November 4, 2014

Val Miller
NIST Office of Weights and Measures
Gaithersburg, MD

Subject: Revised Laboratory Auditing Program Problems for Participants of Fundamentals of Metrology Seminar

The following Laboratory Auditing Program (LAP) problems have been developed to provide new metrologists in the NIST Office of Weights and Measures (OWM) State Laboratory Program a mechanism by which they can begin the process of gaining NIST OWM Recognition of their laboratory prior to participating in a Mass Seminar. By completing the LAP problems, the associated SOP 8 and SOP 18 training and successfully completing the prescribed proficiency tests, a laboratory may be granted Conditional Recognition to support State weights and measures activities, pending participation in the next Mass Seminar.

Successful completion of these LAP problems requires that the PTs and all analyses described on the next page be completed plus a detailed summary generated for each Mass and Volume segment that covers all the required analyses. The problem summary must include a statement of the purpose of the problem, an explanation of what data was evaluated and from what source it came, what analysis was performed and what conclusions the participant has developed about their laboratory measurement system based on the data and analyses. It also needs to include the results of corrective action, preventive action, or improvement action that resulted from the assessments.

Return the LAP problems to NIST OWM as a single submission (do not send them as pieces) either on paper or some form of media. CD-ROM, DVD, or USB sticks are preferred. Memory sticks will not be returned. Be sure to put your name and a title on the CD, media or paper. We are pretty good at guessing who might have sent the problems but it is better if we do not have to do so. Besides, ISO/IEC 17025 and NIST HB 143 require that all Laboratory documentation be complete and this will be part of your laboratory documentation.

For questions please contact either Val Miller or Georgia Harris of NIST OWM. Submit all PT results to Val Miller for initial feedback before completing the problems. Submit all final summaries and data to Georgia Harris as ONE complete package via mail to:

NIST Office of Weights and Measures
Att: Georgia Harris
100 Bureau Drive, MS 2600
Gaithersburg, MD 20899

Laboratory Auditing Program (LAP) Problems

December 8, 2011

Prerequisites:

1. Fundamentals of Metrology course
2. 2 to 4 hour introduction to SOP 7/8 or 4 (at NIST, conducted by NIST on site, or via webinar)
3. 1 to 2 hour introduction to SOP 18/19 (at NIST, conducted by NIST on site, or via webinar)

Problems:

1. Perform a Proficiency Test on artifact(s) provided by NIST or another RMAP PT as instructed and submit a formal/signed Calibration Report for each (mass **and** volume). Provide laboratory data and observations, and any hand calculations, computer print-out or file used in the process along with the report. Submit an interim report for evaluation; submit a final or amended report with full set of LAP problems.

2. Conduct a "certificate review" of the Calibration Report(s) in item 1 and identify any corrective actions that are needed. Use the job aid with SOP 1: http://www.nist.gov/pml/wmd/labmetrology/sops.cfm . Submit amended reports as required.

3. Conduct a "traceability assessment" of the measurement processes in item 1 and identify any corrective actions that are needed. Use the job aid Traceability Assessment Form: http://www.nist.gov/pml/wmd/labmetrology/lab-resources.cfm

    a. Submit copies of all relevant calibration reports for standards used within your laboratory that demonstrate/establish metrological traceability.

    b. Submit copies of the traceability hierarchies that support item 1.

4. Provide a copy of the "measurement assurance" (control charts, range charts, or standard deviation charts and associated analyses) used to obtain standard deviations of the measurement process that are included in the uncertainty analysis for item 6. Perform at least 7 measurements to create control charts (following SOP 9, 17/20) if none exist in the laboratory that include your data. Use the job aid with SOP 9, 17, or 20 to assess your charts: http://www.nist.gov/pml/wmd/labmetrology/sops.cfm. Use the job aid Measurement Assurance System Assessment to assess your measurement assurance system: http://www.nist.gov/pml/wmd/labmetrology/lab-resources.cfm

5. Provide a documented "uncertainty analysis" to support the calibrations in item 1. This should be your own analysis, not a "laboratory documented solution". Use the job aid SOP 29 Worksheet (DOC) with SOP 29: http://www.nist.gov/pml/wmd/labmetrology/sops.cfm

6. Conduct a PT follow-up assessment and complete the PT follow-up form for each PT. Submit the assessment(s) along with any evidence of corrective actions. Use the job aid PT Follow Up Form: http://www.nist.gov/pml/wmd/labmetrology/lab-resources.cfm

Be sure to include the summary assessments per the instructions on page 1 or the problem status will be INCOMPLETE.