

Agro One Soils Laboratory
Quality Control and Quality Assurance Program

December 15, 2014

1. QC/QA References

The Agro One Soils Laboratory presently follows QC/QA guidelines set forth in the Soil Science Society of America Soils Lab Manual that is distributed through the North American Proficiency Testing (NAPT) program and/or Recommended Soil Testing Procedures for the Northeastern United States, 2nd Edition.

2. QC/QA Procedures and Data Analysis

The set or batch size is forty samples that includes thirty-five unknown samples, two reference soils, two duplicate unknown samples and one method blank. The two reference soils are either well-characterized in-house samples collected by Agro-One or soils from past NAPT quarterly sample exchanges and are usually one high and one low pH. The duplicate samples are chosen at random within the set. Where applicable, method blank concentrations are subtracted from the sample results.

The reference and duplicate samples are charted for precision (r-chart) and accuracy (x-chart) with statistics for mean and standard deviation calculated for each analyte. Upper and lower warning and control limits are set at ± 2 std. dev. for the warning limits and ± 3 std. dev. for the control limits. The charts are updated with each run and examined for trends that could indicate problems with the analysis. If such trends are noticed corrective measures are taken.

3. External Check Sample Programs

The lab is a participant in the NAPT soils program (www.naptprogram.org) providing a quarterly exchange of five soil samples from various regions of the continent and the ALP soils program (www.collaborativetesting.com), a three times per year exchange of five soil samples. Samples are treated as regular unknowns submitted to the lab and run for all analytes. Results are then submitted to the program for statistical evaluation and comparison to other participating labs. Our performance in these exchanges has been excellent and compares very favorably to other participating labs performing the same analyses.

4. Instrument Run-Time QC

When samples are analyzed for extractable elements, the instrument is calibrated before each run and a check standard is analyzed every 10 samples. If any analyte in the check is more than $\pm 10\%$ from the theoretical value the instrument is re-standardized and the previous 10 samples are re-analyzed.

All of our instrumentation is well maintained, all labware is cleaned thoroughly prior to each use, and all personnel are properly trained.