

# ANSI C12.25 Provisional American National Standard for In Service Testing of Electricity Meters

8 April 2008

## A. Background and reason for a Provisional Standard

Statistical sampling plans have been in vogue for over 40 years in the electrical utility industry. Plans developed in the 1960's were regulated by the individual utility commissions and typically affected only the investor owned utilities. ANSI weighed in on the matter in the 5<sup>th</sup> edition of ANSI C12.1-1965 in Section 8.1.8.6 Statistical Sampling, in a fairly lengthy and detailed write-up on statistical testing. This write-up included a definition of acceptable performance of the plan and potential corrective actions based on failure of a group. Programs put in use at the time were all sampling by attributes plans as this was feasible to administer given the resources available to the meter shops and the metering engineers of the day.

Over the ensuing years there was an industry wide loss of focus on the reason for the sampling plan and corrective actions became punitive as opposed to beneficial for utility and consumer. Subsequent editions of the ANSI standard eliminated all of the verbiage on acceptable performance and corrective actions while state run regulatory commissions either referred to ANSI for guidance, neglected the topic completely, or put in place pass/fail criteria that had little or nothing to do with valid statistical sampling plans.

In the proposed provisional standard we are hoping to once again provide guidance to utilities and regulatory commissions as they revisit the issue of statistical sampling and incorporate updated sampling by variable statistical plans. This guidance is intended to allow regulatory commissions and utilities to run cost effective sampling plans that will give a better and clearer indication of how a utility's meter population is performing and what would be the best course of action (for both consumers and the utility) for groups that are performing less than optimally.

## B. Proposed Provisional American Standard for In-Service Testing of Electricity Meters

The statistical sampling plan used shall conform to accepted principles of statistical sampling based on either variables or attributes methods as found in either ANSI/ASQC Z1.9 or ANSI/ASQC Z1.4 or equivalent standard.

Meters shall be divided into homogeneous groups, such as manufacturer and manufacturer's type, and may be further subdivided in accordance with location or other factors which may be disclosed by analyzing test records to have an effect on performance. Subsequently, groupings may be modified or combined if justified by performance records.

The sample taken each year from each homogeneous group shall be of sufficient size to demonstrate with reasonable assurance the condition of the group from which the sample is drawn. The sampling plan shall include an adequate policy to ensure that the meters selected

have been randomly selected and have not been physically damaged or tampered with. An acceptable sampling program is one in which a sample will 95 times out of 100, determine whether as many as 97.5 percent of a homogeneous group are within the limits defined in 5.1.2. Plans based on the variables methods shall use a minimum sample size of 30 meters and plans based on the attributes method shall use a minimum sample size of 300 meters in each homogenous group. If a group does not meet the performance criteria then corrective action shall be taken.

The corrective action shall consist of one or more of the following:

- an accelerated test program
- splitting a group into two or more groups
- a time specific retirement program
- a sample driven retirement program

An accelerated test program will test a larger sample of the group to confirm or disprove the failure of a group in the same year or the following year. The larger sample will be defined as the number required to reach the next level of confidence as per ANSI Z1.9 or ANSI Z1.4 or the equivalent standard being used. This larger sample will not include any of the meters from the initial test.

Split the group into two or more groups of similarly performing meters (based on analysis of the meter test data). After defining the groups an accelerated test program will be conducted on each of those groups as defined above.

Implementing a time specific retirement program to retire a group will be over a period of time acceptable to the local utility commission and the utility involved. Length of time specified should take into account the amount of revenue being unrecognized each year and the cost required to retire the group in question.

A sample driven retirement program will be used instead of a time specific retirement program if the cost of the time specific program would be more expensive than ten times the estimated annual loss of revenue. In this situation the consumer and the utility are better served by continuing to monitor this group through an accelerated test program and all meters removed through this accelerated test program shall be retired. No additional effort will be necessary to more quickly retire this group until the estimated loss in revenue is greater than ten percent of the cost to replace the entire meter group.

Members of the committee;

Tom Lawton, TESCO, an Advent Company

Jim DeMars, Florida Power & Light Co.,

Jim Thurber, Baltimore Gas & Electric Company

Roy C. Lokys, Central Hudson Gas & Electric Co.

Ambler Thompson, NIST

Aaron F. Snyder, Ph.D., Enernex

Dave Scott, Plexus