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IN REPLY
REFER TO DSCC-VAT (K Bernier/DSN 850-0563/(614)692-0563) 24 February 2010

MEMORANDUM FOR VSS

SUBJECT: Engineering Practices Study concerning the adoption of ANSI/NCSL Z540.3 in place of ANSI/NCSL Z540.1
Project number 59GP-2009-006

The subject engineering practices study is dated 24 February 2010. If you have any questions please contact the project officer Ken Bernier, by email at Kenneth.bernier@dla.mil or by phone at 614-692-0563.

Michael A. Radecki
Chief
Electronic Components Team

ENGINEERING PRACTICE STUDY
TITLE: ADOPTION OF [ANSI/NCSL Z 540.3 AMERICAN NATIONAL STANDARD REQUIREMENTS FOR THE CALIBRATION OF MEASURING AND TEST EQUIPMENT]
PROJECT NUMBER 59GP-2009-006

24 February 2010
(approval date)

STUDY PROJECT (SEE ENCLOSED)

FINAL REPORT

Study conducted by Ken Bernier

Prepared by:

Ken Bernier
DSCC-VAT

Approved by:

Michael A. Radecki
Chief
Electronic Component Team

EP STUDY: TO DETERMIN IF DSCC SHOULD ADOPT THE NEW REVISION OF ANSI/NCSL Z540.3

PROJECT NUMBER 59GP-2009-006

OBJECTIVE: The purpose of this study was to determine if DSCC should adopt the new revision of ANSI/NCSL Z540.3.

PROBLEM BACKGROUND:

DSCC requires that manufacturer establish and maintain a calibration system in accordance with ANSI/NCSL Z540 in many of the military specifications.

ANSI/NCSL Z540-1 has been withdrawn and superseded by ANSI/NCSL Z540.3.

The significant difference between ANSI/NCSL Z540-1 and ANSI/NCSL Z540.3 involves the introduction of measurement uncertainty as shown below:

DSCC has decided to adopt the revised document ANSI/NCSL Z540.3 that has the following changes from ANSI/NCSL Z540-1-1994

Z540.3 paragraph 5.3b states: the probability that incorrect acceptance will result from calibration test shall not exceed 2% and shall be documented or the test uncertainty ratio shall be equal to or greater than 4:1.

5.3.3 Measurement uncertainty and traceability.

The uncertainty and traceability of all measurement results associated with processes included in the calibration system shall meet the requirements of their applications. Measurement uncertainty components which have an influence on such measurement results shall be included in the estimates of measurement uncertainty.

5.3.3.1 Expression of measurement uncertainty.

A documented procedure shall be used to estimate and express the uncertainty of measurement for all calibrations. As a minimum, the procedure shall address:

a) sources of measurement uncertainty;
b) estimation and combining of uncertainties;
c) conditions and assumptions;
d) documentation and reporting criteria and
e) bibliography.

NOTE 1: Sources of measurement uncertainty that should be addressed include:
measuring and test equipment associated with the calibration;
measurement and calibration methods and procedures;
measurement traceability;
measurement repeatability and reproducibility;
calibration quality monitoring;
changes over time; and
influence quantities.

NOTE 2: for Guidance on the expression of measurement uncertainty, see ANSI/NCSL Z540-2-1997 (R2002)

5.3.3.2 Measurement traceability
The results of a calibration or measurement shall be traceable through a controlled, unbroken chain of competent calibrations to and through the National Institute of Standards and Technology to the SI units of measurement.

Consider what measurement uncertainty will affect.

All measurement results including calibration shall meet the requirements of their application.
The amount of uncertainty in calibration shall be included in the estimates of uncertainty in a measurement.

CONCLUSION:

the obsolete ANSI/NCSL Z540-1 was canceled and replaced with ANSI/NCSL Z540.3. The differences are explained above.

RECOMMENDATION:
Adopt the new revision of ANSI/NCSL Z540.3 “Calibration Laboratories and Measuring and Test Equipment”.