

REVISED EXHIBIT A**TECHNICAL DESCRIPTION OF PROPOSED METHOD FOR THE
SAMPLE TESTING OF INSERVICE GAS METERS****1. INTRODUCTION**

Aquila, Inc. (“Aquila”) proposes to employ a sample testing method starting in calendar year 2007, using fully developed and widely recognized quality control standards, principles and rules, to test inservice gas meters. These standards, principles and rules can be found in standard texts and statistical sampling tables. Details of the method are described in ANSI/ASQC Z1.4¹ which is the “attributes sampling technique.” Sample testing is an economical substitute for one hundred percent (100%) testing.

2. DEFINITIONS

- A. **Acceptable Quality Level (AQL)** – a statistically based acceptance criteria for the maximum percentage or proportion of variant units in a lot that can be considered satisfactory as a process average. (See ANSI/ASQC Z1.4) The AQL to be used in sample testing gas meters is 6.5%.
- B. **Annual Sample** – a random sample taken each year from a group of meters based on guidelines set forth in ANSI/ASQC Z1.4 (inspection for attributes) using general inspection level II, Double Sampling Plans for Normal Inspection.
- C. **Check Flow** – the measured flow rate at twenty percent (20%) of the meter’s rated nameplate capacity.
- D. **Group** – meters of a particular type, manufacturer, and size.

¹ANSI/ASQC Z1.4 (Military Standard MIL-STD-105E), Sampling Procedures and Tables for Inspection by Attributes (1993)

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- F. **Lot** – a collection of meters in a group having the same set year, from which a sample is drawn and inspected to determine compliance with the acceptance criteria. The sample size of the meters picked for testing will depend on the size of the lot it will represent and will come from Table I of ANSI/ASQZ1.4 for attribute plans, and the acceptance or rejection of the lot will depend on the number of nonconforming meters prescribed by Table III-A of ANSI/ASQZ1.4.
- G. **Meter** – a hard case diaphragm type gas meter with a flow capacity of less than four hundred fifty cubic feet per hour (450 ft.³/hr.). (As of December 31, 2005, the Company had 42,200 such meters in its Missouri service territories.)
- H. **Meter Code** – an Aquila unique identification number used to identify a meter's size. Size is specified by the manufacture.
- I. **Open Flow** – the measured flow rate at eighty percent (80%) of the meter's rated nameplate capacity.
- J. **Percent Accuracy** – the ration comparison of the registered volume of a meter under test to the registered volume of a standard.
- K. **Random** – a statistical method of sampling that ensures that each member of a population has the same probability of being selected as any other member.
- L. **Set Year** – the calendar year during which a meter was installed for a customer.
- M. **Specification Limits** – limits that define the conformance boundaries for the registration accuracy of individual meters. These limits are plus or minus two percent ($\pm 2\%$) of one hundred percent (100%) accuracy.
- N. **Type** – the meter's temperature compensation (compensated or uncompensated).
- O. **Year of Purchase** – the calendar year in which a meter was purchased from a manufacturer.

- P. **Years in Service** - the number of years between the year a meter was set and the year it was removed.

3. PURPOSE

The purpose of the Aquila gas meter sample testing plan is:

- A. To determine the quality level of each meter lot by providing a reliable percentage estimate of the meters in each lot lying outside the specification limits for registration accuracy.
- B. To provide information relating to the performance of various meter lots when meter accuracy does not meet the specified quality level and thus provide the basis for repair and recalibration or planned retirement of those meters which are nonconforming.

4. GENERAL METER TESTING PROCEDURES

Meters are tested in accordance with the following:

- A. With the exception of those meters removed from service specifically for known leakage, damage, tampering, noise, or non-registration, and meters that have been selected for retirement, all meters removed from service shall be tested for in-test accuracy at both check flow and open flow prior to any adjustment or repair. The meter accuracy plus the check flow accuracy divided by two (2). This shall be referred to as the in-test accuracy. Those meters which have been removed from service specifically for known leakage or non-registration shall be monitored so that potential problems with certain meter types can be identified, even though the accuracy rate is acceptable.
- B. Meters shall be repaired as necessary and adjusted to within plus or minus one percent ($\pm 1\%$) of one hundred percent (100%) accuracy at the open and check flow rates before being returned to service.

Records shall be maintained for each lot of meters showing intest accuracy of each lot for each calendar year. This intest accuracy data shall be organized into three (3) accuracy categories as follows; (1) more than 2% above 100% accuracy (fast); (2) from 2% above to 2% below 100% accuracy; and (3) more than 2% below 100% accuracy (slow). The accuracy data shall be maintained by number of years in service and by total meters tested in a lot. When calculating the above accuracy categories, all fractions shall be rounded to the nearest whole number (0.5 and greater to be rounded up).

5. PERIODIC SAMPLING PROCEDURES

Meters shall be sample tested in accordance with the procedure described herein.

- A. Aquila will classify its meters into groups according to manufacturer, type and size. Groups are further stratified into lots by set year such that beginning in the 9th year after installation, each lot in every group will be sample tested annually.
- B. Sampling will be in accordance with standard sampling plans as set forth in recognized statistical quality control standards. The size of the sample will depend on the size of the lot it will represent. An additional percentage of the meters needed for the sample shall be selected on a random basis as substitutes for damaged, non-registering, inaccessible, or otherwise invalid meters in the sample. All meters in the sample will be tested for their accuracy of registration, where test results are rounded to the nearest whole number (0.5 and greater to be rounded up).
- C. The statistical method applied to the test data will ensure that not more than six and one half percent (6.5%) of the meters in a lot will deviate from one hundred percent (100%) accuracy of registration by more than plus or minus two percent ($\pm 2\%$).

Attributes Method

1. Sampling by attributes can be performed several ways, usually classified as “single-sampling,” “double-sampling,” or “multiple-sampling.” The plan selected for sampling meters in Missouri is the “double-sampling” technique.
 2. The in-test accuracy of registration of each meter in the sample is classified as either being within or beyond the 98% to 102% specification limits. The decision to accept or reject a lot is then based upon the number of meters in the sample with accuracies beyond the limits. The total number of non-conforming meters is compared with the acceptance and rejection numbers. For those meter lots which have either a very high quality level or a very low quality level, the original sample will be sufficient to provide a decision. The second sample need only be drawn in those instances where the percentage of non-conforming units is within the range between the acceptance and rejection criteria.
- D. If a lot fails, Aquila will remove all meters in that lot over a period not exceed 4 years and it will replace or repair and recalibrate the meters before they can be reused. However, within a lot of meters, if a particular sub-lot can be identified from evaluation of test results which indicates an untimely performance degradation due to possible manufacturer’s defect and is clearly not a condition brought on by age as compared to other members of the lot, the following action will be taken:
1. The particular sub-lot will be further sampled as appropriate to verify above indications.
 2. If confirmed, an accelerated removal program of this particular sub-lot will be implemented.
 3. In this instance the sub-lot is not indicative of the overall meter lot so the in-test accuracy data will be excluded from the analysis.

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- E. All other diaphragm meters, turbine meters, and rotary meters are excluded from sample testing and will be removed, inspected, and tested at least once every one hundred twenty (120) months to ensure proper operation.
- F. For each lot, the maximum permissible sampling period will be listed to thirty (30) years.