



United States
Environmental
Protection
Agency

Office of Air Quality Planning and Standards
Outreach and Information Division
National Air Data Group
Research Triangle Park, NC 27711

AQS Data Coding Manual

Version 3.8

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Note to our users:

This version of the Data Coding Manual removes the references to UTM because we have permission to no longer use or collect UTM data.

If you have suggestions or see corrections that should be made, please let us know. Thank you for your cooperation, and your work to protect our Nation's air quality.

The National Air Data Group, OAQPS, USEPA

AQS DATA CODING MANUAL

Version 3.8
January 5, 2021

Prepared for

**U.S. ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF AIR QUALITY PLANNING AND STANDARDS
OUTREACH AND INFORMATION DIVISION
NATIONAL AIR DATA GROUP
RESEARCH TRIANGLE PARK, NC 27711**

Prepared by

LOCKHEED MARTIN 
**2605 Meridian Parkway, Suite 100
Durham, North Carolina 27713**

And

**U.S. ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF AIR QUALITY PLANNING AND STANDARDS
OUTREACH AND INFORMATION DIVISION
NATIONAL AIR DATA GROUP**

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1 Introduction

1.1 AQS Documentation

This is the AQS Data Coding Manual, part of the Documentation set for the Air Quality System (AQS):

[AQS Data Dictionary](#)

[AQS Data Input Formats \(Summary\)](#)

[AQS Data Coding Manual](#)

[AQS User's Guide](#)

[AQS Data Reports and Retrieval Manual](#)

The [AQS Data Dictionary](#) presents detailed information about data in the database. Terms, concepts and logical groupings of data (“views”) are documented, to help with effective use of the data. Field attributes and definitions, and calculation algorithms, are provided as appropriate. The [AQS Data Dictionary](#) also provides information on transformed, derived or calculated information presented to the user that does not directly reflect data in the form that it is stored in the database.

[AQS Data Input Formats](#) is a small summary document showing the basic requirements for data input. It is intended as a quick reference guide. Detailed information on the various data input formats is contained in the [AQS Data Coding Manual](#).

The [AQS Data Coding Manual](#) (this document) includes the information a user needs to know to create transactions for loading data into the database. Information in the manual is presented on a transaction by transaction basis. Business rules used by the AQS edit software, as well as the accompanying error messages, are laid out to help build error free transactions, or troubleshoot failed transactions.

The [AQS User's Guide](#) includes information about accessing the system via a web browser, using the on-line interface, and entering data using the on-line data entry screens (Maintenance screens). The process for “loading” the transactions described in [AQS Data Coding Manual](#) is explained, including the “critical review” process and “posting” the data to the database.

The [AQS Data Retrieval Manual](#) includes information about using the standard report generation software. Information includes the type of reports, the selections available for each report, the data included on the reports, and the on-line report interface. Information about available work file outputs is also included.

1.2 About This Book

This volume, the [AQS Data Coding Manual](#), explains the data coding and loading rules for the Air Quality System (AQS). This includes the description of the formats, requirements and business rules of various transactions used to create, update, or delete data in the Air Quality

System. It is intended for those individuals who are responsible for maintaining the air quality data for their organizations.

This introductory section provides a brief overview of the Air Quality System with a discussion of the structure of the AQS data.

The remainder of this Coding Manual is organized as follows:

- Section 2 - Overview of Data Coding and Validation
- Section 3 - Common Fields that appear in all transactions
- Section 4 - Site Transactions (AA, AB, AC)
- Section 5 - Monitor Transactions (MA, MB, MC, MD, ME, MF, MG, MH, MI, MJ, MK)
- Section 6 - Raw Data Transactions (RC, RD)
- Section 7 – Quality Assurance (Precision and Accuracy) Transactions (QA, RA, RP)
- Section 8 - Annual Summary Data (RS)
- Section 9 - Blanks Data (RB)

Note: For a description of the AQS data structure, field definitions and formulae for calculated fields, see the [AQS Data Dictionary](#).

1.3 About AQS

The Air Quality System (AQS) is a computer-based information management system for handling the storage and retrieval of information pertaining to ambient outdoor airborne pollutants and related meteorological data. The AQS database uses Oracle database software; access to the database is provided via web browsers (i.e. Internet Explorer). AQS is administered by the U.S. Environmental Protection Agency (USEPA), Office of Air Quality Planning and Standards (OAQPS) in Research Triangle Park, North Carolina.

The collection and maintenance of air quality data is required to establish and enforce the standards set by the following Federal Acts and Amendments:

1955: Air Pollution Control Act

“An Act to provide research and technical assistance relating to air pollution control“
Reserved for Congress the right to control pollution.

1963: Clean Air Act

Emissions standards for stationary sources
Compliance deadlines for States

1965: Motor Vehicle Air Pollution Control Act

Emissions standards for vehicles

1967: Air Quality Act

Created Air Quality Control Regions (AQCR)
Timetables for State Implementation Plans (SIP)

1970: Amendments to the Clean Air Act

National Ambient Air Quality Standards (NAAQS)
New Source Performance Standards(NSPS)
New motor vehicle standards and compliance timetable

1990: Amendments to the Clean Air Act

Modification of standards and timetables

The monitoring data in AQS are the result of the various Clean Air Act requirements to provide a national database of ambient air pollution data: Criteria pollutant (SO₂, NO₂, O₃, CO, PM₁₀, PM_{2.5} and Pb) data, air toxic data, photochemical assessment data, and meteorological data. Individual observations, as well as summarized data are provided. The database contains values from 1957 through the present day. AQS contains hundreds of millions of observations, coming from tens of thousands of monitors.

As regulations broaden to include more pollutants, the AQS system expands. For hazardous air pollutants (HAPS) the USEPA is currently gathering data and has proposed baselines for limiting emissions. There are currently over 1000 pollutants that AQS is prepared to track and additions are made as needed.

In addition to the ambient pollutant concentration data, AQS contains descriptive information about the location of the monitoring site (e.g., address, latitude/longitude, local site name, etc.) where the ambient data are collected as well as information about the types of monitors used to collect the ambient measurements. Quality assurance information is also contained in the AQS.

The air pollution monitoring data residing in the AQS database is submitted directly to the database by many different groups. The State, Tribal and Local air pollution agencies throughout the United States routinely submit monitoring data from the air monitors that they manage. Some Federal agencies, including USEPA and private companies also supply data directly. The data submitted by these various groups are “owned” by those groups... in other words only the agency responsible for a monitor at a site can maintain that monitor’s data. USEPA’s OAQPS maintains the administrative data in AQS (e.g. reference tables and codes, security tables, and overall software maintenance).

AQS data are not real time, because observation data are quality assured by the submitting agencies before loading into the database. Agencies generally have 3 months to collect, analyze, compute, and quality assure the values prior to loading the data into AQS. Each year, the monitoring agencies certify to USEPA that the criteria pollutant data values for that year are correctly stored in the database. This data serves as the basis for area designations (e.g. non-attainment designations), among many other uses. In addition to providing data for evaluating conformance to Federal regulations, data from the AQS is used to fulfill air quality information requests from the public.

Summary air quality data is available on AQS from 1957 onward. Detailed data reported from individual monitoring devices are available for the past decade. Older detail data are available as download files from the archive database. See the AQS website for these files

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2 Overview of Data Coding and Validation

The Air Quality System contains data from a variety of organizations, including state and local agencies, tribes, and federal organizations. It includes descriptions of air monitoring sites and monitoring equipment, measured concentrations of air pollutants and related parameters, and calculated summary and statistical information. This is called air quality (AQ) data throughout the rest of this volume.

Reporting agencies submit AQ data as formatted transactions by first uploading the transaction file(s) to EPA's Central Data Exchange (CDX). Files loaded to CDX are then available to AQS for the batch load process. (Note that online, interactive data entry via AQS Maintain forms is also available, in addition to using the batch process.) The user then employs AQS software to process the data through five steps of batch loading, starting with file loading to AQS and ending with posting the data to the database. Internet Explorer (a Web browser) is used to access both CDX and AQS applications.

2.1 AQS Transactions

Many types of transactions are used to provide data and control information for updating the AQS database. Detailed instructions for assembling individual transactions are presented in Chapters 3 through 8 in this book. For quick reference, the [AQS Transaction Formats](#) document is a summary of the pipe (“|”) delimited input formats and is available for downloading from the AQS website. Code tables of accepted standard values for all fields are also available from the web site. The AQS website address is:

www.epa.gov/TTN/airs/airsaqs

The remainder of the format instructions in this document refer to generating AQS transaction records in a text file. Instructions for generating XML instance documents containing this data are available from the AQS flow section of the Exchange Network website: <http://www.exchangenetwork.net/>. All of data assembly, processing, and “coding” rules are the same, only the final format of the submitted document differ between the transaction format and the XML format.

2.2 General Coding Instructions

AQS transaction formats make use of field delimiters, rather than column position, to determine which field is to be processed. The delimiter character is the vertical bar “|” also known as a “pipe” character. Transactions, therefore, always start with the two-character transaction type, followed by the delimiter character, followed by the one-character Action Indicator (I, U, or D), followed by the delimiter character, followed by the next field (state), etc. If non-key fields are to be ignored, then the delimiters are included directly following the last value supplied (no spaces). Missing delimiters at the end of the transaction record are treated as null fields, i.e. the missing delimiters are assumed to be there by the batch update software.

The legacy (mainframe) transaction formats are still supported for Raw Composite (RC), Raw Hourly, Daily and Sub-Hourly (RD), Raw Precision (RP), and Raw Accuracy (RA), with the exception of non-key field deletions using asterisks. The legacy transaction formats are column-specified and no delimiters are used. Legacy transaction formats are all fixed at 80 characters in length.

Four general types of values are used to code air quality transactions:

- Codes,
- Dates,
- Numeric data, and
- Alphanumeric data.

2.2.0 Codes

Codes must be entered on transactions exactly as they are stored in the AQS tables. For example, a County Code is three digits, and you must code all three digits of the code, including any leading zeros. The instructions for fields that take a code value include the term "code" in the list of field attributes. Smaller code set for fields are included in this document. The larger tables of code values are available from the TTN web pages. Code values are also available as drop-down lists at each field where they are used in the AQS Client software.

2.2.1 Dates

Dates are entered in YYYY, or YYYYMMDD format. YYYY is year, MM is month number, DD is day number. The instructions for fields that take a date value include the term "date" in the list of field attributes.

2.2.2 Time

Time is entered as HH:MM where HH is hour and MM is minute. Values less than 10 need a leading zero. The colon character (":") is normally required.

2.2.3 Numeric Values

The instructions for fields that take a numeric value include the term "numeric" in the list of field attributes. The convention for number of digits and decimal places in this manual is: total number of digits, followed by a comma, followed by the number of decimal places. For example, 10,5 is a ten-digit number including five decimal places (nnnnn.nnnnn).

2.2.4 Alphanumeric Values

The instructions for these fields include the term "character" in the list of field attributes. The length of allowable text is specified for each field. Many alphanumeric fields are validated against reference tables in AQS. For these fields, the values entered must match exactly the values on the appropriate reference tables.

2.2.5 Mandatory Fields

Certain fields are mandatory (required), and they must have a value on the transaction. Some fields are always mandatory; other fields are mandatory only under certain conditions. For example, Action Indicator is always mandatory; it must be coded on every transaction. The coding instructions in subsequent chapters identify fields as Mandatory or Optional, and specify the conditions when a value is mandatory on the transaction. Also, the batch transaction formats contain notes showing various dependencies and required fields.

2.2.6 Key Fields

Certain mandatory fields are also labeled as "Key" fields. These fields are used to uniquely identify specific data in the database. For example, for a Monitor Sampling Period, the Date Sampling Began is a key field. It, along with {state, county, site, parameter, and POC} uniquely identifies one row of data in the database. Key fields are always mandatory for all Action Indicators, and key fields cannot be modified by an update transaction.

2.2.7 Deletion of Non-Key Field Values Using Batch Transactions

The deletion of non-key field values (without deleting the entire record) is no longer supported in the batch transaction mode. The use of asterisks in field values to signify field deletion is no longer supported. The AQS client now has an online maintain function that will allow interactive deletion of a single field.

2.2.8 Transaction Dependencies and Data Completeness

More than one transaction type may be required to insert (add) new data to the database and make it available for public use. The transactions and activities required will vary according to the type of data being inserted. Sometimes the value set in one field may require related data in additional fields or require an additional transaction.

There are various checks performed within AQS to ensure that all required associated data is present before the information is accessible to those outside the group responsible for loading it.

Once data is complete, a system controlled data field called the Status Indicator is set to “P” to indicate that the information is at “public”, “posted” or “production” status.

Examples of transaction dependencies and data completeness requirements:

- In order for a site to be at “P” status it must have:
 - values in all required fields;
 - a Supporting Agency;
 - a monitor associated with it that is at “P” status.
- A monitor at “P” status must have:
 - at least one sampling start period;
 - at least one objective;
 - monitoring type assignments to cover all sampling periods;
 - PQA role assignments to cover all sampling periods since 1/1/2007;
 - for criteria pollutant monitors, reporting organization role assignments to cover all portions of sample periods up to 12/31/2006;
 - for PM10 and PM2.5 monitors, required collection frequency assignments to cover all portions of sample periods since 7/1/1987;
 - for monitors whose Unrestricted Air Flow Indicator value is ‘N’ or ‘W’, at least one probe obstruction;
 - raw, blanks, accuracy, and precision data falling within a sample period;
 - precision and accuracy data for dates up to 12/31/2006 falling within a reporting organization period.
 - for PM2.5, a primary monitor period defined for the site.
- Data values at “P” status must have been statistically evaluated and reviewed.

2.2.9 Validation

Many fields in the database have a limited set of accepted values. Limitations are imposed based on a number of factors such as data type, size, range or value set. These limitations are specified in this document for each field as described above. In cases that the validation is defined by a table of acceptable values, smaller tables are included in this document. Large sets (such as county lists) can be found on the AQS TTN page or viewed in the List of Values (LOV) button associated with that field in the Maintain or Correct forms in the AQS application.

Status indicators are used in many of the tables used for data validation. The status indicator is often used to distinguish between past and present accepted values. Values that are actively accepted for inputting data are set to “P” while values that are inactive (obsolete or deprecated) are set to “I” to allow for old data to be displayed or interpreted but rejected with new data. A common “I” status value is “UNKNOWN”. Reports of legacy data use this value when production status records are encountered with data missing from fields that currently require data. While “UNKNOWN” can be a reported value it is not accepted as valid for input.

You may encounter situations where the data you wish to load does not pass the AQS validation procedures. Usually, this is because of errors in the formation of the transaction; possibly typographical errors or missing required data, etc. If you find that the edits imposed by AQS are preventing you from submitting valid data, you should contact the AQS help desk at 1-866-411-

4372. We can add new codes to reference tables, and change the range of values allowed by the numeric edit checks in AQS.

3 Site Transactions (AA, AB, AC, AD, AE)

This set of five transactions is used to create or update Site information.

Type AA, Basic Site Information, performs data manipulation on the Sites and Agency Roles Tables, and contains site information in the following fields:

| | | |
|--------------------------------|------------------------|-----------------------------|
| Transaction Type | City Code | EPA Region Evaluation Date |
| Action Indicator | Urban Area Code | Direction from Central |
| State Code or Tribal Indicator | AQCR | Business District to Site |
| County Code or Tribal Code | Land Use Type | Distance from Central |
| Site ID | Location Setting | Business District to Site |
| Latitude | Date Site Established | Meteorological Site Type |
| Longitude | Date Site Terminated | Meteorological Site ID |
| Horizontal Collection | ZIP Code | Distance to Meteorological |
| Method | Congressional District | Site |
| Horizontal Datum | Block | Direction to Meteorological |
| Source Scale | Block Group | Site |
| Horizontal Accuracy | Census Tract | Local Site ID |
| Vertical Measure | Class I Area | Vertical Collection Method |
| Time Zone | Local Region | Vertical Datum |
| Agency Code | Local Site Name | Vertical Accuracy |
| Street Address | HQ Evaluation Date | |

Type AB, Site Street Information, performs data manipulation on the Tangent Roads Table, and contains site information in the following fields:

| | | |
|--------------------------------|-----------------------|-------------------------------|
| Transaction Type | Site ID | Traffic Count |
| Action Indicator | Tangent Street Number | Year of Traffic Count |
| State Code or Tribal Indicator | Street Name | Direction from Site to Street |
| County Code or Tribal Code | Road Type | Source of Traffic Count |

Type AC, Site Open Path Information, performs data manipulation on the Open Paths Table, and contains site information in the following fields

| | |
|--|-----------------------|
| Transaction Type | Beam Length |
| Action Indicator | Height of Transmitter |
| State Code or Tribal Indicator | Height of Receiver |
| County Code or Tribal Code | Minimum Beam Height |
| Site ID | Maximum Beam Height |
| Open Path Number | Land Use Under Path |
| Direction from Receiver to Transmitter | |

Type AD, Site Sampler information, contains the following information about samplers:

| | |
|--------------------------------|---------------|
| Transaction Type | Manufacturer |
| Action Indicator | Model Number |
| State Code or Tribal Indicator | Serial Number |
| County Code or Tribal Code | Channel Count |
| Site ID | Begin Date |
| Sampler ID | End Date |

Type AE, Sampler Channel information, contains the following information:

| | |
|--------------------------------|------------------|
| Transaction Type | Channel Number |
| Action Indicator | Filter Type |
| State Code or Tribal Indicator | Target Flow Rate |
| County Code or Tribal Code | Flow Units |
| Site ID | Begin Date |
| Sampler ID | End Date |

Insert transactions (i.e., transactions with Action Indicator I) are used to create new site-related data. When creating a new site, only one type AA is allowed and required, while multiple AB and AC transactions can be entered. Each AB transaction supplies information for one street near a site. Each AC transaction supplies information for one open path monitor at a site.

Update transactions (i.e., transactions with Action Indicator U) are used to change the contents of site-specific fields. Blank fields on an update transaction are ignored; they do not affect fields in the database. The values coded on an update transaction replace the values of the corresponding columns in the database. If no value existed previously, the value from the transaction is inserted into the corresponding column and row. Only non-key fields can be updated.

Delete transactions (i.e., transactions with Action Indicator D) are used to remove site-related information. Note: A site may not be deleted if any raw or blanks data has been loaded for any monitor at the site.

Legacy transactions (80 character card-image) are not supported for site data.

3.0 Site Information - Data Completeness

In addition to supplying data in all required fields as described below, a site must have a monitor assigned to it before it is set, by AQS, to “P” status. A site without a monitor or with an incomplete monitor will be set to “F” status.

Business Rules:

1. A site at P status must have a monitor assigned at P status.

Warning Message:

- 20270 To enter a new Site record, you must enter a least one Monitor record.
2. A site at P status must have a Supporting Agency.

Warning Message:

- 20271 To enter a new Site record, you must enter a Supporting Agency Role record.

3.1 Basic Site Information - Transaction Type AA

The state, county, and site fields are always validated, as described in Section 3 above; other fields will be validated if supplied for Update transactions, but not for Delete transactions.

3.1.0 Transaction Type

Description: Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

Attributes: Alphanumeric
2-character code
Mandatory

Coding Instructions: Place AA in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory

Error Messages:

- Invalid transaction format.

2. Transaction Type must be in TRANSACTION_TYPES table in database.

Error Messages:

- Transaction type not handled.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.1.1 Action Indicator

Description: Indicates the data manipulation action to be performed by the transaction.

Attributes: Alphanumeric
1-character code

Mandatory

Coding Instructions: Place the values I, U, or D in the second delimited field.

- I Insert a new row into the appropriate table in the database.
- U Change one or more column values for an existing row in one or more tables.
- D Delete a row from a table(s) for the row containing the key data.

Business Rules

Common Rules

1. Action Indicator is required.
Error Messages:
 - Invalid Action Indicator.
2. Action Indicator must be either 'I', 'U', or 'D'.
Error Messages:
 - Invalid Action Indicator.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.1.2 State Code or Tribal Indicator

The third field on a transaction can be either a State Code or a Tribal indicator. They are described as follows:

State Code Description: A FIPS (Federal Information Processing Standards) code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Tribal Indicator Description: A flag, with value "TT", to indicate that this data is for a Native American Tribe, and that the next field on the transaction identifies a tribal area using the Bureau of Indian Affairs tribal code.

Attributes: Alphanumeric
 2-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid FIPS state code or a Tribal Indicator in delimited field 3. A State Code is valid if it exists in the STATES Table.

Business Rules

Common Rules:

1. State Code is mandatory.

Error Messages:

- State Code is required.

Insert Rules:

1. State Code must be in STATES table.

Error Messages:

- Invalid State Code

2. State Code must be at production status.

Error Messages:

- Inactive State Code

3. Site with same State Code, County Code and Site ID already exists in database.

Error Messages:

- Attempt to insert Site with State, County, Site that duplicates one already in database.

Update or Delete Rules::

1. (State Code, County Code, Site ID) must be in the SITES table.

Error Messages:

- Unable to update or delete site.

3.1.3 County Code or Tribal Code

The fourth field on any transaction can be either a County Code or a Tribal Code. A County code is indicated by a valid state code in the third field, while a Tribal Code is indicated by a Tribal Indicator in the third field.

County Code Description: A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

Tribal Code Description: A value that identifies a Tribal Area using a Bureau of Indian Affairs Tribal Code.

Attributes: Alphanumeric
3-digit code
Mandatory
Key Field

Coding Instructions: Place a valid county code or a valid tribal code in the fourth delimited field. A County Code is valid if it exists at active status in the Counties table. A Tribal Code is valid if it exists at active status in the Tribal_Areas table.

County Code Business Rules

Common Rules:

1. County Code is required.
Error Messages:
 - County Code is required.

Insert Rules:

1. (State Code, County Code) must be in COUNTIES table.
Error Messages:
 - Invalid County Code
2. (State Code, County Code) must be at production status.
Error Messages:
 - Inactive County Code.
3. Site with same State Code, County Code and Site ID already exists in database.
Error Messages:
 - Attempt to insert Site with State, County, Site that duplicates one already in database.

Update or Delete Rules:

1. (State Code, County Code, Site ID) must be in the SITES table.
Error Messages:
 - Unable to update or delete site.

Tribal Code Business Rules

Common Rules:

1. Tribal Code is required.
Error Messages:
 - Tribal Code is required.

Insert Rules:

1. Tribal Code must be in TRIBAL_AREAS table.
Error Messages:
 - Tribal Code does not exist in the Tribal Areas table.
2. Tribal Code must be at production status.
Error Messages:
 - Tribal Code is not at Production Status.
3. Site with same Tribal Code and Site ID already exists in database.
Error Messages:
 - Duplicate of site with same {Tribal_Code, Site_ID}
4. Site with Latitude and Longitude of same State Code, County Code and Site ID already exists in database.
Error Messages:

- Attempt to insert Site with State, County, Site that duplicates one already in database.

Update or Delete Rules:

1. (Tribal Code, Site ID) must be in the SITES table.

Error Messages:

- Unable to update or delete site.

3.1.4 Site ID

Description:

A numeric identifier (ID) that uniquely identifies each air monitoring site within a county or tribal area. There is no requirement that Site IDs be assigned continuously or in any particular order. Regional and Local organizations are thus free to allocate site numbers in any way they chose as long as there is no duplication within a county and tribal area. For Tribal sites, because tribal areas may cross county or state lines, care must be taken to ensure that the Site ID is unique in the effected Tribal Area and states-county.

A specific Site ID is associated with a specific physical location and address. Any change in address requires a new Site ID to be assigned. This address change could include a change from the roof of one building to another. A change in location on the same roof should not normally require a new Site ID. Although an address change would routinely mean a new Site ID, some changes that do not change the site's location in respect to surrounding sources and its measurement scale, would require no change. An EPA Regional Office should be consulted for assistance in determining whether a new Site ID is required.

If a new Site ID is needed for a site not operated by the air pollution control agency, that agency should be contacted to assist in the ID assignment, to ensure that the ID is unique within the county. In other words, when a new Site ID is assigned, it must be different from any other Site ID already existing for that combination of State and County or Tribal Code.

Attributes:

Alphanumeric
4-digit ID
Mandatory
Key Field

Coding Instructions:

Place a four-digit numeric code in the fifth delimited field. For update and delete, a Site ID value is valid if it exists in combination with state code and County or Tribal Code in the Sites Table.

Business Rules

Common Rules:

1. Site ID is mandatory.
Error Messages:
 - Site ID is required.
2. Site ID must be exactly 4 digits.
Error Messages:
 - Invalid Site ID

Insert Rules:

1. Site with the same State, County and Site ID already exists in database.
Error Messages:
 - Attempt to insert Site with State, County, Site that duplicates one already in database.
2. Site with same Tribal Code and Site ID already exists in database.
Error Messages:
 - Duplicate of site with same {Tribal_Code, Site_ID}
3. When inserting a tribal site, another site with Latitude and Longitude of same State Code, County Code and Site ID already exists in database.
Error Messages:
 - Attempt to insert Site with State, County, Site that duplicates one already in database.

Update or Delete Rules:

1. (State Code, County Code, Site ID) must be in the SITES table.
Error Messages:
 - Unable to update or delete site.
2. (Tribal Code, Site ID) must be in the SITES table.
Error Messages:
 - Unable to update or delete site.

3.1.5 Latitude

Description: The monitoring site's angular distance north or south of the equator measured in decimal degrees. The associated sign specifies the direction of measurement, a positive number indicating north and negative indicating south. EPA Locational Data Policy (LDP) requires that coordinates be provided for all sites. More information regarding EPA's data standards and policies may be found on EPA's Environmental Data Registry (EDR) Website (<http://www.epa.gov/edr/>).

Attributes: Numeric
8 digits, including 6 decimal places and sign ($\pm nn.nnnnnn$)

Coding Instructions: A site's coordinates must be given as latitude and longitude coordinates. When latitude is provided on the transaction, longitude must also be provided.

To insert or update, place a latitude value, in decimal degrees, in the sixth delimited field. For a coordinate above the equator, enter the value as a positive number. For a coordinate below the equator, enter the value as a negative number.

Business Rules

Common Rules:

1. Latitude must be within the state

Error Messages:

- Coordinates are not within the specified state.

2. Latitude must be within the county

Error Messages:

- Coordinates are not within the specified county

Insert Rules

1. Latitude and Longitude combinations must be provided.

Error Messages:

- Location must be specified with latitude/longitude information.

Update Rules

None.

Delete Rules

None.

3.1.6 Longitude

Description: The monitoring site's angular distance east or west of the prime meridian at Greenwich, UK, measured in decimal degrees. The associated sign specifies the direction of measurement, a positive number indicating east and negative indicating west. EPA Locational Data Policy requires that coordinates be provided for all sites. More information regarding EPA's data standards and policies may be found on EPA's Environmental Data Registry (EDR) Website (<http://www.epa.gov/edr/>).

Attributes: Numeric
9 digits, including 6 decimal places and sign (\pm nnn.nnnnnn)

Coding Instructions: A site's coordinates must be given as latitude/longitude coordinates. When longitude is provided on the transaction, latitude must also be provided.

To insert or update, place a longitude value, in decimal degrees, in the seventh delimited field. For a coordinate west of the prime meridian, enter the value as a positive number. For a coordinate east of the prime meridian, enter the value as a negative number.

Business Rules

Common Rules:

1. Longitude must be within the state

Error Messages:

- Coordinates are not within the specified state.

2. Longitude must be within the county

Error Messages:

- Coordinates are not within the specified county

Insert Rules

1. Latitude and Longitude combinations must be provided.

Error Messages:

- Location must be specified with latitude/longitude information.

Update Rules

None.

Delete Rules

None.

3.1.7 Horizontal Collection Method

Description: Method used to determine the latitude/longitude coordinates. Required by EPA Locational Data Policy (LDP). More information regarding EPA's data standards and policies may be found on EPA's Environmental Data Registry (EDR) Website (<http://www.epa.gov/edr/>).

Attributes: Alphanumeric
3-digit code (nnn)
Mandatory (for Insert)

Coding Instructions: Place a valid Horizontal Collection Method code in the eleventh delimited field. A code is valid if it is in the LDP Collection Methods Table. View current code descriptions in the Maintain or Correct forms in AQS, or via Discoverer, and choose the appropriate code.

Example Horizontal Collection Method Codes are listed below:

| <u>Code</u> | <u>Description</u> |
|-------------|--------------------|
| 027 | UNKNOWN |
| 101 | Address Matching |
| 102 | Census Block |
| 103 | GPS |
| 104 | Interpolation |

106 Public Land Survey
108 ZIP Code

Business Rules

Common Rules:

1. Horizontal Collection Method must be in LDP_COLLECTION_METHODS table.
Error Messages:
 - Invalid LDP Horizontal Collection Method Code
2. Horizontal Collection Method must be at production status.
Error Messages:
 - Inactive LDP Horizontal Collection Method Code

Insert Rules

1. Horizontal Collection Method is mandatory.
Error Messages:
 - Horizontal Collection Method is mandatory.

Update Rules

1. Horizontal Collection Method may not be nullified.
Error Messages:
 - Horizontal Collection Method is mandatory.

Delete Rules

None.

3.1.8 Horizontal Datum

Description: The edition of North American Datum used as the basis for determining the site coordinates. (The editions of North American Datum establish a network of monuments and reference points defining a mathematical surface from which geographic computations can be made.) The World Geodetic Survey 1984 (WGS84) is one horizontal datum used by many Global Positioning System (GPS) instruments. United States Geological Survey (USGS) maps often use the North American Datum 1927 (NAD27).

This data element is required by EPA Locational Data Policy. Information regarding EPA's data standards and policies may be found on EPA's Environmental Data Registry (EDR) Website (<http://www.epa.gov/edr/>).

Attributes: Alphanumeric
Up to 120 characters
Mandatory (for Insert)

Coding Instructions: Place a valid Horizontal Datum value in the twelfth delimited field. A value is valid if it is in the LDP Horizontal Data Table. Examples of Example Horizontal Datum values are listed below:

| <u>Horiz Datum</u> | <u>Status Ind</u> |
|--------------------|-------------------|
| NAD27 | P |
| NAD83 | P |
| NAD84 | I |
| UNKNOWN | I |
| WGS84 | P |

Note: A status indicator of I means that old data could have these values, but new data cannot use these values. (I = inactive, P = production)

Business Rules

Common Rules:

- Horizontal Datum must be in LDP_HORIZONTAL_DATA table.
Error Messages:
 - Invalid LDP Horizontal Datum.
- LDP_HORIZONTAL_DATA (LDP_HORIZ_DATUM) must be at production status.
Error Messages:
 - Inactive LDP Horizontal Datum.

Insert Rules

- Horizontal Datum is mandatory.
Error Messages:
 - Horizontal Datum is mandatory.

Update Rules

- Horizontal Datum may not be nullified.
Error Messages:
 - Horizontal Datum is mandatory.

Delete Rules

None.

3.1.9 Source Scale

Description: Identifies the ratio of the map or cartographic product to the true location. The data element for scale should be the X value of the 1:X ratio (e.g., if the scale is 1:24,000, the value of the scale data element should be 24,000). The United States Geological Survey 1:24,000 is usually the smallest reasonable scale for locating sub-facility points, such as stacks or pipes. The relative accuracies of maps as a locational tool decreases as the X value increases. This field is required when the Horizontal Collection Method is based upon using a map and photos. EPA Locational Data Policy requires this data element for maps and photos. More information regarding EPA's data standards and policies may be found on EPA's Environmental Data Registry (EDR) Website (<http://www.epa.gov/edr/>).

Attributes: Numeric
12 digits (nnnnnnnnnnnn)

Optional: It is required when a site's coordinates are derived from a map or photo, but not for GPS methods.

Coding Instructions: Place a valid Source Scale value in the thirteenth delimited field.

Business Rules

Common Rules:

1. Source Scale must be a number greater than 0 if the Horizontal Method is not a GPS method.

Error Messages:

- Invalid Source Scale
2. Source Scale is required if the Horizontal Method is not a GPS method.

Error Messages:

- Required source scale is missing.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.1.10 Horizontal Accuracy

Description: Description of the accuracy of the site coordinates, as a range reported in meters. Only the least accurate measurement needs to be recorded, whether it is latitude or longitude.

For example, here are accuracy standards for various scale maps, assuming that the maps conform to the national mapping accuracy standards:

| | |
|-----------|----------------|
| 1:1,200 | ± 1.02 meters |
| 1:2,400 | ± 2.03 meters |
| 1:4,800 | ± 4.06 meters |
| 1:10,000 | ± 8.47 meters |
| 1:12,000 | ± 10.16 meters |
| 1:24,000 | ± 12.20 meters |
| 1:63,360 | ± 32.20 meters |
| 1:100,000 | ± 50.81 meters |

Map interpolation would also introduce error.

For GPS, the accuracy values vary. The type of GPS used along with operating conditions affect accuracy. The GPS receiver may provide accuracy values associated with specific coordinate readings.

This data element is required by EPA Locational Data Policy (LDP). More information regarding EPA's data standards and policies may be found on EPA's Environmental Data Registry (EDR) Website (<http://www.epa.gov/edr/>).

Attributes: Numeric
 10 digits, including 2 decimal places (nnnnnnnn.nn)
 Mandatory (for Insert)

Coding Instructions: Place the Horizontal Accuracy in the fourteenth delimited field.

Business Rules

Common Rules:

1. Horizontal Accuracy must be greater than 0.

Error Messages:

- Invalid Horizontal Accuracy Value

Insert Rules

1. Horizontal Accuracy is mandatory.

Error Messages:

- Horizontal Accuracy is mandatory.

Update Rules

1. Horizontal Accuracy may not be nullified.

Error Messages:

- Horizontal Accuracy is mandatory.

Delete Rules

None.

3.1.11 Vertical Measure

Description: The elevation, in meters, above or below mean sea level (MSL) of the site. It is required by EPA Locational Data Policy (LDP). More information regarding EPA's data standards and policies may be found on EPA's Environmental Data Registry (EDR) Website (<http://www.epa.gov/edr/>).

Attributes: Numeric
 10 digits, including 2 decimal places (nnnnnnnn.nn)
 Mandatory (for Insert)

Coding Instructions: Place a numeric value in the fifteenth delimited field.

Business Rules

Common Rules:

1. Vertical Measure must be between -10000 and 20000.

Error Messages:

- Vertical measure must be between -10,000 and 20,000
- PL/SQL: numeric or value error: character to number conversion error.

Insert Rules

1. Vertical Measure is mandatory.

Error Messages:

- Vertical Measure is required.

Update Rules

1. Vertical Measure may not be nullified.

Error Messages:

- Vertical Measure is required

Delete Rules

None.

3.1.12 Time Zone

Description: A standard time zone, as established by section 1 of the Standard Time Act, as amended by section 4 of the Uniform Time Act of 1966 (15 U.S.C. 261).

Attributes: Alphanumeric
Up to 30 characters
Mandatory

Coding Instructions: To insert or update a time zone, place a valid value in the sixteenth delimited field. A time zone value is valid if it exists in combination with state code in the State Time Zones Table.

Business RulesCommon Rules:

1. (State Code, Time Zone) must be in STATE_TIME_ZONES table.

Error Messages:

- Invalid Time Zone for state.

2. STATE_TIME_ZONES (STT_STATE_CODE, TZ_TIME_ZONE_NAME) must be at production status.

Error Messages:

- Inactive Time Zone for state.

Insert Rules

1. Time Zone is mandatory.

Error Messages:

- Time Zone is required.

Update Rules

None.

Delete Rules

None.

3.1.13 Agency Code

Description: Identifies the agency responsible for the operation of the monitoring site.

Attributes: Alphanumeric
4-digit code
Mandatory (for insert)

Coding Instructions: To insert, place a valid agency code in the seventeenth delimited field. An Agency Code value is valid if it exists in combination with the state code value in the State Agencies Table.

Business Rules

Common Rules:

1. (State Code, Supporting Agency) must be in STATE_AGENCIES table.

Error Messages:

- Integrity constraint (AIRSRAQS.AR1_SA_FK) violated

2. STATE_AGENCIES (STT_STATE_CODE, AG_AGENCY_CODE) must be at production status.

Error Messages:

- Status for STT_STATE_CODE, AG_AGENCY_CODE is inactive.

Insert Rules

1. Agency Code is mandatory.

Error Messages:

- Agency Code is required on insert transactions.

Update Rules

1. Agency Code may not be updated.

Error Messages:

- Agency Code is ignored on update transactions.

Delete Rules

None.

3.1.14 Street Address

Description: Specifies the building/street location of the monitoring site.

Attributes: Alphanumeric
Up to 240 characters

Mandatory (for Insert)

Coding Instructions: Place street address text in the eighteenth delimited field. Any non-blank value is valid.

Business Rules

Common Rules:

1. Street Address cannot be more than 240 characters.

Error Messages:

- PL/SQL: numeric or value error: character string buffer too small.

Insert Rules

1. Street Address is mandatory.

Error Messages:

- Street Address is required.

Update Rules

1. Street Address may not be nullified.

Error Messages:

- Street Address is required.

Delete Rules

None.

3.1.15 City Code

Description: The city within whose legal boundaries the monitoring site is located.

Attributes: Alphanumeric
5-digit code
Optional

Note: This field is automatically derived from the EPA master geospatial database from the user-provided location (Latitude/Longitude). If it is provided by the user, it will be compared to the derived value, and a warning will be issued if the values do not match, but the transaction will be processed without error. (The derived value will be stored in the database.)

Coding Instructions: Place a valid FIPS city code value in the nineteenth delimited field. A city code value is valid if it exists in combination with state code and County/Tribal Code in the County Cities Table. If the site is not within a city, leave this field blank or use code 00000.

Business Rules

Common Rules:

1. (State Code, County Code, City Code) must be in COUNTY_CITIES table.

Error Messages:

- Invalid City Code for county
2. COUNTY_CITIES (CN_STT_STATE_CODE, CN_COUNTY_CODE, CI_CITY_CODE) must be at production status.

Error Messages:

- Inactive City Code for county.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.1.16 Urban Area Code

Description: The urbanized area within which the monitoring site is located. An urbanized area is a U.S. Census Bureau demographic entity that comprises a place and the adjacent densely-settled surrounding territory that together have a minimum population of 50,000 people.

Attributes: Alphanumeric
4-digit code
Optional

Note: This field is automatically derived from the EPA master geospatial database from the user-provided location (Latitude/Longitude). If it is provided by the user, it will be compared to the derived value, and a warning will be issued if the values do not match, but the transaction will be processed without error. (The derived value will be stored in the database.)

Coding Instructions: Place a valid urban area code value in the twentieth delimited field. An urban area code value is valid if it exists in combination with state code in the State Urbanized Areas Table. If the monitoring site is not within an urbanized area, then leave this field blank or use code 0000.

Business Rules:

Common Rules:

1. (State Code, Urban Area Code) must be in STATE_URBANIZED_AREAS table

Error Messages:

- Invalid Urban Area Code for state
2. STATE_URBANIZED_AREAS (STT_STATE_CODE, UA_UAR_CODE) must be at

production status.

Error Messages:

- Inactive Urban Area Code for state.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.1.17 AQCR

Description: Specifies in which of the 247 Air Quality Control Regions (AQCRs) the monitoring site is located.

Attributes: Alphanumeric
3-digit code
Optional

Coding Instructions: To insert or update AQCR, place a valid AQCR code in the twenty-first delimited field. A valid AQCR code is one that, in combination with state code and County/Tribal Code, exists in the AQCR Counties Table.

Business Rules:

Common Rules:

1. AQCR is required.

Error Messages:

- Please enter a valid AQCR Code for the current State and County Codes.

2. (AQCR, State Code, County Code) must be in AQCR_COUNTIES table.

Error Messages:

- Invalid AQCR code for county

2. AQCR_COUNTIES (AQ_AQCR_CODE, CN_STT_STATE_CODE, CN_COUNTY_CODE) must be at production status.

Error Messages:

- Inactive AQCR code for county

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.1.18 Land Use Type

Description: Categorization of the prevalent land use within 1/4 mile of the monitoring site.

Attributes: Alphanumeric
Up to 20 characters
Mandatory (for Insert)

Coding Instructions: Place a valid land use type term in the twenty-second delimited field. A land use term is valid if it exists in the Land Use Types Table.

Example land use types include:

AGRICULTURAL
BLIGHTED AREAS
COMMERCIAL
DESERT
FOREST
INDUSTRIAL
MILITARY RESERVATION
MOBILE
RESIDENTIAL

Business Rules:

Common Rules:

1. Land Use Type must be in LAND_USE_TYPES table.

Error Messages:

- Invalid Land Use Type

2. LAND_USE_TYPES (LAND_USE_TYPE) must be at production status

Error Messages:

- Inactive Land Use Type

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.1.19 Location Setting

Description: A description of the environmental setting within which the site is located.

Attributes: Alphanumeric
 Up to 50 characters
 Mandatory (for Insert)

Coding Instructions: Place a valid location setting term in the twenty-third delimited field. A location setting term is valid if it exists in the Location Settings Table.

Example location settings include:

RURAL
SUBURBAN
URBAN AND CENTER CITY

Business Rules:

Common Rules:

1. Location Setting must be in LOCATION_SETTINGS table.

Error Messages:

- Invalid Location Setting

2. LOCATION_SETTINGS (LOCATION_SETTING) must be at production status.

Error Messages:

- Inactive Location Setting.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.1.20 Date Site Established

Description: The date on which an air monitoring site began collecting air quality data.

Attributes: Date
 8-digit date
 Mandatory (for Insert)

Coding Instructions: Place a date, using the format YYYYMMDD, in the twenty-fourth delimited field. The date must be between January 1, 1957 and a year after the current date.

Business Rules:

Common Rules:

1. Date Site Established must be between 1/1/1957 and one year from the current date.

Error Messages:

- The Site Established Date is not within the valid date range.

Insert Rules

1. Date Site Established is mandatory.

Error Messages:

- Site Established Date is required.

Update Rules

1. Date Site Established may not be nullified.

Error Messages:

- Site Established Date is required.

2. Date Site Established may not be changed such that it is greater than the earliest Sampling Begin Date for any monitor at the site.

Error Messages:

- Site Established Date and Site Terminated Date may not be changed such that Sample Begin Dates for the site's monitors are not in the range.

Delete Rules

None

3.1.21 Date Site Terminated

Description: The date on which a monitoring site ceased to operate.

Attributes: Date
8-digit date
Optional

Coding Instructions: Place a date, using the format YYYYMMDD, in the twenty-fifth delimited field. The date must be between January 1, 1957 and one year from the current date, and must be greater than date site established. All monitors at a site must have a date sampling ended before a site can be terminated.

Business Rules:

Common Rules:

1. Date Site Terminated must be between Date Site Established and one year from the current date.

Error Messages:

- The Site Terminated Date is not within the valid date range.

2. Date Site Terminated may be valued only if all the sample periods for the site's monitors are closed, I.e., have end dates.

Error Messages:

- All monitors must be closed to terminate a site. Open monitors: (List of open monitor Ids)

Insert Rules

None.

Update Rules

1. Date Site Terminated may not be changed such that it is earlier than the greatest Sampling Begin Date for any monitor at the site.

Error Messages:

- Site Established Date and Site Terminated Date may not be changed such that Sample Begin Dates for the site's monitors are not in the range.

Delete Rules

None.

3.1.22 ZIP Code

Description: The U.S. Postal Service Zone Improvement Plan (ZIP) Code used to address the monitoring site.

Attributes: Alphanumeric
5- or 9-digit code
Optional

Note: This field is automatically derived from the EPA master geospatial database from the user-provided location (Latitude/Longitude). If it is provided by the user, it will be compared to the derived value, and a warning will be issued if the values do not match, but the transaction will be processed without error. (The derived value will be stored in the database.)

Coding Instructions: Place a valid 5-digit or 9-digit ZIP Code in the twenty-sixth delimited field. A ZIP Code value is valid if it exists in combination with state code and County/Tribal Code in the County ZIP Codes Table.

Business Rules:

Common Rules:

1. (State Code, County Code, Zip Code) must be in COUNTY_ZIP_CODES table.

Error Messages:

- Invalid ZIP Code for county

2. (State Code, County Code, Zip Code) must be at production status.

Error Messages:

- Inactive ZIP Code for county.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.1.23 Congressional District

- Description: The Congressional district within which the site is located.
- Attributes: Alphanumeric
2-digit code
Optional
- Note: This field is automatically derived from the EPA master geospatial database from the user-provided location (Latitude/Longitude). If it is provided by the user, it will be compared to the derived value, and a warning will be issued if the values do not match, but the transaction will be processed without error. (The derived value will be stored in the database.)
- Coding Instructions: Place a valid Congressional district number in the twenty-seventh delimited field. A Congressional district value is valid if it exists in combination with state code in the Congressional Districts Table. If there is only one Congressional district in a state (in which case the district is not numbered), enter the value of 1.

Business Rules:

Common Rules:

1. (State Code, Congressional District) must be in CONGRESSIONAL_DISTRICTS table.
Error Messages:
 - Invalid Congressional District Number for state
2. (State Code, Congressional District) must be at production status.
Error Messages:
 - Inactive Congressional District Number for state.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.1.24 Block

- Description: The U.S. Census Bureau block within which the site is located.

Attributes: Alphanumeric
 4-digit code
 Optional

Note: This field is automatically derived from the EPA master geospatial database from the user-provided location (Latitude/Longitude). If it is provided by the user, it will be compared to the derived value, and a warning will be issued if the values do not match, but the transaction will be processed without error. (The derived value will be stored in the database.)

Coding Instructions: Block information must be submitted in conjunction with block group and census tract. Place a valid block number in the twenty-eighth delimited field. A block value is valid if it exists in combination with state code, county code, and census tract in the Blocks Table.

Business Rules:

Common Rules:

1. (State Code, County Code, Census Tract, , Block) must be in BLOCKS table.

Error Messages:

- Invalid Census Block for county

2. (State Code, County Code, Census Tract, Block) must be at production status.

Error Messages:

- Inactive Census Block for county.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.1.25 Block Group

Description: The U.S. Census Bureau block group within which the site is located. Block group is simply the first digit of the Block. It will be ignored if provided.

Attributes: Alphanumeric
 1-digit code
 Ignored

Coding Instructions: Block group information may be submitted in conjunction with block and

census tract. Place a valid block group number in the twenty-ninth delimited field.

3.1.26 Census Tract

Description: The U.S. Census Bureau census tract/block numbering area within which the site is located.

Attributes: Alphanumeric
3- to 6-digit code
Optional

Note: This field is automatically derived from the EPA master geospatial database from the user-provided location (Latitude/Longitude). If it is provided by the user, it will be compared to the derived value, and a warning will be issued if the values do not match, but the transaction will be processed without error. (The derived value will be stored in the database.)

Coding Instructions: Census tract information must be submitted in conjunction with block. Place a valid census tract code in the thirtieth delimited field. A census tract value is valid if it exists in combination with state code, County/Tribal Code, and block in the Blocks Table.

Business Rules:

Common Rules:

1. (State Code, County Code, Census Tract, Block) must be in BLOCKS table.

Error Messages:

- Invalid Census Tract for county

2. (State Code, County Code, Census Tract, Block) must be at production status.

Error Messages:

- Inactive Census Tract for county

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.1.27 Class I Area

Description: The Class One Area within which the site is located. A Class One Area is a geographic area recognized by EPA as being of the highest

environmental quality and requiring maximum protection.

Attributes: Alphanumeric
 6-character code
 Optional

Coding Instructions: Place a valid Class One Area code in the thirty-first delimited field. A Class One Area code is valid if it exists in the Class One Areas Table.

Business Rules:

Common Rules:

1. Class 1 Area must be in CLASS_ONE_AREAS table.

Error Messages:

- Invalid Class One Area Code

2. CLASS_ONE_AREAS (CLASS_1_AREA_CODE) must be at production status.

Error Messages:

- Inactive Class One Area Code

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.1.28 Local Region

Description: The state-specific geographic/administrative area within which the site is located.

Attributes: Alphanumeric
 1- to 2-digit code
 Optional

Coding Instructions: Place a valid local region code in the thirty-second delimited field. A local region code is valid if it exists in combination with state code in the Local Regions Table.

Business Rules:

Common Rules:

1. (State Code, Local Region) must be in LOCAL_REGIONS table.

Error Messages:

- Invalid Local Region for state

2. (State Code, Local Region) must be at production status.

Error Messages:

- Inactive Local Region for state

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.1.29 Local Site Name

Description: The locally defined name of the site.

Attributes: Alphanumeric
Up to 70 characters
Optional

Coding Instructions: Place a text description of the locally-defined site name in the thirty-third delimited field. Any non-blank value is valid.

Business Rules:

Common Rules:

1. Local Site Name cannot be more than 70 characters.

Error Messages:

- PL/SQL: numeric or value error: character string buffer too small.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.1.30 HQ Evaluation Date

Description: The date on which the most recent headquarters (HQ) evaluation of the site occurred.

Attributes: Date
8-digit date
Optional

Coding Instructions: Place a date, in the format YYYYMMDD, in the thirty-fourth delimited field. To be valid, HQ evaluation date must be between January 1, 1980 (when the National Air Monitoring Sites Regulations were published) and the current date.

Business Rules:

Common Rules:

1. HQ Evaluation Date must be between 6/1/1977 and Date Site Terminated, (or the current date, if Date Site Terminated is not valued.)

Error Messages:

- The headquarters evaluation date is not within the valid range.
2. User must have HQ application role to insert or update the HQ Evaluation Date.

Error Messages:

- Insufficient privileges to enter HQ_Eval_Date

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.1.31 EPA Region Evaluation Date

Description: The date on which the most recent EPA Regional evaluation of the site for siting criteria occurred.

Attributes: Date
8-digit date
Optional

Coding Instructions: Place a date, in the format YYYYMMDD, in the thirty-fifth delimited field. To be valid, regional evaluation date must be between January 1, 1980 (when the National Air Monitoring Sites Regulations were published) and the current date.

Business Rules:

Common Rules:

1. EPA Region Evaluation Date must be between 6/1/1977 and Date Site Terminated, (or the current date, if Date Site Terminated is not valued.)

Error Messages:

- The regional evaluation date is not within the valid range.
2. User must have Regional_Admin application role to insert or update the HQ Evaluation

Date.

Error Messages:

- Insufficient privileges to enter Regional_Eval_Date

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.1.32 Direction from Central Business District to Site

Description: A representation of the true, as opposed to magnetic, direction of the site from the central business district. If the site is within the central business district, it is a representation of the direction the probe faces.

Attributes: Alphanumeric
Up to 3-character code
Optional

Coding Instructions: Place a valid compass sector value in the thirty-sixth delimited field. A compass sector value is valid if it exists in the Compass Sectors Table. The 16 compass sector values are: E, ENE, ESE, N, NE, NNE, NNW, NW, S, SE, SSE, SSW, SW, W, WNW, WSW.

Business Rules:

Common Rules:

1. Compass Sector must be in Compass Sectors table

Error Messages:

- Invalid direction from central business district

2. Compass Sector must be at production status.

Error Messages:

- Inactive direction from central business district.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.1.33 Distance from Central Business District to Site

Description: The distance, in kilometers, to the site from the center of the downtown central business district of the city in which the site is located.

Attributes: Numeric
10 digits, including 2 decimal places (nnnnnnnn.nn)
Optional

Coding Instructions: Place a numeric value greater than 0 and less than 1000 in the thirty-seventh delimited field.

Business Rules:

Common Rules:

1. Distance to City must be between 0 AND 1000.

Error Messages:

- The City Distance Measurement must be a value between 0 and 1000.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.1.34 Meteorological Site Type

Description: The type of meteorological station identified for the monitoring site. Required for sites with monitors in a Photochemical Assessment Monitoring System (PAMS) network.

Attributes: Alphanumeric
Up to 20 characters
Optional

Coding Instructions: Place a valid type meteorological site in the thirty-eighth delimited field. A type meteorological site value is valid if it exists in the Met Site Types Table.

Example meteorological site types include:

ON-SITE MET Equip
ON_SITE UA MET
OTHER AIRS SITE
NWS

AIRPORT
OTHER

Business Rules:

Common Rules:

1. Type Meteorological Site must be in MET_SITE_TYPES table

Error Messages:

- Invalid Met Site Type

2. Type Meteorological Site must be at production status

Error Messages:

- Inactive Met Site Type.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.1.35 Meteorological Site ID

Description: The AQS Site ID where meteorological data is collected, if not collected at this site.

Attributes: Alphanumeric
9-digit ID
Optional

Coding Instructions: Place a valid AQS Site ID in the thirty-ninth delimited field. The format for AQS Site ID is a joining of a FIPS state code or tribal indicator (2 characters), a FIPS County/Tribal Code (3 numeric characters), and 4-digit Site ID. A meteorological Site ID value is valid if it represents an existing site (a row on the Sites Table), and type meteorological site is other AQS site.

Business Rules:

Common Rules:

1. Meteorological Site ID must be in SITES table.

Error Messages:

- Met Site not in database

2. Met Site ID must be valued when Met Site Type is "OTHER AIRS SITE"; otherwise, it must not be valued.

Error Messages:

- Met Site must be defined for Met Site Type = 'OTHER AIRS SITE' and must be

Null for all other Met Site Types..

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.1.36 Distance to Meteorological Site

Description: The distance of the associated meteorological site from the air quality monitoring site, in meters. This information is required if the site has monitors that are part of a Photochemical Assessment Monitoring System (PAMS) network. The associated site need not be an AQS site.

Attributes: Numeric
10 digits, including 2 decimal places (nnnnnnnn.nn)
Optional

Coding Instructions: Place a valid numeric distance to meteorological site value in the fortieth delimited field. The distance to meteorological site is valid if it is greater than 0 and type meteorological site is not on-site met equip and not on-site Upper Air meteorological site (UA met). A distance to meteorological site value may be nullified, if type meteorological site is nullified, on-site met equip, or on-site UA met.

Business Rules:

Common Rules:

1. Distance to Meteorological Site must be valued and greater than 0 when Met Site Type is "OTHER AIRS SITE", "NWS", "AIRPORT", or "OTHER"; otherwise, it must not be valued.

Error Messages:

- Met Site Distance must be defined and greater than 0 for Types 'OTHER AIRS SITE','NWS','AIRPORT','OTHER' and must be Null for all other Types.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.1.37 Direction to Meteorological Site

- Description:** A representation of the true, as opposed to magnetic, direction of the meteorological site from this site.
- Attributes:** Alphanumeric
Up to 3-character code
Optional
- Coding Instructions:** Place a valid direction to meteorological site value in the forty-first delimited field. Valid directions are the sixteen standard compass sectors (N, NNE, NE, ENE, etc.) A direction to met site value is valid if:
- it exists in the Compass Sectors Table and
 - type meteorological site is not on-site met equip and
 - not on-site Upper Air meteorological site (UA met).
- A direction to met site value may be nullified, if:
- Type meteorological site is nullified,
 - On-site met equip or
 - On-site UA met.

Business Rules:

Common Rules:

1. Direction to Meteorological Site must be in COMPASS_SECTORS table.
Error Messages:
 - Invalid direction to Met Site
2. Direction to Meteorological Site must be at production status.
Error Messages:
 - Inactive direction to Met Site.
3. Direction to Meteorological Site must be valued and greater than 0 when Met Site Type is "OTHER AIRS SITE", "NWS", "AIRPORT", or "OTHER"; otherwise, it must not be valued.
Error Messages:
 - Invalid direction to Met Site.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.1.38 Local Site ID

- Description: Identification code used by a State, Tribe or Local agency, if different from the AQS Site ID.
- Attributes: Alphanumeric
Up to 40 characters
Optional
- Coding Instructions: Place an alphanumeric value in the forty-second delimited field. No edit checks are performed.

Business Rules

There are no business rules for Local Site ID.

3.1.39 Vertical Collection Method

- Description: The method used to determine the Locational Data Policy (LDP) vertical measure. This data element is required by EPA LDP. More information regarding EPA's data standards and policies may be found on EPA's Environmental Data Registry (EDR) Website (<http://www.epa.gov/edr/>).
- Attributes: Alphanumeric
3-digit code
Mandatory (for Insert)
- Coding Instructions: Place a valid LDP vertical method code in the forty-third delimited field. View vertical method code descriptions in the AQS Maintain or Correct forms, or via Discoverer, and choose the appropriate code. Example Vertical Collection Method Codes are listed below:

| <u>Code</u> | <u>Description</u> |
|-------------|---|
| 001 | GPS CARRIER PHASE STATIC RELATIVE POSITION |
| 002 | GPS CARRIER PHASE KINEMATIC RELATIVE POSITION |
| 003 | GPS CODE (PSEUDO RANGE) DIFFERENTIAL |
| 004 | GPS CODE (PSEUDO RANGE)PRECISE POSITION |
| 005 | GPS CODE (PSEUDO RANGE)STANDARD POSITION (SA OFF) |
| 006 | GPS CODE (PSEUDO RANGE)STANDARD POSITION (SA ON) |
| 007 | CLASSICAL SURVEYING TECHNIQUES |
| 008 | OTHER |
| 009 | ALTIMERY |
| 010 | PRECISE LEVELING-BENCH MARK |
| 011 | LEVELING-NON BENCH MARK CONTROL POINTS |
| 012 | TRIGONOMETRIC LEVELING |
| 013 | PHOTOGRAMMETRIC |
| 014 | TOPOGRAPHIC MAP INTERPOLATION |
| 000 | UNKNOWN |

Business Rules:

Common Rules:

1. Vertical Collection Method must be in LDP_VERTICAL_METHODS table.

Error Messages:

- Invalid LDP Vertical Method Code

2. Vertical Collection Method must be at production status.

Error Messages:

- Inactive LDP Vertical Method Code.

Insert Rules

1. Vertical Collection Method is mandatory.

Error Messages:

- Vertical Method Code is required.

Update Rules

1. Vertical Collection Method may not be nullified.

Error Messages:

- Vertical Method Code is required.

Delete Rules

None.

3.1.40 Vertical Datum

Description: The edition of North American Datum used as the basis for determining the site coordinates. (The editions of North American Datum establish a network of monuments and reference points defining a mathematical surface from which geographic computations can be made.) This data element is required by EPA Locational Data Policy (LDP). More information regarding EPA's data standards and policies may be found on EPA's Environmental Data Registry (EDR) Website (<http://www.epa.gov/edr/>).

Attributes: Alphanumeric
Up to 120 characters
Mandatory (for Insert)

Coding Instructions: Place a valid LDP vertical datum value in the forty-fourth delimited field. A value is valid if it is in the LDP Vertical Data Table. Examples of the Example vertical datum values are listed below:

LDP Vertical Datum
NAVD88
NGVD29
MEAN SEA-LEVEL
LOCAL TIDAL DATUM

Business Rules:

Common Rules:

1. Vertical Datum must be in LDP_VERTICAL_DATA table.

Error Messages:

- Invalid LDP Vertical Datum.

2. Vertical Datum references must be at production status.

Error Messages:

- Inactive DP Vertical Datum.

Insert Rules

1. Vertical Datum is mandatory.

Error Messages:

- Vertical Datum is required.

Update Rules

1. Vertical Datum may not be nullified.

Error Messages:

- Vertical Datum is required.

Delete Rules

None.

3.1.41 Vertical Accuracy

Description: Description of the accuracy of the Vertical Measure, reported in meters. This data element is required by EPA Locational Data Policy (LDP). More information regarding EPA's data standards and policies may be found on EPA's Environmental Data Registry (EDR) Website (<http://www.epa.gov/edr/>).

Attributes: Numeric
10 digits, including 2 decimal places (nnnnnnnn.nn)
Mandatory (for Insert)

Coding Instructions: Place the LDP vertical accuracy value in the forty-fifth delimited field.

Business Rules:

Common Rules:

1. Vertical Accuracy must be greater than 0.

Error Messages:

- Invalid Vertical Accuracy Value.

Insert Rules

1. Vertical Accuracy is mandatory.

Error Messages:

- Vertical Accuracy is required.

Update Rules

1. Vertical Accuracy may not be nullified.

Error Messages:

- Vertical Accuracy is required.

Delete Rules

None.

3.2 Site Street Information - Transaction Type AB

See the [AQS Input Transaction Formats](http://www.epa.gov/ttn/airs/airsaqs/manuals/) at <http://www.epa.gov/ttn/airs/airsaqs/manuals/> for a summary list of field requirements for each transaction format.

3.2.0 Transaction Level Rules and Errors

1. The Site Tangent Street cannot be deleted if a corresponding Monitor Tangent Street has been loaded.

Error Messages:

- Foreign Key (MTR_TR_ID) violated.

3.2.1 Transaction Type

Description: Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

Attributes: Alphanumeric
 2-character code
 Mandatory

Coding Instructions: Place AB in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory

Error Messages:

- Invalid transaction format.

2. Transaction Type must be in TRANSACTION_TYPES table in database.

Error Messages:

- Transaction type not handled.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.2.2 Action Indicator

Description: Indicates the data manipulation action to be performed by the transaction.

Attributes: Alphanumeric
1-character code
Mandatory

Coding Instructions: Place the values I, U, or D in the second delimited field.
I Insert a new row into the appropriate table in the database.
U Change one or more column values for an existing row in one or more tables.
D Delete a row from a table(s) for the row containing the key data.

Business Rules

Common Rules

1. Action Indicator is required.
Error Messages:
 - Action Code is Required.
2. Action Indicator must be either 'I', 'U', or 'D'.
Error Messages:
 - Invalid Action Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.2.3 State Code or Tribal Indicator

The third field on a transaction can be either a State Code or a Tribal indicator. They are described as follows:

State Code Description: A FIPS (Federal Information Processing Standards) code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Tribal Indicator Description: A flag, with value "TT", to indicate that this data is for a Native American Tribe, and that the next field on the transaction identifies a tribal area using the Bureau of Indian Affairs tribal code.

Attributes: Alphanumeric
2-digit code
Mandatory

Key Field

Coding Instructions: Place a valid FIPS state code or a Tribal Indicator in delimited field 3. A State Code is valid if it exists in the STATES Table.

Business Rules

Common Rules:

1. State Code is mandatory.
Error Messages:
 - State Code is required.
2. (State Code, County Code, Site ID) must be in the SITES table.
Error Messages:
 - Invalid Site ID.

3.2.4 County Code or Tribal Code

The fourth field on any transaction can be either a County Code or a Tribal Code. A County code is indicated by a valid state code in the third field, while a Tribal Code is indicated by a Tribal Indicator in the third field.

County Code Description: A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

Tribal Code Description: A value that identifies a Tribal Area using a Bureau of Indian Affairs Tribal Code.

Attributes: Alphanumeric
 3-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid county code or a valid tribal code in the fourth delimited field. A County Code is valid if it exists at active status in the Counties table. A Tribal Code is valid if it exists at active status in the Tribal_Areas table.

County Code Business Rules

Common Rules:

1. County Code is required.
Error Messages:
 - County Code is required.
2. (State Code, County Code, Site ID) must be in the SITES table.
Error Messages:
 - Invalid Site ID.

Tribal Code Business Rules

Common Rules:

1. Tribal Code is required.
Error Messages:
 - Tribal Code is required.

2. (Tribal Code, Site ID) must be in the SITES table.
Error Messages:
 - Invalid Site ID.

3.2.5 Site Number

Description: A numeric identifier (ID) that uniquely identifies each air monitoring site within a county or tribal area. There is no requirement that Site IDs be assigned continuously or in any particular order. Regional and Local organizations are thus free to allocate site numbers in any way they chose as long as there is no duplication within a county and tribal area. For Tribal sites, because tribal areas may cross county or state lines, care must be taken to ensure that the Site ID is unique in the effected Tribal Area and states-county.

A specific Site ID is associated with a specific physical location and address. Any change in address requires a new Site ID to be assigned. This address change could include a change from the roof of one building to another. A change in location on the same roof should not normally require a new Site ID. Although an address change would routinely mean a new Site ID, some changes that do not change the site's location in respect to surrounding sources and its measurement scale, would require no change. An EPA Regional Office should be consulted for assistance in determining whether a new Site ID is required.

If a new Site ID is needed for a site not operated by the air pollution control agency, that agency should be contacted to assist in the ID assignment, to ensure that the ID is unique within the county. In other words, when a new Site ID is assigned, it must be different from any other Site ID already existing for that combination of State and County or Tribal Code.

Attributes: Alphanumeric
4-digit ID
Mandatory
Key Field

Coding Instructions: Place a four-digit numeric code in the fifth delimited field. For update and delete, a Site ID value is valid if it exists in combination with state code and County or Tribal Code in the Sites Table.

Business Rules

Common Rules:

1. Site ID is mandatory.
Error Messages:
 - Site ID is required.
2. Site ID must be exactly 4 digits.
Error Messages:
 - Invalid Site ID length
3. (State Code, County Code, Site ID) must be in the SITES table.
Error Messages:
 - Invalid Site ID.
4. (Tribal Code, Site ID) must be in the SITES table.
Error Messages:
 - Invalid Site ID.

3.2.6 Tangent Street Number

Description: Identifies the number of the street around the site for which the data are being submitted. If street name, type road, traffic flow, year of traffic flow, or direction to street is valued, street number must be valued. Street number is used to associate detailed street information for the site to streets closest to the monitors at this site.

Attributes: Numeric
2 digits (nn)
Mandatory
Key Field

Coding Instructions: Place a valid number in the sixth delimited field.

Business Rules:

Common Rules

1. Tangent Street Number is mandatory.
Error Messages:
 - Tangent Street Number is mandatory.
2. Tangent Street Number must be greater than 0.
Error Messages:
 - Tangent Street Number must be positive

Insert Rules

1. (State Code, County Code, Site ID, Tangent Street Number) must not already be in database.
Error Messages:
 - Unique constraint (AIRSRAQS.TR_SITETANRD1_UK) violated

Update Rules

1. (State Code, County Code, Site ID, Tangent Street Number) must be in database.

Error Messages:

- Tangent Street Number not in database

Delete Rules

1. (State Code, County Code, Site ID, Tangent Street Number) must be in database.

Error Messages:

- Tangent Street Number not in database

3.2.7 Street Name

Description: The name of the street closest to the monitoring site.

Attributes: Alphanumeric
Up to 50 characters
Mandatory (for Insert)

Coding Instructions: Place the street name in the seventh delimited field.

Business Rules:

Common Rules

None.

Insert Rules

1. Street Name is required.

Error Messages

- Street Name is mandatory.

Update Rules

1. Street Name may not be nullified.

Error Messages

- Street Name is mandatory.

Delete Rules

None.

3.2.8 Road Type

Description: The type of road or street being described.

Attributes: Alphanumeric
Up to 20 characters
Mandatory (For Insert)

Coding Instructions: Place a valid type road term in the eighth delimited field. A type road

value is valid if it exists on the Road Types Table.

Valid values include:

ARTERIAL
EXPRESSWAY
FREEWAY
LOCAL ST OR HY
MAJ ST OR HY
THRU ST OR HY

Business Rules:

Common Rules

1. Road Type must be in ROAD_TYPES table.
Error Messages:
 - Integrity constraint (AIRSRAQS.TR_RT_FK) violated
2. ROAD_TYPES (ROAD_TYPE) must be at production status
Error Messages:
 - Status for ROAD_TYPE is inactive

Insert Rules

1. Road Type is mandatory.
Error Messages:
 - Road Type is mandatory.

Update Rules

1. Road Type may not be nullified.
Error Messages:
 - Road Type is mandatory.

Delete Rules

None.

3.2.9 Traffic Count

Description: An estimate of the daily traffic volume on the roadway.

Attributes: Numeric
12 digits (nnnnnnnnnnnn)
Optional

Coding Instructions: Place a valid traffic count in the ninth delimited field. A traffic count value is valid if it is greater than 0.

