

**Radiochemistry Expert Committee (REC)
Meeting Summary**

September 25, 2013

1. Roll Call and Minutes:

Bob Shannon, Chair, called the meeting to order at 1pm EST. Attendance is recorded in Attachment A – there were 7 members present. Associate members present: Terry Romanko, Virgene Mulligan, Tom Patten and Ariana Mankerian.

The minutes from the San Antonio meeting and August 28, 2013 meeting were reviewed. Everyone will be given an additional week to review the San Antonio minutes and then they will be re-distributed for a vote through e-mail. *(Addition: A motion was made by e-mail by David. The motion was seconded by Tom. The minutes were approved with e-mail by: David, Vas, Tom, Larry, Todd, Bob, Carolyn, Marty and Nile. The motion passed.)*

Dave made a motion to approve the August 28th minutes. The motion was seconded by Tom and unanimously approved.

Associate members need to let Bob and Ilona know they own a copy of ISO 17025 so they can be included in distributions of the draft working standard updates.

2. Webinar – Notification of Intent to Revise Standard

Bob received an e-mail from Ken Jackson letting him know that the committee needs to plan a 1 hour Webinar as a means to reach out to interest groups (particularly ABs) before the Radiochemistry Working Draft Standard gets too far along. He suggested 20 minutes of slides showing an outline of the changes the committee is considering. The remaining time would be for comments and additional suggestions for changes.

Tom and Bob will prepare the PowerPoint for this presentation and Marty will be able to help with review before it distributed to the committee for comment.

The committee decided on November 14, 2013 at 1pm EST for the Webinar.

Some concerns were raised about needing to be further along before this meeting is held. The committee should not be concerned because the purpose of this meeting is to get input from stakeholders on needed changes to the standard. The committee should not be done. There will be another meeting with stakeholders once the Working Draft Standard is complete.

3. Standard

Tom reviewed the changes from the last meeting and pointed out that he tried to keep comments in his handout to give people a chance to review the information and comment by e-mail between meetings.

VIM6 - Section 1.7.1 (Tom/Bob/Vas):

1.7.1 e) Background Subtraction Measurements

This section was greatly expanded in the re-write.

e)1): Vas commented that he thought “test source” should be called “calibration source”. “Test source” is a new term and hasn’t been used previously. It was pointed out that this term makes it more generic so every type of source that can be tested does not need to be listed. Alternatives were discussed, but the committee decided to use the term and looked at defining it. Other options considered: tested source, source of concern, etc.

Change text to “net count rate of a test source”.

The MARLAP definition was read to the committee.

After discussion of different possible definitions for “Test Source”, the following was generally agreed to: The final product or matrix that is introduced into a measurement instrument. A *test source* is prepared from laboratory sample material for the purpose of determining its radioactive constituents.

Tom/Bob/Vas will work on the definition and bring it back to the next meeting.

e)2) iii): ANSI recommends quarterly. Labs tend to run these at frequencies as often as weekly and as infrequently as monthly or quarterly. Tom commented that it was day of use in the 2008 standard, weekly in the 2011 standard and is quarterly in ANSI. He commented that it is a minimum requirement and many labs measure more frequently. There are also some labs that measure less than monthly.

Bob mentioned that previous versions of the standard did not do a good job distinguishing between background subtraction counts and short background checks. This update to the standard will make clear that background subtraction is being discussed here.

Terry noted that many labs do a long background count – a thousand minutes. If that had to be done once a week, they would cut back on background subtraction count.

Bob pointed out that there is a full month's data that could be impacted if there is a problem identified at the end of a month. Carolyn's lab does a 1000 minute background every two years. They only do 10 minute sample counts, however, and they do very frequent background checks that are as long as the sample counts (10 minutes). She felt that increased frequency would be a burden on her lab, more because it would require changing software and procedures.

Ariana runs a 30 minute background check each the day of use. She may count samples as long as 5000 minutes, however. To get a 5000 minute background subtraction, She does not do a straight 5000 minute count. Rather she averages twenty 250 minute counts to total 5000 minutes. Tom said he does something similar in New York but pointed out that this is just one way to do this.

Ariana tries to do her background subtraction counts a minimum of every other week, so monthly would not be an issue. Most of the time she does them weekly.

Others who have long counting times take instruments off line one day a week or month to take care of this.

Tom emphasized that a minimum frequency needs to be defined for the standard and he would like to see monthly. Keith reminded everyone that the frequency one chooses has to be something that everyone can live with. The lab needs to decide the level of risk they can tolerate. If background subtraction counts are done monthly and a problem arises, this would impact all the data run that month. Bob commented that we should consider the client needs in this decision, not just what is easiest for the lab. Carolyn commented that increased short background checks would alert the lab about problems during the month. Bob pointed out, however, that they will only identify gross contamination. A count that is as long or longer than the longest sample count is needed to reliably identify all levels of contamination that could impact sample results.

