

OK c) All instructions, standards, manuals and reference data relevant to the work of the laboratory shall be kept up to date and shall be made readily available to personnel (see 4.3).

Document Content includes instructions & test methods

OK d) Deviation from test and calibration methods shall occur only if the deviation has been documented, technically justified, authorized, and accepted by the customer.

See ISO-22, 8, 4.3 example **NOTE** International, regional or national standards or other recognized specifications that contain sufficient and concise information on how to perform the tests and/or calibrations do not need to be supplemented or rewritten as internal procedures if these standards are written in a way that they can be used as published by the operating staff in a laboratory. It may be necessary to provide additional documentation for optional steps in the method or additional details. *2.1.1. Determining Methods Step to Test Method Deviation for*

5.4.2 Selection of methods

X a) The laboratory shall use test and/or calibration methods, including methods for sampling, which meet the needs of the customer and which are appropriate for the tests and/or calibrations it undertakes. Methods published in international, regional or national standards shall preferably be used. The laboratory shall ensure that it uses the latest valid edition of a standard unless it is not appropriate or possible to do so. *TDP, SMC, PCA, System Integrity*

X b) When necessary, the standard shall be supplemented with additional details to ensure consistent application. *The Accuracy & Reliability Test is standard based on ISO/IEC but needs further development on data processing*

OK c) When the customer does not specify the method to be used, the laboratory shall select appropriate methods that have been published either in international, regional or national standards, or by reputable technical organizations, or in relevant scientific texts or journals, or as specified by the manufacturer of the equipment. Laboratory-developed methods or methods adopted by the laboratory may also be used if they are appropriate for the intended use and if they are validated. *TM 2.1.1. Determine Test Method*

OK d) The customer shall be informed as to the method chosen. *may need to add an EAC on site holder in determining method. TM 2.1.1. Step 9*

C e) The laboratory shall confirm that it can properly operate standard methods before introducing the tests or calibrations. If the standard method changes, the confirmation shall be repeated. *TM 2.1.1. need to add decision point*

OK f) The laboratory shall inform the customer when the method proposed by the customer is considered to be inappropriate or out of date. *TM 2.1.1. Step 9 see also ISO-22 checklist item 5.4.3 support*

5.4.3 Laboratory-developed methods

OK a) The introduction of test and calibration methods developed by the laboratory for its own use shall be a planned activity and shall be assigned to qualified personnel equipped with adequate resources.

OK b) Plans shall be updated as development proceeds and effective communication amongst all personnel involved shall be ensured. *TM 4. Major Changes to CIBER (TA for Laboratory) on Quality System*

5.4.4 Non-standard methods

X a) When it is necessary to use methods not covered by standard methods, these shall be subject to agreement with the customer and shall include a clear specification of the customer's requirements and the purpose of the test and/or calibration.

C b) ^{Need description. Get confirmation from may be needed}
^{see 5.4.5.2} The method developed shall have been validated appropriately before use. ^{The 2.2 method validation needs development of validation criteria}

NOTE For new test and/or calibration methods, procedures should be developed prior to the tests and/or calibrations being performed and should contain at least the following information:

- a) appropriate identification;
- b) scope;
- c) description of the type of item to be tested or calibrated;
- d) parameters or quantities and ranges to be determined;
- e) apparatus and equipment, including technical performance requirements;
- f) reference standards and reference materials required;
- g) environmental conditions required and any stabilization period needed;
- h) description of the procedure, including:
 - i) affixing of identification marks, handling, transporting, storing and preparation of items,
 - ii) checks to be made before the work is started,
 - iii) checks that the equipment is working properly and, where required, calibration and adjustment of the equipment before each use,
 - iv) the method of recording the observations and results, v) any safety measures to be observed;
- i) criteria and/or requirements for approval/rejection;
- j) data to be recorded and method of analysis and presentation;
- k) the uncertainty or the procedure for estimating uncertainty.

5.4.5 Validation of methods

5.4.5.1 Validation is the confirmation by examination and the provision of objective evidence that the particular requirements for a specific

022247

intended use are fulfilled.

5.4.5.2

- C a) The laboratory shall validate non-standard methods, laboratory-designed/developed methods, standard methods used outside their intended scope, and amplifications and modifications of standard methods to confirm that the methods are fit for the intended use. The validation shall be as extensive as is necessary to meet the needs of the given application or field of application.
- ~~X~~ b) ^{TM 2.1.2 Validation, Sec 5.4.4. b.} The laboratory shall record the results obtained, the procedure used for the validation, and a statement as to whether the method is fit for the intended use.

NOTE 1 Validation may include procedures for sampling, handling and transportation. *does not include documentation & reporting on the validation*

NOTE 2 The techniques used for the determination of the performance of a method should be one of, or a combination of, the following:

- i) calibration using reference standards or reference materials;
- ii) comparison of results achieved with other methods;
- iii) interlaboratory comparisons;
- iv) systematic assessment of the factors influencing the result;
- v) assessment of the uncertainty of the results based on scientific understanding of the theoretical principles of the method and practical experience.

NOTE 3 When some changes are made in the validated non-standard methods, the influence of such changes should be documented and, if appropriate, a new validation should be carried out.

NA 5.4.5.3 The range and accuracy of the values obtainable from validated methods (e.g., the uncertainty of the results, detection limit, selectivity of the method, linearity, limit of repeatability and/or reproducibility, robustness against external influences and/or cross-sensitivity against interference from the matrix of the sample/test object), as assessed for the intended use, shall be relevant to the customers' needs. *At current time, rotax system do not appear to require details*

NOTE 1 Validation includes specification of the requirements, determination of the characteristics of the methods, a check that the requirements can be fulfilled by using the method, and a statement on the validity.

NOTE 2 As method-development proceeds, regular review should be carried out to verify that the needs of the customer are still being fulfilled. Any change in requirements requiring modifications to the development plan should be approved and authorized.

NOTE 3 Validation is always a balance between costs, risks and technical possibilities. There are many cases in which the range and uncertainty of the values (e.g., accuracy, detection limit, selectivity, linearity, repeatability, reproducibility, robustness and cross-sensitivity) can only be given in a simplified way due to lack of information.

5.4.6 Estimation of uncertainty of measurement

5.4.6.1 A calibration laboratory, or a testing laboratory performing its own calibrations, shall have and shall apply a procedure to estimate the uncertainty of measurement for all calibrations and types of calibrations.

5.4.6.2 Testing laboratories shall have and shall apply procedures for estimating uncertainty of measurement. In certain cases the nature of the test method may preclude rigorous, metrologically and statistically valid, calculation of uncertainty of measurement. In these cases the laboratory shall at least attempt to identify all the components of uncertainty and make a reasonable estimation, and shall ensure that the form of reporting of the result does not give a wrong impression of the uncertainty. Reasonable estimation shall be based on knowledge of the performance of the method and on the measurement scope and shall make use of, for example, previous experience and validation data.

NOTE 1 The degree of rigor needed in an estimation of uncertainty of measurement depends on factors such as:

- i) the requirements of the test method;
- ii) the requirements of the customer;
- iii) the existence of narrow limits on which decisions on conformity to a specification are based.

NOTE 2 In those cases where a well recognized test method specifies limits to the values of the major sources of uncertainty of measurement and specifies the form of presentation of calculated results, the laboratory is considered to have satisfied this clause by following the test method and reporting instructions (see 5.10).

5.4.6.3 When estimating the uncertainty of measurement, all uncertainty components which are of importance in the given situation shall be taken into account using appropriate methods of analysis.

NOTE 1 Sources contributing to the uncertainty include, but are not necessarily limited to, the reference standards and reference materials used, methods and equipment used, environmental conditions, properties and condition of the item being tested or calibrated, and the operator.

NOTE 2 The predicted long-term behavior of the tested and/or calibrated item is not normally taken into account when estimating the measurement uncertainty.

NOTE 3 For further information, see ISO 5725 and the Guide to the Expression of Uncertainty in Measurement (see 1.4).

NVLAP Note: ANSI/NCSL Z540-2-1997 and NIST Technical Note 1297, 1994 edition, are considered to be equivalent to the Guide to the Expression of Uncertainty in Measurement (GUM).

5.4.7 Control of data

5.4.7.1 Calculations and data transfers shall be subject to appropriate checks in a

systematic manner.

Note: Found

5.4.7.2 When computers or automated equipment are used for the acquisition, processing, recording, reporting, storage or retrieval of test or calibration data, the laboratory shall ensure that:

- NA a) computer software developed by the user is documented in sufficient detail and is suitably validated as being adequate for use;
- OK b) ~~Not found~~ *Port Security* procedures are established and implemented for protecting the data; such procedures shall include, but not be limited to, integrity and confidentiality of data entry or collection, data storage, data transmission and data processing; *For 17 Security*
- ? c) computers and automated equipment are maintained to ensure proper functioning and are provided with the environmental and operating conditions necessary to maintain the integrity of test and calibration data.

Note: use of Ref to 17025 & 17026

NOTE Commercial off-the-shelf software (e.g., word processing, database and statistical programs) in general use within their designed application range may be considered to be sufficiently validated. However, laboratory software configuration/modifications should be validated as in 5.4.7.2 a).

5.5 Equipment

5.5.1

F/A a) The laboratory shall be furnished with ~~all items~~ of sampling, measurement and test equipment ~~required for the correct performance of the tests and/or calibrations (including sampling, preparation of test and/or calibration items, processing and analysis of test and/or calibration data).~~

□ b) In those cases where the laboratory needs to use equipment outside its permanent control, it shall ensure that the requirements of this handbook are met.

Remotely operated, special equipment, delivery and

5.5.2

— a) Equipment and its software used for testing, calibration and sampling shall be capable of achieving the accuracy required and shall comply with ~~specifications relevant to the tests and/or calibrations concerned.~~

— b) Calibration programs shall be established for key quantities or values of the instruments ~~where these properties have a significant effect on the results.~~

— c) Before being placed into service, equipment (including that used for sampling) shall be ~~calibrated or checked~~ to establish that it meets the laboratory's specification requirements and complies with the relevant standard specifications. It shall be checked and/or calibrated before use (see 5.6).

Tom 3.1.3 Handbook, Test Instruments

Procedure: Test Control Procedure

Issue

5.5.3 Equipment shall be operated by authorized personnel. Up-to-date instructions on the use and maintenance of equipment (including any relevant manuals provided by the manufacturer of the equipment) shall be readily available for use by the appropriate laboratory personnel.

5.5.4 Each item of equipment and its software used for testing and calibration and significant to the result shall, when practicable, be uniquely identified.

5.5.5 Records shall be maintained of each item of equipment and its software significant to the tests and/or calibrations performed. The records shall include at least the following:

- a) the identity of the item of equipment and its software;
- b) the manufacturer's name, type identification, and serial number or other unique identification;
- c) checks that equipment complies with the specification (see 5.5.2);
- d) the current location, where appropriate;
- e) the manufacturer's instructions, if available, or reference to their location;
- f) dates, results and copies of reports and certificates of all calibrations, adjustments, acceptance criteria, and the due date of next calibration;
- g) the maintenance plan, where appropriate, and maintenance carried out to date;
- h) any damage, malfunction, modification or repair to the equipment.

5.5.6 The laboratory shall have procedures for safe handling, transport, storage, use and planned maintenance of measuring equipment to ensure proper functioning and in order to prevent contamination or deterioration.

NOTE Additional procedures may be necessary when measuring equipment is used outside the permanent laboratory for tests, calibrations or sampling.

5.5.7

a) Equipment that has been subjected to overloading or mishandling, gives suspect results, or has been shown to be defective or outside specified limits, shall be taken out of service. It shall be isolated to prevent its use or clearly labeled or marked as being out of service until it has been repaired and shown by calibration or test to perform correctly.

b) The laboratory shall examine the effect of the defect or departure from specified limits on previous tests and/or calibrations and shall institute the "Control of nonconforming work" procedure (see 4.9).

Reg. 11204 Counter / Precise

TM 3 Product Submitted Invention Log, Test description

TM 2.1.5.1.2 Invention Log

What happens if a GUT is discovered to be damaged

not found

- 5.5.8 Whenever practicable, all equipment under the control of the laboratory and requiring calibration shall be labeled, coded or otherwise identified to indicate the status of calibration, including the date when last calibrated and the date or expiration criteria when recalibration is due.
- 5.5.9 When, for whatever reason, equipment goes outside the direct control of the laboratory, the laboratory shall ensure that the function and calibration status of the equipment are checked and shown to be satisfactory before the equipment is returned to service.
- 5.5.10 When intermediate checks are needed to maintain confidence in the calibration status of the equipment, these checks shall be carried out according to a defined procedure.
- 5.5.11 Where calibrations give rise to a set of correction factors, the laboratory shall have procedures to ensure that copies (e.g., in computer software) are correctly updated.
- 5.5.12 Test and calibration equipment, including both hardware and software, shall be safeguarded from adjustments which would invalidate the test and/or calibration results.

5.6 Measurement traceability

See 180.22

5.6.1 General

- a) All equipment used for tests and/or calibrations, including equipment for subsidiary measurements (e.g., for environmental conditions) having a significant effect on the accuracy or validity of the result of the test, calibration or sampling shall be calibrated before being put into service.
- b) The laboratory shall have an established program and procedure for the calibration of its equipment.

NOTE Such a program should include a system for selecting, using, calibrating, checking, controlling and maintaining measurement standards, reference materials used as measurement standards, and measuring and test equipment used to perform tests and calibrations.

NVLAP Note: See Annex B for requirements for the implementation of traceability policy in NVLAP-accredited laboratories.

5.6.2 Specific requirements

5.6.2.1 Calibration

5.6.2.1.1

- a) For calibration laboratories, the program for calibration of equipment shall be designed and operated so as to ensure that calibrations and measurements made by the laboratory are traceable to the International System of Units (SI) (*Système international d'unités*).

A calibration laboratory establishes traceability of its own measurement standards and measuring instruments to the SI by means of an unbroken chain of calibrations or comparisons linking them to relevant primary standards of the SI units of measurement. The link to SI units may be achieved by reference to national measurement standards. National measurement standards may be primary standards, which are primary realizations of the SI units or agreed representations of SI units based on fundamental physical constants, or they may be secondary standards which are standards calibrated by another national metrology institute.

- ___ b) When using external calibration services, traceability of measurement shall be assured by the use of calibration services from laboratories that can demonstrate competence, measurement capability and traceability.
- ___ c) The calibration certificates issued by these laboratories shall contain the measurement results, including the measurement uncertainty and/or a statement of compliance with an identified metrological specification (see also 5.10.4.2).

NOTE 1 Calibration laboratories fulfilling the requirements of this handbook are considered to be competent. A calibration certificate bearing an accreditation body logo from a calibration laboratory accredited to this handbook, for the calibration concerned, is sufficient evidence of traceability of the calibration data reported.

NOTE 2 Traceability to SI units of measurement may be achieved by reference to an appropriate primary standard (see VIM:1993, 6.4) or by reference to a natural constant, the value of which in terms of the relevant SI unit is known and recommended by the General Conference of Weights and Measures (CGPM) and the International Committee for Weights and Measures (CIPM).

NOTE 3 Calibration laboratories that maintain their own primary standard or representation of SI units based on fundamental physical constants can claim traceability to the SI system only after these standards have been compared, directly or indirectly, with other similar standards of a national metrology institute.

NOTE 4 The term "identified metrological specification" means that it must be clear from the calibration certificate which specification the measurements have been compared with, by including the specification or by giving an unambiguous reference to the specification.