Business Rules:

Common Rules

1. Traffic Count must be greater than 0.
Error Messages:
 - Traffic Count must be positive

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.2.10 Year of Traffic Count

Description: The year when the traffic count value was estimated.

Attributes: Date
4-digit year (yyyy)
Optional

Coding Instructions: Place a valid year of traffic count in the tenth delimited field. A year of traffic count value is valid if it is greater than 1957 and less than or equal to the current year.

Business Rules:

Common Rules

1. Year of Traffic Count must be greater than, or equal to, 1957.

Error Messages:

- A valid Daily Traffic Year is between 1957 and the current year

2. Year of Traffic Count cannot be valued if Traffic Count is not valued.

Error Messages:

- Daily Traffic Year must be blank when Daily Traffic Count is blank

3. Year of Traffic Count must be valued if Traffic Count is valued.

Error Messages:

- Daily Traffic Year is required when Daily Traffic Count is populated.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.2.11 Direction from Site to Street

- Description: The direction from the site to the street at its nearest point.
- Attributes: Alphanumeric
3-character code
Mandatory (for Insert)
- Coding Instructions: Place a valid direction to street in the eleventh delimited field. A direction to street value is valid if exists on the Compass Sectors Table.

Business Rules:

Common Rules

1. Direction to Street must be in COMPASS_SECTORS table.
Error Messages:
 - Integrity constraint (AIRSRAQS.TR_CS_FK) violated.
2. COMPASS_SECTORS (COMPASS_SECTOR) must be at production status
Error Messages:
 - Status for COMPASS_SECTOR is inactive.

Insert Rules

1. Direction to Street is mandatory.
Error Messages:
 - Direction from Site to Street is mandatory.

Update Rules

1. Direction from Site to Street may not be nullified.
Error Messages:
 - No update occurred. Probable use of non updateable field

Delete Rules

None.

3.2.12 Source of Traffic Count

- Description: The method by which the traffic volume/flow count was obtained.
- Attributes: Numeric
10 digits (nnnnnnnnnn)
Optional
- Coding Instructions: Enter a valid source of traffic count code in the twelfth delimited field. A source of traffic count value is valid if it exists on the Traffic Volume Sources Table.

Business Rules:

Common Rules

1. Source of Traffic Count must be in TRAFFIC_VOLUME_SOURCES table

Error Messages:

- Integrity constraint (AIRSRAQS.TR_TV_S_FK) violated

2. TRAFFIC_VOLUME_SOURCES (TVS_ID) must be at production status.

Error Messages:

- Status for TVS_ID is inactive.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.3 Site Open Path Information - Transaction Type AC

See [AQS Input Transaction Formats](http://www.epa.gov/ttn/airs/airsaqs/manuals/) at <http://www.epa.gov/ttn/airs/airsaqs/manuals/> for a summary list of requirements for each transaction format.

3.3.0 Transaction Type

Description: Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

Attributes: Alphanumeric
2-character code
Mandatory

Coding Instructions: Place AC in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory
Error Messages:
 - Invalid transaction format.
2. Transaction Type must be in TRANSACTION_TYPES table in database.
Error Messages:
 - Transaction type not handled.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.3.1 Action Indicator

Description: Indicates the data manipulation action to be performed by the transaction.

Attributes: Alphanumeric
1-character code
Mandatory

Coding Instructions: Place the values I, U, or D in the second delimited field.

I Insert a new row into the appropriate table in the database.

- U Change one or more column values for an existing row in one or more tables.
- D Delete a row from a table(s) for the row containing the key data.

Business Rules

Common Rules

1. Action Indicator is required.
Error Messages:
 - Action Code is Required.
2. Action Indicator must be either ‘I’, ‘U’, or ‘D’.
Error Messages:
 - Invalid Action Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.3.2 State Code or Tribal Indicator

The third field on a transaction can be either a State Code or a Tribal indicator. They are described as follows:

State Code Description: A FIPS (Federal Information Processing Standards) code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Tribal Indicator Description: A flag, with value “TT”, to indicate that this data is for a Native American Tribe, and that the next field on the transaction identifies a tribal area using the Bureau of Indian Affairs tribal code.

Attributes: Alphanumeric
 2-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid FIPS state code or a Tribal Indicator in delimited field 3. A State Code is valid if it exists in the STATES Table.

Business Rules

Common Rules:

1. State Code is mandatory.
Error Messages:

- State Code is required.
2. (State Code, County Code, Site ID) must be in the SITES table.
Error Messages:
 - Invalid Site ID.

3.3.3 County Code or Tribal Code

The fourth field on any transaction can be either a County Code or a Tribal Code. A County code is indicated by a valid state code in the third field, while a Tribal Code is indicated by a Tribal Indicator in the third field.

County Code Description: A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

Tribal Code Description: A value that identifies a Tribal Area using a Bureau of Indian Affairs Tribal Code.

Attributes: Alphanumeric
 3-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid county code or a valid tribal code in the fourth delimited field. A County Code is valid if it exists at active status in the Counties table. A Tribal Code is valid if it exists at active status in the Tribal_Areas table.

County Code Business Rules

Common Rules:

1. County Code is required.
Error Messages:
 - County Code is required.
2. (State Code, County Code, Site ID) must be in the SITES table.
Error Messages:
 - Invalid Site ID.

Tribal Code Business Rules

Common Rules:

1. Tribal Code is required.
Error Messages:
 - Tribal Code is required.
2. (Tribal Code, Site ID) must be in the SITES table.
Error Messages:
 - Invalid Site ID.

3.3.4 Site Number

Description: A numeric identifier (ID) that uniquely identifies each air monitoring site within a county or tribal area. There is no requirement that Site IDs be assigned continuously or in any particular order. Regional and Local organizations are thus free to allocate site numbers in any way they chose as long as there is no duplication within a county and tribal area. For Tribal sites, because tribal areas may cross county or state lines, care must be taken to ensure that the Site ID is unique in the effected Tribal Area and states-county.

A specific Site ID is associated with a specific physical location and address. Any change in address requires a new Site ID to be assigned. This address change could include a change from the roof of one building to another. A change in location on the same roof should not normally require a new Site ID. Although an address change would routinely mean a new Site ID, some changes that do not change the site's location in respect to surrounding sources and its measurement scale, would require no change. An EPA Regional Office should be consulted for assistance in determining whether a new Site ID is required.

If a new Site ID is needed for a site not operated by the air pollution control agency, that agency should be contacted to assist in the ID assignment, to ensure that the ID is unique within the county. In other words, when a new Site ID is assigned, it must be different from any other Site ID already existing for that combination of State and County or Tribal Code.

Attributes: Alphanumeric
4-digit ID
Mandatory
Key Field

Coding Instructions: Place a four-digit numeric code in the fifth delimited field. For update and delete, a Site ID value is valid if it exists in combination with state code and County or Tribal Code in the Sites Table.

Business Rules

Common Rules:

1. Site ID is mandatory.

Error Messages:

- Site ID is required.

2. Site ID must be exactly 4 digits.

Error Messages:

- Invalid Site ID length

3. (State Code, County Code, Site ID) must be in the SITES table.

Error Messages:

- Invalid Site ID.

4. (Tribal Code, Site ID) must be in the SITES table.

Error Messages:

- Invalid Site ID.

3.3.5 Open Path Number

Description: A unique numeric identifier for the individual open path at a site.

Attributes: Numeric
2 digits (nn)
Mandatory
Key Field

Coding Instructions: Place a valid open path number in the sixth delimited field. An open path number value is valid if it is between 1 and 99.

Business Rules:

Common Rules

1. Open Path Number must be greater than 0.

Error Messages:

- Open Path Number must be positive

Insert Rules

1. Open Path Number is mandatory

Error Messages:

- Open Path Number is mandatory.

2. Open Path Number cannot already be entered for the site.

Error Messages:

- Unique constraint (AIRSRAQS.TR_SITEOPNPTH1_UK) violated

Update Rules

1. Requested Open Path Number not in database for Site.

Error Messages:

- Requested Open Path Number not in database

Delete Rules

1. Requested Open Path Number not in database for site.

Error Messages:

- Requested Open Path Number not in database

3.3.6 Direction from Receiver to Transmitter

- Description: The direction from the receiver to the transmitter at the site.
- Attributes: Alphanumeric
Up to 3-character code
Mandatory (for Insert)
- Coding Instructions: Place a valid direction to transmitter in the seventh delimited field. A direction to transmitter value is valid if it exists on the Compass Sectors Table.

Business Rules:

Common Rules

1. Direction to Transmitter must be in COMPASS_SECTORS table.
Error Messages:
 - Integrity constraint (AIRSRAQS.TR_CS_FK) violated.
2. COMPASS_SECTORS (COMPASS_SECTOR) must be at production status
Error Messages:
 - Status for COMPASS_SECTOR is inactive.

Insert Rules

1. Direction to Transmitter is mandatory.
Error Messages:
 - Direction from Receiver to Transmitter is mandatory.

Update Rules

1. Direction from Receiver to Transmitter may not be nullified.
Error Messages:
 - Direction from Receiver to Transmitter is mandatory.

Delete Rules

None.

3.3.7 Beam Length

- Description: The length of the beam projected between the transmitter and the receiver at the site, in meters.
- Attributes: Numeric
10 digits, including 2 decimal places (nnnnnnnn.nn)
Mandatory (for Insert)
- Coding Instructions: Place a valid beam length in the eighth delimited field. A beam length value is valid if it is greater than 0.

Business Rules:

Common Rules

1. Beam Length must be greater than 0.

Error Messages:

- Beam Length must be positive

Insert Rules

1. Beam Length is mandatory.

Error Messages:

- Beam Length is mandatory.

Update Rules

1. Beam Length may not be nullified.

Error Messages:

- Beam Length is mandatory.

Delete Rules

None.

3.3.8 Height of Transmitter

Description: The height of the transmitter above the ground, in meters.

Attributes: Numeric
10 digits, including 2 decimal places (nnnnnnnn.nn)
Mandatory (for Insert)

Coding Instructions: Place a valid height of transmitter in the ninth delimited field. A height of transmitter value is valid if it is greater than 0.

Business Rules:

Common Rules

1. Height of Transmitter must be greater than 0.

Error Messages:

- Height of Transmitter must be positive

Insert Rules

1. Height of Transmitter is mandatory.

Error Messages:

- Height of Transmitter is mandatory.

Update Rules

1. Height of Transmitter may not be nullified.

Error Messages:

- Height of Transmitter is mandatory.

Delete Rules

None.

3.3.9 Height of Receiver

Description: The height of the receiver above the ground, in meters.

Attributes: Numeric
10 digits, including 2 decimal places (nnnnnnnn.nn)
Mandatory (for Insert)

Coding Instructions: Place a valid height of receiver in the tenth delimited field. A height of receiver value is valid if it is greater than 0.

Business Rules:

Common Rules

1. Height of Receiver must be greater than 0.

Error Messages:

- Height of Receiver must be positive

Insert Rules

1. Height of Receiver is mandatory.

Error Messages:

- Height of Receiver is mandatory.

Update Rules

1. Height of Receiver may not be nullified.

Error Messages:

- Height of Receiver is mandatory.

Delete Rules

None.

3.3.10 Minimum Beam Height

Description: The height of the beam (at the lowest point from the ground) being projected between the receiver and transmitter at the site, in meters.

Attributes: Numeric
10 digits, including 2 decimal places (nnnnnnnn.nn)
Mandatory

Coding Instructions: Place a valid minimum height value in the eleventh delimited field. A minimum height value is valid if it is greater than 0 and less than maximum height.

Business Rules:

Common Rules

1. Minimum Height and Maximum height must be supplied together or not at all.

Error Messages:

- Minimum Beam Height is mandatory

2. If valued Minimum Height must be greater than 0.

Error Messages:

- Minimum Height must be positive

3. If valued Minimum Height must be less than Maximum Height.

Error Messages:

- Maximum Height must be greater than Minimum Height

Insert Rules

1. Minimum Beam Height is mandatory.

Error Messages:

- Minimum Beam Height is mandatory.

Update Rules

1. Minimum Beam Height may not be nullified.

Error Messages:

- Minimum Beam Height is mandatory.

Delete Rules

None.

3.3.11 Maximum Beam Height

Description: The height of the beam (at the highest point from the ground) being projected between the receiver and transmitter at the site, in meters.

Attributes: Numeric
10 digits, including 2 decimal places (nnnnnnnn.nn)
Mandatory (for Insert)

Coding Instructions: Place a valid Maximum height value in the twelfth delimited field. A maximum height value is valid if it is greater than 0 and greater than minimum height.

Business Rules:

Common Rules

1. Minimum Height and Maximum height must be supplied together or not at all.

Error Messages:

- Maximum Beam Height is mandatory

2. If valued Maximum Height must be greater than 0.

Error Messages:

- Maximum Height must be positive
3. If valued, Minimum Height must be less than Maximum Height,.
- Error Messages:**
- Maximum Height must be greater than Minimum Height

Insert Rules

1. Maximum Beam Height is mandatory.
- Error Messages:**
- Maximum Beam Height is mandatory.

Update Rules

1. Maximum Beam Height may not be nullified.
- Error Messages:**
- Maximum Beam Height is mandatory.

Delete Rules

None.

3.3.12 Land Use Under Path

Description: The prevalent land use under the path of the beam being projected between the receiver and transmitter at the site.

Attributes: Alphanumeric
Up to 20 characters
Mandatory (for Insert)

Coding Instructions: Place a valid land use under path description in the thirteenth delimited field. A land use under path value is valid if it exists on the Land Use Types Table.

Valid land use under path include:

AGRICULTURAL
BLIGHTED AREAS
COMMERCIAL
DESERT
FOREST
INDUSTRIAL
MILITARY RESERVATION
MOBILE
RESIDENTIAL

Business Rules:

Common Rules

1. Land Use Under Path must be in LAND_USE_TYPES table
- Error Messages:**
- Integrity constraint (AIRSRAQS.OP_LUT_FK) violated

2. LAND_USE_TYPES (LAND_USE_TYPE) must be at production status.
Error Messages:
 - Status for LAND_USE_TYPE is inactive

Insert Rules

1. Land Use Under Path is mandatory
Error Messages:
 - Land Use Under Path is mandatory.

Update Rules

1. Land Use Under Path may not be nullified.
Error Messages:
 - Land Use Under Path is mandatory.

Delete Rules

None.

3.4 Sampler Information – Transaction AD

See AQS Input Transaction Formats at <http://www.epa.gov/ttn/airs/airsaqs/manuals/> for a summary list of requirements for each transaction format.

3.4.0 Description of Transaction

This transaction allows information about the sampler to be stored in the database. This data is needed to support flow rate verifications/audits for filter based speciation methods. That is, the transactions for Speciation Flow Rate Verification and Speciation Semi-Annual Flow Rate Audit reference the sampler and channel information defined in this transaction. This data is only needed for samplers that will be reporting those associated QA transactions.

3.4.1 Transaction Type

Description: Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

Attributes: Alphanumeric
 2-character code
 Mandatory

Coding Instructions: Place AD in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory
Error Messages:

- Invalid transaction format.
2. Transaction Type must be in TRANSACTION_TYPES table in database.
Error Messages:
- Transaction type not handled.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.4.2 Action Indicator

Description: Indicator for Insert, Update, Delete, or Replace action.

Attributes: Alphanumeric
 1-character code
 Mandatory

Coding Instructions: Place the values I, U, or D in the second delimited field.

| | |
|---|---|
| I | Insert a new row into the appropriate table in the database. |
| U | Change one or more column values for an existing row in one or more tables. |
| D | Delete a row from a table(s) for the row containing the key data. |

Business Rules

Common Rules

1. Action Indicator is required.
Error Messages:
 - Action Code is Required.
2. Action Indicator must be either 'I', 'U', or 'D'.
Error Messages:
 - Invalid Action Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.4.3 State Code or Tribal Indicator

The third field on a transaction can be either a State Code or a Tribal indicator. They are described as follows:

State Code Description: A FIPS (Federal Information Processing Standards) code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Tribal Indicator Description: A flag, with value “TT”, to indicate that this data is for a Native American Tribe, and that the next field on the transaction identifies a tribal area using the Bureau of Indian Affairs tribal code.

Attributes: Alphanumeric
 2-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid FIPS state code or a Tribal Indicator in delimited field 3. A State Code is valid if it exists in the STATES Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.4.4 County Code or Tribal Code

The fourth field on any transaction can be either a County Code or a Tribal Code. A County code is indicated by a valid state code in the third field, while a Tribal Code is indicated by a Tribal Indicator in the third field.

County Code Description: A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as

Tribal Code Description: Mexican states or Canadian provinces.
A value that identifies a Tribal Area using a Bureau of Indian Affairs Tribal Code.

Attributes: Alphanumeric
3-digit code
Mandatory
Key Field

Coding Instructions: Place a valid county code or a valid tribal code in the fourth delimited field. A County Code is valid if it exists at active status in the Counties table. A Tribal Code is valid if it exists at active status in the Tribal_Areas table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.4.5 Site Number

Description: A numeric identifier (ID) that uniquely identifies each air monitoring site within a county or tribal area. There is no requirement that Site IDs be assigned continuously or in any particular order. Regional and Local organizations are thus free to allocate site numbers in any way they chose as long as there is no duplication within a county and tribal area. For Tribal sites, because tribal areas may cross county or state lines, care must be taken to ensure that the Site ID is unique in the effected Tribal Area and states-county.

A specific Site ID is associated with a specific physical location and address. Any change in address requires a new Site ID to be assigned. This address change could include a change from the roof of one building to another. A change in location on the same roof should not normally require a new Site ID. Although an address change would routinely mean a new Site ID, some changes that do not change the site's location in

respect to surrounding sources and its measurement scale, would require no change. An EPA Regional Office should be consulted for assistance in determining whether a new Site ID is required.

If a new Site ID is needed for a site not operated by the air pollution control agency, that agency should be contacted to assist in the ID assignment, to ensure that the ID is unique within the county. In other words, when a new Site ID is assigned, it must be different from any other Site ID already existing for that combination of State and County or Tribal Code.

Attributes: Alphanumeric
 4-digit ID
 Mandatory
 Key Field

Coding Instructions: Place a four-digit numeric code in the fifth delimited field. For update and delete, a Site ID value is valid if it exists in combination with state code and County or Tribal Code in the Sites Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.4.6 Sampler ID

Description: The user assigned unique name or id for the sampler at the site (e.g. Speciation-1).

Attributes: Alphanumeric
 Up to 20 characters
 Mandatory
 Key Field

Coding Instructions: Place value in delimited field 6.

Business Rules

Common Rules

1. The Sampler ID must be unique for the site.

Error Messages:

- Attempt to insert Duplicate Sampler.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.4.7 Sampler Owner

Description: Agency code of the agency that owns the sampler.

Attributes: Alphanumeric
 3 or 4 digit code
 Mandatory on insert

Business Rules:

Common Rules

1. Agency Code must be in STATE_AGENCIES table.

Error Messages:

- Integrity constraint (AIRSRAQS.AR1_SA_FK) violated.
2. User submitting record must be associated with the owning agency and have update privileges.
- #### **Error Messages:**
- Insufficient privileges to update owning agency.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.4.8 Manufacturer

Description: Equipment manufacturer.

Attributes: Alphanumeric
 80-character string

Business Rules

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.4.9 Model Number

Description: Manufacturer's model number.

Attributes: Alphanumeric
 40-character string
 Optional

Business Rules

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.4.10 Serial Number

Description: Manufacturer's serial number.

Attributes: Alphanumeric
 40-character string
 Optional

Business Rules

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.4.11 Channel Count

Description: Number of distinct concurrent samples that can be taken by the sampler.

Attributes: Positive number
Mandatory

Business Rules

Common Rules

1. Must be a positive integer.

Error Messages:

- Invalid Channel count.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.4.12 Begin Date

Description: Beginning of date range where the sampler details on the remainder of this transaction are valid.

Attributes: Date
8-digit date
Mandatory
Key Field

Coding Instructions: Place a valid begin date in the field. A begin date value is valid if:

- it is in the format of YYYYMMDD and the begin date does not fall within any other sampler begin and end dates defined for the site.

Business Rules:

Common Rules

1. Begin Date is required.
Error Messages:
 - The Begin Date is mandatory.
2. Begin Date must not fall within any other Begin Date - End Date range for the same site.
Error Messages:
 - Date cannot be within an existing date range.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.4.13 End Date

Description: End of date range where the sampler details on the remainder of this transaction are valid.

Attributes: Date
8-digit date
Optional

Coding Instructions: Place a valid end date in the thirteenth delimited field. An end date value is valid if:

- it is in the format of YYYYMMDD and the begin date does not fall within any other sampler begin and end dates defined for the site.

Business Rules:

Common Rules

1. End Date must be greater than Collocation Begin Date.
Error Messages:
 - End Date must be greater than Begin Date.
2. End Date must not fall within any other Begin Date - End Date range for the same site
Error Messages:
 - Date cannot be within an existing date range.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.5 Sampler Channel – Transaction AE

See AQS Input Transaction Formats at <http://www.epa.gov/ttn/airs/airsaqs/manuals/> for a summary list of requirements for each transaction format.

3.5.0 Definition of Transaction

This transaction is used to store information for each channel associated with a sampler, including filter type associated with each channel and date ranges. This data is needed to support flow rate verifications/audits for filter based speciation methods. That is, the transactions for Speciation Flow Rate Verification and Speciation Semi-Annual Flow Rate Audit reference the sampler and channel information defined in this transaction. This data is only needed for samplers that will be reporting those associated QA transactions.

3.5.1 Transaction Type

Description: Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

Attributes: Alphanumeric
 2-character code
 Mandatory

Coding Instructions: Place AE in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory

Error Messages:

- Invalid transaction format.

2. Transaction Type must be in TRANSACTION_TYPES table in database.

Error Messages:

- Transaction type not handled.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.5.2 Action Indicator

Description: Indicator for Insert, Update, Delete, or Replace action.

Attributes: Alphanumeric
 1-character code
 Mandatory

Coding Instructions: Place the values I, U, or D in the second delimited field.
I Insert a new row into the appropriate table in the database.
U Change one or more column values for an existing row in one or
 more tables.
D Delete a row from a table(s) for the row containing the key data.

Business Rules

Common Rules

1. Action Indicator is required.
Error Messages:
 - Action Code is required.
2. Action Indicator must be either 'I', 'U', or 'D'.
Error Messages:
 - Invalid Action Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.5.3 State Code or Tribal Indicator

The third field on a transaction can be either a State Code or a Tribal indicator. They are described as follows:

State Code Description: A FIPS (Federal Information Processing Standards) code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Tribal Indicator Description: A flag, with value "TT", to indicate that this data is for a Native American Tribe, and that the next field on the transaction identifies a tribal area using the Bureau of Indian Affairs tribal code.

Attributes: Alphanumeric
 2-digit code
 Mandatory

Key Field

Coding Instructions: Place a valid FIPS state code or a Tribal Indicator in delimited field 3. A State Code is valid if it exists in the STATES Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.5.4 County Code or Tribal Code

The fourth field on any transaction can be either a County Code or a Tribal Code. A County code is indicated by a valid state code in the third field, while a Tribal Code is indicated by a Tribal Indicator in the third field.

County Code Description: A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

Tribal Code Description: A value that identifies a Tribal Area using a Bureau of Indian Affairs Tribal Code.

Attributes: Alphanumeric
 3-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid county code or a valid tribal code in the fourth delimited field. A County Code is valid if it exists at active status in the Counties table. A Tribal Code is valid if it exists at active status in the Tribal_Areas table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.5.5 Site Number

Description: A numeric identifier (ID) that uniquely identifies each air monitoring site within a county or tribal area. There is no requirement that Site IDs be assigned continuously or in any particular order. Regional and Local organizations are thus free to allocate site numbers in any way they chose as long as there is no duplication within a county and tribal area. For Tribal sites, because tribal areas may cross county or state lines, care must be taken to ensure that the Site ID is unique in the effected Tribal Area and states-county.

A specific Site ID is associated with a specific physical location and address. Any change in address requires a new Site ID to be assigned. This address change could include a change from the roof of one building to another. A change in location on the same roof should not normally require a new Site ID. Although an address change would routinely mean a new Site ID, some changes that do not change the site's location in respect to surrounding sources and its measurement scale, would require no change. An EPA Regional Office should be consulted for assistance in determining whether a new Site ID is required.

If a new Site ID is needed for a site not operated by the air pollution control agency, that agency should be contacted to assist in the ID assignment, to ensure that the ID is unique within the county. In other words, when a new Site ID is assigned, it must be different from any other Site ID already existing for that combination of State and County or Tribal Code.

Attributes: Alphanumeric
4-digit ID
Mandatory
Key Field

Coding Instructions: Place a four-digit numeric code in the fifth delimited field. For update and delete, a Site ID value is valid if it exists in combination with state code

and County or Tribal Code in the Sites Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.5.6 Sampler ID

Description: The user assigned unique name or id for the sampler at the site (e.g. Speciation-1).

Attributes: Alphanumeric
 Up to 20 characters
 Mandatory
 Key Field

Coding Instructions: Place value in delimited field 6. Must exist for the Site in database (that is, it must have been loaded with an AD transaction previously or in the same file as this transaction).

Business Rules

Common Rules

1. The Sampler ID must be in the SITE_SAMPLERS table in the database.

Error Messages:

- Sampler ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.5.7 Channel Number

Description: Number assigned to channel on sampler.

Attributes: Positive Integer
Mandatory
Key Field

Coding Instructions: Positive Number; must be less than or equal to the channel count for the sampler.

Business Rules

Common Rules

1. The value must be a positive integer.
Error Messages:
 - Invalid number.
2. The value must be less than or equal to the number of channels on the sampler as defined in the Site Sampler record.
Error Messages:
 - Invalid Channel Number..

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.5.8 Filter Type

Description: Type of filter loaded into this channel in sampler (e.g. Quartz)

Attributes: Alphanumeric
Optional

Coding Instructions: Must exist in AQS_FILTER_TYPES table.

Current values are: QUARTZ
TEFLON
GLASS
NYLON

Business Rules

Common Rules

1. The Filer Type must be in the AQS_FILTER_TYPES table in the database.
Error Messages:

- Filter Type not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.5.9 Target Flow Rate

Description: Nominal flow rate for channel.

Attributes: Numeric
 Optional

Coding Instructions: Positive number

Business Rules

Common Rules

1. The value must be in a positive number.

Error Messages:

- Target Flow Rate must be a positive number.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.5.10 Flow Units

Description: Units code of target flow rate.

Attributes: Alphanumeric
 3-digit code
 Conditionally required

Coding Instructions: Place value in tenth field. Required if Target Flow Rate provided. Must exist in AQS Units table with unit type of "FLOW".

Business Rules

Common Rules

1. Must exist in AQS Units table with unit type of "FLOW".

Error Messages:

- Unit code invalid for flow.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.5.11 Begin Date

Description: Beginning of date range where the monitor implements the specified method

Attributes: Date
 8-digit date
 Mandatory
 Key Field

Coding Instructions: Place a valid collocation begin date in the eleventh delimited field. A begin date value is valid if:

- it is in the format of YYYYMMDD,
- the begin date does not fall within any other sampler channel definition period for the site.

Business Rules:

Common Rules

1. Begin Date is required.

Error Messages:

- The Begin Date is mandatory.
2. Begin Date must not fall within any other Sample Channel Begin Date - End Date range for the same site.
- #### **Error Messages:**
- Date cannot be within an existing date range.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.5.12 End Date

Description: End of date range where the monitor implements the specified method

Attributes: Date
8-digit date
Optional

Coding Instructions: Place a valid end date in the twelfth delimited field. A end date value is valid if:

- it is in the format of YYYYMMDD,
- the end date does not fall within any other period defined for the site,
- it is after the Sampler Channel Begin Date.

Business Rules:

Common Rules

1. End Date must be greater than Sampler Channel Begin Date.

Error Messages:

- End Date must be greater than Begin Date.

2. End Date must not fall within any other Sampler Channel Begin Date-Collocation End Date range for the same site.

Error Messages:

- Date cannot be within an existing date range.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

3.6 Site Comments (Online Update Only)

Description: Site comments is a free-format field that may be used in any way desired. It is commonly used to describe special features of a site. Multiple lines can be created by incrementing the sequence number. Online update only.

Attributes: 68 characters
Optional

Coding Instructions: To insert or update, place the appropriate text in the comment fields using the maintain screen.

4 Monitor Transactions (MA – MX)

This set of eleven transactions is used to update monitor information in the site file.

Type MA, Basic Monitor Information, performs data manipulation on the Monitors and Pollutant Area Monitors Tables, and contains the following fields:

| | | |
|--------------------------------|---------------------------------|---------------------------|
| Transaction Type | Measurement Scale | Spatial Average Indicator |
| Action Indicator | Open Path Number | Schedule Exemption |
| State Code or Tribal Indicator | Probe Location Code | Indicator |
| County Code or Tribal Code | Probe Height | Community Monitoring Zone |
| Site ID | Probe Horizontal Distance | Pollutant Area Code – 1 |
| Parameter | Probe Vertical Distance | Pollutant Area Code – 2 |
| POC | Surrogate Indicator | Pollutant Area Code – 3 |
| Project Class | Unrestricted Air Flow Indicator | Pollutant Area Code – 4 |
| Dominant Source | Sample Residence Time | Pollutant Area Code – 5 |
| | Worst Site Type | Close Date |
| | Applicable NAAQS Indicator | |

Type MB, Monitor Sampling Periods, performs data manipulation on the Sample Periods Table, and contains the following fields:

| | | |
|--------------------------------|----------------------------|---------------------|
| Transaction Type | County Code or Tribal Code | Date Sampling Began |
| Action Indicator | Site ID | Date Sampling Ended |
| State Code or Tribal Indicator | Parameter | |
| | POC | |

Type MC, Monitor Type Information, performs data manipulation on the Monitor Type Assignments Table, and contains the following fields:

| | | |
|--------------------------------|----------------------------|-------------------------|
| Transaction Type | County Code or Tribal Code | Monitor Type |
| Action Indicator | Site ID | Monitor Type Begin Date |
| State Code or Tribal Indicator | Parameter | Monitor Type End Date |
| | POC | |

Type MD, Monitor Agency Role, performs data manipulation on the Agency Roles Table, and contains the following fields:

| | | |
|--------------------------------|----------------------------|------------------------|
| Transaction Type | County Code or Tribal Code | Agency Role Name |
| Action Indicator | Site ID | Agency Code |
| State Code or Tribal Indicator | Parameter | Agency Role Begin Date |
| | POC | Agency Role End Date |

Type ME, Monitoring Objective Information, performs data manipulation on the Monitor Objectives Table, and contains the following fields:

| | | |
|--------------------------------|----------------------------|------------------------|
| Transaction Type | County Code or Tribal Code | Urban Area Represented |
| Action Indicator | Site ID | MSA Represented |
| State Code or Tribal Indicator | Parameter | CMSA Represented |
| | POC | CBSA Represented |
| | Monitor Objective Type | CSA Represented |

Type MF, Monitor Sampling Schedule, performs data manipulation on the Req. Coll. Frequencies and Sample Schedules Tables, and contains the following fields:

| | |
|--------------------------------|--|
| Transaction Type | POC |
| Action Indicator | Required Collection Frequency Code |
| State Code or Tribal Indicator | Required Collection Frequency Begin Date |
| County Code or Tribal Code | Required Collection Frequency End Date |
| Site ID | Monthly Required Collection Frequency Code January - |
| Parameter | December (12 instances) |

Type MG, Monitor Street Description, performs data manipulation on the Monitor Tangent Roads Table, and contains the following fields:

| | | |
|--------------------------------|----------------------------|--------------------------|
| Transaction Type | County Code or Tribal Code | Tangent Street Number |
| Action Indicator | Site ID | Distance from Monitor to |
| State Code or Tribal Indicator | Parameter | Tangent Road |
| | POC | |

Type MH, Monitor Obstruction Information, performs data manipulation on the Probe Obstructions Table, and contains the following fields:

| | | |
|--------------------------------|----------------------------|---------------------------|
| Transaction Type | County Code or Tribal Code | Direction from Monitor to |
| Action Indicator | Site ID | Probe Obstruction |
| State Code or Tribal Indicator | Parameter | Distance from Monitor to |
| | POC | Probe Obstruction |
| | Probe Obstruction Type | Probe Obstruction Height |

Type MI, Monitor Regulatory Compliance, performs data manipulation on the Regulation Compliances Table, and contains the following fields:

| | | |
|--------------------------------|----------------------------|----------------------|
| Transaction Type | County Code or Tribal Code | Regulation Code |
| Action Indicator | Site ID | Compliance Indicator |
| State Code or Tribal Indicator | Parameter | Compliance Date |
| | POC | |

Type MJ, Monitor Collocation Period, performs data manipulation on the Monitor Collocations Table, and contains the following fields:

| | | |
|--------------------------------|----------------------------|---|
| Transaction Type | County Code or Tribal Code | Collocation Begin Date |
| Action Indicator | Site ID | Collocation End Date |
| State Code or Tribal Indicator | Parameter POC | Distance from Primary Sampler Primary Sampler Indicator |

Type MK, Monitor Protocol: Deprecated

Type MM, Monitor Method performs data manipulation on the Monitor Method Table, and contains the following fields:

| | | |
|----------------------------|------------------|--------------------------------|
| Transaction Type | Action Indicator | State Code or Tribal Indicator |
| County Code or Tribal Code | Site ID | Parameter Code |
| POC | Method Code | Begin Date |
| End date | | |

Type MN, Monitor Network Affiliation performs data manipulation on the Monitor Network Affiliation Table, and contains the following fields:

| | | |
|--------------------------------|----------------------------|-------------|
| Transaction Type | County Code or Tribal Code | Method Code |
| Action Indicator | Site ID | Begin Date |
| State Code or Tribal Indicator | Parameter Code | End date |
| | POC | |

Type MO, Primary Monitor Period performs data manipulation on the Primary Monitor Period Table, and contains the following fields:

| | | |
|----------------------------|------------------|--------------------------------|
| Transaction Type | Action Indicator | State Code or Tribal Indicator |
| County Code or Tribal Code | Site ID | Parameter Code |
| POC | Method Code | Begin Date |
| End date | | |

Type MX, Monitor Protocol performs data manipulation on the Monitor Protocols Table, and contains the following fields:

| | | |
|----------------------------|------------------|--------------------------------|
| Transaction Type | Action Indicator | State Code or Tribal Indicator |
| County Code or Tribal Code | Site ID | Parameter Code |
| POC | Method Code | Begin Date |
| End date | | |

Update transactions are used to change information for existing monitors. The values coded on an update transaction replace the values of the corresponding fields in the monitor related tables. If no value existed previously, the value from the transaction is inserted into the appropriate monitor related table row. Some fields are required, and cannot be deleted. They are identified in the coding instructions that follow, and in transaction formats.

4.0 Monitor Transactions - Data Completeness

To insert a new monitor, either its parent site must already exist in the database, or the parent site must be created at the same time as the site transactions in the batch file.

To create a new monitor:

- Transaction Types MA, MB, MC, MD, and ME are always required;
- Type MF is required for all PM10 and PM2.5 monitors;
- Type MF with a monthly schedule is required for random or seasonal frequencies;
- Type MI for criteria pollutant monitors;
- Type MH for monitors with Unrestricted Air Flow Indicator of “N” or “W”.

An incomplete monitor will be set to “F” status. Once all required values are entered for a monitor it will be changed to “P” status. (“F” status monitors can only be created through batch loading of data. The Maintain monitor form will not allow a save of data until all required values are entered.) Once a monitor is at “P” status, its information cannot be updated such that the completeness rules are violated.

Business Rules:

1. A parent site must exist in the database before a monitor can be created.
Error Message:
 - An associated Site record could not be found for this monitor.
2. A production monitor must have at least one sample period.
Error Message:
 - To enter a Monitor record, you must also enter a Sampling Period record.
3. A production monitor must have monitor type assignments that cover all sample periods.
Error Message:
 - Each day in a sample period must have a monitor type assignment.
4. A production monitor must have reporting organization periods that cover all sample periods.
Error Message:
 - Each day in a sample period must have a reporting organization.
5. A production monitor must have PQA periods that cover all portions of sample periods since 1/1/2007.
Error Message:
 - Each day in a sample period since 1/1/2007 must have a primary quality assurance organization.

6. A production monitor must have at least one monitor objective.
Error Message:
- To enter a Monitor record, you must also enter a Monitoring Objective record.
7. A production monitor for defined parameters must have required collection frequency periods that cover all portions of sample periods since 7/1/1987. Those parameters are:

- PM10 Total 0-1um STP (81102);
- PM2.5 – Local Conditions (88101);
- Lead TSP LC FRM/FEM (14129);
- Lead PM10 LC FRM/FEM (85129).

Error Message:

- Required collection frequency required for this parameter.

8. A production PM2.5 monitor with seasonal required collection frequency periods must have twelve monthly schedules for those periods and a non-PM2.5 production monitor with random or Seasonal required collection frequency periods must have at least one monthly schedule for those periods.

Error Message:

- Sample Schedule Criteria have not been met.

9. A production monitor with an Unrestricted Air Flow Indicator of “N” or “W” requires at least one probe obstruction.

Error Message:

- You must have at least one active Probe Obstruction record.

10. Method records are required to cover all days of operation for a monitor.

Error Message:

- Each day in a sample period must have a monitor method.

4.1 Basic Monitor Information - Transaction Type MA

See AQS Input Transaction Formats at <http://www.epa.gov/ttn/airs/airsaqs/manuals/> for a summary list of requirements on each transaction format. For criteria pollutant monitors, transaction types MA through ME are required.

4.1.0 Transaction Type

Description: Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

Attributes: Alphanumeric
2-character code
Mandatory

Coding Instructions: Place MA in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory

Error Messages:

- Invalid transaction format.

2. Transaction Type must be in TRANSACTION_TYPES table in database.

Error Messages:

- Transaction type not handled.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.1.1 Action Indicator

Description: Indicates the data manipulation action to be performed by the transaction.

Attributes: Alphanumeric
1-character code
Mandatory

Coding Instructions: Place the values I, U, or D in the second delimited field.

- I Insert a new row into the appropriate table in the database.
- U Change one or more column values for an existing row in one or more tables.
- D Delete a row from a table(s) for the row containing the key data.

Business Rules

Common Rules

1. Action Indicator is required.
Error Messages:
 - Action Code is Required.
2. Action Indicator must be either ‘I’, ‘U’, or ‘D’.
Error Messages:
 - Invalid Action Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.1.2 State Code or Tribal Indicator

The third field on a transaction can be either a State Code or a Tribal indicator. They are described as follows:

State Code Description: A FIPS (Federal Information Processing Standards) code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Tribal Indicator Description: A flag, with value “TT”, to indicate that this data is for a Native American Tribe, and that the next field on the transaction identifies a tribal area using the Bureau of Indian Affairs tribal code.

Attributes: Alphanumeric
 2-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid FIPS state code or a Tribal Indicator in delimited field 3. A State Code is valid if it exists in the STATES Table.

Business Rules

Common Rules:

1. (State Code, County Code, Site ID) must be in the SITES table.

Error Messages:

- Invalid Site ID.

4.1.3 County Code or Tribal Code

The fourth field on any transaction can be either a County Code or a Tribal Code. A County code is indicated by a valid state code in the third field, while a Tribal Code is indicated by a Tribal Indicator in the third field.

County Code Description: A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

Tribal Code Description: A value that identifies a Tribal Area using a Bureau of Indian Affairs Tribal Code.

Attributes: Alphanumeric
3-digit code
Mandatory
Key Field

Coding Instructions: Place a valid county code or a valid tribal code in the fourth delimited field. A County Code is valid if it exists at active status in the Counties table. A Tribal Code is valid if it exists at active status in the Tribal Areas table.

County Code Business Rules

Common Rules:

1. County Code is required.

Error Messages:

- County Code is required.

2. (State Code, County Code, Site ID) must be in the SITES table.

Error Messages:

- Invalid Site ID.

Tribal Code Business Rules

Common Rules:

1. Tribal Code is required.

Error Messages:

- Tribal Code is required.

2. (Tribal Code, Site ID) must be in the SITES table.

Error Messages:

- Invalid Site ID.

4.1.4 Site ID

Description: A numeric identifier (ID) that uniquely identifies each air monitoring site

within a county or tribal area. There is no requirement that Site IDs be assigned continuously or in any particular order. Regional and Local organizations are thus free to allocate site numbers in any way they chose as long as there is no duplication within a county and tribal area. For Tribal sites, because tribal areas may cross county or state lines, care must be taken to ensure that the Site ID is unique in the effected Tribal Area and states-county.

A specific Site ID is associated with a specific physical location and address. Any change in address requires a new Site ID to be assigned. This address change could include a change from the roof of one building to another. A change in location on the same roof should not normally require a new Site ID. Although an address change would routinely mean a new Site ID, some changes that do not change the site's location in respect to surrounding sources and its measurement scale, would require no change. An EPA Regional Office should be consulted for assistance in determining whether a new Site ID is required.

If a new Site ID is needed for a site not operated by the air pollution control agency, that agency should be contacted to assist in the ID assignment, to ensure that the ID is unique within the county. In other words, when a new Site ID is assigned, it must be different from any other Site ID already existing for that combination of State and County or Tribal Code.

Attributes: Alphanumeric
 4-digit ID
 Mandatory
 Key Field

Coding Instructions: Place a four-digit numeric code in the fifth delimited field. For update and delete, a Site ID value is valid if it exists in combination with state code and County or Tribal Code in the Sites Table.

Business Rules

Common Rules:

1. Site ID is mandatory.
Error Messages:
 - Site ID is required.

2. Site ID must be exactly 4 digits.
Error Messages:
 - Invalid Site ID length

3. (State Code, County Code, Site ID) must be in the SITES table.
Error Messages:
 - Invalid Site ID.

- (Tribal Code, Site ID) must be in the SITES table.

Error Messages:

- Invalid Site ID.

4.1.5 Parameter

Description: The code assigned to the parameter measured by the monitor. Parameters may be pollutants or non-pollutants.

Attributes: Alphanumeric
5-digit code
Mandatory
Key Field

Coding Instructions: Place a valid parameter code in the sixth delimited field. A parameter value is valid if it exists on the Parameters Table when Inserting a new monitor; or in combination with state code, County/Tribal Code, Site ID, and POC in the Monitors Table for Updating or Deleting an existing monitor.

Business Rules

Common Rules

- Parameter Code is Mandatory.
Error Messages:
 - Parameter Code is mandatory.
- Parameter Code must be in PARAMETERS table.
Error Messages:
 - Integrity constraint (AIRSRAQS.MO_PA_FK) violated
- PARAMETERS (PARAMETER_CODE) must be at production status.
Error Messages:
 - Status for PARAMETER_CODE is inactive.

Insert Rules

- The Monitor ID, (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC), cannot be already in the MONITORS table in the database.
Error Messages:
 - Unique constraint (AIRSRAQS.MO_MON_UK) violated.

Update Rules

- The Monitor ID, (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC), must be in the MONITORS table in the database.
Error Messages:
 - Monitor ID not in database.

Delete Rules

1. The Monitor ID, (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC), must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

4.1.6 POC (Parameter Occurrence Code)

Description: An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter. For example, the first monitor established to measure CO at a site could have a POC of 1. If an additional monitor were established at the same site to measure CO, that monitor could have a POC of 2. However, if a new instrument is installed to replace the original instrument used as the first monitor, that could be considered the same monitor and it would still have a POC of 1.

For criteria pollutants, data from different sampling methods should only be stored under the same POC if the sampling intervals are the same and the methods are reference or equivalent. For sites where duplicate sampling is being conducted by multiple agencies or by one agency with multiple samplers, multiple POCs must be utilized to store all samples.

For non-criteria pollutants, data from multiple sampling methods can be stored under the same POC if the sampling intervals are the same and there is only one sample for the time reported. If multiple open path monitors are reporting data for the same parameter, each open path would be assigned a different POC.

There are no national EPA practices assigning POC values. There may be regional or agency conventions where a POC value may have specific significance. Numbers do not need to be assigned sequentially.

Attributes: Numeric
2-digit ID
Mandatory
Key Field

Coding Instructions: Place a valid POC value in the seventh delimited field. For Insert, a POC value is valid if it is a one or 2 digit value from 1 to 99, and has not been used for the site and parameter previously. For Update and Delete, a POC value is valid if it exists in combination with state code, County/Tribal Code, Site ID, and parameter on the Monitors Table.

Business Rules

Common Rules

1. POC is Mandatory.

Error Messages:

- POC is mandatory.
2. POC must be a number greater than 0

Error Messages:

- POC must be positive

Insert Rules

1. The Monitor ID, (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC), cannot be already in the MONITORS table in the database.

Error Messages:

- Unique constraint (AIRSRAQS.MO_MON_UK) violated.

Update Rules

1. The Monitor ID, (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC), must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Delete Rules

1. The Monitor ID, (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC), must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

4.1.7 Project Class

Description: The type of sampling performed by the monitor.

Attributes: Alphanumeric
2-digit code
Optional

Coding Instructions: Place a valid project class code in the eighth delimited field. A project class value is valid if it exists in the Project Types Table.

Business Rules:

Common Rules

1. Project Class must be in PROJECT_TYPES table.

Error Messages:

- Integrity constraint (AIRSRAQS.MO_PTY_FK) violated.

2. PROJECT_TYPES (PROJECT_TYPE_CODE) must be at production status.

Error Messages:

- Status for PROJECT_TYPE_CODE is inactive.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.1.8 Dominant Source

- Description: The primary source of the pollutant being measured.
- Attributes: Alphanumeric
Up to 20 characters
Optional
- Coding Instructions: Place a valid dominant source term in the ninth delimited field. A dominant source value is valid if it exists in the Dominant Sources Table. Valid dominant sources include:
- AREA
 - MOBILE
 - POINT

Business Rules:

Common Rules

1. Dominant Source must be in DOMINANT_SOURCES table.
Error Messages:
 - Integrity constraint (AIRSRAQS.MO_DS_FK) violated.
2. DOMINANT_SOURCES (DOMINANT_SOURCE) must be at production status.
Error Messages:
 - Status for DOMINANT_SOURCE is inactive.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.1.9 Measurement Scale

- Description: The geographic scope of the air quality measurements made by the monitor. The implication is that the same measurement made elsewhere within the measurement scale would produce an equivalent result to that

produced at the monitoring site.

Attributes: Alphanumeric
 Up to 20 characters
 Optional

Coding Instruction: Place a valid measurement scale term in the tenth delimited field. A measurement scale term is valid if it exists in the Measurement Scales Table.

Valid measurement scales and descriptions include:

| | |
|----------------|-------------------|
| MICROSCALE | 0 M TO 100 M |
| MIDDLE SCALE | 100 M TO 500 M |
| NEIGHBORHOOD | 500 M TO 4KM |
| REGIONAL SCALE | 50 TO HUNDREDS KM |
| URBAN SCALE | 4 KM TO 50 KM |

Business Rules:

Common Rules

1. Measurement Scale must be in MEASUREMENT_SCALES table.

Error Messages:

- Integrity constraint (AIRSRAQS.MO_MS_FK) violated.

2. MEASUREMENT_SCALES (MEASUREMENT_SCALE) must be at production status.

Error Messages:

- Status for MEASUREMENT_SCALE is inactive.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.1.10 Open Path Number

Description: The specific open path number registered at the site that the monitoring data and monitor represent. The number must be registered at the site before it can be identified by the monitor.

Attributes: Numeric
 2 digits (nn)
 Optional

Coding Instructions: Place a valid open path number in the eleventh delimited field. An open path number value is valid if it exists in combination with state code, County/Tribal Code, and Site ID on the Open Paths Table. In other words,

an open path must be defined for the site before it can be referenced from the monitor.

Business Rules:

Common Rules

1. Open Path Number must be in OPEN_PATHS table for the site.
Error Messages:
 - Integrity constraint (AIRSRAQS.MO_OP_FK) violated.

2. Open Path Number for Site must be at production status.
Error Messages:
 - Open Path is inactive.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.1.11 Probe Location Code

Description: The location of the sampling probe.

Attributes: Alphanumeric
Up to 20 characters
Optional

Coding Instructions: Place a valid probe location term in the twelfth delimited field. A probe location term is valid if it exists in the Probe Locations Table.

Valid probe location codes include:

GROUND LEVEL SUPPORT
OTHER
POLE
SIDE OF BUILDING
TOP OF BUILDING
TOWER

Business Rules:

Common Rules

1. Probe Location Code must be in PROBE_LOCATIONS table.
Error Messages:
 - Integrity constraint (AIRSRAQS.MO_PL_FK) violated.

2. Probe Location Code (PROBE_LOCATION) must be at production status.
Error Messages:

- Status for PROBE_LOCATION is inactive.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.1.12 Probe Height

Description: The height of the sampling probe from the ground in meters.

Attributes: Numeric
 10 digits, including 2 decimal places (nnnnnnnn.nn)
 Optional.
 Required on insert
 Optional on update
 May not be deleted

Coding Instructions: Place a valid probe height value in the thirteenth delimited field. A probe height value is valid if it is greater than 0.

Business Rules:

Common Rules

1. Probe Height must be greater than 0.

Error Messages:

- Probe Height must be positive

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.1.13 Probe Horizontal Distance

Description: The horizontal distance, in meters, of the probe from its supports.

Attributes: Numeric
 10 digits, including 2 decimal places (nnnnnnnn.nn)
 Conditionally required.

Coding Instructions: Place a valid probe horizontal distance value in the fourteenth delimited

field. A horizontal distance value is valid if it is greater than 0. A value of 0 or greater is required if the Probe Vertical Distance is greater than 0. This is a required field for NAMS or PAMS monitors.

Business Rules:

Common Rules

1. Horizontal Distance or Vertical Distance, if provided, must be greater than 0, and the other must be at least 0.

Error Messages:

- Horizontal Distance or Vertical Distance must be greater than 0, and the other must be at least 0

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.1.14 Probe Vertical Distance

Description: The vertical distance, in meters, of the probe from its supports.

Attributes: Numeric
10 digits, including 2 decimal places (nnnnnnnn.nn)
Optional

Coding Instructions: Place a valid probe vertical distance value in the fifteenth delimited field. A horizontal distance value is valid if it is greater than 0. . A value of 0 or greater is required if the Probe Horizontal Distance is greater than 0.

Business Rules:

Common Rules

1. Horizontal Distance or Vertical Distance must be greater than 0, and the other must be at least 0.

Error Messages:

- Horizontal Distance or Vertical Distance must be greater than 0, and the other must be at least 0

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.1.15 Surrogate Indicator

Description: Indicates whether a Total Suspended Particulate (TSP) monitor serves as a surrogate monitor for PM-10.

Attributes: 1-character code: Y or N
Optional: (Required for TSP insert. Prohibited if not TSP)

Coding Instructions: If parameter is 11101 and the monitor is a surrogate for PM-10, then place the value Y in the sixteenth delimited field.
If parameter is not 11101, or parameter is 11101, but the monitor is not a surrogate for PM-10, place nothing or N in the sixteenth delimited field.

Business Rules:

Common Rules

1. Surrogate Indicator may only be valued when Parameter is equal to '11101', which is the code for TSP.

Error Messages:

- Surrogate Indicator is required for TSP (11101) and invalid for all other parameters

2. Surrogate Indicator must be 'Y' or 'N'.

Error Messages:

- Value for Surrogate Flag Indicator must be one of the following: Y, N

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.1.16 Unrestricted Air Flow Indicator

Description: Indication of whether the flow of air to the monitor is restricted.

Attributes: Alphanumeric
1-character code: Y, N, or W
Optional

Coding Instructions: Place a valid unrestricted air flow indicator in the seventeenth delimited field. An unrestricted air flow indicator value is valid if it is Y (for yes), N (for no), or W (for waiver). If the value entered is N, transaction MH is

required to enter monitor obstruction information.

Business Rules:

Common Rules

1. Unrestricted Air Flow Indicator must be 'Y', 'N', or 'W'.

Error Messages:

- Value for Unrestricted Air Flow Indicator must be one of the following: Y, N, W

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.1.17 Sample Residence Time

Description: The time in seconds for the sample to move from the probe inlet to the monitor.

Attributes: Numeric
10 digits, including 2 decimal places (nnnnnnnn.nn)
Optional

Coding Instructions: Place a valid sample residence time in the eighteenth delimited field. A sample residence time value is valid if it is greater than 0.

Business Rules:

Common Rules

1. Sample residence time value must be numeric.

Error Messages:

1. Unable to insert Monitor into database.
 - invalid number

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.1.18 Worst Site Type

Description: Within a particular monitoring area, those monitors with the highest PM-10 concentrations must have their worst site type set to “1”, and are expected to monitor at the recommended collection frequency. Other monitors must be classified as either: “2”, not worst site monitors; or “3”, monitoring on an accelerated schedule, but not at the recommended collection frequency.

Attributes: Alphanumeric
1-digit code
Optional: (Required for PM-10 insert, Prohibited if not PM-10)

Coding Instructions: Place a valid worst site type code in the nineteenth delimited field.

If either Pollutant Area Code 1, Pollutant Area Code 2, Pollutant Area Code 3, Pollutant Area Code 4, Or Pollutant Area Code 5 are populated with a monitoring area code, then worst site type is required.

For an insert, a worst site type value is valid if:

- it exists in the Worst Site Types Table AND
- at least one of the Pollutant Area Code fields (1,2,3,4 or 5) is populated with a monitoring area code.

For an update, a worst site type value is valid if:

- it exists in the Worst Site Types Table AND
 - at least one of the Pollutant Area Code fields (1,2,3,4 or 5) is populated with a monitoring area code, OR
 - there is an existing monitoring area code for the monitor on the Pollutant Area Monitors Table.

Business Rules:

Common Rules

1. Worst Site Type must be valued when Pollutant Area Code is a Monitoring Area.

Error Messages:

- Worst Site Type is required for a Monitoring Area

2. Worst Site Type may not be valued when Pollutant Area Code is not a Monitoring Area

Error Messages:

- Worst Site Type is invalid for a Monitor Planning Area
- Worst Site Type is invalid for a Status Area

3. Worst Site Type must be in WORST_SITE_TYPES table.

Error Messages:

- Integrity constraint (AIRSRAQS.PAM_WST_FK) violated.

4. WORST_SITE_TYPES (WORST_SITE_TYPE) must be at production status.

Error Messages:

- Status for WORST_SITE_TYPE is inactive.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.1.19 Applicable NAAQS Indicator

Description: The applicable NAAQS (National Ambient Air Quality Standards) indicator determines whether the data from a monitor in a monitor planning area should be compared to either the short-term or annual NAAQS, or both.

Attributes: Alphanumeric
1-character code
Optional

Coding Instructions: Place a valid applicable NAAQS indicator in the twentieth delimited field. An applicable NAAQS indicator value is valid if it is S (for short-term), A (for annual), or B (for both), and one of the following is populated with a monitor planning area code: Pollutant Area Code 1, Pollutant Area Code 2, Pollutant Area Code 3, Pollutant Area Code 4, or Pollutant Area Code 5.

Business Rules:

Common Rules

1. Applicable NAAQS Indicator must be valued when Pollutant Area Code is a Monitor Planning Area.

Error Messages:

- Applicable NAAQS Indicator is required for a Monitor Planning Area

2. Applicable NAAQS Indicator may not be valued when Pollutant Area Code is not a Monitor Planning Area.

Error Messages:

- Applicable NAAQS Indicator is invalid for a Monitoring Area
- Applicable NAAQS Indicator is invalid for a Status Area

3. Applicable NAAQS Indicator must be 'S', 'A', or 'B'.

Error Messages:

- Value for Applicable NAAQS Indicator must be one of the following: S, A, B

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.1.20 Spatial Average Indicator

Description: Indicates whether spatial averaging is to be performed for the individual annual weighted means for sites that are flagged and in the same community monitoring zone.

Attributes: Alphanumeric
1-character code
Optional

Coding Instructions: Place a valid spatial average indicator in the twenty-first delimited field. A spatial average indicator value is valid if:

- It is Y (for yes), or N (for no), AND
- One of the following is populated with a monitor planning area code: Pollutant Area Code 1, Pollutant Area Code 2, Pollutant Area Code 3, Pollutant Area Code 4, or Pollutant Area Code 5, AND
- Community monitoring zone is assigned a value.

Business Rules:

Common Rules

1. Spatial Average Indicator must be valued when Pollutant Area Code is a Monitor Planning Area.

Error Messages:

- Spatial Average Indicator is required for a Monitor Planning Area

2. Spatial Average Indicator may not be valued when Pollutant Area Code is not a Monitor Planning Area.

Error Messages:

- Spatial Average Indicator is invalid for a Monitoring Area
- Spatial Average Indicator is invalid for a Status Area

1. Spatial Average Indicator must be 'Y' or 'N'.

Error Messages:

- Value for Spatial Average Indicator must be one of the following: Y, N

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.1.21 Schedule Exemption Indicator

Description: Indicates whether the sampling schedule differs from that required by the standard by approval of the Regional Administrator.

Attributes: 1-character code: Y or N
Optional

Coding Instructions: Place a valid schedule exemption indicator in the twenty-second delimited field. A schedule exemption indicator value is valid if it is Y (for yes) or N (for no), and one of the following is populated with a monitor planning area code: Pollutant Area Code 1, Pollutant Area Code 2, Pollutant Area Code 3, Pollutant Area Code 4, Or Pollutant Area Code 5.

Business Rules:

Common Rules

1. Schedule Exemption Indicator must be valued when Pollutant Area Code is a Monitor Planning Area.

Error Messages:

- Schedule Exemption Indicator is required for a Monitor Planning Area

2. Schedule Exemption Indicator may not be valued when Pollutant Area Code is not a Monitor Planning Area

Error Messages:

- Schedule Exemption Indicator is invalid for a Monitoring Area
- Schedule Exemption Indicator is invalid for a Status Area.

3. Schedule Exemption Indicator must be 'Y' or 'N'.

Error Messages:

- Value for Schedule Exemption Indicator must be one of the following: Y, N

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.1.22 Community Monitoring Zone

Description: A sequential number assigned to an optional averaging area with an established, defined boundary within a monitor planning area that has a relatively uniform concentration of annual PM-2.5. Community monitoring zones do not cross geographical lines.

Attributes: Numeric
4 digits (nnnn)
Optional

Coding Instructions: Place a valid community monitoring zone number in the twenty-third delimited field. A community monitoring zone value is valid if one of the following is populated with a monitor planning area code: Pollutant Area Code 1, Pollutant Area Code 2, Pollutant Area Code 3, Pollutant Area Code 4, Or Pollutant Area Code 5.

Business Rules:

Common Rules

1. Community Monitoring Zone must be valued when Pollutant Area Code is a Monitor Planning Area.

Error Messages:

- Community Monitoring Zone is required for a Monitor Planning Area.

2. Community Monitoring Zone may not be valued when Pollutant Area Code is not a Monitor Planning Area.

Error Messages:

- Community Monitoring Zone is invalid for a Monitoring Area.
- Community Monitoring Zone is invalid for a Status Area

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.1.23 Pollutant Area Code 1, 2, 3, 4, or 5

Description: Designation of pollutant areas to which the monitor is assigned. Using these fields, up to five pollutant areas can be designated for an individual monitor.

Pollutant areas are geographic areas defined by a program office in which a certain pollutant should be closely watched. Most are problem or non-attainment areas, but attainment areas requiring special attention may also be defined. Types of pollutant areas are status areas, monitoring areas, and monitor planning areas.

Attributes: Alphanumeric
5-character code
Optional

Coding Instructions: The transaction format allows the designation of up to five pollutant areas. The delimited fields allocated for these designations are positions 24-28. Assignments should be made in sequence, i.e., do not use position 25, if you have not yet used position 24. Only one Pollutant Area Code for each pollutant area type may be assigned to a single monitor. (It is valid to assign one monitoring area and one status area; it is not valid to assign two monitoring areas.)

To insert, place a valid pollutant area code in the next available field (24-28). A Pollutant Area Code value is valid if it exists on the Pollutant Areas Table, and its pollutant area type is valid for the assigned value of parameter.

Business Rules:

Common Rules

1. Pollutant Area Code must be in POLLUTANT_AREAS table.

Error Messages:

- Integrity constraint (AIRSRAQS.PAM_PAR_FK) violated
2. (POLLUTANT_AREAS) POLLUTANT_AREA_CODE must be at production status.
- #### **Error Messages:**
- POLLUTANT_AREA_CODE is inactive.

3. Pollutant Area Code must be valid for Parameter
Error Messages:
 - Invalid PAM_TYPE for parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.1.24 Close Date

Description: User supplied date for closing/stopping all monitor activities. Supplying this field will automatically end all monitor subordinates with the date provided.

Please Note: Clearing this field (i.e. updating it to null) will not re-open any subordinate date ranges (such as Sample_Period); that must be done via a separate transaction.

Attributes: Date
8 digits in format YYYYMMDD.
Optional

Coding Instructions: Place a valid date string (YYYYMMDD) in the 29th delimited field. A Close_Date is valid if it is greater than all of the monitor subordinate (e.g. Sampling Period) begin dates.

Business Rules:

Common Rules

1. Close Date must be in a valid date format..
Error Messages:
 - Invalid Date Format.

Insert Rules

1. Close Date is not allowed when inserting a Monitor.
Error Messages:
 - Close Date not allowed when inserting a Monitor.

Update Rules

1. Close Date must be less than the Site's termination date.
Error Messages:
 - Close Date is greater than the site termination date.

2. Close Date must be greater than all Sample Period Begin Dates for the Monitor.

Error Messages:

- Close Date is less than a Sample Period Begin Date for the Monitor.

3. Close Date may only be set for a monitor at production status.

Error Messages:

- Monitor is not at production status.

Delete Rules

None.

4.2 Monitor Sampling Periods - Transaction Type MB

See AQS Input Transaction Formats at <http://www.epa.gov/ttn/airs/airsaqs/manuals/> for a summary list of requirements on each transaction format. For criteria pollutant monitors, transaction types MA through ME are required.

Multiple sampling periods allow for definition of periodic monitoring. The edit restrictions prevent more than one sampling period from having a null value for Date Sampling Ended. The beginning of a sample period cannot be changed with an update (U) transaction.

The fields described below are validated for insert (I) and update (U) transactions.

4.2.0 Transaction Level Rules and Errors

1. A sampling period cannot be deleted for a production monitor if that deletion would leave the monitor with no sample periods.
Error Messages:
 - To enter a Monitor record, you must also enter a Sampling Period record.
2. A sampling period cannot be changed (updated or deleted) in a manner that would exclude existing raw data from that sample period.
Error Messages:
 - Raw data exists outside of sample periods.
3. A sampling period cannot be changed (updated or deleted) in a manner that would exclude existing blanks data from that sample period.
Error Messages:
 - Blank data exists outside of sample periods.
4. A sampling period cannot be changed (updated or deleted) in a manner that would exclude existing accuracy data from that sample period.
Error Messages:
 - Accuracy data exists outside of sample periods.
5. A sampling period cannot be changed (updated or deleted) in a manner that would exclude existing precision data from that sample period.
Error Messages:
 - Precision data exists outside of sample periods.

4.2.1 Transaction Type

Description: Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

Attributes: Alphanumeric
 2-character code
 Mandatory

Coding Instructions: Place MB in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory
Error Messages:
 - Invalid transaction format.
2. Transaction Type must be in TRANSACTION_TYPES table in database.
Error Messages:
 - Transaction type not handled.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.2.2 Action Indicator

Description: Indicates the data manipulation action to be performed by the transaction.

Attributes: Alphanumeric
 1-character code
 Mandatory

Coding Instructions: Place the values I, U, or D in the second delimited field.
I Insert a new row into the appropriate table in the database.
U Change one or more column values for an existing row in one or more tables.
D Delete a row from a table(s) for the row containing the key data.

Business Rules

Common Rules

1. Action Indicator is required.
Error Messages:
 - Action Code is Required.
2. Action Indicator must be either 'I', 'U', or 'D'.
Error Messages:
 - Invalid Action Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.2.3 State Code or Tribal Indicator

The third field on a transaction can be either a State Code or a Tribal indicator. They are described as follows:

State Code Description: A FIPS (Federal Information Processing Standards) code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Tribal Indicator Description: A flag, with value “TT”, to indicate that this data is for a Native American Tribe, and that the next field on the transaction identifies a tribal area using the Bureau of Indian Affairs tribal code.

Attributes: Alphanumeric
2-digit code
Mandatory
Key Field

Coding Instructions: Place a valid FIPS state code or a Tribal Indicator in delimited field 3. A State Code is valid if it exists in the STATES Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.2.4 County Code or Tribal Code

The fourth field on any transaction can be either a County Code or a Tribal Code. A County code is indicated by a valid state code in the third field, while a Tribal Code is indicated by a Tribal Indicator in the third field.

County Code Description: A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

Tribal Code Description: A value that identifies a Tribal Area using a Bureau of Indian Affairs Tribal Code.

Attributes: Alphanumeric
3-digit code
Mandatory
Key Field

Coding Instructions: Place a valid county code or a valid tribal code in the fourth delimited field. A County Code is valid if it exists at active status in the Counties table. A Tribal Code is valid if it exists at active status in the Tribal_Areas table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.2.5 Site ID

Description: A numeric identifier (ID) that uniquely identifies each air monitoring site within a county or tribal area. There is no requirement that Site IDs be assigned continuously or in any particular order. Regional and Local organizations are thus free to allocate site numbers in any way they chose as long as there is no duplication within a county and tribal area. For Tribal sites, because tribal areas may cross county or state lines, care must be taken to ensure that the Site ID is unique in the effected Tribal Area and states-county.

A specific Site ID is associated with a specific physical location and address. Any change in address requires a new Site ID to be assigned. This address change could include a change from the roof of one building to another. A change in location on the same roof should not normally require a new Site ID. Although an address change would routinely mean a new Site ID, some changes that do not change the site's location in respect to surrounding sources and its measurement scale, would require no change. An EPA Regional Office should be consulted for assistance in determining whether a new Site ID is required.

If a new Site ID is needed for a site not operated by the air pollution control agency, that agency should be contacted to assist in the ID assignment, to ensure that the ID is unique within the county. In other words, when a new Site ID is assigned, it must be different from any other Site ID already existing for that combination of State and County or Tribal Code.

Attributes: Alphanumeric
 4-digit ID
 Mandatory
 Key Field

Coding Instructions: Place a four-digit numeric code in the fifth delimited field. For update and delete, a Site ID value is valid if it exists in combination with state code and County or Tribal Code in the Sites Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.2.6 Parameter

Description: The code assigned to the parameter measured by the monitor. Parameters may be pollutants or non-pollutants.

Attributes: Alphanumeric
 5-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid parameter code in the sixth delimited field. A parameter value is valid if it exists in combination with (State Code, County Code, Site ID, and POC) or (Tribal Code, Site ID, and POC) in the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.2.7 POC (Parameter Occurrence Code)

Description: An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter. For example, the first monitor established to measure CO at a site could have a POC of 1. If an additional monitor were established at the same site to measure CO, that monitor could have a POC of 2. However, if a new instrument is installed to replace the original instrument used as the first monitor, that could be considered the same monitor and it would still have a POC of 1.

For criteria pollutants, data from different sampling methods should only be stored under the same POC if the sampling intervals are the same and the methods are reference or equivalent. For sites where duplicate sampling is being conducted by multiple agencies or by one agency with multiple samplers, multiple POCs must be utilized to store all samples.