Marty noted that if monthly is used for the gamma and alpha frequencies, why should gas proportional counting be different?

Bob and others on the call felt the issue of composite counts is used at enough labs that it needs to be considered. Is it OK to add/average a number of shorter background counts instead of running a long background count? Vas commented that using the average of background counts is not something he is familiar with. He thinks this is a new discussion. Vas asked if this also applies to samples. Everyone emphasized that samples need to be run as described in the method (or procedure) and that the current discussion should only apply to background subtraction counts.

There was further discussion on whether the background subtraction count can be evaluated in lieu of short background checks or whether the background check sample has to be a different sample.

Keith will try to capture the conversation today so it can be written in the standard for everyone to evaluate. Here is his suggestion (emailed to Bob)

The counting period for a background subtraction measurement may be a single continuous interval or it may be a combination of many shorter intervals spread over a time frame appropriate for the instrument type, as long as the total background count time is at least as long as the longest sample count time. Determining the background count rate from multiple counting intervals allows the lab to analyze background data statistically to check for excessive variability or nonstationarity.

Carolyn and Keith commented that statistics have to be handled correctly. Counting repeated backgrounds will show that there is uncertainty associated with the background in excess of the Poisson uncertainty and this needs to be accounted for in the estimation of uncertainty. This is not often done at labs.

e) 2) iv): Tom said that for liquid scintillation detectors, both sample and background count rates are dependent on the chemical and physical make-up of the samples being counted. He noted a reagent blank can be used to estimate the quenched background.

Marty pointed out that the background has to be adjusted for the actual quench of each sample when you subtract it from that sample. For some methods, backgrounds determined for varying levels of quench can be significantly different from that observed in a reagent blank. When validating data, he has seen too many examples of over- or under-correction of results due to determinations of background that do not account for difference in quench.

Tom stated in his laboratory the samples are prepared so a batch of samples and the background sample will have the same quench. Bob and Marty commented that this is not always possible – depends on the method. It works for tritium in water where all of the samples are distilled but not in other cases where the final sample matrix is more complex and levels of quench vary from sample to sample.

After much discussion, there was general agreement that frequency information needed to be added about individual quenched background and quenched background curves:

- Individual quenched background: once per preparation batch.
- Quenched background curve: according to frequency specified in laboratory procedures.

The background in liquid scintillation counters fluctuate over time so the frequency needs to be greater.

Keith pointed out that there is no frequency specified in the standard for efficiency/quench calibration for any of the counting methods and asked whether there is really any need to specify frequencies in this section?

Keith was asked if he could consider the discussion and see if it is possible to put some language together that gives some flexibility to deviate from the specific minimum frequencies that are currently listed in the draft standard. As long as something is in place that verifies the statistics of what is happening, flexibility should be acceptable. A lab has the opportunity to prove that what they are doing makes sense. This expands what his original action item was. Bob will work with Keith on this.

Section 1.7.1 e)3):

The section contains what is needed and no changes were made.

Section 1.7.1 f): Short-term Background Checks

The group continued discussion about backgrounds. Are subtraction counts and short-term background check needed in all cases? Terry pointed out that daily background checks on alpha spectrometers would not be practicable due to the length of sample counts and the significant effort involved in setting up the counts.

Carolyn asked if there is a way to say background checks need to be done often enough to identify contamination. Tom would prefer not to set a specific frequency in the standard.

Perhaps the frequency could be stated as – “as required to meet data (or measurement) quality objectives” or use the language that is already in 2) in this section. In any case, the lab needs to have a written policy.

Bob commented that it would seem that a background subtraction count could suffice as a short term check too as long as it were evaluated and demonstrates that the backgrounds are stable.

The following was added:

- 3) Background subtraction counts may be evaluated as short-term background checks.
- 4) The laboratory shall have written procedures that indicate the frequency and length of short-term background checks and address ...

The committee should think about this and make a final decision next meeting.

Section 1.7.1 g): Contamination Monitoring

The lab needs a procedure for decontamination. The text in 2) was changed to:

The laboratory shall have written procedures that address cases where detectors are determined to have been contaminated. Detectors may not be brought back into service until corrective actions are completed.

