GLP 4

Good Laboratory Practice for Periodic Recalibration of State Standards

1 Purpose

Many States have provisions in their weights and measures laws that require the periodic submission of their State standards to NIST for calibration. Those provisions are based on an early version of the Model Law (1911), which was considered appropriate for the circumstances that prevailed prior to the establishment of the new State Standards Program by NIST. Periodic calibration is necessary on a defined regular, periodic basis, and when measurement control results from internal control charts or external interlaboratory comparisons indicate questionable data. Good Measurement Practices 11 and 13 provide guidance regarding appropriate calibration intervals and documentation of metrological traceability.

Standards of mass, volume, and length, fabricated from modern materials, kept in the controlled environment of a State metrology laboratory under the custody of trained metrologists, are generally stable and not subject to excessive change. The cooperative NIST-State audit programs often identify changes in ample time for corrective action in the unlikely event that such a change should occur. These same programs provide the necessary evidence of the ability to provide metrological traceability of measurement results at a level of confidence sufficient for the need.

The process of packing, shipping, and unpacking exposes the standards to unnecessary hazards that could result in damage, compromising their integrity. The return and re-calibration could take several months, causing an unavailability of State services that would be disruptive to the performance of the mission of the State laboratories.

2 Policy Recommendations

To develop a policy for the guidance of and implementation by all 50 States regarding this subject, the following actions are recommended:

2.1 States should recognize the fact that periodic return of their State standards to NIST (or another suitable and accredited calibration laboratory) for re-calibration is essential to comply with State laws regarding metrological traceability and with ISO/IEC 17025, GMP 11, and when: 1) data regarding traceability is unavailable; 2) charted measurement results indicate that the standards are out of control; 3) measurement results on interlaboratory comparisons or performance tests are suspect; or 4) NIST advises the State of the need.

2.2 GMP 11 and GMP 13 provide the basis for documenting metrological traceability and provide baseline calibration intervals. These publications are templates that must be modified to specific measurement parameters and applications in each laboratory. Documented calibration intervals may state that calibrations are

obtained whenever evidence from outside evaluations, proficiency tests, and/or internal controls indicate that significant changes may have taken place, or when measurement results are suspect, but shall not exceed a specified number of years (with the number specified) and may not exceed limits defined in GMP 11 and 13 without significant statistical and technical analysis by the laboratory and by the NIST Office of Weights and Measures. Statements such as "calibration as needed" are unacceptable for both laboratory measurement equipment and measurement standards.

2.3 References to the periodic re-calibration of State standards in the law such as,

"He (the director) shall maintain the State standards in good order and shall submit them, at least once in ten years, to the National Institute of Standards and Technology for calibration,"

should be followed, if present, and may be amended to reflect a more frequent interval, plus calibration based on identified needs. Alternatively, the wording of Sections 3 and 12 of the present Uniform Law from NIST Handbook 130[1] may be substituted:

"SECTION 3. PHYSICAL STANDARDS. -- Weights and measures that are traceable to the U.S. prototype standards supplied by the Federal Government, or approved as being satisfactory by NIST, shall be the state reference and working standards of weights and measures, and shall be maintained in such calibration as prescribed by the NIST as demonstrated through laboratory accreditation or recognition. All field standards may be prescribed by the Director and shall be verified upon their initial receipt, and as often thereafter as deemed necessary by the Director."

"SECTION 12. POWERS AND DUTIES OF THE DIRECTOR. -- The director shall:

12 (a) maintain traceability of the state standards as demonstrated through laboratory accreditation or recognition."

The approach described above is recommended by NIST because many States that participate in the Office of Weights and Measures Laboratory Metrology Program have the capability of evaluating their own State standards, with adequate statistically valid data, and with the necessary documentation referencing metrological traceability to the International System of Units (SI) (or "national standards", when required by State laws). The Laboratory Metrology Program provides interaction between the State standards laboratories and NIST, ensuring satisfactory laboratory conditions suitable for reference standards and/or working standards in addition to the proper use of NIST procedures in standards calibration. Thus, each State program is evaluated and, if found in compliance, is Recognized to perform the measurements listed on the Certificate of

[1] NIST Handbook 130, Uniform Laws and Regulations in the Areas of Legal Metrology and Engine Fuel Quality (Latest Edition). This text was originally published in the 2005 version of Handbook 130 and has not been updated as of the publication of this Good Laboratory Practice.

Metrological Traceability according to the requirements in ISO/IEC 17025 as referenced in NIST Handbook 143, Program Handbook (latest edition).

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