For non-criteria pollutants, data from multiple sampling methods can be stored under the same POC if the sampling intervals are the same and there is only one

sample for the time reported. If multiple open path monitors are reporting data for the same parameter, each open path would be assigned a different POC.

There are no national EPA practices assigning POC values. There may be regional or agency conventions where a POC value may have specific significance. Numbers do not need to be assigned sequentially.

Attributes: Numeric
 2-digit ID
 Mandatory
 Key Field

Coding Instructions: Place a valid POC value in the seventh delimited field. A POC value is valid if it exists in combination with (State Code, County Code, Site ID, and Parameter) or (Tribal Code, Site ID, and Parameter) on the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.2.8 Date Sampling Began

Description: The date on which a distinct period of operations, i.e., collection of air quality samples, began for the monitor.

Attributes: Date
 8-digit date
 Mandatory
 Key Field

Coding Instructions: Place a valid date string in the eighth delimited field. A date sampling began value is valid if it: is in the format of YYYYMMDD, does not fall within any other sample periods defined for the monitor, is greater than or equal to the date site established for the corresponding site, and is less than or equal to the date site terminated for the corresponding site, if populated.

Business Rules:

Common Rules

1. Date Sampling Began is mandatory.

Error Messages:

- Sample Period Begin Date is required.

Insert Rules

1. Date Sampling Began must not fall within any other Date Sampling Began-Date Sampling Ended range for the same monitor.

Error Messages:

- Date cannot be within an existing date range
2. Date Sampling Begin must be greater than, or equal to, the site's established date, and less than, or equal to, the site's terminated date, if the site has been terminated, or one year from the current date, if the site hasn't been terminated.

Error Messages:

- Samp Beg must be between date Site established or 1yr from today.

Update Rules

None.

Delete Rules

None.

4.2.9 Date Sampling Ended

Description: The date on which a distinct period of operations, i.e., collection of air quality samples, stopped for the monitor.

Attributes: Date
8-digit date
Optional

Coding Instructions: Place a valid date string in the ninth delimited field. A date sampling ended value is valid if it: is in the format of YYYYMMDD, is greater than or equal to the specified date sampling began, does not fall within any other sample periods defined for the monitor, is greater than or equal to the date site established for the corresponding site, and is less than or equal to the date site terminated for the corresponding site, if populated.

Business Rules:

Common Rules

1. Date Sampling Ended must be greater than Date Sampling Began.

Error Messages:

- The end date must be greater than the start date

2. Date Sampling Ended must be less than, or equal to, the site's terminated date, if the site has been terminated, or one year from the current date, if the site hasn't been terminated.

Error Messages:

- Date Sampling Ended must be between date Site established or 1yr from today.

3. Date Sampling Ended must not fall within any other Date Sampling Began-Date Sampling Ended range for the same monitor.

Error Messages:

- Date cannot be within an existing date range

4. Date Sampling Ended must not exclude (orphan) any Raw, Precision, Accuracy, or Summary data that has been loaded for the monitor. (I.e. there cannot be any data loaded for the monitor after the Date Sampling Ended.)

Error Messages:

- Raw, precision, or accuracy data exist outside of sample periods

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.3 Monitor Type Information - Transaction Type MC

See the AQS Data Input Transaction Formats at <http://www.epa.gov/ttn/airs/airsaqs/manuals/> for a summary list of requirements on each transaction format. For criteria pollutant monitors, transaction types MA through ME are required.

4.3.0 Transaction Level Rules and Errors

1. The monitor type assignment for a production monitor cannot be changed, (i.e., updated or deleted), in a manner that would leave any portion of that monitor's sample periods without a monitor type assignment.

Error Messages:

- Each day in a sample period must have a monitor type assignment.

The fields described below are validated for insert (I) and update (U) transactions.

4.3.1 Transaction Type

Description: Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

Attributes: Alphanumeric
2-character code
Mandatory

Coding Instructions: Place MC in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory

Error Messages:

- Invalid transaction format.

2. Transaction Type must be in TRANSACTION_TYPES table in database.

Error Messages:

- Transaction type not handled.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.3.2 Action Indicator

Description: Indicates the data manipulation action to be performed by the transaction.

Attributes: Alphanumeric
1-character code
Mandatory

Coding Instructions: Place the values I, U, or D in the second delimited field.
I Insert a new row into the appropriate table in the database.
U Change one or more column values for an existing row in one or more tables.
D Delete a row from a table(s) for the row containing the key data.

Business Rules

Common Rules

1. Action Indicator is required.
Error Messages:
 - Action Code is Required.
2. Action Indicator must be either 'I', 'U', or 'D'.
Error Messages:
 - Invalid Action Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.3.3 State Code or Tribal Indicator

The third field on a transaction can be either a State Code or a Tribal indicator. They are described as follows:

State Code Description: A FIPS (Federal Information Processing Standards) code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Tribal Indicator Description: A flag, with value "TT", to indicate that this data is for a Native American Tribe, and that the next field on the transaction identifies a tribal area using the Bureau of Indian Affairs tribal code.

Attributes: Alphanumeric
2-digit code
Mandatory

Key Field

Coding Instructions: Place a valid FIPS state code or a Tribal Indicator in delimited field 3. A State Code is valid if it exists in the STATES Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None
Invalid State-County

4.3.4 County Code or Tribal Code

The fourth field on any transaction can be either a County Code or a Tribal Code. A County code is indicated by a valid state code in the third field, while a Tribal Code is indicated by a Tribal Indicator in the third field.

County Code Description: A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

Tribal Code Description: A value that identifies a Tribal Area using a Bureau of Indian Affairs Tribal Code.

Attributes: Alphanumeric
 3-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid county code or a valid tribal code in the fourth delimited field. A County Code is valid if it exists at active status in the Counties table. A Tribal Code is valid if it exists at active status in the Tribal Areas table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.3.5 Site ID

Description: A numeric identifier (ID) that uniquely identifies each air monitoring site within a county or tribal area. There is no requirement that Site IDs be assigned continuously or in any particular order. Regional and Local organizations are thus free to allocate site numbers in any way they chose as long as there is no duplication within a county and tribal area. For Tribal sites, because tribal areas may cross county or state lines, care must be taken to ensure that the Site ID is unique in the effected Tribal Area and states-county.

A specific Site ID is associated with a specific physical location and address. Any change in address requires a new Site ID to be assigned. This address change could include a change from the roof of one building to another. A change in location on the same roof should not normally require a new Site ID. Although an address change would routinely mean a new Site ID, some changes that do not change the site's location in respect to surrounding sources and its measurement scale, would require no change. An EPA Regional Office should be consulted for assistance in determining whether a new Site ID is required.

If a new Site ID is needed for a site not operated by the air pollution control agency, that agency should be contacted to assist in the ID assignment, to ensure that the ID is unique within the county. In other words, when a new Site ID is assigned, it must be different from any other Site ID already existing for that combination of State and County or Tribal Code.

Attributes: Alphanumeric
 4-digit ID
 Mandatory
 Key Field

Coding Instructions: Place a four-digit numeric code in the fifth delimited field. For update and delete, a Site ID value is valid if it exists in combination with state code and County or Tribal Code in the Sites Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.3.6 Parameter

Description: The code assigned to the parameter measured by the monitor. Parameters may be pollutants or non-pollutants.

Attributes: Alphanumeric
5-digit code
Mandatory
Key Field

Coding Instructions: Place a valid parameter code in the sixth delimited field. A parameter value is valid if it exists in combination with (State Code, County Code, Site ID, and POC) or (Tribal Code, Site ID, and POC) in the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.3.7 POC (Parameter Occurrence)

Code)

Description: An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter. For example, the first monitor established to measure CO at a site could have a POC of 1. If an additional monitor were established at the same site to measure CO, that monitor could have a POC of 2. However, if a new instrument is installed to replace the original instrument used as the first monitor, that could be considered the same monitor and it would still have a POC of 1.

For criteria pollutants, data from different sampling methods should only be stored under the same POC if the sampling intervals are the same and the methods are reference or equivalent. For sites where duplicate sampling is being conducted by multiple agencies or by one agency with multiple samplers, multiple POCs must be utilized to store all samples.

For non-criteria pollutants, data from multiple sampling methods can be stored under the same POC if the sampling intervals are the same and there is only one sample for the time reported. If multiple open path monitors are reporting data for the same parameter, each open path would be assigned a different POC.

There are no national EPA practices assigning POC values. There may be regional or agency conventions where a POC value may have specific significance. Numbers do not need to be assigned sequentially.

Attributes: Numeric
 2-digit ID
 Mandatory
 Key Field

Coding Instructions: Place a valid POC value in the seventh delimited field. A POC value is valid if it exists in combination with (State Code, County Code, Site ID, and Parameter) or (Tribal Code, Site ID, and Parameter) on the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.3.8 Monitor Type

Description: The monitor's organizational classification.

Please note that recent enhancements have revised the use of this field. The monitor type now specifies the monitor's agency organizational level such as EPA, or SLAMS, or Industrial

Network affiliation information (such as NCORE, PAMS, NATTS, etc) is no longer part of monitor type information. A new transaction called Monitor Network Affiliation - transaction type MN – is used to specify the monitoring network or networks to which a monitor belongs. See section 4.13 for information about transaction type MN..

Attributes: Alphanumeric
20-character code
Mandatory
Key Field

Coding Instructions: Place a valid monitor type term in the eighth delimited field. A monitor type value is valid if it exists in the Monitor Types Table.

Valid monitor type values include:

EPA
INDUSTRIAL
NON-EPA FEDERAL
SLAMS
TRIBAL MONITORS

Business Rules:

Common Rules

1. Monitor Type is mandatory.
Error Messages:
 - Monitor Type is mandatory.
2. Monitor Type must be in MONITOR_TYPES table.
Error Messages:
 - Integrity constraint (AIRSRAQS.MTA_MT_FK) violated.
3. Monitor Type must be at production status.
Error Messages:
 - Status for MONITOR_TYPE is inactive.
4. User must have EPA_HQ application role to assign PAMS and NCORE monitor type.

Error Messages:

- Insufficient privileges for specified monitor type.

Insert Rules

1. The combination of Monitor Type and Monitor Type Begin Date must not already be in MONITOR_TYPES table for monitor.

Error Messages:

- Unique constraint (AIRSRAQS.MTA_MONTYPASG1_UK) violated.

Update Rules

None.

Delete Rules

None.

4.3.9 Monitor Type Begin Date

Description: The date on which the monitor type assignment went into effect.

Attributes: Date
8-digit date
Mandatory
Key Field

Coding Instructions: Place a valid date string in the ninth delimited field. A monitor type begin date value is valid if it: is in the format of YYYYMMDD, the monitor type is National Air Monitoring System (NAMS) or State and Local Air Monitoring System (SLAMS) and is between January 1, 1980 and one year from the current date, the monitor type is not NAMS or SLAMS and is between January 1, 1957 and one year from the current date, does not fall within any other monitor type assignment periods defined for the monitor for the same monitor type, and falls within a sample period for the monitor.

Business Rules:**Common Rules**

1. Monitor Type Begin Date is mandatory.

Error Messages:

- Monitor Type Begin Date is required.

2. If Monitor Type is 'NAMS' or 'SLAMS', then Monitor Type Begin Date must greater than, or equal to, 1/1/1980.

Error Messages:

- The NAMS AND SLAMS monitor_type_begin_date must be between a valid range > 01-JAN-1980.

3. Monitor Type Begin Date must be less than one year from the current date.

Error Messages:

- Monitor Type dates must not be greater than 1 year from current date.

4. Monitor Type Begin Date must fall within a sampling period of the monitor.

Error Messages:

- Monitor_type_begin_date not within valid sample period.

5. Monitor Type Begin Date must not fall within any other Monitor Type Begin Date-Monitor Type End Date range for the same monitor and type

Error Messages:

- Date cannot be within an existing date range

6. If Monitor Type is 'NCORE', then Monitor Type Begin Date must greater than, or equal to, 1/1/2009.

Error Messages:

- Begin Date for NCORE Monitor Type must be \geq 01-JAN-2009

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.3.10 Monitor Type End Date

Description: The date on which a monitor type assignment ends.

Attributes: Date
8-digit date
Optional

Coding Instructions: Place a valid date string in the tenth delimited field. A monitor type end date value is valid if it: is in the format of YYYYMMDD, is greater than the monitor type begin date, the monitor type is National Air Monitoring System (NAMS) or State and Local Air Monitoring System (SLAMS) and is between January 1, 1980 and one year from the current date, the monitor type is not NAMS or SLAMS and is between January 1, 1957 and one year from the current date, does not fall within any other monitor type assignment periods defined for the monitor for the same monitor type, and falls within a sample period for the monitor. Multiple monitor type designations with a blank monitor type end date are valid. By definition, a NAMS is also a SLAMS, and a Photochemical Assessment Monitoring System (PAMS) can also be a NAMS or SLAMS.

Business Rules:

Common Rules

1. Monitor Type End Date must be greater than, or equal to, Monitor Type Begin Date.
Error Messages:
 - The end date must be greater than the start date.
2. Monitor Type End Date must fall within a valid sampling period.
Error Messages:
 - Monitor Type End date must fall within a valid sample period.
3. Monitor Type End Date must not be greater than 1 year from today.
Error Messages:
 - Monitor Type dates must not be greater than 1 year from current date.
4. Monitor Type End Date must not fall within any other Monitor Type Begin Date-Monitor Type End Date range for the same monitor and type .
Error Messages:
 - Date cannot be within an existing date range
5. Monitor Type End Date must not exclude (orphan) any Raw, Precision, Accuracy, or Summary data that has been loaded for the monitor . (I.e. There cannot be any data loaded for the monitor after the Monitor Type End Date.)
Error Messages:
 - Monitor Type End Date will orphan data for monitor.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.4 Monitor Agency Role - Transaction Type MD

See AQS Input Transaction Formats at <http://www.epa.gov/ttn/airs/airsaqs/manuals/> for a summary list of requirements on each transaction format. For criteria pollutant monitors, transaction types MA through ME are required.

4.4.0 Transaction Level Rules and Errors

1. A Reporting Organization assignment cannot be changed, (i.e., updated or deleted), in a manner that would exclude existing any Precision or Accuracy data, up to 12/31/2006, from that assignment's date range.

Error Messages:

- Raw, precision, or accuracy data exists outside of reporting organization periods

2. A Reporting Organization assignment for a production monitor cannot be changed, (i.e., updated or deleted), in a manner that leave any portion of that monitor's sample periods, up to 12/31/2006, without a Reporting Organization.

Error Messages:

- Each day in a sample period before 1/1/2007 for a criteria pollutant must have a reporting organization.

3. A PQAO assignment for a production monitor cannot be changed, (i.e., updated or deleted), in a manner that leave any portion of that monitor's sample periods since 1/1/2007 without a PQAO.

Error Messages:

- Each day in a sample period since 1/1/2007 must have a primary quality assurance organization.

3. A PQAO assignment cannot be created for any period preceding 1/1/2007.

Error Messages:

- The beginning date for a PQAO period must start no earlier than 1/1/2007.

The fields described below are validated for insert (I) and update (U) transactions.

4.4.1 Transaction Type

Description: Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

Attributes: Alphanumeric
 2-character code
 Mandatory

Coding Instructions: Place MD in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory

Error Messages:

- Invalid transaction format.

2. Transaction Type must be in TRANSACTION_TYPES table in database.

Error Messages:

- Transaction type not handled.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.4.2 Action Indicator

Description: Indicates the data manipulation action to be performed by the transaction.

Attributes: Alphanumeric
1-character code
Mandatory

Coding Instructions: Place the values I, U, or D in the second delimited field.
I Insert a new row into the appropriate table in the database.
U Change one or more column values for an existing row in one or more tables.
D Delete a row from a table(s) for the row containing the key data.

Business Rules

Common Rules

1. Action Indicator is required.
Error Messages:
 - Action Code is Required.
2. Action Indicator must be either 'I', 'U', or 'D'.
Error Messages:
 - Invalid Action Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.4.3 State Code or Tribal Indicator

The third field on a transaction can be either a State Code or a Tribal indicator. They are described as follows:

State Code Description: A FIPS (Federal Information Processing Standards) code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Tribal Indicator Description: A flag, with value “TT”, to indicate that this data is for a Native American Tribe, and that the next field on the transaction identifies a tribal area using the Bureau of Indian Affairs tribal code.

Attributes: Alphanumeric
 2-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid FIPS state code or a Tribal Indicator in delimited field 3. A State Code is valid if it exists in the STATES Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.4.4 County Code or Tribal Code

The fourth field on any transaction can be either a County Code or a Tribal Code. A County code is indicated by a valid state code in the third field, while a Tribal Code is indicated by a Tribal Indicator in the third field.

County Code Description: A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

Tribal Code Description: A value that identifies a Tribal Area using a Bureau of Indian Affairs Tribal Code.

Attributes: Alphanumeric
 3-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid county code or a valid tribal code in the fourth delimited

field. A County Code is valid if it exists at active status in the Counties table. A Tribal Code is valid if it exists at active status in the Tribal_Areas table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.4.5 Site ID

Description: A numeric identifier (ID) that uniquely identifies each air monitoring site within a county or tribal area. There is no requirement that Site IDs be assigned continuously or in any particular order. Regional and Local organizations are thus free to allocate site numbers in any way they chose as long as there is no duplication within a county and tribal area. For Tribal sites, because tribal areas may cross county or state lines, care must be taken to ensure that the Site ID is unique in the effected Tribal Area and states-county.

A specific Site ID is associated with a specific physical location and address. Any change in address requires a new Site ID to be assigned. This address change could include a change from the roof of one building to another. A change in location on the same roof should not normally require a new Site ID. Although an address change would routinely mean a new Site ID, some changes that do not change the site's location in respect to surrounding sources and its measurement scale, would require no change. An EPA Regional Office should be consulted for assistance in determining whether a new Site ID is required.

If a new Site ID is needed for a site not operated by the air pollution control agency, that agency should be contacted to assist in the ID assignment, to ensure that the ID is unique within the county. In other words, when a new Site ID is assigned, it must be different from any other Site ID already existing for that combination of State and County or Tribal Code.

Attributes: Alphanumeric
 4-digit ID
 Mandatory
 Key Field

Coding Instructions: Place a four-digit numeric code in the fifth delimited field. For update and delete, a Site ID value is valid if it exists in combination with state code and County or Tribal Code in the Sites Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.4.6 Parameter

Description: The code assigned to the parameter measured by the monitor. Parameters may be pollutants or non-pollutants.

Attributes: Alphanumeric
 5-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid parameter code in the sixth delimited field. A parameter value is valid if it exists in combination with (State Code, County Code, Site ID, and POC) or (Tribal Code, Site ID, and POC) in the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.4.7 POC (Parameter Occurrence Code)

Description: An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter. For example, the first monitor established to measure CO at a site could have a POC of 1. If an additional monitor were established at the same site to measure CO, that monitor could have a POC of 2. However, if a new instrument is installed to replace the original instrument used as the first monitor, that could be considered the same monitor and it would still have a POC of 1.

For criteria pollutants, data from different sampling methods should only be stored under the same POC if the sampling intervals are the same and the methods are reference or equivalent. For sites where duplicate sampling is being conducted by multiple agencies or by one agency with multiple samplers, multiple POCs must be utilized to store all samples.

For non-criteria pollutants, data from multiple sampling methods can be stored under the same POC if the sampling intervals are the same and there is only one sample for the time reported. If multiple open path monitors are reporting data for the same parameter, each open path would be assigned a different POC.

There are no national EPA practices assigning POC values. There may be regional or agency conventions where a POC value may have specific significance. Numbers do not need to be assigned sequentially.

Attributes: Numeric
2-digit ID
Mandatory
Key Field

Coding Instructions: Place a valid POC value in the seventh delimited field. A POC value is valid if it exists in combination with (State Code, County Code, Site ID, and Parameter) or (Tribal Code, Site ID, and Parameter) on the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.4.8 Agency Role Name

Description: Classification of an agency's role in regard to the monitor.

Attributes: Alphanumeric
 20 characters
 Mandatory
 Key Field

Coding Instructions: Place a valid agency role term in the eighth delimited field. A role name value is valid if it exists in the Agency Roles Table with the role type of monitor. Multiple agency role names with the same value cannot be entered for the same period. If the agency changes for any role, the begin and end dates are used to define the applicable time period.

Valid agency roles include:

REPORTING
ANALYZING
COLLECTING
PQAO

Business Rules:

Common Rules

1. Agency Role Name must be in ROLES table.

Error Messages:

- Integrity constraint (AIRSRAQS.AR1_ROL_FK) violated.

2. ROLES (ROLE) must be at production status.

Error Messages:

- Status for ROLE is inactive.

3. Agency Role Name is mandatory.

Error Messages:

- Agency Role Name is mandatory.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.4.9 Agency Code

Description: Identification of an agency responsible for performing a role for the monitor.

Attributes: Alphanumeric
4-digit code
Mandatory
Key Field

Coding Instructions: To insert or update, place a valid agency code in the ninth delimited field. An agency code value is valid if it exists in combination with the state code value in the State Agencies Table.

Business Rules:

Common Rules

1. (State Code, Agency Code) must be in STATE_AGENCIES table.

Error Messages:

- Integrity constraint (AIRSRAQS.AR1_SA_FK) violated.

2. STATE_AGENCIES (STT_STATE_CODE, AG_AGENCY_CODE) must be at production status.

Error Messages:

- Status for STT_STATE_CODE, AG_AGENCY_CODE is inactive

Insert Rules

1. Agency Code is mandatory.

Error Messages:

- Agency Code is mandatory.

Update Rules

1. Agency Code may not be nullified.

Error Messages:

- No update occurred. Probable use of non updateable field

Delete Rules

None.

4.4.10 Agency Role Begin Date

Description: The date on which the agency began performance of the role for the monitor. For the role of reporting, it also indicates the date that precision and accuracy data applies to the agency as reporting organization.

Attributes: Date
8-digit date
Key Field
Mandatory

Coding Instructions: Place a valid date string in the tenth delimited field. A begin date value is valid if it: is in the format of YYYYMMDD, does not fall within any other agency role periods defined for the monitor for the same role name, and falls within a sample period for the monitor.

Business Rules:

Common Rules

1. Agency Role Begin Date is mandatory.

Error Messages:

- Agency Role Begin Date is mandatory.

2. Agency Role Begin Date must fall within a valid sample period.

Error Messages:

- Agency Role Begin Date must fall within a valid sample period.

Insert Rules

1. Agency Role Begin Date must not fall within any other Begin Date-End Date range for the same monitor and role.

Error Messages:

- Date cannot be within an existing date range.

Update Rules

None.

Delete Rules

None.

4.4.11 Agency Role End Date

Description: The date on which the agency ended a period of performance of the role for the monitor. For the role of reporting, it also indicates the last date that precision and accuracy data applies to the agency as reporting organization.

Attributes: Date
8-digit date
Mandatory

Coding Instructions: Place a valid date string in the tenth delimited field. An end date value is valid if it: is in the format of YYYYMMDD, is greater than the begin date, does not fall within any other agency role periods defined for the monitor for the same role name, and falls within a sample period for the monitor.

Business Rules:

Common Rules

1. Agency Role End Date may only be valued if Agency Role Begin Date is valued, and must be greater than, or equal to, Agency Role Begin Date.

Error Messages:

- Monitor Agency Role End Date must be greater than or equal to Begin Date.

2. Agency Role End Date must not fall within any other Begin Date-End Date range for the same monitor and role.

Error Messages:

- Date cannot be within an existing date range

3. End date must fall in a valid sampling period.

Error Messages:

- Agency Role End Date must fall within a valid sample period.

4. Agency Role End Date must not exclude (orphan) any Raw, Composite, Blank, Precision, Accuracy, or Summary data that has been loaded for the monitor, (i.e., there cannot be any data loaded for the monitor after the End Date.)

Error Messages:

- Raw, precision, or accuracy data exists outside of reporting organization periods

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.5 Monitoring Objective Information - Transaction Type ME

See AQS Input Transaction Formats at <http://www.epa.gov/ttn/airs/airsaqs/manuals/> for a summary list of requirements on each transaction format. For criteria pollutant monitors, transaction types MA through ME are required.

The fields described below are validated for insert (I) and update (U) transactions.

4.5.0 Transaction Level Rules and Errors

1. An objective for a production monitor cannot be deleted if that would leave the monitor without at least one objective.

Error Messages:

- To enter a Monitor record, you must also enter a Monitoring Objective record.

4.5.1 Transaction Type

Description: Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

Attributes: Alphanumeric
2-character code
Mandatory

Coding Instructions: Place ME in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory

Error Messages:

- Invalid transaction format.

2. Transaction Type must be in TRANSACTION_TYPES table in database.

Error Messages:

- Transaction type not handled.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.5.2 Action Indicator

Description: Indicates the data manipulation action to be performed by the transaction.

Attributes: Alphanumeric
1-character code
Mandatory

Coding Instructions: Place the values I, U, or D in the second delimited field.

- I Insert a new row into the appropriate table in the database.
- U Change one or more column values for an existing row in one or more tables.

D Delete a row from a table(s) for the row containing the key data.

Business Rules

Common Rules

1. Action Indicator is required.
Error Messages:
 - Action Code is Required.
2. Action Indicator must be either 'I', 'U', or 'D'.
Error Messages:
 - Invalid Action Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.5.3 State Code or Tribal Indicator

The third field on a transaction can be either a State Code or a Tribal indicator. They are described as follows:

State Code Description: A FIPS (Federal Information Processing Standards) code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Tribal Indicator Description: A flag, with value "TT", to indicate that this data is for a Native American Tribe, and that the next field on the transaction identifies a tribal area using the Bureau of Indian Affairs tribal code.

Attributes: Alphanumeric
 2-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid FIPS state code or a Tribal Indicator in delimited field 3. A State Code is valid if it exists in the STATES Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.
Error Messages:
 - Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.5.4 County Code or Tribal Code

The fourth field on any transaction can be either a County Code or a Tribal Code. A County code is indicated by a valid state code in the third field, while a Tribal Code is indicated by a Tribal Indicator in the third field.

County Code Description: A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

Tribal Code Description: A value that identifies a Tribal Area using a Bureau of Indian Affairs Tribal Code.

Attributes: Alphanumeric
 3-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid county code or a valid tribal code in the fourth delimited field. A County Code is valid if it exists at active status in the Counties table. A Tribal Code is valid if it exists at active status in the Tribal_Areas table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.5.5 Site ID

Description: A numeric identifier (ID) that uniquely identifies each air monitoring site within a county or tribal area. There is no requirement that Site IDs be assigned continuously or in any particular order. Regional and Local organizations are thus free to allocate site numbers in any way they chose as long as there is no duplication within a county and tribal area. For Tribal sites, because tribal areas may cross county or state lines, care must be taken to ensure that the Site ID is unique in the effected Tribal Area and states-county.

A specific Site ID is associated with a specific physical location and address. Any change in address requires a new Site ID to be assigned. This address change could include a change from the roof of one building to another. A change in location on the same roof should not normally require a new Site ID. Although an address change would routinely mean a new Site ID, some changes that do not change the site's location in respect to surrounding sources and its measurement scale, would require no change. An EPA Regional Office should be consulted for assistance in determining whether a new Site ID is required.

If a new Site ID is needed for a site not operated by the air pollution control agency, that agency should be contacted to assist in the ID assignment, to ensure that the ID is unique within the county. In other words, when a new Site ID is assigned, it must be different from any other Site ID already existing for that combination of State and County or Tribal Code.

Attributes: Alphanumeric
4-digit ID
Mandatory
Key Field

Coding Instructions: Place a four-digit numeric code in the fifth delimited field. For update and delete, a Site ID value is valid if it exists in combination with state code and County or Tribal Code in the Sites Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.5.6 Parameter

Description: The code assigned to the parameter measured by the monitor. Parameters may be pollutants or non-pollutants.

Attributes: Alphanumeric
5-digit code
Mandatory
Key Field

Coding Instructions: Place a valid parameter code in the sixth delimited field. A parameter value is valid if it exists in combination with (State Code, County Code, Site ID, and POC) or (Tribal Code, Site ID, and POC) in the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.5.7 POC (Parameter Occurrence Code)

Description: An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter. For example, the first monitor established to measure CO at a site could have a POC of 1. If an additional monitor were established at the same site to measure CO, that monitor could have a POC of 2. However, if a new instrument is installed to replace the original instrument used as the first monitor, that could be considered the same monitor and it would still have a POC of 1.

For criteria pollutants, data from different sampling methods should only be stored under the same POC if the sampling intervals are the same and the methods are reference or equivalent. For sites where duplicate sampling is being conducted by multiple agencies or by one agency with multiple samplers, multiple POCs must be utilized to store all samples.

For non-criteria pollutants, data from multiple sampling methods can be stored under the same POC if the sampling intervals are the same and there is only one sample for the time reported. If multiple open path monitors are reporting data for the same parameter, each open path would be assigned a different POC.

There are no national EPA practices assigning POC values. There may be regional or agency conventions where a POC value may have specific significance. Numbers do not need to be assigned sequentially.

Attributes: Numeric
 2-digit ID
 Mandatory
 Key Field

Coding Instructions: Place a valid POC value in the seventh delimited field. A POC value is valid if it exists in combination with (State Code, County Code, Site ID, and Parameter) or (Tribal Code, Site ID, and Parameter) on the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.5.8 Monitor Objective Type

Description: Identification of the reason for measuring air quality by the monitor.

Attributes: Alphanumeric
 Up to 50 characters

Mandatory
Key Field

Coding Instructions: Place a valid monitor objective term in the eighth delimited field. A monitor objective value is valid if it exists in the Monitor Objective Types Table. Multiple monitor objectives, applying to one or more geographical areas, may be specified.

Valid monitoring objective types include:

EXTREME DOWNWIND
GENERAL/BACKGROUND
HIGHEST CONCENTRATION
MAX OZONE CONCENTRATION
MAX PRECURSOR EMISSIONS IMPACT
OTHER
POPULATION EXPOSURE
QUALITY ASSURANCE
REGIONAL TRANSPORT
SOURCE ORIENTED
UPWIND BACKGROUND
WELFARE RELATED IMPACTS

Business Rules:

Common Rules

1. Monitor Objective Type is required.

Error Messages:

- Monitor Objective Type is mandatory.

2. Monitor Objective Type must be in MONITOR_OBJECTIVE_TYPES table.

Error Messages:

- Integrity constraint (AIRSRAQS.MOB_MOT_FK) violated

3. Monitor Objective Type must be at production status.

Error Messages:

- Status for MONITOR_OBJ_TYPE is inactive

Insert Rules

1. Monitor Objective Type must not already be in database for monitor.

Error Messages:

- Unique constraint (AIRSRAQS.MOB_MONOBJ1_UK) violated.

Update Rules

None.

Delete Rules

None.

4.5.9 Urban Area Represented

Description: The urbanized area from which the concentrations originated (not the

location of the monitor).

Attributes: Alphanumeric
 4-digit code
 Optional:
 Conditionally Required
 Optional on update
 May not be deleted

Coding Instructions: It is required to designate the origin of concentrations that apply to a monitor objective classification. One, and only one, of urban area represented, Core Based Statistical Area (CBSA) represented, or Combined Statistical Area (CSA) represented may be used to indicate the designation. Place a valid urban area represented code in the ninth delimited field. An urban area represented value is valid if it exists in the Urbanized Areas Table.

Business Rules:

Common Rules

1. Urban Area Represented must be valued if both CBSA Represented and CSA Represented are not valued, and it must not be valued if either of the other two are valued.
Error Messages:
 - A value is required for ONLY one of the following: CBSA, CSA, or UAR
2. Urban Area Represented and CBSA Represented and CSA Represented may not be null.
Error Messages:
 - Urbanized Area, CBSA, or CSA must be specified.
3. Urban Area Represented must be in URBANIZED_AREAS table.
Error Messages:
 - Integrity constraint (AIRSRAQS.MOB_UA_FK) violated.
4. URBANIZED_AREAS (UAR_CODE) must be at production status.
Error Messages:
 - Status for UAR_CODE is inactive

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.5.10 MSA Represented

Description: Metropolitan Statistical Area is no longer supported for monitoring objective. CBSA (see below) has replaced it. The Metropolitan Statistical Area (MSA) from which the concentrations originated, not the location of the monitor.

Attributes: Alphanumeric
4-digit code
Conditionally Required

Coding Instructions: Metropolitan Statistical Area is no longer supported for monitoring objective. CBSA (see below) has replaced it.

Business Rules:

Common Rules

None.

Insert Rules

1. MSA Represented is no longer supported.

Error Messages:

- MSAs and CMSAs are no longer supported for monitor objectives.

Update Rules

1. MSA Represented is no longer supported.

Error Messages:

- MSAs and CMSAs are no longer supported for monitor objectives.

Delete Rules

None.

4.5.11 CMSA Represented

Description: Consolidated Metropolitan Statistical Area (CMSA) is no longer supported for monitoring objective. CSA (see below) has replaced it. The Consolidated Metropolitan Statistical Area from which the concentrations originated, not the location of the monitor.

Attributes: Alphanumeric
2-digit code
Conditionally Required

Coding Instructions: Consolidated Metropolitan Statistical Area (CMSA) is no longer supported for monitoring objective. CSA (see below) has replaced it.

Business Rules:

Common Rules

None.

Insert Rules

1. CMSA Represented is no longer supported.

Error Messages:

- MSAs and CMSAs are no longer supported for monitor objectives.

Update Rules

1. CMSA Represented is no longer supported.

Error Messages:

- MSAs and CMSAs are no longer supported for monitor objectives.

Delete Rules

None.

4.5.12 CBSA Represented

Description: The Core Based Statistical Area (CBSA) from which the concentrations originated, not the location of the monitor.

Attributes: Alphanumeric
5-digit code
Conditionally Required

Coding Instructions: It is required to designate the origin of concentrations that apply to a monitor objective classification. One, and only one, of urban area represented, CBSA represented, or CSA represented may be used to indicate the designation. Place a valid CBSA represented code in the twelfth delimited field. A CBSA represented value is valid if it exists in the CORE_BASED_STATISTICAL_AREAS Table.

Business Rules:

Common Rules

1. CBSA Represented must be valued if both CSA Represented and Urban Area Represented are not valued, and it must not be valued if either of the other two are valued.
Error Messages:
 - A value is required for ONLY one of the following: CBSA, CSA, or UAR
2. Urban Area Represented and CBSA Represented and CSA Represented may not be null.
Error Messages:
 - Urbanized Area, CBSA, or CSA must be specified.
3. CBSA Represented must be in CORE_BASED_STATISTICAL_AREAS table.
Error Messages:
 - Integrity constraint (AIRSRAQS.MOB_CBSA_FK) violated.
4. CBSA_CODE must be at production status.
Error Messages:
 - Status for CBSA_CODE is inactive.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.5.13 CSA Represented

Description: The Combined Statistical Area (CSA) from which the concentrations originated, not the location of the monitor.

Attributes: Alphanumeric
3-digit code
Conditionally Required

Coding Instructions: It is required to designate the origin of concentrations that apply to a monitor objective classification. One, and only one, of urban area represented, CBSA represented, or CSA represented may be used to indicate the designation. Place a valid CSA represented code in the thirteenth delimited field. A CSA represented value is valid if it exists in the COMBINED_STATISTICAL_AREAS Table.

Business Rules:

Common Rules

1. CSA Represented must be valued if both CBSA Represented and Urban Area Represented are not valued, and it must not be valued if either of the other two are valued.
Error Messages:
 - A value is required for ONLY one of the following: CBSA, CSA, or UAR
2. Urban Area Represented and CBSA Represented and CSA Represented may not be null.
Error Messages:
 - Urbanized Area, CBSA, or CSA must be specified.
3. CSA Represented must be in COBINED_STATISTICAL_AREAS table.
Error Messages:
 - Integrity constraint (AIRSRAQS.MOB_CSA_FK) violated.
4. CSA_CODE must be at production status.
Error Messages:
 - Status for CSA_CODE is inactive.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.6 Monitor Sampling Schedule - Transaction Type MF

See AQS Input Transaction Formats at <http://www.epa.gov/ttn/airs/airsaqs/manuals/index.htm> for a summary list of requirements on each transaction format.

4.6.0 Transaction Level Rules and Messages

1. Monitor Sampling Schedule is required for PM10 and PM2.5 monitors.
Error Messages:
 - Each day in a sample period since 7/1/1987 for a criteria PM monitor must have a required collection frequency.
2. The Required Collection Frequency assignment for a production monitor cannot be changed, (i.e., updated or deleted), in a manner that would leave any portion of that monitor's sample periods since 7/1/1987 without a required collection frequency.
Error Messages:
 - Each day in a sample period since 7/1/1987 for a criteria PM monitor must have a required collection frequency.
3. A Seasonal Required Collection Frequency assignment, (i.e., where RCF Code is "S"), requires at least twelve Monthly Collection Frequencies for a PM2.5 monitor and a seasonal or random Required Collection Frequency assignment, (i.e., where RCF Code is "8", "9", or "S"), requires at least one Monthly Collection Frequency for a non-PM2.5 monitor.
Error Messages:
 - Sample Schedule Criteria have not been met.

The fields described below are validated for insert (I) and update (U) transactions.

4.6.1 Transaction Type

Description: Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

Attributes: Alphanumeric
2-character code
Mandatory

Coding Instructions: Place MF in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory

Error Messages:

- Invalid transaction format.

- Transaction Type must be in TRANSACTION_TYPES table in database.

Error Messages:

- Transaction type not handled.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.6.2 Action Indicator

Description: Indicates the data manipulation action to be performed by the transaction.

Attributes: Alphanumeric
 1-character code
 Mandatory

Coding Instructions: Place the values I, U, or D in the second delimited field.
I Insert a new row into the appropriate table in the database.
U Change one or more column values for an existing row in one or more tables.
D Delete a row from a table(s) for the row containing the key data.

Business Rules

Common Rules

- Action Indicator is required.
Error Messages:
 - Action Code is Required.
- Action Indicator must be either 'I', 'U', or 'D'.
Error Messages:
 - Invalid Action Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.6.3 State Code or Tribal Indicator

The third field on a transaction can be either a State Code or a Tribal indicator. They are described as follows:

State Code Description: A FIPS (Federal Information Processing Standards) code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Tribal Indicator Description: A flag, with value “TT”, to indicate that this data is for a Native American Tribe, and that the next field on the transaction identifies a tribal area using the Bureau of Indian Affairs tribal code.

Attributes: Alphanumeric
2-digit code
Mandatory
Key Field

Coding Instructions: Place a valid FIPS state code or a Tribal Indicator in delimited field 3. A State Code is valid if it exists in the STATES Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.6.4 County Code or Tribal Code

The fourth field on any transaction can be either a County Code or a Tribal Code. A County code is indicated by a valid state code in the third field, while a Tribal Code is indicated by a Tribal Indicator in the third field.

County Code Description: A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

Tribal Code Description: A value that identifies a Tribal Area using a Bureau of Indian Affairs Tribal Code.

Attributes: Alphanumeric
 3-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid county code or a valid tribal code in the fourth delimited field. A County Code is valid if it exists at active status in the Counties table. A Tribal Code is valid if it exists at active status in the Tribal_Areas table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.6.5 Site ID

Description: A numeric identifier (ID) that uniquely identifies each air monitoring site within a county or tribal area. There is no requirement that Site IDs be assigned continuously or in any particular order. Regional and Local organizations are thus free to allocate site numbers in any way they chose as long as there is no duplication within a county and tribal area. For Tribal sites, because tribal areas may cross county or state lines, care must be taken to ensure that the Site ID is unique in the effected Tribal Area and states-county.

A specific Site ID is associated with a specific physical location and address. Any change in address requires a new Site ID to be assigned. This address change could include a change from the roof of one building to another. A change in location on the same roof should not normally require a new Site ID. Although an address change would routinely mean a new Site ID, some changes that do not change the site's location in respect to surrounding sources and its measurement scale, would require no change. An EPA Regional Office should be consulted for assistance in determining whether a new Site ID is required.

If a new Site ID is needed for a site not operated by the air pollution control agency, that agency should be contacted to assist in the ID assignment, to ensure that the ID is unique within the county. In other words, when a new Site ID is assigned, it must be different from any other Site ID already existing for that combination of State and County or Tribal Code.

Attributes: Alphanumeric
 4-digit ID
 Mandatory
 Key Field

Coding Instructions: Place a four-digit numeric code in the fifth delimited field. For update and delete, a Site ID value is valid if it exists in combination with state code and County or Tribal Code in the Sites Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.6.6 Parameter

Description: The code assigned to the parameter measured by the monitor. Parameters may be pollutants or non-pollutants.

Attributes: Alphanumeric
 5-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid parameter code in the sixth delimited field. A parameter value is valid if it exists in combination with (State Code, County Code, Site ID, and POC) or (Tribal Code, Site ID, and POC) in the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.6.7 POC (Parameter Occurrence Code)

Description: An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter. For example, the first monitor established to measure CO at a site could have a POC of 1. If an additional monitor were established at the same site to measure CO, that monitor could have a POC of 2. However, if a new instrument is installed to replace the original instrument used as the first monitor, that could be considered the same monitor and it would still have a POC of 1.

For criteria pollutants, data from different sampling methods should only be stored under the same POC if the sampling intervals are the same and the methods are reference or equivalent. For sites where duplicate sampling is being conducted by multiple agencies or by one agency with multiple samplers, multiple POCs must be utilized to store all samples.

For non-criteria pollutants, data from multiple sampling methods can be stored under the same POC if the sampling intervals are the same and there is only one sample for the time reported. If multiple open path monitors are reporting data for the same parameter, each open path would be assigned a different POC.

There are no national EPA practices assigning POC values. There may be regional or agency conventions where a POC value may have specific significance. Numbers do not need to be assigned sequentially.

Attributes: Numeric
2-digit ID
Mandatory
Key Field

Coding Instructions: Place a valid POC value in the seventh delimited field. A POC value is valid if it exists in combination with (State Code, County Code, Site ID, and Parameter) or (Tribal Code, Site ID, and Parameter) on the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.6.8 Required Collection Frequency Code

Description: The required collection frequency (RCF) is mandatory for both Photochemical Assessment Monitoring System (PAMS) regulations for organic compounds and PM-2.5 or PM-10 monitors.

Attributes: Alphanumeric
1- or 2-character code
Mandatory
Key Field

Coding Instructions: Place a valid RCF code in the eighth delimited field. A RCF code value is valid if it exists in the Collection Frequencies Table.

Valid collection frequency codes for PAMS include:

| | |
|---|--------------------------------|
| A | DAILY: 24 - 1 HR SAMPLES -PAMS |
| B | DAILY: 8 - 3 HR SAMPLES - PAMS |
| C | DAILY: 1 - 3 HR SAMPLE - PAMS |
| D | DAILY: 1 - 24 HR SAMPLE - PAMS |
| E | DAILY: 4 - 6 HR SAMPLES - PAMS |
| F | DAILY: 4 - 3 HR SAMPLES - PAMS |
| G | EVERY 3RD DAY:24-1 HR - PAMS |
| H | EVERY 3RD DAY:8-3 HOUR - PAMS |
| I | EVERY 3RD DAY:1-3 HR - PAMS |
| J | EVERY 3RD DAY:1-24 HR - PAMS |
| K | EVERY 3RD DAY:4-6 HR - PAMS |
| L | EVERY 3RD DAY:4-3 HR - PAMS |
| M | EVERY 6TH DAY:24-1 HR - PAMS |

| | |
|---|------------------------------|
| N | EVERY 6TH DAY:8-3 HR - PAMS |
| O | EVERY 6TH DAY:1-3 HR - PAMS |
| P | EVERY 6TH DAY:1-24 HR - PAMS |
| Q | EVERY 6TH DAY:4-3 HR – PAMS |

Valid collection frequency codes for PM monitors include:

| | |
|----|---------------------------|
| S | SEASONAL |
| T | 5 OUT OF 7 DAYS (FOR PSI) |
| 1 | EVERY DAY |
| 2 | EVERY OTHER DAY |
| 3 | EVERY 3RD DAY |
| 4 | EVERY 4TH DAY |
| 5 | EVERY 5TH DAY |
| 6 | EVERY 6TH DAY |
| 7 | EVERY 12TH DAY |
| 8 | STRATIFIED RANDOM |
| 9 | RANDOM |
| R | EPISODIC SAMPLING |
| 10 | EVERY 24TH DAY |

Business Rules:

Common Rules

- Required Collection Frequency Code must be in COLLECTION_FREQUENCIES table.
Error Messages:
 - Integrity constraint (AIRSRAQS.RCF_CF_FK) violated.
- COLLECTION_FREQUENCIES (COLL_FREQ_CODE) must be at production status.
Error Messages:
 - Status for COLL_FREQ_CODE is inactive.
- Required Collection Frequency Code must be '1', '3', '6', or 'S' if Parameter is '88101'.
Error Messages:
 - PM2.5 may only have required collection frequencies of 1, 3, 6, or S.
- Required Collection Frequency Code must be valid for the Parameter, e.g., a PAMS collection frequency may not be assigned to a PM monitor.
Error Messages:
 - Invalid collection frequency for the parameter.

Insert Rules

- Required Collection Frequency Code is required.
Error Messages:
 - Required Collection Frequency Code is mandatory.

Update Rules

- Required Collection Frequency Code may not be nullified.
Error Messages:
 - No update occurred. Probable use of non updateable field

Delete Rules

None.

4.6.9 Required Collection Frequency Begin Date

Description: The date on which the required collection frequency (RCF) went into effect.

Attributes: Date
8-digit date
Mandatory:
Key Field

Coding Instructions: Place a valid date string in the ninth delimited field. An RCF begin date value is valid if it: is in the format of YYYYMMDD, is between July 1, 1987 and one year from the current date, does not fall within any other required collection frequency periods defined for the monitor, and falls within a sample period for the monitor. The RCF begin date cannot be changed via update.

Business Rules:

Common Rules

1. Required Collection Frequency Begin Date is required.

Error Messages:

- Required Collection Frequency Begin Date is mandatory.

5. Required Collection Frequency Begin Date must not fall within any other RCF Begin Date-RCF End Date range for the same monitor (State Code, County Code, Site ID, Parameter, POC).

Error Messages:

- More than one RCF defined for this monitor-date.

Insert Rules

None

Update Rules

None.

Delete Rules

None.

4.6.10 Required Collection Frequency End Date

Description: The date on which the required collection frequency (RCF) ended.

Attributes: Date
 8-digit date
 Optional

Coding Instructions: Place a valid date string in the tenth delimited field. An RCF end date value is valid if it: is in the format of YYYYMMDD, is greater than the RCF begin date, is between July 1, 1987 and one year from the current date, does not fall within any other required collection frequency periods defined for the monitor, and falls within a sample period for the monitor.

Business Rules:

Common Rules

1. RCF End Date must be greater than RCF Begin Date.

Error Messages:

- The End Date must be greater than the Begin Date.

3. RCF End Date must not fall within any other RCF Begin Date-RCF End Date range for the same monitor.

Error Messages:

- More than one RCF defined for this monitor-date.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

**4.6.11 Monthly Required Collection
Frequency - January to
December (12 Instances)**

Description: Specifies the collection frequency required within an indicated month for a monitor's required collection frequency when that frequency is stratified random, random, or seasonal. Twelve slots are available, one for each month in a year.

Attributes: Numeric
 12 digits (nnnnnnnnnnnn)
 Optional

Coding Instructions: The Monthly Required Collection Frequency is required when the Required Collection Frequency code is 8, 9, or S (stratified random, random, or seasonal). The delimited field positions for collection frequency are 11-22. Field positions correlate to month number offset by 10, i.e., field 11 is for month 1 (January), field 12 is for month 2 (February), etc. Place a valid collection frequency in the appropriate delimited field. A value is valid if it is a valid collection frequency code for intermittent sampling (values 1, 2, 3, 4, 5, 6, or 7).

Business Rules:

Common Rules

1. Monthly Required Collection Frequency may only be valued if Required Collection Frequency Code is '8', '9', or 'S'.
Error Messages:
 - The RCF for the Monitor Must = 8, 9, or S to establish a sample schedule.
2. Monthly Required Collection Frequency must be in COLLECTION_FREQUENCIES table.
Error Messages:
 - Integrity constraint (AIRSRAQS.SS_CF_FK) violated.
3. Monthly Required Collection Frequency must be at production status.
Error Messages:
 - Status for COLL_FREQ_CODE is inactive.
4. Monthly Required Collection Frequency must be '1', '3', or '6' if Parameter is '88101'.
Error Messages:
 - PM2.5 may only have required collection frequencies of 1, 3, 6, or S.
5. Monthly Required Collection Frequency Code must be valid for the Parameter
Error Messages:
 - Invalid collection frequency for the parameter.
6. Monthly Required Collection Frequency Code must have a daily interval, i.e., it must not be codes '8', '9', or 'S'.
Error Messages:
 - Monthly collection frequency must have daily interval.
7. Monthly Required Collection Frequency Code must have a daily interval greater than the Offset.
Error Messages:
 - Required collection frequency offset must be greater or equal to 0 and less than the daily interval

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.6.12 Offset

Description: Specifies offset applied to the standard ample schedule calendar posted at <http://www.epa.gov/ttn/amtic/calendar.html>.

Attributes: Numeric
12 digits (nnnnnnnnnnnn)
Optional (Defaults to 0)

Coding Instructions: A whole number greater than 0 but less than the applicable daily interval should be assigned.

Business Rules:

Common Rules

1. Required Collection Frequency Code must have a daily interval greater than the Offset.

Error Messages:

- Required collection frequency offset must be greater or equal to 0 and less than the daily interval

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.7 Monitor Tangent Roads - Transaction Type MG

See [AQS Input Transaction Formats](http://www.epa.gov/ttn/airs/airsaqs/manuals/) at <http://www.epa.gov/ttn/airs/airsaqs/manuals/> for a summary list of requirements on each transaction format. For criteria pollutant monitors, transaction types MA through MX are required.

The monitor's relationship to nearby streets may be described by using the MG transaction. If either tangent street number or distance from monitor is valued, the other must also be valued. Similarly, one may not be deleted without also deleting the other.

The fields described below are validated for insert (I) and update (U) transactions.

4.7.0 Transaction Type

Description: Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

Attributes: Alphanumeric
2-character code
Mandatory

Coding Instructions: Place MG in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory

Error Messages:

- Invalid transaction format.

2. Transaction Type must be in TRANSACTION_TYPES table in database.

Error Messages:

- Transaction type not handled.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.7.1 Action Indicator

Description: Indicates the data manipulation action to be performed by the transaction.

Attributes: Alphanumeric
 1-character code
 Mandatory

Coding Instructions: Place the values I, U, or D in the second delimited field.
I Insert a new row into the appropriate table in the database.
U Change one or more column values for an existing row in one or
 more tables.
D Delete a row from a table(s) for the row containing the key data.

Business Rules

Common Rules

1. Action Indicator is required.
 Error Messages:
 - Action Code is Required.
2. Action Indicator must be either 'I', 'U', or 'D'.
 Error Messages:
 - Invalid Action Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.7.2 State Code or Tribal Indicator

The third field on a transaction can be either a State Code or a Tribal indicator. They are described as follows:

State Code Description: A FIPS (Federal Information Processing Standards) code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Tribal Indicator Description: A flag, with value "TT", to indicate that this data is for a Native American Tribe, and that the next field on the transaction identifies a tribal area using the Bureau of Indian Affairs tribal code.

Attributes: Alphanumeric
 2-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid FIPS state code or a Tribal Indicator in delimited field 3. A State Code is valid if it exists in the STATES Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.7.3 County Code or Tribal Code

The fourth field on any transaction can be either a County Code or a Tribal Code. A County code is indicated by a valid state code in the third field, while a Tribal Code is indicated by a Tribal Indicator in the third field.

County Code Description: A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

Tribal Code Description: A value that identifies a Tribal Area using a Bureau of Indian Affairs Tribal Code.

Attributes: Alphanumeric
 3-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid county code or a valid tribal code in the fourth delimited field. A County Code is valid if it exists at active status in the Counties table. A Tribal Code is valid if it exists at active status in the Tribal_Areas table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.7.4 Site ID

Description: A numeric identifier (ID) that uniquely identifies each air monitoring site within a county or tribal area. There is no requirement that Site IDs be assigned continuously or in any particular order. Regional and Local organizations are thus free to allocate site numbers in any way they chose as long as there is no duplication within a county and tribal area. For Tribal sites, because tribal areas may cross county or state lines, care must be taken to ensure that the Site ID is unique in the effected Tribal Area and states-county.

A specific Site ID is associated with a specific physical location and address. Any change in address requires a new Site ID to be assigned. This address change could include a change from the roof of one building to another. A change in location on the same roof should not normally require a new Site ID. Although an address change would routinely mean a new Site ID, some changes that do not change the site's location in respect to surrounding sources and its measurement scale, would require no change. An EPA Regional Office should be consulted for assistance in determining whether a new Site ID is required.

If a new Site ID is needed for a site not operated by the air pollution control agency, that agency should be contacted to assist in the ID assignment, to ensure that the ID is unique within the county. In other words, when a new Site ID is assigned, it must be different from any other Site ID already existing for that combination of State and County or Tribal Code.

Attributes: Alphanumeric
4-digit ID
Mandatory
Key Field

Coding Instructions: Place a four-digit numeric code in the fifth delimited field. For update and delete, a Site ID value is valid if it exists in combination with state code and County or Tribal Code in the Sites Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.7.5 Parameter

Description: The code assigned to the parameter measured by the monitor. Parameters may be pollutants or non-pollutants.

Attributes: Alphanumeric
5-digit code
Mandatory
Key Field

Coding Instructions: Place a valid parameter code in the sixth delimited field. A parameter value is valid if it exists in combination with (State Code, County Code, Site ID, and POC) or (Tribal Code, Site ID, and POC) in the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.7.6 POC (Parameter Occurrence Code)

Description: An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter. For example, the first monitor established to measure CO at a site could have a POC of 1. If an additional monitor were established at the same site to measure CO, that monitor could have a POC of 2. However, if a new instrument is installed to replace the original instrument used as the first monitor, that could be considered the same monitor and it would still have a POC of 1.

For criteria pollutants, data from different sampling methods should only be stored under the same POC if the sampling intervals are the same and the methods are reference or equivalent. For sites where duplicate sampling is being conducted by multiple agencies or by one agency with multiple samplers, multiple POCs must be utilized to store all samples.

For non-criteria pollutants, data from multiple sampling methods can be stored under the same POC if the sampling intervals are the same and there is only one sample for the time reported. If multiple open path monitors are reporting data for the same parameter, each open path would be assigned a different POC.

There are no national EPA practices assigning POC values. There may be regional or agency conventions where a POC value may have specific significance. Numbers do not need to be assigned sequentially.

Attributes: Numeric
2-digit ID
Mandatory
Key Field

Coding Instructions: Place a valid POC value in the seventh delimited field. A POC value is valid if it exists in combination with (State Code, County Code, Site ID, and Parameter) or (Tribal Code, Site ID, and Parameter) on the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.7.7 Tangent Street Number

Description: Designation of a street number that exists for the site. Used to associate information about the relationship between specific monitors at the site and tangent roads at the site.

Attributes: Numeric
2 digits (nn)
Mandatory
Key Field

Coding Instructions: Place a valid tangent street number in the eighth delimited field. A tangent street number is valid if it exists in combination with state code, County/Tribal Code, and Site ID on the Tangent Roads Table.

Business Rules:

Common Rules

1. Tangent Street Number is required.

Error Messages:

- Tangent Street Number is mandatory.

2. Tangent Street number must be in the TANGENT_ROADS table for the site.

Error Messages:

- Integrity constraint (AIRSRAQS.MTR_TR_FK) violated.

Insert Rules

1. The Tangent Street Number must not already be in the database for the monitor.

Error Messages:

- Unique constraint (AIRSRAQS.MTR_UK) violated.

Update Rules

None.

Delete Rules

None.

4.7.8 Distance from Monitor to Tangent Road

Description: The distance in meters between the sensing of air sampling equipment at a monitoring site and the nearest edge of the roadway.

Attributes: Numeric

10 digits, including 2 decimal places (nnnnnnnn.nn)
Mandatory

Coding Instructions: Place a valid distance from monitor value in the ninth delimited field. A distance from monitor value is valid if it is greater than 0.

Business Rules:

Common Rules

1. Distance from monitor must be greater than 0.

Error Messages:

- Distance from monitor must be positive.

Insert Rules

1. Distance from Monitor to Tangent Road is mandatory.

Error Messages:

- Required Collection Frequency Begin Date is mandatory.

Update Rules

1. Distance from Monitor to Tangent Road may not be nullified.

Error Messages:

- Unable to Update or Delete requested Monitor Tangent Road.
- Invalid number

Delete Rules

None.

4.8 Monitor Obstruction Information - Transaction Type MH

See [AQS Input Transaction Formats](http://www.epa.gov/ttn/airs/airsaqs/manuals/) at <http://www.epa.gov/ttn/airs/airsaqs/manuals/> for a summary list of requirements on each transaction format. For criteria pollutant monitors, transaction types MA through ME are required.

The type of obstruction for a monitor with restricted air flow is described by using the MH transaction. See Appendix XX for a description of the transaction formats, including those required to create monitors. For criteria pollutant monitors, transaction types MA through ME are required.

4.8.0 Transaction Level Rules and Errors

1. A Monitor Obstruction record may not be created if the unrestricted air flow indicator for the monitor (State Code, County Code, Site ID, Parameter, POC) is 'Y'.
Error Messages:
 - Probe Obstruction information is not valid for the given Unrestricted Air Flow indicator.
2. A Monitor Obstruction record is required if the unrestricted air flow indicator for the monitor (State Code, County Code, Site ID, Parameter, POC) is 'N' or 'W'.
Error Messages:
 - You must have at least one active Probe Obstruction record.

The fields described below are validated for insert (I) and update (U) transactions.

4.8.1 Transaction Type

Description: Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

Attributes: Alphanumeric
2-character code
Mandatory

Coding Instructions: Place MH in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory

Error Messages:

- Invalid transaction format.
2. Transaction Type must be in TRANSACTION_TYPES table in database.

Error Messages:

- Transaction type not handled.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.8.2 Action Indicator

Description: Indicates the data manipulation action to be performed by the transaction.

Attributes: Alphanumeric
1-character code
Mandatory

Coding Instructions: Place the values I, U, or D in the second delimited field.
I Insert a new row into the appropriate table in the database.
U Change one or more column values for an existing row in one or more tables.
D Delete a row from a table(s) for the row containing the key data.

Business Rules

Common Rules

1. Action Indicator is required.
Error Messages:
 - Action Code is Required.
2. Action Indicator must be either 'I', 'U', or 'D'.
Error Messages:
 - Invalid Action Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.8.3 State Code or Tribal Indicator

The third field on a transaction can be either a State Code or a Tribal indicator. They are described as follows:

State Code Description: A FIPS (Federal Information Processing Standards) code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Tribal Indicator Description: A flag, with value “TT”, to indicate that this data is for a Native American Tribe, and that the next field on the transaction identifies a tribal area using the Bureau of Indian Affairs tribal code.

Attributes: Alphanumeric
2-digit code
Mandatory
Key Field

Coding Instructions: Place a valid FIPS state code or a Tribal Indicator in delimited field 3. A State Code is valid if it exists in the STATES Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.8.4 County Code or Tribal Code

The fourth field on any transaction can be either a County Code or a Tribal Code. A County code is indicated by a valid state code in the third field, while a Tribal Code is indicated by a Tribal Indicator in the third field.

County Code Description: A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

Tribal Code Description: A value that identifies a Tribal Area using a Bureau of Indian Affairs Tribal Code.

Attributes: Alphanumeric
3-digit code
Mandatory

Key Field

Coding Instructions: Place a valid county code or a valid tribal code in the fourth delimited field. A County Code is valid if it exists at active status in the Counties table. A Tribal Code is valid if it exists at active status in the Tribal_Areas table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.8.5 Site ID

Description: A numeric identifier (ID) that uniquely identifies each air monitoring site within a county or tribal area. There is no requirement that Site IDs be assigned continuously or in any particular order. Regional and Local organizations are thus free to allocate site numbers in any way they chose as long as there is no duplication within a county and tribal area. For Tribal sites, because tribal areas may cross county or state lines, care must be taken to ensure that the Site ID is unique in the effected Tribal Area and states-county.

A specific Site ID is associated with a specific physical location and address. Any change in address requires a new Site ID to be assigned. This address change could include a change from the roof of one building to another. A change in location on the same roof should not normally require a new Site ID. Although an address change would routinely mean a new Site ID, some changes that do not change the site's location in respect to surrounding sources and its measurement scale, would require no change. An EPA Regional Office should be consulted for assistance in determining whether a new Site ID is required.

If a new Site ID is needed for a site not operated by the air pollution control agency, that agency should be contacted to assist in the ID assignment, to ensure that the ID is unique within the county. In other

words, when a new Site ID is assigned, it must be different from any other Site ID already existing for that combination of State and County or Tribal Code.

Attributes: Alphanumeric
 4-digit ID
 Mandatory
 Key Field

Coding Instructions: Place a four-digit numeric code in the fifth delimited field. For update and delete, a Site ID value is valid if it exists in combination with state code and County or Tribal Code in the Sites Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.8.6 Parameter

Description: The code assigned to the parameter measured by the monitor. Parameters may be pollutants or non-pollutants.

Attributes: Alphanumeric
 5-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid parameter code in the sixth delimited field. A parameter value is valid if it exists in combination with (State Code, County Code, Site ID, and POC) or (Tribal Code, Site ID, and POC) in the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal

Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.8.7 POC (Parameter Occurrence Code)

Description: An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter. For example, the first monitor established to measure CO at a site could have a POC of 1. If an additional monitor were established at the same site to measure CO, that monitor could have a POC of 2. However, if a new instrument is installed to replace the original instrument used as the first monitor, that could be considered the same monitor and it would still have a POC of 1.

For criteria pollutants, data from different sampling methods should only be stored under the same POC if the sampling intervals are the same and the methods are reference or equivalent. For sites where duplicate sampling is being conducted by multiple agencies or by one agency with multiple samplers, multiple POCs must be utilized to store all samples.

For non-criteria pollutants, data from multiple sampling methods can be stored under the same POC if the sampling intervals are the same and there is only one sample for the time reported. If multiple open path monitors are reporting data for the same parameter, each open path would be assigned a different POC.

There are no national EPA practices assigning POC values. There may be regional or agency conventions where a POC value may have specific significance. Numbers do not need to be assigned sequentially.

Attributes: Numeric
2-digit ID
Mandatory
Key Field

Coding Instructions: Place a valid POC value in the seventh delimited field. A POC value is valid if it exists in combination with (State Code, County Code, Site ID,

and Parameter) or (Tribal Code, Site ID, and Parameter) on the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.8.8 Probe Obstruction Type

Description: The type of obstruction responsible for the restricted air flow of a monitor.

Attributes: Alphanumeric
Up to 20 characters
Mandatory
Key Field

Coding Instructions: Place a valid type obstruction term in the eighth delimited field. A type obstruction value is valid if it exists in the Probe Obstruction Types Table. Valid probe obstruction types include:

BUILDINGS
CLIFFS
OTHER
RIDGES
TREES/BRUSH

Business Rules:

Common Rules

1. Type of Obstruction is required.

Error Messages:

- Probe Obstruction Type is mandatory.

2. Type of Obstruction must be in PROBE_OBSTRUCTION_TYPES table.

Error Messages:

- Integrity constraint (AIRSRAQS.POB_POT_FK) violated.

3. Type of Obstruction must be at production status.

Error Messages:

- Status for PROBE_OBSTR_TYPE is inactive.

Insert Rules

1. The combination of Type of Obstruction and Direction from Monitor must not already exist in database for monitor.

Error Messages:

- Unique constraint (AIRSRAQS.POB_UK) violated

Update Rules

None.

Delete Rules

None.

4.8.9 Direction from Monitor to Probe Obstruction

Description: The direction from the monitor to the obstruction.

Attributes: Alphanumeric
3-character code
Mandatory

Coding Instructions: Place a valid direction from monitor in the ninth delimited field. A direction from monitor value is valid if it exists in the Compass Sectors Table.

Business Rules:

Common Rules

1. Direction From Monitor is required.

Error Messages:

- Direction from Monitor to Probe Obstruction is mandatory.

2. Direction From Monitor must be in COMPASS_SECTORS table.

Error Messages:

- Integrity constraint (AIRSRAQS.POB_CS_FK) violated.

3. Direction From Monitor must be at production status (in COMPASS_SECTORS).

Error Messages:

- Integrity constraint (AIRSRAQS.POB_CS_FK) violated

Insert Rules

1. The combination of Type of Obstruction and Direction From Monitor must not already exist in database for monitor.

Error Messages:

- Unique constraint (AIRSRAQS.POB_UK) violated

Update Rules

None.

Delete Rules

None.

4.8.10 Distance from Monitor to Probe Obstruction

Description: The distance, in meters, between the probe and obstruction.

Attributes: Numeric
10 digits, including 2 decimal places (nnnnnnnn.nn)
Mandatory

Coding Instructions: Place a valid distance to monitor value in the tenth delimited field. A distance to monitor value is valid if it is greater than 0.

Business Rules:

Common Rules

1 Distance from Monitor to Probe Obstruction must be greater than 0.

Error Messages:

- Distance To Monitor must be positive.

Insert Rules

1. Distance from Monitor to Probe Obstruction is required.

Error Messages:

- Distance from Monitor to Probe Obstruction is mandatory.

Update Rules

1. Distance from Monitor to Probe Obstruction may not be nullified.

Error Messages:

- Unable to Update or Delete requested Probe Obstruction.
1. Missing expression

Delete Rules

None.

4.8.11 Probe Obstruction Height

Description: The height, in meters, of the top of the obstruction above the probe.

Attributes: Numeric
10 digits, including 2 decimal places (nnnnnnnn.nn)
Mandatory

Coding Instructions: Place a valid height of obstruction value in the eleventh delimited field. A

height of obstruction value is valid if it is greater than 0.

Business Rules:

Common Rules

1. Probe Obstruction Height must be greater than 0.

Error Messages:

- Height of Obstruction must be positive.

Insert Rules

1. Probe Obstruction Height is required.

Error Messages:

- Probe Obstruction Height is mandatory.

Update Rules

1. Probe Obstruction Height may not be nullified

Error Messages:

- Unable to Update or Delete requested Probe Obstruction.
1. Missing expression

Delete Rules

None.

4.9 Monitor Regulatory Compliance - Transaction Type MI

See [AQS Input Transaction Formats](http://www.epa.gov/ttn/airs/airsaqs/manuals/) at <http://www.epa.gov/ttn/airs/airsaqs/manuals/> for a summary list of requirements on each transaction format. For criteria pollutant monitors, transaction types MA through ME are required.

The fields described below are validated for insert (I) and update (U) transactions.

4.9.0 Transaction Type

Description: Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

Attributes: Alphanumeric
2-character code
Mandatory

Coding Instructions: Place MI in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory
Error Messages:
 - Invalid transaction format.
2. Transaction Type must be in TRANSACTION_TYPES table in database.
Error Messages:
 - Transaction type not handled.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.9.1 Action Indicator

Description: Indicates the data manipulation action to be performed by the transaction.

Attributes: Alphanumeric
1-character code
Mandatory

- Coding Instructions: Place the values I, U, or D in the second delimited field.
- I Insert a new row into the appropriate table in the database.
 - U Change one or more column values for an existing row in one or more tables.
 - D Delete a row from a table(s) for the row containing the key data.

