



COLORADO
Department of Public
Health & Environment

Air Pollution Control Division Technical Services Program

APPENDIX D5

Standard Operating Procedure for Generating QA Data Strings for AQS

AQS QA Transaction Coding Format for APCD Network Criteria Pollutant Quality Assurance Checks

For every valid QC check and every valid performance evaluation that is performed, a QA transaction must be loaded to the National EPA AQS database summarizing the event. This document is to provide additional clarification on what these data submissions should look like, and how the data “strings” are put together for submission to AQS.

1-Point Quality Control (QC)

Format: (bar delimited with no extra spaces)

QA|I|1-Point QC|0240|08|###|####|#####|#|YYMMDD|1|###|00#|monitor|assessment

Where:

- 1) All QA transactions start with 2 letters “QA”
- 2) 1 letter: “I” for inserting a record, “D” for deleting a record, or “U” for updating a record, generally an “I” will be used, unless data that already exists in AQS is being removed or modified.
- 3) “1-Point QC”, written exactly this way with Capitals and spaces
- 4) 4 digits for organization performing the 1-point QC ...CDPHE organization code is “0240”
- 5) 2 digits for state code...Colorado code is “08”
- 6) 3 digits for county code
- 7) 4 digits for site code
- 8) 5 digits for parameter code
 - a. 42101 for CO
 - b. 44201 for O₃
 - c. 42401 for SO₂
 - d. 42602 for NO₂
 - e. 42601 for NO
 - f. 42603 for NO_x
 - g. 42600 for NO_y
 - h. 42612 for NO_y-NO
- 9) 1 or 2 digits for POC number [check with Gaseous and Meteorology Monitoring (GMM) unit for analyzer specific POC #s]
- 10) 8 digits for date assessment was performed
- 11) Value should always be “1” unless additional QC checks of the same analyzer on the same date are performed. This is the Assessment Number field (e.g. if three assessments were performed on same analyzer on same day codes for the three assessments would be “1”, “2”, and “3” respectively.)
- 12) 3 digits for monitoring method code
 - a. 054 for TECO CO

- b. 554 for TECO trace CO
 - c. 087 for TAPI O₃
 - d. 100 for TAPI SO₂
 - e. 600 for TAPI trace SO₂
 - f. 212 for TAPI NO₂ CAPS
 - g. 200 for TAPI NO₂ Photolytic
 - h. 099 for TAPI NO_x
 - i. 599 for TAPI trace NO_x
 - j. 699 for TAPI NO_y
 - k. (see gaseous group for any additional method codes, or to verify current Oxides of Nitrogen method codes)
- 13) 3 digits for Units code "007" for ppm (CO and O₃) or "008" for ppb (SO₂ and Oxides of Nitrogen)
- 14) Numeric value for Monitor (indicated) concentration
- 15) Numeric value for QC Assessment (actual, based on tank and dilutions or ozone transfer standard) concentration. For those used to the older RA & RP transactions, PLEASE BE AWARE that this order has been reversed.

Annual Performance Evaluation (PE)

Format: (bar delimited with no extra spaces)

QA||Annual PE|0240|08|###|####|#####|#|YYMMDD|1|###|00#|L1M|L1A|L2M|L2A|L3M|L3A|L4M|L4A|L5M|L5A|L6M|L6A|L7M|L7A|L8M|L8A|L9M|L9A|L10M|L10A

Where:

- 1) All QA transactions start with 2 letters "QA"
- 2) 1 letter: "I" for inserting a record, "D" for deleting a record, or "U" for updating a record, generally an "I" will be used, unless data that already exists in AQS is being removed or modified.
- 3) "Annual PE", written exactly this way with Capitals and spaces
- 4) 4 digits for organization performing the Performance Evaluation ...CDPHE organization code is "0240"
- 5) 2 digits for state code...Colorado code is "08"
- 6) 3 digits for county code
- 7) 4 digits for site code
- 8) 5 digits for parameter code
 - a. 42101 for CO
 - b. 44201 for O₃
 - c. 42401 for SO₂
 - d. 42602 for NO₂
 - e. 42601 for NO
 - f. 42603 for NO_x

