.3.3.a.v	M	ZMS should read Z_{MS}	Correct subscript	

7.2.4.c.xiii	M	Since this refers to spectral resolution, I assume it may not be applied to techniques, such as GPC, where there is no spectrum.	I very strongly suggest just stating that this applies to alpha spectrometry only.	
8.2.1.a.i.a	S	Six points is far more than needed to fit the energy curve which tends to be highly linear	3 points should suffice.	
8.0	M	The tables referenced are not included in the document to be reviewed. This is unacceptable if this is a formal review as these contain requirements referenced throughout this section. Additionally, many of the requirements are redundant with those in 1-7. Why are they repeated?	Notify appropriate QA personnel that the document provided for review was inadequate and take appropriate, documented corrective action prior to finalizing the document.	
8.1.1.f.iii	M	Should pulsar read pulser?	Use correct term	
8.1.2.d	M	RL is not defined	See comment above	
8.2.1.b.i.b	M	This requirement does not adequately address all cases that may be used by your labs. Depending on the software and the curve(s) being fitted, six points may not be sufficient to meet the intent of the requirement. And if single nuclide calibrations (which actually would not be a curve) are being performed 1-3 points might suffice. ASTM is preparing a standard to address calibration, but it is not yet published. Down the road, I would recommend looking in that direction.	This is a bigger issue than can be quickly addressed given different fit types in use. I have seen recommendation the minimum number of points needed to define a specific curve plus 1 but don't forget that in some cases two equations being spliced together. At least try to clarify the issue so as to not penalize labs who are doing defensible work and not to have a requirement that does not fulfill its intention.	
8.2.1.b.ii.a	M	ASTM D3649 was revised in 2006.	Reference the "current version"	
8.2.1.c	S	Section 7.1.2.d.i requires modeled calibrations to be validated using physical reference standards.	Refer to 7.1.2.d in this text	

8.2.4.b	M	This implies that sealing samples is sufficient to provide quantitative results for the inferential determination of Ra-226. Where is the evidence to support this approach??? A standard or other validated method? While sealing is better than not sealing or using plastic counting containers. This approach has repeatedly been shown to be problematic—or at least far more challenging than one might expect. Specifically, it makes unsupported assumptions: that radon is not emanated from the solid and that radon and progeny are distributed evenly throughout the geometry--which is rarely the case.	Refer to a clearly documented approach or consider removing the requirement. If you are going to retain this, at least address that the container must be full (no headspace) and match the geometry of the cal stnd and that the sample must be stored to achieve full equilibrium. And require that the approach be validated using real samples of the matrix of interest – possibly by comparison to a second independent method.	
8.2.5.c	M	The assumptions used to construct the library should not only be documented/saved at the lab, they are critical in performing validation and assessment of data and should be viewed as part of, and reported together with, the results.	Require reporting of any assumptions used for the analysis (assumed decay equilibria, inferential determinations, etc.)	
8.3.1	M	This section does not differentiate between radionuclide specific determinations and gross activity screening. In general, the language in this section seems to be very imprecise.	Rework section to separately address the two cases. Mention that positive bias may be acceptable for screening measurements.	

8.3.1.c	M	8.3.1.c -- what does "significantly different" mean? Is dead time of 0.005% significantly different from 0.1%? Yes – likely so… Would either of these compromise results? No. You want to ensure that the applied correction will not introduce bias that could compromise use of the results. Consider relaxing the requirement. Modern electronics are capable of producing results at the 10% dead-time level and above that will add minimal additional bias/uncertainty to results.	Update the language to clearly address the real issue – minimize bias that will compromise results.	
8.3.1.g	M	Crosstalk is only an issue when activity is present in the opposing channel that can interfere with the measurement. Consider that corrections for crosstalk are not performed when counting chemically separated radionuclides such as Sr where there is no alpha to crosstalk.	Specifically exclude crosstalk correction when there is not net activity in the opposing channel such as is most often the case when counting chemically separated radionuclides.	
8.4.2.e	S	What does “phase separation is minimized” mean. If you have evidence of “minimized phase separation”, don’t you still have phase separation?.	Suggest that the requirement be there is no visual or other evidence of phase separation before or after completion of the count.	
Reference #10	M	D7282 was recently revised. It is much improved.	Reference “current version”.	