NOTE 5 When the terms "international standard" or "national standard" are used in connection with traceability, it is assumed that these standards fulfill the properties of primary standards for the realization of SI units.

NOTE 6 Traceability to national measurement standards does not necessarily require the use of the national metrology institute of the country in which the laboratory is located.

NOTE 7 If a calibration laboratory wishes or needs to obtain traceability from a national metrology institute other than in its own country, this laboratory should select a national metrology institute that actively participates in the activities of BIPM either directly or through regional groups.

NOTE 8 The unbroken chain of calibrations or comparisons may be achieved in several steps carried out by different laboratories that can demonstrate traceability.

___ 5.6.2.1.2 There are certain calibrations that currently cannot be strictly made in SI units. In these cases calibration shall provide confidence in measurements by establishing traceability to appropriate measurement standards such as:

- ___ a) the use of certified reference materials provided by a competent supplier to give a reliable physical or chemical characterization of a material;
- ___ b) the use of specified methods and/or consensus standards that are clearly described and agreed by all parties concerned.
- ___ c) Participation in a suitable program of interlaboratory comparisons is required where possible.

5.6.2.2 Testing

___ 5.6.2.2.1 For testing laboratories, the requirements given in 5.6.2.1 apply for measuring and test equipment with measuring functions used, unless it has been established that the associated contribution from the calibration contributes little to the total uncertainty of the test result. When this situation arises, the laboratory shall ensure that the equipment used can provide the uncertainty of measurement needed.

NOTE The extent to which the requirements in 5.6.2.1 should be followed depends on the relative contribution of the calibration uncertainty to the total uncertainty. If calibration is the dominant factor, the requirements should be strictly followed.

___ 5.6.2.2.2 Where traceability of measurements to SI units is not possible and/or not relevant, the same requirements for traceability to, for example, certified reference materials, agreed methods and/or consensus standards, are required as for calibration laboratories (see 5.6.2.1.2).

5.6.3 Reference standards and reference materials

5.6.3.1 Reference standards

- ___ a) The laboratory shall have a program and procedure for the calibration of its reference standards.
- ___ b) Reference standards shall be calibrated by a body that can provide traceability as described in 5.6.2.1.
- ___ c) Such reference standards of measurement held by the laboratory shall be used for calibration only and for no other purpose, unless it can be shown that their performance as reference standards would not be invalidated. Reference standards shall be calibrated before and after any adjustment.

5.6.3.2 Reference materials

___ Reference materials shall, where possible, be traceable to SI units of measurement, or to certified reference materials. Internal reference materials shall be checked as far

as is technically and economically practicable.

5.6.3.3 Intermediate checks

— Checks needed to maintain confidence in the calibration status of reference, primary, transfer or working standards and reference materials shall be carried out according to defined procedures and schedules.

5.6.3.4 Transport and storage

— The laboratory shall have procedures for safe handling, transport, storage and use of reference standards and reference materials in order to prevent contamination or deterioration and in order to protect their integrity.

NOTE Additional procedures may be necessary when reference standards and reference materials are used outside the permanent laboratory for tests, calibrations or sampling.

5.7 Sampling

5.7.1

- a) The laboratory shall have a sampling plan and procedures for sampling when it carries out sampling of substances, materials or products for subsequent testing or calibration.
- b) The sampling plan as well as the sampling procedure shall be available at the location where sampling is undertaken. Sampling plans shall, whenever reasonable, be based on appropriate statistical methods. The sampling process shall address the factors to be controlled to ensure the validity of the test and calibration results.

NOTE 1 Sampling is a defined procedure whereby a part of a substance, material or product is taken to provide for testing or calibration of a representative sample of the whole. Sampling may also be required by the appropriate specification for which the substance, material or product is to be tested or calibrated. In certain cases (e.g., forensic analysis), the sample may not be representative but is determined by availability.

NOTE 2 Sampling procedures should describe the selection, sampling plan, withdrawal and preparation of a sample or samples from a substance, material or product to yield the required information.

— **5.7.2** Where the customer requires deviations, additions or exclusions from the documented sampling procedure, these shall be recorded in detail with the appropriate sampling data and shall be included in all documents containing test and/or calibration results, and shall be communicated to the appropriate personnel.

— **5.7.3** The laboratory shall have procedures for recording relevant data and operations relating to sampling that forms part of the testing or calibration that is undertaken. These records shall include the sampling procedure used, the identification of the sampler, environmental conditions (if relevant) and diagrams or other equivalent means to identify the sampling location as necessary and, if appropriate, the statistics the sampling procedures are

based upon.

5.8 Handling of test and calibration items

C 5.8.1 The laboratory shall have procedures for the transportation, receipt, handling, protection, storage, retention and/or disposal of test and/or calibration items, including all provisions necessary to protect the integrity of the test or calibration item, and to protect the interests of the laboratory and the customer.

5.8.2 *TM 3. Product Submittal Inventory Log Test Procedures Form
Item Condition*

___ a) The laboratory shall have a system for identifying test and/or calibration items. *TM 3 check*

___ b) The identification shall be retained throughout the life of the item in the laboratory. *TM 3 check*

___ c) The system shall be designed and operated so as to ensure that items cannot be confused physically or when referred to in records or other documents. *TM 3 check*

___ d) The system shall, if appropriate, accommodate a sub-division of groups of items and the transfer of items within and from the laboratory.

5.8.3 *TM 3 check*

___ a) Upon receipt of the test or calibration item, abnormalities or departures from normal or specified conditions, as described in the test or calibration method, shall be recorded.

___ b) When there is doubt as to the suitability of an item for test or calibration, or when an item does not conform to the description provided, or the test or calibration required is not specified in sufficient detail, the laboratory shall consult the customer for further instructions before proceeding and shall record the discussion. *TM 3 check*

5.8.4

___ a) The laboratory shall have procedures and appropriate facilities for avoiding deterioration, loss or damage to the test or calibration item during storage, handling and preparation.

___ b) Handling instructions provided with the item shall be followed.

___ c) When items have to be stored or conditioned under specified environmental conditions, these conditions shall be maintained, monitored and recorded.

___ d) Where a test or calibration item or a portion of an item is to be held secure, the laboratory shall have arrangements for storage and security that protect the condition and integrity of the secured items or portions concerned.

NOTE 1 Where test items are to be returned into service after testing, special care is required to ensure that they are not damaged or injured during the handling, testing or storing/waiting processes.

NOTE 2 A sampling procedure and information on storage and transport of samples, including information on sampling factors influencing the test or calibration result, should be provided to those responsible for taking and transporting the samples.

NOTE 3 Reasons for keeping a test or calibration item secure can be for reasons of record, safety or value, or to enable complementary tests and/or calibrations to be performed later.

5.9 Assuring the quality of test and calibration results

5.9.1

- ___ a) The laboratory shall have quality control procedures for monitoring the validity of tests and calibrations undertaken.
- ___ b) The resulting data shall be recorded in such a way that trends are detectable and, where practicable, statistical techniques shall be applied to the reviewing of the results.
- ___ c) This monitoring shall be planned and reviewed and may include, but not be limited to, the following:
 - ___ 1) regular use of certified reference materials and/or internal quality control using secondary reference materials;
 - ___ 2) participation in interlaboratory comparison or proficiency-testing programs;
 - ___ 3) replicate tests or calibrations using the same or different methods;
 - ___ 4) retesting or recalibration of retained items;
 - ___ 5) correlation of results for different characteristics of an item.

NOTE The selected methods should be appropriate for the type and volume of the work undertaken.

- ___ ♦ 5.9.2 Quality control data shall be analyzed and, where they are found to be outside pre-defined criteria, planned action shall be taken to correct the problem and to prevent incorrect results from being reported.

5.10 Reporting the results

5.10.1 General

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- ___ a) The results of each test, calibration, or series of tests or calibrations carried out by the laboratory shall be reported accurately, clearly, unambiguously and objectively, and in accordance with any specific

instructions in the test or calibration methods.

OK b)

The results shall be reported, usually in a test report or a calibration certificate (see Note 1), and shall include all the information requested by the customer and necessary for the interpretation of the test or calibration results and all information required by the method used. This information is normally that required by 5.10.2, and 5.10.3 or 5.10.4.

As per office handbook

OK c)

150-22

In the case of tests or calibrations performed for internal customers, or in the case of a written agreement with the customer, the results may be reported in a simplified way. Any information listed in 5.10.2 to 5.10.4 which is not reported to the customer shall be readily available in the laboratory which carried out the tests and/or calibrations.

NOTE 1 Test reports and calibration certificates are sometimes called test certificates and calibration reports, respectively.

NOTE 2 The test reports or calibration certificates may be issued as hard copy or by electronic data transfer provided that the requirements of this handbook are met.

5.10.2 Test reports and calibration certificates

Each test report or calibration certificate shall include at least the following information, unless the laboratory has valid reasons for not doing so:

OK a)

a title (e.g., "Test Report" or "Calibration Certificate"); *As per*

OK b)

the name and address of the laboratory, and the location where the tests and/or calibrations were carried out, if different from the address of the laboratory;

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OK c)

unique identification of the test report or calibration certificate (such as the serial number), and on each page an identification in order to ensure that the page is recognized as a part of the test report or calibration certificate, and a clear identification of the end of the test report or calibration certificate;

*CIBER part 77
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OK d)

the name and address of the customer;

OK e)

identification of the method used;

UCR Date

OK f)

a description of, the condition of, and unambiguous identification of the item(s) tested or calibrated;

As per

A System Identifier

Number

CIBER

Self Document

OK g)

the date of receipt of the test or calibration item(s) where this is critical to the validity and application of the results, and the date(s) of performance of the test or calibration;

Handwritten notes and stamps in the right margin, including a box with text that is partially legible.

OK h)

reference to the sampling plan and procedures used by the laboratory or other bodies where these are relevant to the validity or application of the results;

OK i)

the test or calibration results with, where appropriate, the units of

measurement;

h i) the name(s), function(s) and signature(s) or equivalent identification of person(s) authorizing the test report or calibration certificate;

k k) where relevant, a statement to the effect that the results relate only to the items tested or calibrated.

NVLAP Note: NVLAP defines the person(s) who authorizes the test report or calibration certificate as the Approved Signatory (see 1.5.2).

NOTE 1 Hard copies of test reports and calibration certificates should also include the page number and total number of pages.

NOTE 2 It is recommended that laboratories include a statement specifying that the test report or calibration certificate shall not be reproduced except in full, without written approval of the laboratory.

5.10.3 Test reports

5.10.3.1 In addition to the requirements listed in 5.10.2, test reports shall, where necessary for the interpretation of the test results, include the following:

ca a) deviations from, additions to, or exclusions from the test method, and information on specific test conditions, such as environmental conditions;

cl b) where relevant, a statement of compliance/non-compliance with requirements and/or specifications;

ca c) where applicable, a statement on the estimated uncertainty of measurement; information on uncertainty is needed in test reports when it is relevant to the validity or application of the test results, when a customer's instruction so requires, or when the uncertainty affects compliance to a specification limit;

cl d) where appropriate and needed, opinions and interpretations (see 5.10.5);

cl e) additional information which may be required by specific methods, customers or groups of customers.

5.10.3.2 In addition to the requirements listed in 5.10.2 and 5.10.3.1, test reports containing the results of sampling shall include the following, where necessary for the interpretation of test results:

cl a) the date of sampling;

cl b) unambiguous identification of the substance, material or product sampled (including the name of the manufacturer, the model or type of designation and serial numbers as appropriate);

cl c) the location of sampling, including any diagrams, sketches or photographs;

cl d) a reference to the sampling plan and procedures used;

022259

- ___ e) details of any environmental conditions during sampling that may affect the interpretation of the test results;
- ___ f) any standard or other specification for the sampling method or procedure, and deviations, additions to or exclusions from the specification concerned.

5.10.4 Calibration certificates

5.10.4.1 In addition to the requirements listed in 5.10.2, calibration certificates shall include the following, where necessary for the interpretation of calibration results:

- ___ a) the conditions (e.g., environmental) under which the calibrations were made that have an influence on the measurement results;
- ___ b) the uncertainty of measurement and/or a statement of compliance with an identified metrological specification or clauses thereof;
- ___ c) evidence that the measurements are traceable (see Note 2 in 5.6.2.1 .1).

5.10.4.2

- ___ a) The calibration certificate shall relate only to quantities and the results of functional tests.
- ___ b) If a statement of compliance with a specification is made, this shall identify which clauses of the specification are met or not met.
- ___ c) When a statement of compliance with a specification is made omitting the measurement results and associated uncertainties, the laboratory shall record those results and maintain them for possible future reference.
- ___ d) When statements of compliance are made, the uncertainty of measurement shall be taken into account.

___ **5.10.4.3** When an instrument for calibration has been adjusted or repaired, the calibration results before and after adjustment or repair, if available, shall be reported.

___ **5.10.4.4** A calibration certificate (or calibration label) shall not contain any recommendation on the calibration interval except where this has been agreed with the customer. This requirement may be superseded by legal regulations.

5.10.5 Opinions and interpretations

ok When opinions and interpretations are included, the laboratory shall document the basis upon which the opinions and interpretations have been made. Opinions and interpretations shall be clearly marked as such in a test report. *NOTE 5-4*

NOTE 1 Opinions and interpretations should not be confused with inspections and product certifications as intended in ISO/IEC 17020 and ISO/IEC Guide 65.

NOTE 2 Opinions and interpretations included in a test report may comprise, but not be limited to, the following:

- i) an opinion on the statement of compliance/noncompliance of the results with requirements;
- ii) fulfillment of contractual requirements;
- iii) recommendations on how to use the results;
- iv) guidance to be used for improvements.

NOTE 3 In many cases it might be appropriate to communicate the opinions and interpretations by direct dialogue with the customer. Such dialogue should be written down.

5.10.6 Testing and calibration results obtained from subcontractors

- c a) When the test report contains results of tests performed by subcontractors, these results shall be clearly identified. *NIST 5.2 will add explicit statement under 5.4.6 for 2 checks*
- etc b) The subcontractor shall report the results in writing or electronically. *NIST 5.2*
- N/A c) When a calibration has been subcontracted, the laboratory performing the work shall issue the calibration certificate to the contracting laboratory.

5.10.7 Electronic transmission of results

OK In the case of transmission of test or calibration results by telephone, telex, facsimile or other electronic or electromagnetic means, the requirements of this handbook shall be met (see also 5.4.7). *Para 17 Sec 2*

5.10.8 Format of reports and certificates

ok The format shall be designed to accommodate each type of test or calibration carried out and to minimize the possibility of misunderstanding or misuse.

NIST basic ISS Ag 8 format
NOTE 1 Attention should be given to the layout of the test report or calibration certificate, especially with regard to the presentation of the test or calibration data and ease of assimilation by the reader.

NOTE 2 The headings should be standardized as far as possible.

5.10.9 Amendments to test reports and calibration certificates

- ok a) Material amendments to a test report or calibration certificate after issue shall be made only in the form of a further document, or data transfer, which includes the statement: *TM 12.1*

Amendment
 "Supplement to Test Report [or Calibration Certificate], serial number . . . [or as otherwise identified]," or an equivalent form of wording.