This text leaves options for the lab. They can decide to raise the detection limit of the instrument if they can't decontaminate it. They can have it serviced by the manufacturer, etc ... There are lots of options and the lab needs to have a corrective action plan. How is a detector repurposed? If it cannot be repurposed, then what happens? This can be in the SOP, Quality Manual, instrument manual, etc ... It is up to the lab to determine where its procedures are documented.

Unresolved Issues

Tom will review his notes and look for issues that are still unresolved in this section. He will prepare a summary and send it to the committee for discussion by e-mail between meetings.

Attachment D contains comments captured in the working document that need to be kept for further discussion.

Addition: Attachment E has been added to capture Tom's summary of open issues for discussion by e-mail and at the next meeting.

4. Action Items

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

5. Next Meeting and Close

The next meeting is scheduled for Wednesday, October 16th at 1pm EST. This is a week earlier due to a conference that many people will be attending on the 23rd.

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

The meeting was adjourned and ended at 3:03 pm EST.

Attachment A
Participants
Radiochemistry Expert Committee

Members	Affiliation		Contact Information	
			Phone	Email
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	tms15@health.state.ny.us
Sreenivas (Vas) Komanduri Present	State of NJ Department of Environmental Protection Trenton, NJ	AB	609-984-0855	Sreenivas.Komanduri@dep.state.nj.us
Marty Johnson Present	US Army Aviation and Missile Command Nuclear Counting Redstone Arsenal, AL	Lab	865-712-0275	Mjohnson@tSC-tn.com
Dave Fauth Present	Consultant Aiken, SC	Other	803-649-5268	dj1fauth@bellsouth.net
Carolyn Wong Present	Lawrence Livermore National Laboratory Livermore, CA	Lab	925-422-0398	wong65@llnl.gov
Keith McCroan Present	US EPA ORIA NAREL, Montgomery AL	Lab	334-270-3418	mccroan.keith@epa.gov
Todd Hardt Absent	Pro2Serve, Inc. Oak Ridge, TN	Other	865-241-6780	HardtTL@oro.doe.gov
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Richard Sheibley Absent	Sheibley Consulting, LLC	Other (Former AB)	651-485-1875	RHSHEIB111@yahoo.com
Ilona Taunton (Program Administrator) Present	The NELAC Institute	n/a	828-712-9242	Ilona.taunton@nelac-institute.org

Attachment B
Action Items – REC

	Action Item	Who	Target Completion	Actual Completion
3	Richard will prepare language update for 1.5.3 and submit to committee.	Richard	2-26-13	
10	Prepare definition for “activity” based on today’s conversation.	Bob	5/22/13	6/13
11	Complete and distribute language proposed for 1.7.1.	Bob Tom Vas	5/22/13 To be finished for 6/26/13 meeting. Next Meeting	In Progress
20	Bob will update Standard/Base Document. All should review and comment to Bob.	Bob All	8/28/13	
21	Work on presentation of blanks in the module.	Carolyn Marty	8/28/13	
22	Update Base Document and distribute.	Bob	9/24/13	
23	Propose final language to define Test Source.	Bob, Tom, Vas	10/15/13	
24	Capture background averaging of counts discussion and attempt to add to standard. Send draft language before next meeting.	Keith	10/15/13	
25	Give thought to discussion on section e) and see if language can be added to give the labs more flexibility. Keith and Bob will send more direction.	Bob Keith	10/15/13	
26	Prepare a summary of any open issues in Section 1.7.1 and distribute to the committee for comments by e-mail between meetings.	Tom All	10/15/13	

Attachment C – Back Burner / Reminders

	Item	Meeting Reference	Comments
1	Update charter in October 2013	n/a	
2	Issue of noting modifications to methods.	1/16/13	
3	Look at batching when QC is looked at.	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	

Attachment D

Section 1.7.1 d) 2) i) a):

There was substantial discussion regarding whether daily should be changed to “daily to semiweekly”.

Several possible changes would include: day of use, semiweekly upon use, weekly.

Discussion included:

The current standard states daily. We should maintain daily to bolster confidence in the quality of data produced.

Given the stability of solid state detectors, decreased frequency would be in tune with ANSI N42.12 and best science principles.

Most commercial labs (most environmental labs for that matter) do performance check per day of use and are not likely to change due to contractual obligations.

Why is monthly/weekly acceptable for an alpha spectrometer but not a gamma spectrometer?

The proposed wording would not prevent anybody from doing performance checks more frequently.

Off-line comment: one reason daily is fine is that the relative cost (time and effort) for a daily check in not onerous.

Offline comment: a number organizations (e.g., DOD, DOE) might not understand the rationale for the change and be reluctant to accept our new standard.