Business Rules

Common Rules

1. Action Indicator is required.
Error Messages:
 - Action Code is Required.
2. Action Indicator must be either 'I', 'U', or 'D'.
Error Messages:
 - Invalid Action Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.9.2 State Code or Tribal Indicator

The third field on a transaction can be either a State Code or a Tribal indicator. They are described as follows:

State Code Description: A FIPS (Federal Information Processing Standards) code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Tribal Indicator Description: A flag, with value "TT", to indicate that this data is for a Native American Tribe, and that the next field on the transaction identifies a tribal area using the Bureau of Indian Affairs tribal code.

Attributes: Alphanumeric
2-digit code
Mandatory
Key Field

Coding Instructions: Place a valid FIPS state code or a Tribal Indicator in delimited field 3. A State Code is valid if it exists in the STATES Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.
Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.9.3 County Code or Tribal Code

The fourth field on any transaction can be either a County Code or a Tribal Code. A County code is indicated by a valid state code in the third field, while a Tribal Code is indicated by a Tribal Indicator in the third field.

County Code Description: A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

Tribal Code Description: A value that identifies a Tribal Area using a Bureau of Indian Affairs Tribal Code.

Attributes: Alphanumeric
 3-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid county code or a valid tribal code in the fourth delimited field. A County Code is valid if it exists at active status in the Counties table. A Tribal Code is valid if it exists at active status in the Tribal_Areas table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.
Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.9.4 Site ID

Description: A numeric identifier (ID) that uniquely identifies each air monitoring site within a county or tribal area. There is no requirement that Site IDs be assigned continuously or in any particular order. Regional and Local organizations are thus free to allocate site numbers in any way they chose as long as there is no duplication within a county and tribal area. For Tribal sites, because tribal areas may cross county or state lines, care must be taken to ensure that the Site ID is unique in the effected Tribal Area and states-county.

A specific Site ID is associated with a specific physical location and address. Any change in address requires a new Site ID to be assigned. This address change could include a change from the roof of one building to another. A change in location on the same roof should not normally require a new Site ID. Although an address change would routinely mean a new Site ID, some changes that do not change the site's location in respect to surrounding sources and its measurement scale, would require no change. An EPA Regional Office should be consulted for assistance in determining whether a new Site ID is required.

If a new Site ID is needed for a site not operated by the air pollution control agency, that agency should be contacted to assist in the ID assignment, to ensure that the ID is unique within the county. In other words, when a new Site ID is assigned, it must be different from any other Site ID already existing for that combination of State and County or Tribal Code.

Attributes: Alphanumeric
4-digit ID
Mandatory
Key Field

Coding Instructions: Place a four-digit numeric code in the fifth delimited field. For update and delete, a Site ID value is valid if it exists in combination with state code and County or Tribal Code in the Sites Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.9.5 Parameter

Description: The code assigned to the parameter measured by the monitor. Parameters may be pollutants or non-pollutants.

Attributes: Alphanumeric
5-digit code
Mandatory
Key Field

Coding Instructions: Place a valid parameter code in the sixth delimited field. A parameter value is valid if it exists in combination with (State Code, County Code, Site ID, and POC) or (Tribal Code, Site ID, and POC) in the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.9.6 POC (Parameter Occurrence Code)

Description: An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter. For example, the first monitor

established to measure CO at a site could have a POC of 1. If an additional monitor were established at the same site to measure CO, that monitor could have a POC of 2. However, if a new instrument is installed to replace the original instrument used as the first monitor, that could be considered the same monitor and it would still have a POC of 1.

For criteria pollutants, data from different sampling methods should only be stored under the same POC if the sampling intervals are the same and the methods are reference or equivalent. For sites where duplicate sampling is being conducted by multiple agencies or by one agency with multiple samplers, multiple POCs must be utilized to store all samples.

For non-criteria pollutants, data from multiple sampling methods can be stored under the same POC if the sampling intervals are the same and there is only one sample for the time reported. If multiple open path monitors are reporting data for the same parameter, each open path would be assigned a different POC.

There are no national EPA practices assigning POC values. There may be regional or agency conventions where a POC value may have specific significance. Numbers do not need to be assigned sequentially.

Attributes: Numeric
 2-digit ID
 Mandatory
 Key Field

Coding Instructions: Place a valid POC value in the seventh delimited field. A POC value is valid if it exists in combination with (State Code, County Code, Site ID, and Parameter) or (Tribal Code, Site ID, and Parameter) on the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.9.7 Regulation Code

Description: Identification of an EPA regulation for which compliance documentation is required.

Attributes: Alphanumeric
2-character code
Mandatory
Key Field

Coding Instructions: Place a valid monitor regulation code in the eighth delimited field. A monitor regulation code value is valid if it exists in combination with parameter on the Parameter Regulations Table.
Valid regulation codes and meanings include:

| | |
|----|--------------------------------|
| QC | Quality Assurance Criteria Met |
| RM | Reference Method Used |
| SC | Siting Criteria Met |

Business Rules:

Common Rules

1. Regulation Code is required.

Error Messages:

- Regulation Code is mandatory.

2. Regulation Code must be in REGULATIONS table.

Error Messages:

- Integrity constraint (AIRSRAQS.RC_RE_FK) violated.

3. Regulation Code must be at production status.

Error Messages:

- Status for REGULATION_CODE is inactive.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.9.8 Compliance Indicator

Description: The compliance status of a monitor with respect to an EPA regulation.

Attributes: Alphanumeric
1-character code
Conditionally Required

Key Field

Coding Instructions: Place a compliance indicator in the ninth delimited field. A compliance indicator value is valid for the following cases: monitor regulation code is RM or ST and compliance indicator is Y or N; monitor regulation code is SC and compliance indicator is Y, N, or W; monitor regulation code is QC and compliance indicator is Y, N, or C. Indicators: Y (in compliance with the regulation), N (not in compliance with the regulation), W (compliance has been waived), or C (in conditional compliance with the regulation).

Business Rules:

Common Rules

1. Compliance Indicator may be: 'Y' or 'N' if Regulation Code is 'ST', 'RM', or 'FC'.
Error Messages:
 - The Compliance Indicator must be Y or N when the Regulation Code is ST, RM, or FC.
2. Compliance Indicator may be: 'Y', 'N', or 'W' if Regulation Code is 'SC' .
Error Messages:
 - The Compliance Indicator must be Y, N, or W when the Regulation Code is SC.
3. Compliance Indicator may be 'Y', 'N', or 'C' if Regulation Code is 'QC' .
Error Messages:
 - The Compliance Indicator must be Y, N, or C when the Regulation Code is QC.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.9.9 Compliance Date

Description: The date on which the current status of the monitor's compliance with the regulation was achieved.

Attributes: Date
8-digit date
Conditionally Required

Coding Instructions: Place a valid compliance date in the tenth delimited field. A compliance date value is valid if it is in the form of YYYYMMDD and compliance

indicator is Y, W, or C.

Business Rules:

Common Rules

1. If Regulation Code is 'SC' and Compliance Indicator is 'Y' or 'W' then Compliance Date must be between 1/1/1957 and one year from the current date.
Error Messages:
 - The Compliance Date must be between 1/1/1957 and 1 year from the current date when the Regulation Code is SC and the Compliance Indicator is Y or W.
2. If Regulation Code is 'SC' and Compliance Indicator is 'N' then Compliance Date is not allowed.
Error Messages:
 - The Compliance Date must be null when the Compliance Indicator is N and the Regulation Code is SC, QC, RM, or ST.
3. If Regulation Code is 'QC' and Compliance Indicator is 'Y' or 'C' then Compliance Date must be between 1/1/1957 and the current date.
Error Messages:
 - Compliance Date must be between 1/1/1957 and the current date.
4. If Regulation Code is 'QC' and Compliance Indicator is 'N' then Compliance Date is not allowed.
Error Messages:
 - The Compliance Date must be null when the Compliance Indicator is N and the Regulation Code is SC, QC, RM, or ST.
5. If Regulation Code is 'FC', then Compliance Date must be between 1/1/1957 and the current date.
Error Messages:
 - The Compliance Date must be between 1/1/1957 and the current date when the Regulation Code is FC.
6. If Regulation Code is 'RM', and Compliance Indicator is 'Y' then Compliance Date must be between 1/1/1970 and the current date.
Error Messages:
 - The Compliance Date must be between 1/1/1970 and the current date when the Regulation Code is RM and the Compliance Indicator is Y.
7. If Regulation Code is 'RM' and Compliance Indicator is 'N' then Compliance Date is not allowed.
Error Messages:
 - The Compliance Date must be null when the Compliance Indicator is N and the Regulation Code is SC, QC, RM, or ST.
8. If Regulation Code is 'ST' and Compliance Indicator is 'Y' then Compliance Date must be between 7/1/1987 and one year from the current date.
Error Messages:

- The Compliance Date must be between 7/1/1987 and 1 year from the current date when the Regulation Code is ST and the Compliance Indicator is Y.
9. If Regulation Code is 'ST' and Compliance Indicator is 'N' then Compliance Date is not allowed.
- Error Messages:**
- The Compliance Date must be null when the Compliance Indicator is N and the Regulation Code is SC, QC, RM, or ST.
10. Compliance Date must fall within a sampling period of the monitor.
- Error Messages:**
- The compliance date is not within the valid range.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.10 Monitor Collocation Period - Transaction Type MJ

See AQS Input Transaction Formats at <http://www.epa.gov/ttn/airs/airsaqs/manuals/> for a summary list of requirements on each transaction format. For criteria pollutant monitors, transaction types MA through MX are required.

Submission of this transaction is recommended for collocated monitors when the raw data for both monitors is submitted for storage. When the raw data is posted to production, the post process will also create precision records when the raw data falls within collocation period for the specific monitors.

The fields described below are validated for insert (I) and update (U) transactions.

4.10.0 Transaction Type

Description: Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

Attributes: Alphanumeric
2-character code
Mandatory

Coding Instructions: Place MJ in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory
Error Messages:
 - Invalid transaction format.
2. Transaction Type must be in TRANSACTION_TYPES table in database.
Error Messages:
 - Transaction type not handled.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.10.1 Action Indicator

Description: Indicates the data manipulation action to be performed by the transaction.

Attributes: Alphanumeric
 1-character code
 Mandatory

Coding Instructions: Place the values I, U, or D in the second delimited field.
I Insert a new row into the appropriate table in the database.
U Change one or more column values for an existing row in one or
 more tables.
D Delete a row from a table(s) for the row containing the key data.

Business Rules

Common Rules

1. Action Indicator is required.
 Error Messages:
 - Action Code is Required.
2. Action Indicator must be either 'I', 'U', or 'D'.
 Error Messages:
 - Invalid Action Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.10.2 State Code or Tribal Indicator

The third field on a transaction can be either a State Code or a Tribal indicator. They are described as follows:

State Code Description: A FIPS (Federal Information Processing Standards) code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Tribal Indicator Description: A flag, with value "TT", to indicate that this data is for a Native American Tribe, and that the next field on the transaction identifies a tribal area using the Bureau of Indian Affairs tribal code.

Attributes: Alphanumeric
 2-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid FIPS state code or a Tribal Indicator in delimited field 3. A State Code is valid if it exists in the STATES Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.10.3 County Code or Tribal Code

The fourth field on any transaction can be either a County Code or a Tribal Code. A County code is indicated by a valid state code in the third field, while a Tribal Code is indicated by a Tribal Indicator in the third field.

County Code Description: A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

Tribal Code Description: A value that identifies a Tribal Area using a Bureau of Indian Affairs Tribal Code.

Attributes: Alphanumeric
 3-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid county code or a valid tribal code in the fourth delimited field. A County Code is valid if it exists at active status in the Counties table. A Tribal Code is valid if it exists at active status in the Tribal_Areas table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.10.4 Site ID

Description: A numeric identifier (ID) that uniquely identifies each air monitoring site within a county or tribal area. There is no requirement that Site IDs be assigned continuously or in any particular order. Regional and Local organizations are thus free to allocate site numbers in any way they chose as long as there is no duplication within a county and tribal area. For Tribal sites, because tribal areas may cross county or state lines, care must be taken to ensure that the Site ID is unique in the effected Tribal Area and states-county.

A specific Site ID is associated with a specific physical location and address. Any change in address requires a new Site ID to be assigned. This address change could include a change from the roof of one building to another. A change in location on the same roof should not normally require a new Site ID. Although an address change would routinely mean a new Site ID, some changes that do not change the site's location in respect to surrounding sources and its measurement scale, would require no change. An EPA Regional Office should be consulted for assistance in determining whether a new Site ID is required.

If a new Site ID is needed for a site not operated by the air pollution control agency, that agency should be contacted to assist in the ID assignment, to ensure that the ID is unique within the county. In other words, when a new Site ID is assigned, it must be different from any other Site ID already existing for that combination of State and County or Tribal Code.

Attributes: Alphanumeric
4-digit ID
Mandatory
Key Field

Coding Instructions: Place a four-digit numeric code in the fifth delimited field. For update and delete, a Site ID value is valid if it exists in combination with state code and County or Tribal Code in the Sites Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.10.5 Parameter

Description: The code assigned to the parameter measured by the monitor. Parameters may be pollutants or non-pollutants.

Attributes: Alphanumeric
5-digit code
Mandatory
Key Field

Coding Instructions: Place a valid parameter code in the sixth delimited field. A parameter value is valid if it exists in combination with (State Code, County Code, Site ID, and POC) or (Tribal Code, Site ID, and POC) in the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.10.6 POC (Parameter Occurrence Code)

Description: An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter. For example, the first monitor established to measure CO at a site could have a POC of 1. If an additional monitor were established at the same site to measure CO, that monitor could have a POC of 2. However, if a new instrument is installed to replace the original instrument used as the first monitor, that could be considered the same monitor and it would still have a POC of 1.

For criteria pollutants, data from different sampling methods should only be stored under the same POC if the sampling intervals are the same and the methods are reference or equivalent. For sites where duplicate sampling is being conducted by multiple agencies or by one agency with multiple samplers, multiple POCs must be utilized to store all samples.

For non-criteria pollutants, data from multiple sampling methods can be stored under the same POC if the sampling intervals are the same and there is only one sample for the time reported. If multiple open path monitors are reporting data for the same parameter, each open path would be assigned a different POC.

There are no national EPA practices assigning POC values. There may be regional or agency conventions where a POC value may have specific significance. Numbers do not need to be assigned sequentially.

Attributes: Numeric
2-digit ID
Mandatory
Key Field

Coding Instructions: Place a valid POC value in the seventh delimited field. A POC value is valid if it exists in combination with (State Code, County Code, Site ID, and Parameter) or (Tribal Code, Site ID, and Parameter) on the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.10.7 Collocation Begin Date

Description: The beginning date of the time period during which a collocated monitor pair recorded precision and accuracy data. Used to determine data completeness.

Attributes: Date
8-digit date
Mandatory
Key Field

Coding Instructions: Place a valid collocation begin date in the eighth delimited field. A collocation begin date value is valid if:

- it is in the format of YYYYMMDD, primary monitor indicator is Y, and the collocation begin date does not fall within any other collocation period defined for the monitor, or
- primary monitor indicator is N, and collocation begin date falls within a primary monitor collocation period defined for a monitor of the same parameter at the same site.

Business Rules:

Common Rules

1. Collocation Begin Date is required.

Error Messages:

- The Collocation Begin Date is mandatory.

2. Collocation Begin Date must not fall within any other Collocation Begin Date-Collocation End Date range for the same monitor.

Error Messages:

- Date cannot be within an existing date range.

3. Collocation Begin Date must fall within a sampling period of the monitor.

Error Messages:

- The begin date must fall within an existing sampling period.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.10.8 Collocation End Date

Description: The ending date of the time period during which a collocated monitor pair recorded precision and accuracy data. Used to determine data completeness.

Attributes: Date
8-digit date
Optional

Coding Instructions: Place a valid collocation end date in the ninth delimited field. A collocation end date value is valid if:

- it is in the format of YYYYMMDD and either primary monitor indicator is Y and the collocation end date does not fall within any other collocation period defined for the monitor, **OR**
- primary monitor indicator is N, and the collocation end date falls within a primary monitor collocation period defined for a monitor of the same parameter at the same site.

Business Rules:

Common Rules

1. Collocation End Date must be greater than Collocation Begin Date.
Error Messages:
 - End Date must be greater than Begin Date.
2. Collocation End Date must not fall within any other Collocation Begin Date-Collocation End Date range for the same monitor.
Error Messages:
 - Date cannot be within an existing date range.
3. Collocation End Date must fall within a sampling period of the monitor.
Error Messages:
 - Collocation End Date must fall within a valid sample period.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.10.9 Distance from Primary Sampler

Description: The distance, in meters, between a duplicate sampler and the primary sampler in a collocated pair.

Attributes: Numeric
10 digits, including 2 decimal places (nnnnnnnn.nn)
Optional

Coding Instructions: Place a valid distance from primary sampler in the tenth delimited field.

Business Rules:

Common Rules

1. Distance from Primary Sampler is mandatory when Primary Sampler Indicator is “N”.

Error Messages:

- Distance from Primary Sampler must be between 1 and 4.

2. Distance from Primary Sampler is invalid when Primary Sampler Indicator is “Y”

Error Messages:

- Collocation distance must be null when the primary monitor indicator is 'Y'

3. Distance from Primary Sampler must be between 1 and 4.

Error Messages:

- Distance from Primary Sampler must be between 1 and 4.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.10.10 Sampler Indicator

Description: Indicates whether the monitor is the primary or duplicate monitor in a collocated monitor pair.

Attributes: 1-character code: Y or N
Mandatory

Coding Instructions: Place a valid primary monitor indicator in the eleventh delimited field. A primary monitor indicator value is valid if it is Y (for primary) or N (for not primary).

Business Rules:

Common Rules

1. Primary Sampler Indicator must be 'Y' or 'N'.
Error Messages:
 - Value for Primary Monitor Indicator must be one of the following: Y, N.
2. If Primary Sampler Indicator is 'N', then there must be another monitor of the same parameter at the same site that is defined as the primary monitor.
Error Messages:
 - No primary monitor found for this collocated monitor

Insert Rules

1. Primary Sampler Indicator is required.
Error Messages:
 - Primary Sampler Indicator is mandatory.

Update Rules

1. Primary Sampler Indicator may not be nullified.
Error Messages:
 - Unable to Update or Delete Monitor Collocation
 - Literal does not match format string

Delete Rules

None.

4.11 Monitor Protocol - Transaction Type MK

The Monitor Protocol transaction type has been deprecated. It will not be accepted by AQS starting in January of 2015.

See AQS Input Transaction Formats at <http://www.epa.gov/ttn/airs/airsaqs/manuals/> for a summary list of requirements on each transaction format.

The database records created by this transaction will be automatically created by the load process when a new protocol is submitted for a monitor. Through calendar year 2014 this transaction can be used to specify an alternate method detectable limit when the Federal default is not used, but the preferred method for submitting an alternate method detection limit is to enter the value on the individual raw data transactions for which the value applies and a new monitor protocol record will be created. Beginning in 2015, this transaction will not be accepted and only automatically created records will exist in the database.

The fields described below are validated for insert (I) and update (U) transactions.

4.11.0 Transaction Level Rules and Errors

1. The monitor protocol cannot be deleted when Raw, Composite, Blank, Precision, Accuracy or Summary data has been loaded that uses the Monitor Protocol.

Error Messages:

- 1. Integrity constraint (AIRSRAQS.AC_MP_FK) violated
- 2. Integrity constraint (AIRSRAQS.PD_MP_FK) violated
- 3. Integrity constraint (AIRSRAQS.SPR_MP_FK) violated
- 4. Monitor protocol cannot be deleted due to use on raw data

4.11.1 Transaction Type

Description: Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

Attributes: Alphanumeric
2-character code
Mandatory

Coding Instructions: Place MK in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory

Error Messages:

- Invalid transaction format.

- Transaction Type must be in TRANSACTION_TYPES table in database.

Error Messages:

- Transaction type not handled.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.11.2 Action Indicator

Description: Indicates the data manipulation action to be performed by the transaction.

Attributes: Alphanumeric
 1-character code
 Mandatory

Coding Instructions: Place the values I, U, or D in the second delimited field.
I Insert a new row into the appropriate table in the database.
U Change one or more column values for an existing row in one or
 more tables.
D Delete a row from a table(s) for the row containing the key data.

Business Rules

Common Rules

- Action Indicator is required.
Error Messages:
 - Action Code is Required.
- Action Indicator must be either 'I', 'U', or 'D'.
Error Messages:
 - Invalid Action Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.11.3 State Code or Tribal Indicator

The third field on a transaction can be either a State Code or a Tribal indicator. They are described as follows:

State Code Description: A FIPS (Federal Information Processing Standards) code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Tribal Indicator Description: A flag, with value “TT”, to indicate that this data is for a Native American Tribe, and that the next field on the transaction identifies a tribal area using the Bureau of Indian Affairs tribal code.

Attributes: Alphanumeric
2-digit code
Mandatory
Key Field

Coding Instructions: Place a valid FIPS state code or a Tribal Indicator in delimited field 3. A State Code is valid if it exists in the STATES Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.11.4 County Code or Tribal Code

The fourth field on any transaction can be either a County Code or a Tribal Code. A County code is indicated by a valid state code in the third field, while a Tribal Code is indicated by a Tribal Indicator in the third field.

County Code Description: A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

Tribal Code Description: A value that identifies a Tribal Area using a Bureau of Indian Affairs Tribal Code.

Attributes: Alphanumeric
 3-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid county code or a valid tribal code in the fourth delimited field. A County Code is valid if it exists at active status in the Counties table. A Tribal Code is valid if it exists at active status in the Tribal_Areas table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.11.5 Site ID

Description: A numeric identifier (ID) that uniquely identifies each air monitoring site within a county or tribal area. There is no requirement that Site IDs be assigned continuously or in any particular order. Regional and Local organizations are thus free to allocate site numbers in any way they chose as long as there is no duplication within a county and tribal area. For Tribal sites, because tribal areas may cross county or state lines, care must be taken to ensure that the Site ID is unique in the effected Tribal Area and states-county.

A specific Site ID is associated with a specific physical location and address. Any change in address requires a new Site ID to be assigned. This address change could include a change from the roof of one building to another. A change in location on the same roof should not normally require a new Site ID. Although an address change would routinely mean a new Site ID, some changes that do not change the site's location in respect to surrounding sources and its measurement scale, would require no change. An EPA Regional Office should be consulted for assistance in determining whether a new Site ID is required.

If a new Site ID is needed for a site not operated by the air pollution control agency, that agency should be contacted to assist in the ID assignment, to ensure that the ID is unique within the county. In other words, when a new Site ID is assigned, it must be different from any other Site ID already existing for that combination of State and County or Tribal Code.

Attributes: Alphanumeric
 4-digit ID
 Mandatory
 Key Field

Coding Instructions: Place a four-digit numeric code in the fifth delimited field. For update and delete, a Site ID value is valid if it exists in combination with state code and County or Tribal Code in the Sites Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.11.6 Parameter

Description: The code assigned to the parameter measured by the monitor. Parameters may be pollutants or non-pollutants.

Attributes: Alphanumeric
 5-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid parameter code in the sixth delimited field. A parameter value is valid if it exists in combination with (State Code, County Code, Site ID, and POC) or (Tribal Code, Site ID, and POC) in the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.11.7 POC (Parameter Occurrence Code)

Description: An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter. For example, the first monitor established to measure CO at a site could have a POC of 1. If an additional monitor were established at the same site to measure CO, that monitor could have a POC of 2. However, if a new instrument is installed to replace the original instrument used as the first monitor, that could be considered the same monitor and it would still have a POC of 1.

For criteria pollutants, data from different sampling methods should only be stored under the same POC if the sampling intervals are the same and the methods are reference or equivalent. For sites where duplicate sampling is being conducted by multiple agencies or by one agency with multiple samplers, multiple POCs must be utilized to store all samples.

For non-criteria pollutants, data from multiple sampling methods can be stored under the same POC if the sampling intervals are the same and there is only one sample for the time reported. If multiple open path monitors are reporting data for the same parameter, each open path would be assigned a different POC.

There are no national EPA practices assigning POC values. There may be regional or agency conventions where a POC value may have specific significance. Numbers do not need to be assigned sequentially.

Attributes: Numeric
2-digit ID
Mandatory

Key Field

Coding Instructions: Place a valid POC value in the seventh delimited field. A POC value is valid if it exists in combination with (State Code, County Code, Site ID, and Parameter) or (Tribal Code, Site ID, and Parameter) on the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.11.8 Monitor Protocol ID

Description: The sequential monitor protocol identification (MP ID) number used to distinguish combinations of sample duration, unit, method, collection frequency, composite type, and alternate method detectable limit (Alt-MDL) for a monitor.

Attributes: Numeric
4 digits (nnnn)
Mandatory
Key Field

Coding Instructions: Place a valid alternate MP ID in the eighth delimited field. An alternate MP ID value is valid if it is between 1 and 99 and has not been assigned to another protocol combination for the monitor.

Business Rules:

Common Rules

1. Alternate MP ID must be greater than 0

Error Messages:

- Alternate MP ID must be positive

Insert Rules

1. Alternate MP ID cannot already be in database for monitor.

Error Messages:

- Unique constraint (AIRSRAQS.MP_PK) violated

Update Rules

None.

Delete Rules

None.

4.11.9 Duration Code

Description: The period of time during which the sample value was collected.

Attributes: Alphanumeric
1-character code
Mandatory

Coding Instructions: Place a valid sample duration code in the eighth delimited field. A sample duration value is valid if it exists in the Sample Durations Table and if it exists in combination with unit, parameter, method, and collection frequency in the Protocols Table.

Business Rules

Common Rules

1. The combination of (Duration Code, Reported Unit, Parameter, and Method Code) must be in PROTOCOLS table.

Error Messages:

- Invalid Protocol.

2. Sample duration must be an observed rather than a computed duration.

Error Messages:

- Raw data must be submitted with an observed duration.

3. Duration Code must not be different than the one used for any other data for the monitor in the year.

Error Messages:

- Duration Code does not match the annual summary duration.

Insert Rules

1. Duration Code is required.

Error Messages:

- Invalid Protocol.

Update Rules

None.

Delete Rules

None.

4.11.10 Reported Unit

Description: The dimensional system in which the pollutant concentration or parameter reading is expressed.

Attributes: Alphanumeric
3-digit code
Mandatory

Coding Instructions: Place a valid unit code in the ninth delimited field. A unit value is valid if it exists in the Units Table and if it exists in combination with parameter, sampling duration, method, and collection frequency in the Protocols Table.

Business Rules

Common Rules

1. The combination of (Duration Code, Reported Unit, Parameter, Method Code, and Collection Frequency Code) must be in PROTOCOLS table.

Error Messages:

- Invalid Protocol.

Insert Rules

1. Reported Unit is required

Error Messages:

- Invalid Protocol.

Update Rules

None.

Delete Rules

None.

4.11.11 Method Code

Description: Identifies a particular method for collecting and analyzing samples of the monitor's parameter.

Attributes: Alphanumeric
3-digit code
Mandatory

Coding Instructions: Place a valid method code in the tenth delimited field. A method code is valid if it exists in combination with parameter in the Sampling Methodologies Table, and if it exists in combination with parameter, sampling duration, units, and collection frequency in the Protocols Table.

Business Rules

Common Rules

1. The combination of (Duration Code, Reported Unit, Parameter, Method Code, and Collection Frequency Code) must be in PROTOCOLS table.

Error Messages:

- Invalid Protocol.

Insert Rules

1. Method Code is required.

Error Messages:

- Invalid Protocol.

Update Rules

None.

Delete Rules

None.

4.11.12 Collection Frequency Code

Description: The frequency according to which sample observations are to be made, specified as the amount of time that elapses between observations. Indicates how often 24-hour samples are taken, e.g., daily, every third day, stratified random, etc.

Attributes: Alphanumeric
1- or 2-digit code
Optional
Key Field

Coding Instructions: Place a valid collection frequency code in the twelfth delimited field. A collection frequency value is valid if it exists in the Collection Frequencies Table and if it exists in combination with parameter, method, sample duration, unit, and composite type in the Protocols Table.

Business Rules:

Common Rules

1. The combination of (Duration Code, Reported Unit, Parameter, Method Code, Collection Frequency Code, Composite Type) must be in PROTOCOLS table.

Error Messages:

- Invalid Protocol.

Insert Rules

1. The combination of (State Code, County Code, Site ID, Parameter, POC, Duration Code, Reported Unit, Method Code, Collection Frequency Code, Composite Type, Alternate Minimum Detectable Limit) cannot already be in database for the monitor.

Error Messages:

- Unique constraint (AIRSRAQS.MP_UK) violated.

Update Rules

1. Collection Frequency Code is not an updateable field.

Error Messages:

- Collection Frequency Code is not an updateable field.

Delete Rules

None.

4.11.13 Composite Type

Description: The time period over which samples are composited, or the frequency of submitting composite samples.

Attributes: Alphanumeric
10 characters
Optional
Key Field

Coding Instructions: Place a valid composite type term in the thirteenth delimited field. A composite type value is valid if it exists in the Composite Types Table, it exists in combination with parameter, method, sample duration, unit, and collection frequency in the Protocols Table, and sample duration is C.

Business Rules:

Common Rules

1. The combination of (Duration Code, Reported Unit, Parameter, Method Code, Collection Frequency Code, Composite Type) must be in PROTOCOLS table.

Error Messages:

- Invalid Protocol.

Insert Rules

1. The combination of (State Code, County Code, Site ID, Parameter, POC, Duration Code, Reported Unit, Method Code, Collection Frequency Code, Composite Type, Alternate Minimum Detectable Limit) cannot already be in database for the monitor.

Error Messages:

- Unique constraint (AIRSRAQS.MP_UK) violated.

Update Rules

1. Collection Frequency Code is not an updateable field.

Error Messages:

- Sampling Frequency is not an updateable field.

Delete Rules

None.

4.11.14 Alternate Method Detectable Limit (Alt-MDL)

Description: The method detectable limit defined for the monitor by the reporting agency, which supersedes the EPA-defined method detectable limit for the designated methodology.

Attributes: Numeric
10 digits, including 5 decimal places (nnnnn.nnnnn)
Optional

Coding Instructions: Place an alternate MDL value in the fourteenth delimited field. There are no edit checks to verify the validity of an alternate method detectable limit value.

Business Rules:

Common Rules

None.

Insert Rules

1. The combination of (State Code, County Code, Site ID, Parameter, POC, Duration Code, Reported Unit, Method Code, Collection Frequency Code, Composite Type, Alternate Minimum Detectable Limit) cannot already be in database for the monitor.

Error Messages:

- Unique constraint (AIRSRAQS.MP_UK) violated.

Update Rules

None.

Delete Rules

None.

4.12 Monitor Method - Transaction Type MM

4.12.0 Description of Transaction

See AQS Input Transaction Formats at <http://www.epa.gov/ttn/airs/airsaqs/manuals/> for a summary list of requirements on each transaction format.

This transaction is used to specify the method of sample collection and analysis (the sampling methodology) of the monitor for specified date ranges. Only 1 method can be specified at any given time, and only one method per day can be specified (that is, methods cannot be changed on an hourly basis). This is a new record in version 3.0 of the Coding Manual and reflects the EPA's decision to move the sample methodology information from the Raw Data (RD) transaction to now be a property of the monitor.

AQS has automatically created Monitor Method data for all existing monitors. All raw data was scanned and a Monitor Method record was created every time data was reported with a new method. The appropriate begin and end dates were populated. (If "method switching" was being done on a per-sample basis – e.g., for filters – then a large number of Monitor Method Records were created. "Method Switching" should not be done; rather, two monitors (POCs) should be established, per the technical note at:

<http://www.epa.gov/ttn/airs/airsaqs/memos/Technical%20Note-POC%206%2018%20Final%20%282%29.pdf>)

When raw data is submitted, AQS evaluates the method on the submitted raw data record with the method stored on the monitor method record for the date of the raw data submittal. If the same method is not specified on both, then AQS will do the following:

- For an initial period of time while users become familiar with this new validation, AQS will issue a warning message, and will also load the raw data. This period of time is envisioned to end in the second calendar quarter of 2014.
- Following the initial phase in period, AQS will reject raw data that specifies a method different from the method stored on the monitor method record for the date of the raw data observation.

4.12.1 Transaction Level Rules and Messages

1. All days of operation for a criteria monitor must be covered by a FEM or FRM method unless exclusion has been requested.

Error Message:

- Non FRM/FEM method not allowed for regulatory criteria pollutant monitor.

4.12.2 Transaction Type

Description: Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

Attributes: Alphanumeric
2-character code
Mandatory

Coding Instructions: Place MM in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory
Error Messages:
 - Invalid transaction format.
2. Transaction Type must be in TRANSACTION_TYPES table in database.
Error Messages:
 - Transaction type not handled.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.12.3 Action Indicator

Description: Indicator for Insert, Update, Delete, or Replace action.

Attributes: Alphanumeric
1-character code
Mandatory

Coding Instructions: Place the values I, U, or D in the second delimited field.

| | |
|---|---|
| I | Insert a new row into the appropriate table in the database. |
| U | Change one or more column values for an existing row in one or more tables. |
| D | Delete a row from a table(s) for the row containing the key data. |

Business Rules

Common Rules

1. Action Indicator is required.
Error Messages:
 - Action Code is Required.
2. Action Indicator must be either 'I', 'U', or 'D'.
Error Messages:
 - Invalid Action Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.12.4 State Code or Tribal Indicator

The third field on a transaction can be either a State Code or a Tribal indicator. They are described as follows:

State Code Description: A FIPS (Federal Information Processing Standards) code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Tribal Indicator Description: A flag, with value "TT", to indicate that this data is for a Native American Tribe, and that the next field on the transaction identifies a tribal area using the Bureau of Indian Affairs tribal code.

Attributes: Alphanumeric
2-digit code
Mandatory
Key Field

Coding Instructions: Place a valid FIPS state code or a Tribal Indicator in delimited field 3. A State Code is valid if it exists in the STATES Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.
Error Messages:
 - Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.12.5 County Code or Tribal Code

The fourth field on any transaction can be either a County Code or a Tribal Code. A County code is indicated by a valid state code in the third field, while a Tribal Code is indicated by a Tribal Indicator in the third field.

County Code Description: A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

Tribal Code Description: A value that identifies a Tribal Area using a Bureau of Indian Affairs Tribal Code.

Attributes: Alphanumeric
 3-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid county code or a valid tribal code in the fourth delimited field. A County Code is valid if it exists at active status in the Counties table. A Tribal Code is valid if it exists at active status in the Tribal_Areas table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.12.6 Site Number

Description: A numeric identifier (ID) that uniquely identifies each air monitoring site within a county or tribal area. There is no requirement that Site IDs be assigned continuously or in any particular order. Regional and Local organizations are thus free to allocate site numbers in any way they chose as long as there is no duplication within a county and tribal area. For Tribal sites, because tribal areas may cross county or state lines, care must be taken to ensure that the Site ID is unique in the effected Tribal Area and states-county.

A specific Site ID is associated with a specific physical location and address. Any change in address requires a new Site ID to be assigned. This address change could include a change from the roof of one building to another. A change in location on the same roof should not normally require a new Site ID. Although an address change would routinely mean a new Site ID, some changes that do not change the site's location in respect to surrounding sources and its measurement scale, would require no change. An EPA Regional Office should be consulted for assistance in determining whether a new Site ID is required.

If a new Site ID is needed for a site not operated by the air pollution control agency, that agency should be contacted to assist in the ID assignment, to ensure that the ID is unique within the county. In other words, when a new Site ID is assigned, it must be different from any other Site ID already existing for that combination of State and County or Tribal Code.

Attributes: Alphanumeric
4-digit ID
Mandatory
Key Field

Coding Instructions: Place a four-digit numeric code in the fifth delimited field. For update and delete, a Site ID value is valid if it exists in combination with state code and County or Tribal Code in the Sites Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.12.7 Parameter Code

Description: The code assigned to the parameter measured by the monitor. Parameters may be pollutants or non-pollutants.

Attributes: Alphanumeric
5-digit code
Mandatory
Key Field

Coding Instructions: Place a valid parameter code in the sixth delimited field. A parameter value is valid if it exists in combination with (State Code, County Code, Site ID, and POC) or (Tribal Code, Site ID, and POC) in the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.12.8 POC (Parameter Occurrence Code)

Description: An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter. For example, the first monitor established to measure CO at a site could have a POC of 1. If an additional monitor were established at the same site to measure CO, that monitor could have a POC of 2. However, if a new instrument is installed to replace the original instrument used as the first monitor, that could be considered the same monitor and it would still have a POC of 1.

For criteria pollutants, data from different sampling methods should only be stored under the same POC if the sampling intervals are the same and the methods are reference or equivalent. For sites where duplicate sampling is being conducted by multiple agencies or by one agency with multiple samplers, multiple POCs must be utilized to store all samples.

For non-criteria pollutants, data from multiple sampling methods can be stored under the same POC if the sampling intervals are the same and there is only one sample for the time reported. If multiple open path monitors are reporting data for the same parameter, each open path would be assigned a different POC.

There are no national EPA practices assigning POC values. There may be regional or agency conventions where a POC value may have specific significance. Numbers do not need to be assigned sequentially.

Attributes: Numeric
 2-digit ID
 Mandatory
 Key Field

Coding Instructions: Place a valid POC value in the seventh delimited field. A POC value is valid if it exists in combination with (State Code, County Code, Site ID, and Parameter) or (Tribal Code, Site ID, and Parameter) on the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.12.9 Method Code

Description: Identifies a particular method for collecting and analyzing samples of the monitor's parameter.

Attributes: Alphanumeric

3-digit code
Mandatory
Key Field

Coding Instructions: Place a valid method code in the tenth delimited field. A method code is valid if it exists in combination with parameter in the Sampling Methodologies Table, and if it exists in combination with parameter, sampling duration, units, and collection frequency in the Protocols Table.

Business Rules

Common Rules

1. The Method Code must be in SAMPLING_METHODODOLOGIES table for the specified parameter.

Error Messages:

- Invalid Method Code.

Insert Rules

1. Method Code is required.

Error Messages:

- Method Code is required.

Update Rules

None.

Delete Rules

None.

4.12.10 Begin Date

Description: Beginning of date range where the monitor implements the specified method.

Attributes: Date
8-digit date
Mandatory
Key Field

Coding Instructions: Place a valid monitor method begin date in the eighth delimited field. A begin date value is valid if:

- it is in the format of YYYYMMDD, and
- the begin date does not fall within any other monitor method period defined for the monitor.

Business Rules:

Common Rules

1. Begin Date is required.

Error Messages:

- The Begin Date is mandatory.
2. Begin Date must not fall within any other Monitor Method Begin Date - End Date range for the same monitor.

Error Messages:

- Date cannot be within an existing date range.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.12.11 End Date

Description: End of date range where the monitor implements the specified method.

Attributes: Date
8-digit date
Optional

Coding Instructions: Place a valid end date in the ninth delimited field. An end date value is valid if:

- it is in the format of YYYYMMDD, and
- it is after the begin date, and
- the end date does not fall within any other period defined for the monitor.

Business Rules:

Common Rules

1. End Date must be greater than Monitor Method Begin Date.

Error Messages:

- End Date must be greater than Begin Date.

2. End Date must not fall within any other Monitor Method Begin Date - End Date range for the same monitor.

Error Messages:

- Date cannot be within an existing date range.

3. End Date must fall within a sampling period of the monitor.

Error Messages:

- End Date must fall within a valid sample period.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.13 Monitor Network Affiliation - Transaction Type MN

4.13.0 Description of Transaction

See AQS Input Transaction Formats at <http://www.epa.gov/ttn/airs/airsaqs/manuals/> for a summary list of requirements on each transaction format.

This transaction is used to specify a monitor's network affiliation. Recent enhancements to monitor metadata (descriptive data) have been made which divide the former set of "Monitor Types" into 2 different groups. The administrative classifications, such as SLAMS or TRIBAL MONITOR will remain as "Monitor Types". And the new Network Affiliation record will be used to indicate the network(s) to which a monitor belongs. This is intended to simplify data processing and retrieval.

Network affiliations are created for specific date ranges, and multiple affiliations can be specified for a single monitor at the same time. Note that only one Monitor Type assignment is now allowed for a monitor for a given time, but multiple network affiliations for the monitor at a single time are allowed.

A snapshot of the allowed values for network affiliation is presented in the table below.

Current list of monitor networks as of 12/4/2014

| <i>NETWORK NAME</i> | <i>NETWORK DESCRIPTION</i> |
|-------------------------|--|
| SUPPLEMENTAL SPECIATION | Supplemental Speciation Stations |
| UNOFFICIAL PAMS | Unofficial Photochemical Assessment Monitoring Stations |
| PAMS | Photochemical Assessment Monitoring Stations |
| TRENDS SPECIATION | Trends Speciation Stations |
| SCHOOL AIR TOXICS | School Air Toxics Stations |
| PROPOSED NCORE | Proposed National Core (NCORE) Multi-pollutant Monitoring Stations |
| IMPROVE | EPA/National Park Service Visibility (IMPROVE) Program Stations |
| CASTNET | Clean Air Status and Trends Stations |
| VOL SCHOOL AT | Voluntary School Air Toxics Stations |
| NCORE | National Core (NCORE) Multi-pollutant Monitoring Stations |
| NATTS | National Air Toxics Trends Stations |

4.13.1 Transaction Type

Description: This is a Monitor Network Affiliation transaction.

Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

Attributes: Alphanumeric
 2-character code
 Mandatory

Coding Instructions: Place MN in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory

Error Messages:

- Invalid transaction format.

2. Transaction Type must be in TRANSACTION_TYPES table in database.

Error Messages:

- Transaction type not handled.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.13.2 Action Indicator

Description: Indicator for Insert, Update, Delete, or Replace action.

Attributes: Alphanumeric
 1-character code
 Mandatory

Coding Instructions: Place the values I, U, or D in the second delimited field.

| | |
|---|---|
| I | Insert a new row into the appropriate table in the database. |
| U | Change one or more column values for an existing row in one or more tables. |
| D | Delete a row from a table(s) for the row containing the key data. |

Business Rules

Common Rules

1. Action Indicator is required.

Error Messages:

- Action Code is Required.

2. Action Indicator must be either 'I', 'U', or 'D'.

Error Messages:

- Invalid Action Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.13.3 State Code or Tribal Indicator

The third field on a transaction can be either a State Code or a Tribal indicator. They are described as follows:

State Code Description: A FIPS (Federal Information Processing Standards) code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Tribal Indicator Description: A flag, with value “TT”, to indicate that this data is for a Native American Tribe, and that the next field on the transaction identifies a tribal area using the Bureau of Indian Affairs tribal code.

Attributes: Alphanumeric
 2-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid FIPS state code or a Tribal Indicator in delimited field 3. A State Code is valid if it exists in the STATES Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.13.4 County Code or Tribal Code

The fourth field on any transaction can be either a County Code or a Tribal Code. A County code is indicated by a valid state code in the third field, while a Tribal Code is indicated by a Tribal Indicator in the third field.

County Code Description: A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

Tribal Code Description: A value that identifies a Tribal Area using a Bureau of Indian Affairs Tribal Code.

Attributes: Alphanumeric
3-digit code
Mandatory
Key Field

Coding Instructions: Place a valid county code or a valid tribal code in the fourth delimited field. A County Code is valid if it exists at active status in the Counties table. A Tribal Code is valid if it exists at active status in the Tribal_Areas table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.13.5 Site Number

Description: A numeric identifier (ID) that uniquely identifies each air monitoring site within a county or tribal area. There is no requirement that Site IDs be assigned continuously or in any particular order. Regional and Local organizations are thus free to allocate site numbers in any way they chose as long as there is no duplication within a county and tribal area. For Tribal sites, because tribal areas may cross county or state lines, care must be taken to ensure that the Site ID is unique in the effected Tribal Area and states-county.

A specific Site ID is associated with a specific physical location and address. Any change in address requires a new Site ID to be assigned. This address change could include a change from the roof of one building

to another. A change in location on the same roof should not normally require a new Site ID. Although an address change would routinely mean a new Site ID, some changes that do not change the site's location in respect to surrounding sources and its measurement scale, would require no change. An EPA Regional Office should be consulted for assistance in determining whether a new Site ID is required.

If a new Site ID is needed for a site not operated by the air pollution control agency, that agency should be contacted to assist in the ID assignment, to ensure that the ID is unique within the county. In other words, when a new Site ID is assigned, it must be different from any other Site ID already existing for that combination of State and County or Tribal Code.

Attributes: Alphanumeric
 4-digit ID
 Mandatory
 Key Field

Coding Instructions: Place a four-digit numeric code in the fifth delimited field. For update and delete, a Site ID value is valid if it exists in combination with state code and County or Tribal Code in the Sites Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.13.6 Parameter Code

Description: The code assigned to the parameter measured by the monitor. Parameters may be pollutants or non-pollutants.

Attributes: Alphanumeric
 5-digit code
 Mandatory

Key Field

Coding Instructions: Place a valid parameter code in the sixth delimited field. A parameter value is valid if it exists in combination with (State Code, County Code, Site ID, and POC) or (Tribal Code, Site ID, and POC) in the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.13.7 POC (Parameter Occurrence Code)

Description: An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter. For example, the first monitor established to measure CO at a site could have a POC of 1. If an additional monitor were established at the same site to measure CO, that monitor could have a POC of 2. However, if a new instrument is installed to replace the original instrument used as the first monitor, that could be considered the same monitor and it would still have a POC of 1.

For criteria pollutants, data from different sampling methods should only be stored under the same POC if the sampling intervals are the same and the methods are reference or equivalent. For sites where duplicate sampling is being conducted by multiple agencies or by one agency with multiple samplers, multiple POCs must be utilized to store all samples.

For non-criteria pollutants, data from multiple sampling methods can be stored under the same POC if the sampling intervals are the same and there is only one sample for the time reported. If multiple open path monitors are reporting data for the same parameter, each open path would be assigned a different POC.

There are no national EPA practices assigning POC values. There may be regional or agency conventions where a POC value may have specific significance. Numbers do not need to be assigned sequentially.

Attributes: Numeric
 2-digit ID
 Mandatory
 Key Field

Coding Instructions: Place a valid POC value in the seventh delimited field. A POC value is valid if it exists in combination with (State Code, County Code, Site ID, and Parameter) or (Tribal Code, Site ID, and Parameter) on the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.13.8 Network Name

Description: Identifies the monitoring network associated with the monitor (e.g. NCORE, PAMS, NATTS)

Attributes: Alphanumeric
 Up to 25 characters
 Mandatory

Coding Instructions: Place a valid network name in the eighth delimited field. A network name is valid if it exists on the MONITOR_NETWORKS table with a status of 'P'.

The assignment of the monitor network affiliations of "NCORE" and "PAMS" is limited to EPA Headquarters users and is done only after a complete review and approval is done for all site/monitor metadata.

Business Rules

Common Rules

1. The network name must be in the MONITOR_NETWORK_CODE column of the MONITOR_NETWORKS table with a status of P within AQS.

Error Messages:

- Invalid Network Name.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.13.9 Begin Date

Description: Beginning of date range where the monitor is affiliated with the specified network.

Attributes: Date
 8-digit date
 Mandatory
 Key Field

Coding Instructions: Place a valid monitor network affiliation begin date (the date the monitor began operating and following quality assurance guidelines for a particular network designation) in the ninth delimited field. A begin date value is valid if it is in the format of YYYYMMDD. (Recall, network affiliation dates can overlap / a monitor can be affiliated with more than one network at a time.)

Business Rules:

Common Rules

1. Begin Date is required.

Error Messages:

- The Begin Date is mandatory.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.13.10 End Date

Description: End of date range where the monitor is affiliated with the specified network.

Attributes: Date
8-digit date
Optional

Coding Instructions: Place a valid end date in the tenth delimited field. An end date value is valid if it is after the begin date for the specified monitor network affiliation.

Business Rules:

Common Rules

1. End Date must be greater than monitor network affiliation Begin Date.

Error Messages:

- End Date must be greater than Begin Date.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.14 Primary Monitor Period - Transaction Type MO

4.14.0 Description of Transaction

See AQS Input Transaction Formats at <http://www.epa.gov/ttn/airs/airsaqs/manuals/> for a summary list of requirements on each transaction format.

This transaction is used to specify the primary monitor at a site when required. A primary monitor period may be created for any parameter, but are required for the following:

- 14129 (TSP Lead at LC)
- 85129 (PM₁₀ Lead at LC)
- 42602 (NO₂)
- 88101 (PM_{2.5})

When monitors for these parameters are created at a site, a primary monitor period record for that parameter must be in effect for the site. AQS uses this record to perform site level data combinations and data substitution of missing values for NAAQS-related calculations.

If only one monitor for a listed parameter exists at a site, then that monitor will be the primary monitor for the site. Primary monitor periods are specified for date ranges.

4.14.1 Transaction Type

Description: Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

Attributes: Alphanumeric
2-character code
Mandatory

Coding Instructions: Place MO in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory

Error Messages:

- Invalid transaction format.

2. Transaction Type must be in TRANSACTION_TYPES table in database.

Error Messages:

- Transaction type not handled.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.14.2 Action Indicator

Description: Indicates the data manipulation action to be performed by the transaction.

Attributes: Alphanumeric
 1-character code
 Mandatory

Coding Instructions: Place the values I, U, or D in the second delimited field.
I Insert a new row into the appropriate table in the database.
U Change one or more column values for an existing row in one or
 more tables.
D Delete a row from a table(s) for the row containing the key data.

Business Rules

Common Rules

1. Action Indicator is required.
Error Messages:
 - Action Code is Required.
2. Action Indicator must be either 'I', 'U', or 'D'.
Error Messages:
 - Invalid Action Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.14.3 State Code or Tribal Indicator

The third field on a transaction can be either a State Code or a Tribal indicator. They are described as follows:

State Code Description: A FIPS (Federal Information Processing Standards) code that

identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Tribal Indicator Description: A flag, with value “TT”, to indicate that this data is for a Native American Tribe, and that the next field on the transaction identifies a tribal area using the Bureau of Indian Affairs tribal code.

Attributes: Alphanumeric
2-digit code
Mandatory
Key Field

Coding Instructions: Place a valid FIPS state code or a Tribal Indicator in delimited field 3. A State Code is valid if it exists in the STATES Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.14.4 County Code or Tribal Code

The fourth field on any transaction can be either a County Code or a Tribal Code. A County code is indicated by a valid state code in the third field, while a Tribal Code is indicated by a Tribal Indicator in the third field.

County Code Description: A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

Tribal Code Description: A value that identifies a Tribal Area using a Bureau of Indian Affairs Tribal Code.

Attributes: Alphanumeric
3-digit code
Mandatory
Key Field

Coding Instructions: Place a valid county code or a valid tribal code in the fourth delimited field. A County Code is valid if it exists at active status in the Counties table. A Tribal Code is valid if it exists at active status in the Tribal_Areas table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.14.5 Site Number

Description: A numeric identifier (ID) that uniquely identifies each air monitoring site within a county or tribal area. There is no requirement that Site IDs be assigned continuously or in any particular order. Regional and Local organizations are thus free to allocate site numbers in any way they chose as long as there is no duplication within a county and tribal area. For Tribal sites, because tribal areas may cross county or state lines, care must be taken to ensure that the Site ID is unique in the effected Tribal Area and states-county.

A specific Site ID is associated with a specific physical location and address. Any change in address requires a new Site ID to be assigned. This address change could include a change from the roof of one building to another. A change in location on the same roof should not normally require a new Site ID. Although an address change would routinely mean a new Site ID, some changes that do not change the site's location in respect to surrounding sources and its measurement scale, would require no change. An EPA Regional Office should be consulted for assistance in determining whether a new Site ID is required.

If a new Site ID is needed for a site not operated by the air pollution control agency, that agency should be contacted to assist in the ID assignment, to ensure that the ID is unique within the county. In other words, when a new Site ID is assigned, it must be different from any other

Site ID already existing for that combination of State and County or Tribal Code.

Attributes: Alphanumeric
 4-digit ID
 Mandatory
 Key Field

Coding Instructions: Place a four-digit numeric code in the fifth delimited field. For update and delete, a Site ID value is valid if it exists in combination with state code and County or Tribal Code in the Sites Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.14.6 Parameter Code

Description: The code assigned to the parameter measured by the monitor. Parameters may be pollutants or non-pollutants.

Attributes: Alphanumeric
 5-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid parameter code in the sixth delimited field. A parameter value is valid if it exists in combination with (State Code, County Code, Site ID, and POC) or (Tribal Code, Site ID, and POC) in the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.14.7 POC (Parameter Occurrence Code)

Description: An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter. For example, the first monitor established to measure CO at a site could have a POC of 1. If an additional monitor were established at the same site to measure CO, that monitor could have a POC of 2. However, if a new instrument is installed to replace the original instrument used as the first monitor, that could be considered the same monitor and it would still have a POC of 1.

For criteria pollutants, data from different sampling methods should only be stored under the same POC if the sampling intervals are the same and the methods are reference or equivalent. For sites where duplicate sampling is being conducted by multiple agencies or by one agency with multiple samplers, multiple POCs must be utilized to store all samples.

For non-criteria pollutants, data from multiple sampling methods can be stored under the same POC if the sampling intervals are the same and there is only one sample for the time reported. If multiple open path monitors are reporting data for the same parameter, each open path would be assigned a different POC.

There are no national EPA practices assigning POC values. There may be regional or agency conventions where a POC value may have specific significance. Numbers do not need to be assigned sequentially.

Attributes: Numeric
2-digit ID
Mandatory
Key Field

Coding Instructions: Place a valid POC value in the seventh delimited field. A POC value is valid if it exists in combination with (State Code, County Code, Site ID, and Parameter) or (Tribal Code, Site ID, and Parameter) on the Monitors

Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.14.8 Begin Date

Description: The date on which the specified monitor became the primary monitor for that parameter at the site.

Attributes: Date
8-digit date
Mandatory
Key Field

Coding Instructions: Place the date on which the specified monitor became the primary monitor for that pollutant at the site. This is the beginning of the primary monitor period. Place this date in the eighth delimited field. A begin date is valid if:

- it is in the format of YYYYMMDD, and
- the begin date falls within a sampling period of the monitor, and
- the begin date does **not** fall within any other primary monitor periods defined for the site.

Business Rules:

Common Rules

1. Begin Date is required.

Error Messages:

- The Begin Date is mandatory.
2. Begin Date must not fall within any other Begin Date - End Date range for the same parameter at the site.
- #### **Error Messages:**
- Date cannot be within an existing date range.

3. Begin Date must fall within a sampling period of the monitor.

Error Messages:

- The begin date must fall within an existing sampling period.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.14.9 End Date

Description: The date on which the specified monitor ceased to be the primary monitor for that parameter at the site.

Attributes: Date
8-digit date
Optional

Coding Instructions: Place a valid end date in the ninth delimited field. An end date value is valid if:

- it is in the format of YYYYMMDD, and
- it is after the begin date, and
- it does not fall within any other primary monitor periods defined for that parameter at the site, and
- it does not fall outside of the sampling periods defined for the monitor.

Business Rules:

Common Rules

1. End Date must be greater than Begin Date.

Error Messages:

- End Date must be greater than Begin Date.

2. End Date must not fall within any other Primary Monitor Period Begin Date - End Date range for the same parameter at the site.

Error Messages:

- Date cannot be within an existing date range.

3. End Date must fall within a sampling period of the monitor.

Error Messages:

- End Date must fall within a valid sample period.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.15 Monitor Channel - Transaction Type MP

4.15.0 Description of Transaction

See AQS Input Transaction Formats at <http://www.epa.gov/ttn/airs/airsaqs/manuals/> for a summary list of requirements on each transaction format.

For speciated data, observations of multiple parameters can result from the analysis of a sample from a single channel. For example, concentrations of several different metals can be determined by analyzing one filter from one channel of a sampler. So the analysis of one sample from one channel can generate data that is stored under multiple AQS monitors.

The purpose of this transaction is to allow the mapping of parameters to sampler channels. Once this relationship is established, it will be possible to submit flow data once for a channel, rather than having to submit the same flow data multiple times for each monitor associated with the channel.

After establishing the Monitor Channel records, flow data at the channel level can be submitted using the Speciation Semi-Annual Flow Rate Audit transaction. See §10.2 of this document for details of that transaction.

4.15.1 Transaction Type

Description: Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

Attributes: Alphanumeric
2-character code
Mandatory

Coding Instructions: Place MP in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory
Error Messages:
 - Invalid transaction format.
2. Transaction Type must be in TRANSACTION_TYPES table in database.
Error Messages:
 - Transaction type not handled.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.15.2 Action Indicator

Description: Indicates the data manipulation action to be performed by the transaction.

Attributes: Alphanumeric
 1-character code
 Mandatory

Coding Instructions: Place the values I, U, or D in the second delimited field.
I Insert a new row into the appropriate table in the database.
U Change one or more column values for an existing row in one or more tables.
D Delete a row from a table(s) for the row containing the key data.

Business Rules

Common Rules

1. Action Indicator is required.
Error Messages:
 - Action Code is Required.
2. Action Indicator must be either 'I', 'U', or 'D'.
Error Messages:
 - Invalid Action Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.15.3 State Code or Tribal Indicator

The third field on a transaction can be either a State Code or a Tribal indicator. They are described as follows:

State Code Description: A FIPS (Federal Information Processing Standards) code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Tribal Indicator Description: A flag, with value “TT”, to indicate that this data is for a Native American Tribe, and that the next field on the transaction identifies a tribal area using the Bureau of Indian Affairs tribal code.

Attributes: Alphanumeric
 2-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid FIPS state code or a Tribal Indicator in delimited field 3. A State Code is valid if it exists in the STATES Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.15.4 County Code or Tribal Code

The fourth field on any transaction can be either a County Code or a Tribal Code. A County code is indicated by a valid state code in the third field, while a Tribal Code is indicated by a Tribal Indicator in the third field.

County Code Description: A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

Tribal Code Description: A value that identifies a Tribal Area using a Bureau of Indian Affairs Tribal Code.

Attributes: Alphanumeric
 3-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid county code or a valid tribal code in the fourth delimited

field. A County Code is valid if it exists at active status in the Counties table. A Tribal Code is valid if it exists at active status in the Tribal_Areas table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.15.5 Site Number

Description: A numeric identifier (ID) that uniquely identifies each air monitoring site within a county or tribal area. There is no requirement that Site IDs be assigned continuously or in any particular order. Regional and Local organizations are thus free to allocate site numbers in any way they chose as long as there is no duplication within a county and tribal area. For Tribal sites, because tribal areas may cross county or state lines, care must be taken to ensure that the Site ID is unique in the effected Tribal Area and states-county.

A specific Site ID is associated with a specific physical location and address. Any change in address requires a new Site ID to be assigned. This address change could include a change from the roof of one building to another. A change in location on the same roof should not normally require a new Site ID. Although an address change would routinely mean a new Site ID, some changes that do not change the site's location in respect to surrounding sources and its measurement scale, would require no change. An EPA Regional Office should be consulted for assistance in determining whether a new Site ID is required.

If a new Site ID is needed for a site not operated by the air pollution control agency, that agency should be contacted to assist in the ID assignment, to ensure that the ID is unique within the county. In other words, when a new Site ID is assigned, it must be different from any other Site ID already existing for that combination of State and County or Tribal Code.

Attributes: Alphanumeric
 4-digit ID
 Mandatory
 Key Field

Coding Instructions: Place a four-digit numeric code in the fifth delimited field. For update and delete, a Site ID value is valid if it exists in combination with state code and County or Tribal Code in the Sites Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.15.6 Parameter Code

Description: The code assigned to the parameter measured by the monitor. Parameters may be pollutants or non-pollutants.

Attributes: Alphanumeric
 5-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid parameter code in the sixth delimited field. A parameter value is valid if it exists in combination with (State Code, County Code, Site ID, and POC) or (Tribal Code, Site ID, and POC) in the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.15.7 POC (Parameter Occurrence Code)

Description: An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter. For example, the first monitor established to measure CO at a site could have a POC of 1. If an additional monitor were established at the same site to measure CO, that monitor could have a POC of 2. However, if a new instrument is installed to replace the original instrument used as the first monitor, that could be considered the same monitor and it would still have a POC of 1.

For criteria pollutants, data from different sampling methods should only be stored under the same POC if the sampling intervals are the same and the methods are reference or equivalent. For sites where duplicate sampling is being conducted by multiple agencies or by one agency with multiple samplers, multiple POCs must be utilized to store all samples.

For non-criteria pollutants, data from multiple sampling methods can be stored under the same POC if the sampling intervals are the same and there is only one sample for the time reported. If multiple open path monitors are reporting data for the same parameter, each open path would be assigned a different POC.

There are no national EPA practices assigning POC values. There may be regional or agency conventions where a POC value may have specific significance. Numbers do not need to be assigned sequentially.

Attributes: Numeric
2-digit ID
Mandatory
Key Field

Coding Instructions: Place a valid POC value in the seventh delimited field. A POC value is valid if it exists in combination with (State Code, County Code, Site ID, and Parameter) or (Tribal Code, Site ID, and Parameter) on the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.15.8 Sampler ID

Description: The user's unique name or ID for the sampler at the site.

Attributes: Alphanumeric
 Up to 20 characters
 Mandatory
 Key Field

Coding Instructions: Place a valid Sampler ID code in the eighth delimited field.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.15.9 Channel Number

Description: Number assigned to channel on sampler.

Attributes: Numeric

Positive Integer
Mandatory
Key Field

Coding Instructions: Place value in the ninth field. Must be already defined for the Sampler in database (or earlier in the same submission file).

Business Rules

Common Rules

1. The Monitor Channel must be in the MONITORS table in the database.

Error Messages:

- Monitor Channel Number not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.15.10 Begin Date

Description: Beginning of date range where the

Attributes: Date
8-digit date
Mandatory
Key Field

Coding Instructions: Place a valid collocation begin date in the tenth delimited field. A begin date value is valid if:

- it is in the format of YYYYMMDD, primary monitor indicator is Y, and the collocation begin date does not fall within any other collocation period defined for the monitor, or
- primary monitor indicator is N, and collocation begin date falls within a primary monitor collocation period defined for a monitor of the same parameter at the same site.

Business Rules:

Common Rules

1. Begin Date is required.

Error Messages:

- The Begin Date is mandatory.

2. Begin Date must not fall within any other Begin Date- End Date range for the same

monitor.

Error Messages:

- Date cannot be within an existing date range.

3. Begin Date must fall within a sampling period of the monitor.

Error Messages:

- The begin date must fall within an existing sampling period.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.15.11 End Date

Description: End of date range where the monitor

Attributes: Date
8-digit date
Optional

Coding Instructions: Place a valid end date in the eleventh delimited field. A end date value is valid if:

- it is in the format of YYYYMMDD and either primary monitor indicator is Y and the collocation end date does not fall within any other period defined for the monitor, **OR**
- primary monitor indicator is N, and the end date falls within a primary monitor period defined for a monitor of the same parameter at the same site.

Business Rules:

Common Rules

1. End Date must be greater than Collocation Begin Date.

Error Messages:

- End Date must be greater than Begin Date.

2. End Date must not fall within any other Collocation Begin Date-Collocation End Date range for the same monitor.

Error Messages:

- Date cannot be within an existing date range.

3. End Date must fall within a sampling period of the monitor.

Error Messages:

- End Date must fall within a valid sample period.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.16 Monitor NAAQS Exclusion - Transaction Type MX

4.16.0 Description of Transaction

See AQS Input Transaction Formats at <http://www.epa.gov/ttn/airs/airsaqs/manuals/> for a summary list of requirements on each transaction format.

The purpose of this transaction is to enable a monitor to be categorized as non-regulatory, i.e. have its data excluded from NAAQS calculations performed by AQS. Previously, this tagging ability was implemented via a Monitor Type code of 'NON-REGULATORY' (and prior to that, of 'SPECIAL PURPOSE'). Monitor types have been revised, and now only the Monitor Exclusions indicator is used to determine if data from a monitor is to be excluded from regulatory data summaries.

AQS has automatically created Monitor Exclusion data for all existing criteria pollutant monitors that had a Monitor Type assignment of 'NON-REGULATORY' for any period of time.

4.16.1 Transaction Level Rules and Messages

1. All days of operation for a criteria monitor must be covered by a FEM or FRM method unless exclusion has been requested.

Error Message:

- Non FRM/FEM method not allowed for regulatory criteria pollutant monitor.

4.16.2 Transaction Type

Description: Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

Attributes: Alphanumeric
2-character code
Mandatory

Coding Instructions: Place MX in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory

Error Messages:

- Invalid transaction format.

2. Transaction Type must be in TRANSACTION_TYPES table in database.

Error Messages:

- Transaction type not handled.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.16.3 Action Indicator

Description: Indicates the data manipulation action to be performed by the transaction.

Attributes: Alphanumeric
1-character code
Mandatory

Coding Instructions: Place the values I, U, or D in the second delimited field.

| | |
|---|---|
| I | Insert a new row into the appropriate table in the database. |
| U | Change one or more column values for an existing row in one or more tables. |
| D | Delete a row from a table(s) for the row containing the key data. |

Business Rules

Common Rules

1. Action Indicator is required.
Error Messages:
 - Action Code is Required.
2. Action Indicator must be either 'I', 'U', or 'D'.
Error Messages:
 - Invalid Action Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.16.4 State Code or Tribal Indicator

The third field on a transaction can be either a State Code or a Tribal indicator. They are described as follows:

State Code Description: A FIPS (Federal Information Processing Standards) code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Tribal Indicator Description: A flag, with value “TT”, to indicate that this data is for a Native American Tribe, and that the next field on the transaction identifies a tribal area using the Bureau of Indian Affairs tribal code.

Attributes: Alphanumeric
 2-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid FIPS state code or a Tribal Indicator in delimited field 3. A State Code is valid if it exists in the STATES Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.16.5 County Code or Tribal Code

The fourth field on any transaction can be either a County Code or a Tribal Code. A County code is indicated by a valid state code in the third field, while a Tribal Code is indicated by a Tribal Indicator in the third field.

County Code Description: A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

Tribal Code Description: A value that identifies a Tribal Area using a Bureau of Indian Affairs Tribal Code.

Attributes: Alphanumeric
 3-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid county code or a valid tribal code in the fourth delimited field. A County Code is valid if it exists at active status in the Counties table. A Tribal Code is valid if it exists at active status in the Tribal_Areas table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.16.6 Site Number

Description: A numeric identifier (ID) that uniquely identifies each air monitoring site within a county or tribal area. There is no requirement that Site IDs be assigned continuously or in any particular order. Regional and Local organizations are thus free to allocate site numbers in any way they chose as long as there is no duplication within a county and tribal area. For Tribal sites, because tribal areas may cross county or state lines, care must be taken to ensure that the Site ID is unique in the effected Tribal Area and states-county.

A specific Site ID is associated with a specific physical location and address. Any change in address requires a new Site ID to be assigned. This address change could include a change from the roof of one building to another. A change in location on the same roof should not normally require a new Site ID. Although an address change would routinely mean a new Site ID, some changes that do not change the site's location in respect to surrounding sources and its measurement scale, would require no change. An EPA Regional Office should be consulted for assistance in determining whether a new Site ID is required.

If a new Site ID is needed for a site not operated by the air pollution control agency, that agency should be contacted to assist in the ID assignment, to ensure that the ID is unique within the county. In other words, when a new Site ID is assigned, it must be different from any other Site ID already existing for that combination of State and County or Tribal Code.

Attributes: Alphanumeric
 4-digit ID
 Mandatory
 Key Field

Coding Instructions: Place a four-digit numeric code in the fifth delimited field. For update and delete, a Site ID value is valid if it exists in combination with state code and County or Tribal Code in the Sites Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.16.7 Parameter Code

Description: The code assigned to the parameter measured by the monitor. Parameters may be pollutants or non-pollutants.