- ok b) Such amendments shall meet all the requirements of this handbook. *TM 12.2*

- ___ c) **When it is necessary to issue a complete new test report or calibration certificate, this shall be uniquely identified and shall contain a reference to the original that it replaces.**

Annex A (normative)**Referencing NVLAP accreditation****A.1 Conditions for referencing the NVLAP term, logo, and symbol**

The term *NVLAP* and the NVLAP logo are registered marks of the Federal Government, which retains exclusive rights to control the use thereof. Permission to use the term and symbol (NVLAP logo with approved caption) is granted to NVLAP accredited laboratories for the limited purpose of announcing their accredited status, and for use on reports that describe only testing or calibration within the scope of accreditation. NVLAP reserves the right to control the quality of the use of the NVLAP term, logo, and symbol.

In order to become and remain accredited, laboratories shall comply with the following conditions pertaining to the use of the term *NVLAP*, the NVLAP logo, and NVLAP symbol. Failure to comply with these conditions may result in suspension or revocation of a laboratory's accreditation.

- ___ a) An applicant laboratory that has not yet achieved accreditation may make reference to its applicant status. If the NVLAP Lab Code is used, it shall be accompanied by a statement accurately reflecting the laboratory's status. An applicant laboratory shall not use the NVLAP term, logo or symbol in a manner that implies accreditation.
- ___ b) The laboratory shall have a policy and procedure for controlling the use of the term *NVLAP* and the NVLAP symbol.
- ___ c) The term and/or symbol shall not be used in a manner that brings NVLAP into disrepute or misrepresents a laboratory's scope of accreditation or accredited status.
- ___ d) When the term *NVLAP* is used to reference a laboratory's accredited status, it shall be accompanied by the NVLAP Lab Code.
- ___ e) When the NVLAP symbol used to reference a laboratory's accredited status, it shall be comprised of the NVLAP logo and the NVLAP Lab Code in an approved caption. The caption shall appear below and in close proximity to the logo. The following captions have been approved by NVLAP:
 - "For the scope of accreditation under NVLAP Lab Code 000000-0"
 - "NVLAP Lab Code 000000-0".

See Annex A of NIST Handbook 150 for examples of the logo with captions.

- f) When the NVLAP symbol is used, the form of the NVLAP logo must conform to the following guidelines:
- ___ 1) The logo shall stand by itself and shall not be combined with any other logo, symbol, or graphic.
 - ___ 2) The aspect ratio (width to height) shall be 2.25 to 1.
 - ___ 3) The logo and caption shall be of a size that allows the caption to be easily read. The size of the caption shall not exceed the size of the logo itself.
 - ___ 4) The logo shall appear in black, blue, or other color approved by NVLAP, and may be filled or unfilled. In the case of a filled logo, the same color shall be used for the outline and the fill.
- ___ g) The name of at least one Approved Signatory shall appear on a test or calibration report that displays the NVLAP symbol or references NVLAP accreditation. A computer-generated report may have the Approved Signatory's name printed along with the test or calibration results, as long as there is evidence that there is a system in place to ensure that the report cannot be generated without the review and consent of the Approved Signatory. There may be legal or contractual requirements for original signatures to appear on the report.
- h)
- ___ 1) When the term and/or symbol are used on test or calibration reports, such use shall be limited to reports in which some or all of the data are from tests or calibrations performed by the laboratory under its scope of accreditation.
 - ___ 2) A test or calibration report that contains both data covered by the accreditation and data not covered by the accreditation shall clearly identify the data that are not covered by the accreditation.
 - ___ 3) The report must prominently display the following statement at the beginning of the report: "This report contains data that are not covered by the NVLAP accreditation."
- i)
- ___ 1) When the term and/or symbol are used on test or calibration reports that also include work done by subcontracted laboratories, such use shall be limited to reports in which some or all of the data are from tests or calibrations performed by the laboratory under its scope of accreditation.
 - ___ 2) A test or calibration report that contains both data covered by the accreditation and data provided by a subcontractor shall clearly identify the data that were provided by the subcontracted laboratory.

- ___ 3) The report must prominently display the following statement at the beginning of the report: "This report contains data that were produced under subcontract by Laboratory X." If the subcontracted laboratory is accredited by NVLAP, then its Lab Code should also be stated.
- ___ 4) If the subcontracted laboratory is accredited by a body other than NVLAP, then the name of the accreditation body and the laboratory's number or other unique identifier should also be stated. If the subcontracted laboratory is not accredited, then this must be stated.
- ___ j) Each test or calibration report bearing the term and/or symbol shall include a statement that the report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.
- ___ k) When used in a contract or proposal, the term and/or symbol shall be accompanied by a description of the laboratory's scope of accreditation and current accreditation status.
- ___ l) Laboratories shall not use the terms *certified* or *registered* when referencing their NVLAP accreditation or conformance to ISO/IEC 17025 requirements. The correct term is *accredited*.

Annex B (normative)**Implementation of traceability policy in accredited laboratories****B.1 Policy overview**

It is a fundamental requirement that the results of all accredited calibrations and the results of all calibrations required to support accredited tests shall be traceable to the SI (the International System of Units) through standards maintained by the National Institute of Standards and Technology (NIST) or other internationally recognized national metrology institutes (NMIs). NIST Handbook 150 (and ISO/IEC 17025) details the specific requirements for traceability to be met by testing and calibration laboratories. This annex provides guidance as to how these requirements may be met and how traceability of measurement can be assured by an accredited laboratory.

Internationally recognized NMIs are those that are signatory to the Comité International des Poids et Mesures (CIPM) Mutual Recognition Arrangement (MRA) titled "Mutual recognition of national measurement standards and of calibration and measurement certificates issued by national metrology institutes" and that have the necessary calibration services listed in Appendix C of the MRA, Calibration and Measurement Capabilities (CMC). For more details on the CIPM MRA and the CMC database, please see <http://www.bipm.org/en/convention/mra/> or visit the NVLAP web site.

B.2 General

- ___ a) Laboratories shall be able to demonstrate proper use of traceable standards and test and measurement equipment by competent laboratory personnel in a suitable environment in performing the tests for which accreditation is desired or held. This demonstration will include the determination of the appropriate measurement uncertainty.
- ___ b) Calibration certificates received by NVLAP-accredited testing and calibration laboratories with new or recalibrated equipment shall meet the requirements of ISO/IEC 17025. The certificates must include the uncertainty of measurement and/or a statement of compliance with an identified metrological specification or clauses thereof.

Note to assessor: The NVLAP assessor(s) must, for each measurement parameter, indicate which method the laboratory has employed to achieve traceability. Select from B.3.1, B.3.2, B.3.3, B.3.4, or B.3.5 below. If B.3.4 or B.3.5 is selected, supporting documentation is also required as indicated.

B.3 Demonstration of traceability

- B.3.1 NVLAP-accredited laboratories may submit appropriate physical standards and test and measurement equipment directly to NIST or, when appropriate, to another national metrology institute. Accredited laboratories may obtain certified reference materials from NIST (called Standard Reference Materials under copyright) or from another national metrology institute. Use of a national metrology institute other than NIST shall be documented and will be assessed by NVLAP.**
- B.3.2 Testing laboratories that perform calibrations only for themselves do not need to be accredited as calibration laboratories. Calibration laboratories that perform specific calibrations only for themselves to support their accredited services do not need to be accredited for those calibrations. For the purpose of assuring traceability, an accredited laboratory may calibrate its own equipment if the appropriate requirements of NIST Handbook 150 have been met.**
- B.3.3 NVLAP-accredited laboratories that do not demonstrate traceability as described in B.3.1 or B.3.2, shall use accredited calibration laboratory services wherever available. Accredited calibration laboratories are those accredited by NVLAP or by any accrediting body with which NVLAP has a mutual recognition arrangement. A listing of NVLAP-accredited calibration laboratories and of accreditation bodies with which NVLAP currently has agreements is available from NVLAP.**
- B.3.4 If a NVLAP-accredited laboratory submits physical standards or test and measurement equipment to a calibration service provider that is not accredited by NVLAP or by an accrediting body with which NVLAP has a mutual recognition arrangement, the laboratory shall:**
- a) document that an appropriate accredited calibration service provider is not available;**
- b) audit the claim of traceability of the provider of the calibration service and document the following areas related to the calibration and claim of traceability of its standards and test and measurement equipment:**
- 1) information regarding assessment of the quality system used by the calibration service provider,**
- 2) the calibration procedure(s) used by the calibration service provider,**
- 3) the physical standards or other test and measurement equipment used by the calibration service provider (including evidence of traceability to standards maintained by NIST or an appropriate national metrology institute and copies of relevant calibration certificates),**
- 4) information regarding the calibration intervals of relevant standards or other test and measurement equipment.**

- ___ 5) the environmental conditions of the laboratory,
 - ___ 6) the method(s) by which uncertainties are determined (e.g., *Guide to the Expression of Uncertainty in Measurement (GUM)*), and
 - ___ 7) the relative uncertainties achieved at all steps of the process;
- ___ c) pursue the traceability chain until traceability to appropriate stated references is completely validated, when a calibration service provider submits physical standards and/or test and measurement equipment used in the calibration to another laboratory(s) not accredited by NVLAP;
- ___ d) enter the audit documentation, including all findings of nonconformance and resolutions of those findings, into the laboratory's quality management record-keeping system.

NOTE An on-site visit to the provider of the calibration service is encouraged, but is not required as long as the information listed above is obtained and otherwise verified. Self-declaration of compliance to ISO/IEC 17025 or other relevant standards by a calibration service provider is not acceptable evidence of verification of traceability. Citation of a NIST Test Number by the calibration service provider likewise is not acceptable evidence of verification of traceability.

- ___ **B.3.5** If traceable calibration services are not available or appropriate, laboratories may demonstrate comparison to a widely used standard that is clearly specified and mutually agreeable to all parties concerned, particularly in measurements where NIST does not maintain a U.S. national standard. For example, NIST does not maintain a standard for all hardness testing scales. There are several widely used commercial standards available for hardness. However, these standards may not all give equivalent measurement results; therefore, it is important to specify which standard is used and to obtain agreement among all parties involved that the choice made is acceptable.

**NIST HANDBOOK 150 CHECKLIST
COMMENTS AND NONCONFORMITIES**

Instructions to the Assessor: Use this sheet to document comments and nonconformities. For each, identify the appropriate item number from the checklist. Identify comments with a "C" and nonconformities with an "X." If additional space is needed, make copies of this page (or use additional blank sheets).

Item No. C or X	Comments and/or Nonconformities
4.1.18.j 4.2.16)	C C CPI will be tested by someone in CIA community with documents based on <u>OSP prnta Qk/1900C/1900C</u> . Documents use the <u>Point Test method</u> . Test Method
4.2.7	C is a parent course for actual test procedure & methods used. Needs development in terms of being a conscious process but current controls of status of procedures are significant of the concept.
4.3.22b)	C The review is to be periodic, but Plan QA Activities 11.2 Plan QA Activities "event is documented and stored in the ITA Project book..." and placed in a calendar. There is no clear table showing a planned schedule for documents but the calendar process fulfills the part. CIA does all scheduling for reviews.
4.8.1	C No examples /ie could in current log. Check on next visit who shows example of log for another CIBER subunit which shows how entry. The complaint log not accessible via ITA director's "Custom: Complaint Log" title, need further submission forms as well as the log itself. The log items is retained for 1 year & then cleared.
4.11.4	C CIA Log, examples reviewed but this under review in subsequent visits.
4.13.12	C FAC new guidelines (Confidentiality procedures) in specifying life cycle 4.3.4.15. CIBER to look at the procedure and adopt and adjust CIBER retention policy accordingly.
4.13.2.1	C Review on subsequent assessment visits. No testing has been performed under this accreditation so forecasts would be of course. See Test Method from check-list of list. Continued on back



U.S. ELECTION ASSISTANCE COMMISSION
1225 New York Ave. NW - Suite 1100
Washington, DC 20005

September 15, 2006

Mr. Wally Birdseye
President, Federal Solutions
CIBER Federal Solutions
7900 Westpark Drive
McLean, VA 22102-3105

Dear Mr. Birdseye:

As you know, the accreditation assessment for ITA Practices Ciber, Huntsville, Alabama, was conducted to support the EAC interim testing program pending implementation of the full EAC Testing and Certification and program. The full program will be conducted in cooperation with the National Voluntary Laboratory Accreditation Program (NVLAP) under NIST. The interim program is intended to accredit independent, non-governmental test laboratories formerly authorized under the National Association of State Election Directors (NASED). This will allow these labs to continue voting system testing under a limited EAC accreditation.

The EAC interim accreditation report for Ciber Inc. notes that the voting system operation is a small branch office of corporate Ciber with the official title of ITA Practice, Ciber, Inc. The report finds that the responsibility of managing, defining and implementing Ciber's ISO 9001 compliant corporate quality management system is vested in another branch office of Ciber. Although ITA Practice, Ciber, created processes and procedures in 2005 to follow the management directive, the lab assessor found that processes are not presently implemented or followed. The report further finds that currently, ITA Practice, Ciber is not following their own defined processes and procedures to ensure the quality of their work product. The interim accreditation report notes in its assessment of ITA Practice, Ciber, that:

"CIBER has not shown the resources to provide a reliable product. The current quality management plan requires more time to spend on managing the process than they appear to have available and it was clear during the assessment visit that they had not accepted that they have a responsibility to provide quality reviewed reports that show what was done in testing."

Given the findings of the laboratory assessment, prior to receiving interim accreditation from the EAC, Ciber must implement the cure outlined below.

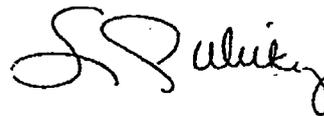
022271

Ciber or another EAC accredited laboratory taking responsibility for ITA Ciber operations must implement a policy and system of voting system testing and quality assurance that meets ISO/IEC 17025 and NIST handbook 150-2006. Specifically, the following issues must be addressed and the following remedies implemented. The lab must:

- a. Assign resources, adopt policies and implement systems for developing standardized tests to be used in evaluating the functionality of voting systems and voting system software. Neither ITA Practices, Ciber nor any of its partners will be permitted to rely on test plans suggested by a voting system manufacturer.
- b. Assign resources, adopt policies and implement systems for quality review and control of all tests performed on voting systems and the report of results from those tests. This shall include provisions to assure that all required tests have been performed by ITA Practices, Ciber or its accredited partner lab.

After ITA Practices, Ciber has implemented the above requirements it must request a follow-up laboratory assessment. This request shall be made in writing to me. The document should certify that you have met the requirements of this letter. EAC will schedule a one-day reassessment visit by an accredited laboratory assessor to verify that appropriate processes have been implemented to correct the deficiencies noted in the original assessment. This reassessment will take place within 90 days of the EAC's receipt of the documentation from Ciber. Should you have any questions regarding this notification, please contact Brian Hancock in our office at either 202-566-3122 or by email at BHancock@eac.gov

Sincerely,



Thomas Wilkey
Executive Director, EAC

022272

Election Assistance Commission (EAC)
Interim Accreditation
Independent Test Authorities (ITA)

Assessment Report

CIBER & Wyle

Conducted: Jul 17-22, 2006
Huntsville, AL

Assessor: Steven V. Freeman

022273

Introduction

This accreditation assessment was conducted to support an interim program pending implementation of the full EAC Accreditation program in cooperation with the National Voluntary Laboratory Accreditation Program (NVLAP) under NIST Handbook 150-2006, NVLAP Procedures and General Requirements and NIST Handbook 150-22- 2005 NVLAP Voting System Testing (HB 150-22). The interim program is designed to accredit ITAs formerly authorized under the National Association of State Election Directors (NASSED) accreditation program to continue voting system testing under an EAC accreditation until such time as the NVLAP/EAC joint accreditation has qualified one or more testing laboratories as Voting System Test Laboratory (VSTL).