- g. 42600 for NO_y
 - h. 42612 for NO_y-NO
- 9) 1 or 2 digits for POC number (check with GMM unit for analyzer specific POC #s)
- 10) 8 digits for date assessment was performed
- 11) Value should always be “1” unless additional audits of the same analyzer on the same date are performed. This is the Assessment Number field (e.g. if three assessments were performed on same analyzer on same day codes for the three assessments would be “1”, “2”, and “3” respectively.)
- 12) 3 digits for monitoring method code
- a. 054 for TECO CO
 - b. 554 for TECO trace CO
 - c. 087 for TAPI O₃
 - d. 100 for TAPI SO₂
 - e. 600 for TAPI trace SO₂
 - f. 212 for TAPI NO₂ CAPS
 - g. 200 for TAPI NO₂ Photolytic
 - h. 099 for TAPI NO_x
 - i. 599 for TAPI trace NO_x
 - j. 699 for TAPI NO_y
 - k. (see gaseous group for any additional method codes, or to verify current Oxides of Nitrogen method codes)
- 13) 3 digits for Units code “007” for ppm (CO and O₃) or “008” for ppb (SO₂ and NO₂)
- NOTE: for the next 20 steps LEVELS 1-10 correspond to the EPA's expanded audit levels Tiered concentration ranges. The audit values must be placed in the correct concentration “bins”, and both the assessment value and the monitor value should fall within the same “bin”. The Monitor value is the concentration indicated by the analyzer being audited. The Assessment value is the known or actual value established by the auditor’s transfer standard equipment and/or EPA Protocol tanks. Click on hyperlink above to see levels. For those used to the older RA & RP transactions, PLEASE BE AWARE that this order has been reversed. The bin concentration range matching is not currently required for NO, NO_x, NO_y and NO_y-NO because they are not criteria pollutants.**
- 14) Numeric value for LEVEL 1 Monitor (indicated) concentration
- 15) Numeric value for LEVEL 1 Assessment (actual) concentration.
- 16) Numeric value for LEVEL 2 Monitor (indicated) concentration
- 17) Numeric value for LEVEL 2 Assessment (actual) concentration.
- 18) Numeric value for LEVEL 3 Monitor (indicated) concentration
- 19) Numeric value for LEVEL 3 Assessment (actual) concentration.
- 20) Numeric value for LEVEL 4 Monitor (indicated) concentration
- 21) Numeric value for LEVEL 4 Assessment (actual) concentration.
- 22) Numeric value for LEVEL 5 Monitor (indicated) concentration
- 23) Numeric value for LEVEL 5 Assessment (actual) concentration.
- 24) Numeric value for LEVEL 6 Monitor (indicated) concentration

- 25) Numeric value for LEVEL 6 Assessment (actual) concentration.
- 26) Numeric value for LEVEL 7 Monitor (indicated) concentration
- 27) Numeric value for LEVEL 7 Assessment (actual) concentration.
- 28) Numeric value for LEVEL 8 Monitor (indicated) concentration
- 29) Numeric value for LEVEL 8 Assessment (actual) concentration.
- 30) Numeric value for LEVEL 9 Monitor (indicated) concentration
- 31) Numeric value for LEVEL 9 Assessment (actual) concentration.
- 32) Numeric value for LEVEL 10 Monitor (indicated) concentration
- 33) Numeric value for LEVEL 10 Assessment (actual) concentration.

NOTE: a minimum of three concentrations is required, at least two of which should be within the ranges that 80% of the ambient concentrations for that site fall, and at least one point should be near the NAAQS value or the highest value seen annually, whichever is higher.