Attributes: Alphanumeric
 5-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid parameter code in the sixth delimited field. A parameter value is valid if it exists in combination with (State Code, County Code, Site ID, and POC) or (Tribal Code, Site ID, and POC) in the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.16.8 POC (Parameter Occurrence Code)

Description: An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter. For example, the first monitor established to measure CO at a site could have a POC of 1. If an additional monitor were established at the same site to measure CO, that monitor could have a POC of 2. However, if a new instrument is installed to replace the original instrument used as the first monitor, that could be considered the same monitor and it would still have a POC of 1.

For criteria pollutants, data from different sampling methods should only be stored under the same POC if the sampling intervals are the same and the methods are reference or equivalent. For sites where duplicate sampling is being conducted by multiple agencies or by one agency with multiple samplers, multiple POCs must be utilized to store all samples.

For non-criteria pollutants, data from multiple sampling methods can be stored under the same POC if the sampling intervals are the same and there is only one sample for the time reported. If multiple open path monitors are reporting data for the same parameter, each open path would be assigned a different POC.

There are no national EPA practices assigning POC values. There may be regional or agency conventions where a POC value may have specific significance. Numbers do not need to be assigned sequentially.

Attributes: Numeric
2-digit ID
Mandatory

Key Field

Coding Instructions: Place a valid POC value in the seventh delimited field. A POC value is valid if it exists in combination with (State Code, County Code, Site ID, and Parameter) or (Tribal Code, Site ID, and Parameter) on the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.16.9 Pollutant Standard ID

Description: This is the code representing the pollutant and the related NAAQS standard as stored in AQS. Enter NULL to exclude the monitor from all NAAQS standards (equivalent to old NON-REGULATORY monitor type); When populated with a standard ID, the monitor will be excluded from just that NAAQS Design Value calculation. As of this writing, only the PM 2.5 Annual standard is valid for this field.

Attributes: Integer
Optional

Coding Instructions: Place a valid pollutant standard ID in the eighth delimited field.

Business Rules:

Common Rules

1. The Pollutant Standard ID must be on the AQS Pollutant_Period_Standards table and marked as “Excludable”. (Presently only ‘18’ for the PM 2.5 Annual Standard)

Error Messages:

- Pollutant Standard ID not valid for exclusion..

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.16.10 Begin Date

Description: Beginning of date range where the monitor should be excluded from NAAQS calculations.

Attributes: Date
8-digit date
Mandatory
Key Field

Coding Instructions: Place a valid begin date in the ninth delimited field. A begin date value is valid if:

- it is in the format of YYYYMMDD, and
- it falls within a sampling period for the monitor, and
- it does not fall within any other exclusion period defined for the same pollutant standard at the monitor.

Business Rules:

Common Rules

1. Begin Date is required.

Error Messages:

- The Begin Date is mandatory.

2. Begin Date must not fall within any other Begin Date - End Date range for the same pollutant standard at the monitor.

Error Messages:

- Date cannot be within an existing date range.

3. Begin Date must fall within a sampling period of the monitor.

Error Messages:

- The begin date must fall within an existing sampling period.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.16.11 End Date

Description: End of date range where the monitor should be excluded from NAAQS calculations.

Attributes: Date
8-digit date
Optional

Coding Instructions: Place a valid end date in the tenth delimited field. An end date value is valid if:

- it is in the format of YYYYMMDD, and
- it is after the begin date, and
- it is within a sampling period for the monitor, and
- it does not fall within any other exclusion periods defined for the pollutant standard at the monitor.

Business Rules:

Common Rules

1. End Date must be greater than Exclusion Begin Date.
Error Messages:
 - End Date must be greater than Begin Date.
2. End Date must not fall within any other Exclusion Begin Date - End Date range for the same pollutant standard at the monitor.
Error Messages:
 - Date cannot be within an existing date range.
3. End Date must fall within a sampling period of the monitor.
Error Messages:
 - End Date must fall within a valid sample period.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.16.12 Exclusion Comment

Description: The justification for the exclusion request, as provided by the agency that owns the monitor.

Attributes: Alphanumeric
2000 characters

Mandatory

Coding Instructions: Plain text only; “|” is a reserved character, i.e., it should not be used.

Business Rules:

Common Rules

None.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5 Raw Data Transactions (RC, RD)

Transaction Types RC (Composite Raw Data) and RD (Hourly, Daily, Sub-Hourly Raw Data) perform data manipulation on the Raw Data Table.

The transactions in this group are used to insert, update, and delete the individual observations of parameter values in the AQS database. Most of the parameter values are the concentrations of air pollutants measured with various methods and at various time intervals. Some non-pollutant observations are also reported, such as wind speed and other meteorological values. Together, these observations of parameter values are collectively called raw data because they are the actual values reported by the monitoring sites. There are two types of Raw Data, Simple and Composite.

Hourly, Daily, Sub-Hourly Raw Data are the sample values that have been collected by monitoring stations that can be defined for a given date and time of day. Types of Hourly, Daily, Sub-Hourly Raw Data include: hourly, daily, and sub-hourly type of data.

Composite data are concentration values derived from two or more air samples obtained at different times and combined and analyzed as one sample.

In contrast to this is the summary data, which is usually calculated from the raw data by the AQS software, and is stored in the summaries tables.

The qualifier field is used only with real observations, when an observed parameter value is present. A non-blank qualifier indicates the observed value is exceptional in some way, usually higher than normal by a substantial amount. The value of the qualifier indicates the cause of the exceptional observation (a forest fire, for example). If no specific cause can be attributed for the exceptional observation, V is coded for the qualifier (to indicate that the value is valid). A non-blank qualifier exempts the associated observation from certain quality assurance tests which it would not otherwise pass. Without the exemption provided by the qualifier, neither the exceptional data nor any normal data for the same day or month would pass the quality assurance tests.

Most values do not have qualifiers, since qualifiers are only associated with rare (exceptional) events or circumstances. Furthermore, the use of qualifiers is important only for criteria pollutants. Every episode of qualifier usage (except code V) must be approved by state and EPA officials and must conform with the procedures and requirements set forth in Guideline on the Identification and Use of Air Quality Data Affected by Exceptional Events, publication number EPA-450/4-86-007, July, 1986.

Action Indicators are interpreted the same way for raw data transactions. Insert actions are used to enter raw data values where none previously existed. The monitor reporting the raw data values must already exist in the database. Delete actions are used to remove one or more existing raw data values from the AQS database. Update actions are used to change existing raw data values.

Transaction type RC contains composite raw data with the following fields:

| | | |
|--------------------------------|-----------------------|-------------------|
| Transaction Type | Composite Period | Qualifier-6 |
| Action Indicator | Number of Samples | Qualifier-7 |
| State Code or Tribal Indicator | Composite Type | Qualifier-8 |
| County Code or Tribal Code | Reported Sample Value | Qualifier-9 |
| Site ID | Monitor Protocol ID | Qualifier-10 |
| Parameter | Qualifier-1 | Alternate Method |
| POC | Qualifier-2 | Detectable Limit |
| Reported Unit | Qualifier-3 | Uncertainty Value |
| Method Code | Qualifier-4 | |
| Composite Year | Qualifier-5 | |

Transaction type RD contains simple data with the following fields:

| | | |
|--------------------------------|---------------------------|-------------------|
| Transaction Type | Date | Qualifier-5 |
| Action Indicator | Sample Time | Qualifier-6 |
| State Code or Tribal Indicator | Reported Sample Value | Qualifier-7 |
| County Code or Tribal Code | Qualifier Code -Null Data | Qualifier-8 |
| Site ID | Collection Frequency Code | Qualifier-9 |
| Parameter | Monitor Protocol ID | Qualifier-10 |
| POC | Qualifier-1 | Alternate Method |
| Duration Code | Qualifier-2 | Detectable Limit |
| Reported Unit | Qualifier-3 | Uncertainty Value |
| Method Code | Qualifier-4 | |

Detailed coding instructions for these raw data transactions are given in the following sections.

5.1 Composite Raw Data - Transaction Type RC

See [AQS Input Transaction Formats](http://www.epa.gov/ttn/airs/airsaqs/manuals/) at <http://www.epa.gov/ttn/airs/airsaqs/manuals/> for a summary list of requirements on each transaction format. Transaction type RC is used for composite observations. Type RC transactions insert, update, and delete raw data values in the Raw Data Table of the AQS database.

An insert transaction is used to insert a new observation into the database where none already exists. An update transaction is used to change or delete an existing observation in the database. A delete transaction is used to delete an observation and its associated fields from the database.

5.1.0 Transaction Type

Description: Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

Attributes: Alphanumeric

2-character code
Mandatory

Coding Instructions: Place RC in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory

Error Messages:

- Invalid transaction format.

2. Transaction Type must be in TRANSACTION_TYPES table in database.

Error Messages:

- Transaction type not handled.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5.1.1 Action Indicator

Description: Indicates the data manipulation action to be performed by the transaction.

Attributes: Alphanumeric
1-character code
Mandatory

Coding Instructions: Place the values I, U, or D in the second delimited field.

- I Insert a new row into the appropriate table in the database.
- U Change one or more column values for an existing row in one or more tables.
- D Delete a row from a table(s) for the row containing the key data.

Business Rules

Common Rules

1. Action Indicator is required.

Error Messages:

- Action Code is Required.

2. Action Indicator must be either 'I', 'U', or 'D'.

Error Messages:

- Invalid Action Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5.1.2 State Code or Tribal Indicator

The third field on a transaction can be either a State Code or a Tribal indicator. They are described as follows:

State Code Description: A FIPS (Federal Information Processing Standards) code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Tribal Indicator Description: A flag, with value “TT”, to indicate that this data is for a Native American Tribe, and that the next field on the transaction identifies a tribal area using the Bureau of Indian Affairs tribal code.

Attributes: Alphanumeric
2-digit code
Mandatory
Key Field

Coding Instructions: Place a valid FIPS state code or a Tribal Indicator in delimited field 3. A State Code is valid if it exists in the STATES Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5.1.3 County Code or Tribal Code

The fourth field on any transaction can be either a County Code or a Tribal Code. A County code is indicated by a valid state code in the third field, while a Tribal Code is indicated by a Tribal Indicator in the third field.

County Code Description: A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

Tribal Code Description: A value that identifies a Tribal Area using a Bureau of Indian Affairs Tribal Code.

Attributes: Alphanumeric
3-digit code
Mandatory
Key Field

Coding Instructions: Place a valid county code or a valid tribal code in the fourth delimited field. A County Code is valid if it exists at active status in the Counties table. A Tribal Code is valid if it exists at active status in the Tribal_Areas table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5.1.4 Site ID

Description: A numeric identifier (ID) that uniquely identifies each air monitoring site within a county or tribal area. There is no requirement that Site IDs be assigned continuously or in any particular order. Regional and Local organizations are thus free to allocate site numbers in any way they chose as long as there is no duplication within a county and tribal area. For Tribal sites, because tribal areas may cross county or state lines, care must be taken to ensure that the Site ID is unique in the effected Tribal Area and states-county.

A specific Site ID is associated with a specific physical location and address. Any change in address requires a new Site ID to be assigned. This address change could include a change from the roof of one building to another. A change in location on the same roof should not normally require a new Site ID. Although an address change would routinely mean a new Site ID, some changes that do not change the site's location in respect to surrounding sources and its measurement scale, would require no change. An EPA Regional Office should be consulted for assistance in determining whether a new Site ID is required.

If a new Site ID is needed for a site not operated by the air pollution control agency, that agency should be contacted to assist in the ID assignment, to ensure that the ID is unique within the county. In other words, when a new Site ID is assigned, it must be different from any other Site ID already existing for that combination of State and County or Tribal Code.

Attributes: Alphanumeric
 4-digit ID
 Mandatory
 Key Field

Coding Instructions: Place a four-digit numeric code in the fifth delimited field. For update and delete, a Site ID value is valid if it exists in combination with state code and County or Tribal Code in the Sites Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5.1.5 Parameter

Description: The code assigned to the parameter measured by the monitor. Parameters may be pollutants or non-pollutants.

Attributes: Alphanumeric
 5-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid parameter code in the sixth delimited field. A parameter value is valid if it exists in combination with (State Code, County Code, Site ID, and POC) or (Tribal Code, Site ID, and POC) in the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5.1.6 POC (Parameter Occurrence Code)

Description: An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter. For example, the first monitor established to measure CO at a site could have a POC of 1. If an additional monitor were established at the same site to measure CO, that monitor could have a POC of 2. However, if a new instrument is installed to replace the original instrument used as the first monitor, that could be considered the same monitor and it would still have a POC of 1.

For criteria pollutants, data from different sampling methods should only be stored under the same POC if the sampling intervals are the same and the methods are reference or equivalent. For sites where duplicate sampling is being conducted by multiple agencies or by one agency with multiple samplers, multiple POCs must be utilized to store all samples.

For non-criteria pollutants, data from multiple sampling methods can be stored under the same POC if the sampling intervals are the same and there is only one sample for the time reported. If multiple open path

monitors are reporting data for the same parameter, each open path would be assigned a different POC.

There are no national EPA practices assigning POC values. There may be regional or agency conventions where a POC value may have specific significance. Numbers do not need to be assigned sequentially.

Attributes: Numeric
 2-digit ID
 Mandatory
 Key Field

Coding Instructions: Place a valid POC value in the seventh delimited field. A POC value is valid if it exists in combination with (State Code, County Code, Site ID, and Parameter) or (Tribal Code, Site ID, and Parameter) on the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5.1.7 Reported Unit

Description: The dimensional system in which the pollutant concentration or parameter reading is expressed. If an alternate method detectable limit is reported, it is also expressed in these same units.

Attributes: Alphanumeric
 3-digit code
 Mandatory

Coding Instructions: Place a valid unit code in the eighth delimited field. A unit value is valid if it exists in the Units Table and if it exists in combination with a sample duration of C, parameter, method, and composite type in the Protocols Table.

Business Rules

Common Rules

1. The combination of (Parameter, Composite Type, Reported Unit, and Method Code) must be in PROTOCOLS table.

Error Messages:

- Invalid Protocol

2. Flow units are not allowed.

Error Messages:

- Flow units are not allowed.

Insert Rules

1. Reported Unit is required

Error Messages:

- Invalid Protocol

Update Rules

None.

Delete Rules

None.

5.1.8 Method Code

Description: Identifies a particular method for collecting and analyzing samples of the monitor's parameter.

Attributes: Alphanumeric
3-digit code
Mandatory

Coding Instructions: Place a valid method code in the ninth delimited field. A method value is valid if it exists in combination with parameter in the Sampling Methodologies Table, and if it exists in combination with the parameter, duration code of C, unit, and composite type in the Protocols Table.

Business Rules

Common Rules

1. The combination of (Parameter, Composite Type, Reported Unit, and Method Code) must be in PROTOCOLS table.

Error Messages:

- Invalid Protocol.

Insert Rules

1. Method Code is required.

Error Messages:

- Invalid Protocol

Update Rules

None.

Delete Rules

None.

5.1.9 Composite Year

Description: The calendar year for which the observation was reported.

Attributes: Date
4-digit year (yyyy)
Mandatory
Key Field

Coding Instructions: Place a valid year in the tenth delimited field. A year value is valid if it is in the form of YYYY, it is between 1957 and the current year, and there is valid sample period defined for the monitor in that year.

Business Rules

Common Rules

1. Composite Year is Required.
Error Messages:
 - Invalid Composite Year.
2. Composite Year must be in the format 'YYYY'.
Error Messages:
 - Invalid Composite Year.
3. Composite Year must be less than, or equal to, the current year.
Error Messages:
 - The sample date is not within an available year
4. Composite Year must be greater or equal to the earliest supported year.
Error Messages:
 - The sample date is not within an available year
5. Composite Year and Composite Period must fall within a valid sample period for the monitor .
Error Messages:
 - Monitor is inactive for this date.

Insert Rules

1. Composite data must not already exist in the database for the combination of Composite Year and Composite Period for the Monitor.
Error Messages:

- Attempted to insert a value for an existing date and time.

Update Rules

1. Composite data must exist in the database for the combination of Composite Year and Composite Period for the Monitor

Error Messages:

- Production record doesn't exist to update or delete

Delete Rules

1. Composite data must exist in the database for the combination of Composite Year and Composite Period for the Monitor.

Error Messages:

- Production record doesn't exist to update or delete.

5.1.10 Composite Period

Description: Indicates the time period within the year to which the observation applies. It is expressed in units that may be inferred from composite type.

Attributes: Alphanumeric
2-digit code
Mandatory
Key Field

Coding Instructions: Place a valid period code in the eleventh delimited field. A period code is valid if it falls within the minimum and maximum period defined for composite type in the Composite Types Table.

Valid period codes depend on composite type as follows:

| Comp Type | Valid Period Code |
|------------------|--------------------------|
| 1 (Quarterly) | 01-04 |
| 2 (Seasonal) | 01-04 |
| 3 (Monthly) | 01-12 |
| 4 (Weekly) | 01-53 |
| 5 (Annually) | 01 |

Business Rules

Common Rules

1. Composite Period is Required.

Error Messages:

- Invalid Composite Period

2. Composite Period must be an integer with value between the MIN_PERIOD and

MAX_PERIOD defined in the COMPOSITE_TYPES table for the Composite Type.

Error Messages:

- Invalid Composite Period.
3. The date corresponding to the Composite Year and Composite Period must be less than, or equal to, the current date.

Error Messages:

- The sample date is not within an available year

4. Composite Year and Composite Period must fall within a valid sample period for the monitor .

Error Messages:

- Monitor is inactive for this date.

Insert Rules

1. Composite data must not already exist in the database for the combination of Composite Year and Composite Period for the Monitor.

Error Messages:

- Attempted to insert a value for an existing date and time.

Update Rules

1. Composite data must exist in the database for the combination of Composite Year and Composite Period for the Monitor

Error Messages:

- Production record doesn't exist to update or delete

Delete Rules

1. Composite data must exist in the database for the combination of Composite Year and Composite Period for the Monitor.

Error Messages:

- Production record doesn't exist to update or delete.

5.1.11 Number of Samples

Description: Indicates the number of samples that were combined to yield the composite sample value.

Attributes: Alphanumeric
10-digit number
Mandatory

Coding Instructions: Place a valid number of samples in the twelfth delimited field. A number of samples value is valid if it is greater than 0 and is less than the maximum number of samples defined for composite type in the Composite Types Table.

Business Rules

Common Rules

1. Number of Samples is required.
Error Messages:
 - Invalid Sample Count
2. Number of samples must be a positive integer.
Error Messages:
 - Invalid Sample Count
3. Number of Samples must be less than or equal to the maximum count defined for Composite Type.
Error Messages:
 - Sample Count must be between 1 and the maximum allowed for the Composite Type.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5.1.12 Composite Type

Description: Indicates the time period over which samples are composited or the frequency of submitting composite samples.

Attributes: Alphanumeric
10 Character Code
Mandatory

Coding Instructions: Place a valid composite type term in the thirteenth delimited field. A composite type value is valid if it exists in the Composite Types Table, it exists in combination with parameter, method, sample duration equal to C, and unit in the Protocols Table.

Valid composite types include:

ANNUAL
MONTHLY
QUARTERLY
SEASONAL
WEEKLY

Business Rules

Common Rules

1. Composite Type is required.

Error Messages:

- Invalid Composite Type
2. Composite Type must exist in the COMPOSITE_TYPES table.
Error Messages:
 - Invalid Composite Type
 3. The combination of (Parameter, Composite Type, Reported Unit, and Method Code) must be in PROTOCOLS table at production status.
Error Messages:
 - Invalid Protocol
 4. Composite Type must not be different than the one used for any other composite data for the monitor in the year.
Error Messages:
 - Composite Type may only change for first sample of year.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5.1.13 Reported Sample Value

- Description:** The value of a composite observation.
- Attributes:** Numeric
10 digits, including 5 decimal places (nnnnn.nnnnn)
Mandatory
- Coding Instructions:** Place the sample value in the thirteenth delimited field. Reported scale is implied from the number of digits allocated to the right of the decimal point. For example, to submit the value of 1.2 in the scale of 3, then submit the value as 1.200.

For some parameters, upper and lower limits have been established for observations. The sample value is compared to these limits, if they exist on the Parameters Table for the pollutant. If the sample value falls outside the range defined by the absolute max sample value and the absolute min sample value, and there is no qualifier entered with the sample value, then the sample value will be rejected with an error message.

Lead (12128) is the only parameter that is reported as a composite observation (duration code = C), and that has an absolute maximum

sample value defined on the Parameters Table. The relevant maximum values for lead composite observations are listed below:

| Parameter | Code | Units | Abs Max Sample Value | Abs Min Sample Value | Fed Rel Max Sample Value | Fed Rel Min Sample Value |
|-----------|-------|-----------------------------|----------------------|----------------------|--------------------------|--------------------------|
| Lead | 12128 | µg/m ³ (25 C) | 100 | 0 | 100 | 0 |

If the sample falls outside the range defined by the Federal relative maximum sample value and Federal relative minimum sample value, and there is not qualifier entered with the sample value, then the sample will not be rejected, but will be highlighted in the Statistical Critical Review Report with a warning message.

Business Rules

Common Rules

1. Reported Sample Value must be a number with no more than 5 digits before or after the decimal point.

Error Messages:

- Invalid numeric format.

2. Reported Sample Value, when converted to standard units, must fall within the absolute value range defined for the parameter.

Error Messages:

- Standard value falls outside absolute value range for the parameter.

3. Reported Sample Value is required.

Error Messages:

- Invalid combination of Reported Sample Value, Uncertainty Value, and Qualifier Code -Null Data

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5.1.14 Monitor Protocol ID

Description: The sequential monitor protocol identification (MP ID) number used to distinguish combinations of sample duration, unit, method, collection frequency, composite type, and alternate method detectable limit (MDL)

for a monitor. The monitor protocol ID is ignored by AQS.

Attributes: Numeric
 2 digits (nn)
 Optional (Please do not report!)

Coding Instructions: Place a valid MP ID number in the fifteenth delimited field. An MP ID value is valid if it exists in the monitor Protocols Table for the monitor. (Note: it is only necessary to provide this value if an Alternate Method Detectable Limit applies to the sample value; otherwise, the appropriate monitor protocols can be derived.) If an MP ID does not exist for the combination of codes, but the combination exists on the Protocols Table, a new MP ID will be assigned and stored in the correct database table.

Business Rules

Common Rules

1. The MP ID must exist in the database for the monitor.

Error Messages:

- Invalid MP_ID

Insert Rules

1. Data associated with inactive protocol cannot be inserted in AQS.

Error Messages:

- Inactive protocols may not be newly associated with sample values

Update Rules

1. For update transaction of a record associated with inactive protocol, update should be allowed if protocol fields are not updated.

Error Messages:

- Inactive protocols may not be newly associated with sample values

Delete Rules

None.

5.1.15 Qualifier Code 1-10

Description: Qualifications used to describe the composite raw data. They may document exceptional data or quality assurance exceptions.

Attributes: Alphanumeric
 1- or 2-character code
 Optional

Coding Instructions: Ten fields (delimited fields 16-25), are allocated for the designation of composite data qualifiers. It is valid to designate one, and only one, exceptional data qualifier, and as many quality assurance qualifiers as are

necessary. To designate qualifiers, use the available fields in sequence: place the first qualification in field 16, the second in field 17, and so on. A particular qualifier value is valid if it exists in the Qualifiers Table and is associated with the parameter as defined in the Parameter Qualifiers table.

Business Rules

Common Rules

1. Qualifier Code must be in PARAMETER_QUALIFIERS table.
Error Messages:
 - Invalid Raw Data Qualifier.
2. QUALIFIERS (QUALIFIER_CODE) must be at production status.
Error Messages:
 - Invalid Raw Data Qualifier.
3. Qualifier Code must not be a Null Data type.
Error Messages:
 - Invalid Raw Data Qualifier

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5.1.16 Alternate Method Detectable Limit (Alt-MDL)

- Description:** Method Code detectable limit (MDL) is the minimum detectable level defined for the monitor and method.
- Attributes:** Numeric
10 digits, including 5 decimal places (nnnnn.nnnnn)
Optional
- Coding Instructions:** Place a valid MDL in the 26th delimited field. A user can report MDL on the composite raw data (RC) transaction, or leave it blank. If it is reported on the composite raw data transactions, then the software looks to see whether it is a new MDL value (i.e., does not exist on the Monitor Protocol Table). If it is a new value, a new monitor protocol record is system-generated and that new monitor protocol identification (MP ID) number is stored with the raw data value.

If the reported MDL value is not a new value, and there is already a monitor protocol record for that method and MDL, then the existing alternate MP ID from the Monitor Protocol Table is stored with the raw data value.

Although not the recommended process for reporting Alt-MDL, another way of reporting a new MDL is to create a new monitor protocol with the new value using the MK transaction. Then the raw data transactions can reference the new monitor protocol record being created in the batch stream, and the MDL value is not needed, since it is already on the protocol record. To do this, the alternate MP ID on the MK record being created would be the same value contained in the alternate MP ID field on the RC or RD transactions.

Business Rules

Common Rules

1. MDL must be a positive number with no more than 5 digits before or after the decimal point.

Error Messages:

- Value larger than specified precision allows for this column

2. Alternate MP ID and MDL may not be specified at the same time.

Error Messages:

- MP_ID and MDL may not both be specified.

Insert Rules

None.

Update Rules

None.

5.1.17 Uncertainty Value

Description: The measure of method uncertainty associated with the sample data point, which will include components of both the analytical and the volume uncertainty. No blank corrections are assumed (other than laboratory baseline corrections which are an integral part of each analysis).

Attributes: Numeric
11 digits, including 5 decimal places (nnnnnn.nnnnn)
Optional

Coding Instructions: Place a valid Uncertainty Value in the 28th field. A valid value is a number between 1 and 999999.99999, inclusive.

Business Rules

Common Rules

1. Uncertainty Value must be a positive number with no more than 6 digits before, and 4

digits after, the decimal point.

Error Messages:

- Value larger than specified precision allows for this column

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5.2 Hourly, Daily, Sub-Hourly Raw Data - Transaction Type RD

The type RD (“Raw Data”) transaction is used for individual parameter observations. See [AQS Input Transaction Formats](http://www.epa.gov/ttn/airs/airsaqs/manuals/) at <http://www.epa.gov/ttn/airs/airsaqs/manuals/> for a summary list of requirements on each transaction format.

An insert transaction is used to insert observations or qualifiers into the database where neither currently exists. An update transaction is used to change or delete existing observations or missing value reason codes. A delete transaction is used to remove all the existing observations and missing value reason codes within the temporal scope of the transaction.

Data Review and Production Status

The process for setting Raw data to production status is the most involved of all of the data types in AQS and requires the most user interaction. At each stage of the process the Status Indicator is set to a different value:

1. F Data is loaded and load process is not complete. Data at F status is only visible to members of the screening group while the data is loading. Data remaining at F status after a load is supposedly completed indicates a failure during load and a likely corruption of data.
2. R Data has been successfully loaded, automated relational checks have passed and data is ready for review. Data is only visible to members of the screening group responsible for the monitor and will not be included in any reports except for those specifically designed to view pre-production data.
3. S Statistical Analysis and Critical Review tests (StatCR) have been done and reports are available (see sections 6.3 and 6.4 below). Some manual editing and further review may be required. Data is only visible to members of the screening group responsible for the monitor and will not be included in any reports except for those specifically designed to view pre-production data.
4. P Data is at Production status and is readable by all AQS users.

5.2.0 Transaction Level Rules and Errors

1. Only one transaction allowed for a monitor/date/time.
A pre-production Record already exists for the Monitor - Date-Time

Error Messages:

- A pre-production Record already exists for the Monitor - Date-Time.

2. Sample values may not have overlapping durations

Error Messages:

- Sample duration overlaps immediately preceding or succeeding sample value.

5.2.1 Transaction Type

Description: Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

Attributes: Alphanumeric
 2-character code
 Mandatory

Coding Instructions: Place RD in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory
 Error Messages:
 - Invalid transaction format.

2. Transaction Type must be in TRANSACTION_TYPES table in database.
 Error Messages:
 - Transaction type not handled.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5.2.2 Action Indicator

Description: Indicates the data manipulation action to be performed by the transaction.

Attributes: Alphanumeric
 1-character code
 Mandatory

Coding Instructions: Place the values I, U, or D in the second delimited field.
I Insert a new row into the appropriate table in the database.
U Change one or more column values for an existing row in one or more tables.
D Delete a row from a table(s) for the row containing the key data.

Business Rules

Common Rules

1. Action Indicator is required.
 Error Messages:
 - Action Code is Required.

2. Action Indicator must be either 'I', 'U', or 'D'.
 Error Messages:

- Invalid Action Code.

Insert Rules

1. Production record for monitor/date/time may not exist.

Error Messages:

- Attempted to insert a value for an existing date and time..

Update Rules

1. Production record for monitor/date/time must exist.

Error Messages:

- Production record doesn't exist to update or delete.

Delete Rules

1. Production record for monitor/date/time must exist.

Error Messages:

- Production record doesn't exist to update or delete.

5.2.3 State Code or Tribal Indicator

The third field on a transaction can be either a State Code or a Tribal indicator. They are described as follows:

State Code Description: A FIPS (Federal Information Processing Standards) code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Tribal Indicator Description: A flag, with value “TT”, to indicate that this data is for a Native American Tribe, and that the next field on the transaction identifies a tribal area using the Bureau of Indian Affairs tribal code.

Attributes: Alphanumeric
 2-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid FIPS state code or a Tribal Indicator in delimited field 3. A State Code is valid if it exists in the STATES Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None

5.2.4 County Code or Tribal Code

The fourth field on any transaction can be either a County Code or a Tribal Code. A County code is indicated by a valid state code in the third field, while a Tribal Code is indicated by a Tribal Indicator in the third field.

County Code Description: A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

Tribal Code Description: A value that identifies a Tribal Area using a Bureau of Indian Affairs Tribal Code.

Attributes: Alphanumeric
 3-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid county code or a valid tribal code in the fourth delimited field. A County Code is valid if it exists at active status in the Counties table. A Tribal Code is valid if it exists at active status in the Tribal_Areas table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5.2.5 Site ID

Description: A numeric identifier (ID) that uniquely identifies each air monitoring site within a county or tribal area. There is no requirement that Site IDs be

assigned continuously or in any particular order. Regional and Local organizations are thus free to allocate site numbers in any way they chose as long as there is no duplication within a county and tribal area. For Tribal sites, because tribal areas may cross county or state lines, care must be taken to ensure that the Site ID is unique in the effected Tribal Area and states-county.

A specific Site ID is associated with a specific physical location and address. Any change in address requires a new Site ID to be assigned. This address change could include a change from the roof of one building to another. A change in location on the same roof should not normally require a new Site ID. Although an address change would routinely mean a new Site ID, some changes that do not change the site's location in respect to surrounding sources and its measurement scale, would require no change. An EPA Regional Office should be consulted for assistance in determining whether a new Site ID is required.

If a new Site ID is needed for a site not operated by the air pollution control agency, that agency should be contacted to assist in the ID assignment, to ensure that the ID is unique within the county. In other words, when a new Site ID is assigned, it must be different from any other Site ID already existing for that combination of State and County or Tribal Code.

Attributes: Alphanumeric
 4-digit ID
 Mandatory
 Key Field

Coding Instructions: Place a four-digit numeric code in the fifth delimited field. For update and delete, a Site ID value is valid if it exists in combination with state code and County or Tribal Code in the Sites Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5.2.6 Parameter

Description: The code assigned to the parameter measured by the monitor. Parameters may be pollutants or non-pollutants.

Attributes: Alphanumeric
5-digit code
Mandatory
Key Field

Coding Instructions: Place a valid parameter code in the sixth delimited field. A parameter value is valid if it exists in combination with (State Code, County Code, Site ID, and POC) or (Tribal Code, Site ID, and POC) in the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5.2.7 POC (Parameter Occurrence Code)

Description: An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter. For example, the first monitor established to measure CO at a site could have a POC of 1. If an additional monitor were established at the same site to measure CO, that monitor could have a POC of 2. However, if a new instrument is installed to replace the original instrument used as the first monitor, that could be considered the same monitor and it would still have a POC of 1.

For criteria pollutants, data from different sampling methods should only be stored under the same POC if the sampling intervals are the same and the methods are reference or equivalent. For sites where duplicate

sampling is being conducted by multiple agencies or by one agency with multiple samplers, multiple POCs must be utilized to store all samples.

For non-criteria pollutants, data from multiple sampling methods can be stored under the same POC if the sampling intervals are the same and there is only one sample for the time reported. If multiple open path monitors are reporting data for the same parameter, each open path would be assigned a different POC.

There are no national EPA practices assigning POC values. There may be regional or agency conventions where a POC value may have specific significance. Numbers do not need to be assigned sequentially.

Attributes: Numeric
 2-digit ID
 Mandatory
 Key Field

Coding Instructions: Place a valid POC value in the seventh delimited field. A POC value is valid if it exists in combination with (State Code, County Code, Site ID, and Parameter) or (Tribal Code, Site ID, and Parameter) on the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5.2.8 Duration Code

Description: The period of time during which the blank sample value was collected.

Attributes: Alphanumeric
 1-character code
 Mandatory

Coding Instructions: Place a valid sample duration code in the eighth delimited field. A sample

duration value is valid if it exists in the Sample Durations Table and if it exists in combination with unit, parameter, method, and collection frequency in the Protocols Table.

Business Rules

Common Rules

1. The combination of (Duration Code, Reported Unit, Parameter, and Method Code) must be in PROTOCOLS table.

Error Messages:

- Invalid Protocol.

2. The combination of (Duration Code, Reported Unit, Parameter, Method Code, and Collection Frequency Code) must be at Production status.

Error Messages:

- Inactive protocols may not be newly associated with sample values.

3. Duration Code must not be different than the one used for any other data for the monitor in the year.

Error Messages:

- Sample duration cannot change within a calendar year

Insert Rules

1. Duration Code is required.

Error Messages:

- Invalid Protocol.

Update Rules

None.

Delete Rules

None.

5.2.9 Reported Unit

Description: The dimensional system in which the pollutant concentration or parameter reading is expressed. If an alternate method detectable limit is reported, it must also be expressed in the same units.

Attributes: Alphanumeric
3-digit code
Mandatory

Coding Instructions: Place a valid unit code in the ninth delimited field. A unit value is valid if it exists in the Units Table and if it exists in combination with parameter, sampling duration, method, and collection frequency in the Protocols Table.

Business Rules

Common Rules

1. The combination of (Duration Code, Reported Unit, Parameter, Method Code, and Collection Frequency Code) must be in PROTOCOLS table.

Error Messages:

- Invalid Protocol.
2. The combination of (Duration Code, Reported Unit, Parameter, Method Code, and Collection Frequency Code) must be at Production status.

Error Messages:

- Inactive protocols may not be newly associated with sample values.

Insert Rules

1. Reported Unit is required

Error Messages:

- Invalid Protocol.

Update Rules

None.

Delete Rules

None.

5.2.10 Method Code

Description: Identifies a particular method for collecting and analyzing samples of the monitor's parameter.

Attributes: Alphanumeric
3-digit code
Mandatory

Coding Instructions: Place a valid method code in the tenth delimited field. A method code is valid if it exists in combination with parameter in the Sampling Methodologies Table, and if it exists in combination with parameter, sampling duration, units, and collection frequency in the Protocols Table.

Business Rules

Common Rules

1. The combination of (Duration Code, Reported Unit, Parameter, Method Code, and Collection Frequency Code) must be in PROTOCOLS table.

Error Messages:

- Invalid Protocol.

2. The combination of (Duration Code, Reported Unit, Parameter, Method Code, and Collection Frequency Code) must be at Production status.

Error Messages:

- Inactive protocols may not be newly associated with sample values.

3. The method must match the method defined for the monitor and date.

Error Messages:

- The provided method does not match the monitor method for the provided sample date.

Insert Rules

1. Method Code is required.

Error Messages:

- Invalid Protocol.

Update Rules

None.

Delete Rules

None.

5.2.11 Sample Date

Description: The calendar date for which the observation is being reported. This date represents the date for the day which contains the most hours for the collected sample.

Attributes: Date
8-digit date
Mandatory
Key Field

Coding Instructions: Place a valid date in the eleventh delimited field. A date value is valid if it is in the form of YYYYMMDD, it is between 1957 and the current date, and it falls within a valid sample period defined for the monitor.

Business Rules

Common Rules

1. Sample Date is required.

Error Messages:

- A non-numeric character was found where a numeric was expected

2. Sample Date must be less than, or equal to, the system date.

Error Messages:

- Date must be less than current date

3. Sample Date must fall within a valid sample period for the monitor.

Error Messages:

- Date must be within a valid sample period.

Insert Rules

1. A production raw data value must not exist for the Monitor, Sample Date, and Sample Time.
Error Messages:
 - Attempted to insert a value for an existing date and time.
2. Sample Date and Sample Time for the sample may not fall within the duration period of the sample immediately preceding it, not span into the duration period of the sample immediately succeeding it.
Error Messages:
 - Sample duration overlaps immediately preceding or succeeding sample value.

Update Rules

1. A production raw data value must be in the database for the Monitor, Sample Date, and Time.
Error Messages:
 - Production record doesn't exist to update or delete.

Delete Rules

1. A production raw data value must be in the database for the Monitor, Sample Date, and Time.
Error Messages:
 - Production record doesn't exist to update or delete.

5.2.12 Sample Time

Description: The time at which the sampling for the reported observation began, in standard time at the location of the monitoring site.

Attributes: Alphanumeric
5 characters
Mandatory
Key Field

Coding Instructions: Place a valid sample time in the twelfth delimited field. A sample time value is valid if it is in the format of HH:MM, and does not overlap another observation's time period for the monitor, for the same Duration Code.

Business Rules

Common Rules

1. Sample Time is required.
Error Messages:
 - A non-numeric character was found where a numeric was expected
2. Start time must be in the format: HH:MM.
Error Messages:
 - Invalid time format.

3. A pre-production raw data value must not already be in the database for the Monitor, Sample Date, and Time.

Error Messages:

- A pre-production Record already exists for the Monitor - Date-Time

Insert Rules

1. A production raw data value must not already be in the database for the Monitor, Sample Date, and Time.

Error Messages:

- Attempted to insert a value for an existing date and time.

2. Sample Date and Sample Time for the sample may not fall within the duration period of the sample immediately preceding it, not span into the duration period of the sample immediately succeeding it.

Error Messages:

- Sample duration overlaps immediately preceding or succeeding sample value

Update Rules

1. A production raw data value must be in the database for the Monitor, Sample Date, and Time.

Error Messages:

- Production record doesn't exist to update or delete.

Delete Rules

1. A production raw data value must be in the database for the Monitor, Sample Date, and Time.

Error Messages:

- Production record doesn't exist to update or delete.

5.2.13 Reported Sample Value

Description: The value of an observation being reported.

Attributes: Numeric
10 digits, including 5 decimal places (nnnnn.nnnnn)
Conditionally Required for Insert and Update

Coding Instructions: Place the sample value in the thirteenth delimited field. Reported scale is implied from the number of digits allocated to the right of the decimal point. For example, to submit the value of 1.2 in the scale of 3, then submit the value as 1.200.

For some parameters, upper and lower limits have been established for observations. The sample value is compared to these limits, if they exist on the Parameters Table for the pollutant. If the sample value falls outside the range defined by the absolute max sample value and the absolute min

sample value, and there is no qualifier entered with the sample value, then the sample value will be rejected with an error message.

If the sample falls outside the range defined by the Federal relative maximum sample value and Federal relative minimum sample value, and there is no qualifier entered with the sample value, then the sample will not be rejected, but will be highlighted in the Statistical Critical Review Report with a warning message.

For PM10 and PM2.5, the negative minimum values only apply to specific continuous sampling methods that do report individual hourly averages less than 0 because of the measurement technology used.

The relevant maximum/minimum values and parameters are listed below:

| Parameter Code | Parameter Description | Abs Max Sample Value | Abs Min Sample Value | Fed Rel Max Sample Value | Fed Rel Min Sample Value | Reported Unit |
|----------------|-----------------------------|----------------------|----------------------|--------------------------|--------------------------|------------------------------|
| 11101 | Suspended Particulate (TSP) | 10000 | 0 | 1000 | 0 | µg/meter ³ (25 c) |
| 12128 | Lead (TSP) | 100 | 0 | 100 | 0 | µg/meter ³ (25 c) |
| 42101 | Carbon Monoxide | 50 | 0 | 75 | 0 | parts per million (ppm) |
| 42401 | Sulfur Dioxide | 1 | 0 | 1 | 0 | ppm |
| 42601 | Nitric Oxide | 1.2 | 0 | 1 | 0 | ppm |
| 42602 | Nitrogen Dioxide | 0.4 | 0 | 1 | 0 | ppm |
| 42603 | Oxides of Nitrogen | 1.2 | 0 | 1.5 | 0 | ppm |
| 43101 | Total Hydrocarbons | 99999 | 0 | 10000 | 0 | parts per billion carbon |
| 43102 | Total NMOC | 20000 | 0 | 10000 | 0 | parts per billion carbon |
| 43201 | Methane | 99999 | 0 | | | parts per billion carbon |
| 44201 | Ozone | 0.5 | 0 | 0.4 | 0 | pm |
| 61102 | Wind Direction | 360 | 0 | 360 | 0 | degrees, compass |
| 61104 | Resultant Direction | 360 | 0 | 360 | 0 | degrees, compass |

| Parameter Code | Parameter Description | Abs Max Sample Value | Abs Min Sample Value | Fed Rel Max Sample Value | Fed Rel Min Sample Value | Reported Unit |
|----------------|---------------------------------|----------------------|----------------------|--------------------------|--------------------------|-----------------------|
| 61106 | Std Dev Hz Wind Dir | 360 | 0 | 360 | 0 | degrees, compass |
| 61107 | Std Dev Vt Wind Dir | 360 | 0 | 360 | 0 | degrees, compass |
| 61112 | Vert Wind Direction | 360 | 0 | 360 | 0 | degrees, compass |
| 62101 | Outdoor Temperature | 150 | -60 | | | degrees, Fahrenheit |
| 62102 | Virtual Temperature | 150 | -60 | | | degrees, Fahrenheit |
| 62104 | Temperature 24-Hour Max | 150 | -60 | | | degrees, Fahrenheit |
| 62105 | Temperature 24-Hour Min | 150 | -60 | | | degrees, Fahrenheit |
| 62107 | Indoor Temperature | 150 | -60 | | | degrees, Fahrenheit |
| 62201 | Relative Humidity | 100 | 0 | | | percent rel humidity |
| 68101 | Sample Flow Rate - CV | 20 | 0 | 20 | 0 | percent |
| 68102 | Sample Volume | 25.2 | 8 | | | cubic meter |
| 68103 | Ambient Min Temperature | 55 | -40 | 55 | -40 | degrees, centigrade |
| 68104 | Ambient Max Temperature | 55 | -40 | 55 | -40 | degrees, centigrade |
| 68105 | Ambient Avg. Temperature | 55 | -40 | 55 | -40 | degrees, centigrade |
| 68106 | Sample Min Barometric Pressure | 850 | 450 | 850 | 450 | millimeters (mercury) |
| 68107 | Sample Max Barometric Pressure | 850 | 450 | 850 | 450 | millimeters (mercury) |
| 68108 | Sample Avg. Barometric Pressure | 850 | 450 | 850 | 450 | millimeters (mercury) |
| 68109 | Elapsed Sample Time | 1500 | 480 | | | minutes |
| 81102 | PM-10 Total 0-10 Um | 5000 | -10 | 500 | -10 | µg/cubic meter (25 c) |

| Parameter Code | Parameter Description | Abs Max Sample Value | Abs Min Sample Value | Fed Rel Max Sample Value | Fed Rel Min Sample Value | Reported Unit |
|----------------|-------------------------|----------------------|----------------------|--------------------------|--------------------------|---------------------|
| 88101 | PM-2.5 Local Conditions | 5000 | -10 | 500 | -10 | µg/cubic meter (LC) |

Business Rules

Common Rules

1. Reported Sample Value must be a number with no more than 5 digits before or after the decimal point.

Error Messages:

- Value larger than specified precision allows for this column

2. Reported Sample Value must be valued if Qualifier Code -Null Data is not valued, and must not be valued if Qualifier Code -Null Data is valued.

Error Messages:

- The null data qualifier code or the reported sample value must exist.

3. Reported Sample Value, when converted to standard units, must fall within the absolute value range defined for the parameter.

Error Messages:

- Standard value falls outside absolute value range for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5.2.14 Null Data Code

Description: This is a code to explain why no sample value was reported.

Attributes: Alphanumeric
2-character code
Optional

Coding Instructions: Place a valid null value code in the fourteenth delimited field. A null data code value is valid if it exists in the Qualifiers Table with the qualifier type of null.

Business Rules

Common Rules

1. Null Data Code is required if the Reported Sample Value is blank (Null).
Error Messages:
 - The null data qualifier code or the reported sample value must exist..
2. Null Data Code must be in QUALIFIERS table.
Error Messages:
 - Integrity constraint (AIRSRAQS.QD_QU_FK) violated.
3. Null Data Code must be at production status.
Error Messages:
 - Inactive Null Data Code.
3. Null Data Code and Event Qualifier may not be assigned to same sample.
Error Messages:
 - A sample may be qualified by no more than one event or null qualifier..

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5.2.15 Collection Frequency Code

- Description: Indicates the elapsed time period between observations.
- Attributes: Alphanumeric
1- or 2-digit code
Optional
- Coding Instructions: Use of Collection Frequency Code has been deprecated. Any value provided will be ignored.

Business Rules

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5.2.16 Monitor Protocol ID

- Description: The sequential monitor protocol identification (MP ID) number used to distinguish combinations of parameter, sample duration, unit, method, collection frequency, and alternate method detectable limit (MDL) for a monitor. The monitor protocol value reported here is ignored by AQS.
- Attributes: Numeric
2 digits (nn)
Optional (Please do not report)
- Coding Instructions: Use of Monitor Protocol ID has been deprecated. Any value provided will be ignored.

Business Rules

Common Rules

Insert Rules

Update Rules

Delete Rules

None.

5.2.17 Qualifier Code 1-10

- Description: Qualifications used to describe the raw data. They may document exceptional data, or quality assurance exceptions.
- Attributes: Alphanumeric
1- or 2-character code
Optional
- Coding Instructions: Ten fields (delimited fields 17-26), are allocated for the designation of raw data qualifiers. It is valid to designate one, and only one, exceptional data qualifier, and as many quality assurance qualifiers as are necessary. To designate qualifiers, use the available fields in sequence: place the first qualification in field 17, the second in field 18, and so on. A particular qualifier value is valid if it exists in the Qualifiers Table and the combination of parameter qualifier exists on the parameter qualifier table.

Business Rules

Common Rules

1. Qualifier Code must be valid for parameter.

Error Messages:

- Qualifier Code is not valid for the Parameter.
2. QUALIFIERS (QUALIFIER_CODE) must be at production status.

Error Messages:

- Invalid Raw Data Qualifier.

3. Qualifier Code must not be a Null Data code

Error Messages:

- Invalid Raw Data Qualifier

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5.2.18 Alternate Method Detectable Limit (Alt-MDL)

Description: Method Code detectable limit (MDL) is the minimum detectable level defined for the monitor and method.

Attributes: Numeric
10 digits, including 5 decimal places (nnnnn.nnnnn)
Optional

Coding Instructions: Place a valid MDL in the 27th delimited field. A user can report MDL on the Hourly, Daily, Sub-Hourly Raw Data (RD) transaction, or leave it blank. If it is reported on the raw data transactions, then the software looks to see whether it is a new MDL value (i.e., does not exist on the Monitor Protocol Table). If it is a new value, a new monitor protocol record is system-generated and that new monitor protocol identification (MP ID) number is stored with the raw data value.

If the reported MDL value is not a new value, and there is already a monitor protocol record for that method and MDL, then the existing alternate MP ID from the Monitor Protocol Table is stored with the raw data value.

Although not the preferred process, another way of reporting a new MDL is to create a new monitor protocol with the new value using the MK transaction. Then the raw data transactions can reference the new monitor protocol record being created in the batch stream, and the MDL value is not needed, since it is already on the protocol record. To do this, the alternate MP ID on the MK record being created would be the same value contained in the alternate MP ID field on the RC or RD transactions.

Business Rules

Common Rules

1. MDL must be a positive number with no more than 5 digits before or after the decimal point.

Error Messages:

- Value larger than specified precision allows for this column

2. Alternate MP ID and MDL may not be specified at the same time.

Error Messages:

- MP_ID and MDL may not both be specified.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5.2.19 Uncertainty Value

Description: The measure of method uncertainty associated with the blank data point, which will include components of both the analytical and the volume uncertainty.

Attributes: Numeric
11 digits, including 5 decimal places (nnnnnn.nnnnn)
Optional

Coding Instructions: Must be a positive number

Business Rules

Common Rules

1. Uncertainty Value must be a positive number with no more than 6 digits before, and 4 digits after, the decimal point.

Error Messages:

- Value larger than specified precision allows for this column

2. Uncertainty Value may only be valued if a Reported Sample Value is provided.

Error Messages:

- Invalid combination of Sample Value, Uncertainty, and Null Data Code

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5.3 Statistical Tests

The pattern and gap tests performed on hourly data (duration of 1) are described briefly below. See EPA document Screening Procedures for Ambient Air Quality for more detailed information (publication # EPA-450/2-78-037, July 1978). The values are validated via the following statistical tests, and results are included in the Statistical Critical Review Report for user review prior to posting as production data.

5.3.0 Pattern Tests

Pattern tests are performed on hourly data for pollutants 44201 ozone (O₃), 42101 carbon monoxide (CO), 42401 sulfur dioxide (SO₂), and 42602 nitrogen dioxide (NO₂). Exceptional event data are excluded from the tests. The tests are run on a month of hourly data. Essentially, each test scans the month's values and compares them against empirically derived thresholds to determine if they are questionable. If so, the value is flagged as failing that particular test. The raw data values are converted to the appropriate units before the tests are applied. The factors used to convert from reporting units to the units of the tests are given in Table 6-1. The threshold values for each pollutant and each test are listed in Table 6-2. As Table 6-2 shows, different threshold values pertain depending on the season of the year and the time of day.

The Dixon test (not applied to CO) scans each day's values and determines the highest, second highest, and lowest values in that day. It then computes the Dixon ratio, defined as $(\text{max} - \text{secmax})/(\text{max} - \text{low})$. If this value is greater than 0.55, the day fails the Dixon test and all hours are marked as failing.

The max hour test compares each value in the month to a constant to determine if the value is too high. If so, it is marked as failing.

The high difference test compares the value at each hour in the month to the previous hour and the subsequent hour. If the difference between any two hours is greater than allowable, then the hour under inspection is marked as failing.

The spike test works much like the high difference test, except that both differences must be greater than allowable for the test to fail. Also, the percentage difference between the hour in question and both its adjacent hours must be greater than allowable for the test to fail. If either the difference or the percentage comparison fails, the value is rejected.

The high consecutive values test looks at each hour and the subsequent three hours. If all four values are greater than allowable, then all four hours are marked as failing the test.

Table 6-1 Conversion Factors for the Pattern and Gap Tests

| Pollutant | Units for Gap and Pattern Tests | Reported Units | Conversion Factors |
|--------------------------|---------------------------------|---|------------------------------------|
| 42101 (CO) | parts per million (ppm) | 005 (mg/m ³ 25°) 006 (mg/m ³ 0°) 007 (ppm) 008 (ppb) | 0.86957 0.79653 1.0 0.001 |
| 42401 (SO ₂) | pphm* | 001 (µg/m ³ 25°) 002 (µg/m ³ 0°) 007 (ppm) 008 (ppb) | 0.03817 0.03496 100.0 0.1 |
| 42602 (NO ₂) | pphm* | 001 (µg/m ³ 25°) 002 (µg/m ³ 0°) 007 (ppm) 008 (ppb) | 0.05319 0.04872 100.0 0.1 |
| 44201 (O ₃) | pphm* | 001 (µg/m ³ 25°) 002 (µg/m ³ 0°) 007 (ppm) 008 (ppb) | 0.05102 0.04673 100.0 0.1 |

*ppm - parts per million, mg/m³ - milligrams per cubic meter, ppb - parts per billion, pphm - parts per hundred million, µg/m³ - micrograms per cubic meter

Table 6-2 Threshold Values for the Pattern Tests

| Pollutant | Data Minimum Stratification | Maximum Hour Test | High Difference Test | Spike | Consecutive Values Test | Value* |
|-----------------------|---|-------------------|----------------------|--------------|-------------------------|--------|
| Ozone (pphm) | Summer-Day Months: 05-10 Hours: 10-17 | 50 | 15 | 10 (300%) | 26 | 5 |
| | Summer-Night Months: 05-10 Hours: 18-09 | 38 | 10 | 5 (300%) | 26 | 5 |
| | Winter-Day Months: 11-04 Hours: 10-17 | 26 | 13 | 10 (300%) | 26 | 5 |
| | Winter-Night Months: 11-04 Hours: 18-09 | 15 | 10 | 5 (300%) | 26 | 5 |
| Carbon Monoxide (ppm) | Rush Traffic Hours: 06-10 06-20 | 65 | 22 | 17 (500%) | 35 | 17 |
| | Non-Rush Traffic Hours: 11-15 21-05 | 44 | 22 | 17 (500%) | 35 | 17 |
| Sulfur Dioxide (pphm) | Zone 1 Regions 1, 5, 6, 7 | 99 | 19 | 8 (500%) | 38 | 25 |
| | Zone 2 Regions 2, 3, 4 | 50 | 11 | 8 (500%) | 38 | 25 |

| Pollutant | Data Minimum Stratification | Maximum Hour Test | High Difference Test | Spike | Consecutive Values Test | Value* |
|-------------------------|-----------------------------|-------------------|----------------------|--------------|-------------------------|--------|
| | Zone 3 Regions 8, 9, 10 | 30 | 8 | 8 (500%) | 38 | 25 |
| Nitrogen Dioxide (pphm) | None | 64 | 27 | 11 (300%) | 53 | 12 |

* Values below the minimum are excluded from the high difference and spike tests.

5.3.1 Gap Test

The gap test is performed on data for pollutants 44201 (O₃), 42101 (CO), 42401 (SO₂), and 42602 (NO₂). Exceptional events data are excluded. The gap test is so named because it looks for gaps in the Frequency Distribution Table for a month's values. The test is run on a month of hourly data (duration of 1). For each pollutant, the program builds a Frequency Distribution Table and computes constants associated with the frequency distribution. If there is not enough data to compute the constants, a warning is issued. Having determined the constants, a largest reasonable gap is estimated. Then the largest actual gap in the data is determined and compared to the largest estimated gap to determine whether the month passes or fails the gap test.

5.3.2 Patterns and Gap Failure Report

The patterns and gap failure report is produced by the Critical Review (CR) statistics program. The report identifies the day in which a pattern test failed or the month in which the gap test failed, and it shows the first and last keys of the transactions involved in the failed test. Under the heading hourly values failing test(s)/test(s) failed, the report gives additional information to help identify the values that failed the test.

For pattern test failures, the report shows all the values for each day in which a value failed a test. If database values are being changed with update transactions, some of the values listed may be from the database and some from the transactions in the batch transaction file. One-letter codes under the values indicate which of the pattern tests a value failed. If a particular value failed more than one test, multiple codes are listed. The codes are:

- C High consecutive values test
- D Dixon test
- H High difference test
- M Max hour test
- S Spike test

The codes are also listed on each page of the reports as part of the page heading.

Determining which values are involved in a failure of the gap test is a bit more difficult. The gap test identifies a gap in the frequency distribution of a month's values. Often, but not always, the gap is due to an outlier, a value unusually higher or lower than the bulk of the data for the month.

The patterns and gap failure report does not identify the date and hour of the value(s) failing the gap test, but it does give information that may allow manual identification of the values(s). Gap size is the difference in magnitude between the two values on either side of the gap in the frequency distribution, expressed in the units used for the gap test (ppm or pphm). Num above gap is the number of values above the gap. If the number of values is large, the gap is in the smallest values for the month. Finally, slot below gap is the value on the low end of the gap, expressed in the units of the test (ppm or pphm).

5.3.3 Shewhart Test

The Shewhart test which is performed on daily data is described briefly herein. See EPA Document Screening Procedures for Ambient Air Quality for more detailed information (publication # EPA-450/2-78-037, July 1987).

The Shewhart test is performed on daily data (duration is 7, 24-hour) for pollutants 12128 (Pb), 42401 (SO₂), 42602 (NO₂), 88101 (PM-2.5), and 81102 (PM-10). Exceptional events data are excluded. The test is run on a month of daily data. The program counts the number of valid samples for the current month and each of the three previous months. If there is insufficient data to perform the test, a warning message is issued. Given sufficient data for at least two of the three previous months, the program computes the mean and range for the current month. It then computes the historical mean and range, from the mean and range of the data for the three historical months. The mean and range for the current month are compared against the historical values to determine whether the current month passes or fails the Shewhart test.

5.4 Critical Review Tests

For monitors defined as SLAMS, NAMS, and PAMS, measurement data is identified as suspect, or considered for review, if it meets certain “Critical Review” conditions. This data is periodically examined by EPA headquarters personnel.

The specific tests are as follows:

5.4.0 Criteria Pollutants

- Any value that exceeds the 3-year historical maximum. The 3-year historical maximum is defined as the maximum non-exceptional event value obtained between the current year and the current year minus 3 years.
- The first maximum of the dataset is 125% greater than second maximum on a per monitor-year basis.
- Value exceeds of the NAAQS times the critical review factor located in the state_thresholds table.
- NAAQS exceedances that are deleted from the database.

5.4.1 Non-Criteria Pollutants

- Any monitor/quarter whose first maximum is 175% greater than the 3-year historical maximum
- The first maximum of the dataset is 150% greater than second maximum on a per monitor-year basis.

5.4.2 Certified Data

- Any monitor whose certified data has changed due to a change in the raw data for a monitor/year. This change may be in the form of an insertion, modification, or deletion of the supporting raw data.

6 Accuracy and Precision Transactions (RA, RP)

These transactions are no longer supported as of March of 2015.

6.1 Accuracy Data - Transaction Type RA

This transaction type is no longer supported.

6.2 Precision Data - Transaction Type RP

This transaction type is no longer supported.

7 QA Transactions for Monitors

7.1 1-Point Quality Control (QC)

7.1.0 Description of Assessment

40 CFR Part 58 Appendix A §3.2.1 regulations require the primary quality assurance organization (PQAO) to perform a quality control check at least once every 2 weeks at required ranges (0.01 – 0.1ppm for SO₂, NO₂ and O₃; and 1 – 10 ppm for CO) on every automated gaseous monitor. The “check standard” is a gas concentration generated from standard reference materials. In the case of O₃, the “check standard” concentration is generated using an ozone generator.

The monitors for which this assessment applies usually sample continuously and report hourly average values as raw data to AQS. When it is time to run the 1-Point QC check, the check standard is introduced in the monitor, and readings from the monitor recorded. The monitor concentration and the check standard concentration are reported to AQS for the monitor and date. A null data code is included on the raw data transaction for that hour if a routine observation cannot be made for the hour due to performing the 1-Point QC check, and will indicate that the 1-Point QC check was performed.

For 1-Point QC Checks, the known value of the check gas concentration is referred to as the Assessment Concentration on the transaction. The value indicated by the monitor as a result of sampling the standard reference gas is referred to as the Monitor Concentration on the transaction. This should help alleviate some of the confusion that arose from the terms “actual” and “indicated” on the old RP and RA transactions.

A field by field description of the 1-Point QC transaction follows.

7.1.1 Transaction Type

Description: Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields). For the QA transactions, the literal 'QA' is used for every QA transaction as the transaction type. The assessment type field is used to differentiate between the various QA assessments.

Attributes: Alphanumeric
2-character code
Mandatory

Coding Instructions: Place 'QA' in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory

Error Messages:

- Invalid transaction format.

2. Transaction Type must be in TRANSACTION_TYPES table in database.

Error Messages:

- Transaction type not handled.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.1.2 Action Indicator

Description: Indicates the data manipulation action to be performed by the transaction.

Attributes: Alphanumeric
1-character code
Mandatory

Coding Instructions: Place the values I, U, or D in the second delimited field.

- I Insert a new row into the appropriate table in the database.
- U Change one or more column values for an existing row in one or more tables.
- D Delete a row from a table(s) for the row containing the key data.

Business Rules

Common Rules

1. Action Indicator is required.
Error Messages:
 - Invalid Action Indicator.
2. Action Indicator must be either 'I', 'U', or 'D'.
Error Messages:
 - Invalid Action Indicator.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.1.3 Assessment Type

Description: Indicates the specific QA assessment reported via the transaction.

Attributes: Alphanumeric QA Assessment Code
 Mandatory
 Key Field

Coding Instructions: Place the values in the third delimited field. Literal: "1-Point QC". Each assessment is specified via the assessment type field on the QA transaction.

Business Rules

Common Rules

1. Assessment type is required.
Error Messages:
 - Assessment Type is required.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.1.4 Performing Agency

Description: Agency Code of organization performing assessment

Attributes: Alphanumeric
 3 or 4 digit code
 Optional
 System generated if left null

Coding Instructions: Place the performing agency code value in the fourth delimited field. Must exist in the AGENCIES Reference Table.

If this field is left null at submission time, then the agency code from the submitter's user profile record is used to populate the performing agency field. Therefore, any transactions being submitted on behalf of an agency by a user from a different agency should have the performing agency code populated on the transactions being submitted.

Business Rules

Common Rules

1. The Agency performing the audit must be in the AGENCIES table.

Error Messages:

- Integrity constraint (AIRSRAQS.MONITOR_ASSESSMENTS_PER_AG_FK) violated.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.1.5 State Code / Tribal Indicator

The fifth field on a transaction can be either a State Code or a Tribal indicator. They are described as follows:

State Code Description: A FIPS (Federal Information Processing Standards) code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Tribal Indicator Description: A flag, with value "TT", to indicate that this data is for a Native American Tribe, and that the next field on the transaction identifies a tribal area using the Bureau of Indian Affairs tribal code.

Attributes: Alphanumeric
 2-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid FIPS state code or a Tribal Indicator in delimited field 5. A State Code is valid if it exists in the STATES Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.1.6 County Code / Tribal Code

The sixth field on any transaction can be either a County Code or a Tribal Code. A County code is indicated by a valid state code in the third field, while a Tribal Code is indicated by a Tribal Indicator in the third field.

County Code Description: A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

Tribal Code Description: A value that identifies a Tribal Area using a Bureau of Indian Affairs Tribal Code.

Attributes: Alphanumeric
 3-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid county code or a valid tribal code in the sixth delimited field. A County Code is valid if it exists at active status in the Counties table. A Tribal Code is valid if it exists at active status in the Tribal_Areas table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None

7.1.7 Site Number

Description: A numeric identifier that uniquely identifies each air monitoring site within a county or tribal area. There is no requirement that Site Numbers be assigned continuously or in any particular order. Regional and Local organizations are thus free to allocate site numbers in any way they chose as long as there is no duplication within a county and tribal area. For Tribal sites, because tribal areas may cross county or state lines, care must be taken to ensure that the Site Number is unique in the effected Tribal Area and states-county.

A specific Site Number is associated with a specific physical location and address. Any change in address requires a new Site Number to be assigned. This address change could include a change from the roof of one building to another. A change in location on the same roof should not normally require a new Site Number. Although an address change would routinely mean a new Site Number, some changes that do not change the site's location in respect to surrounding sources and its measurement scale, would require no change. An EPA Regional Office should be consulted for assistance in determining whether a new Site Number is required.

If a new Site Number is needed for a site not operated by the air pollution control agency, that agency should be contacted to assist in the Number assignment, to ensure that the Number is unique within the county. In other words, when a new Site Number is assigned, it must be different from any other Site Number already existing for that combination of State and County or Tribal Code.

Attributes: Alphanumeric
4-digit Number
Mandatory
Key Field

Coding Instructions: Place a four-digit numeric code in the seventh delimited field. For update and delete, a Site Number is valid if it exists in combination with state code and County or Tribal Code in the Sites Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site Number, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.1.8 Parameter Code

Description: The code assigned to the parameter measured by the monitor. Parameters may be pollutants or non-pollutants.

Attributes: Alphanumeric
5-digit code
Mandatory
Key Field

Coding Instructions: Place a valid parameter code in the eighth delimited field. A parameter value is valid if it exists in combination with (State Code, County Code, Site ID, and POC) or (Tribal Code, Site ID, and POC) in the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.1.9 POC

Description: An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter. For example, the first monitor established to measure CO at a site could have a POC of 1. If an additional monitor were established at the same site to measure CO, that monitor could have a POC of 2. However, if a new instrument is installed to replace the original instrument used as the first monitor, that could be considered the same monitor and it would still have a POC of 1.

For criteria pollutants, data from different sampling methods should only be stored under the same POC if the sampling intervals are the same and the methods are reference or equivalent. For sites where duplicate sampling is being conducted by multiple agencies or by one agency with multiple samplers, multiple POCs must be utilized to store all samples.

For non-criteria pollutants, data from multiple sampling methods can be stored under the same POC if the sampling intervals are the same and there is only one sample for the time reported. If multiple open path monitors are reporting data for the same parameter, each open path would be assigned a different POC.

There are no national EPA practices assigning POC values. There may be regional or agency conventions where a POC value may have specific significance. Numbers do not need to be assigned sequentially.

Attributes: Numeric
2-digit ID
Mandatory
Key Field

Coding Instructions: Place a valid POC value in the ninth delimited field. A POC value is valid if it exists in combination with (State Code, County Code, Site ID, and Parameter) or (Tribal Code, Site ID, and Parameter) on the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.1.10 Assessment date

Description: Date that the assessment was performed.

Attributes: Date
 8-digit date
 Mandatory
 Key Field

Coding Instructions: Place a valid date string in the tenth delimited field. The date format is YYYYMMDD.

Business Rules:

Common Rules

1. Assessment Date is mandatory.

Error Messages:

- Assessment Date is required.

2. Assessment Date must fall within a sampling period of the monitor.

Error Messages:

- Date must be within a valid sample period

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.1.11 Assessment Number

Description: A unique number associated with an assessment performed at a site on a given day. Value should be “1” unless additional assessments of the same type are performed.

Attributes: Non-zero integer
 Mandatory
 Key Field

Coding Instructions: Valid number placed in the eleventh delimited field. Positive number.

Business Rules

Common Rules

1. The value is not a valid positive integer.

Error Messages:

- Assessment number must be a positive integer.
2. The same assessment number already exists for that day for that monitor.

Error Messages:

- Duplicate assessment.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.1.12 Monitor Method Code

Description: The sampling methodology of the monitor being assessed.

Attributes: Alphanumeric
 3-digit code
 Mandatory on insert

Coding Instructions: A valid method code is to be placed in the twelfth delimited field.

Business Rules

Common Rules

1. The Monitor Method Code must match the Monitor Method assignment in the database for the monitor for the day.

Error Messages:

- The provided method does not match the monitor method for the provided assessment date.

2. The Monitor Method Code must be in the SAMPLING_METHODOLOGIES table for the parameter listed.

Error Messages:

- Please enter a valid Methodology Code for the current Parameter Code.
- The Method does not exist or is inactive.
- Invalid Method Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.1.13 Reported Unit

Description: Unit of measure associated with the reported concentration, mass, or flow value.

Attributes: Alphanumeric
 3-digit code
 Mandatory on insert

Coding Instructions: Unit code is to be placed in the thirteenth field.