Summary of Findings

Under NASSED, Wyle Laboratories and CIBER, Inc. were separately accredited as Hardware and Software ITAs. Under those roles, Wyle tested the principle voting devices—those components that received the votes of the voter and performed the basic tally operation. CIBER tested the Election Management System (EMS) and Reporting System components that performed consolidation of voting results from multiple voting devices on a general purpose computer such as a Commercial Off The Shelf (COTS) workstation or server. Wyle and CIBER have since formed an exclusive team agreement to work with each other as a joint testing cooperative to perform the full voting system certification testing. The source code review of software resident to the voting or vote tallying device which had been Wyle's responsibility has actually been performed by CIBER or source code reviewers working with CIBER in the last year or more.

Wyle has a long identity as a voting system testing lab being the first accredited under the NASSED program. Wyle brought to the program a strong background in environmental testing of DOD systems and holds separate accreditation such as the American Association for Laboratory Accreditation (A2LA) for the major hardware test methods required for voting system accreditation. Wyle has a well-defined quality management system in the terms of ISO/IEC 17025 which is generally exercised and used. The corporate culture and higher level management support are compatible with and help support quality management practices.

The CIBER ITA operation is actually a small branch office, *ITA Practice, CIBER, Inc.*, operating independently from the corporate CIBER operations. Corporate CIBER's quality management system (which is ISO 9001 compliant) places the responsibility to define and implement the quality program under the ISO/IEC 17025 requirements at the ITA Practice Director's level but places the QA Manager responsible at a branch office (PPQA Group) located remotely from ITA Practice locatoin. ITA Practice's *Process and Project Quality Assurance Plan (PPQAP) [Apr 2005]* policy document and supporting processes and procedures were created last year but critical processes were not implemented nor procedures followed. ITA Practice, CIBER is unable to follow their own defined processes and procedures to ensure the quality of their work.

Although Wyle and CIBER are working together, they have distinctly different quality management programs and different levels of proficiency about following those programs. In the Hardware/Software division, Wyle tests only to the boundaries of the device—they do not, as a rule, perform any operations on the EMS or Reporting system components and limit the interaction with transfer media to the input/output ports of the specific device.. CIBER performs more of the system integration testing by producing variations of election definitions which they either provide to Wyle or operate the voting devices to produce results to use in the Reporting system testing but generally do not exercise a wide function of the voting device, leaving that testing to Wyle. Wyle reports follow ISO/IEC guidelines and tend to be reasonably complete

descriptions of what testing was performed although they don't always indicate where a test was only done in an earlier version. In a number of reports over the last year, Wyle has indicated that CIBER is expected to complete certain tests involving the EMS or Reporting systems. CIBER's reports provide limited or no descriptions of the testing performed so a reader or reviewer can not tell if all the testing was completed. Cross checking between CIBER and Wyle reports has revealed at times that neither ITA has performed certain tests, expecting that the test was done by the other.

Wyle has a demonstrated capability to do well in the limited scope of hardware testing and some related functional testing but does not have the internal resources to perform what is being identified for the new VSTLs as the core requirement testing. With the right partner Wyle could potentially be a full scale test lab but needs to develop the internal resources to be able to take a lead in system integration testing and end-to-end functional testing including more aggressive security testing.

CIBER has not shown the resources to provide a reliable product. The current quality management plan requires more time to spend on managing the process than they appear to have available and it was clear during the assessment visit that they had not accepted that they have a responsibility to provide quality reviewed reports that show what was done in testing. The ITA Practice Director indicated during the assessment that their difficulties were that corporate CIBER did not allow for the personnel resource time for quality management functions but there may be other alternatives for allocating the resources.

In addition, during the review, ITA Practice Director indicated that the testing for a product tends to either use vendor developed tests or new tests developed specifically for the product—they have no standard test methods defined. This makes their testing dependent on the vendor input and vulnerable to unique vendor interpretations rather than a core validated set of internal references for training and testing.

A proposal was made that Wyle take the lead and provide direction on quality management reviews, audits, test planning, and report writing. CIBER would add software review and election definition experience with possibly some security expertise through corporate CIBER. Wyle, under this proposal, would be fully responsible for the coordination of testing and the final report. CIBER/Wyle would need to work out additional criteria to standardized test plans, determine the who and how review of the TDP would be conducted, and the contract oversight relations.

All the ITAs need to complete a review of the VSS 2002 and new VVSG 2005 and update the requirements cross-reference matrix to be used to identify which requirements have been tested and where or when. The former matrix developed jointly between the ITAs is missing significant requirements and variations on requirements. (Note: Shawn Southworth, ITA Practice Director, reports that CIBER does not have that version of the checklist.)

Recommendation

Wyle to continue as a Hardware ITA, eventually serving as a resource lab for environmental hardware testing for new VSTLs or move to becoming a VSTL by taking responsibility for full system testing with possible subcontracting to CIBER or another qualified group.

CIBER ITA Practice continues only with the support of Wyle or a commitment from corporate CIBER to provide management assistance in getting the quality system functioning and fuller reporting of results with a review in 120 days.

(signed)

022275

Steven V. Freeman

Attachments:

- 1. CIBER Organization**
 - a. ITA Organization**
 - b. Corporate Organization**

022276

EAC Technical Supplement Checklist:

Review test lab procedures/standards for the following elements of the VSS 2002 (and equivalent VVSG 2005).

(W) Wyle

(C) Ciber

Core voting system tests:

- ___ 1 Technical Data Package review,
 - ___ a Verify that TDP contains required document content and identify vendor's document meeting requirements.
 - (C) Initial TDP Review
 - (W) Test Procedures, Sect 1.
 - ___ b Identification of deliverables: Documents or manuals to be delivered to client for operation, maintenance, and training.
 - (C) Not identified.
 - (W) Not identified.
 - ___ c Terms and references. Unique usage
 - (C) Need to add
 - (W) Need to add
 - ___ d Review of documents for completeness and consistency
 - (C) Document No. ITA 2002 QTP R1.0 04-15-0, Sec 4
 - (W) Test Procedures No VSS-2002,
 - ___ e Quality Assurance plan
 - (C) Document No. ITA 2002 QTP R1.0 04-15-0, Sec 4 Step 9
 - (W) Quality Assurance Test Procedure Need reference identification
 - ___ f Configuration Management
 - (C) Document No. ITA 2002 QTP R1.0 04-15-0, Sec 4 Step 9. May need to add attention to identifying EUT for configuration purposes
 - (W) Configuration Management Test Procedure. Need reference identification
 - ___ g Review of System release change log
 - (C) Document No. ITA 2002 QTP R1.0 04-15-0, Sec 4 TDP Step 7, 9
Sec 5 Source Code reviews.
 - (W) Test Procedures. May need to add.
 - ___ h Review of vendor tests. Includes but not limited to:
 - i Readiness Check
 - ii Operational Status Check
 - (C) Document No. ITA 2002 QTP R1.0 04-15-0, Sec 8.1 Test Data and Procedure Preparation. May need to add specifics for validating Readiness Check and Operational Status Check.
 - (W) Test Procedures 2.0 PreQualification Tests. Verification at the Polling Place Test Procedure (Needs document identification).i May need to add specifics for validating Readiness/Operational Status Check.

Note: Wyle providing validation of the Readiness/Operational Status Check for Ciber.
 - ___ i Review of prior test lab tests
 - (C) Section 7. Qualification Previously Qualified Software. May need to expand
 - (W) Need to add
 - Deliverables-----
 - ___ j TDP Document Trace matrix directory. Matching the document requirements to the vendor's document names or titles.
 - (W) Test Procedures, Sec 1

Use the Requirements of the FECVSS 2002 Trace to Vendor Testing and Technical Data Package.

(C) Document No. ITA 2002 QTP R1.0 04-15-0, Sec 4
TDP Inventory (Template)
Initial TDP Review Checklist.doc

- ___ k Production of formal Test Plan (VSS 2002-Vol II, App A)
(C) Document No. ITA 2002 QTP R1.0 04-15-0, Sec 8.1 Test Data and Procedure Preparation.
(W) Test Procedures, Sec 1 and Appendix A (Volume 1, FEC VSS 2002 Functional Requirements) Note that this does not include Volume II requirements
QD XI-1, Test Control Program includes development Test Plan.

___ 2 Source code review,

Wyle no longer does source code review. All source code review for Wyle testing is done by Ciber. This constitutes a change in the scope of accreditation for Wyle/Ciber.

___ a Catalog of source code

(C) Document No. ITA 2002 QTP R1.0 04-15-0, Sec 5. Need to develop and add. Currently produce a master list of all files submitted as part of the source code and provide with some reports. This list includes source code, make files, .dlls and other files which may or may not be reviewed or relevant

(W) Defer to Ciber for source code review.

___ b Catalog of compilation environment including COTS components of build

(C) Needs to add. Request copy of new procedure for Witnessed Build which is expected to address this.

___ c Determination of changes from prior review

(C) Document No. ITA 2002 QTP R1.0 04-15-0, Sec 5, Step 4. Perform a diff comparison on files submitted for a change to verify what has changed and checking with vendor's change log. May need to specify documenting what files (source and installed) are changed.

___ d Review for coding conventions and integrity requirements

(C) Document No. ITA 2002 QTP R1.0 04-15-0, Sec 5. Step 6 lists the exceptions currently identified from the VSS standards.

i Demonstrate

___ e Review for security

(C) Document No. ITA 2002 QTP R1.0 04-15-0, Sec 5. Only those items currently listed in VSS 2002 and documented in Step 6 are examined. Source code reviewers are expected to report any strange code or process they notice that would be considered a security breach. Current list includes the following with known security implications::

Q: 5.4.2d Unbound area not protected

R: 5.4.2f Case statement with no default area

S: 5.4.2g Possible vote counter overflow Needs attention. This requirement should expect that an overflow condition is prevented or detected and reported for operator action.

FF: 5.4.2v If else operator used more than once. Incorrect. Needs adjustment

HH: 4.2.2 Self modifying, Dynamic Loaded, Interpreted code. Needs development

HH: 4.2.2 Unbound Area, Pointer Values, Dynamic Memory unprotected. Needs development.

Other items under VSS 2002 code review have security implications in terms of features to aid in detection or to prevent hiding unsecure code.

Although not specifically required by VSS 2002, issues such as hardcoded passwords or passphrases or 'backdoors' should be included and provisions specified to client on how such issues will be reported or treated. See topic on reporting anomalies.

i Demonstrate

----Deliverables----

- ___ f Report of results.
(C) Document No. ITA 2002 QTP R1.0 04-15-0, Sec 5. Note comments about catalogs of file.
- ___ g Witnessed build from verified source code and COTS
(C) The procedures in the current document is being superceded by a revision to be provided.

- ___ 3 Physical configuration audit,
 - ___ a Configuration verification against Configuration Management plan
(C) Performed during final Functional Configuration Test. ????
(W) Test Procedures 4.2. Hardware Configuration. See comment in TDP area issue.
 - ___ b Accessibility standards
(C) Expect hardware ITA
(W) Accessibility Test Procedure , VSS Volume I, Section 2.2.7, Common Standards 2.2.7.1 (svf: physical size and position). Needs to provide specification of table height for item b. See Title 29, CFR, 1910.
Accessibility Test Procedure , VSS Volume I, Section 2.2.7, Common Standards 2.2.7.2 (svf: acoustical and tactile)
 - ___ c Construction
(W) Design, Construction, and Maintenance Characteristics Test Procedure, VSS Volume I, Section 3.4.1, Materials, Processes, and Parts.
Section 3.4.2, Durability. This requirement lacks adequate guidance for test method
Section 3.4.3. Reliability.
Section 3.4.4 Maintainability
Section 3.4.4.1 Physical Attributes supporting maintenance.
Section 3.4.4.2 Additional Attributes.
Section 3.4.5. Availability. Also, VS Test Procedure 6.9, Need to calculate and report Ai. Under ISO/IEC 17025 procedures this will need to include reporting the basis for the calculation including assumptions made to create proposed values for some of the factors.
Section 3.4.6. Product Marking.
Section 3.4.7. Workmanship.
VS Test Procedure, 6.10 Product Safety under product safety review to ensure compliance with UL 60950-1. This includes review of requirements for features specified under entire section 3.4 in terms of safety concerns excepting possibility Durability. In Design, Construction, and Maintenance Characteristics Test Procedure, need to develop and/or reference test method standard (possibly referencing UL 60950-1)
 - ___ d Validity of operations provided in deliverable manuals
(C) During functional test, need specification of procedure for software operation.
(W) During functional test, need specification of procedure for equipment operation.
 - ___ e Hardware transportation and storage tests.
(C)
(W) Environmental Control – Transit and Storage Test Procedure, VSS Volume I, Section 3.2.2.14. Need to develop reference to Operational Status Test to include validation and repeatability between all the tests. Should reference use of the test for both pre-test and post-test determination of operability.
 - ___ f Hardware operational environmental test.

Note: The system integration tests for accuracy and reliability (e.1. and 2. below) are conducted in conjunction with this test and the final criteria include all components used to consolidate polling place and jurisdiction results from individual voting machines.

(W) Wyle considers a system crash or "abend" as a failure. Resetting the machine is not an acceptable recovery. Check against the VSS 2002 shows the section which specified 'acceptable' errors is not in the final version and Wyle's approach is correct. Need to address the issue of including extended operation of the user interface and not use exclusive automated testing.

- ___ g EMC and electrical test suit. If test is submitted from a third-party source
 - i *Verify test lab is accredited by MRP body*
 - ii *Verify equipment under test is for same configuration as being certified*
 - iii *Verify that operational status check was appropriate*

(C) Defer to Wyle
(W) VS Test Procedure 6.5 Test Operations Procedures – Electrical Performance Requirements Test Procedures, Electrical Power Disturbance Electromagnetic Radiation, (CFR Part 15, Class B/FCC Part 15 Class B) Electrostatic Disruption Electromagnetic Susceptibility Electrical Fast Transients Lightning Surge Conducted RF Immunity Magnetic Fields Immunity
- ___ h Safety inspection.
(Covered under construction)
 ---Deliverables---
- ___ i Reports for the hardware, EMC and electrical, and Safety tests and inspections. If necessary (i.e. from third party source), provide a statement reporting the results of the verification on the applicability of the reports.
(C) Need to develop. (Tech Guide #3??)
(W) QD V-1. Instructions, Procedures, and Certification Reports
QD VII-1. Supplier Evaluation and Suppliers List. For third-party report.
- ___ j Directory of deliverables, including hardware and software setup and both application and COTS installed files. (Part of witnessed build documentation)
(C) Need to develop process. Have form and procedures.
- ___ 4 Functional configuration audit,
 - ___ a Functional Requirement matrix against technical specification and manuals
(C) QTP Sec. 4. TDP Review. Step 8 & 9 (second part of the cross-reference matrix between the VSS designated documents and the vendor identification).
(W) Test Procedures, Sec 1
Use the second part of the Requirements of the FECVSS 2002 Trace to Vendor Testing and Technical Data Package.
 - ___ b Test Specifications for functional requirements
(C) QTP Section 9
 Need to develop specific test methods. Ciber has common practices/test case for most of the functional requirements but needs to document for consistency and repeatability.