Flow Rate Verification

Format: (bar delimited with no extra spaces)

QA|I|Flow Rate Verification|0240|08|###|####|#####|#|YYMMDD|1|###|###|monitor|assessment

Where:

- 1) All QA transactions start with 2 letters "QA"
- 2) 1 letter: "I" for inserting a record, "D" for deleting a record, or "U" for updating a record, generally an "I" will be used, unless data that already exists in AQS is being removed or modified.
- 3) "Flow Rate Verification", written exactly this way with Capitals and spaces
- 4) 4 digits for organization performing the flow rate verification ...CDPHE organization code is "0240"
- 5) 2 digits for state code...Colorado code is "08"
- 6) 3 digits for county code
- 7) 4 digits for site code
- 8) 5 digits for parameter code
 - a. 81102 for ALL (filter based and continuous except GRIMM) PM₁₀
 - b. 88101 for Low Volume Filter Based PM_{2.5} (FRM)
 - c. 88500 for PM_{2.5} TEOM (FDMS and 1405 only) (not FEM)
 - d. 88501 for PM_{2.5} TEOM (NOT FDMS OR 1405) (not FEM)
 - e. 86502 for coarse (PM_{10-2.5}) (1405)
 - f. 85101 for GRIMM PM₁₀
- 9) 1 or 2 digits for POC number [check with Particulate Monitoring (PM) unit for sampler specific POC #s]
- 10) 8 digits for date assessment was performed

- 11) Value should always be “1” for filter based monitoring unless additional verifications of the same analyzer on the same date are performed. This is the Assessment Number field (e.g. if three assessments were performed on same analyzer on same day codes for the three assessments would be “1”, “2”, and “3” respectively.) For continuous analyzer, since two or three flow assessments are often made this will require total flow, main flow, and coarse flow (on 1405s) to be entered as separate audits each with its own assessment number...1,2,3,etc.
- 12) 3 digits for monitoring method code
- a. 063 for High Volume Filter based PM₁₀
 - b. 126 for Low Volume Filter Based R&P 20000 PM₁₀
 - c. 127 for Low Volume Filter Based R&P 2025 PM₁₀
 - d. 143 for Low Volume Filter Based R&P 2000 PM_{2.5}
 - e. 145 for Low Volume Filter Based R&P 2025 PM_{2.5}
 - f. 195 for GRIMM
 - g. 715 for TEOM PM_{2.5} (NOT FDMS or 1405)
 - h. 761 for TEOM w/ FDMS
 - i. 079 for PM₁₀ TEOM
 - j. 790 for 1405
 - k. (see particulate group for other continuous method codes)
- 13) 3 digits for Units code “118” for Lpm (low volume filter based and all continuous particulate) or “083” for m³/min (High Volume PM₁₀ only)
- 14) Numeric value for Monitor (indicated) flow
- 15) Numeric value for QC Assessment (actual, based on tank and dilutions or ozone transfer standard) flow. For those used to the older RA & RP transactions, PLEASE BE AWARE that this order has been reversed.

Semi-Annual Flow Rate Audit

Format: (bar delimited with no extra spaces)

QA|I|Semi-Annual Flow Rate Audit|0240|08|###|####|#####|#|YYMMDD|1|###|00#|
monitor|assessment

Where:

- 1) All QA transactions start with 2 letters “QA”
- 2) 1 letter: “I” for inserting a record, “D” for deleting a record, or “U” for updating a record, generally an “I” will be used, unless data that already exists in AQS is being removed or modified.
- 3) “Semi-Annual Flow Rate Audit”, written exactly this way with Capitals and spaces
- 4) 4 digits for organization performing the flow rate verification ...CDPHE organization code is “0240”