Business Rules

Common Rules

1. Must exist in UNITS Reference table.

Error Messages:

- Not a valid unit.
- Unit required.

2. Units of measure must be appropriate for type of assessment.

Error Messages:

- Only concentration units may be used for ____ assessments.
- Only mass units may be used for ____ assessments.
- Flow audits must be submitted with flow units.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.1.14 Monitor Concentration

Description: The concentration value provided by the monitor being assessed.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the fourteenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.1.15 Assessment Concentration

Description: The value of the known gas standard concentration.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the fifteenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.1.16 Null Code

Description: An AQS Null Data Code is used to explain that the required audit was performed, but considered invalid.

Attributes: Alphanumeric
 2-character code
 Optional

Coding Instructions: Alphanumeric null code value shall be the qualifier code “1C”. It is to be placed in the sixteenth field.

Business Rules:

Common Rules

1. The value must be a valid qualifier code type of NULL.

Error Messages:

- Invalid Null Data Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.1.17 Comment

Description: Free form text describing the invalidation.

Attributes: Alphanumeric
 Optional

Coding Instructions: Plain text only; “|” is a reserved character, i.e., it should not be used.

Business Rules:

Common Rules

None.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.2 Annual Performance Evaluation (PE)

7.2.0 Description of Assessment

40 CFR Part 58 Appendix A §3.2.2 regulations require the PQAQO, each calendar quarter (during which monitors are operated), evaluate at least 25 percent of the SLAMS monitors for SO₂, NO₂, O₃, or CO such that each monitor is evaluated at least once per year. The evaluation is made by challenging the monitor with audit gas standards of known concentration from at least three of ten audit levels¹. The audit levels selected should represent or bracket 80 percent of ambient concentrations measured by the monitor being evaluated.

Each audit level has a minimum and maximum concentration range, with the lowest range defined as audit level 1. For the criteria gases, 10 audit level ranges are currently defined.

AQS evaluates each reported assessment concentration on the transaction with its reported level number. If the concentration is not within the level's concentration range, then AQS will produce a warning message when processing the transaction. The concentration values and reported level number will be stored in the database and a warning will be issued on the error report produced by the batch load process.

The maximum and minimum allowable reported values defined for the parameter would also apply, and produce rejections if exceeded.

A field by field description of the Annual PE transaction follows.

7.2.1 Transaction Type

Description: Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

Attributes: Alphanumeric
2-character code
Mandatory

Coding Instructions: Place QA in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory

Error Messages:

- Invalid transaction format.

2. Transaction Type must be in TRANSACTION_TYPES table in database.

Error Messages:

¹ <http://www.epa.gov/ttn/amtic/files/ambient/pm25/datamang/TechMemoforPEAuditLevels.pdf>

- Transaction type not handled.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.2.2 Action Indicator

Description: Indicates the data manipulation action to be performed by the transaction.

Attributes: Alphanumeric
1-character code
Mandatory

Coding Instructions: Place the values I, U, or D in the second delimited field.

| | |
|---|---|
| I | Insert a new row into the appropriate table in the database. |
| U | Change one or more column values for an existing row in one or more tables. |
| D | Delete a row from a table(s) for the row containing the key data. |

Business Rules

Common Rules

1. Action Indicator is required.
Error Messages:
 - Action Code is Required.
2. Action Indicator must be either 'I', 'U', or 'D'.
Error Messages:
 - Invalid Action Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.2.3 Assessment Type

Description: Indicates the specific QA assessment associated with the transaction.

Attributes: Alphanumeric QA Assessment Code
 Mandatory
 Key Field

Coding Instructions: Place the values in the third delimited field. Literal: "Annual PE".

Business Rules

Common Rules

1. Assessment type is required.

Error Messages:

- Assessment Type is required.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.2.4 Performing Agency

Description: Agency Code of organization performing assessment

Attributes: Alphanumeric
 3 or 4 digit code
 Optional
 System generated if left null

Coding Instructions: Place the performing agency code value in the fourth delimited field. Must exist in the AGENCIES Reference Table.

If this field is left null at submission time, then the agency code from the submitter's user profile record is used to populate the performing agency field. Therefore, any transactions being submitted on behalf of an agency by a user from a different agency should have the performing agency code populated on the transactions being submitted.

Business Rules

Common Rules

1. The Agency performing the audit must be in the AGENCIES table.

Error Messages:

- Integrity constraint (AIRSRAQS.MONITOR_ASSESSMENTS_PER_AG_FK) violated.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.2.5 State Code/Tribal Indicator

The fifth field on a transaction can be either a State Code or a Tribal indicator. They are described as follows:

State Code Description: A FIPS (Federal Information Processing Standards) code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Tribal Indicator Description: A flag, with value “TT”, to indicate that this data is for a Native American Tribe, and that the next field on the transaction identifies a tribal area using the Bureau of Indian Affairs tribal code.

Attributes: Alphanumeric
2-digit code
Mandatory
Key Field

Coding Instructions: Place a valid FIPS state code or a Tribal Indicator in delimited field 5. A State Code is valid if it exists in the STATES Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

None.

7.2.6 County Code/Tribal Code

The sixth field on any transaction can be either a County Code or a Tribal Code. A County code is indicated by a valid state code in the third field, while a Tribal Code is indicated by a Tribal Indicator in the third field.

County Code Description: A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

Tribal Code Description: A value that identifies a Tribal Area using a Bureau of Indian Affairs Tribal Code.

Attributes: Alphanumeric
3-digit code
Mandatory
Key Field

Coding Instructions: Place a valid county code or a valid tribal code in the sixth delimited field. A County Code is valid if it exists at active status in the Counties table. A Tribal Code is valid if it exists at active status in the Tribal_Areas table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.2.7 Site Number

Description: A numeric identifier that uniquely identifies each air monitoring site within a county or tribal area. There is no requirement that Site Numbers be assigned continuously or in any particular order. Regional and Local organizations are thus free to allocate site numbers in any way they chose as long as there is no duplication within a county and tribal area. For Tribal sites, because tribal areas may cross county or state lines, care must

be taken to ensure that the Site Number is unique in the effected Tribal Area and states-county.

A specific Site Number is associated with a specific physical location and address. Any change in address requires a new Site Number to be assigned. This address change could include a change from the roof of one building to another. A change in location on the same roof should not normally require a new Site Number. Although an address change would routinely mean a new Site Number, some changes that do not change the site's location in respect to surrounding sources and its measurement scale, would require no change. An EPA Regional Office should be consulted for assistance in determining whether a new Site Number is required.

If a new Site Number is needed for a site not operated by the air pollution control agency, that agency should be contacted to assist in the Number assignment, to ensure that the Number is unique within the county. In other words, when a new Site Number is assigned, it must be different from any other Site Number already existing for that combination of State and County or Tribal Code.

Attributes: Alphanumeric
 4-digit Number
 Mandatory
 Key Field

Coding Instructions: Place a four-digit numeric code in the seventh delimited field. For update and delete, a Site Number is valid if it exists in combination with state code and County or Tribal Code in the Sites Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site Number, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.2.8 Parameter Code

Description: The code assigned to the parameter measured by the monitor. Parameters may be pollutants or non-pollutants.

Attributes: Alphanumeric
5-digit code
Mandatory
Key Field

Coding Instructions: Place a valid parameter code in the eighth delimited field. A parameter value is valid if it exists in combination with (State Code, County Code, Site ID, and POC) or (Tribal Code, Site ID, and POC) in the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.2.9 POC

Description: An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter. For example, the first monitor established to measure CO at a site could have a POC of 1. If an additional monitor were established at the same site to measure CO, that monitor could have a POC of 2. However, if a new instrument is installed to replace the original instrument used as the first monitor, that could be considered the same monitor and it would still have a POC of 1.

For criteria pollutants, data from different sampling methods should only be stored under the same POC if the sampling intervals are the same and the methods are reference or equivalent. For sites where duplicate sampling is being conducted by multiple agencies or by one agency with multiple samplers, multiple POCs must be utilized to store all samples.

For non-criteria pollutants, data from multiple sampling methods can be stored under the same POC if the sampling intervals are the same and there is only one sample for the time reported. If multiple open path monitors are reporting data for the same parameter, each open path would be assigned a different POC.

There are no national EPA practices assigning POC values. There may be regional or agency conventions where a POC value may have specific significance. Numbers do not need to be assigned sequentially.

Attributes: Numeric
 2-digit ID
 Mandatory
 Key Field

Coding Instructions: Place a valid POC value in the ninth delimited field. A POC value is valid if it exists in combination with (State Code, County Code, Site ID, and Parameter) or (Tribal Code, Site ID, and Parameter) on the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.2.10 Assessment Date

Description: Date that the assessment was performed.

Attributes: Date
 8-digit date
 Mandatory
 Key Field

Coding Instructions: Place a valid date string in the tenth delimited field. The date format is YYYYMMDD.

Business Rules:

Common Rules

1. Assessment Date is mandatory.

Error Messages:

- Assessment Date is required.

2. Assessment Date must fall within a sampling period of the monitor.

Error Messages:

- Date must be within a valid sample period.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.2.11 Assessment Number

Description: A unique number associated with an assessment performed at a site on a given day. Value should be "1" unless additional assessments of the same type are performed.

Attributes: Non-zero integer
Mandatory
Key Field

Coding Instructions: Valid number placed in the eleventh delimited field. Positive number.

Business Rules

Common Rules

1. The value is not a valid positive integer.

Error Messages:

- Assessment number must be a positive integer.

2. The same assessment number already exists for that day for that monitor.

Error Messages:

- Duplicate assessment.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.2.12 Monitor Method Code

Description: The sampling methodology of the monitor being assessed.

Attributes: Alphanumeric
 3-digit code
 Mandatory on insert

Coding Instructions: A valid method code is to be placed in the twelfth delimited field.

Business Rules

Common Rules

1. The Monitor Method Code must match the Monitor Method assignment in the database for the monitor for the day.

Error Messages:

- The provided method does not match the monitor method for the provided assessment date.

2. The Monitor Method Code must be in the SAMPLING_METHODOLOGIES table for the parameter listed.

Error Messages:

- Please enter a valid Methodology Code for the current Parameter Code.
- The Method does not exist or is inactive.
- Invalid Method Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.2.13 Reported Unit

Description: Unit of measure associated with the reported concentration, mass, or flow value.

Attributes: Alphanumeric
 3-digit code
 Mandatory on insert and update

Coding Instructions: Unit code is to be placed in the thirteenth field.

Business Rules

Common Rules

1. Must exist in UNITS Reference table.

Error Messages:

- Not a valid unit.
- Unit required.

2. Units of measure must be appropriate for type of assessment.

Error Messages:

- Only concentration units may be used for ____ assessments.
- Only mass units may be used for ____ assessments.
- Flow audits must be submitted with flow units.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.2.14 Level 1 Monitor Concentration

Description: The concentration value provided by the monitor being assessed at level 1.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the fourteenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.2.15 Level 1 Assessment Concentration

Description: The value of the known gas standard concentration in Audit Level 1.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the fifteenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.2.16 Level 2 Monitor Concentration

Description: The concentration value provided by the monitor being assessed at level 2.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the sixteenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules
None.

Delete Rules
None.

7.2.17 Level 2 Assessment Concentration

Description: The value of the known gas standard concentration in Audit Level 2.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the seventeenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

7.2.18 Level 3 Monitor Concentration

Description: The concentration value provided by the monitor being assessed at level 3.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the eighteenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.2.19 Level 3 Assessment Concentration

Description: The value of the known gas standard concentration in Audit Level 3.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the nineteenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.2.20 Level 4 Monitor Concentration

Description: The concentration value provided by the monitor being assessed at level 4.

Attributes: Numeric

Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the twentieth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.2.21 Level 4 Assessment Concentration

Description: The value of the known gas standard concentration in Audit Level 4.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the twenty-first field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.2.22 Level 5 Monitor Concentration

Description: The concentration value provided by the monitor being assessed at level 5.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the twenty-second field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.2.23 Level 5 Assessment Concentration

Description: The value of the known gas standard concentration in Audit Level 5.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the twenty-third field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

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None.

Update Rules

None.

Delete Rules

None.

7.2.24 Level 6 Monitor Concentration

Description: The concentration value provided by the monitor being assessed at level 6.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the twenty-fourth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.2.25 Level 6 Assessment Concentration

Description: The value of the known gas standard concentration in Audit Level 6.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the twenty-fifth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.2.26 Level 7 Monitor Concentration

Description: The concentration value provided by the monitor being assessed at level 7.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the twenty-sixth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.2.27 Level 7 Assessment Concentration

Description: The value of the known gas standard concentration in Audit Level 7.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the twenty-seventh field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.2.28 Level 8 Monitor Concentration

Description: The concentration value provided by the monitor being assessed at level 8.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the twenty-eighth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

None.

7.2.29 Level 8 Assessment Concentration

Description: The value of the known gas standard concentration in Audit Level 8.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the twenty-ninth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.2.30 Level 9 Monitor Concentration

Description: The concentration value provided by the monitor being assessed at level 9.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the thirtieth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.2.31 Level 9 Assessment Concentration

Description: The value of the known gas standard concentration in Audit Level 9.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the thirty-first field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.2.32 Level 10 Monitor Concentration

Description: The concentration value provided by the monitor being assessed at level 10.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the thirty-second field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.2.33 Level 10 Assessment Concentration

Description: The value of the known gas standard concentration in Audit Level 10.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the thirty-third field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.3 Flow Rate Verification

7.3.0 Description of Assessment

40 CFR Part 58 Appendix A §3.2.3, 3.3.2 and 3.3.4.1 describe requirements for a one-point flow rate verification check on automated and manual monitors used to measure PM₁₀, PM_{10-2.5}, PM_{2.5}, and Pb (Pb-TSP and Pb-PM₁₀). To perform the flow rate verification check, the monitor's normal flow rate is checked using a certified flow rate transfer standard. This check is performed at different frequencies depending on the type of monitor being used. For manual method hi-vol samplers, flow rates must be verified on at least a quarterly basis. For manual method lo-vol samplers, flow rates must be verified on at least a monthly basis. For automated methods, flow rates must also be verified monthly.

Particulate monitors using automated methods usually sample continuously and report hourly average values as raw data to AQS. When this check is performed, if the hourly average raw data value is not available for reporting, then a null value and null data code is reported for that hour. The known flow rate of the transfer standard, and the measured (or indicated) value from the monitor, are recorded by the operator for entry into AQS for that monitor on that date. For manual monitors, the check is performed prior to or after sampling so there is no data loss.

A field by field description of the Flow Rate Verification transaction follows.

7.3.1 Transaction Type

Description: Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

Attributes: Alphanumeric
2-character code
Mandatory

Coding Instructions: Place QA in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory

Error Messages:

- Invalid transaction format.

2. Transaction Type must be in TRANSACTION_TYPES table in database.

Error Messages:

- Transaction type not handled.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.3.2 Action Indicator

Description: Indicates the data manipulation action to be performed by the transaction.

Attributes: Alphanumeric
 1-character code
 Mandatory

Coding Instructions: Place the values I, U, or D in the second delimited field.
I Insert a new row into the appropriate table in the database.
U Change one or more column values for an existing row in one or
 more tables.
D Delete a row from a table(s) for the row containing the key data.

Business Rules

Common Rules

1. Action Indicator is required.
Error Messages:
 - Action Code is Required.
2. Action Indicator must be either 'I', 'U', or 'D'.
Error Messages:
 - Invalid Action Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.3.3 Assessment Type

Description: Indicates the specific QA assessment associated with the transaction.

Attributes: Alphanumeric QA Assessment Code
 Mandatory
 Key Field

Coding Instructions: Place the values in the third delimited field. Literal: “Flow Rate Verification”.

Business Rules

Common Rules

1. Assessment type is required.

Error Messages:

- Assessment Type is required.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.3.4 Performing Agency

Description: Agency Code of organization performing assessment

Attributes: Alphanumeric
 3 or 4 digit code
 Optional
 System generated if left null

Coding Instructions: Place the performing agency code value in the fourth delimited field. Must exist in the AGENCIES Reference Table.

If this field is left null at submission time, then the agency code from the submitter’s user profile record is used to populate the performing agency field. Therefore, any transactions being submitted on behalf of an agency by a user from a different agency should have the performing agency code populated on the transactions being submitted.

Business Rules

Common Rules

1. The Agency performing the audit must be in the AGENCIES table.

Error Messages:

- Integrity constraint (AIRSRAQS.MONITOR_ASSESSMENTS_PER_AG_FK) violated.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.3.5 State Code/Tribal Indicator

The fifth field on a transaction can be either a State Code or a Tribal indicator. They are described as follows:

State Code Description: A FIPS (Federal Information Processing Standards) code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Tribal Indicator Description: A flag, with value “TT”, to indicate that this data is for a Native American Tribe, and that the next field on the transaction identifies a tribal area using the Bureau of Indian Affairs tribal code.

Attributes: Alphanumeric
 2-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid FIPS state code or a Tribal Indicator in delimited field 5. A State Code is valid if it exists in the STATES Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.3.6 County Code/Tribal Code

The sixth field on any transaction can be either a County Code or a Tribal Code. A County code is indicated by a valid state code in the third field, while a Tribal Code is indicated by a Tribal Indicator in the third field.

County Code Description: A FIPS code that identifies a county, or equivalent geo-political

entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

Tribal Code Description: A value that identifies a Tribal Area using a Bureau of Indian Affairs Tribal Code.

Attributes: Alphanumeric
 3-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid county code or a valid tribal code in the sixth delimited field. A County Code is valid if it exists at active status in the Counties table. A Tribal Code is valid if it exists at active status in the Tribal_Areas table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.3.7 Site Number

Description: A numeric identifier that uniquely identifies each air monitoring site within a county or tribal area. There is no requirement that Site Numbers be assigned continuously or in any particular order. Regional and Local organizations are thus free to allocate site numbers in any way they chose as long as there is no duplication within a county and tribal area. For Tribal sites, because tribal areas may cross county or state lines, care must be taken to ensure that the Site Number is unique in the effected Tribal Area and states-county.

A specific Site Number is associated with a specific physical location and address. Any change in address requires a new Site Number to be assigned. This address change could include a change from the roof of one building to another. A change in location on the same roof should not normally require a new Site Number. Although an address change would

routinely mean a new Site Number, some changes that do not change the site's location in respect to surrounding sources and its measurement scale, would require no change. An EPA Regional Office should be consulted for assistance in determining whether a new Site Number is required.

If a new Site Number is needed for a site not operated by the air pollution control agency, that agency should be contacted to assist in the Number assignment, to ensure that the Number is unique within the county. In other words, when a new Site Number is assigned, it must be different from any other Site Number already existing for that combination of State and County or Tribal Code.

Attributes: Alphanumeric
 4-digit Number
 Mandatory
 Key Field

Coding Instructions: Place a four-digit numeric code in the seventh delimited field. For update and delete, a Site Number is valid if it exists in combination with state code and County or Tribal Code in the Sites Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site Number, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.3.8 Parameter Code

Description: The code assigned to the parameter measured by the monitor. Parameters may be pollutants or non-pollutants.

Attributes: Alphanumeric
 5-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid parameter code in the eighth delimited field. A parameter value is valid if it exists in combination with (State Code, County Code, Site ID, and POC) or (Tribal Code, Site ID, and POC) in the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.3.9 POC

Description: An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter. For example, the first monitor established to measure CO at a site could have a POC of 1. If an additional monitor were established at the same site to measure CO, that monitor could have a POC of 2. However, if a new instrument is installed to replace the original instrument used as the first monitor, that could be considered the same monitor and it would still have a POC of 1.

For criteria pollutants, data from different sampling methods should only be stored under the same POC if the sampling intervals are the same and the methods are reference or equivalent. For sites where duplicate sampling is being conducted by multiple agencies or by one agency with multiple samplers, multiple POCs must be utilized to store all samples.

For non-criteria pollutants, data from multiple sampling methods can be stored under the same POC if the sampling intervals are the same and there is only one sample for the time reported. If multiple open path monitors are reporting data for the same parameter, each open path would be assigned a different POC.

There are no national EPA practices assigning POC values. There may be regional or agency conventions where a POC value may have specific significance. Numbers do not need to be assigned sequentially.

Attributes: Numeric
 2-digit ID
 Mandatory
 Key Field

Coding Instructions: Place a valid POC value in the ninth delimited field. A POC value is valid if it exists in combination with (State Code, County Code, Site ID, and Parameter) or (Tribal Code, Site ID, and Parameter) on the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.3.10 Assessment Date

Description: Date that the assessment was performed.

Attributes: Date
 8-digit date
 Mandatory
 Key Field

Coding Instructions: Place a valid date string in the tenth delimited field. The date format is YYYYMMDD.

Business Rules:

Common Rules

1. Assessment Date is mandatory.

Error Messages:

- Assessment Date is required.

2. Assessment Date must fall within a sampling period of the monitor.

Error Messages:

- Date must be within a valid sample period.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.3.11 Assessment Number

Description: A unique number associated with an assessment performed at a site on a given day. Value should be “1” unless additional assessments of the same type are performed.

Attributes: Non-zero integer
Mandatory
Key Field

Coding Instructions: Valid number placed in the eleventh delimited field. Positive number.

Business Rules

Common Rules

1. The value is not a valid positive integer.
Error Messages:
 - Assessment number must be a positive integer.
2. The same assessment number already exists for that day for that monitor.
Error Messages:
 - Duplicate assessment.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.3.12 Monitor Method Code

Description: The sampling methodology of the monitor being assessed.

Attributes: Alphanumeric
3-digit code
Mandatory on insert

Coding Instructions: A valid method code is to be placed in the twelfth delimited field.

Business Rules

Common Rules

1. The Monitor Method Code must match the Monitor Method assignment in the database for the monitor for the day.

Error Messages:

- The provided method does not match the monitor method for the provided assessment date.

2. The Monitor Method Code must be in the SAMPLING_METHODOLOGIES table for the parameter listed.

Error Messages:

- Please enter a valid Methodology Code for the current Parameter Code.
- The Method does not exist or is inactive.
- Invalid Method Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.3.13 Reported Unit

Description: Unit of measure associated with the reported concentration, mass, or flow value.

Attributes: Alphanumeric
 3-digit code
 Mandatory on insert and update

Coding Instructions: Unit code is to be placed in the thirteenth field.

Business Rules

Common Rules

1. Must exist in UNITS Reference table.

Error Messages:

- Not a valid unit.
- Unit required.

2. Units of measure must be appropriate for type of assessment.

Error Messages:

- Only concentration units may be used for ____ assessments.
- Only mass units may be used for ____ assessments.

- Flow audits must be submitted with flow units.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.3.14 Monitor Flow Rate

Description: The measured flow rate provided by the monitor being assessed.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the fourteenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.3.15 Assessment Flow Rate

Description: The flow rate of the flow transfer standard.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the fifteenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Business Rules

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.4 Semi-Annual Flow Rate Audit

7.4.0 Description of Assessment

40 CFR Part 58 Appendix A §3.2.4, 3.3.3, 3.3.4 and 3.3.4.1 describe requirements for flow rate audits to be performed on each monitor used to measure PM₁₀, PM_{10-2.5}, PM_{2.5} and Pb. The Semi-Annual Flow Rate Audits should be performed at least every 6 months. To perform the audit, the monitor's normal flow rate is checked using a certified flow rate transfer standard which is different from the one used for calibrating the monitor. The auditing agency conducting the Semi-Annual Flow Rate Audit may be the PQAQO, or may be an independent agency. In any event, the assessment should be conducted by other than the routine site operator.

Particulate monitors using automated methods usually sample continuously and report hourly average values as raw data to AQS. When this audit is performed, the hourly average raw data value may not be available for reporting, in which case a null value and null data code are reported for that hour. The flow standard value (known flow rate of the transfer standard), and the monitor value (response value indicated by monitor) are recorded by the operator for entry into AQS for the monitor being assessed, for that date. For manual monitors the assessment can be performed prior to or after sampling so there is no data loss.

A field by field description of the Semi-Annual Flow Rate Audit transaction follows.

7.4.1 Transaction Type

Description: Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

Attributes: Alphanumeric
2-character code
Mandatory

Coding Instructions: Place QA in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory

Error Messages:

- Invalid transaction format.

2. Transaction Type must be in TRANSACTION_TYPES table in database.

Error Messages:

- Transaction type not handled.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.4.2 Action Indicator

Description: Indicates the data manipulation action to be performed by the transaction.

Attributes: Alphanumeric
 1-character code
 Mandatory

Coding Instructions: Place the values I, U, or D in the second delimited field.
 I Insert a new row into the appropriate table in the database.
 U Change one or more column values for an existing row in one or
 more tables.
 D Delete a row from a table(s) for the row containing the key data.

Business Rules

Common Rules

1. Action Indicator is required.
 Error Messages:
 - Action Code is Required.
2. Action Indicator must be either 'I', 'U', or 'D'.
 Error Messages:
 - Invalid Action Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.4.3 Assessment Type

Description: Indicates the specific QA assessment associated with the transaction.

Attributes: Alphanumeric QA Assessment Code
 Mandatory
 Key Field

Coding Instructions: Place the values in the third delimited field. Literal: "Semi-Annual Flow Rate Audit".

Business Rules

Common Rules

1. Assessment type is required.

Error Messages:

- Assessment Type is required.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.4.4 Performing Agency

Description: Agency Code of organization performing assessment

Attributes: Alphanumeric
 3 or 4 digit code
 Optional
 System generated if left null

Coding Instructions: Place the performing agency code value in the fourth delimited field. Must exist in the AGENCIES Reference Table.

If this field is left null at submission time, then the agency code from the submitter's user profile record is used to populate the performing agency field. Therefore, any transactions being submitted on behalf of an agency by a user from a different agency should have the performing agency code populated on the transactions being submitted.

Business Rules

Common Rules

1. The Agency performing the audit must be in the AGENCIES table.

Error Messages:

- Integrity constraint (AIRSRAQS.MONITOR_ASSESSMENTS_PER_AG_FK) violated.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.4.5 State Code/Tribal Indicator

The fifth field on a transaction can be either a State Code or a Tribal indicator. They are described as follows:

State Code Description: A FIPS (Federal Information Processing Standards) code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Tribal Indicator Description: A flag, with value “TT”, to indicate that this data is for a Native American Tribe, and that the next field on the transaction identifies a tribal area using the Bureau of Indian Affairs tribal code.

Attributes: Alphanumeric
 2-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid FIPS state code or a Tribal Indicator in delimited field 5. A State Code is valid if it exists in the STATES Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.4.6 County Code/Tribal Code

The sixth field on any transaction can be either a County Code or a Tribal Code. A County code is indicated by a valid state code in the third field, while a Tribal Code is indicated by a Tribal Indicator in the third field.

County Code Description: A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it

identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.
Tribal Code Description: A value that identifies a Tribal Area using a Bureau of Indian Affairs Tribal Code.

Attributes: Alphanumeric
3-digit code
Mandatory
Key Field

Coding Instructions: Place a valid county code or a valid tribal code in the sixth delimited field. A County Code is valid if it exists at active status in the Counties table. A Tribal Code is valid if it exists at active status in the Tribal_Areas table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.4.7 Site Number

Description: A numeric identifier that uniquely identifies each air monitoring site within a county or tribal area. There is no requirement that Site Numbers be assigned continuously or in any particular order. Regional and Local organizations are thus free to allocate site numbers in any way they chose as long as there is no duplication within a county and tribal area. For Tribal sites, because tribal areas may cross county or state lines, care must be taken to ensure that the Site Number is unique in the effected Tribal Area and states-county.

A specific Site Number is associated with a specific physical location and address. Any change in address requires a new Site Number to be assigned. This address change could include a change from the roof of one building to another. A change in location on the same roof should not normally require a new Site Number. Although an address change would routinely mean a new Site Number, some changes that do not change the

site's location in respect to surrounding sources and its measurement scale, would require no change. An EPA Regional Office should be consulted for assistance in determining whether a new Site Number is required.

If a new Site Number is needed for a site not operated by the air pollution control agency, that agency should be contacted to assist in the Number assignment, to ensure that the Number is unique within the county. In other words, when a new Site Number is assigned, it must be different from any other Site Number already existing for that combination of State and County or Tribal Code.

Attributes: Alphanumeric
 4-digit Number
 Mandatory
 Key Field

Coding Instructions: Place a four-digit numeric code in the seventh delimited field. For update and delete, a Site Number is valid if it exists in combination with state code and County or Tribal Code in the Sites Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site Number, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.4.8 Parameter Code

Description: The code assigned to the parameter measured by the monitor. Parameters may be pollutants or non-pollutants.

Attributes: Alphanumeric
 5-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid parameter code in the eighth delimited field. A parameter value is valid if it exists in combination with (State Code, County Code, Site ID, and POC) or (Tribal Code, Site ID, and POC) in the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.4.9 POC

Description: An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter. For example, the first monitor established to measure CO at a site could have a POC of 1. If an additional monitor were established at the same site to measure CO, that monitor could have a POC of 2. However, if a new instrument is installed to replace the original instrument used as the first monitor, that could be considered the same monitor and it would still have a POC of 1.

For criteria pollutants, data from different sampling methods should only be stored under the same POC if the sampling intervals are the same and the methods are reference or equivalent. For sites where duplicate sampling is being conducted by multiple agencies or by one agency with multiple samplers, multiple POCs must be utilized to store all samples.

For non-criteria pollutants, data from multiple sampling methods can be stored under the same POC if the sampling intervals are the same and there is only one sample for the time reported. If multiple open path monitors are reporting data for the same parameter, each open path would be assigned a different POC.

There are no national EPA practices assigning POC values. There may be regional or agency conventions where a POC value may have specific significance. Numbers do not need to be assigned sequentially.

Attributes: Numeric
 2-digit ID
 Mandatory
 Key Field

Coding Instructions: Place a valid POC value in the ninth delimited field. A POC value is valid if it exists in combination with (State Code, County Code, Site ID, and Parameter) or (Tribal Code, Site ID, and Parameter) on the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.4.10 Assessment Date

Description: Date that the assessment was performed.

Attributes: Date
 8-digit date
 Mandatory
 Key Field

Coding Instructions: Place a valid date string in the tenth delimited field. The date format is YYYYMMDD.

Business Rules:

Common Rules

1. Assessment Date is mandatory.

Error Messages:

- Assessment Date is required.

2. Assessment Date must fall within a sampling period of the monitor.

Error Messages:

- Date must be within a valid sample period.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.4.11 Assessment Number

Description: A unique number associated with an assessment performed at a site on a given day. Value should be “1” unless additional assessments of the same type are performed.

Attributes: Non-zero integer
Mandatory
Key Field

Coding Instructions: Valid number placed in the eleventh delimited field. Positive number.

Business Rules

Common Rules

1. The value is not a valid positive integer.

Error Messages:

- Assessment number must be a positive integer.
2. The same assessment number already exists for that day for that monitor.

Error Messages:

- Duplicate assessment.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.4.12 Monitor Method Code

Description: The sampling methodology of the monitor being assessed.

Attributes: Alphanumeric
3-digit code
Mandatory on insert

Coding Instructions: A valid method code is to be placed in the twelfth delimited field.

Business Rules

Common Rules

1. The Monitor Method Code must match the Monitor Method assignment in the database for the monitor for the day.

Error Messages:

- The provided method does not match the monitor method for the provided assessment date.

2. The Monitor Method Code must be in the SAMPLING_METHODOLOGIES table for the parameter listed.

Error Messages:

- Please enter a valid Methodology Code for the current Parameter Code.
- The Method does not exist or is inactive.
- Invalid Method Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.4.13 Reported Unit

Description: Unit of measure associated with the reported concentration, mass, or flow value.

Attributes: Alphanumeric
 3-digit code
 Mandatory on insert and update

Coding Instructions: Unit code is to be placed in the thirteenth field.

Business Rules

Common Rules

1. Must exist in UNITS Reference table.

Error Messages:

- Not a valid unit.
- Unit required.

2. Units of measure must be appropriate for type of assessment.

Error Messages:

- Only concentration units may be used for ____ assessments.
- Only mass units may be used for ____ assessments.
- Flow audits must be submitted with flow units.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.4.14 Monitor Flow Rate

Description: The measured flow rate provided by the monitor being assessed.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the fourteenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.4.15 Assessment Flow Rate

Description: The flow rate of the flow transfer standard.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the fifteenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.5 Flow Rate Verification for PMc

7.5.0 Description of Assessment

40 CFR Part 58 Appendix A §3.2.3 describes requirements for performing a one-point flow rate verification check on automated and manual monitors used to measure PMc (PMc stands for PM-coarse, another way to say PM_{10-2.5}). Because PMc data is often generated by calculating the difference in values between a PM₁₀ sampler and a PM_{2.5} sampler, this transaction includes additional fields to report both flows.

To perform the flow rate verification check, each monitor's normal flow rate is checked using a certified flow rate transfer standard. This check is performed on at least a monthly basis. The Flow Rate Verification for PMc transaction includes additional fields to allow the reporting of both the PM₁₀ and PM_{2.5} samplers' indicated flow rate, as well as the true flow rate of the standard flow meter. The transaction also includes fields to report the method code for both samplers.

Particulate monitors using automated methods usually sample continuously and report hourly average values as raw data to AQS. If automated monitors are in use, and if hourly average values are not available for reporting as raw data due to a flow rate verification, then a null value and null data code is reported as the raw data record for that hour. The known flow rate of the transfer standard, and the measured (or indicated) value from the monitor are reported using the flow rate verification for PMc transaction.

A field by field description of the Flow Rate Verification for PMc transaction follows.

7.5.1 Transaction Type

Description: Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

Attributes: Alphanumeric
2-character code
Mandatory

Coding Instructions: Place QA in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory

Error Messages:

- Invalid transaction format.

2. Transaction Type must be in TRANSACTION_TYPES table in database.

Error Messages:

- Transaction type not handled.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.5.2 Action Indicator

Description: Indicates the data manipulation action to be performed by the transaction.

Attributes: Alphanumeric
1-character code
Mandatory

Coding Instructions: Place the values I, U, or D in the second delimited field.

| | |
|---|---|
| I | Insert a new row into the appropriate table in the database. |
| U | Change one or more column values for an existing row in one or more tables. |
| D | Delete a row from a table(s) for the row containing the key data. |

Business Rules

Common Rules

1. Action Indicator is required.
Error Messages:
 - Action Code is Required.
2. Action Indicator must be either 'I', 'U', or 'D'.
Error Messages:
 - Invalid Action Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.5.3 Assessment Type

Description: Indicates the specific QA assessment associated with the transaction.

Attributes: Alphanumeric QA Assessment Code
 Mandatory
 Key Field

Coding Instructions: Place the values in the third delimited field. Literal: “PMc Flow Rate V”.

Business Rules

Common Rules

1. Assessment type is required.

Error Messages:

- Assessment Type is required.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.5.4 Performing Agency

Description: Agency Code of organization performing assessment

Attributes: Alphanumeric
 3 or 4 digit code
 Optional
 System generated if left null

Coding Instructions: Place the performing agency code value in the fourth delimited field. Must exist in the AGENCIES Reference Table.

If this field is left null at submission time, then the agency code from the submitter’s user profile record is used to populate the performing agency field. Therefore, any transactions being submitted on behalf of an agency by a user from a different agency should have the performing agency code populated on the transactions being submitted.

Business Rules

Common Rules

1. The Agency performing the audit must be in the AGENCIES table.

Error Messages:

- Integrity constraint (AIRSRAQS.MONITOR_ASSESSMENTS_PER_AG_FK) violated.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.5.5 State Code/Tribal Indicator

The fifth field on a transaction can be either a State Code or a Tribal indicator. They are described as follows:

State Code Description: A FIPS (Federal Information Processing Standards) code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Tribal Indicator Description: A flag, with value “TT”, to indicate that this data is for a Native American Tribe, and that the next field on the transaction identifies a tribal area using the Bureau of Indian Affairs tribal code.

Attributes: Alphanumeric
 2-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid FIPS state code or a Tribal Indicator in delimited field 5. A State Code is valid if it exists in the STATES Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.5.6 County Code/Tribal Code

The sixth field on any transaction can be either a County Code or a Tribal Code. A County code is indicated by a valid state code in the third field, while a Tribal Code is indicated by a Tribal Indicator in the third field.

County Code Description: A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

Tribal Code Description: A value that identifies a Tribal Area using a Bureau of Indian Affairs Tribal Code.

Attributes: Alphanumeric
3-digit code
Mandatory
Key Field

Coding Instructions: Place a valid county code or a valid tribal code in the sixth delimited field. A County Code is valid if it exists at active status in the Counties table. A Tribal Code is valid if it exists at active status in the Tribal_Areas table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.5.7 Site Number

Description: A numeric identifier that uniquely identifies each air monitoring site within a county or tribal area. There is no requirement that Site Numbers be assigned continuously or in any particular order. Regional and Local organizations are thus free to allocate site numbers in any way they chose as long as there is no duplication within a county and tribal area. For Tribal sites, because tribal areas may cross county or state lines, care must be taken to ensure that the Site Number is unique in the effected Tribal Area and states-county.

A specific Site Number is associated with a specific physical location and address. Any change in address requires a new Site Number to be assigned. This address change could include a change from the roof of one building to another. A change in location on the same roof should not normally require a new Site Number. Although an address change would routinely mean a new Site Number, some changes that do not change the site's location in respect to surrounding sources and its measurement scale, would require no change. An EPA Regional Office should be consulted for assistance in determining whether a new Site Number is required.

If a new Site Number is needed for a site not operated by the air pollution control agency, that agency should be contacted to assist in the Number assignment, to ensure that the Number is unique within the county. In other words, when a new Site Number is assigned, it must be different from any other Site Number already existing for that combination of State and County or Tribal Code.

Attributes: Alphanumeric
 4-digit Number
 Mandatory
 Key Field

Coding Instructions: Place a four-digit numeric code in the seventh delimited field. For update and delete, a Site Number is valid if it exists in combination with state code and County or Tribal Code in the Sites Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site Number, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.5.8 Parameter Code

Description: The code assigned to the parameter measured by the monitor. Parameters may be pollutants or non-pollutants.

Attributes: Alphanumeric
 5-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid parameter code in the eighth delimited field. A parameter value is valid if it exists in combination with (State Code, County Code, Site ID, and POC) or (Tribal Code, Site ID, and POC) in the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.5.9 POC

Description: An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter. For example, the first monitor established to measure CO at a site could have a POC of 1. If an additional monitor were established at the same site to measure CO, that monitor could have a POC of 2. However, if a new instrument is installed to replace the original instrument used as the first monitor, that could be considered the same monitor and it would still have a POC of 1.

For criteria pollutants, data from different sampling methods should only be stored under the same POC if the sampling intervals are the same and the methods are reference or equivalent. For sites where duplicate sampling is being conducted by multiple agencies or by one agency with multiple samplers, multiple POCs must be utilized to store all samples.

For non-criteria pollutants, data from multiple sampling methods can be stored under the same POC if the sampling intervals are the same and there is only one sample for the time reported. If multiple open path

monitors are reporting data for the same parameter, each open path would be assigned a different POC.

There are no national EPA practices assigning POC values. There may be regional or agency conventions where a POC value may have specific significance. Numbers do not need to be assigned sequentially.

Attributes: Numeric
 2-digit ID
 Mandatory
 Key Field

Coding Instructions: Place a valid POC value in the ninth delimited field. A POC value is valid if it exists in combination with (State Code, County Code, Site ID, and Parameter) or (Tribal Code, Site ID, and Parameter) on the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.5.10 Assessment Date

Description: Date that the assessment was performed.

Attributes: Date
 8-digit date
 Mandatory
 Key Field

Coding Instructions: Place a valid date string in the tenth delimited field. The date format is YYYYMMDD.

Business Rules:

Common Rules

1. Assessment Date is mandatory.

Error Messages:

- Assessment Date is required.

2. Assessment Date must fall within a sampling period of the monitor.

Error Messages:

- Date must be within a valid sample period.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.5.11 Assessment Number

Description: A unique number associated with an assessment performed at a site on a given day. Value should be “1” unless additional assessments of the same type are performed.

Attributes: Non-zero integer
Mandatory
Key Field

Coding Instructions: Valid number placed in the eleventh delimited field. Positive number.

Business Rules

Common Rules

1. The value is not a valid positive integer.

Error Messages:

- Assessment number must be a positive integer.

2. The same assessment number already exists for that day for that monitor.

Error Messages:

- Duplicate assessment.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.5.12 PM10 Monitor Method Code

Description: The sampling methodology of the PM10 monitor being assessed.

Attributes: Alphanumeric
 3-digit code
 Mandatory on insert

Coding Instructions: A valid method code is to be placed in the twelfth delimited field.

Business Rules

Common Rules

1. The Monitor Method Code must match the Monitor Method assignment in the database for the monitor for the day.

Error Messages:

- The provided method does not match the monitor method for the provided assessment date.

2. The Monitor Method Code must be in the SAMPLING_METHODOLOGIES table for the parameter listed.

Error Messages:

- Please enter a valid Methodology Code for the current Parameter Code.
- The Method does not exist or is inactive.
- Invalid Method Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.5.13 Reported Unit

Description: Unit of measure associated with the reported concentration, mass, or flow value.

Attributes: Alphanumeric
 3-digit code
 Mandatory on insert and update

Coding Instructions: Unit code is to be placed in the thirteenth field.

Business Rules

Common Rules

1. Must exist in UNITS Reference table.

Error Messages:

- Not a valid unit.
- Unit required.

2. Units of measure must be appropriate for type of assessment.

Error Messages:

- Only concentration units may be used for ____ assessments.
- Only mass units may be used for ____ assessments.
- Flow audits must be submitted with flow units.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.5.14 PM10 Monitor Flow Rate

Description: The measured flow rate provided by the monitor being assessed.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the fourteenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.5.15 PM10 Assessment Flow Rate

Description: The flow rate of the flow transfer standard.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the fifteenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.5.16 PM 2.5 Monitor Method Code

Description: The sampling methodology of the PM 2.5 monitor being assessed.

Attributes: Alphanumeric
 3-digit code
 Mandatory on insert

Coding Instructions: A valid method code is to be placed in the sixteenth delimited field.

Business Rules

Common Rules

1. The Monitor Method Code must match the Monitor Method assignment in the database for the monitor for the day.

Error Messages:

- The provided method does not match the monitor method for the provided assessment date.

2. The Monitor Method Code must be in the SAMPLING_METHODOLOGIES table for the parameter listed.

Error Messages:

- Please enter a valid Methodology Code for the current Parameter Code.
- The Method does not exist or is inactive.
- Invalid Method Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.5.17 PM 2.5 Monitor Flow Rate

Description: The measured flow rate provided by the monitor being assessed.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the seventeenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.5.18 PM 2.5 Assessment Flow Rate

Description: The flow rate of the flow transfer standard.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the eighteenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.6 Semi-Annual Flow Rate Audit for PMc

7.6.0 Description of Assessment

40 CFR Part 58 Appendix A §3.2.4 describes requirements for semi-annual flow rate audits on automated and manual monitors used to measure PMc (PMc stands for PM-coarse, another way to say PM_{10-2.5}). Because PMc data is often generated by calculating the difference in values between a PM₁₀ sampler and a PM_{2.5} sampler, this transaction includes additional fields to report both flows.

To perform the semi-annual flow rate audit, each monitor's normal flow rate is checked using a certified flow rate transfer standard. This check is performed on at least a semi-annual basis. The Semi-Annual Flow Rate Audit for PMc transaction includes additional fields to allow the reporting of both the PM₁₀ and PM_{2.5} samplers' indicated flow rate, as well as the true flow rate of the standard flow meter. The transaction also includes fields to report the method code for both samplers.

Particulate monitors using automated methods usually sample continuously and report hourly average values as raw data to AQS. If automated monitors are in use, and if hourly average values are not available for reporting as raw data due to a flow rate verification, then a null value and null data code is reported as the raw data record for that hour. The known flow rate of the transfer standard, and the measured (or indicated) value from the monitor are reported using the flow rate verification for PMc transaction.

A field by field description of the Semi-Annual flow Rate Audit for PMc transaction follows.

7.6.1 Transaction Type

Description: Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

Attributes: Alphanumeric
2-character code
Mandatory

Coding Instructions: Place QA in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory

Error Messages:

- Invalid transaction format.
2. Transaction Type must be in TRANSACTION_TYPES table in database.
- #### **Error Messages:**
- Transaction type not handled.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.6.2 Action Indicator

Description: Indicates the data manipulation action to be performed by the transaction.

Attributes: Alphanumeric
 1-character code
 Mandatory

Coding Instructions: Place the values I, U, or D in the second delimited field.
I Insert a new row into the appropriate table in the database.
U Change one or more column values for an existing row in one or more tables.
D Delete a row from a table(s) for the row containing the key data.

Business Rules

Common Rules

1. Action Indicator is required.
Error Messages:
 - Action Code is Required.
2. Action Indicator must be either 'I', 'U', or 'D'.
Error Messages:
 - Invalid Action Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.6.3 Assessment Type

Description: Indicates the specific QA assessment associated with the transaction.

Attributes: Alphanumeric QA Assessment Code
 Mandatory
 Key Field

Coding Instructions: Place the values in the third delimited field. Literal: “PMc Semi Annual Flow Rate Audit”.

Business Rules

Common Rules

1. Assessment type is required.

Error Messages:

- Assessment Type is required.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.6.4 Performing Agency

Description: Agency Code of organization performing assessment

Attributes: Alphanumeric
 3 or 4 digit code
 Optional
 System generated if left null

Coding Instructions: Place the performing agency code value in the fourth delimited field. Must exist in the AGENCIES Reference Table.

If this field is left null at submission time, then the agency code from the submitter’s user profile record is used to populate the performing agency field. Therefore, any transactions being submitted on behalf of an agency by a user from a different agency should have the performing agency code populated on the transactions being submitted.

Business Rules

Common Rules

1. The Agency performing the audit must be in the AGENCIES table.

Error Messages:

- Integrity constraint (AIRSRAQS.MONITOR_ASSESSMENTS_PER_AG_FK) violated.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.6.5 State Code/Tribal Indicator

The fifth field on a transaction can be either a State Code or a Tribal indicator. They are described as follows:

State Code Description: A FIPS (Federal Information Processing Standards) code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Tribal Indicator Description: A flag, with value “TT”, to indicate that this data is for a Native American Tribe, and that the next field on the transaction identifies a tribal area using the Bureau of Indian Affairs tribal code.

Attributes: Alphanumeric
 2-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid FIPS state code or a Tribal Indicator in delimited field 5. A State Code is valid if it exists in the STATES Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.6.6 County Code/Tribal Code

The sixth field on any transaction can be either a County Code or a Tribal Code. A County code is indicated by a valid state code in the third field, while a Tribal Code is indicated by a Tribal Indicator in the third field.

County Code Description: A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

Tribal Code Description: A value that identifies a Tribal Area using a Bureau of Indian Affairs Tribal Code.

Attributes: Alphanumeric
3-digit code
Mandatory
Key Field

Coding Instructions: Place a valid county code or a valid tribal code in the sixth delimited field. A County Code is valid if it exists at active status in the Counties table. A Tribal Code is valid if it exists at active status in the Tribal_Areas table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.6.7 Site Number

Description: A numeric identifier that uniquely identifies each air monitoring site within a county or tribal area. There is no requirement that Site Numbers be assigned continuously or in any particular order. Regional and Local organizations are thus free to allocate site numbers in any way they chose as long as there is no duplication within a county and tribal area. For Tribal sites, because tribal areas may cross county or state lines, care must be taken to ensure that the Site Number is unique in the effected Tribal Area and states-county.

A specific Site Number is associated with a specific physical location and address. Any change in address requires a new Site Number to be assigned. This address change could include a change from the roof of one building to another. A change in location on the same roof should not normally require a new Site Number. Although an address change would routinely mean a new Site Number, some changes that do not change the site's location in respect to surrounding sources and its measurement scale, would require no change. An EPA Regional Office should be consulted for assistance in determining whether a new Site Number is required.

If a new Site Number is needed for a site not operated by the air pollution control agency, that agency should be contacted to assist in the Number assignment, to ensure that the Number is unique within the county. In other words, when a new Site Number is assigned, it must be different from any other Site Number already existing for that combination of State and County or Tribal Code.

Attributes: Alphanumeric
 4-digit Number
 Mandatory
 Key Field

Coding Instructions: Place a four-digit numeric code in the seventh delimited field. For update and delete, a Site Number is valid if it exists in combination with state code and County or Tribal Code in the Sites Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site Number, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.6.8 Parameter Code

Description: The code assigned to the parameter measured by the monitor. Parameters may be pollutants or non-pollutants.

Attributes: Alphanumeric
 5-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid parameter code in the eighth delimited field. A parameter value is valid if it exists in combination with (State Code, County Code, Site ID, and POC) or (Tribal Code, Site ID, and POC) in the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.6.9 POC

Description: An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter. For example, the first monitor established to measure CO at a site could have a POC of 1. If an additional monitor were established at the same site to measure CO, that monitor could have a POC of 2. However, if a new instrument is installed to replace the original instrument used as the first monitor, that could be considered the same monitor and it would still have a POC of 1.

For criteria pollutants, data from different sampling methods should only be stored under the same POC if the sampling intervals are the same and the methods are reference or equivalent. For sites where duplicate sampling is being conducted by multiple agencies or by one agency with multiple samplers, multiple POCs must be utilized to store all samples.

For non-criteria pollutants, data from multiple sampling methods can be stored under the same POC if the sampling intervals are the same and there is only one sample for the time reported. If multiple open path

monitors are reporting data for the same parameter, each open path would be assigned a different POC.

There are no national EPA practices assigning POC values. There may be regional or agency conventions where a POC value may have specific significance. Numbers do not need to be assigned sequentially.

Attributes: Numeric
 2-digit ID
 Mandatory
 Key Field

Coding Instructions: Place a valid POC value in the ninth delimited field. A POC value is valid if it exists in combination with (State Code, County Code, Site ID, and Parameter) or (Tribal Code, Site ID, and Parameter) on the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.6.10 Assessment Date

Description: Date that the assessment was performed.

Attributes: Date
 8-digit date
 Mandatory
 Key Field

Coding Instructions: Place a valid date string in the tenth delimited field. The date format is YYYYMMDD.

Business Rules:

Common Rules

1. Assessment Date is mandatory.

Error Messages:

- Assessment Date is required.

2. Assessment Date must fall within a sampling period of the monitor.

Error Messages:

- Date must be within a valid sample period.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.6.11 Assessment Number

Description: A unique number associated with an assessment performed at a site on a given day. Value should be “1” unless additional assessments of the same type are performed.

Attributes: Non-zero integer
Mandatory
Key Field

Coding Instructions: Valid number placed in the eleventh delimited field. Positive number.

Business Rules

Common Rules

1. The value is not a valid positive integer.

Error Messages:

- Assessment number must be a positive integer.

2. The same assessment number already exists for that day for that monitor.

Error Messages:

- Duplicate assessment.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.6.12 PM10 Monitor Method Code

Description: The sampling methodology of the monitor being assessed.

Attributes: Alphanumeric
 3-digit code
 Mandatory on insert

Coding Instructions: A valid method code is to be placed in the twelfth delimited field.

Business Rules

Common Rules

1. The Monitor Method Code must match the Monitor Method assignment in the database for the monitor for the day.

Error Messages:

- The provided method does not match the monitor method for the provided assessment date.

2. The Monitor Method Code must be in the SAMPLING_METHODOLOGIES table for the parameter listed.

Error Messages:

- Please enter a valid Methodology Code for the current Parameter Code.
- The Method does not exist or is inactive.
- Invalid Method Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.6.13 Reported Unit

Description: Unit of measure associated with the reported concentration, mass, or flow value.

Attributes: Alphanumeric
 3-digit code
 Mandatory on insert and update

Coding Instructions: Unit code is to be placed in the thirteenth field.

Business Rules

Common Rules

1. Must exist in UNITS Reference table.

Error Messages:

- Not a valid unit.
- Unit required.

2. Units of measure must be appropriate for type of assessment.

Error Messages:

- Only concentration units may be used for ____ assessments.
- Only mass units may be used for ____ assessments.
- Flow audits must be submitted with flow units.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.6.14 PM10 Monitor Flow Rate

Description: The measured flow rate provided by the monitor being assessed.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the fourteenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.6.15 PM10 Assessment Flow Rate

Description: The flow rate of the flow transfer standard.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the fifteenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.6.16 PM 2.5 Monitor Method Code

Description: The sampling methodology of the monitor being assessed.

Attributes: Alphanumeric
 3-digit code
 Mandatory on insert

Coding Instructions: A valid method code is to be placed in the sixteenth delimited field.

Business Rules

Common Rules

1. The Monitor Method Code must match the Monitor Method assignment in the database for the monitor for the day.

Error Messages:

- The provided method does not match the monitor method for the provided assessment date.

2. The Monitor Method Code must be in the SAMPLING_METHODOLOGIES table for the parameter listed.

Error Messages:

- Please enter a valid Methodology Code for the current Parameter Code.

- The Method does not exist or is inactive.
- Invalid Method Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.6.17 PM 2.5 Monitor Flow Rate

Description: The measured flow rate provided by the monitor being assessed.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the seventeenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.6.18 PM 2.5 Assessment Flow Rate

Description: The flow rate of the flow transfer standard.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the eighteenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.7 Performance Evaluation Program (PEP)

7.7.0 Description of Assessment

40 CFR Part 58 Appendix A §3.2.7, §3.3.7 and §3.3.4.4 describe requirements for performance evaluation (PE) sampling to be performed on automated and manual monitors used to measure bias for PM_{2.5} and Pb. The PE is implemented by collocating a second independent monitor within 2-4 meters of the site's primary monitor and sending the PE sample to an independent laboratory for analysis.

- If a PQAO has ≤ 5 PM_{2.5} sites, then 5 PM_{2.5} PEP audits per year are required.
- If greater than 5 sites, then 8 PEP audits per year are required.
- Both primary and PEP monitor concentrations must be valid and $> 3 \mu\text{g}/\text{m}^3$.
- If a PQAO has ≤ 5 Pb PM₁₀ sites, then 1 audit and 4 collocated samples per year are required.
- If greater than 5 Pb PM₁₀ sites, then 2 audits, and 6 collocated samples per year are required.

7.7.0.1 PM_{2.5} PEP

Data flow from the primary monitor:

PEP assessments consist of a comparison of the S/L/T agency (PQAO's) primary monitor with a collocated, EPA FRM monitor which is brought on site and operated by EPA or a representative such as Environmental Services Assistance Team (ESAT) contractors. Sometimes authority to run this program is delegated to state agencies, and referred to as self-implementing states.

The primary monitor samples every 6th day (or every 3rd day if a PSD program monitor). The EPA monitor (PEP monitor) samples concurrently with the primary monitor.

The PQAO's monitoring results (from the primary monitor) consist of a sample volume, and exposed filter. The exposed filter is sent to the PQAO's lab for analysis. This is the analyzing agency in AQS for the monitor being audited.

The PQAO records the sample volume. The lab analyzes the mass of PM_{2.5} on the filter, and reports that result back to the PQAO. The PQAO then submits the concentration value (mass/volume) to AQS via an RD transaction, as well as their in-house data systems.

Data flow from the collocated PEP monitor:

The PEP monitor will sample concurrently with the PQAO's primary monitor, and the exposed PEP filter is sent to the USEPA Region 4 lab for analysis of mass.

A chain of custody form (COC) is used by the PEP monitor operators (ESAT / USEPA / or delegated state personnel) to report metadata about the PEP monitor's results to both the USEPA

Region 4 PEP laboratory and also to a PEP program support contractor. Met data and sample volume are part of the metadata included on the COC.

The PEP program support contractor uses the filter results and COC data and creates a PEP transaction for input into AQS. The data is also loaded into a PEP database maintained by the contractor.

The USEPA Region 4 lab sends the results of the PEP filter analyses (sample mass) to the contractor who enters this data into the PEP database. The filter id which is uniquely assigned to each filter when manufactured is used to identify the metadata and audit values.

The contractor uses the filter id to associate the sample volume with the appropriate filter so that concentration can be calculated. The contractor then creates and loads the PEP transactions to AQS using the PEP transaction.

For PEP transactions, the RP transaction is used. The indicated value is left blank; only the actual value is populated. The agency being audited must have already submitted raw data from the primary monitor for the date of the PEP audit before the PEP data can be loaded to AQS. As part of the validation process, AQS checks to see that there is already a state sample in the data base.

7.7.0.2 PEP for Pb

7.7.0.2.1 Pb PEP

Pb PEP assessments consist of a comparison of the PQAO's primary Pb monitors (TSP at LC - 14129, or PM10 at LC – 85129 – either hi vol or lo vol methods) with a collocated, Pb-PEP FRM monitor which is brought on site and operated independently by EPA or an EPA contractor on a day the primary sampler is set to run.

Data flow from PQAO primary monitor:

The PQAO's monitoring results (from the primary monitor) consist of a sample volume, and exposed filter. The exposed filter is sent to the PQAO's lab for analysis. This is the analyzing agency in AQS.

The PQAO records the sample volume. The lab analyzes the mass of Pb on the filter, and reports that result back to the PQAO. The PQAO then submits the concentration value (mass/volume) to AQS via an RD transaction, as well as their in-house data systems.

Data Flow from PEP Monitor:

If the PQAO has been certified as self implementing, then the Pb PEP data will be analyzed at a laboratory which is independent from the laboratory used for routine (primary) sample analysis. The Pb PEP result will then be loaded by the PQAO as a Pb PEP assessment.

If the PQAO uses the federally implemented Pb-PEP, the exposed PEP filter is sent to the USEPA Region 9 lab for analysis of Pb mass. A chain of custody form (COC) is used by the PEP monitor operators (ESAT / USEPA) to supply metadata about the PEP monitor's results to both the USEPA Region 9 PEP laboratory (the analyzing agency) as well as the Pb PEP program support contractor for OAQPS. This data includes the filter id and sample volume.

The USEPA Region 9 lab sends the Pb results of the filter analyses to the support contractor, using the filter id to identify the metadata.

The support contractor uses the filter id to associate the sample volume with the appropriate filter so that the final concentration can be calculated. At the time of this writing, the transactions have not yet been created and submitted to AQS.

7.7.0.2.2 Collocated Pb PEP

Collocated Pb PEP assessments consist of a comparison of the S/L/T agency (PQAO's) collocated Pb monitor (TSP at LC, or PM10 at LC – (hi vol or lo vol) with the associated primary monitor, with the analysis being performed at an EPA lab. The PQAO runs its collocated sampler on a day when it **is not** performing precision collocated sampling to meet precision collocation requirements, so that the filter can be sent to EPA for analysis.

Data Flow from the PQAO's Primary Monitor:

The PQAO's primary monitor reports a concentration value to AQS for the sampling day in the routine fashion. This value can be compared against the Collocated Pb PEP concentration value reported by the Pb PEP support contractor to determine the comparability of the PQAO's collocated sampler. Because the collocated filter is analyzed by an independent laboratory, this assessment provides a determination of the quality associated with the PQAO's laboratory.

Data Flow from PQAO's Collocated Monitor:

The filter from the S/L/T collocated sampler and a Chain of Custody (COC) form is sent to an independent laboratory (EPA Region 9 for TSP filters, or OAQPS for PM₁₀ filters) for analysis; rather than the PQAO's routine analyzing agency.

The PQAO goes to the monitoring site to remove the filter, the COC form is completed, and hardcopy is sent to the Region 9 lab. The PQAO completes the remainder of the COC form and provides the data to the Pb PEP support contractor. Validation of the COC form data is performed by EPA Regional Office personnel.

A copy of the COC is sent by the PQAO (emailed) to the Region 9 laboratory.

The Region 9 lab reports the filter result (mass) to the support contractor, who uses the mass and volume data to provide the concentration for reporting via the transaction.

A field by field description of the PEP transaction (covering all PEP types) follows.

7.7.1 Transaction Type

Description: Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

Attributes: Alphanumeric
 2-character code
 Mandatory

Coding Instructions: Place QA in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory
Error Messages:
 - Invalid transaction format.
2. Transaction Type must be in TRANSACTION_TYPES table in database.
Error Messages:
 - Transaction type not handled.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.7.2 Action Indicator

Description: Indicates the data manipulation action to be performed by the transaction.

Attributes: Alphanumeric
 1-character code
 Mandatory

Coding Instructions: Place the values I, U, or D in the second delimited field.
I Insert a new row into the appropriate table in the database.
U Change one or more column values for an existing row in one or more tables.
D Delete a row from a table(s) for the row containing the key data.

Business Rules

Common Rules

1. Action Indicator must be either 'I', 'U', or 'D'.

Error Messages:

- Invalid Action Indicator.

Insert Rules

1. A record must not already exist for the State Code, County Code, Site Number, Parameter Code, Assessment Date, and Assessment Number.

Error Messages:

- Unique constraint (AIRSRAQS.PEP_PK) violated.

Update Rules

1. A record must exist for the State Code, County Code, Site Number, Parameter Code, Assessment Date, and Assessment Number.

Error Messages:

- PEP audit does not exist.

Delete Rules

1. A record must exist for the State Code, County Code, Site Number, Parameter Code, Assessment Date, and Assessment Number.

Error Messages:

- PEP audit does not exist.

7.7.3 Assessment Type

Description: Indicates the specific QA assessment associated with the transaction.

Attributes: Alphanumeric QA Assessment Code
 Mandatory
 Key Field

Coding Instructions: Place the values in the third delimited field. Literal: "PEP".

Business Rules

Common Rules

1. Assessment type is required.

Error Messages:

- Assessment Type is required.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.7.4 Performing Agency

Description: Agency Code of organization performing assessment

Attributes: Alphanumeric
 3 or 4 digit code
 Optional
 System generated if left null

Coding Instructions: Place the performing agency code value in the fourth delimited field. Must exist in the AGENCIES Reference Table.

If this field is left null at submission time, then the agency code from the submitter's user profile record is used to populate the performing agency field. Therefore, any transactions being submitted on behalf of an agency by a user from a different agency should have the performing agency code populated on the transactions being submitted.

Business Rules

Common Rules

1. Performing Agency is required.
Error Messages:
 - Performing Agency is required.

2. The agency performing the audit must be in the AGENCIES table.
Error Messages:
 - Agency does not exist.

- 3.. The agency performing the audit must be active in the AGENCIES table.
Error Messages:
 - Agency is not at production status..

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.7.5 State Code/Tribal Indicator

The fifth field on a transaction can be either a State Code or a Tribal indicator. They are described as follows:

State Code Description: A FIPS (Federal Information Processing Standards) code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Tribal Indicator Description: A flag, with value “TT”, to indicate that this data is for a Native American Tribe, and that the next field on the transaction identifies a tribal area using the Bureau of Indian Affairs tribal code.

Attributes: Alphanumeric
2-digit code
Mandatory
Key Field

Coding Instructions: Place a valid FIPS state code or a Tribal Indicator in delimited field 5. A State Code is valid if it exists in the STATES Table.

Business Rules

Common Rules

1. The Site (State Code, County Code, Site ID) or (Tribal Code, Site ID) must be in the SITE_BASIC table in the database.

Error Messages:

- Site record (State, County, Site Number) not in database.

2. The Site (State Code, County Code, Site ID) or (Tribal Code, Site ID) must be at production status

Error Messages:

- The site is not at production status..

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.7.6 County Code/Tribal Code

The sixth field on any transaction can be either a County Code or a Tribal Code. A County code is indicated by a valid state code in the third field, while a Tribal Code is indicated by a Tribal Indicator in the third field.

County Code Description: A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it

identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.
Tribal Code Description: A value that identifies a Tribal Area using a Bureau of Indian Affairs Tribal Code.

Attributes: Alphanumeric
3-digit code
Mandatory
Key Field

Coding Instructions: Place a valid county code or a valid tribal code in the sixth delimited field. A County Code is valid if it exists at active status in the Counties table. A Tribal Code is valid if it exists at active status in the Tribal_Areas table.

Business Rules

Common Rules

1. The Site (State Code, County Code, Site ID) or (Tribal Code, Site ID) must be in the SITE_BASIC table in the database.

Error Messages:

- Site record (State, County, Site Number) not in database.

2. The Site (State Code, County Code, Site ID) or (Tribal Code, Site ID) must be at production status

Error Messages:

- The site is not at production status..

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.7.7 Site Number

Description: A numeric identifier that uniquely identifies each air monitoring site within a county or tribal area. There is no requirement that Site Numbers be assigned continuously or in any particular order. Regional and Local organizations are thus free to allocate site numbers in any way they chose as long as there is no duplication within a county and tribal area. For Tribal sites, because tribal areas may cross county or state lines, care must be taken to ensure that the Site Number is unique in the effected Tribal Area and states-county.

A specific Site Number is associated with a specific physical location and address. Any change in address requires a new Site Number to be

assigned. This address change could include a change from the roof of one building to another. A change in location on the same roof should not normally require a new Site Number. Although an address change would routinely mean a new Site Number, some changes that do not change the site's location in respect to surrounding sources and its measurement scale, would require no change. An EPA Regional Office should be consulted for assistance in determining whether a new Site Number is required.

If a new Site Number is needed for a site not operated by the air pollution control agency, that agency should be contacted to assist in the Number assignment, to ensure that the Number is unique within the county. In other words, when a new Site Number is assigned, it must be different from any other Site Number already existing for that combination of State and County or Tribal Code.

Attributes: Alphanumeric
 4-digit Number
 Mandatory
 Key Field

Coding Instructions: Place a four-digit numeric code in the seventh delimited field. For update and delete, a Site Number is valid if it exists in combination with state code and County or Tribal Code in the Sites Table.

Business Rules

Common Rules

1. The Site (State Code, County Code, Site Number) or (Tribal Code, Site ID) must be in the SITE_BASIC table in the database.

Error Messages:

- Site record (State, County, Site Number) not in database.

2. The Site (State Code, County Code, Site ID) or (Tribal Code, Site ID) must be at production status

Error Messages:

- The site is not at production status..

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.7.8 Parameter Code

Description: The code assigned to the parameter measured by the monitor. Parameters

may be pollutants or non-pollutants.

Attributes: Alphanumeric
 5-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid parameter code in the eighth delimited field. A parameter value is valid if it exists in combination with (State Code, County Code, Site ID, and POC) or (Tribal Code, Site ID, and POC) in the Monitors Table.

Business Rules

Common Rules

1. The Parameter must exist in the PARAMETERS table with active status.

Error Messages:

- Invalid Parameter Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.7.9 POC

Description: Use of POC is deprecated

Attributes: Numeric
 2-digit ID
 Mandatory
 Key Field

Coding Instructions: Any value provided for POC will be ignored.

Business Rules

Common Rules

1. POC is deprecated for PEP assessments.

Warning Messages:

- POC is no longer supported for PEP assessments.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.7.10 Assessment Date

Description: Date that the assessment was performed.

Attributes: Date
 8-digit date
 Mandatory
 Key Field

Coding Instructions: Place a valid date string in the tenth delimited field. The date format is YYYYMMDD.

Business Rules:

Common Rules

1. Assessment Date is mandatory.
Error Messages:
 - Cannot insert NULL into ASSESSMENT_DATE.
2. Assessment Date must be provided in YYYYMMDD format.
Error Messages:
 - Invalid date or date format.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.7.11 Assessment Number

Description: A unique number associated with an assessment performed at a site on a given day. Value should be “1” unless additional assessments of the same type are performed.

Attributes: Non-zero integer
 Mandatory
 Key Field

Coding Instructions: Valid number placed in the eleventh delimited field. Positive number.

Business Rules

Common Rules

1. The value is a number.

Error Messages:

- Invalid number format.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.7.12 PEP Type

Description: Indicates whether the PEP monitor is operated by the Audit Agency or by the Monitoring Agency.