- (W) VS Test Procedures, Sec 4.4.4
Appendix Functional Qualification Checklist
(topic) Test Procedure which specifically reference functional requirement.
- ___ c Verify functional operation against requirements of Vol I, §2 thru §8 (See Requirements Checklist)
(C) QTP Section 9 Step 10.
Final Report Template.doc, Appendix C. FEC Requirements Relevant to Software Functional Testing. (undated and not currently used)
Update and use
(W) VS Test Procedure Section 1. Uses checklist (Needs to be updated against official version VSS).
- ___ d Verify functional operation against requirements of vendors technical specification and manuals
(C) QTP Section 9 Step 10. modify checklist (App C) to include vendor specific requirements

(W) VS Test Procedures, Sect 1 and slightly Sect 4.4.4, part of TDP review
- ___ e Verify HAVA functional requirements.
(C) Primarily covered under Wyle testing. Need to use as part of system integration test.
(W) Casting a Ballot, Vol I, Sec 2.4.3.3
Post-voting functions,
--- Deliverables ---
- ___ f Provide a Requirement matrix showing which tests performed and requirement satisfied.
(C) Section 9, App C
(W)
- ___ g Report deficiencies encountered and resolutions of deficiencies.
Note: not all deficiencies will result in a recommendation to not certify.
(C) Sect 9 & 10, App C, comment section *Verify against official VSS 2002 and use*
(W) QD XV-2. *Notice of Anomaly.*
- ___ 5 System integration tests,
 - ___ a Accuracy. For non-COTS systems, includes 48 environmental operating test.
(C) QTP 13 COTS Functional and Volume Hardware Testing. Step 3
 - ___ b ~~Reliability.~~ For non-COTS systems, includes 48 environmental operating test. For COTS
(C) including testing for multi-feed as part of accuracy test. Need to specify/reference
 - ___ c Volume & Stress tests
(C) Need to document. Ciber does perform tests to exercise maximum limits of system but do not have procedure identified or documented.
 - ___ d Security tests.
(C) Need to document
 - ___ e (VVSG 2005) Cryptographic
 - ___ f Telecommunication, as applicable to system design.
(C) Need to document
 - ___ g System end-to-end of EMS, vote recording, vote tabulation, consolidation, and canvass reporting.
(C) QTP Sect 12. Final System Level Testing

---Deliverables---

- h Report on tests performed and their results.
 - (C) QTP Sect 12, Step 7 Prepare anomaly list. May need to include specifics for HAVA provisional balloting, absentee ballot consolidation, and write-in resolution.
- 6 Qualification Test Report
 - (C) QTR Template (not uniquely identified/ versioned under document control)
 - (W) QD V-1 Instructions, Procedures, and Certification Reports
 - a Introduction.
 - (C) QTR Template Sec 1 (copied supplied is not current.need update).
 - 1.1 Test Agency History and Capability
 - 1.2 Document Overview
 - (W) Have an electronic copy that is "cut and paste" but not controlled master. This has been a source of error in the past. Need to develop.
 - b Qualification Test Background (B2)
 - i General Information about the qualification test process. (For outside readers not familiar with the ITA testing).
 - (C) standard boilerplate text.
 - (W) standard boilerplate
 - ii A list and definition of all terms and nomenclature peculiar to the hardware, the software, or the test report.
 - (W) QD V-1. Sec 4.0 Terms and Definitions.
 - c System Identification (B3). This is the test hardware and software used in this test.
 - (C) QTR Sec 5.4
 - (W) QD V-1 Sec 4.9 Test Hardware/Software description Sec 4.
 - i System name and major subcomponents. Sec 3
 - ii System Version. Sec 3
 - iii Test support hardware.
 - (W) Materials required for testing QTR Sec 5.0 (ISO/IEC 17025 5.10.2 f)
 - (C) QTR Sec 3. Hardware Support
 - iv Specific documents (deliverables) from the TDP used to support testing
 - (W) QTR Sec 5.3.
 - (C) QTR Sec 3 Documentation provided to support testing. Need to specify which are part of the vendor deliverables.
 - d System Overview (B4). Describes the voting system in terms of
 - i its overall design structure,
 - ii technologies used,
 - iii processing capacity claimed by the vendor and
 - iv modes of operation.
 - v (May) include other products that interface with the voting system. *Note: Shall include components necessary to consolidate and produce final results including telecommunications.*
 - (C) QTR Sec 4
 - (W) QTR Sec 4
 - e Qualification Test Results (B5). "This section provides a summary of the results of the testing process, and indicates any special considerations that affect the conclusions derived from the test results. This summary includes:
 - i Acceptability of the system design and construction based on the performance and software source code review.
 - (C) QTR Sect 5
 - (W) QTR Sect 6

- ii The degree to which the hardware and software meet the vendor's specifications and the standards, and the acceptability of the vendor's technical and user documentation
 - (C) QTR Sect 5 by subsection
 - (W) QTR 1.3 Summary
- iii General findings on maintainability
 - (1) Includes notation of specific procedures or activities that are difficult to perform.
 - (C) Need to add to template in System Overview
 - (W) Attach A as a note.
- iv Identification and description of any deficiencies that remain uncorrected after completion of the qualification test
 - (1) that has caused or is judged to be capable of causing the loss or corruption of voting data, providing sufficient detail to support a recommendation to reject the system being tested.
 - (2) deficiency in compliance with the security requirements,
 - (3) deficiency in compliance with the accuracy requirements,
 - (4) deficiency in data retention, and
 - (5) deficiency audit requirements are fully described);
 - Note: In practice, vendors will not allow reports to be published if it has this level of deficiency.*
 - (C) At end of each Appendice. Need to add to QTR Template/procedure
 - (W) Located after body of report using a standard Notice of Anomaly (NOA)
- v Recommendations to EAC for approval or rejection
 - (C) QTR 5.4, Includes summary description of the system configuration to be certified
 - (W) QTR 1.3 (Executive Summary) including system configuration to be certified.
- vi Note: Deficiencies that do not result in a loss or corruption of voting data shall not necessarily be a cause for rejection. (Identified as "anomaly")

— f Appendix Test Operations and Findings (B6)

- i Additional details of test results needed to enable understanding of the conclusions. B. b. Organized to reflect the Qualification Test Plan.
- ii Summaries of the results of
 - (1) hardware examinations,
 - (2) operating and non-operating hardware tests,
 - (3) software module tests,
 - (4) software function tests, and
 - (5) system-level tests (including
 - (6) security and
 - (7) telecommunications tests, and
 - (8) the results of the Physical and
 - (9) Functional Configuration Audits)

— g Appendix Test Data Analysis (B7)

- i summary records of the test data and
- ii the details of the analysis. The analysis includes
 - (1) a comparison of the vendor's hardware and software specifications to the test data, together with
 - (2) any mathematical or statistical procedure used for data reduction and processing.

(W) In attachments B through ---, based on relevant standards appropriate for the specific tests.

(C) No known requirements under current scope of operation. Will need to adopt/ensure as part of including specific hardware tests.

1 Purpose and Application.

1.1 Purpose. The following checklist was developed for use in the Election Assistance Commission (EAC) Interim Accreditation for Independent Test Authority Labs (ITAs). This program is an interim program pending implementation of the full EAC Accreditation program in cooperation with the National Voluntary Laboratory Accreditation Program (NVLAP) under NIST Handbook 150-2006, NVLAP Procedures and General Requirements and NIST Handbook 150-22- 2005 NVLAP Voting System Testing (HB 150-22). The interim program is designed to accredit ITAs formerly authorized under the National Association of State Election Directors (NASED) accreditation program to continue voting system testing under an EAC accreditation until such time as the NVLAP/EAC joint accreditation has qualified at least one testing laboratory as Voting System Test Laboratory (VSTL).

1.2 Background. The NASED ITAs were accredited under the NASED Program Handbook 9201, Accreditation of Independent Testing Authorities for Voting System Qualification Testing, (Rev A), 7 Apr 2001. (HB 9201). The HB 9201 was based on Department of Defense standards such as MILSTD-490A and MIL-STD-2167A which had been deleted or superceded by the time of the Rev A release. Rev A was to have been a temporary revision pending the completion of the new voting system standards in 2002 (which was to add a much larger scope of accreditation to include the election management software integration with vote tallying equipment as a voting system.) The Help America Vote Act (HAVA) provisions took the responsibility from NASED and the revision was cancelled pending the development of a new program under EAC and NIST.

1.3 Usage. For the purpose of this accreditation, the management documents provided by the candidate lab were developed under the NASED HBK but will be assessed using ISO/IEC 17025 criteria. As such, it is expected that the documented policy and procedures may not explicitly follow the language and procedures recommended under ISO/IEC 17025 but that the underlying program may support a quality management program that meets the intent of ISO/IEC 17025. On the items below, the assessor will place a

- "X" on substantive discrepancies to be considered in the accreditation decision.
- "C" on items where some work is needed to bring the program into compliance with ISO/IEC 17025 but procedures used support the integrity of the testing process.
- "OK" where published procedures and policies are supported by evidence of implementation/ A technical supplement checklist will include Voting System Standards/HAVA requirements for specific review, assessment, or testing.

Note: In general, the Voting System testing is not a calibration activity as intended under ISO/IEC 17025. Calibrated instruments are used in the environmental testing.

(The number in parenthesis is a back reference to page reference to ISO/IEC 17025)

2 Reference Documents

2.1 Normative

2.2 ISO/IEC 17025(2005). *General requirements for the competence of testing and calibration laboratories*, dated 2005-5-15.

2.3 FEC VSS-2002, *General requirements for the competence of testing and calibration laboratories*, dated May 2002 (Note: official version posted on EAC web site and available since 2004)

2.4 FEC VVSG-2005,

2.5 Internal

2.5.1 Parent organization

2.5.1.1 CIBER's Custom Solution Division Quality Management Manual (CQMM) (ISO 9001 compliant)

2.5.2 QA Program for ITA Practices

2.5.2.1 Process and Project Quality Assurance Plan (PPQAP), Ver 3.0, Apr 30, 2005. Parent document (note: document labeling which says Version 2.0 and Version Release History shows Apr 2004 both are typo errors)

- 2.5.2.2 Project Quality Assurance Process (PQAP) ITA Practices quality document
- 2.5.3 ITA Testing Process
- 2.5.3.1 Quality Test Process for Voting System Software (QTP), 4/15/05 Governs testing process

3 Terms and definitions (2)

- 3.1 Election Assistance Commission (EAC).
- 3.2 Federal Election Commission (FEC).

4 Management requirements (2)

4.1 Organization (2)

- 4.1.1 The laboratory or the organization of which it is part shall be an entity that can be held legally responsible

Legal Name: CIBER, Inc. Format Note: Legal name is all caps for CIBER

- 4.1.2 It is the responsibility of the laboratory to carry out its testing and calibration activities in such a way as to meet the requirements of this International Standard and to satisfy the needs of the customer, the regulatory authorities or organizations providing recognition.

The EAC shall be identified as the organization providing recognition and as the governing regulatory authority.

Need to make change

Currently, QTP Sec 17. As part of the Test Complaint Procedure.

Sec 1.3.

- 4.1.3 The management system shall cover work carried out in the laboratory's permanent facilities, at site away from its permanent facilities, or in associated temporary or mobile facilities.

CQMM 1. Indicated that the ITA Practice, CIBER, Inc. shall to define and use their quality program independently but compliant to the parent CIBER's Custom Solution Division's program within the terms of the ISO/IEC 17025 requirements. The actual QA Manager is specified in the QA policies and procedures as ?

- 4.1.4 If the laboratory is part of an organization performing activities other than testing and/or calibration, the responsibilities of key personnel in the organization that have an involvement or influence on the testing and/or calibration activities of the laboratory shall be defined in order to identify potential conflicts of interest.

NOTE 1 Where a laboratory is part of a larger organization, the organizational arrangements should be such that departments having conflicting interests, such as production, commercial marketing or financing do not adversely influence the laboratory's compliance with the requirements of this International Standard.

NOTE 2 If the laboratory wishes to be recognized as a third-party laboratory, it should be able to demonstrate that it is impartial and that it and its personnel are free from any undue commercial, financial and other pressures which might influence their technical judgment. The third-party testing or calibration laboratory should not engage in any activities that may endanger the trust in its independence of judgment and integrity in relation to its testing or calibration activities.

See organization charts:
Overall CIBER, Inc.

ITA Practice.

*QTPVS Para 1, Introduction
PQAP, Sec 3, pg 4*

(VS 4.1.1) Employee can not develop and test a product or otherwise consult for a client and then test as ITA the client. Need to develop or confirm from CIBER corporate policy.

4.1.5 The laboratory shall

a) have managerial and technical personnel who, irrespective of other responsibilities, have the authority and resources needed to carry out their duties, including the implementation, maintenance and improvement of the management system, and to identify the occurrence of departures from the management system or from the procedures for performing tests and/or calibrations, and to initiate actions to prevent or minimize such departures (see also 5.2);

PQAP, Sec 3, pg 4

b) have arrangements to ensure that its management and personnel are free from any undue internal and external commercial, financial and other pressures and influences that may adversely affect the quality of their work;

Need to add. Billing and contracting are done outside ITA Practices and ITA Practices Director.

c) have policies and procedures to ensure the protection of its customers' confidential information and proprietary rights, including procedures for protecting the electronic storage and transmission of results;

*PQAP, Sec 3 geographically separated office with their own filing network and file system
(VS-4.1.2) Covered.*

d) have policies and procedures to avoid involvement in any activities that would diminish confidence in its competence, impartiality, judgement or operational integrity;

*Certification of Laboratory Conditions and Practices for EAC. 12 Jan 05.
QTP Sec 1*

e) define the organization and management structure of the laboratory, its place in any parent organization, and the relationships between quality management, technical operations and support services;

See organization chart

f) specify the responsibility, authority and interrelationships of all personnel who manage, perform or verify work affecting the quality of the tests and/or calibrations;

*(See also 5.2)
PQAP, ITA organization and the table of Roles and Responsibilities*

g) provide adequate supervision of testing and calibration staff, including trainees, by persons familiar with methods and procedures, purpose of each test and/or calibration, and with the assessment of the test or calibration results;

(See also 5.2)

Need to add. ITA Practices is using processes to make sure personnel are qualified before working independently but do not have a statement of policy to cover supervision while new hires are being qualified or changes of position to a function where not previously qualified.

h) have technical management which has overall responsibility for the technical operations and the provision of the resources needed to ensure the required quality of laboratory operations;

ITA Practice Director. See QTAP, Sec 3. Currently there are only three full time employees so many positions will overlap.

i) appoint a member of staff as quality manager (however named) who, irrespective of other duties and responsibilities, shall have defined responsibility and authority for ensuring that the management system related to quality is implemented and followed at all times; the quality manager shall have direct access to the highest level of management at which decisions are made on laboratory policy or resources;

PQAP, pg 6 & 7 ITA QA Representatives are assigned to advise the ITA Practices Director directly on QA issues. Currently these are T. Dunn and J. Price (independent subcontractors)

j) appoint deputies for key managerial personnel (see Note);

Not documented. Currently Jack Cobb but not reflected in organizational chart.

k) (New) ensure that its personnel are aware of the relevance and importance of their activities and how they contribute to the achievement of the objectives of the management system.

With three people sitting down at some table.

NOTE Individuals may have more than one function and it may be impractical to appoint deputies for every function.

4.1.6 (New) Top management shall ensure that appropriate communication processes are established within the laboratory and that communication takes place regarding the effectiveness of the management system.

Emails and conversations. Small organization.

4.2 Management system (3)

4.2.1 The laboratory shall establish, implement and maintain a management system appropriate to the scope of its activities. The laboratory shall document its policies, systems, programmes, procedures and instructions to the extent necessary to assure the quality of the test and/or calibration results. The system's documentation shall be communicated to, understood by, available to, and implemented by the appropriate personnel.

