AQS Data Handling

(Under the hood)

Topics

- Regulatory Requirements
- Overall data handling
- Standard Value Calculation
- Allowed and disallowed qualifiers
- Summary statistics – pollutant standards and exceptional data types
- Collection frequency
- Data completeness

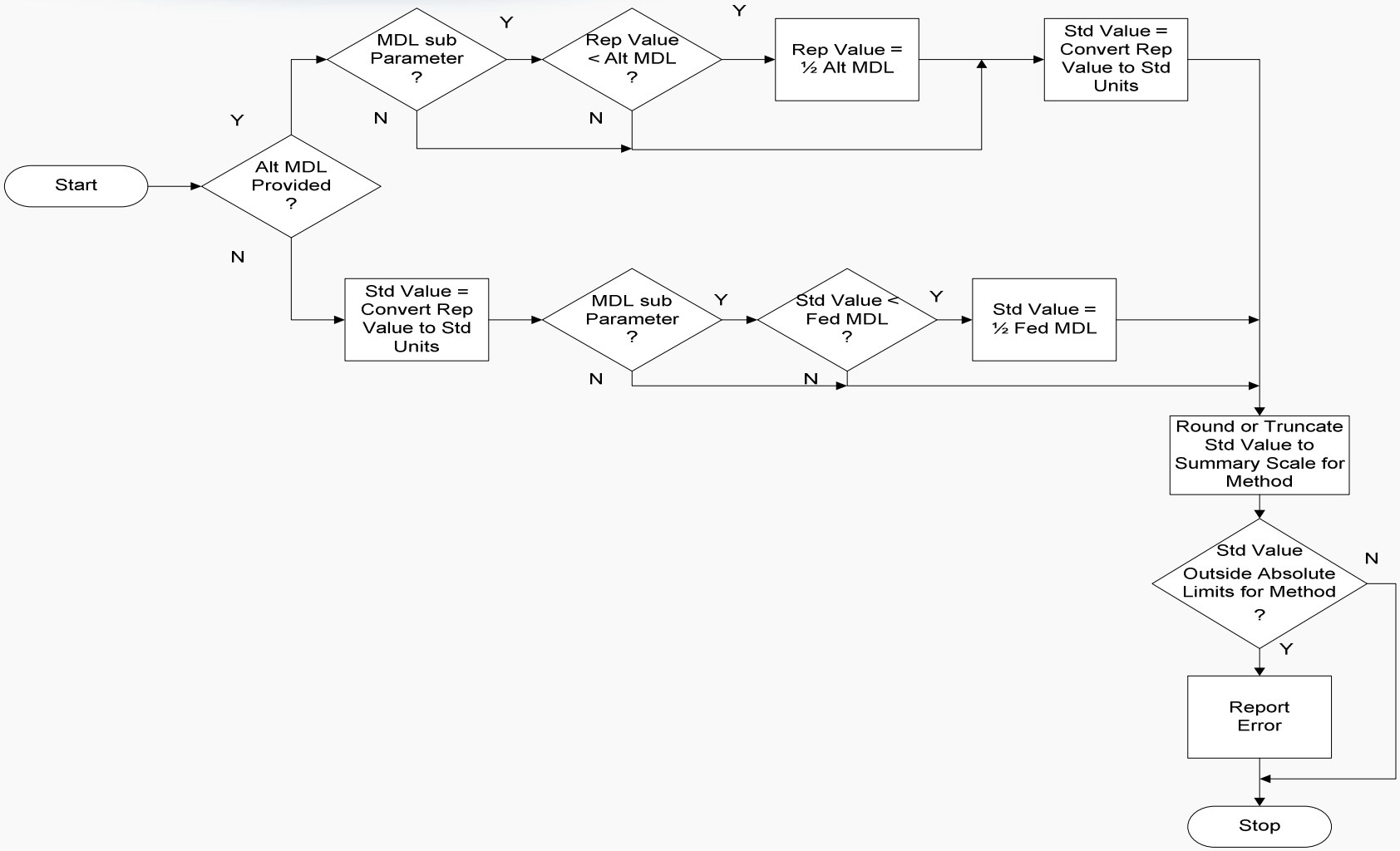
Regulatory Requirements

- The data handling requirements for most criteria pollutants are specified in 40 CFR Part 50 in one of the appendices.
  - PM 10: Appendix K
  - PM 2.5: Appendix N
  - Ozone: Appendix P
  - Lead: Appendix R
  - NO2: Appendix S
  - SO2: Appendix T