Attributes: Alphanumeric
 Mandatory on insert

Coding Instructions: Literal: "INDEPENDENT" or "COLLOCATED" . Value to be placed in twelfth delimited field.

Business Rules

Common Rules

1. The PEP type must be in the PEP_SAMPLER_TYPES reference table.

Error Messages:

- PEP sampler type does not exist.

2. The PEP type must be active.

Error Messages:

- PEP sampler type is not at production status.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.7.13 PEP Method Code

Description: The sampling methodology used for the PEP assessment.

Attributes: Alphanumeric
 3-digit code
 Mandatory on insert

Coding Instructions: A valid method code is to be placed in the thirteenth delimited field.

Business Rules

Common Rules

1. PEP Method Code is required.
Error Messages:
 - PEP Method Required.
2. PEP Method Code must be in the SAMPLING_METHODODOLOGIES table for the Parameter Code.
Error Messages:
 - Method does not exist
 -
3. PEP Method Code must be active.
Error Messages:
 - Invalid Method Code

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.7.14 Reported Unit

Description: Unit of measure associated with the reported concentration, mass, or flow value.

Attributes: Alphanumeric
 3-digit code
 Mandatory on insert and update

Coding Instructions: Unit code is to be placed in the fourteenth field.

Business Rules

Common Rules

1. Reported Unit is required.

Error Messages:

- Unit required.
2. Must exist in UNITS Reference table.

Error Messages:

- Invalid Unit Code.
3. Units must be of the Concentration type.

Error Messages:

- Only concentration units may be used for PEP assessments..

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.7.15 Assessment Concentration

Description: The value reported by the PEP monitor for the Date-Time.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the fifteenth field.

Business Rules

Common Rules

1. The value must be a valid number.

Error Messages:

- Invalid number format.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.8 National Performance Audit Program

7.8.0 Description of Assessment

40 CFR Part 58 Appendix A § 2.4 describes requirements for the National Performance Evaluation Programs including a description of the National Performance Audit Program. The NPAP assessment is an independent audit of the PQAO's gaseous monitors, performed by USEPA. In a few cases, the authority to perform the NPAP audits has been delegated to a "self-implementing" agency (a State Agency). In this case, the State will be allowed to enter annual performance evaluations representing NPAP audits. Otherwise, the PQAO cannot be the NPAP auditing agency.

20% of the PQAO's monitors must be audited each year, resulting in complete network coverage every 5 years. Mobile auditing labs or equipment travel to the monitor sites and perform the assessment.

The audit is performed by challenging the gaseous monitors with known, independent standards. These standards are either introduced at the inlet of the sampling probe (referred to as through the probe), or directly into the monitor (referred to as back of analyzer) when it is difficult to introduce the standard at the inlet of the probe due to logistical concerns. Depending on how the standard is introduced to the monitor, the audit is referred to as either an NPAP – TTP, or NPAP – BOA

The standards used for the assessment are commercially supplied standards that comply with NIST standards, and are used when conducting audits for the following monitors:

- O₃ (using an ozone generator)
- NO₂
 - 3 channels used for NO₂ ; 2 are physical for measuring NO_x and NO, the 3rd is a difference of the others.
- CO
- SO₂
- Multiblend Audits which include CO/NO/SO₂ and O₃ generator

Audits are conducted at various concentration levels. These levels are achieved by diluting the multiblend cylinder gases to the desired concentration levels. The diluted gas is analyzed with a certified USEPA CO analyzer to check that the correct CO concentration is achieved. The other gas concentrations are then assumed to be proportionally correct. The S/L/T monitors are then audited using the diluted standard gas at three or more concentration levels.

7.8.1 Transaction Type

Description: Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

Attributes: Alphanumeric

2-character code
Mandatory

Coding Instructions: Place QA in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory

Error Messages:

- Invalid transaction format.

2. Transaction Type must be in TRANSACTION_TYPES table in database.

Error Messages:

- Transaction type not handled.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.8.2 Action Indicator

Description: Indicates the data manipulation action to be performed by the transaction.

Attributes: Alphanumeric
1-character code
Mandatory

Coding Instructions: Place the values I, U, or D in the second delimited field.

I Insert a new row into the appropriate table in the database.

U Change one or more column values for an existing row in one or more tables.

D Delete a row from a table(s) for the row containing the key data.

Business Rules

Common Rules

1. Action Indicator is required.

Error Messages:

- Action Code is Required.

2. Action Indicator must be either 'I', 'U', or 'D'.

Error Messages:

- Invalid Action Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.8.3 Assessment Type

Description: Indicates the specific QA assessment associated with the transaction.

Attributes: Alphanumeric QA Assessment Code
 Mandatory
 Key Field

Coding Instructions: Place the values in the third delimited field. Literal: “NPAP”.

Business Rules

Common Rules

1. Assessment type is required.

Error Messages:

- Assessment Type is required.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.8.4 Performing Agency

Description: Agency Code of organization performing assessment

Attributes: Alphanumeric
 3 or 4 digit code
 Optional
 System generated if left null

Coding Instructions: Place the performing agency code value in the fourth delimited field. Must exist in the AGENCIES Reference Table.

If this field is left null at submission time, then the agency code from the submitter's user profile record is used to populate the performing agency field. Therefore, any transactions being submitted on behalf of an agency by a user from a different agency should have the performing agency code populated on the transactions being submitted.

Business Rules

Common Rules

1. The Agency performing the audit must be in the AGENCIES table.

Error Messages:

- Integrity constraint (AIRSRAQS.MONITOR_ASSESSMENTS_PER_AG_FK) violated.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.8.5 State Code/Tribal Indicator

The fifth field on a transaction can be either a State Code or a Tribal indicator. They are described as follows:

State Code Description: A FIPS (Federal Information Processing Standards) code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Tribal Indicator Description: A flag, with value "TT", to indicate that this data is for a Native American Tribe, and that the next field on the transaction identifies a tribal area using the Bureau of Indian Affairs tribal code.

Attributes: Alphanumeric
2-digit code
Mandatory
Key Field

Coding Instructions: Place a valid FIPS state code or a Tribal Indicator in delimited field 5. A State Code is valid if it exists in the STATES Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.8.6 County Code/Tribal Code

The sixth field on any transaction can be either a County Code or a Tribal Code. A County code is indicated by a valid state code in the third field, while a Tribal Code is indicated by a Tribal Indicator in the third field.

County Code Description: A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

Tribal Code Description: A value that identifies a Tribal Area using a Bureau of Indian Affairs Tribal Code.

Attributes: Alphanumeric
 3-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid county code or a valid tribal code in the sixth delimited field. A County Code is valid if it exists at active status in the Counties table. A Tribal Code is valid if it exists at active status in the Tribal_Areas table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.8.7 Site Number

Description: A numeric identifier that uniquely identifies each air monitoring site within a county or tribal area. There is no requirement that Site Numbers be assigned continuously or in any particular order. Regional and Local organizations are thus free to allocate site numbers in any way they chose as long as there is no duplication within a county and tribal area. For Tribal sites, because tribal areas may cross county or state lines, care must be taken to ensure that the Site Number is unique in the effected Tribal Area and states-county.

A specific Site Number is associated with a specific physical location and address. Any change in address requires a new Site Number to be assigned. This address change could include a change from the roof of one building to another. A change in location on the same roof should not normally require a new Site Number. Although an address change would routinely mean a new Site Number, some changes that do not change the site's location in respect to surrounding sources and its measurement scale, would require no change. An EPA Regional Office should be consulted for assistance in determining whether a new Site Number is required.

If a new Site Number is needed for a site not operated by the air pollution control agency, that agency should be contacted to assist in the Number assignment, to ensure that the Number is unique within the county. In other words, when a new Site Number is assigned, it must be different from any other Site Number already existing for that combination of State and County or Tribal Code.

Attributes: Alphanumeric
4-digit Number
Mandatory
Key Field

Coding Instructions: Place a four-digit numeric code in the seventh delimited field. For update and delete, a Site Number is valid if it exists in combination with state code and County or Tribal Code in the Sites Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site Number, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.8.8 Parameter Code

Description: The code assigned to the parameter measured by the monitor. Parameters may be pollutants or non-pollutants.

Attributes: Alphanumeric
5-digit code
Mandatory
Key Field

Coding Instructions: Place a valid parameter code in the eighth delimited field. A parameter value is valid if it exists in combination with (State Code, County Code, Site ID, and POC) or (Tribal Code, Site ID, and POC) in the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.8.9 POC

Description: An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter. For example, the first monitor established to measure CO at a site could have a POC of 1. If an additional monitor were established at the same site to measure CO, that monitor could have a POC of 2. However, if a new instrument is installed to replace the original instrument used as the first monitor, that could be

considered the same monitor and it would still have a POC of 1.

For criteria pollutants, data from different sampling methods should only be stored under the same POC if the sampling intervals are the same and the methods are reference or equivalent. For sites where duplicate sampling is being conducted by multiple agencies or by one agency with multiple samplers, multiple POCs must be utilized to store all samples.

For non-criteria pollutants, data from multiple sampling methods can be stored under the same POC if the sampling intervals are the same and there is only one sample for the time reported. If multiple open path monitors are reporting data for the same parameter, each open path would be assigned a different POC.

There are no national EPA practices assigning POC values. There may be regional or agency conventions where a POC value may have specific significance. Numbers do not need to be assigned sequentially.

Attributes: Numeric
 2-digit ID
 Mandatory
 Key Field

Coding Instructions: Place a valid POC value in the ninth delimited field. A POC value is valid if it exists in combination with (State Code, County Code, Site ID, and Parameter) or (Tribal Code, Site ID, and Parameter) on the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.8.10 Assessment Date

Description: Date that the assessment was performed.

Attributes: Date
 8-digit date
 Mandatory
 Key Field

Coding Instructions: Place a valid date string in the tenth delimited field. The date format is YYYYMMDD.

Business Rules:

Common Rules

1. Assessment Date is mandatory.

Error Messages:

- Assessment Date is required.

2. Assessment Date must fall within a sampling period of the monitor.

Error Messages:

- Date must be within a valid sample period.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.8.11 Assessment Number

Description: A unique number associated with an assessment performed at a site on a given day. Value should be “1” unless additional assessments of the same type are performed.

Attributes: Non-zero integer
 Mandatory
 Key Field

Coding Instructions: Valid number placed in the eleventh delimited field. Positive number.

Business Rules

Common Rules

1. The value is not a valid positive integer.

Error Messages:

- Assessment number must be a positive integer.

2. The same assessment number already exists for that day for that monitor.

Error Messages:

- Duplicate assessment.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.8.12 NPAP Type

Description: Code meaning “Through the probe” or “Back of analyzer”

Attributes: Alphanumeric
 3-character code
 Mandatory on insert

Coding Instructions: Literal: “TTP” or “BOA” Value to be placed in twelfth delimited field.

Business Rules

Common Rules

1. The NPAP type must be TTP or BOA.

Error Messages:

- Invalid NPAP type.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.8.13 Monitor Method Code

Description: The sampling methodology of the monitor being assessed.

Attributes: Alphanumeric
 3-digit code
 Mandatory on insert

Coding Instructions: A valid method code is to be placed in the thirteenth delimited field.

Business Rules

Common Rules

1. The Monitor Method Code must match the Monitor Method assignment in the database for the monitor for the day.

Error Messages:

- The provided method does not match the monitor method for the provided assessment date.

2. The Monitor Method Code must be in the SAMPLING_METHODOLOGIES table for the parameter listed.

Error Messages:

- Please enter a valid Methodology Code for the current Parameter Code.
- The Method does not exist or is inactive.
- Invalid Method Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.8.14 Assessment Method Code

Description: For parameters other than Ozone, this is the method code of the CO monitor used to determine check gas dilution.

Attributes: Alphanumeric
 3-digit code

Coding Instructions: A valid method code is to be placed in the fourteenth delimited field.

Business Rules

Common Rules

1. The Monitor Method Code must match the Monitor Method assignment in the database for the monitor for the day.

Error Messages:

- The provided method does not match the monitor method for the provided assessment date.

2. The Monitor Method Code must be in the SAMPLING_METHODOLOGIES table for the parameter listed.

Error Messages:

- Please enter a valid Methodology Code for the current Parameter Code.
- The Method does not exist or is inactive.
- Invalid Method Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.8.15 Reported Unit

Description: Unit of measure associated with the reported concentration, mass, or flow value.

Attributes: Alphanumeric
 3-digit code
 Mandatory on insert and update

Coding Instructions: Unit code is to be placed in the fifteenth field.

Business Rules

Common Rules

1. Must exist in UNITS Reference table.

Error Messages:

- Not a valid unit.
- Unit required.

2. Units of measure must be appropriate for type of assessment.

Error Messages:

- Only concentration units may be used for ____ assessments.
- Only mass units may be used for ____ assessments.
- Flow audits must be submitted with flow units.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.8.16 Level 1 Monitor Concentration

Description: The concentration value provided by the monitor being assessed at level 1.

Attributes: Numeric

Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the sixteenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.8.17 Level 1 Assessment Concentration

Description: The value of the known gas standard concentration in Audit Level 1.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the seventeenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.8.18 Level 2 Monitor Concentration

Description: The concentration value provided by the monitor being assessed at level 2.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the eighteenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.8.19 Level 2 Assessment Concentration

Description: The value of the known gas standard concentration in Audit Level 2.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the nineteenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

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None.

Update Rules

None.

Delete Rules

None.

7.8.20 Level 3 Monitor Concentration

Description: The concentration value provided by the monitor being assessed at level 3.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the twentieth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.8.21 Level 3 Assessment Concentration

Description: The value of the known gas standard concentration in Audit Level 3.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the twenty-first field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.8.22 Level 4 Monitor Concentration

Description: The concentration value provided by the monitor being assessed at level 4.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the twenty-second field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.8.23 Level 4 Assessment Concentration

Description: The value of the known gas standard concentration in Audit Level 4.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the twenty-third field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.8.24 Level 5 Monitor Concentration

Description: The concentration value provided by the monitor being assessed at level 5.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the twenty-fourth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

None.

7.8.25 Level 5 Assessment Concentration

Description: The value of the known gas standard concentration in Audit Level 5.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the twenty-fifth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.8.26 Level 6 Monitor Concentration

Description: The concentration value provided by the monitor being assessed at level 6.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the twenty-sixth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.8.27 Level 6 Assessment Concentration

Description: The value of the known gas standard concentration in Audit Level 6.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the twenty-seventh field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.8.28 Level 7 Monitor Concentration

Description: The concentration value provided by the monitor being assessed at level 7.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the twenty-eighth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.8.29 Level 7 Assessment Concentration

Description: The value of the known gas standard concentration in Audit Level 7.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the twenty-ninth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.8.30 Level 8 Monitor Concentration

Description: The concentration value provided by the monitor being assessed at level 8.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the thirtieth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.8.31 Level 8 Assessment Concentration

Description: The value of the known gas standard concentration in Audit Level 8.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the thirty-first field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Business Rules

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.8.32 Level 9 Monitor Concentration

Description: The concentration value provided by the monitor being assessed at level 9.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the thirty-second field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.8.33 Level 9 Assessment Concentration

Description: The value of the known gas standard concentration in Audit Level 9.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the thirty-third field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.8.34 Level 10 Monitor Concentration

Description: The concentration value provided by the monitor being assessed at level 10.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the thirty-fourth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.8.35 Level 10 Assessment Concentration

Description: The value of the known gas standard concentration in Audit Level 10.

Attributes: Numeric

Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the thirty-fifth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.9 Field Proficiency Test (PT)

7.9.0 Description of Assessment

A proficiency test is a type of assessment in which a sample, the composition of which is unknown to the analyst, is provided to test whether the analyst/laboratory can produce analytical results within the specified acceptance criteria. PTs for volatile organic compounds (VOCs), carbonyls and metals are implemented in the NATTS program and can be used in other programs as well.

- VOCs and carbonyls are analyzed on site by analyzers. The proficiency test in this case is auditing the on-site analyzer. This means that the monitor id is needed on the transaction to identify the analyzer being assessed. This assessment is referred to as a Field Proficiency Test or Field PT.
- Metal analysis is performed by a laboratory off site. The proficiency test in this case is auditing the lab used to analyze the metals. For this case, the monitor id is not appropriate; rather the agency code of the lab is needed to identify the audited lab. This assessment is referred to as a Lab Proficiency Test, or Lab PT.

7.9.1 Transaction Type

Description: Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

Attributes: Alphanumeric
2-character code
Mandatory

Coding Instructions: Place QA in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory

Error Messages:

- Invalid transaction format.

2. Transaction Type must be in TRANSACTION_TYPES table in database.

Error Messages:

- Transaction type not handled.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.9.2 Action Indicator

Description: Indicates the data manipulation action to be performed by the transaction.

Attributes: Alphanumeric
1-character code
Mandatory

Coding Instructions: Place the values I, U, or D in the second delimited field.
I Insert a new row into the appropriate table in the database.
U Change one or more column values for an existing row in one or more tables.
D Delete a row from a table(s) for the row containing the key data.

Business Rules

Common Rules

1. Action Indicator is required.
Error Messages:
 - Action Code is Required.
2. Action Indicator must be either 'I', 'U', or 'D'.
Error Messages:
 - Invalid Action Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.9.3 Assessment Type

Description: Indicates the specific QA assessment associated with the transaction.

Attributes: Alphanumeric QA Assessment Code
Mandatory
Key Field

Coding Instructions: Place the values in the third delimited field. Literal: "Field Proficiency Test".

Business Rules

Common Rules

1. Assessment type is required.

Error Messages:

- Assessment Type is required.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.9.4 Performing Agency

Description: Agency Code of organization performing assessment

Attributes: Alphanumeric
 3 or 4 digit code
 Optional
 System generated if left null

Coding Instructions: Place the performing agency code value in the fourth delimited field. Must exist in the AGENCIES Reference Table.

If this field is left null at submission time, then the agency code from the submitter's user profile record is used to populate the performing agency field. Therefore, any transactions being submitted on behalf of an agency by a user from a different agency should have the performing agency code populated on the transactions being submitted.

Business Rules

Common Rules

1. The Agency performing the audit must be in the AGENCIES table.

Error Messages:

- Integrity constraint (AIRSRAQS.MONITOR_ASSESSMENTS_PER_AG_FK) violated.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.9.5 State Code/Tribal Indicator

The fifth field on a transaction can be either a State Code or a Tribal indicator. They are described as follows:

State Code Description: A FIPS (Federal Information Processing Standards) code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Tribal Indicator Description: A flag, with value “TT”, to indicate that this data is for a Native American Tribe, and that the next field on the transaction identifies a tribal area using the Bureau of Indian Affairs tribal code.

Attributes: Alphanumeric
 2-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid FIPS state code or a Tribal Indicator in delimited field 5. A State Code is valid if it exists in the STATES Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.9.6 County Code/Tribal Code

The sixth field on any transaction can be either a County Code or a Tribal Code. A County code is indicated by a valid state code in the third field, while a Tribal Code is indicated by a Tribal Indicator in the third field.

County Code Description: A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

Tribal Code Description: A value that identifies a Tribal Area using a Bureau of Indian Affairs Tribal Code.

Attributes: Alphanumeric
3-digit code
Mandatory
Key Field

Coding Instructions: Place a valid county code or a valid tribal code in the sixth delimited field. A County Code is valid if it exists at active status in the Counties table. A Tribal Code is valid if it exists at active status in the Tribal_Areas table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.9.7 Site Number

Description: A numeric identifier that uniquely identifies each air monitoring site within a county or tribal area. There is no requirement that Site Numbers be assigned continuously or in any particular order. Regional and Local organizations are thus free to allocate site numbers in any way they chose as long as there is no duplication within a county and tribal area. For Tribal sites, because tribal areas may cross county or state lines, care must be taken to ensure that the Site Number is unique in the effected Tribal Area and states-county.

A specific Site Number is associated with a specific physical location and address. Any change in address requires a new Site Number to be assigned. This address change could include a change from the roof of one building to another. A change in location on the same roof should not normally require a new Site Number. Although an address change would routinely mean a new Site Number, some changes that do not change the site's location in respect to surrounding sources and its measurement scale, would require no change. An EPA Regional Office should be consulted

for assistance in determining whether a new Site Number is required.

If a new Site Number is needed for a site not operated by the air pollution control agency, that agency should be contacted to assist in the Number assignment, to ensure that the Number is unique within the county. In other words, when a new Site Number is assigned, it must be different from any other Site Number already existing for that combination of State and County or Tribal Code.

Attributes: Alphanumeric
 4-digit Number
 Mandatory
 Key Field

Coding Instructions: Place a four-digit numeric code in the seventh delimited field. For update and delete, a Site Number is valid if it exists in combination with state code and County or Tribal Code in the Sites Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site Number, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.9.8 Parameter Code

Description: The code assigned to the parameter measured by the monitor. Parameters may be pollutants or non-pollutants.

Attributes: Alphanumeric
 5-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid parameter code in the eighth delimited field. A parameter value is valid if it exists in combination with (State Code, County Code,

Site ID, and POC) or (Tribal Code, Site ID, and POC) in the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.9.9 POC

Description:

An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter. For example, the first monitor established to measure CO at a site could have a POC of 1. If an additional monitor were established at the same site to measure CO, that monitor could have a POC of 2. However, if a new instrument is installed to replace the original instrument used as the first monitor, that could be considered the same monitor and it would still have a POC of 1.

For criteria pollutants, data from different sampling methods should only be stored under the same POC if the sampling intervals are the same and the methods are reference or equivalent. For sites where duplicate sampling is being conducted by multiple agencies or by one agency with multiple samplers, multiple POCs must be utilized to store all samples.

For non-criteria pollutants, data from multiple sampling methods can be stored under the same POC if the sampling intervals are the same and there is only one sample for the time reported. If multiple open path monitors are reporting data for the same parameter, each open path would be assigned a different POC.

There are no national EPA practices assigning POC values. There may be regional or agency conventions where a POC value may have specific significance. Numbers do not need to be assigned sequentially.

Attributes:

Numeric
2-digit ID
Mandatory

Key Field

Coding Instructions: Place a valid POC value in the ninth delimited field. A POC value is valid if it exists in combination with (State Code, County Code, Site ID, and Parameter) or (Tribal Code, Site ID, and Parameter) on the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.9.10 Assessment Date

Description: Date that the assessment was performed.

Attributes: Date
8-digit date
Mandatory
Key Field

Coding Instructions: Place a valid date string in the tenth delimited field. The date format is YYYYMMDD.

Business Rules:

Common Rules

1. Assessment Date is mandatory.

Error Messages:

- Assessment Date is required.

2. Assessment Date must fall within a sampling period of the monitor.

Error Messages:

- Date must be within a valid sample period.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.9.11 Assessment Number

Description: A unique number associated with an assessment performed at a site on a given day. Value should be "1" unless additional assessments of the same type are performed.

Attributes: Non-zero integer
Mandatory
Key Field

Coding Instructions: Valid number placed in the eleventh delimited field. Positive number.

Business Rules

Common Rules

1. The value is not a valid positive integer.
Error Messages:
 - Assessment number must be a positive integer.
2. The same assessment number already exists for that day for that monitor.
Error Messages:
 - Duplicate assessment.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.9.12 Monitor Method Code

Description: The sampling methodology of the monitor being assessed.

Attributes: Alphanumeric
3-digit code
Mandatory on insert

Coding Instructions: A valid method code is to be placed in the twelfth delimited field.

Business Rules

Common Rules

1. The Monitor Method Code must match the Monitor Method assignment in the database for the monitor for the day.

Error Messages:

- The provided method does not match the monitor method for the provided assessment date.

2. The Monitor Method Code must be in the SAMPLING_METHODOLOGIES table for the parameter listed.

Error Messages:

- Please enter a valid Methodology Code for the current Parameter Code.
- The Method does not exist or is inactive.
- Invalid Method Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.9.13 Reported Unit

Description: Unit of measure associated with the reported concentration, mass, or flow value.

Attributes: Alphanumeric
 3-digit code
 Mandatory on insert and update

Coding Instructions: Unit code is to be placed in the thirteenth field.

Business Rules

Common Rules

1. Must exist in UNITS Reference table.

Error Messages:

- Not a valid unit.
- Unit required.

2. Units of measure must be appropriate for type of assessment.

Error Messages:

- Only concentration units may be used for ____ assessments.
- Only mass units may be used for ____ assessments.
- Flow audits must be submitted with flow units.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.9.14 Monitor Concentration

Description: The concentration value provided by the monitor being assessed.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the fourteenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.9.15 Assessment Concentration

Description: The known value of the analyte concentration.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the fifteenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.

- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.10 Duplicate

7.10.0 Description of Assessment

Precision refers to the agreement between independent measurements performed according to identical protocols and procedures. Collocated monitoring, analysis of duplicate samples and analysis of replicate samples are ways to estimate precision for all or part of the measurement system. In order to distinguish these terms, the following definitions come from the NATTS Technical Assistance Document (available on EPA’s AMTIC website). These definitions will apply for data submitted to AQS using the duplicate or replicate transaction.

- Collocated Sample Collection – Collocated samples are samples collected simultaneously using two completely separate sampling systems, and then analyzing the samples and comparing the results obtained. This approach provides information on “Inter-system” variability.
- Duplicate Sample Collection – Duplicate samples are samples collected simultaneously using one collection system (i.e., two separate samples through the same sampling system at the same time), and then analyzing the samples and comparing the results obtained. This simultaneous collection is typically accomplished by teeing the line from the flow control device to the canisters, and then doubling the collection flow rate. This approach provides information on “Intra-system” variability.
- Replicate Analysis – Replicate analyses is the analysis of one discrete sample multiple times. These are also known as “split” sample analyses. This approach provides information on “Analytical” variability.

7.10.1 Transaction Type

Description: Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

Attributes: Alphanumeric
2-character code
Mandatory

Coding Instructions: Place QA in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory

Error Messages:

- Invalid transaction format.

- Transaction Type must be in TRANSACTION_TYPES table in database.

Error Messages:

- Transaction type not handled.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.10.2 Action Indicator

Description: Indicates the data manipulation action to be performed by the transaction.

Attributes: Alphanumeric
1-character code
Mandatory

Coding Instructions: Place the values I, U, or D in the second delimited field.
I Insert a new row into the appropriate table in the database.
U Change one or more column values for an existing row in one or more tables.
D Delete a row from a table(s) for the row containing the key data.

Business Rules

Common Rules

- Action Indicator is required.
Error Messages:
 - Action Code is Required.
- Action Indicator must be either 'I', 'U', or 'D'.
Error Messages:
 - Invalid Action Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.10.3 Assessment Type

Description: Indicates the specific QA assessment associated with the transaction.

Attributes: Alphanumeric QA Assessment Code
 Mandatory
 Key Field

Coding Instructions: Place the values in the third delimited field. Literal: "Duplicate".

Business Rules

Common Rules

1. Assessment type is required.

Error Messages:

- Assessment Type is required.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.10.4 Performing Agency

Description: Agency Code of organization performing assessment

Attributes: Alphanumeric
 3 or 4 digit code
 Optional
 System generated if left null

Coding Instructions: Place the performing agency code value in the fourth delimited field. Must exist in the AGENCIES Reference Table.

If this field is left null at submission time, then the agency code from the submitter's user profile record is used to populate the performing agency field. Therefore, any transactions being submitted on behalf of an agency by a user from a different agency should have the performing agency code populated on the transactions being submitted.

Business Rules

Common Rules

1. The Agency performing the audit must be in the AGENCIES table.

Error Messages:

- Integrity constraint (AIRSRAQS.MONITOR_ASSESSMENTS_PER_AG_FK)

violated.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.10.5 State Code/Tribal Indicator

The fifth field on a transaction can be either a State Code or a Tribal indicator. They are described as follows:

State Code Description: A FIPS (Federal Information Processing Standards) code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Tribal Indicator Description: A flag, with value “TT”, to indicate that this data is for a Native American Tribe, and that the next field on the transaction identifies a tribal area using the Bureau of Indian Affairs tribal code.

Attributes: Alphanumeric
 2-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid FIPS state code or a Tribal Indicator in delimited field 5. A State Code is valid if it exists in the STATES Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.10.6 County Code/Tribal Code

The sixth field on any transaction can be either a County Code or a Tribal Code. A County code is indicated by a valid state code in the third field, while a Tribal Code is indicated by a Tribal Indicator in the third field.

County Code Description: A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

Tribal Code Description: A value that identifies a Tribal Area using a Bureau of Indian Affairs Tribal Code.

Attributes: Alphanumeric
3-digit code
Mandatory
Key Field

Coding Instructions: Place a valid county code or a valid tribal code in the sixth delimited field. A County Code is valid if it exists at active status in the Counties table. A Tribal Code is valid if it exists at active status in the Tribal_Areas table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.10.7 Site Number

Description: A numeric identifier that uniquely identifies each air monitoring site within a county or tribal area. There is no requirement that Site Numbers be assigned continuously or in any particular order. Regional and Local organizations are thus free to allocate site numbers in any way they chose as long as there is no duplication within a county and tribal area. For Tribal sites, because tribal areas may cross county or state lines, care must be taken to ensure that the Site Number is unique in the effected Tribal Area and states-county.

A specific Site Number is associated with a specific physical location and address. Any change in address requires a new Site Number to be assigned. This address change could include a change from the roof of one building to another. A change in location on the same roof should not normally require a new Site Number. Although an address change would routinely mean a new Site Number, some changes that do not change the site's location in respect to surrounding sources and its measurement scale, would require no change. An EPA Regional Office should be consulted for assistance in determining whether a new Site Number is required.

If a new Site Number is needed for a site not operated by the air pollution control agency, that agency should be contacted to assist in the Number assignment, to ensure that the Number is unique within the county. In other words, when a new Site Number is assigned, it must be different from any other Site Number already existing for that combination of State and County or Tribal Code.

Attributes: Alphanumeric
 4-digit Number
 Mandatory
 Key Field

Coding Instructions: Place a four-digit numeric code in the seventh delimited field. For update and delete, a Site Number is valid if it exists in combination with state code and County or Tribal Code in the Sites Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site Number, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.10.8 Parameter Code

Description: The code assigned to the parameter measured by the monitor. Parameters may be pollutants or non-pollutants.

Attributes: Alphanumeric
 5-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid parameter code in the eighth delimited field. A parameter value is valid if it exists in combination with (State Code, County Code, Site ID, and POC) or (Tribal Code, Site ID, and POC) in the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.10.9 POC

Description: An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter. For example, the first monitor established to measure CO at a site could have a POC of 1. If an additional monitor were established at the same site to measure CO, that monitor could have a POC of 2. However, if a new instrument is installed to replace the original instrument used as the first monitor, that could be considered the same monitor and it would still have a POC of 1.

For criteria pollutants, data from different sampling methods should only be stored under the same POC if the sampling intervals are the same and the methods are reference or equivalent. For sites where duplicate sampling is being conducted by multiple agencies or by one agency with multiple samplers, multiple POCs must be utilized to store all samples.

For non-criteria pollutants, data from multiple sampling methods can be stored under the same POC if the sampling intervals are the same and there is only one sample for the time reported. If multiple open path

monitors are reporting data for the same parameter, each open path would be assigned a different POC.

There are no national EPA practices assigning POC values. There may be regional or agency conventions where a POC value may have specific significance. Numbers do not need to be assigned sequentially.

Attributes: Numeric
 2-digit ID
 Mandatory
 Key Field

Coding Instructions: Place a valid POC value in the ninth delimited field. A POC value is valid if it exists in combination with (State Code, County Code, Site ID, and Parameter) or (Tribal Code, Site ID, and Parameter) on the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.10.10 Assessment Date

Description: Date that the assessment was performed.

Attributes: Date
 8-digit date
 Mandatory
 Key Field

Coding Instructions: Place a valid date string in the tenth delimited field. The date format is YYYYMMDD.

Business Rules:

Common Rules

1. Assessment Date is mandatory.

Error Messages:

- Assessment Date is required.

2. Assessment Date must fall within a sampling period of the monitor.

Error Messages:

- Date must be within a valid sample period.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.10.11 Assessment Number

Description: A unique number associated with an assessment performed at a site on a given day. Value should be “1” unless additional assessments of the same type are performed.

Attributes: Non-zero integer
Mandatory
Key Field

Coding Instructions: Valid number placed in the eleventh delimited field. Positive number.

Business Rules

Common Rules

1. The value is not a valid positive integer.

Error Messages:

- Assessment number must be a positive integer.

2. The same assessment number already exists for that day for that monitor.

Error Messages:

- Duplicate assessment.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.10.12 Monitor Method Code

Description: The sampling methodology of the monitor being assessed.

Attributes: Alphanumeric
 3-digit code
 Mandatory on insert

Coding Instructions: A valid method code is to be placed in the twelfth delimited field.

Business Rules

Common Rules

1. The Monitor Method Code must match the Monitor Method assignment in the database for the monitor for the day.

Error Messages:

- The provided method does not match the monitor method for the provided assessment date.

2. The Monitor Method Code must be in the SAMPLING_METHODOLOGIES table for the parameter listed.

Error Messages:

- Please enter a valid Methodology Code for the current Parameter Code.
- The Method does not exist or is inactive.
- Invalid Method Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.10.13 Reported Unit

Description: Unit of measure associated with the reported concentration, mass, or flow value.

Attributes: Alphanumeric
 3-digit code
 Mandatory on insert and update

Coding Instructions: Unit code is to be placed in the thirteenth field.

Business Rules

Common Rules

1. Must exist in UNITS Reference table.

Error Messages:

- Not a valid unit.
- Unit required.

2. Units of measure must be appropriate for type of assessment.

Error Messages:

- Only concentration units may be used for ____ assessments.
- Only mass units may be used for ____ assessments.
- Flow audits must be submitted with flow units.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.10.14 Duplicate Value 1

Description: The concentration value provided by the monitor being assessed.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the fourteenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.10.15 Duplicate Value 2

Description: The concentration value provided by the monitor being assessed.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the fifteenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.10.16 Duplicate Value 3

Description: The concentration value provided by the monitor being assessed.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the sixteenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.10.17 Duplicate Value 4

Description: The concentration value provided by the monitor being assessed.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the seventeenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.10.18 Duplicate Value 5

Description: The concentration value provided by the monitor being assessed.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the eighteenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.11 Replicate

7.11.0 Description of Assessment

Precision refers to the agreement between independent measurements performed according to identical protocols and procedures. Collocated monitoring, analysis of duplicate samples and analysis of replicate samples are ways to estimate precision for all or part of the measurement system. In order to distinguish these terms, the following definitions come from the NATTS Technical Assistance Document (available on EPA’s AMTIC website). These definitions will apply for data submitted to AQS using the duplicate or replicate transaction.

- Collocated Sample Collection – Collocated samples are samples collected simultaneously using two completely separate sampling systems, and then analyzing the samples and comparing the results obtained. This approach provides information on “Inter-system” variability.
- Duplicate Sample Collection – Duplicate samples are samples collected simultaneously using one collection system (i.e., two separate samples through the same sampling system at the same time), and then analyzing the samples and comparing the results obtained. This simultaneous collection is typically accomplished by teeing the line from the flow control device to the canisters, and then doubling the collection flow rate. This approach provides information on “Intra-system” variability.
- Replicate Analysis – Replicate analyses is the analysis of one discrete sample multiple times. These are also known as “split” sample analyses. This approach provides information on “Analytical” variability.

7.11.1 Transaction Type

Description: Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

Attributes: Alphanumeric
2-character code
Mandatory

Coding Instructions: Place QA in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory

Error Messages:

- Invalid transaction format.

- Transaction Type must be in TRANSACTION_TYPES table in database.

Error Messages:

- Transaction type not handled.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.11.2 Action Indicator

Description: Indicates the data manipulation action to be performed by the transaction.

Attributes: Alphanumeric
1-character code
Mandatory

Coding Instructions: Place the values I, U, or D in the second delimited field.
I Insert a new row into the appropriate table in the database.
U Change one or more column values for an existing row in one or more tables.
D Delete a row from a table(s) for the row containing the key data.

Business Rules

Common Rules

- Action Indicator is required.
Error Messages:
 - Action Code is Required.
- Action Indicator must be either 'I', 'U', or 'D'.
Error Messages:
 - Invalid Action Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.11.3 Assessment Type

Description: Indicates the specific QA assessment associated with the transaction.

Attributes: Alphanumeric QA Assessment Code
 Mandatory
 Key Field

Coding Instructions: Place the values in the third delimited field. Literal: "Replicate".

Business Rules

Common Rules

1. Assessment type is required.

Error Messages:

- Assessment Type is required.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.11.4 Performing Agency

Description: Agency Code of organization performing assessment

Attributes: Alphanumeric
 3 or 4 digit code
 Optional
 System generated if left null

Coding Instructions: Place the performing agency code value in the fourth delimited field. Must exist in the AGENCIES Reference Table.

If this field is left null at submission time, then the agency code from the submitter's user profile record is used to populate the performing agency field. Therefore, any transactions being submitted on behalf of an agency by a user from a different agency should have the performing agency code populated on the transactions being submitted.

Business Rules

Common Rules

1. The Agency performing the audit must be in the AGENCIES table.

Error Messages:

- Integrity constraint (AIRSRAQS.MONITOR_ASSESSMENTS_PER_AG_FK)

violated.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.11.5 State Code/Tribal Indicator

The fifth field on a transaction can be either a State Code or a Tribal indicator. They are described as follows:

State Code Description: A FIPS (Federal Information Processing Standards) code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Tribal Indicator Description: A flag, with value “TT”, to indicate that this data is for a Native American Tribe, and that the next field on the transaction identifies a tribal area using the Bureau of Indian Affairs tribal code.

Attributes: Alphanumeric
 2-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid FIPS state code or a Tribal Indicator in delimited field 5. A State Code is valid if it exists in the STATES Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.11.6 County Code/Tribal Code

The sixth field on any transaction can be either a County Code or a Tribal Code. A County code is indicated by a valid state code in the third field, while a Tribal Code is indicated by a Tribal Indicator in the third field.

County Code Description: A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

Tribal Code Description: A value that identifies a Tribal Area using a Bureau of Indian Affairs Tribal Code.

Attributes: Alphanumeric
3-digit code
Mandatory
Key Field

Coding Instructions: Place a valid county code or a valid tribal code in the sixth delimited field. A County Code is valid if it exists at active status in the Counties table. A Tribal Code is valid if it exists at active status in the Tribal_Areas table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.11.7 Site Number

Description: A numeric identifier that uniquely identifies each air monitoring site within a county or tribal area. There is no requirement that Site Numbers be assigned continuously or in any particular order. Regional and Local organizations are thus free to allocate site numbers in any way they chose as long as there is no duplication within a county and tribal area. For Tribal sites, because tribal areas may cross county or state lines, care must be taken to ensure that the Site Number is unique in the effected Tribal Area and states-county.

A specific Site Number is associated with a specific physical location and address. Any change in address requires a new Site Number to be assigned. This address change could include a change from the roof of one building to another. A change in location on the same roof should not normally require a new Site Number. Although an address change would routinely mean a new Site Number, some changes that do not change the site's location in respect to surrounding sources and its measurement scale, would require no change. An EPA Regional Office should be consulted for assistance in determining whether a new Site Number is required.

If a new Site Number is needed for a site not operated by the air pollution control agency, that agency should be contacted to assist in the Number assignment, to ensure that the Number is unique within the county. In other words, when a new Site Number is assigned, it must be different from any other Site Number already existing for that combination of State and County or Tribal Code.

Attributes: Alphanumeric
 4-digit Number
 Mandatory
 Key Field

Coding Instructions: Place a four-digit numeric code in the seventh delimited field. For update and delete, a Site Number is valid if it exists in combination with state code and County or Tribal Code in the Sites Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site Number, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.11.8 Parameter Code

Description: The code assigned to the parameter measured by the monitor. Parameters may be pollutants or non-pollutants.

Attributes: Alphanumeric
 5-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid parameter code in the eighth delimited field. A parameter value is valid if it exists in combination with (State Code, County Code, Site ID, and POC) or (Tribal Code, Site ID, and POC) in the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.11.9 POC

Description: An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter. For example, the first monitor established to measure CO at a site could have a POC of 1. If an additional monitor were established at the same site to measure CO, that monitor could have a POC of 2. However, if a new instrument is installed to replace the original instrument used as the first monitor, that could be considered the same monitor and it would still have a POC of 1.

For criteria pollutants, data from different sampling methods should only be stored under the same POC if the sampling intervals are the same and the methods are reference or equivalent. For sites where duplicate sampling is being conducted by multiple agencies or by one agency with multiple samplers, multiple POCs must be utilized to store all samples.

For non-criteria pollutants, data from multiple sampling methods can be stored under the same POC if the sampling intervals are the same and there is only one sample for the time reported. If multiple open path

monitors are reporting data for the same parameter, each open path would be assigned a different POC.

There are no national EPA practices assigning POC values. There may be regional or agency conventions where a POC value may have specific significance. Numbers do not need to be assigned sequentially.

Attributes: Numeric
 2-digit ID
 Mandatory
 Key Field

Coding Instructions: Place a valid POC value in the ninth delimited field. A POC value is valid if it exists in combination with (State Code, County Code, Site ID, and Parameter) or (Tribal Code, Site ID, and Parameter) on the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.11.10 Assessment Date

Description: Date that the assessment was performed.

Attributes: Date
 8-digit date
 Mandatory
 Key Field

Coding Instructions: Place a valid date string in the tenth delimited field. The date format is YYYYMMDD.

Business Rules:

Common Rules

1. Assessment Date is mandatory.

Error Messages:

- Assessment Date is required.

2. Assessment Date must fall within a sampling period of the monitor.

Error Messages:

- Date must be within a valid sample period.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.11.11 Assessment Number

Description: A unique number associated with an assessment performed at a site on a given day. Value should be “1” unless additional assessments of the same type are performed.

Attributes: Non-zero integer
Mandatory
Key Field

Coding Instructions: Valid number placed in the eleventh delimited field. Positive number.

Business Rules

Common Rules

1. The value is not a valid positive integer.

Error Messages:

- Assessment number must be a positive integer.

2. The same assessment number already exists for that day for that monitor.

Error Messages:

- Duplicate assessment.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.11.12 Monitor Method Code

Description: The sampling methodology of the monitor being assessed.

Attributes: Alphanumeric
 3-digit code
 Mandatory on insert

Coding Instructions: A valid method code is to be placed in the twelfth delimited field.

Business Rules

Common Rules

1. The Monitor Method Code must match the Monitor Method assignment in the database for the monitor for the day.

Error Messages:

- The provided method does not match the monitor method for the provided assessment date.

2. The Monitor Method Code must be in the SAMPLING_METHODOLOGIES table for the parameter listed.

Error Messages:

- Please enter a valid Methodology Code for the current Parameter Code.
- The Method does not exist or is inactive.
- Invalid Method Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.11.13 Reported Unit

Description: Unit of measure associated with the reported concentration, mass, or flow value.

Attributes: Alphanumeric
 3-digit code
 Mandatory on insert and update

Coding Instructions: Unit code is to be placed in the thirteenth field.

Business Rules

Common Rules

1. Must exist in UNITS Reference table.

Error Messages:

- Not a valid unit.
- Unit required.

2. Units of measure must be appropriate for type of assessment.

Error Messages:

- Only concentration units may be used for ____ assessments.
- Only mass units may be used for ____ assessments.
- Flow audits must be submitted with flow units.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.11.14 Replicate Value 1

Description: The concentration value provided by the monitor being assessed.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the fourteenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.11.15 Replicate Value 2

Description: The concentration value provided by the monitor being assessed.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the fifteenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.11.16 Replicate Value 3

Description: The concentration value provided by the monitor being assessed.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the sixteenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

None.

7.11.17 Replicate Value 4

Description: The concentration value provided by the monitor being assessed.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the seventeenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.11.18 Replicate Value 5

Description: The concentration value provided by the monitor being assessed.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the eighteenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.12 QA Zero Span Transaction

7.12.0 Description of Assessment

Zero and Span are two different measurements that are quality control checks.

The zero check is a challenge of the instruments zero calibration conducted by introducing zero air into the analyzer and measuring the instrument response.

The span check is a challenge of the upper limit of the analyzers calibration conducted by introducing a calibration gas (approximately 80% of the operating range) into the analyzer.

7.12.1 Transaction Type

Description: Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields). For the QA transactions, the literal 'QA' is used for every QA transaction as the transaction type. The assessment type field is used to differentiate between the various QA assessments.

Attributes: Alphanumeric
2-character code
Mandatory

Coding Instructions: Place 'QA' in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory

Error Messages:

- Invalid transaction format.

2. Transaction Type must be in TRANSACTION_TYPES table in database.

Error Messages:

- Transaction type not handled.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.12.2 Action Indicator

Description: Indicates the data manipulation action to be performed by the transaction.

Attributes: Alphanumeric
 1-character code
 Mandatory

Coding Instructions: Place the values I, U, or D in the second delimited field.
 I Insert a new row into the appropriate table in the database.
 U Change one or more column values for an existing row in one or
 more tables.
 D Delete a row from a table(s) for the row containing the key data.

Business Rules

Common Rules

1. Action Indicator is required.
 Error Messages:
 - Invalid Action Indicator.
2. Action Indicator must be either 'I', 'U', or 'D'.
 Error Messages:
 - Invalid Action Indicator.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.12.3 Assessment Type

Description: Indicates the specific QA assessment reported via the transaction.

Attributes: Alphanumeric QA Assessment Code
 Mandatory
 Key Field

Coding Instructions: Place the values in the third delimited field. Literal: "Zero Span". Each assessment is specified via the assessment type field on the QA transaction.

Business Rules

Common Rules

1. Assessment type is required.

Error Messages:

- Assessment Type is required.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.12.4 Performing Agency

Description: Agency Code of organization performing assessment

Attributes: Alphanumeric
 3 or 4 digit code
 Optional
 System generated if left null

Coding Instructions: Place the performing agency code value in the fourth delimited field. Must exist in the AGENCIES Reference Table.

If this field is left null at submission time, then the agency code from the submitter's user profile record is used to populate the performing agency field. Therefore, any transactions being submitted on behalf of an agency by a user from a different agency should have the performing agency code populated on the transactions being submitted.

Business Rules

Common Rules

1. The Agency performing the audit must be in the AGENCIES table.

Error Messages:

- Integrity constraint (AIRSRAQS.MONITOR_ASSESSMENTS_PER_AG_FK) violated.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.12.5 State Code / Tribal Indicator

The fifth field on a transaction can be either a State Code or a Tribal indicator. They are described as follows:

State Code Description: A FIPS (Federal Information Processing Standards) code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Tribal Indicator Description: A flag, with value “TT”, to indicate that this data is for a Native American Tribe, and that the next field on the transaction identifies a tribal area using the Bureau of Indian Affairs tribal code.

Attributes: Alphanumeric
2-digit code
Mandatory
Key Field

Coding Instructions: Place a valid FIPS state code or a Tribal Indicator in delimited field 5. A State Code is valid if it exists in the STATES Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.12.6 County Code / Tribal Code

The sixth field on any transaction can be either a County Code or a Tribal Code. A County code is indicated by a valid state code in the third field, while a Tribal Code is indicated by a Tribal Indicator in the third field.

County Code Description: A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as

Tribal Code Description: Mexican states or Canadian provinces.
A value that identifies a Tribal Area using a Bureau of Indian Affairs Tribal Code.

Attributes: Alphanumeric
3-digit code
Mandatory
Key Field

Coding Instructions: Place a valid county code or a valid tribal code in the sixth delimited field. A County Code is valid if it exists at active status in the Counties table. A Tribal Code is valid if it exists at active status in the Tribal_Areas table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None

7.12.7 Site Number

Description: A numeric identifier that uniquely identifies each air monitoring site within a county or tribal area. There is no requirement that Site Numbers be assigned continuously or in any particular order. Regional and Local organizations are thus free to allocate site numbers in any way they chose as long as there is no duplication within a county and tribal area. For Tribal sites, because tribal areas may cross county or state lines, care must be taken to ensure that the Site Number is unique in the effected Tribal Area and states-county.

A specific Site Number is associated with a specific physical location and address. Any change in address requires a new Site Number to be assigned. This address change could include a change from the roof of one building to another. A change in location on the same roof should not normally require a new Site Number. Although an address change would routinely mean a new Site Number, some changes that do not change the

site's location in respect to surrounding sources and its measurement scale, would require no change. An EPA Regional Office should be consulted for assistance in determining whether a new Site Number is required.

If a new Site Number is needed for a site not operated by the air pollution control agency, that agency should be contacted to assist in the Number assignment, to ensure that the Number is unique within the county. In other words, when a new Site Number is assigned, it must be different from any other Site Number already existing for that combination of State and County or Tribal Code.

Attributes: Alphanumeric
 4-digit Number
 Mandatory
 Key Field

Coding Instructions: Place a four-digit numeric code in the seventh delimited field. For update and delete, a Site Number is valid if it exists in combination with state code and County or Tribal Code in the Sites Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site Number, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.12.8 Parameter Code

Description: The code assigned to the parameter measured by the monitor. Parameters may be pollutants or non-pollutants.

Attributes: Alphanumeric
 5-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid parameter code in the eighth delimited field. A parameter value is valid if it exists in combination with (State Code, County Code, Site ID, and POC) or (Tribal Code, Site ID, and POC) in the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.12.9 POC

Description: An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter. For example, the first monitor established to measure CO at a site could have a POC of 1. If an additional monitor were established at the same site to measure CO, that monitor could have a POC of 2. However, if a new instrument is installed to replace the original instrument used as the first monitor, that could be considered the same monitor and it would still have a POC of 1.

For criteria pollutants, data from different sampling methods should only be stored under the same POC if the sampling intervals are the same and the methods are reference or equivalent. For sites where duplicate sampling is being conducted by multiple agencies or by one agency with multiple samplers, multiple POCs must be utilized to store all samples.

For non-criteria pollutants, data from multiple sampling methods can be stored under the same POC if the sampling intervals are the same and there is only one sample for the time reported. If multiple open path monitors are reporting data for the same parameter, each open path would be assigned a different POC.

There are no national EPA practices assigning POC values. There may be regional or agency conventions where a POC value may have specific significance. Numbers do not need to be assigned sequentially.

Attributes: Numeric
 2-digit ID
 Mandatory
 Key Field

Coding Instructions: Place a valid POC value in the ninth delimited field. A POC value is valid if it exists in combination with (State Code, County Code, Site ID, and Parameter) or (Tribal Code, Site ID, and Parameter) on the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.12.10 Assessment date

Description: Date that the assessment was performed.

Attributes: Date
 8-digit date
 Mandatory
 Key Field

Coding Instructions: Place a valid date string in the tenth delimited field. The date format is YYYYMMDD.

Business Rules:

Common Rules

1. Assessment Date is mandatory.

Error Messages:

- Assessment Date is required.

2. Assessment Date must fall within a sampling period of the monitor.

Error Messages:

- Date must be within a valid sample period

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.12.11 Assessment Number

Description: A unique number associated with an assessment performed at a site on a given day. Value should be “1” unless additional assessments of the same type are performed.

Attributes: Non-zero integer
Mandatory
Key Field

Coding Instructions: Valid number placed in the eleventh delimited field. Positive number.

Business Rules

Common Rules

1. The value is not a valid positive integer.

Error Messages:

- Assessment number must be a positive integer.
2. The same assessment number already exists for that day for that monitor.

Error Messages:

- Duplicate assessment.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.12.12 Monitor Method Code

Description: The sampling methodology of the monitor being assessed.

Attributes: Alphanumeric
3-digit code
Mandatory on insert

Coding Instructions: A valid method code is to be placed in the twelfth delimited field.

Business Rules

Common Rules

1. The Monitor Method Code must match the Monitor Method assignment in the database for the monitor for the day.

Error Messages:

- The provided method does not match the monitor method for the provided assessment date.

2. The Monitor Method Code must be in the SAMPLING_METHODOLOGIES table for the parameter listed.

Error Messages:

- Please enter a valid Methodology Code for the current Parameter Code.
- The Method does not exist or is inactive.
- Invalid Method Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.12.13 Reported Unit

Description: Unit of measure associated with the reported concentration, mass, or flow value.

Attributes: Alphanumeric
 3-digit code
 Mandatory on insert

Coding Instructions: Unit code is to be placed in the thirteenth field.

Business Rules

Common Rules

1. Must exist in UNITS Reference table.

Error Messages:

- Not a valid unit.
- Unit required.

2. Units of measure must be appropriate for type of assessment.

Error Messages:

- Only concentration units may be used for ____ assessments.
- Only mass units may be used for ____ assessments.
- Flow audits must be submitted with flow units.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.12.14 Monitor Zero Value

Description: The concentration value provided by the monitor being assessed.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the fourteenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.12.15 Assessment Span Value

Description: The value of the known gas standard concentration.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the fifteenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.12.16 Monitor Span Value

Description: The concentration value provided by the monitor being assessed.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the sixteenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.12.17 Null Code

Description: An AQS Null Data Code is used to explain that the required audit was performed, but considered invalid.

Attributes: Alphanumeric
 2-character code

Optional

Coding Instructions: Alphanumeric null code value shall be the qualifier code “1C”. It is to be placed in the seventeenth field.

Business Rules:

Common Rules

1. The value must be a valid qualifier code type of NULL.

Error Messages:

- Invalid Null Data Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.12.18 Comment

Description: Free form text describing the invalidation.

Attributes: Alphanumeric
 Optional

Coding Instructions: Plain text only; “|” is a reserved character, i.e., it should not be used.

Business Rules:

Common Rules

None.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

8 QA Transactions For Labs

8.1 Pb Analysis Audit

8.1.0 Description of Assessment

Requirements for the Pb (lead) analysis audit program can be found in 40 CFR Part 58 Appendix A §3.3.4.2.

Each laboratory analyzing Pb filters receives Pb strips that are prepared with a known amount of Pb. The Pb strips can be supplied by USEPA (OAQPS), or made by the PQAO's analyzing laboratory.

The analyzing laboratory analyzes the strip and reports the mass to the PQAO (or reporting organization) for entry into AQS. The known mass, and the analyzing laboratory's determination of the mass, comprise the pair of values submitted on the transaction, and are used to calculate QA statistics.

Pb strips should be analyzed every quarter (or sampling quarter for PSD). Three samples in each of 2 ranges are required every quarter, distributed over the quarter evenly. The ranges are defined as equivalent ambient Pb concentrations of:

| Parameter | Range | Equivalent ambient Pb concentration ($\mu\text{g}/\text{m}^3$) | Acceptable Levels |
|-----------------------------|-------|---|-------------------------------------|
| TSP LC (14129) | 1 | 30 – 100% of Pb NAAQS | 4 - 40 $\mu\text{g}/\text{strip}^*$ |
| TSP LC (14129) | 2 | 200 – 300% of Pb NAAQS | 41 - 125 $\mu\text{g}/\text{strip}$ |
| PM ₁₀ LC (85129) | 1 | 30 – 100% of Pb NAAQS | 1 – 4 $\mu\text{g}/\text{filter}$ |
| PM ₁₀ LC (85129) | 2 | 200 – 300% of Pb NAAQS | 5 – 11 $\mu\text{g}/\text{filter}$ |

*Acceptable audit levels based on recent assessment of various monitoring organizations.

8.1.1 Transaction Type

Description: Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

Attributes: Alphanumeric
2-character code
Mandatory

Coding Instructions: Place QA in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory
Error Messages:
 - Invalid transaction format.
2. Transaction Type must be in TRANSACTION_TYPES table in database.
Error Messages:
 - Transaction type not handled.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

8.1.2 Action Indicator

Description: Indicates the data manipulation action to be performed by the transaction.

Attributes: Alphanumeric
1-character code
Mandatory

Coding Instructions: Place the values I, U, or D in the second delimited field.
I Insert a new row into the appropriate table in the database.
U Change one or more column values for an existing row in one or more tables.
D Delete a row from a table(s) for the row containing the key data.

Business Rules

Common Rules

1. Action Indicator is required.
Error Messages:
 - Action Code is Required.
2. Action Indicator must be either 'I', 'U', or 'D'.
Error Messages:
 - Invalid Action Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

8.1.3 Assessment Type

Description: Indicates the specific QA assessment associated with the transaction.

Attributes: Alphanumeric QA Assessment Code
 Mandatory
 Key Field

Coding Instructions: Place the values in the third delimited field. Literal: “Pb Analysis Audit”.

Business Rules

Common Rules

1. Assessment type is required.

Error Messages:

- Assessment Type is required.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

8.1.4 Performing Agency

Description: Agency Code of organization performing assessment

Attributes: Alphanumeric
 3 or 4 digit code
 Optional
 System generated if left null

Coding Instructions: Place the performing agency code value in the fourth delimited field. Must exist in the AGENCIES Reference Table.

If this field is left null at submission time, then the agency code from the submitter’s user profile record is used to populate the performing agency field. Therefore, any transactions being submitted on behalf of an agency by a user from a different agency should have the performing agency code populated on the transactions being submitted.

Business Rules

Common Rules

1. The Agency performing the audit must be in the AGENCIES table.

Error Messages:

- Integrity constraint (AIRSRAQS.MONITOR_ASSESSMENTS_PER_AG_FK) violated.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

8.1.5 Primary Quality Assurance Organization

Description: Agency Code of organization responsible for the quality of data for Monitoring Organization

Attributes: Alphanumeric
 3 or 4 digit code
 Mandatory
 System generated if left null

Coding Instructions: Place the code representing the PQAQ for the monitoring organization in the fifth delimited field. Must exist in the AGENCIES Reference Table.

Business Rules

Common Rules

1. The Agency performing the audit must be in the AGENCIES table.

Error Messages:

- Integrity constraint (AIRSRAQS.MONITOR_ASSESSMENTS_PER_AG_FK) violated.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

8.1.6 Parameter Code

Description: The code assigned to the parameter measured by the monitor. Parameters may be pollutants or non-pollutants.

Attributes: Alphanumeric
5-digit code
Mandatory
Key Field

Coding Instructions: Place a valid parameter code in the sixth delimited field. A parameter value is valid if it exists in combination with (State Code, County Code, Site ID, and POC) or (Tribal Code, Site ID, and POC) in the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

8.1.7 Assessment Date

Description: Date that the assessment was performed.

Attributes: Date
8-digit date
Mandatory
Key Field

Coding Instructions: Place a valid date string in the seventh delimited field. The date format is YYYYMMDD.

Business Rules:

Common Rules

1. Assessment Date is mandatory.

Error Messages:

- Assessment Date is required.

2. Assessment Date must fall within a sampling period of the monitor.

Error Messages:

- Date must be within a valid sample period.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

8.1.8 Assessment Number

Description: A unique number associated with an assessment performed at a site on a given day. Value should be “1” unless additional assessments of the same type are performed.

Attributes: Non-zero integer
Mandatory
Key Field

Coding Instructions: Valid number placed in the eighth delimited field. Positive number.

Business Rules

Common Rules

1. The value is not a valid positive integer.

Error Messages:

- Assessment number must be a positive integer.

2. The same assessment number already exists for that day for that monitor.

Error Messages:

- Duplicate assessment.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

8.1.9 Reported Unit

Description: Unit of measure associated with the reported concentration, mass, or flow value.

Attributes: Alphanumeric
 3-digit code
 Mandatory on insert and update

Coding Instructions: Unit code is to be placed in the ninth field.

Business Rules

Common Rules

1. Must exist in UNITS Reference table.

Error Messages:

- Not a valid unit.
- Unit required.

2. Units of measure must be appropriate for type of assessment.

Error Messages:

- Only concentration units may be used for ____ assessments.
- Only mass units may be used for ____ assessments.
- Flow audits must be submitted with flow units.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

8.1.10 Laboratory Response Value 1

Description: The mass of lead reported by lab for level 1.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the tenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

8.1.11 Assessment Mass 1

Description: The known mass of lead on the test strip for level 1.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the eleventh field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

8.1.12 Laboratory Response Value 2

Description: The mass of lead reported by lab for level 2.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the twelfth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

8.1.13 Assessment Mass 2

Description: The known mass of lead on the test strip for level 2.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the thirteenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

8.2 Lab Proficiency Test (PT)

8.2.0 Description of Assessment

A proficiency test (PT) is a type of assessment in which a sample, the composition of which is unknown to the analyst, is provided to test whether the analyst/laboratory can produce analytical results within the specified acceptance criteria. PTs for volatile organic compounds (VOCs), carbonyls and metals are implemented in the NATTS program and can be used in other programs as well.

- VOCs and carbonyls are analyzed on site by analyzers. The proficiency test in this case is auditing the on-site analyzer. This means that the monitor id is needed on the transaction to identify the analyzer being assessed. This assessment is referred to as a Field Proficiency Test or Field PT.
- Metal analysis is performed by a laboratory off site. The proficiency test in this case involves auditing the lab used to analyze the metals. For this case, the monitor id is not appropriate; rather the agency code of the lab is needed to identify the audited lab. This assessment is referred to as a Lab Proficiency Test, or Lab PT.

8.2.1 Transaction Type

Description: Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

Attributes: Alphanumeric
2-character code
Mandatory

Coding Instructions: Place QA in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory

Error Messages:

- Invalid transaction format.

2. Transaction Type must be in TRANSACTION_TYPES table in database.

Error Messages:

- Transaction type not handled.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

8.2.2 Action Indicator

Description: Indicates the data manipulation action to be performed by the transaction.

Attributes: Alphanumeric
 1-character code
 Mandatory

Coding Instructions: Place the values I, U, or D in the second delimited field.
 I Insert a new row into the appropriate table in the database.
 U Change one or more column values for an existing row in one or
 more tables.
 D Delete a row from a table(s) for the row containing the key data.

Business Rules

Common Rules

1. Action Indicator is required.
 Error Messages:
 - Action Code is Required.
2. Action Indicator must be either 'I', 'U', or 'D'.
 Error Messages:
 - Invalid Action Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

8.2.3 Assessment Type

Description: Indicates the specific QA assessment associated with the transaction.

Attributes: Alphanumeric QA Assessment Code
 Mandatory
 Key Field

Coding Instructions: Place the values in the third delimited field. Literal: "Lab Proficiency Test".

Business Rules

Common Rules

1. Assessment type is required.

Error Messages:

- Assessment Type is required.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

8.2.4 Performing Agency

Description: Agency Code of laboratory performing assessment (analysis of strips).

Attributes: Alphanumeric
 3 or 4 digit code
 Mandatory
 Key field

Coding Instructions: Place the performing agency code value in the fourth delimited field.
Must exist in the AGENCIES Reference Table.

Business Rules

Common Rules

1. The Agency performing the audit must be in the AGENCIES table.

Error Messages:

- Integrity constraint (AIRSRAQS.MONITOR_ASSESSMENTS_PER_AG_FK) violated.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

8.2.5 Primary Quality Assurance Organization

Description: Agency Code of organization responsible for the quality of data for Monitoring Organization.

Attributes: Alphanumeric
 3 or 4 digit code
 Mandatory
 Key field

Coding Instructions: Place the code representing the PQAQO for the monitoring organization in the fifth delimited field. Must exist in the AGENCIES Reference Table.

Business Rules

Common Rules

1. The Agency performing the audit must be in the AGENCIES table.

Error Messages:

- Integrity constraint (AIRSRAQS.MONITOR_ASSESSMENTS_PER_AG_FK) violated.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

8.2.6 Parameter Code

Description: The code assigned to the parameter measured by the monitor. Parameters may be pollutants or non-pollutants.

Attributes: Alphanumeric
 5-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid parameter code in the sixth delimited field. A parameter value is valid if it exists in combination with (State Code, County Code, Site ID, and POC) or (Tribal Code, Site ID, and POC) in the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal

Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

8.2.7 Assessment Date

Description: Date that the assessment was performed.

Attributes: Date
 8-digit date
 Mandatory
 Key Field

Coding Instructions: Place a valid date string in the seventh delimited field. The date format is YYYYMMDD.

Business Rules:

Common Rules

1. Assessment Date is mandatory.

Error Messages:

- Assessment Date is required.

2. Assessment Date must fall within a sampling period of the monitor.

Error Messages:

- Date must be within a valid sample period.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

8.2.8 Assessment Number

Description: A unique number associated with an assessment performed at a site on a given day. Value should be "1" unless additional assessments of the same type are performed.

Attributes: Non-zero integer
Mandatory
Key Field

Coding Instructions: Valid number placed in the eighth delimited field. Positive number.

Business Rules

Common Rules

1. The value is not a valid positive integer.
Error Messages:
 - Assessment number must be a positive integer.
2. The same assessment number already exists for that day for that monitor.
Error Messages:
 - Duplicate assessment.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

8.2.9 Reported Unit

Description: Unit of measure associated with the reported concentration, mass, or flow value.

Attributes: Alphanumeric
3-digit code
Mandatory on insert and update

Coding Instructions: Unit code is to be placed in the ninth field.

Business Rules

Common Rules

1. Must exist in UNITS Reference table.
Error Messages:
 - Not a valid unit.
 - Unit required.
2. Units of measure must be appropriate for type of assessment.

Error Messages:

- Only concentration units may be used for ____ assessments.
- Only mass units may be used for ____ assessments.
- Flow audits must be submitted with flow units.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

**8.2.10 Laboratory Response Value
1**

Description: The mass of analyte reported by Lab.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the tenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

8.2.11 Assessment Mass 1

Description: The known mass of analyte on the test media.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the eleventh field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

9 QA Transactions For Verification Standards

9.1 Ambient Air Protocol Gas Verification Program (AA-PGVP)

9.1.0 Description of Assessment

The basic principles of the U.S. Environmental Protection Agency (EPA) *Traceability Protocol for the Assay and Certification of Gaseous Calibration Standards* (EPA, 1997) were developed jointly by EPA, the National Bureau of Standards (now National Institute of Standards and Technology [NIST]), and specialty gas producers over 30 years ago. At the time, commercially prepared calibration gases were perceived as being too inaccurate and too unstable for use in calibrations and audits of continuous source emission monitors and ambient air quality monitors. The protocol was developed to improve their quality by establishing their traceability to NIST Standard Reference Materials (SRMs) and to provide reasonably priced products. This protocol established the gas metrological procedures for measurement and certification of these calibration gases for EPA's Acid Rain Program under 40 Code of Federal Regulations (CFR) Part 75, for the Ambient Air Quality Monitoring Program under 40 CFR Part 58, and for the Source Testing Program under 40 CFR Parts 60, 61, and 68. EPA required monitoring organizations implementing these programs ("the regulated community") to use EPA Protocol Gases or NIST standards as their calibration gases. 40 CFR Part 58 Appendix A includes the following language.

2.6 Gaseous and Flow Rate Audit Standards. Gaseous pollutant concentration standards (permeation devices or cylinders of compressed gas) used to obtain test concentrations for CO, SO₂, NO, and NO₂ must be traceable to either a National Institute of Standards and Technology (NIST) Traceable Reference Material (NTRM), NIST Standard Reference Materials (SRM) and Netherlands Measurement Institute (NMI) Primary Reference Materials (valid as covered by Joint Declaration of Equivalence) or a NIST-certified Gas Manufacturer's Internal Standard (GMIS), certified in accordance with one of the procedures given in reference 4 of this appendix. Vendors advertising certification with the procedures provided in reference 4 of this appendix and distributing gases as "EPA Protocol Gas" must participate in the EPA Protocol Gas Verification Program or not use "EPA" in any form of advertising.

In 1997, EPA revised the protocol to establish detailed statistical procedures for estimating the total uncertainty of these gases (EPA, 1997). The acceptance criterion that is required for EPA's Acid Rain Program (EPA, 1993) is for the total uncertainty to be less than +/- 2.0 percent. Although not specified in CFR the AA-PGVP established an acceptance goal of 4%.