See Documents/Internal for a list of Quality manuals and documents. Basic organization is the QA program plans for the administration of the QA program with a separate set of documents for the QA for the testing activity.

(VS-4.2.1) See Document Control for master copies.

- 4.2.2 **The laboratory's management system policies related to quality, including a quality policy statement, shall be defined in a quality manual (however named). The overall objectives shall be established, and shall be reviewed during management review. The quality policy statement shall be issued under the authority of top management. It shall include at least the following:**

PPQA, Apr 2005 Sec 1 Purpose, authorized under ITA Practices Director and Director of Federal Systems

PQAP, Sec 1. Purpose

a) the laboratory management's commitment to good professional practice and to the quality of its testing and calibration in servicing its customers;

b) the management's statement of the laboratory's standard of service;

Should consider strengthening this part of statement more explicitly.

c) the purpose of the management system related to quality;

d) a requirement that all personnel concerned with testing and calibration activities within the laboratory familiarize themselves with the quality documentation and implement the policies and procedures in their work; and

Need to add to ITA Practices QA document. All in office are involved in working with the QA procedures. Currently, CIBER corporate requires each employee to receive and sign off on a statement.

e) (New) the laboratory management's commitment to comply with this International Standard and to continually improve the effectiveness of the management system.

Need to add.

- 4.2.3 (New) Top management shall provide evidence of commitment to the development and implementation of the management system and to continually improving its effectiveness.

Need to add or document from corporate

- 4.2.4 (New) Top management shall communicate to the organization the importance of meeting customer requirements as well as statutory and regulatory requirements.

Need to add or document from corporate

- 4.2.5 -a) The quality manual shall include or make reference to the supporting procedures including technical procedures.

PPQAP does identify and reference both PPQA and QTP.

-b) It shall outline the structure of the documentation used in the management system.

PPQAP 1.3

4.2.6 The roles and responsibilities of technical management and the quality manager, including their responsibility for ensuring compliance with this International Standard, shall be defined in the quality manual.
PPQAP 3.1 Explains the roles and separation of QA Representatives to the testing activity.

4.2.7 (New) Top management shall ensure that the integrity of the management system is maintained when changes to the management system are planned and implemented.
Need reference from corporate

(VS-4.2.2- ensuring QA Manual considers topics)

a) internal audits and management review;

PPQA 8.2.3

b) writing and implementing system procedures;

PPQA, 8.2.2.

c) writing and implementing system instructions;

Do not currently have instructions at this level.

d) staff training and individual development plans;

CIBER Policies and Procedures Training Ver 2.3

e) contract review;

Need to develop

f) staff members who work at home and at alternate work sites outside the laboratory (e.g., telecommuting);

Need to specify

g) referencing EAC accreditation and use of the EAC branding.

Modify for reflect EAC rather than NASBD. EAC will need to provide further guidance.

(VS-4.2.3) The following program-specific procedures shall be included with the quality manual when it is submitted as part of the application package:

a) review of the vendor Technical Data Package (VSS-2002, Volume II, Section 2). This procedure shall include:

QTP, Sec 4 TDP Review. Need to review and update to include the following.

Use in preparing Qualification/National Certification Test Plan. (Ref VSS Vol II, 2.1, See also VI, 9.)

Format. Table of content, abstracts, and cross-index against the VSS/VVSG documentation requirements (Ref: VSS Vol II, 2.1.1.3)

Provisions for placing the TDP in escrow for reference in state certification and acceptance testing. (Ref: VSS Vol II, 2.1.2)

Note: Completion of the TDP Review includes the validation of user procedures and operation manuals against the actual equipment.

Note: vendor diagnostics and simulations must be validated.

b) selecting the laboratory staff for a Qualification/National Certification test team;

Need to develop.

c) writing a Qualification/National Certification Test Plan for first-time testing and testing of modified systems (Ref VSS-2002, Volume II, Appendix A);
QTP, Sec 8 Qualification Test Plan.

d) writing Test Operation Procedure (Ref VSS-2002, Volume II, Appendix A.6.4);
Need to develop. Currently, CIBER performs the customized tests from knowledge and information from the TDP review but does not have a reference copy that defines the common process used in all test campaigns.

e) conducting testing at a customer's site (if the laboratory offers such services);

NOTE: Reference NASED Tech Guide 3

Need to develop.

f) writing a Qualification/National Certification Test Report (VSS-2002, Volume II, Appendix B);
QTP Sect. 14. Need to review and develop.

g) reviewing the Configuration Management Plan (VSS-2002, Volume II, Section 2.11);
QTP Sec 1.5 Configuration Management During Qualification.

h) ensuring the protection of proprietary information against threat from persons outside the laboratory, from visitors to the laboratory, from laboratory personnel without a need to know, and from other unauthorized persons;
(contained elsewhere in ISO/IEC 17025)

i) cooperating with the EAC during test campaigns;

Need to update.

j) witnessing of system build and installation. (Vol-2002, Volume I, 9.2.6.4, NASED Tech Guide 3)
Have created a draft form and need to complete and validate. Needs acceptance review and possible further expansion based on review.

4.3 Document control (4)

4.3.1 General (4)

Under CIBER corporate policies, approved master copies of the QA policies and manuals are stored under a corporate server Sharepoint subdirectory for the individual divisions. Personnel within the appropriate division and corporate QA management responsibility have access.

For internal to ITA Practices, they have a process but have not documented the process. The samples of documents shown lack identification, version identification and other required features. Need to document and develop further.

4.3.2 Document approval and issue. (4)

4.3.2.1 a) Have a working process requiring approval by ITA Practices Director. Need to document and develop further.

b) Master List. Using the 'Roadmap' but the 'Roadmap' is limited to product testing documents and does not include QA and others. Need to develop

4.3.2.2 The procedure(s) adopted shall ensure that:

- a) authorized editions Need to develop
- b) periodically reviewed Need to develop
- c) invalid or obsolete removed/assured against intended use Need to develop
- d) obsolete documents retained Need to develop

4.3.2.3 Uniquely identified Not being done, need to develop

- a) date of issue/revision
- b) page numbering
- c) the total number of pages or mark for end of document
- d) issuing authority

4.3.3 Document changes (5)

4.3.3.1 Review and Approval process. Only for the Qualification Test process but not for all controlled documents. PPQA, Sec 7-8.2 for covered documents. Need to be expanded.

4.3.3.2 New or altered text marked or identified. Document and do.

- 4.3.3.3** a) *If permitted to amend by hand, document and authorize*
b) *clearly marked, initialed and date. If authorized, document.*

4.3.3.4 Making changes to electronic records.

4.4 Review of requests, tenders and contracts (5)

4.4.1 Procedures for ibid.

QQTP, Sec 3 TDP Review.

QTP, Sec 1.4

Need to develop

a). *Requirements known and understood*

(VS-4.4.1) Consider HAVA, VSS/VVSG, EAC directives, and,

(VS-4.4.3) if required, specific state requirements and does not circumvent the Federal standards.

(VS-4.4.4) If involved, check that state requirements are current.

(VS-4.9.1) Where necessary, EAC—especially if for accepted report and certified system.

e) Responsibility for authorizing resuming of work, if halted.

4.9.2 Where non-conforming work could recur or doubt exists of laboratory compliance with own policies and procedures, corrective action in 4.11 shall be promptly followed. Need to develop

4.10 Improvement (7)

►The laboratory shall continually improve the effectiveness of its management system through the use of the quality policy, quality objectives, audit results, analysis of data, corrective and preventive actions and management review.

4.11 Corrective action. (8)

4.11.1 General (8)

PPQAP, Sec 8.2 Suggestions, Issues and Corrective Action Requests (CARs)

PQAP, requires ITA Practices to create Corrective Action Log. Not created. Need procedures

4.11.2 Cause analysis (8)

4.11.3 Selection and Implementation of corrective actions. (8)

4.11.4 Monitoring of corrective actions (8)

4.11.5 Additional audits (8)

4.12 Preventive action (8)

4.12.1 a) Handled as discussions within office. Need to develop procedure and management tracking process.

b) (New) Action plan for identified preventative action

4.12.2 Procedures to initiate and application of controls

4.13 Control of records (9)

4.13.1 General (9)

4.13.1.1 QTP, Sec 15 Archive and Qualification Test Artifacts. Observed checkout log and directory

4.13.1.2

—a Storage of files. Not seen were QA records such as audit reports which are stored with corporate QA.

-b Retention times. Implied kept forever. Open question of what retention should be required but this is a conservative choice.

4.13.2 Technical records (9)

4.13.2.1 a) QTP, Sec 15 Archive and Qualification Test Artifacts. Observed checkout log and directory.

b) Found vendor manuals, sample ballots, test ballots, test voting results, hand written notes, CDs, scripts, weekly status reports and communication with customer. Have not accumulated enough to exceed available, local storage.

c) Not noticed. Handwritten copies marked but printed copies did not have

4.13.2.2 No test log requirements defined or practices that shows records are complete and identifiable. May need to develop better practice.

4.13.2.3 a) Very little handwritten/ hardcopy notes.

b) TDP reviews, spreadsheet makes new entries but don't lock entries to prevent later changes. Need develop

4.14 Internal audits (9)

4.14.1 a) PQAP 8.2.3 Internal audits are performed by a separate corporate office Process and Product Quality Audit(s) (PPQA Group) with specific training, independence, from observed activity, and direct top management access.

PPQA, Sec 7.2 PPQA Reviews When: ITA Practice Director requests a project review by the PPQA at least once each calendar year and the event of changes in staff, scope of accreditation, facilities, or equipment.

PQAP, 8.1.2 Plan Quality Assurance Events lists ITA Project Audit (yearly), Quality Assurance Training on staff change, and Accreditation Audit by ITA Accreditation Committee

Date of last internal audit: (2005)

This program is actually managed outside of the ITA Practice responsibilities. Copies of the report were not available to the ITA Practice Director. PQAP defines that any recommendations are reported in CARs. However, ITA Director does not have a log and reports there were no previous CARs (procedure was created last year and may not have been in place for last action). May need to request contact with PPQA group. Terry Debell, Manager Internal Audit and Compliance. 303-267-3820.

X *Also have project oriented internal audits by the ITA QA Representatives which perform a Process Conformance Audit at the end of each Qualification Test. A report is to be provided to the ITA Director and CARs for any recommendations for deficiencies. There have been no Process Performance Audits. The Representatives were assigned last year.*

b) The CIBER corporate program ensures training of audit personnel. The ITA QA Representatives

PQAP provides for creation of CARs which the ITA Director must provide for reviews to include monitor the actions from the CARs.

4.14.2 PQAP 8.2.2 2nd paragraph. The CARs created are to trigger corrective action including involvement of the ITA Practice Director. Need to add notification of customers in writing if investigations show that laboratory results may have been affected.

4.14.3 The PQAP CARs procedure would appear to satisfy requirement for recorded.

4.14.4 Need to identify procedures for follow up of CARs or, if not defined, develop.

4.15 Management reviews (10)

4.15.1 May be in Corporate

X Date of most recent management review: (the review last year may qualify as a management review)

- **Actions from previous review (CARs)**
- **Reports from third party assessment groups**
- **Customer Audit (feedback) reports**
- **Internal audit reports, including any associated corrective action**
- **Documented problems arising from lack of procedural adherence**
- **Results of proficiency testing and any inter-laboratory comparisons.**
- **Corrective action requests and any preventative actions taken**
- **Details of customer complaints and feedback**
- **Staff training**
- **Current adequacy of staff, equipment, and facility resources**
- **Future plans and projections for new work, staff, equipment, and other requirements.**
- **Summary of annual review and revision activity for all controlled generic**

5 Technical requirements (10)

5.1 General (10)

5.1.1 (no comment)

5.1.2

i) human factors. QTP Sect 3.2.2 Job Description for ITA Practice Director

Software Analyst

TD Specialist

ITA QA Representatives

Configuration Mgr

Test Engineer

ii) accommodation and environmental QTP, Sec 15.1 Archiving.

PPQAP Sec 3.2.1 Facilities and Equipment

iii) test ... methods and method validation. QTP Sec 3 through 17

iv) equipment. Not prepared

v) measurement traceability N/A except as applies to calibrated equipment

vi) sampling N/A except as applies to calibrated equipment

vii) the handling of test and calibration items. QTP, Sec 3 for TDP, 6 for equipment

5.2 Personnel (11)

5.2.1 a) Ensuring qualification of personnel. CIBER Policies & Procedures Training, Ver 2.2 1/1/06. (on Corporate server) general policy.

Source Code Review Qualification Test. Consists of spreadsheet with sample code and list of items to find. A partial copy of Vol I 4.2.3, and edited Vol II coding convention standards. Does not include issues about problem such as integrity and security issues. Just used to see if basic competency exists

All other is based on experience performing the tests. No training for security, testing procedures. Corporate training requirements for corporate procedures and quality program. No formal training on voting requirements such as the VSS, state laws variations. Such information is acquired through discussion and vendor designs. May result in problems in critical evaluation of vendor design.

b) Providing supervision during activity where personnel are becoming qualified.

Only one person has been added since creation of office so training has been informal. He observed and participated with experienced technical staff until deemed ready. Need documented policy or procedure

5.2.2 a) Documented goals in the form of formal Position Description containing requirements for Educational Requirements, Professional Certificates, work related experience and other requirements.

b) CIBER Training also establishes corporate required training. No supplemental training is defined for the differences required for the ITA Practices under ISO/IEC 17025 based standards (new) or division specific.

c) *The training program as it exists based on corporate training is not completely relevant.*

d) *(new).*

(VS-4.5.2) Positions assigned

Laboratory Director: Shawn Southworth, ITA Practices Director

Technical Director: Shawn Southworth, ITA Practices Director

Authorized Representative: Shawn Southworth, ITA Practices Director

Approved Signatory Personnel: Shawn Southworth, ITA Practices Director

Team Leaders: Shawn Southworth, ITA Practices Director

Jack Cobb, Systems Software Analyst,
training record available and reviewed Does not verify J. Cobb is qualified to test.

Comment [SVF1]: Business card says 'System'

Quality Manager: Paul Rainville, Director of Delivery.

prainville@ciber.com

703-610-6400 x 6475

Not listed on Org chart. External to ITA Practices office.

ITA QA Representatives: (defined as local staff/employees with responsibilities to monitor QA requirements, assigned in org chart and PD)

Tom Dunn **No training records or record of designated as qualification**

Jennifer Price **No training records or record of designated as qualification**

5.2.3 Personnel,

a) employed and/or contracted personnel. All personnel assigned qualify under this requirement

b) CIBER Policy and Procedure. Subcontractor Monitoring, Feed back from client of manager is collected and a performance assessment is made. Records held at divisional office. No policy/procedure for training or qualifying for competency. Corporate training appears to be irrelevant for them.

5.2.4 Job descriptions. Available and complete. Individuals identified as assigned to position in QTP Organization Chart in Sect 3. Recommended that the names be removed from the QTP Org Chart and the information be provided in other forms.

5.2.5 Authorizations for testing.

a). Authorize specific personnel to perform specific processes. Informal.

b). Training record reviewed for Jack Cobb. Does not include record of authorization for performing tests. No record exists for subcontracted employees.

(VS-5.2.3). The laboratory shall notify both accreditation agency and the EAC within 30 days of any change in key personnel. When key personnel are added to the staff, the notification of changes shall include a current resume for each new staff member. *This requirement is based on direction given under the initial NASED accreditation and is to be transferred to EAC. Need to develop/update.*

Note 1: 'Key Personnel' is considered here to be the personnel identified in VS-4.5.2 above.

