

Activity: Measuring and Test Equipment Calibration

1.0 Purpose: This guideline provides a method of assuring that the calibration of M&TE, equipment and components is performed and maintained in accordance with applicable standards and regulations.

2.0 Scope: This guideline provides a method to review adequacy of:

- The program for calibration of M&TE systems, equipment and components.
- The performance of calibration activities.
- The methods for assuring that items remain in calibration.
- Corrective actions prescribed for items determined to be out of calibration.

This guideline is applicable to but not limited to the calibration of the M&TE items in the areas of NSSS, BOP and data collection and readout.

3.0 References:

3.1 NUREG/CR-1369, "Procedure Evaluation Checklist for Maintenance, Test and Calibration

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Procedures Used in Nuclear Power Plants"

- 3.2 ANSI N45.2.4-1972/IEEE-336-1971, "Installation, Inspection and Testing Requirements for Instrumentation and Electric Equipment During the Construction of Nuclear Power Generating Stations"
- 3.3 IEEE Standard 338-1977, "IEEE Standard Criteria for the Periodic Testing of Nuclear Power Generating Station Safety Systems"
- 3.4 IEEE Standard 498, Calibration and Control of Measuring and Test Equipment Used in Nuclear Facilities"
- 3.5 NRC I&E 35745B, "QA Program of Surveillance Tests and Calibration Control"
- 3.6 NRC I&E 35250, "QA Program for M&TE"
- 3.7 NRC Regulatory Guide 1.105, Revision 2, "Instrument Setpoints"
- 3.8 NUREG 75/087, "NRC Standard Review Plan"

4.0 Guidelines:

4.1 In preparation for and during the conduct of this surveillance:

- Obtain and review implementing procedures, instructions and drawings governing this activity.
- Prepare a guide or checklist using the selected items from this guideline.
- Review past surveys, audits, surveillances and other evaluations/ assessments.
- Ensure that checklists include, where applicable, actual observations of performance, general plant conditions, radiological work practices, housekeeping, work document controls and use,

and safety practices.

NOTE: Refer to Guideline A.1, "General Quality Surveillance Guidance," for specific details on the attributes listed above.

4.2 Ensure that the following elements are addressed by the procedures/instructions for calibration of I&C systems, equipment and components.

- A. Identification of I&C items requiring periodic calibration.
- B. Calibration intervals.
- C. Identification of calibration status.
- D. Instructions/procedures for calibration of each type of item.
- E. Does purpose and scope clearly describe the function performed?
- F. Are all prerequisites identified?
- G. Are all plant, system or equipment conditions to be established prior to performance of work clearly stated?
- H. Are all pertinent precautions noted?
- I. Is all necessary support equipment involved listed?
- J. Are the latest approved specifications and drawings available and used?
- K. Does the procedure/instruction have clear, concise and understandable steps - no multi-step paragraphs?
- L. Are tables, charts and graphs readable and helpful?

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- M. Are data sheets adequate - enough space and room for calculations?
- N. Can the procedure be performed in the sequence it is written?
- O. Does the procedure/instruction state whether or not the instrument can be calibrated in place or needs to be removed?
- P. Documentation of calibration results.
- Q. Qualification/certification of personnel performing calibrations and maintenance of training records.
- R. Acceptance criteria and tolerances.
- S. Recording both as-found and as-left conditions.
- T. Identification of person recording data and/or performing the test.
- U. Directions for items found out of tolerance including evaluation and corrective actions.
- V. Identification of the item being calibrated or tested by the tag number, label, etc.
- W. QA/QC Hold Points.
- X. Sign-off of steps.
- Y. Post calibration/test review.
- Z. Maintenance of electrical train separation requirements.
- AA. Control of maintenance and test equipment use.
- BB. Housekeeping requirements.
- CC. Restoration steps.

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DD. The range of the instrument or device encompasses the normal operating range of the equipment or system.

4.3 Select activities in the areas of calibration of I&C systems, equipment, and/or components as appropriate for verification of the following:

- A. The instructions or procedures used are the latest approved revisions including temporary changes. Also ensure that drawings, vendor manuals, and other documents are controlled copies with the latest approved revision.
- B. Personnel involved in the performance of calibration activities are qualified, certified, and or trained in the method.
- C. Testing/calibration activities do not violate technical specification requirements or limiting conditions of operation (LCO).
- D. Performance of calibration activities have been performed at the minimum frequencies required by procedures and/or specifications.
- E. Clearance requests are obtained to remove equipment from operation in accordance with the plant Technical Specifications and to provide protection for equipment and personnel.
- F. Maintenance and test equipment, and special tools are those specified in the procedure and that these items are adequate for performing the calibrations/tests.
- G. The M&TE is in calibration and is identified by appropriate calibration labels and

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stickers.

- H. QC personnel are on hand to witness specified QC hold points.
- I. That procedures for installing and restoring temporary modifications (ie., jumpers, lifted leads, interlock bypasses, etc.) are adhered to during performance of the calibration/testing activities.
- J. That applicable precautions, warnings, and limitations are observed.
- K. Are necessary permits, modifications and clearances completed prior to start of work?
- L. Are plant operators aware of the scope of and the start of the job?
- M. Component cleanliness and housekeeping procedures are followed.
- N. ALARA considerations, Radiation Work Permits, etc. are followed.
- O. Work is performed in accordance with the procedure/ instructions with appropriate sign-offs.
- P. Equipment restoration is adequate and in accordance with procedures.
- Q. Retesting is performed to verify normal operation of equipment (ie., all bypasses, interlock defeats, switches are restored to their normal configuration).
- R. Data entries are made during the performance of the procedure and not after completion of all the steps.
- S. The "as found" and "as left data" is within specified limits.

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- T. That appropriate corrective actions are taken upon discovery of items that are found out of tolerance. This includes reporting to federal agencies as required, evaluation of the deficient condition, and corrective action on the discrepancy.
- U. That calibrations/testing performed by outside contractors are performed and controlled in accordance with purchase documents, approved procedures, and an approved QA/QC program.

5.0 Other Guidelines for Consideration:

- 5.1 A.1, "General Quality Surveillance Guidance"