- 5) 2 digits for state code...Colorado code is "08"
- 6) 3 digits for county code
- 7) 4 digits for site code
- 8) 5 digits for parameter code
 - a. 81102 for ALL PM₁₀ (filter based and continuous except GRIMM)
 - b. 88101 for Low Volume Filter Based PM_{2.5} (FRM)
 - c. 88500 for PM_{2.5} TEOM (FDMS and 1405 only) (not FEM)
 - d. 88501 for PM_{2.5} TEOM (NOT FDMS OR 1405) (not FEM)
 - e. 86502 for coarse (PM_{10-2.5}) (1405)
 - f. 85101 for GRIMM PM₁₀
- 9) 1 or 2 digits for POC number (check with PM unit for sampler specific POC #s)
- 10) 8 digits for date assessment was performed
- 11) Value should always be "1" for low volume filter based monitoring unless additional verifications of the same analyzer on the same date are performed. This is the Assessment Number field (e.g. if three assessments were performed on same analyzer on same day codes for the three assessments would be "1", "2", and "3" respectively.) For continuous analyzer, since two or three flow assessments are often made this will require total flow, main flow, and coarse flow (on 1405s) to be entered as separate audits each with its own assessment number...1,2,3,etc. For high volume samplers numbers 1-4 will be used to designate the sampler number (therefore if additional audits performed on the sampler on the same day, those audits will have to be given different date)
- 12) 3 digits for monitoring method code
 - a. 063 for High Volume Filter based PM₁₀
 - b. 126 for Low Volume Filter Based R&P 20000 PM₁₀
 - c. 127 for Low Volume Filter Based R&P 2025 PM₁₀
 - d. 143 for Low Volume Filter Based R&P 2000 PM_{2.5}
 - e. 145 for Low Volume Filter Based R&P 2025 PM_{2.5}
 - f. 195 for GRIMM
 - g. 715 for TEOM PM_{2.5} (NOT FDMS or 1405)
 - h. 761 for TEOM w/ FDMS
 - i. 079 for PM₁₀ TEOM
 - j. 790 for 1405
 - k. (see particulate group for other continuous method codes)
- 13) 3 digits for Units code "118" for Lpm (low volume filter based and all continuous particulate) or "083" for m³/min (High Volume PM₁₀ only)
- 14) Numeric value for Monitor (indicated) flow
- 15) Numeric value for QC Assessment (actual, based on tank and dilutions or ozone transfer standard) flow. For those used to the older RA & RP transactions, PLEASE BE AWARE that this order has been reversed.

Pb Analysis Audit

Format: (bar delimited with no extra spaces)

QA|I|Pb Analysis Audit|####|0240|#####|YYMMDD|#|077|Level 1 lab value|Level 1 true value|Level 2 lab value|Level 2 true value

Where:

- 1) All QA transactions start with 2 letters "QA"
- 2) 1 letter: "I" for inserting a record, "D" for deleting a record, or "U" for updating a record, generally an "I" will be used, unless data that already exists in AQS is being removed or modified.
- 3) "Pb Analysis Audit", written exactly this way with Capitals and spaces
- 4) 4 digits for the agency performing the analysis...Chester LABNet agency code is "1334"
- 5) 4 digits for the PQA0 ...CDPHE organization code is "0240"
- 6) 5 digits for parameter code
 - a. 14129 for High Volume TSP quartz filters
 - b. 85129 for Low Volume PM₁₀ Teflon filters
- 7) 8 digits for date assessment was performed
- 8) These PB laboratory analyses are run in triplicate for two different concentrations. Three assessments will be reported as assessment numbers "1", "2", and "3".
- 9) 3 digits for Units code "077" for micrograms
- 10) Numeric value for indicated Low level concentration Lab result
- 11) Numeric value for true Low level concentration of strip
- 12) Numeric value for indicated High level concentration Lab result
- 13) Numeric value for true High level concentration of strip

For additional coding information on PM_{10-2.5}, NATTS, or laboratory activities, please refer to the [AQS Data Coding Manual](#), Version 3.1 March 14, 2014 or to the TTN AQS Codes and Descriptions website <https://www3.epa.gov/ttnairs1/airsaqsORIG/manuals/codedescs.htm>. If you need to see what a QA transaction should look like you can download the [AQS QA transaction generator tool](#). This tool will allow you to enter audit or QC information about a single transaction, and will generate the string for you, which is helpful if you need to see exactly what a final string needs to look like (spacing, # of digits, fields, etc).