Note 2: 'both accreditation agency' is a residue from NASED as accreditation agency. It has not been confirmed that the future accreditation agency will require this but this was statement is extracted and updated from a draft for that agency. For this accreditation, the accreditation body is EAC.

5.3 Accommodation and environmental conditions (12)

5.3.1 a). Laboratory facilities for testing and/or calibration, including but not limited to energy sources, lighting and environmental conditions, shall be such as to facilitate correct performance of the tests and/or calibrations. *The office is a basic administrative office with adequate lighting and support. No special needs outside of environmental testing requirement performed by other labs.*

b) The laboratory shall ensure that the environmental conditions do not invalidate the results or adversely affect the required quality of any measurement. N/A for base office.

Note: Particular care shall be taken when sampling and tests and/or calibrations are undertaken at sites other than a permanent laboratory facility.

c) The technical requirements for accommodation and environmental conditions that can affect the results of tests and calibrations shall be documented. N/A.

(VS-5.3.1) a) The laboratory shall have adequate facilities to conduct the voting system testing that it offers. This includes facilities for staff training, record keeping, document storage, and software storage.

b) If testing activities are conducted at more than one location, all locations shall meet the EAC requirements, and mechanisms shall be in place to ensure secure communication between all locations.

(VS-5.3.2)

(VS-5.3.3)

5.3.2

a) The laboratory shall monitor, control and record environmental conditions as required by the relevant specifications, methods and procedures or where they influence the quality of the results.

b) Tests and calibrations shall be stopped when the environmental conditions jeopardize the results of the tests and/or calibrations.

5.3.3

5.3.4 Access to and use of areas affecting the quality of the tests and/or calibrations shall be controlled. The laboratory shall determine the extent of control based on its particular conditions.

(VS-5.3.6) If the laboratory is conducting its tests at a customer site or other location outside the laboratory facility, the environment shall conform, as appropriate, to the requirements for a laboratory environment. If a customer's system on which a test is conducted is potentially open to access by unauthorized entities during test, the ITA shall control the test environment. This is to ensure that the systems are in a defined state compliant with the requirements for the test before starting to perform testing work and that the systems ensure that unauthorized entities do not gain access during testing. Ref NASED Technical Guideline #4. Draft procedures exist and are awaiting approval.

5.3.5 *Good housekeeping. Observed reasonable office house-keeping.*

5.4 Test and calibration methods and method validation (12)

5.4.1 General (12)

QTP, Sec 1.4 through 10.

a) The laboratory shall use appropriate methods and procedures for all tests and/or calibrations within its scope.

b) The laboratory shall have instructions on the use and operation of all relevant equipment, and on the handling and preparation of items for testing and/or calibration, or both, where the absence of such instructions could jeopardize the results of tests and/or calibrations. Not widely needed at Ciber. May need to look at such an instruction to provide the control of operating system setup as an example.

c) All instructions, standards, manuals and reference data relevant to the work of the laboratory shall be kept up to date and shall be made readily available to personnel (see 4.3).

d) Deviation from test and calibration methods shall occur only if the deviation has been documented, technically justified, authorized, and accepted by the customer.
Need to develop.

5.4.2 Selection of methods (13)

Currently limited to broad based QTP for test areas such as TDP Review, Source Code Review, Functional Testing. Need to develop more specific test procedures that provide a standard base for testing between vendors.

a) Preferred test methods from international, regional, or national standards. (VS 5.4.1) methods required in VSS/VVSG shall be used.

b) Additional details to supplement standard method.

d) Customer informed and agrees.

e) Shall confirm that it can properly be performed. (See under review of tenders, etc.)

(VS-5.4.2) Validation of the test method will be included in documentation.

5.4.3 Laboratory-developed methods (13)

a)

5.4.4 Non-standard methods (13).

5.4.5 Validation of methods (14).

5.4.5.1 Validation definition

Validation is the confirmation by examination and the provision of objective evidence that the particular requirements for a specific intended use are fulfilled.

5.4.5.2 The laboratory shall validate non-standard methods, laboratory-designed/developed methods, standard methods used outside their intended scope, and amplifications and modifications of standard methods to confirm that the methods are fit for the intended use. The validation shall be as extensive as is necessary to meet the needs of the given application or field of application. The laboratory shall record the results obtained, the procedure used for the validation, and a statement as to whether the method is fit for the intended use.

Need to develop

5.4.6 Estimation of uncertainty of measurement (14) N/A May need to develop in the future.

5.4.7 Control of data (15)

5.4.7.1 Calculation and data transfers.

Calculations and data transfers shall be subject to appropriate checks in a systematic manner.

5.4.7.2

When computers or automated equipment are used for the acquisition, processing, recording, reporting, storage or retrieval of test or calibration data, the laboratory shall ensure that:

a) computer software developed by the user is documented in sufficient detail and is suitably validated as being adequate for use;

Will need to develop for test tools and utilities used for testing provided by a vendor.

b) procedures are established and implemented for protecting the data; such procedures shall include, but not be limited to, integrity and confidentiality of data entry or collection, data storage, data transmission and data processing;

May need to develop.

c). computers and automated equipment are maintained to ensure proper functioning and are provided with the environmental and operating conditions necessary to maintain the integrity of test and calibration data

5.5 **Equipment (15).** *N/A However, review these requirements because they may apply and give guidance for some concerns and issues for working with the vendor supplied equipment refer 5.5.5. May need to apply to actual equipment under test.*

5.6 **Measurement traceability (17).** *N/A except as applies to calibrated equipment*

5.7 **Sampling (19).** *N/A. Program currently does not deal with sampling from manufacturing production.*

5.8 **Handling of test and calibration items (19).**

5.8.1

The laboratory shall have procedures for the transportation, receipt, handling, protection, storage, retention and/or disposal of test and/or calibration items, including all provisions necessary to protect the integrity of the test or calibration item, and to protect the interests of the laboratory and the customer.

5.8.2 a-d)

5.8.3 a-b).

5.8.4 a-d)

5.9 **Assuring the quality of test and calibration results (20)**

5.9.1

5.9.2 *(New) Quality control data analyzed.*

5.10 **Reporting the results (20)**

5.10.1 **General (20)**

5.10.2 **Test reports and calibration certificates (20)**

--a) *title*

--b) *name and address of laboratory*

(W) QD V-1, Cover page,

if testing elsewhere, Need to add provisions for test location if different than company address in scope

(C) QTR template, cover page,

if testing elsewhere, Need to add provisions for test location if different than company address

--c) **unique identification of test report and identification of end of report**

(W) QD V-1 job number and use 'page x of y' to identify end of report

(C) Need to develop. Current standard identification is only title and version number on cover page.

--d) name and address of customer.

(W) QD V-1 Sect 3 and cover page

(C) QTR template, name is in Sec 3 Need to provide address.

--e) Identification of the method used (VS in requirement matrix)

(W) QD V-1 Sect 4.9

(C) Need to develop. Currently do not have a set of test methods/procedures which can be referenced.

--f) description of equipment under test

(W) QD V-1 Sec 4.9, QTR Sec 4.

(C) QTR Sec 3 Test Support Hardware

--g) date of receipt (N/A to voting system)

--h) sampling plan (N/A to voting system)

--i) test results (VSS Vol II, App B5 Test Result Summary), and B6 Appendix of Test Results and Findings)

(C) QTR Sect 5 Qualification Test Results and subdivided TDP, Source Code Review, Functional Test. Where are PCA. Appendices divided into TDP (A), Source Code Review (B), Functional Test (C) including system integration results and should include security and should include telecommunications. Where is Witnessed Build?

(W) QTR Sect 6.1 Summary and Attachment A (Functional Req, Matrix includes Sect 2-8 of functional requirements).

Specific Data in Appendices B- (required) for specific tests

--j) names, functions, and signature or person(s) authorizing test report.

(C) "Prepared by" line on QTR cover page. Authority to assign is designated in Project Quality Assurance Process Tailored for ITA Practice. (Page 6 of 16) as Approved Signatory as specified in Position Description

(W) Listed on cover page per QD V-1 and includes:

Prepared

Approved

Quality Assurance Manager

Release (Department Manager)

--k) Statement that the results relate only to the items tested or calibrated.

(W) In QTR Sec 1.3 Summary with standard defined language. Also includes recommendation about restricted reproduction

(C) Need to add.

5.10.3 Test reports (21)

5.10.3.1

a) deviations from test methods

(C) Needs to establish reference test method

(W) QTR Sec 6 and QD V-1

b) compliance/non-compliance with requirements (covered under QTR standard App B5 item e).i.

c) N/A except under referenced test standards outside the scope of accreditation

d) (See 5.10.5)

e) additional information required (such as additional tests or information for a requested

5.10.3.2 Sampling (N/A to voting system testing)

5.10.4 Calibration certificates (22) (N/A)

5.10.5 Opinions and interpretations (22)

(C) Need to develop

(W) If accepting prior results without retesting in QTR Sect 6. May need expand criteria.

5.10.6 Testing and calibration results obtained from subcontractors (23)

a) identify test was done by a sub-contractor

(W) QTR Sect 6. and App A. Procedure defined in QD VII-1 Approved Vendor list.

(C) Need to specify

5.10.7 Electronic transmission of results (23) (refers to Control of Data in electronic media)

(C) Need to give results

(W) QD VII-1. Document Control (reference 5.4.7)

5.10.8 Format of reports and certificates (23) (covered by VSS II, App B requirements)

5.10.9 Amendments to test reports and calibration certificates (23)

(W) QD V-1, 5.4. Publish as full revision with changes marked.

(C) QTP Sec 14. Point 2. Needs to review to include requirements of this checklist
Section 5.10

**Election Assistance Commission (EAC)
Interim Accreditation
Independent Test Authorities (ITA)**

Assessment Report

**SysTest Labs, L.C.C.
with
Percept Technology Labs**

**Conducted: Jul 10-12, 2006
Denver, CO**

Assessor: Steven V. Freeman

022306

Introduction

This accreditation assessment was conducted to support an interim program pending implementation of the full EAC Accreditation program in cooperation with the National Voluntary Laboratory Accreditation Program (NVLAP) under NIST Handbook 150-2006, NVLAP Procedures and General Requirements and NIST Handbook 150-22- 2005 NVLAP Voting System Testing (HB 150-22). The interim program is designed to accredit ITAs formerly authorized under the National Association of State Election Directors (NASED) accreditation program to continue voting system testing under an EAC accreditation until such time as the NVLAP/EAC joint accreditation has qualified one or more testing laboratories as Voting System Test Laboratory (VSTL).

Summary of Findings

SysTest Labs with Percept Technology has the basic capability to perform a full range of voting system tests under the Federal Election Commission (FEC) Voting System Standards (VSS-2002). Their quality management system was written to the earlier NASED Handbook 9201-A, 2001. They are in the process of converting their system to NIST Handbook 150-2006 but currently have a mix between the two. There was evidence through reviews, edits, and approval processes that they are actively engaged in developing and improving their processes and their personnel and top management are fully involved in a quality system and the necessary adaptations to respond to new requirements.

To perform this assessment, an interim checklist was created to implement the requirements of ISO/IEC 17025 as the NVLAP standards and checklists could not be used. This same checklist is being used for all three ITAs to check compliance and a work copy is being delivered to the labs for their reference on meeting unsatisfied requirements.

Deficiencies found in SysTest Labs/Precept assessment are classed as:

- ❖ on-going work which is expected to show progress and follow-up at the next assessment review but may not necessarily be fully completed as a continuous process of improvement,
- ❖ minor deficiencies whose correction are to available for review to EAC within 120 days or an alternative date set between the lab and EAC.
- ❖ major deficiencies which the lab needs to respond to within 30 days with a plan of corrective action and scheduled return visit.

(A successful assessment and recommendation for accreditation by NVLAP as a VSTL may, with EAC approval, may satisfy the requirement for a scheduled return assessment.)

On-going work. All the deficiencies in this category are due to the drafting and rewriting of the new procedures to the ISO/IEC standards. The process of reviewing, rewriting, and approving new procedures is an on-going process and should show evidence of the underlying quality management process is being used. This area also includes the process of adapting new EAC procedures which have not yet been approved.

Minor deficiencies:

1. The internal audits were against specific procedures or issues and did not encompass the review of management quality processes required under the accreditation guidelines. This is ameliorated by the fact the review and revision on going with the change over to the new Quality System Manual is performing the same function, only lacking the formal record keeping of issues and corrective action plans needed to support the annual management review.

2. There is no record of a formal management review during the past year that could be presented for the assessment. Top management involvement with the change over to the new Quality System Manual, like the internal audits, is performing much of the same function with weekly management reviews but lacks formal record and the overall review of progress over the longer time period of an annual review.
3. There is no formal recording of complaints and reports of non-compliance for review and analysis. Complaints are being handled immediately and through weekly management reviews but there is not the formal record of the complaints that would support analysis of trends or follow-up review through later audits or management reviews.
4. Test methods exist as templates and test scripts but need to be placed under the controlled document system and their validation, where required, documented. The new SLPs planned or in draft are providing the mechanism to do this but do not include the validation component.
5. The copy of the VSS-2002 used was not current and the checklist used to trace completion of requirements derived from that VSS-2002 version was not complete. A new checklist to correct this problem should include adoption of the VVSG-2005 changes where appropriate. Note: this problem exists for all the labs as the checklist involved; was initially created and intended to be used as a common reference; the correction and replacement should involve a similar common document.

Major deficiencies.

1. Several of the labs used as subcontracted labs are not accredited by an IOC/IEC 17025 based accreditation body. This problem is partially a problem within the standards and EAC draft policies themselves as 17025 accreditation is not necessarily the appropriate method for validating labs performing the tests under quality standards (for example, the safety and accessibility standards). However, an accreditation program does exist for the Mil-Std 810 standards but is not held by the subcontracted lab, APT, performing the related tests.

Recommendation

Accreditation should be continued as a full service ITA provisionally based on continued development and follow through on the reported deficiencies, to be reviewed in 120 days or at such time as directed by the EAC. Some issues are dependent on clarification of procedures through the EAC.

(signed)

Steven V. Freeman

Attachments:

- A. Laboratory Identification and Contacts.
- B. Organization Chart as/of 7/10/06.
- C. EAC Interim Checklist Summary of Findings. (In draft)
- D. Core Voting System Tech Supplemental Checklist.doc (In draft)

022308

Laboratory Identification and Contacts

Lead Laboratory:

Legal Name: SysTest Labs, L.C.C.

Address: 216 16th Street
Suite 700
Denver, CO 80202
USA

Telephone: (303) 575-6881
Fax: (303) 575-6882
Internet: www.systest.com

Key Contacts: See Organization Structure 10 July 2006 (Attach A)

President	Brian Phillips	BrianP@Systest.com
Chief Operating Officer	Glenn Truglio	
Director, Qualification Test Services	James Nilius	jnilius@systest.com
Qualify Assurance Director	Jeff Knutson	jknutson@asystest.com
Hardware Manager	Darrick E. Forester	
Source Code Review Manager	Jo Johnson	
Managers, Voting Test Specialists	Jennifer Garcia	
	Jeff Knutson	
Delivery Manager	Lesley Hoppert	

Environmental Hardware Team Partner:

Legal Name: Percept Technology Labs, Inc.
Address: 4888 Pearl East Cir. #110
Boulder, Colorado 80301
Telephone: (303) 444-7480
www.percept.com

Key Contacts:

Brian G. Cleveland, President & CEO
John J. Mozeliak, Chief Operating Officer
Al Backlund, Director of Global Compliance Business Unit

022309

Technical Supplement:

Review test lab procedures/standards for the following elements of the VSS 2002 (and VVSG 2005).