Typical Data Handling

- A Raw Data values is received in “Reported Units”
- A value in “Standard Units” is calculated
- Multi-hour averages are calculated (e.g. 8-hour ozone)
- Daily averages are calculated for Monitor
- Quarterly averages are calculated for Monitor
- Annual averages are calculated for the Monitor
- Daily averages are calculated for the Site
- Lead: Monthly and rolling 3-month averages are calculated for the Site.
- Quarterly averages are calculated for the Site
- Annual averages are calculated for the Site
- 3-Year averages (Design Values) are calculated for the Site or Monitor

Standard Value Calculation



½ MDL Substitution

- The default behavior for AQS is to perform ½ MDL substitution
- As of this writing, there are 287 parameters where ½ MDL substitution does **not** occur. They are listed at http://www.epa.gov/ttn/airs/airsaqs/manuals/codedescs.htm under the name parameters_nomdlsub.xls.
- If an alternate MDL is provided on the RD transaction, it is used instead of the Federal MDL for the Methodology
- The AQS Team has been directed to reverse the present configuration, so that no ½ MDL substitution is the default.

Acceptance / Rejection Rules for Raw Data

- Site-Monitor configuration:
  - Monitor exists and is active, and monitor ownership/access-control
  - Raw Data method active for Monitor
- Valid protocol: Combination of parameter, method, unit, and duration.
- No duplicates in time frame of duration
- Value between absolute min and absolute max for method

Qualifiers

- The EPA Ambient Air Monitoring Group has determined that certain qualifiers are not valid for specific regulatory parameters. The list of these is posted at:

  http://www.epa.gov/ttn/airs/airsaqs/manuals/codedescs.htm

Summaries and Pollutant Standards

- Each criteria pollutant has a set of NAAQS standards:
  - Lead: 3-Month Rolling Average
  - CO: 8-Hour Standard, and 1-Hour Standard
  - SO2: 1-Hour Standard, Annual Standard, 24-Hour Standard, Secondary 3-Hour Standard,
  - PM 10: 24-Hour Standard
  - PM 2.5: 24-hour Standard, Annual Standard (for both 2006 and 2013)
  - NO2: 1-Hour Standard, Annual Standard
  - Ozone: 8-Hour 2008, 8-Hour 1997, 1-Hour Standard
- For each standard, separate summary records are computed at each time period (daily, annual, etc.)
  - Caveat: Only summaries that “make sense” are computed.

Exceptional Data Types

- 40 CFR Part 50 Section 14 specifies the treatment of data affected by “Exceptional Events”
- AQS utilizes an Exceptional Data Type on each summary to indicate which exceptional event flagged data is included in the summary:
  - 1 – All exceptional event flagged values are excluded.
  - 2 – No values are excluded
  - 5 – EPA concurred exceptional event flagged values are excluded.
- Note: Previously, AQS utilized the value ‘0’ to indicate that there were not flagged values in the time period; this has been eliminated for site-summaries and is planned for elimination for monitor summaries in the future.

Collection Frequency

- Collection frequency shows up in two places in AQS – At the Monitor level as “Required Collection Frequency”, and for Raw Data as the “Collection Frequency Code” on the RD transaction.
- The “Collection Frequency Code” from the RD transaction is deprecated; it has never been used for any processing in AQS. Earlier this year, a warning was added whenever it is used.
- All completeness calculations, for other than hourly data, are controlled by the Monitor Required Collection Frequency.

Data Completeness

- The term, “data completeness”, has two meanings in AQS:
  - Monitoring Completeness: How complete is the monitoring process during the time that a monitor is operating.
  - Regulatory Completeness: For each year, how complete is the monitoring.
- Monitoring completeness is shown on AMP430 and AMP600.
- Regulatory completeness is shown on AMP450 and AMP480

NAAQS Exclusion

- AQS uses the NAAQS Exclusion to indicate that data for a monitor and time period is not appropriate for comparison to the NAAQS. (This includes SPMs operating less than 2 years and other reasons for exclusion.)
- AQS utilizes this metadata for design value calculations for parameters that are combined at the site level (PM 2.5, Lead, and NO2).
- For all other criteria pollutants, the exclusion is manually applied outside of AQS to the design value calculations. (For example: If you apply a 6-month exclusion to an Ozone monitor in AQS, the AQS design value will be unaffected, but the “official” design value will reflect the exclusion.)