Section 1.7.1 d) 2) iv):

Again, there was substantial discussion over a proposal to monitor crosstalk for alpha and beta each day of use for gas proportional counting. There were a lot of good arguments for and against:

This is a new requirement and is onerous to labs.

Since crosstalk is a correction-class parameter and not a principal-class parameter, it would be sufficient to verify it with a QC sample (Th/Sr) and there is no compelling or technical reason to verify it in day of use checks on gas proportional counters.

The LCS will detect a change in the crosstalk - therefore we do not need to check this during performance checks.

An LCS cannot reliably detect such changes since it contains both alpha and beta activity and the crosstalk effect would be overwhelmed by major channel activity in both minor channels.

Some labs use a mixed alpha/beta (e.g., Pu/Sr) source for an efficiency check in a single measurement. Since i) the alpha-to-beta crosstalk is a few % for Pu (but not 20-35%), ii) beta-to-alpha crosstalk is ~0.3%, and iii) the beta counting rate is 4-5 times that of alpha, we are able to check for efficiencies in a single measurement. Thus we cleverly extract two efficiency parameters from a single measurement. The proposal is to perform two measurements and track and trend four parameters. This is a top down QC view. There is no problem with if other labs checking crosstalk but it should not be a requirement.

The marginal cost is minimal since labs do not need to perform additional counts (they already count alpha and beta sources) they just need to evaluate/trend the minor channel data

Laboratories routinely run methods (i.e., alpha/beta) where there is significant activity in the minor channel that will spill into the major channel. A change in the response of the instrument (due to malfunction or blunder such as accidentally changing ROI file) it will impact results and will never be detected.

As described (and in alpha beta methods) alpha-to-beta crosstalk and beta-to-alpha crosstalk (or amplification factor, spill-down or misclassification) are technically inaccurate terms unless they are measuring a pure alpha emitter without lower energy secondary emissions that show up in the beta channel. True alpha to beta crosstalk, such as could be measured using Po-210, is much lower than the 20-35% values observed with Pu-239, Am-241, or Th-230. (very nicely put by Terry by the way!)

If we require crosstalk checks for GPC, then we need to require them for liquid scintillation. This opens a Pandora box of difficulties because i) there are very many protocols with different crosstalks, and ii) because liquid scintillation samples are chemically unstable and have to be prepared frequently.

Similarly, this raises a number of questions since this concern is not restricted to crosstalk but applies to checks for each configuration used (i.e., voltage / discriminator - why wouldn't we require performance checks at the alpha voltage?

Section 1.7.1 d) 2) v):

There was discussion. Is a Na(Tl)I detector a gamma ray spectrometry system or a scintillation detector? If it is a scintillation detector, what about energy and shape calibration checks?

Should we say solid state gamma spectrometers? Other ideas?

Attachment E

E-mail 10/1/13 from Tom Semkow

All:

Please find attached Section 1.7.1 with corrections as discussed at the 9/25/13 teleconference. I have accepted changes where the committee seemed to be in agreement, and left those to decide. The detailed comments are in the Section text. There seem to be the following five consecutive points to decide:

- allowing alternate performance checks for gamma spectrometry (biweekly).

For: it satisfies ANSI and recognizes stability of semiconductor detectors. It does not replace "daily" but merely adds a new alternative method. Some labs do energy calibration biweekly, not merely verifications. This method ensures continuous validity of energy calibration within 0.1-0.2 keV. Even if there is a small drift, say 2 channels per year, it is not important, because the energy calibration is always on target within 3 to 4 days between calibrations.

Against: many labs including commercial labs use per day checks which gives them assurance of stability to which they are used or obliged by contract.

- adding new requirement of checking crosstalk per day of use on gas proportional detectors.

For: many labs are using individual alpha and beta sources for efficiency performance check. Therefore it is possible to measure and check crosstalks at the same time.

Against: caution is advised against adding a new requirement because it may lead to loss of certification, unless it is essential. Since crosstalk is a correction parameter and not a principal parameter it is not essential monitoring it per day of use.

- allowing a composite background.

For: allows for measuring dispersion and nonstationarity.

Against: new technique not widely practiced.

- frequency of subtractive background in gas proportional counting.

Weekly: more frequent background evaluation. However may not be long enough due to lack of time on detector.

or

Monthly: Allows long counting time but may not pick up contamination quickly enough.

- should short-term background check be required?

Yes: caution is advised against adding a new requirement because it may lead to loss of certification, unless it is essential.

No: short-term background check is useful, however there are other "required backgrounds" such as subtraction background and method blank that can reveal contamination or malfunction as well.

Please, kindly think about it and communicate your thoughts by email before next teleconference.

Thank you - Tom Semkow