Core voting system tests:

- ___ 1 Technical Data Package review,
- OK/C SLP-VC-07 PCA Documentation Review
PCA Document Review.
- ___ a Verify that TDP contains required document content and identify vendor's document meeting requirements.
- OK Vendor provides document trace and SysTest uses the trace to complete the PCA Doc
Develops one for each configuration component and the 12 required documents from the VSS/VVSG
- ___ b Identification of deliverables: Documents or manuals to be delivered to client for operation, maintenance, and training.
- C Task vendor to provide a list of deliverable documents or manuals.
Supported in QTR, Section 3. "The TDP User/Owner manuals that would be part of the certified system delivered to a purchaser of the system are as follows:
- ___ c Terms and references.
- OK Entry in QTP/QTR Template to include items needing identification
- ___ d Review of documents for completeness and consistency
- OK SLP-VC-07 5.1.3.
Documents are examined by subject expert, e.g., Software Specification is reviewed by Source Code team, against VSS requirements in that area.
- ___ e Quality Assurance plan
- OK SLP-VC-07, PCA Doc-
Performed as part of PCA review.
- ___ f Configuration Management
- OK SLP-VC-07, PCA Doc-Quality Assurance
Performed as part of PCA review
Also examined and exercised in the Witnessed Build
- ___ g Review of System release change log
SLP-VC-07, PCA Doc-Change Notes
- ___ h Review of vendor tests. *Includes but not limited to:*
 - ___ i Readiness Check
 - ___ ii Operational Status Check
- ___ SLP-VC-08, FCA
FCA Doc . Have separate template for Software, Hardware, Hardware/Software
No sampling of vendor tests (perform test method validation)
- ___ i Review of prior test lab tests
See comments under PCA on accepting reports from other labs.
If using other ITA reports on earlier product tests, need to validate and report the justification for acceptance of the report.
----Deliverables----
- ___ j TDP Document Trace matrix directory. Matching the document requirements to the vendor's document names or titles.
- OK See above, In application package, exhibit 1.6
- ___ k Production of formal Test Plan
SLP-VC-05, Qualification Test Plan (Original qualification or modified system)
Template QTP included in application package Exhibit 1.10

SysTest produced a Pre-Qualification Test Report (QAM 4.1.2) which summarized the results for the test and verification documentation, System Operation, Software, and Hardware Specification reviews. It provides a method to document and report discrepancies in the TDP/PCA document reviews to be resolved and document resolutions. SysTest has replaced this with the production of actual Test Plan to include the discrepancy report. This discrepancy report is carried through and provided as part of the Qualification Test Report.

2 Source code review,

QAM 4.1.3

QSM 4.1.1.9 This is mainly a reference to identifying and assigning personnel to the source code review

SLP-VC-11, PCA Source Code Review provides the procedures

SysTest has created a set of 'definitions' for different languages: C, C++, C#, Cobol, Delphi, HTML, Java, Oracle SQL, Perl, Powerbuilder, (MS) SQL, Visual Basic, XML. These 'definitions' are tables for reporting against the VSS/VVSG requirements and are used to identify requirements that may not apply.

a Catalog of source code

The SLP-VC-11 does not describe use of Module-Finder. Needs instructions for use.

b Catalog of compilation environment including COTS components of build

SLP-VC-13 Rev 03, 5.1.2 Verify environment to identify components of the build. If changed components are identified or are revealed, the vendor is required to resolve. SysTest requiring copies of the licensed versions to verify use of valid COTS and to assist in detecting modified components but not listed in procedures. Procedures update to include

c Determination of changes from prior review.

SLP-VC-11, Rev 05. 5.3.1. Working off the vendor supplied change documentation but also performing code differences against the components supplied for the Witnessed Build.

d Review for coding conventions and integrity requirements

SysTest has created a set of 'definitions' for different languages: C, C++, C#, Cobol, Delphi, HTML, Java, Oracle SQL, Perl, Powerbuilder, (MS) SQL, Visual Basic, XML. These 'definitions' are tables for reporting against the VSS/VVSG requirements and are used to identify requirements that may not apply. The Module-Finder utility runs a check against some of the requirements to highlight and identify modules requiring specific attention but all modules are subject to a human review by at least two and sometimes more reviewers. This procedure was witnessed. Needs to be recorded in procedures.

e Review for security.

Need documentation of specific features and practices used to review for security. This is being performed by knowledgeable human reviewers. Specific issues currently under review are unbound arrays, pointers, and dynamic structures. SysTest has also, in the past, detected and reported on 'race track' vulnerabilities. Needed for future development is an active process to recognize and adapt reviews to pick up on new vulnerabilities.

i Demonstrate

----Deliverables-----

f Report of results

SLP-VC-11 PCA Source Code Review, 5.4.2 This process is basically include the source code review forms into the report following code statistics such as line counts provided by the Module-Finder. It is organized by functionality and language. Detailed module by module reports are not provided in the Qualification report but are available through archived test documentation.

- g Witnessed build from verified source code and COTS.
SLP-VC-13.
Discussed need to identify modules which were reviewed and which executables are changed. Changes in executables may occur due to build procedure changes or COTS library changes rather than reviewed source code changes. Need to review Guideline 3 on Witnessed Build for documentation required with the Witnessed Build. Specifically missing currently is the report to include observed anomalies from the source code review.
- 3 Physical configuration audit,
QAM 3.27 Performing Accuracy and Reliability Testing
QSM (refers to SLP)
SLP-VC-09 PCA Software and Hardware Configuration Audit
SLP-VC-23 Hardware Test Management
PC Configuraton Checklist
Organization:
Percept handles test cases against hardware requirements
Derek handles System configuration and environmental description
Jennifer handles System configuration-functional
TC-history provides document change history.
Includes VSS requirement for each item.
 - a Configuration verification against Configuration Management plan
SLP-VC-09, 5.2.2 Verify the test environment. Verifies the equipment under test, manuals, and supplies presented for testing match the equipment/documentation reviewed in TDP. Should include physical inspection of components and parts to see that the equipment design is as defined in documentation include the APL. After any mitigation, the equipment is audited to ensure configuration is defined and consistent with documentation. Need to update SLP to reflect the mitigation audit. Procedures include pictures and physical descriptions of changes and to confirm any Engineering Changes (EC) are complete. Also discussed issue of component marking to reflect version control and identification. May need to include diagrams or pictures where a marking change is required.
 - b Accessibility standards
SLP-VC-23, 5.2 includes provisions for the Common Standards portion of the Accessibility Checklist (a tab in the PCA checklist). SysTest performs the physical measurements; Percept performs the other checks.
Minor note: VSS 2002/VVSG 2005 do not specify the table height involving a access limits for someone in a wheel chair. 28 CFR Ch. I (7-1-94) under Americans Disability Act, identifies the max height as 34 inches for table mounted or elevated equipment. Recommended to SysTest to include the reference and use in their test method.
 - c Construction, including safety
SLP-VC-23/VSS Vol I 3.2.8. (Note: Typo in VSS 2002. Section 3.2.8 refers to 29 CFR where App B references 20 CFR. VVSG 2005 corrects to 29 CFR).
Test is performed in Safety Lab under standard methods for 29 CFR.
 - d Validity of operations provided in deliverable manuals
SLP-VC-23/09. Need to update to include reference to maintainability test case.
Percept, under Maintainability Test Case, reviews maintenance manuals
SysTest, under SLP-VC-12 Preparing Test Cases, 5.1.4 to include testing of the vendor's manuals. Recommendation to include a statement in the Deliverable section of the report to recognize these manuals have been reviewed.

- e Hardware transportation and storage tests.
SLP-VC-23, Table 1, Environmental Hardware.
Issues to consider is ensuring the equipment tested is the same configuration used in final certification and that the operational status check has been validated. Need to include details for operational status check to ensure full verification of components and design. Will involve changes to several SLP. SysTest has been working with ensuring the operational status test is comprehensive and been revising test cases to allow for more comprehensive check.
 - f Hardware operational environmental test.
Note: The system integration tests for accuracy and reliability (e.1. and 2. below) are conducted in conjunction with this test and the final criteria include all components used to consolidate polling place and jurisdiction results from individual voting machines.
See below e1 and 2..
 - g EMC and electrical test suit.
SLP-VC-23, Table 1, Environmental Hardware.
Criterion performs this test with oversight by Percept. Criterion is fully accredited for these test under NVLAP. Issue may occur if the vendor brings in reports from other test labs. Need to add procedures to provide review/acceptance criteria for third party reports based on the following three criteria:
 - i *Verify test lab is accredited by MRP body*
 - ii *Verify equipment under test is for same configuration as being certified*
 - iii *Verify that operational status check/operations was applicable to a voting system operation.*
 - h Safety inspection.
SLP-VC-23. See item c above. In addition, consider the issue of the third party reports.
 - i *Verify test lab is accredited by MRP body*
 - ii *Verify equipment under test is for same configuration as being certified*
 - iii *Verify that operational status check was appropriate*

---Deliverables---
 - i Reports for the hardware, EMC and electrical, and Safety tests and inspections.
If necessary, provide a statement reporting the results of the verification on the applicability of the reports.
SLP-VC-23, 5.6. Need to add procedures to when requested to accept third party reports to document validation of the report for acceptability.
 - j Directory of deliverables, including hardware and software setup and both application and COTS installed files. (Part of witnessed build documentation)
Qualification Report Template Rev 1.00 , 7.4 Appendix for qualification configuration and as a element in the Witnessed Build package. Need to add specifics about designating COTS components that are necessary for certified configuration.
- 4 Functional configuration audit,
QAM 4.1.1 through 4.21.8 Qualification Review and Test Documents.
QSM (references into SLP) May need to provide overview of test structures and requirements. Needs to provide a section with the generic voting system requirements provided in QAM 4.1.1 through 4.21.8.
SLP-VC-08 Vendor Test Review
SLP-VC-05 Qualification Test Plan
SLP-VC-15 FCA Test Execution – Functional Integrated System
SLP-VC-16 FCA Test Execution - Regression
Form FCA 2002 Document Review

- ___ a Functional Requirement matrix against technical specification and manuals
Form FCA 2002 Vendor Testing and TDP Trace
Form FCA 2002 Document Review.
- ___ b Test Specifications for functional requirements
Form FCA 2002 Vendor Testing and TDP Trace
Form FCA 2002 Document Review. Includes vendor tests reviewed.
- ___ c Verify functional operation against requirements of Vol I, §2 thru §6 (See Requirements Checklist)
SLP-VC-12 FCA Preparing Test Cases
Core set of test cases
Accuracy Test Case
System Gen01
System Gen03-Rotation
System Gen04-Addl Languages
System Gen02-Straight Party
System Pri01- Open Primary
System Pri02 - Closed Primary
System Pri03 - Blanket Primary
Security Test cases
Baseline Test Case
Telecom Test Case
- ___ d Verify functional operation against requirements of vendors technical specification and manuals
Form Supported Functionality Declaration Rev 02 (sales reps provides and vendor submits as part of application) used as a basis for developing test cases for these additional functionality
- ___ e Verify HAVA functional requirements.
Included in Supported Functionality Declaration to include Provisional, Addl Languages.
Need to review for other items in 3.01.
---- Deliverables ----
- ___ f Provide a Requirement matrix showing which tests performed and requirement satisfied.
Prior version is incomplete. Proposing to use the Hardware & Software FCA Document Review of Testing to include reference of actual tested versus accepted earlier tests. May require reporting justification for accepting outside/older test reports.
- ___ g Report deficiencies encountered and resolutions of deficiencies.
Note: not all deficiencies will result in a recommendation to not certify.
SLP-VC-18 Discrepancy report and Test/Review Corrections.
- ___ 5 System integration tests,
 - ___ a Accuracy. For non-COTS systems, includes 48 hr environmental operating test.
SLP-VC-23. Table 1 (Need to add accuracy under Environmental Hardware Test table)
Earlier had not been doing this test under the 48 hr environment. They have revised procedure.
Need to ensure that the accuracy test includes the transfer of results and accumulation to the consolidated reporting.
 - ___ b Reliability. For non-COTS systems, includes 48 hr environmental operating test.
SLP-VC-23. Table 1.
Need to ensure that the reliability test includes the transfer of results and accumulation to the consolidated reporting.
 - ___ c Volume tests, and
 - ___ d Security tests.

- ___ e (VVSG 2005) Cryptographic
- ___ f Telecommunication, as applicable to system design.
- ___ g System end-to-end of EMS, vote recording, vote tabulation, consolidation, and canvass reporting.
----Deliverables----
- ___ h Report on tests performed and their results.

§ 5.

- ___ 6 Qualification Test Report
 - ___ a Introduction.
 - ___ b Qualification Test Background (B2)
 - i General Information about the qualification test process. (For outside readers not familiar with the ITA testing).
 - ii A list and definition of all terms and nomenclature peculiar to the hardware, the software, or the test report
 - ___ c System Identification (B3). This is the test hardware and software used in this test.
 - i System name and major subcomponents.
 - ii System Version.
 - iii Test support hardware and
 - iv Specific documents (deliverables) from the TDP used to support testing
 - ___ d System Overview (B4). Describes the voting system in terms of
 - i its overall design structure,
 - ii technologies used,
 - iii processing capacity claimed by the vendor and
 - iv modes of operation.
 - v (May) include other products that interface with the voting system. *Note: Shall include components necessary to consolidate and produce final results including telecommunications.*
 - ___ e Qualification Test Results (B5). "This section provides a summary of the results of the testing process, and indicates any special considerations that affect the conclusions derived from the test results. This summary includes:
 - i Acceptability of the system design and construction based on the performance and software source code review.
 - ii The degree to which the hardware and software meet the vendor's specifications and the standards, and the acceptability of the vendor's technical and user documentation
 - iii General findings on maintainability
 - (1) Includes notation of specific procedures or activities that are difficult to perform.
 - iv d. Identification and description of any deficiencies that remain uncorrected after completion of the qualification test
 - (1) that has caused or is judged to be capable of causing the loss or corruption of voting data, providing sufficient detail to support a recommendation to reject the system being tested.
 - (2) deficiency in compliance with the security requirements,
 - (3) deficiency in compliance with the accuracy requirements,
 - (4) deficiency in data retention, and
 - (5) deficiency audit requirements are fully described); and
 - v Recommendations to NASED ITA committee for approval or rejection
 - vi Note: Deficiencies that do not result in a loss or corruption of voting data shall not necessarily be a cause for rejection.

- f Appendix Test Operations and Findings (B6)
 - i Additional details of test results needed to enable understanding of the conclusions. B. b. Organized to reflect the Qualification Test Plan.
 - ii Summaries of the results of
 - (1) hardware examinations,
 - (2) operating and non-operating hardware tests,
 - (3) software module tests,
 - (4) software function tests, and
 - (5) system-level tests (including
 - (6) security and
 - (7) telecommunications tests, and
 - (8) the results of the Physical and
 - (9) Functional Configuration Audits)
- g Appendix Test Data Analysis (B7)
 - i summary records of the test data and
 - ii the details of the analysis. The analysis includes
 - (1) a comparison of the vendor's hardware and software specifications to the test data, together with
 - (2) any mathematical or statistical procedure used for data reduction and processing.