In 2009 EPA-OAQPS and EPA Region's 2 and 7 developed the Ambient Air Protocol Gas Verification Program (AA-PGVP). This program is expected to:

- ensure that producers selling EPA Protocol Gases participate in the AA-PGVP and
- provide end users with information about participating producers and verification results.

This program is considered a verification program because its current implementation level does not allow for a large enough sample size of EPA Protocol Gases from any one specialty gas producer to yield a statistically rigorous assessment of the accuracy.

The program is implemented by monitoring organizations who purchase a cylinder from the specialty gas producer and send the new, unused gas cylinder to the Region 2 or Region 7 laboratory. This process will allow for a submission that is “blind” to the producer. However, if EPA does not receive cylinders from a producer that is used by a monitoring organization, then EPA has to contact producers directly for cylinder submission.

9.1.1 Transaction Type

Description: Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

Attributes: Alphanumeric
2-character code
Mandatory

Coding Instructions: Place QA in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory
Error Messages:
 - Invalid transaction format.
2. Transaction Type must be in TRANSACTION_TYPES table in database.
Error Messages:
 - Transaction type not handled.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

9.1.2 Action Indicator

Description: Indicates the data manipulation action to be performed by the transaction.

Attributes: Alphanumeric
1-character code

Mandatory

Coding Instructions: Place the values I, U, or D in the second delimited field.

- I Insert a new row into the appropriate table in the database.
- U Change one or more column values for an existing row in one or more tables.
- D Delete a row from a table(s) for the row containing the key data.

Business Rules

Common Rules

1. Action Indicator is required.
Error Messages:
 - Action Code is Required.
2. Action Indicator must be either 'I', 'U', or 'D'.
Error Messages:
 - Invalid Action Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

9.1.3 Assessment Type

Description: Indicates the specific QA assessment associated with the transaction.

Attributes: Alphanumeric QA Assessment Code
 Mandatory
 Key Field

Coding Instructions: Place the values in the third delimited field. Literal: "AA-PGVP".

Business Rules

Common Rules

1. Assessment type is required.
Error Messages:
 - Assessment Type is required.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

9.1.4 Performing Agency

Description: Agency Code of organization performing assessment

Attributes: Alphanumeric
 3 or 4 digit code
 Mandatory
 Key field

Coding Instructions: Place the performing agency code value in the fourth delimited field. Must exist in the AGENCIES Reference Table.

Business Rules

Common Rules

1. The Agency performing the audit must be in the AGENCIES table.

Error Messages:

- Integrity constraint (AIRSRAQS.MONITOR_ASSESSMENTS_PER_AG_FK) violated.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

9.1.5 Producer ID

Description: Unique identifier of organization that produced cylinder being assessed.

Attributes: Alphanumeric
 Up to 8 characters
 Mandatory
 Key Field

Coding Instructions: Place in the fifth field. Must exist in AAPGVP_PRODUCERS Reference Table.

Business Rules

Common Rules

1. The Agency must be in the AAPGVP_PRODUCERS table.

Error Messages:

- Not a valid cylinder producer ID.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

9.1.6 Cylinder ID

Description: Unique identifier (e.g. serial number) of gas cylinder being assessed.

Attributes: Alphanumeric
 Up to 40 characters
 Mandatory
 Key Field

Coding Instructions: Place value in the sixth field.

Business Rules

Common Rules

None.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

9.1.7 Parameter Code

Description: The code assigned to the parameter measured by the monitor. Parameters may be pollutants or non-pollutants.

Attributes: Alphanumeric
 5-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid parameter code in the seventh delimited field. A parameter value is valid if it exists in combination with (State Code, County Code, Site ID, and POC) or (Tribal Code, Site ID, and POC) in the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

9.1.8 Assessment Date

Description: Date that the assessment was performed.

Attributes: Date
 8-digit date
 Mandatory
 Key Field

Coding Instructions: Place a valid date string in the eighth delimited field. The date format is YYYYMMDD.

Business Rules:

Common Rules

1. Assessment Date is mandatory.

Error Messages:

- Assessment Date is required.

2. Assessment Date must fall within a sampling period of the monitor.

Error Messages:

- Date must be within a valid sample period.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

9.1.9 Assessment Number

Description: A unique number associated with an assessment performed at a site on a given day. Value should be “1” unless additional assessments of the same type are performed.

Attributes: Non-zero integer
Mandatory
Key Field

Coding Instructions: Valid number placed in the ninth delimited field. Positive number.

Business Rules

Common Rules

1. The value is not a valid positive integer.
Error Messages:
 - Assessment number must be a positive integer.
2. The same assessment number already exists for that day for that monitor.
Error Messages:
 - Duplicate assessment.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

9.1.10 Reported Unit

Description: Unit of measure associated with the reported concentration, mass, or flow value.

Attributes: Alphanumeric
3-digit code
Mandatory on insert and update

Coding Instructions: Unit code is to be placed in the tenth field.

Business Rules

Common Rules

1. Must exist in UNITS Reference table.

Error Messages:

- Not a valid unit.
- Unit required.

2. Units of measure must be appropriate for type of assessment.

Error Messages:

- Only concentration units may be used for ____ assessments.
- Only mass units may be used for ____ assessments.
- Flow audits must be submitted with flow units.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

9.1.11 Cylinder Certified Concentration

Description: Gas concentration specified by cylinder producer.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the eleventh field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

9.1.12 Assessment Concentration

Description: Measured concentration of gas in cylinder.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the twelfth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

9.2 Ozone Standard Reference Photometer and Ozone Transfer Standard Verification (SRP)

9.2.0 Description of Assessment

On February 8, 1979 (Federal Register, 44:8221-8233), the U.S. Environmental Protection Agency amended Appendix D of Title 40, Code of Federal Regulations (CFR), Part 50, to prescribe a calibration procedure for the calibration of reference methods for measuring ozone in the atmosphere. The procedure is based on the use of ultraviolet (UV) photometry as the authoritative standard for ozone and allows the use of transfer standards for the calibration of ambient ozone monitors, provided such transfer standards are adequately referenced to a UV ozone standard of higher authority (level) and traceability.

Guidance on the process can be found in the document *Transfer Standards for the Calibration of Air Monitoring Analyzers for Ozone* on AMTIC

<http://www.epa.gov/ttn/amtic/files/ambient/qaqc/OzoneTransferStandardGuidance.pdf>

The document discusses how various levels of transfer standards are verified and traceable to an authoritative NIST standard.

The transaction can be used to report:

1. NIST Level 1 SRP verifications to the EPA RTP Level 1 SRPs
2. EPA RTP Level 1 SRPs to EPA Regional Level 1 SRPs
3. EPA Regional Level 1SRPs to monitoring organization Level 2 transfer standards
4. monitoring organization Level 2 transfer standards to monitoring organization Level 3 transfer standards
5. monitoring organization Level 3 transfer standards to monitoring organization Level 4 transfer standards
6. 6 by 6 verifications
7. Re-verification (new point to 6 by 6)

In the case of each transaction the authoritative standard is the standard “closer” in traceability to the NIST standard.

9.2.1 Transaction Type

Description: Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

Attributes: Alphanumeric
2-character code
Mandatory

Coding Instructions: Place QA in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory
Error Messages:
 - Invalid transaction format.
2. Transaction Type must be in TRANSACTION_TYPES table in database.
Error Messages:
 - Transaction type not handled.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

9.2.2 Action Indicator

Description: Indicates the data manipulation action to be performed by the transaction.

Attributes: Alphanumeric
 1-character code
 Mandatory

Coding Instructions: Place the values I, U, or D in the second delimited field.
I Insert a new row into the appropriate table in the database.
U Change one or more column values for an existing row in one or
 more tables.
D Delete a row from a table(s) for the row containing the key data.

Business Rules

Common Rules

1. Action Indicator is required.
Error Messages:
 - Action Code is Required.
2. Action Indicator must be either 'I', 'U', or 'D'.
Error Messages:
 - Invalid Action Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

9.2.3 Assessment Type

Description: Indicates the specific QA assessment associated with the transaction.

Attributes: Alphanumeric QA Assessment Code
 Mandatory
 Key Field

Coding Instructions: Place the values in the third delimited field. Literal: “Ozone SRP”.

Business Rules

Common Rules

1. Assessment type is required.

Error Messages:

- Assessment Type is required.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

9.2.4 Verification Type

Description: “6X6” is for the initial verification of a new standard ozone generator.
 “Standard” is for a routine SRP assessment.

Attributes: Alphanumeric
 Mandatory
 Key Field

Coding Instructions: Literal: “6X6” or “Standard” in the fourth field.

Business Rules

Common Rules

1. The Verification Type must be “6X6” or “Standard”.

Error Messages:

- Invalid Verification Type.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

9.2.5 Performing Agency

Description: Agency Code of organization performing the assessment.

Attributes: Alphanumeric
 3 or 4 digit code
 Mandatory
 Key field

Coding Instructions: Place the performing agency code value in the fourth delimited field.
Must exist in the AGENCIES Reference Table.

Business Rules

Common Rules

1. The Agency performing the audit must be in the AGENCIES table.

Error Messages:

- Integrity constraint (AIRSRAQS.MONITOR_ASSESSMENTS_PER_AG_FK) violated.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

9.2.6 Primary Quality Assurance Organization

Description: Agency Code of organization responsible for the quality of instrument being assessed.

Attributes: Alphanumeric
 3 or 4 digit code

Mandatory
Key field

Coding Instructions: Place the code representing the PQA0 for the monitoring organization in the fifth delimited field. Must exist in the AGENCIES Reference Table.

Business Rules

Common Rules

1. The Agency performing the audit must be in the AGENCIES table.

Error Messages:

- Integrity constraint (AIRSRAQS.MONITOR_ASSESSMENTS_PER_AG_FK) violated.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

9.2.7 Parameter Code

Description: The code assigned to the parameter measured by the monitor. Parameters may be pollutants or non-pollutants.

Attributes: Alphanumeric
5-digit code
Mandatory
Key Field

Coding Instructions: Place a valid parameter code in the seventh delimited field. A parameter value is valid if it exists in combination with (State Code, County Code, Site ID, and POC) or (Tribal Code, Site ID, and POC) in the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

9.2.8 Authoritative Standard ID

Description: Unique ID for Authoritative standard.

Attributes: Alphanumeric
 Up to 8 characters
 Mandatory
 Key Field

Coding Instructions: Place in the eighth field. Must exist in SRP_STANDARDS Reference Table.

Business Rules

Common Rules

1. The Agency must be in the SRP_STANDARDS table.

Error Messages:

- Not a valid standard ID.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

9.2.9 Authoritative Standard Level

Description: Primary EPA standard is Level 1, those validated against it are level 2, and those validated against level 2 standards are level 3.

Attributes: Numeric
 1-digit
 Mandatory
 Key Field

Coding Instructions: Place in the ninth field.

Business Rules

Common Rules

1. Must be 1, 2, or 3.
Error Messages:
 - Not a valid standard level.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

9.2.10 Transfer standard ID

Description: Unique ID code (serial number) for transfer standard.

Attributes: Alphanumeric
 Up to 40 characters
 Mandatory
 Key Field

Coding Instructions: Place in the tenth field.

Business Rules

Common Rules

None.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

9.2.11 Transfer Standard Level

Description: Level 1, 2, 3, 4 transfer standard has to be equal or a higher number then the Authoritative Standard

Attributes: Numeric
 1-digit
 Mandatory
 Key Field

Coding Instructions: Place in the eleventh field.

Coding Instructions: Place value in the eleventh field.

Business Rules

Common Rules

1. Must be 1, 2, 3, or 4.

Error Messages:

- Not a valid transfer standard level.
2. Must be equal to or greater than the Authoritative Standard Level on the same record.

Error Messages:

- Transfer standard level less than Authoritative Standard Level.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

9.2.12 Assessment Date

Description: Date that the assessment was performed.

Attributes: Date
 8-digit date
 Mandatory
 Key Field

Coding Instructions: Place a valid date string in the twelfth delimited field. The date format is YYYYMMDD.

Business Rules:

Common Rules

1. Assessment Date is mandatory.

Error Messages:

- Assessment Date is required.
2. Assessment Date must fall within a sampling period of the monitor.

Error Messages:

- Date must be within a valid sample period.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

9.2.13 Assessment Number

Description: A unique number associated with an assessment performed at a site on a given day. Value should be "1" unless additional assessments of the same type are performed.

Attributes: Non-zero integer
Mandatory
Key Field

Coding Instructions: Valid number placed in the thirteenth delimited field. Positive number.

Business Rules

Common Rules

1. The value is not a valid positive integer.

Error Messages:

- Assessment number must be a positive integer.
2. The same assessment number already exists for that day for that monitor.

Error Messages:

- Duplicate assessment.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

9.2.14 Reported Unit

Description: Unit of measure associated with the reported concentration, mass, or flow value.

Attributes: Alphanumeric
3-digit code
Mandatory on insert and update

Coding Instructions: Unit code is to be placed in the fourteenth field.

Business Rules

Common Rules

1. Must exist in UNITS Reference table.

Error Messages:

- Not a valid unit.
- Unit required.

2. Units of measure must be appropriate for type of assessment.

Error Messages:

- Only concentration units may be used for ____ assessments.
- Only mass units may be used for ____ assessments.
- Flow audits must be submitted with flow units.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

9.2.15 Transfer Standard Value 1

Description: Measurement from instrument being assessed.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the fifteenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

9.2.16 Authoritative Standard Value 1

Description: Measurement from authoritative standard instrument.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the sixteenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

9.2.17 Transfer Standard Value 2

Description: Measurement from instrument being assessed..

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the seventeenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

**9.2.18 Authoritative Standard Value
2**

Description: Measurement from authoritative standard instrument.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the eighteenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

9.2.19 Transfer Standard Value 3

Description: Measurement from instrument being assessed.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the nineteenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

9.2.20 Authoritative Standard Value 3

Description: Measurement from authoritative standard instrument.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the twentieth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

9.2.21 Transfer Standard Value 4

Description: Measurement from instrument being assessed..

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the twenty-first field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

9.2.22 Authoritative Standard Value

4

Description: Measurement from authoritative standard instrument..

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the twenty-second field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

9.2.23 Transfer Standard Value 5

Description: Measurement from instrument being assessed.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the twenty-third field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

9.2.24 Authoritative Standard Value 5

Description: Measurement from authoritative standard instrument.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the twenty-fourth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

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None.

Delete Rules

None.

9.2.25 Transfer Standard Value 6

Description: Measurement from instrument being assessed.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the twenty-fifth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

9.2.26 Authoritative Standard Value 6

Description: Measurement from authoritative standard instrument.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the twenty-sixth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for

the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

9.2.27 Transfer Standard Value 7

Description: Measurement from instrument being assessed..

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the twenty-seventh field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

9.2.28 Authoritative Standard Value 7

Description: Measurement from authoritative standard instrument.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the twenty-eighth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

9.2.29 Transfer Standard Value 8

Description: Measurement from instrument being assessed..

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the twenty-ninth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

9.2.30 Authoritative Standard Value 8

Description: Measurement from authoritative standard instrument.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the thirtieth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

9.2.31 Transfer Standard Value 9

Description: Measurement from instrument being assessed.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the thirty-first field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

9.2.32 Authoritative Standard Value 9

Description: Measurement from authoritative standard instrument.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the thirty-second field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

9.2.33 Transfer Standard Value 10

Description: Measurement from instrument being assessed..

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the thirty-third field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

9.2.34 Authoritative Standard Value 10

Description: Measurement from authoritative standard instrument.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the thirty-fourth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

10 QA Transactions for Speciation Flow

10.1 Speciation Flow Rate Verification

10.1.0 Description of Assessment

Chemical Speciation Network (CSN) site operators collect flow verification and other information to assess operation of speciation samplers. In addition, site auditors from EPA and PQAOs perform regular audits that include a flow audit for these samplers.

Flow rate verifications should be conducted monthly, although reporting to AQS is not required. Semi-Annual Flow Rate Audits should be conducted every 6 months, and are required reporting.

Multi-parameter flows

Each sampler has multiple flow channels containing a different type of filter (Teflon, nylon, or quartz). Each filter is analyzed for multiple analytes, each of which gets its own parameter code. Thus each flow channel represents a number of different AQS parameter codes that are captured by the type of filter in that channel. Each channel's flow is independent and needs to be verified separately. Thus the three sampler channels will involve three flow checks, but over 40 separate parameters.

This transaction allows reporting the flow values by channel. This alleviates the need to submit the same flow information on many similar transactions on a parameter by parameter basis. Instead, the parameters are mapped to each channel within the database, and only one transaction on a channel basis, rather than multiple transactions on a parameter basis, are needed.

The monitors are mapped to channels by a new table (t_monitor_channels) which allows the reported channel flow data to be associated with all of the appropriate monitors for each site.

The conceptual difference between a flow rate verification and a flow audit consists of the personnel performing the assessment and the standard used. When an audit is performed, an independent auditor and flow standard are used (as opposed to the more routine flow verifications). However, the only difference on the transaction is the assessment type specifying flow rate verification vs. flow audit.

10.1.1 Transaction Type

Description: Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

Attributes: Alphanumeric
2-character code
Mandatory

Coding Instructions: Place QA in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory
Error Messages:
 - Invalid transaction format.
2. Transaction Type must be in TRANSACTION_TYPES table in database.
Error Messages:
 - Transaction type not handled.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

10.1.2 Action Indicator

Description: Indicates the data manipulation action to be performed by the transaction.

Attributes: Alphanumeric
1-character code
Mandatory

Coding Instructions: Place the values I, U, or D in the second delimited field.
I Insert a new row into the appropriate table in the database.
U Change one or more column values for an existing row in one or more tables.
D Delete a row from a table(s) for the row containing the key data.

Business Rules

Common Rules

1. Action Indicator is required.
Error Messages:
 - Action Code is Required.
2. Action Indicator must be either 'I', 'U', or 'D'.
Error Messages:
 - Invalid Action Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

10.1.3 Assessment Type

Description: Indicates the specific QA assessment associated with the transaction.

Attributes: Alphanumeric QA Assessment Code
 Mandatory
 Key Field

Coding Instructions: Place the values in the third delimited field. Literal: “Speciation Flow Rate V”.

Business Rules

Common Rules

1. Assessment type is required.

Error Messages:

- Assessment Type is required.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

10.1.4 Performing Agency

Description: Agency Code of organization performing assessment

Attributes: Alphanumeric
 3 or 4 digit code
 Optional
 System generated if left null

Coding Instructions: Place the performing agency code value in the fourth delimited field. Must exist in the AGENCIES Reference Table.

If this field is left null at submission time, then the agency code from the submitter’s user profile record is used to populate the performing agency field. Therefore, any transactions being

submitted on behalf of an agency by a user from a different agency should have the performing agency code populated on the transactions being submitted.

Business Rules

Common Rules

1. The Agency performing the audit must be in the AGENCIES table.

Error Messages:

- Integrity constraint (AIRSRAQS.MONITOR_ASSESSMENTS_PER_AG_FK) violated.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

10.1.5 State Code/Tribal Indicator

The fifth field on a transaction can be either a State Code or a Tribal indicator. They are described as follows:

State Code Description: A FIPS (Federal Information Processing Standards) code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Tribal Indicator Description: A flag, with value “TT”, to indicate that this data is for a Native American Tribe, and that the next field on the transaction identifies a tribal area using the Bureau of Indian Affairs tribal code.

Attributes: Alphanumeric
 2-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid FIPS state code or a Tribal Indicator in delimited field 5. A State Code is valid if it exists in the STATES Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

10.1.6 County Code/Tribal Code

The sixth field on any transaction can be either a County Code or a Tribal Code. A County code is indicated by a valid state code in the third field, while a Tribal Code is indicated by a Tribal Indicator in the third field.

County Code Description: A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

Tribal Code Description: A value that identifies a Tribal Area using a Bureau of Indian Affairs Tribal Code.

Attributes: Alphanumeric
 3-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid county code or a valid tribal code in the sixth delimited field. A County Code is valid if it exists at active status in the Counties table. A Tribal Code is valid if it exists at active status in the Tribal_Areas table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

10.1.7 Site Number

Description: A numeric identifier that uniquely identifies each air monitoring site within a county or tribal area. There is no requirement that Site Numbers be assigned continuously or in any particular order. Regional and Local organizations are thus free to allocate site numbers in any way they chose as long as there is no duplication within a county and tribal area. For Tribal sites, because tribal areas may cross county or state lines, care must be taken to ensure that the Site Number is unique in the effected Tribal Area and states-county.

A specific Site Number is associated with a specific physical location and address. Any change in address requires a new Site Number to be assigned. This address change could include a change from the roof of one building to another. A change in location on the same roof should not normally require a new Site Number. Although an address change would routinely mean a new Site Number, some changes that do not change the site's location in respect to surrounding sources and its measurement scale, would require no change. An EPA Regional Office should be consulted for assistance in determining whether a new Site Number is required.

If a new Site Number is needed for a site not operated by the air pollution control agency, that agency should be contacted to assist in the Number assignment, to ensure that the Number is unique within the county. In other words, when a new Site Number is assigned, it must be different from any other Site Number already existing for that combination of State and County or Tribal Code.

Attributes: Alphanumeric
4-digit Number
Mandatory
Key Field

Coding Instructions: Place a four-digit numeric code in the seventh delimited field. For update and delete, a Site Number is valid if it exists in combination with state code and County or Tribal Code in the Sites Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site Number, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

10.1.8 Sampler ID

Description: The user's unique name or id for the sampler at the site.

Attributes: Alphanumeric
 Up to 20 characters
 Mandatory
 Key Field

Coding Instructions: Place value in eighth field. Must exist for the Site in database (that is, it must have been loaded with an AD transaction previously).

Business Rules

Common Rules

1. The Sampler ID must be in the SITE_SAMPLERS table in the database.

Error Messages:

- Sampler ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

10.1.9 Channel Number

Description: Number assigned to channel on sampler at the site.

Attributes: Numeric
 Positive Integer
 Mandatory
 Key Field

Coding Instructions: Place number in the ninth field.

Business Rules

Common Rules

1. The channel must be defined for Sampler in database.

Error Messages:

- Channel Number not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

10.1.10 Assessment Date

Description: Date that the assessment was performed.

Attributes: Date
 8-digit date
 Mandatory
 Key Field

Coding Instructions: Place a valid date string in the tenth delimited field. The date format is YYYYMMDD.

Business Rules:

Common Rules

1. Assessment Date is mandatory.

Error Messages:

- Assessment Date is required.

2. Assessment Date must fall within a sampling period of the monitor.

Error Messages:

- Date must be within a valid sample period.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

10.1.11 Assessment Number

Description: A unique number associated with an assessment performed at a site on a given day. Value should be “1” unless additional assessments of the same type are performed.

Attributes: Non-zero integer
Mandatory
Key Field

Coding Instructions: Valid number placed in the eleventh delimited field. Positive number.

Business Rules

Common Rules

1. The value is not a valid positive integer.
Error Messages:
 - Assessment number must be a positive integer.
2. The same assessment number already exists for that day for that monitor.
Error Messages:
 - Duplicate assessment.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

10.1.12 Reported Unit

Description: Unit of measure associated with the reported concentration, mass, or flow value.

Attributes: Alphanumeric
3-digit code
Mandatory on insert and update

Coding Instructions: Unit code is to be placed in the twelfth field.

Business Rules

Common Rules

1. Must exist in UNITS Reference table.
Error Messages:
 - Not a valid unit.
 - Unit required.
2. Units of measure must be appropriate for type of assessment.
Error Messages:
 - Only concentration units may be used for ____ assessments.
 - Only mass units may be used for ____ assessments.

- Flow audits must be submitted with flow units.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

10.1.13 Sampler Flow Rate

Description: The measured flow rate provided by the sampler being assessed.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the thirteenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

10.1.14 Assessment Flow Rate

Description: The flow rate of the flow transfer standard.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the fourteenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

10.2 Speciation Semi-Annual Flow Rate Audit

10.2.0 Description of Assessment

Chemical Speciation Network (CSN) site operators collect flow verification and other information to assess operation of speciation samplers. In addition, site auditors from EPA and PQAOs perform regular audits that include a flow audit for these samplers.

Flow rate verifications should be conducted monthly, although reporting to AQS is not required. Semi-Annual Flow Rate Audits should be conducted every 6 months, and are required reporting.

Multi-parameter flows

Each sampler has multiple flow channels containing a different type of filter (Teflon, nylon, or quartz). Each filter is analyzed for multiple analytes, each of which gets its own parameter code. Thus each flow channel represents a number of different AQS parameter codes that are captured by the type of filter in that channel. Each channel's flow is independent and needs to be verified separately. Thus the three sampler channels will involve three flow checks, but over 40 separate parameters.

This transaction allows reporting the flow values by channel. This alleviates the need to submit the same flow information on many similar transactions on a parameter by parameter basis. Instead, the parameters are mapped to each channel within the database, and only one transaction on a channel basis, rather than multiple transactions on a parameter basis, are needed.

The monitors are mapped to channels by a new table (t_monitor_channels) which allows the reported channel flow data to be associated with all of the appropriate monitors for each site.

The conceptual difference between a flow rate verification and a flow audit consists of the personnel performing the assessment and the standard used. When an audit is performed, an independent auditor and flow standard are used (as opposed to the more routine flow verifications). However, the only difference on the transaction is the assessment type specifying flow rate verification vs. flow audit.

10.2.1 Transaction Type

Description: Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

Attributes: Alphanumeric
2-character code
Mandatory

Coding Instructions: Place QA in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory
Error Messages:
 - Invalid transaction format.
2. Transaction Type must be in TRANSACTION_TYPES table in database.
Error Messages:
 - Transaction type not handled.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

10.2.2 Action Indicator

Description: Indicates the data manipulation action to be performed by the transaction.

Attributes: Alphanumeric
1-character code
Mandatory

Coding Instructions: Place the values I, U, or D in the second delimited field.
I Insert a new row into the appropriate table in the database.
U Change one or more column values for an existing row in one or more tables.
D Delete a row from a table(s) for the row containing the key data.

Business Rules

Common Rules

1. Action Indicator is required.
Error Messages:
 - Action Code is Required.
2. Action Indicator must be either 'I', 'U', or 'D'.
Error Messages:
 - Invalid Action Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

10.2.3 Assessment Type

Description: Indicates the specific QA assessment associated with the transaction.

Attributes: Alphanumeric QA Assessment Code
 Mandatory
 Key Field

Coding Instructions: Place the values in the third delimited field. Literal: “Speciation Flow Rate Audit”.

Business Rules

Common Rules

1. Assessment type is required.

Error Messages:

- Assessment Type is required.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

10.2.4 Performing Agency

Description: Agency Code of organization performing assessment

Attributes: Alphanumeric
 3 or 4 digit code
 Optional
 System generated if left null

Coding Instructions: Place the performing agency code value in the fourth delimited field. Must exist in the AGENCIES Reference Table.

If this field is left null at submission time, then the agency code from the submitter’s user profile record is used to populate the performing agency field. Therefore, any transactions being submitted on behalf of an agency by a user from a different agency should have the performing agency code populated on the transactions being submitted.

Business Rules

Common Rules

1. The Agency performing the audit must be in the AGENCIES table.

Error Messages:

- Integrity constraint (AIRSRAQS.MONITOR_ASSESSMENTS_PER_AG_FK) violated.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

10.2.5 State Code/Tribal Indicator

The fifth field on a transaction can be either a State Code or a Tribal indicator. They are described as follows:

State Code Description: A FIPS (Federal Information Processing Standards) code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Tribal Indicator Description: A flag, with value “TT”, to indicate that this data is for a Native American Tribe, and that the next field on the transaction identifies a tribal area using the Bureau of Indian Affairs tribal code.

Attributes: Alphanumeric
2-digit code
Mandatory
Key Field

Coding Instructions: Place a valid FIPS state code or a Tribal Indicator in delimited field 5. A State Code is valid if it exists in the STATES Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

10.2.6 County Code/Tribal Code

The sixth field on any transaction can be either a County Code or a Tribal Code. A County code is indicated by a valid state code in the third field, while a Tribal Code is indicated by a Tribal Indicator in the third field.

County Code Description: A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

Tribal Code Description: A value that identifies a Tribal Area using a Bureau of Indian Affairs Tribal Code.

Attributes: Alphanumeric
 3-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid county code or a valid tribal code in the sixth delimited field. A County Code is valid if it exists at active status in the Counties table. A Tribal Code is valid if it exists at active status in the Tribal_Areas table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

10.2.7 Site Number

Description: A numeric identifier that uniquely identifies each air monitoring site

within a county or tribal area. There is no requirement that Site Numbers be assigned continuously or in any particular order. Regional and Local organizations are thus free to allocate site numbers in any way they chose as long as there is no duplication within a county and tribal area. For Tribal sites, because tribal areas may cross county or state lines, care must be taken to ensure that the Site Number is unique in the effected Tribal Area and states-county.

A specific Site Number is associated with a specific physical location and address. Any change in address requires a new Site Number to be assigned. This address change could include a change from the roof of one building to another. A change in location on the same roof should not normally require a new Site Number. Although an address change would routinely mean a new Site Number, some changes that do not change the site's location in respect to surrounding sources and its measurement scale, would require no change. An EPA Regional Office should be consulted for assistance in determining whether a new Site Number is required.

If a new Site Number is needed for a site not operated by the air pollution control agency, that agency should be contacted to assist in the Number assignment, to ensure that the Number is unique within the county. In other words, when a new Site Number is assigned, it must be different from any other Site Number already existing for that combination of State and County or Tribal Code.

Attributes: Alphanumeric
 4-digit Number
 Mandatory
 Key Field

Coding Instructions: Place a four-digit numeric code in the seventh delimited field. For update and delete, a Site Number is valid if it exists in combination with state code and County or Tribal Code in the Sites Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site Number, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules
None.

10.2.8 Sampler ID

Description: The user's unique name or id for the sampler at the site.

Attributes: Alphanumeric
 Up to 20 characters
 Mandatory
 Key Field

Coding Instructions: Place value in eighth field. Must exist for the Site in database (that is, it must have been loaded with an AD transaction previously).

Business Rules

Common Rules

1. The Sampler ID must be in the SITE_SAMPLERS table in the database.

Error Messages:

- Sampler ID not in database.

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

10.2.9 Channel Number

Description: Number assigned to channel on sampler at the site.

Attributes: Numeric
 Positive Integer
 Mandatory
 Key Field

Coding Instructions: Place number in the ninth field.

Business Rules

Common Rules

1. The channel must be defined for Sampler in database.

Error Messages:

- Channel Number not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

10.2.10 Assessment Date

Description: Date that the assessment was performed.

Attributes: Date
 8-digit date
 Mandatory
 Key Field

Coding Instructions: Place a valid date string in the tenth delimited field. The date format is YYYYMMDD.

Business Rules:

Common Rules

1. Assessment Date is mandatory.

Error Messages:

- Assessment Date is required.

2. Assessment Date must fall within a sampling period of the monitor.

Error Messages:

- Date must be within a valid sample period.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

10.2.11 Assessment Number

Description: A unique number associated with an assessment performed at a site on a given day. Value should be "1" unless additional assessments of the same type are performed.

Attributes: Non-zero integer
Mandatory
Key Field

Coding Instructions: Valid number placed in the eleventh delimited field. Positive number.

Business Rules

Common Rules

1. The value is not a valid positive integer.
Error Messages:
 - Assessment number must be a positive integer.
2. The same assessment number already exists for that day for that monitor.
Error Messages:
 - Duplicate assessment.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

10.2.12 Reported Unit

Description: Unit of measure associated with the reported concentration, mass, or flow value.

Attributes: Alphanumeric
3-digit code
Mandatory on insert and update

Coding Instructions: Unit code is to be placed in the twelfth field.

Business Rules

Common Rules

1. Must exist in UNITS Reference table.
Error Messages:
 - Not a valid unit.
 - Unit required.
2. Units of measure must be appropriate for type of assessment.
Error Messages:
 - Only concentration units may be used for ____ assessments.
 - Only mass units may be used for ____ assessments.
 - Flow audits must be submitted with flow units.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

10.2.13 Sampler Flow Rate

Description: The measured flow rate provided by the sampler being assessed.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the thirteenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

10.2.14 Assessment Flow Rate

Description: The flow rate of the flow transfer standard.

Attributes: Numeric
 Mandatory on insert

Coding Instructions: Number (unrestricted). It is to be placed in the fourteenth field.

Business Rules

Common Rules

1. The value must be a valid number in the allowable range for the parameter.

Error Messages:

- Invalid Number or number format.
- Warning! The value must be between the min and max concentration levels for the parameter.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

11 Annual Summary Data - Transaction Type RS

Annual summary data is usually system-generated from the raw data contained in the system. However, the new AQS makes provision for storing summary data from agencies when they will not be submitting raw data.

Transaction type RS contains annual summary data in the following fields:

Transaction Type
Action Indicator
State Code or Tribal Indicator
County Code or Tribal Code
Site ID
Parameter
POC
Duration Code
Reported Unit
Method Code
Summary Year
Exceptional Data Type ID
Count of Observations
Count of Exceptional Events
Maximum Value
Maximum Value Date
Maximum Value Time
Maximum Value 2nd Highest
Maximum Value Date of 2nd Highest
Maximum Value Time of 2nd Highest
Maximum Value 3rd Highest
Maximum Value 4th Highest
Maximum Value 5th Highest
Minimum Sample Value
Arithmetic Mean
Arithmetic Standard Deviation
Geometric Mean
Geometric Standard Deviation
Percentile Sample Value - 10th
Percentile Sample Value - 25th
Percentile Sample Value - 50th
Percentile Sample Value - 75th
Percentile Sample Value - 90th
Percentile Sample Value - 95th
Percentile Sample Value - 98th
Percentile Sample Value - 99th
Percent of Observations
Count of Half-MDL Substitutions

11.1.0 Transaction Type

Description: Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

Attributes: Alphanumeric
2-character code
Mandatory

Coding Instructions: Place RS in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory
Error Messages:
 - Invalid transaction format.
2. Transaction Type must be in TRANSACTION_TYPES table in database.
Error Messages:
 - Transaction type not handled.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

11.1.1 Action Indicator

Description: Indicates the data manipulation action to be performed by the transaction.

Attributes: Alphanumeric
1-character code
Mandatory

Coding Instructions: Place the values I, U, or D in the second delimited field.

| | |
|---|---|
| I | Insert a new row into the appropriate table in the database. |
| U | Change one or more column values for an existing row in one or more tables. |
| D | Delete a row from a table(s) for the row containing the key data. |

Business Rules

Common Rules

1. Action Indicator is required.
Error Messages:
 - Action Code is Required.

2. Action Indicator must be either 'I', 'U', or 'D'.

Error Messages:

- Invalid Action Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

11.1.2 State Code or Tribal Indicator

The third field on a transaction can be either a State Code or a Tribal indicator. They are described as follows:

State Code Description: A FIPS (Federal Information Processing Standards) code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Tribal Indicator Description: A flag, with value "TT", to indicate that this data is for a Native American Tribe, and that the next field on the transaction identifies a tribal area using the Bureau of Indian Affairs tribal code.

Attributes: Alphanumeric
 2-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid FIPS state code or a Tribal Indicator in delimited field 3. A State Code is valid if it exists in the STATES Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None

11.1.3 County Code or Tribal Code

The fourth field on any transaction can be either a County Code or a Tribal Code. A County code is indicated by a valid state code in the third field, while a Tribal Code is indicated by a Tribal Indicator in the third field.

County Code Description: A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

Tribal Code Description: A value that identifies a Tribal Area using a Bureau of Indian Affairs Tribal Code.

Attributes: Alphanumeric
3-digit code
Mandatory
Key Field

Coding Instructions: Place a valid county code or a valid tribal code in the fourth delimited field. A County Code is valid if it exists at active status in the Counties table. A Tribal Code is valid if it exists at active status in the Tribal_Areas table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None

11.1.4 Site ID

Description: A numeric identifier (ID) that uniquely identifies each air monitoring site within a county or tribal area. There is no requirement that Site IDs be assigned continuously or in any particular order. Regional and Local organizations are thus free to allocate site numbers in any way they chose

as long as there is no duplication within a county and tribal area. For Tribal sites, because tribal areas may cross county or state lines, care must be taken to ensure that the Site ID is unique in the effected Tribal Area and states-county.

A specific Site ID is associated with a specific physical location and address. Any change in address requires a new Site ID to be assigned. This address change could include a change from the roof of one building to another. A change in location on the same roof should not normally require a new Site ID. Although an address change would routinely mean a new Site ID, some changes that do not change the site's location in respect to surrounding sources and its measurement scale, would require no change. An EPA Regional Office should be consulted for assistance in determining whether a new Site ID is required.

If a new Site ID is needed for a site not operated by the air pollution control agency, that agency should be contacted to assist in the ID assignment, to ensure that the ID is unique within the county. In other words, when a new Site ID is assigned, it must be different from any other Site ID already existing for that combination of State and County or Tribal Code.

Attributes: Alphanumeric
 4-digit ID
 Mandatory
 Key Field

Coding Instructions: Place a four-digit numeric code in the fifth delimited field. For update and delete, a Site ID value is valid if it exists in combination with state code and County or Tribal Code in the Sites Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None

11.1.5 Parameter

Description: The code assigned to the parameter measured by the monitor. Parameters may be pollutants or non-pollutants.

Attributes: Alphanumeric
5-digit code
Mandatory
Key Field

Coding Instructions: Place a valid parameter code in the sixth delimited field. A parameter value is valid if it exists in combination with (State Code, County Code, Site ID, and POC) or (Tribal Code, Site ID, and POC) in the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

11.1.6 POC (Parameter Occurrence Code)

Description: An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter. For example, the first monitor established to measure CO at a site could have a POC of 1. If an additional monitor were established at the same site to measure CO, that monitor could have a POC of 2. However, if a new instrument is installed to replace the original instrument used as the first monitor, that could be considered the same monitor and it would still have a POC of 1.

For criteria pollutants, data from different sampling methods should only be stored under the same POC if the sampling intervals are the same and the methods are reference or equivalent. For sites where duplicate sampling is being conducted by multiple agencies or by one agency with multiple samplers, multiple POCs must be utilized to store all samples.

For non-criteria pollutants, data from multiple sampling methods can be stored under the same POC if the sampling intervals are the same and there is only one sample for the time reported. If multiple open path monitors are reporting data for the same parameter, each open path would be assigned a different POC.

There are no national EPA practices assigning POC values. There may be regional or agency conventions where a POC value may have specific significance. Numbers do not need to be assigned sequentially.

Attributes: Numeric
 2-digit ID
 Mandatory
 Key Field

Coding Instructions: Place a valid POC value in the seventh delimited field. A POC value is valid if it exists in combination with (State Code, County Code, Site ID, and Parameter) or (Tribal Code, Site ID, and Parameter) on the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

11.1.7 Duration Code

Description: The period of time during which the blank sample value was collected.

Attributes: Alphanumeric
 1-character code
 Mandatory

Coding Instructions: Place a valid sample duration code in the eighth delimited field. A sample duration value is valid if it exists in the Sample Durations Table and if it exists in combination with unit, parameter, method, and collection

frequency in the Protocols Table.

Business Rules

Common Rules

1. The combination of (Duration Code, Reported Unit, Parameter, and Method Code) must be in PROTOCOLS table.

Error Messages:

- Invalid Protocol.

2. Sample duration must be an observed rather than a computed duration.

Error Messages:

- Raw data must be submitted with an observed duration.

3. Duration Code must not be different than the one used for any other data for the monitor in the year.

Error Messages:

- Duration Code does not match the annual summary duration.

Insert Rules

1. Duration Code is required.

Error Messages:

- Invalid Protocol.

1. Data associated with inactive protocol cannot be inserted in AQS.

Error Messages:

- Inactive protocols may not be newly associated with sample values

Update Rules

1. For update transaction of a record associated with inactive protocol, update should be allowed if protocol fields are not updated.

Error Messages:

- Inactive protocols may not be newly associated with sample values

Delete Rules

None.

11.1.8 Reported Unit

Description: The dimensional system in which the pollutant concentration or parameter reading is expressed.

Attributes: Alphanumeric
3-digit code
Mandatory

Coding Instructions: Place a valid unit code in the ninth delimited field. A unit value is valid if it exists in the Units Table and if it exists in combination with parameter,

sampling duration, and method in the Protocols Table.

Business Rules

Common Rules

1. The combination of (Duration Code, Reported Unit, Parameter, and Method Code) must be in PROTOCOLS table.

Error Messages:

- Invalid Protocol.

Insert Rules

1. Reported Unit is required

Error Messages:

- Invalid Protocol.

2. Data associated with inactive protocol cannot be inserted in AQS.

Error Messages:

- Inactive protocols may not be newly associated with sample values

Update Rules

1. For update transaction of a record associated with inactive protocol, update should be allowed if protocol fields are not updated.

Error Messages:

- Inactive protocols may not be newly associated with sample values

Delete Rules

None.

11.1.9 Method Code

Description: Identifies a particular method for collecting and analyzing samples of the monitor's parameter.

Attributes: Alphanumeric
3-digit code
Mandatory

Coding Instructions: Place a valid method code in the tenth delimited field. A method code is valid if it exists in combination with parameter in the Sampling Methodologies Table, and if it exists in combination with parameter, sampling duration, and units in the Protocols Table.

Business Rules

Common Rules

1. The combination of (Duration Code, Reported Unit, Parameter, and Method Code) must be in PROTOCOLS table.

Error Messages:

- Invalid Protocol.

Insert Rules

1. Method Code is required.

Error Messages:

- Invalid Protocol.

2. Data associated with inactive protocol cannot be inserted in AQS.

Error Messages:

- Inactive protocols may not be newly associated with sample values

Update Rules

1. For update transaction of a record associated with inactive protocol, update should be allowed if protocol fields are not updated.

Error Messages:

- Inactive protocols may not be newly associated with sample values

Delete Rules

None.

11.1.10 Summary Year

Description: The year whose raw data is summarized.

Attributes: Date
4-digit year (yyyy)
Mandatory
Key Field

Coding Instructions: Place a valid summary year number in the eleventh delimited field. A year value is valid if it is in the format of YYYY and there is a valid sampling period defined for the monitor in that year.

Business Rules

Common Rules

1. Summary Year is required.
Error Messages:
 - Year is required.
2. Summary Year must be in the format 'YYYY'.
Error Messages:
 - Invalid Year.
3. The monitor must have been active for some portion of the Summary Year.
Error Messages:
 - Monitor not active during Annual Summary Year
4. Summary Year must less than, or equal to, the current year.
Error Messages:
 - Annual Summary Year must be LE current year.

Insert Rules

1. The combination of Summary Year and Exceptional Data Type ID must not already be in database for Monitor.
Error Messages:
 - Unique constraint (AIRSRAQS.ANS_PK) violated

Update Rules

1. The combination of Summary Year and Exceptional Data Type ID must be in database for Monitor.
Error Messages:
 - No Annual Summary data to update or delete.

Delete Rules

1. The combination of Summary Year and Exceptional Data Type ID must be in database for Monitor.

Error Messages:

- No Annual Summary data to update or delete

11.1.11 Exceptional Data Type ID

Description: Indication of whether exceptional data exists in the year being summarized, and whether such exceptional data is included in the reported summary values.

Attributes: Numeric
1-digit code (n)
Mandatory
Key Field

Coding Instructions: Place a valid exceptional data type number in the twelfth delimited field. An exceptional data type value is valid if it exists in the Exceptional Data Types Table.

Business Rules

Common Rules

1. Exceptional Data Type ID is required.

Error Messages:

- Exceptional Data Type is required.

2. Exceptional Data Type ID must be in EXCEPTIONAL_DATA_TYPES table.

Error Messages:

- Integrity constraint (AIRSRAQS.ANS_EDT_FK) violated

3. Exceptional Data Type ID must be at production status.

Error Messages:

- Status for EDT_ID is inactive.

4. Exceptional Data Type ID cannot be 0 if there are other summary records for the monitor and Summary Year with Exceptional Data Type ID > 0.

Error Messages:

- EDT cannot be 0 when exceptional event data already loaded for year.

5. Exceptional Data Type ID cannot be > 0 if there are other summary records for the monitor and Summary Year with Exceptional Data Type ID of 0.

Error Messages:

- EDT Indicator must be 0

Insert Rules

1. The combination of Summary Year and Exceptional Data Type ID must not already be in database for Monitor.

Error Messages:

- Unique constraint (AIRSRAQS.ANS_PK) violated

Update Rules

1. The combination of Summary Year and Exceptional Data Type ID must be in database for Monitor.

Error Messages:

- No Annual Summary data to update or delete.

Delete Rules

1. The combination of Summary Year and Exceptional Data Type ID must be in database for Monitor.

Error Messages:

- No Annual Summary data to update or delete

11.1.12 Count of Observations

Description: The number of raw data values that are the basis for the summary values.

Attributes: Numeric
5 digits (nnnnn)
Optional

Coding Instructions: Place a valid count of observations in the thirteenth delimited field. A count of observations value is valid if it is greater than 0.

Business Rules

Common Rules

1. Count of Observations must be a positive integer.

Error Messages:

- Check constraint (AIRSRAQS.ANS_POSITIVE_OBS_CNT) violated.

2. Count of Observations must not be greater than what is possible for Duration Code.

Error Messages:

- Observation Count is an invalid value.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

11.1.13 Count of Exceptional Events

- Description: The number of data points in the summarized data set that were qualified by exceptional events.
- Attributes: Numeric
5 digits (nnnnn)
Optional
- Coding Instructions: Place a valid number of exceptional events value in the fourteenth delimited field. A number of exceptional events value is valid if:
- it is 0 and the exceptional data type is 0 or 1; **OR**
 - it is greater than 0 and less than or equal to count of observations, and exceptional data type is 2.

Business Rules

Common Rules

1. Count of Exceptional Events must be less than, or equal to, Count of Observations.

Error Messages:

- Check constraint (AIRSRAQS.ANS_EX_DATA_CNT) violated.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

11.1.14 Maximum Value

- Description: The highest sample value in the yearly sample value set.
- Attributes: Numeric
10 digits, including 5 decimal places (nnnnn.nnnnn)
Optional
- Coding Instructions: Place a valid highest sample value in the fifteenth delimited field. A highest sample value is valid if it is greater than or equal to the second, third, fourth, and fifth highest values reported on the transaction record.

Business Rules

Common Rules

1. Maximum Value must be a number with no more than 5 digits either before or after the decimal point.

Error Messages:

- Invalid Summary Maximum.

2. Maximum Value must be greater than or equal to the Second Maximum Value.

Error Messages:

- Sample Value must be less than or equal to the sample value of the previous level.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

11.1.15 Maximum Value Date

Description: The earliest date on which the highest sample value in the yearly data set was reported.

Attributes: Date
8-digit date
Optional

Coding Instructions: Place a valid date of highest sample value in the sixteenth delimited field. A date of highest sample value is valid if it is in the format of YYYYMMDD where the year portion is equal to year.

Business Rules

Common Rules

1. Date of Highest Sample Value must be in the format 'YYYYMMDD'.

Error Messages:

- Invalid Date.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

11.1.16 Maximum Value Time

Description: The time of day at which the highest sample value in the yearly data set was reported.

Attributes: Alphanumeric
 5 characters
 Optional

Coding Instructions: Place a valid time of highest sample value in the seventeenth delimited field. A time of highest sample value is valid if it is in the form of HH:MM, where HH is between 00 and 23, and MM is between 00 and 59.

Business Rules

Common Rules

1. Time of Highest Sample Value must be in the format 'HH:MM'.

Error Messages:

- Invalid Time.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

11.1.17 Maximum Value Second Highest

Description: The second highest sample value in the yearly sample value set.

Attributes: Numeric
 10 digits, including 5 decimal places (nnnnn.nnnnn)
 Optional

Coding Instructions: Place a sample second highest sample value in the eighteenth delimited field. A second highest sample value is valid if it is not greater than highest sample value, and is greater than or equal to the third, fourth, and fifth highest values reported on the transaction record.

Business Rules

Common Rules

1. Must be a number with no more than 5 digits either before or after the decimal point.

Error Messages:

- Invalid Summary 2nd Highest Value.

2. The 2nd Highest Sample Value must not be greater than the Highest Sample Value, nor less than the 3rd Highest Sample Value.

Error Messages:

- Sample Value must be less than or equal to the sample value of the previous level

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

11.1.18 Maximum Value Date of Second Highest

Description: If the second highest value is less than the highest, this identifies the earliest date on which the second highest sample value in the yearly data set was reported; if the second highest is equal to the highest, this identifies the second earliest date on which the value was reported.

Attributes: Date
8-digit date
Optional

Coding Instructions: Place a valid date of second highest sample value in the nineteenth delimited field. A date of second highest sample value is valid if it is in the format of YYYYMMDD where the year portion is equal to year. If the highest sample value and second highest sample value are equal, then date of second highest sample must be greater than date of highest sample value.

Business Rules

Common Rules

1. Date of 2nd Highest Sample Value must be in the format 'YYYYMMDD'.

Error Messages:

- Invalid Date.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

11.1.19 Maximum Value Time of Second Highest

Description: The time of day on which the second highest sample value in the yearly data set was reported.

Attributes: Alphanumeric
5 characters
Optional

Coding Instructions: Place a valid time of highest sample value in the twentieth delimited field. A time of highest sample value is valid if it is in the form of HH:MM, where HH is between 00 and 23, and MM is between 00 and 59.

Business Rules

Common Rules

1. Time of 2nd Highest Sample Value must be in the format 'HH:MM'.

Error Messages:

- Invalid Time.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

11.1.20 Maximum Value Third Highest

Description: The third highest sample value in the yearly sample value set.

Attributes: Numeric
10 digits, including 5 decimal places (nnnnn.nnnnn)
Optional

Coding Instructions: Place a third highest sample value in the twenty-first delimited field. A third highest sample value is valid if it is not greater than second highest sample value, and is greater than or equal to the fourth and fifth highest values reported on the transaction record.

Business Rules

Common Rules

1. Must be a number with no more than 5 digits either before or after the decimal point.

Error Messages:

- Invalid Summary 3rd Highest Value.

2. The 3rd Highest Sample Value must not be greater than the 2nd Highest Sample Value, nor less than the 4th Highest Sample Value.

Error Messages:

- Sample Value must be less than or equal to the sample value of the previous level

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

11.1.21 Maximum Value Fourth Highest

Description: The fourth highest sample value in the yearly sample value set.

Attributes: Numeric
10 digits, including 5 decimal places (nnnnn.nnnnn)
Optional

Coding Instructions: Place a fourth highest sample value in the twenty-second delimited field. A fourth highest sample value is valid if it is not greater than third highest sample value, and is greater than or equal to the fifth highest value reported on the transaction record.

Business Rules

Common Rules

1. Must be a number with no more than 5 digits either before or after the decimal point.

Error Messages:

- Invalid Summary 4th Highest Value.

2. The 4th Highest Sample Value must not be greater than the 3rd Highest Sample Value, nor less than the 5th Highest Sample Value.

Error Messages:

- Sample Value must be less than or equal to the sample value of the previous level.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

11.1.22 Maximum Value Fifth Highest

Description: The fifth highest sample value in the yearly sample value set.

Attributes: Numeric
10 digits, including 5 decimal places (nnnnn.nnnnn)
Optional

Coding Instructions: Place a fifth highest sample value in the twenty-third delimited field. A fifth highest sample value is valid if it is not greater than fourth highest sample value.

Business Rules

Common Rules

1. Must be a number with no more than 5 digits either before or after the decimal point.
Error Messages:
 - Invalid Summary 5th Highest Value.
2. The 5th Highest Sample Value must not be greater than the 4th Highest Sample Value.
Error Messages:
 - Sample Value must be less than or equal to the sample value of the previous level

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

11.1.23 Minimum Sample Value

Description: The lowest sample value in the yearly sample value set.

Attributes: Numeric
10 digits, including 5 decimal places (nnnnn.nnnnn)
Optional

Coding Instructions: Place a lowest sample value in the twenty-fourth delimited field. A lowest sample value is valid if it is not greater than the lowest of the highest values reported on the transaction record.

Business Rules

Common Rules

1. Must be a number with no more than 5 digits either before or after the decimal point.

Error Messages:

- Invalid Lowest Sample Value.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

11.1.24 Arithmetic Mean

Description: The measure of central tendency obtained from the sum of the observed pollutant data values in the yearly data set divided by the number of values that comprise the sum for the yearly data set.

Attributes: Numeric
10 digits, including 5 decimal places (nnnnn.nnnnn)
Optional

Coding Instructions: Place the arithmetic mean in the twenty-fifth delimited field.

Business Rules

Common Rules

1. Must be a number with no more than 5 digits either before or after the decimal point.

Error Messages:

- Invalid Arithmetic Mean.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

11.1.25 Arithmetic Standard Deviation

Description: The measure of the dispersion about the central tendency of a pollutant that is the square root of the arithmetic mean of the squares of the variation of each data value from the arithmetic mean of the data values of the yearly data set.

Attributes: Numeric
 10 digits, including 5 decimal places (nnnnn.nnnnn)
 Optional

Coding Instructions: Place the arithmetic standard deviation in the twenty-sixth delimited field.

Business Rules

Common Rules

1. Must be a number with no more than 5 digits either before or after the decimal point.

Error Messages:

- Invalid Arithmetic Standard Deviation.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

11.1.26 Geometric Mean

Description: The measure of central tendency obtained from the sum of the logarithms of observed sample values in the yearly data set, divided by the number of values, with that result applied as an exponent to 10.

Attributes: Numeric
 10 digits, including 5 decimal places (nnnnn.nnnnn)
 Optional

Coding Instructions: Place the geometric mean in the twenty-seventh delimited field.

Business Rules

Common Rules

1. Must be a number with no more than 5 digits either before or after the decimal point.

Error Messages:

- Invalid geometric mean.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

11.1.27 Geometric Standard Deviation

Description: The measure of the dispersion about the central tendency of a pollutant that is based on the variation between the geometric mean of a sample of values and the logarithms of the values themselves.

Attributes: Numeric
10 digits, including 5 decimal places (nnnnn.nnnnn)
Optional

Coding Instructions: Place the geometric standard deviation in the twenty-eighth delimited field.

Business Rules

Common Rules

1. Must be a number with no more than 5 digits either before or after the decimal point.

Error Messages:

- Invalid Geometric Standard Deviation.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

11.1.28 Percentile Sample Value - 10TH Percentile

Description: The sample value occurring in the tenth percentile of the yearly data set when sorted from lowest to highest.

Attributes: Numeric
10 digits, including 5 decimal places (nnnnn.nnnnn)
Optional

Coding Instructions: Place the sample value in the twenty-ninth delimited field.

Business Rules

Common Rules

1. Must be a number with no more than 5 digits either before or after the decimal point.

Error Messages:

- Invalid Summary Percentile

2. The 10th Percentile must not be greater than the 25th Percentile.

Error Messages:

- Percentile Sample Value is not greater than prior percentile sample value.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

11.1.29 Percentile Sample Value - 25TH Percentile

Description: The sample value occurring in the twenty-fifth percentile of the yearly data set when sorted from lowest to highest.

Attributes: Numeric
10 digits, including 5 decimal places (nnnnn.nnnnn)
Optional

Coding Instructions: Place the sample value in the thirtieth delimited field.

Business Rules

Common Rules

1. Must be a number with no more than 5 digits either before or after the decimal point.

Error Messages:

- Invalid Summary Percentile

2. The 25th Percentile must not be greater than the 50th Percentile, nor less than the 10th Percentile.

Error Messages:

- Percentile Sample Value is not greater than prior percentile sample value.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

11.1.30 Percentile Sample Value - 50TH Percentile

Description: The sample value occurring in the fiftieth percentile of the yearly data set when sorted from lowest to highest.

Attributes: Numeric
10 digits, including 5 decimal places (nnnnn.nnnnn)
Optional

Coding Instructions: Place the sample value in the thirty-first delimited field.

Business Rules

Common Rules

1. Must be a number with no more than 5 digits either before or after the decimal point.

Error Messages:

- Invalid Summary Percentile

2. The 50th Percentile must not be greater than the 75th Percentile, nor less than the 25th Percentile.

Error Messages:

- Percentile Sample Value is not greater than prior percentile sample value.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

11.1.31 Percentile Sample Value - 75TH Percentile

Description: The sample value occurring in the seventy-fifth percentile of the yearly data set when sorted from lowest to highest.

Attributes: Numeric
10 digits, including 5 decimal places (nnnnn.nnnnn)
Optional

Coding Instructions: Place the sample value in the thirty-second delimited field.

Business Rules

Common Rules

1. Must be a number with no more than 5 digits either before or after the decimal point.

Error Messages:

- Invalid Summary Percentile
2. The 75th Percentile must not be greater than the 90th Percentile, nor less than the 50th Percentile.
- Error Messages:**
- Percentile Sample Value is not greater than prior percentile sample value.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

11.1.32 Percentile Sample Value - 90TH Percentile

Description: The sample value occurring in the ninetieth percentile of the yearly data set when sorted from lowest to highest.

Attributes: Numeric
10 digits, including 5 decimal places (nnnnn.nnnnn)
Optional

Coding Instructions: Place the sample value in the thirty-third delimited field.

Business Rules

Common Rules

1. Must be a number with no more than 5 digits either before or after the decimal point.

Error Messages:

- Invalid Summary Percentile
2. The 90th Percentile must not be greater than the 95th Percentile, nor less than the 75th Percentile.
- Error Messages:**
- Percentile Sample Value is not greater than prior percentile sample value.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

11.1.33 Percentile Sample Value - 95TH Percentile

Description: The sample value occurring in the ninety-fifth percentile of the yearly data set when sorted from lowest to highest.

Attributes: Numeric
10 digits, including 5 decimal places (nnnnn.nnnnn)
Optional

Coding Instructions: Place the sample value in the thirty-fourth delimited field.

Business Rules

Common Rules

1. Must be a number with no more than 5 digits either before or after the decimal point.
Error Messages:
 - Invalid Summary Percentile
2. The 95th Percentile must not be greater than the 98th Percentile, nor less than the 90th Percentile.
Error Messages:
 - Percentile Sample Value is not greater than prior percentile sample value.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

11.1.34 Percentile Sample Value - 98TH Percentile

Description: The sample value occurring in the ninety-eighth percentile of the yearly data set when sorted from lowest to highest.

Attributes: Numeric
10 digits, including 5 decimal places (nnnnn.nnnnn)
Optional

Coding Instructions: Place the sample value in the thirty-fifth delimited field.

Business Rules

Common Rules

1. Must be a number with no more than 5 digits either before or after the decimal point.
Error Messages:
 - Invalid Summary Percentile
2. The 98th Percentile must not be greater than the 99th Percentile, nor less than the 95th Percentile.
Error Messages:
 - Percentile Sample Value is not greater than prior percentile sample value.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

11.1.35 Percentile Sample Value - 99TH Percentile

Description: The sample value occurring in the ninety-ninth percentile of the yearly data set when sorted from lowest to highest.

Attributes: Numeric
10 digits, including 5 decimal places (nnnnn.nnnnn)
Optional

Coding Instructions: Place the sample value in the thirty-sixth delimited field.

Business Rules

Common Rules

1. Must be a number with no more than 5 digits either before or after the decimal point.
Error Messages:
 - Invalid Summary Percentile
2. The 99th Percentile must not be less than the 98th Percentile.
Error Messages:
 - Percentile Sample Value is not greater than prior percentile sample value.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

11.1.36 Percent of Observations

Description: The percent of actual data values that were reported compared to the number of data values that could have been reported for the year.

Attributes: Numeric
10 digits, including 4 decimal places (nnnnnn.nnnn)
Optional

Coding Instructions: Place the observation percentage in the thirty-seventh delimited field.

Business Rules

Common Rules

1. The percent of observations must be a number between 0 and 100.

Error Messages:

- Invalid Percent of Observations.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

11.1.37 Count of Half-MDL Substitutions

Description: Represents the number of substitutions of one-half the Method Code Detectable Limit value for the year.

Attributes: Numeric
5 digits (nnnnn)
Optional

Coding Instructions: Place the count of observations with one-half the MDL in the thirty-eighth delimited field.

Business Rules

Common Rules

1. Number < MDL must be an integer greater than or equal to 0.

Error Messages:

- Invalid Number < MDL.

2. Number < MDL must be less than, or equal to, Count of Observations.

Error Messages:

- Check constraint (AIRSRAQS.ANS_OBS_CNT_LT_HALF_MDL) violated

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

12 Blanks Data – Transaction Type RB

Blanks data provides an audit of background concentrations of parameters in the un-exposed filters.

Transaction type RB contains blanks data in the following fields:

Transaction Type

Action Indicator

State Code or Tribal Indicator

County Code or Tribal Code

Site ID

Parameter

POC

Duration Code

Reported Unit

Method Code

Blank Type

Blank Date

Blank Time

Blank Value

Null Data Code

Qualifier-1

Qualifier-2

Qualifier-3

Qualifier-4

Qualifier-5

Qualifier-6

Qualifier-7

Qualifier-8

Qualifier-9

Qualifier-10

Alternate Method Detectable

Limit

Uncertainty Value

Insert transactions are used to enter new blank measurement values.

Update transactions are used to change existing blank measurement values.

Delete Transactions are used to remove existing blank measurement values.

The details for each field on the blank transaction are provided below:

12.1.0 Transaction Type

Description: Specifies which batch transaction is being processed by the batch load software (i.e., which tables and columns will be updated with the data in the delimited fields).

Attributes: Alphanumeric
2-character code
Mandatory

Coding Instructions: Place RB in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory

Error Messages:

- Invalid transaction format.

2. Transaction Type must be in TRANSACTION_TYPES table in database.

Error Messages:

- Transaction type not handled.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

12.1.1 Action Indicator

Description: Indicates the data manipulation action to be performed by the transaction.

Attributes: Alphanumeric
1-character code

Mandatory

Coding Instructions: Place the values I, U, or D in the second delimited field.

- I Insert a new row into the appropriate table in the database.
- U Change one or more column values for an existing row in one or more tables.
- D Delete a row from a table(s) for the row containing the key data.

Business Rules

Common Rules

1. Action Indicator is required.
Error Messages:
 - Action Code is Required.
2. Action Indicator must be either 'I', 'U', or 'D'.
Error Messages:
 - Invalid Action Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

12.1.2 State Code or Tribal Indicator

The third field on a transaction can be either a State Code or a Tribal indicator. They are described as follows:

State Code Description: A FIPS (Federal Information Processing Standards) code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Tribal Indicator Description: A flag, with value "TT", to indicate that this data is for a Native American Tribe, and that the next field on the transaction identifies a tribal area using the Bureau of Indian Affairs tribal code.

Attributes: Alphanumeric
 2-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid FIPS state code or a Tribal Indicator in third delimited field.
A State Code is valid if it exists in the STATES Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None

12.1.3 County Code or Tribal Code

The fourth field on any transaction can be either a County Code or a Tribal Code. A County code is indicated by a valid state code in the third field, while a Tribal Code is indicated by a Tribal Indicator in the third field.

County Code Description: A FIPS code that identifies a county, or equivalent geo-political entity, such as parish or independent city. For foreign countries, it identifies the geo-political equivalent to U. S. states, such as Mexican states or Canadian provinces.

Tribal Code Description: A value that identifies a Tribal Area using a Bureau of Indian Affairs Tribal Code.

Attributes: Alphanumeric
 3-digit code
 Mandatory
 Key Field

Coding Instructions: Place a valid county code or a valid tribal code in the fourth delimited field. A County Code is valid if it exists at active status in the Counties table. A Tribal Code is valid if it exists at active status in the Tribal Area table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None

12.1.4 Site ID

Description: A numeric identifier (ID) that uniquely identifies each air monitoring site within a county or tribal area. There is no requirement that Site IDs be assigned continuously or in any particular order. Regional and Local organizations are thus free to allocate site numbers in any way they chose as long as there is no duplication within a county and tribal area. For Tribal sites, because tribal areas may cross county or state lines, care must be taken to ensure that the Site ID is unique in the effected Tribal Area and states-county.

A specific Site ID is associated with a specific physical location and address. Any change in address requires a new Site ID to be assigned. This address change could include a change from the roof of one building to another. A change in location on the same roof should not normally require a new Site ID. Although an address change would routinely mean a new Site ID, some changes that do not change the site's location in respect to surrounding sources and its measurement scale, would require no change. An EPA Regional Office should be consulted for assistance in determining whether a new Site ID is required.

If a new Site ID is needed for a site not operated by the air pollution control agency, that agency should be contacted to assist in the ID assignment, to ensure that the ID is unique within the county. In other words, when a new Site ID is assigned, it must be different from any other Site ID already existing for that combination of State and County or Tribal Code.

Attributes: Alphanumeric
4-digit ID
Mandatory
Key Field

Coding Instructions: Place a four-digit numeric code in the fifth delimited field. For update and delete, a Site ID value is valid if it exists in combination with state code and County or Tribal Code in the Sites Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal

Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None

12.1.5 Parameter

Description: The code assigned to the parameter measured by the monitor. Parameters may be pollutants or non-pollutants.

Attributes: Alphanumeric
5-digit code
Mandatory
Key Field

Coding Instructions: Place a valid parameter code in the sixth delimited field. A parameter value is valid if it exists in combination with (State Code, County Code, Site ID, and POC) or (Tribal Code, Site ID, and POC) in the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

12.1.6 POC (Parameter Occurrence Code)

Description: An identifier used to distinguish between multiple monitors at the same

site that are measuring the same parameter. For example, the first monitor established to measure CO at a site could have a POC of 1. If an additional monitor were established at the same site to measure CO, that monitor could have a POC of 2. However, if a new instrument is installed to replace the original instrument used as the first monitor, that could be considered the same monitor and it would still have a POC of 1.

For criteria pollutants, data from different sampling methods should only be stored under the same POC if the sampling intervals are the same and the methods are reference or equivalent. For sites where duplicate sampling is being conducted by multiple agencies or by one agency with multiple samplers, multiple POCs must be utilized to store all samples.

For non-criteria pollutants, data from multiple sampling methods can be stored under the same POC if the sampling intervals are the same and there is only one sample for the time reported. If multiple open path monitors are reporting data for the same parameter, each open path would be assigned a different POC.

There are no national EPA practices assigning POC values. There may be regional or agency conventions where a POC value may have specific significance. Numbers do not need to be assigned sequentially.

Attributes: Numeric
 2-digit ID
 Mandatory
 Key Field

Coding Instructions: Place a valid POC value in the seventh delimited field. A POC value is valid if it exists in combination with (State Code, County Code, Site ID, and Parameter) or (Tribal Code, Site ID, and Parameter) on the Monitors Table.

Business Rules

Common Rules

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) or (Tribal Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.

Error Messages:

- Monitor ID not in database.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

12.1.7 Duration Code

Description: The period of time during which the blank sample value was collected.

Attributes: Alphanumeric
1-character code
Mandatory

Coding Instructions: Place a valid sample duration code in the eighth delimited field. A sample duration value is valid if it exists in the Sample Durations Table and if it exists in combination with unit, parameter, method, and collection frequency in the Protocols Table. The duration code is only used to associate the blank sample with a protocol, it has no other significance (blanks data effectively has no duration).

Business Rules

Common Rules

1. The combination of (Duration Code, Reported Unit, Parameter, and Method Code) must be in PROTOCOLS table.

Error Messages:

- Invalid Protocol.

Insert Rules

1. Duration Code is required.

Error Messages:

- Invalid Protocol.

2. Data associated with inactive protocol cannot be inserted in AQS.

Error Messages:

- Inactive protocols may not be newly associated with sample values

Update Rules

1. For update transaction of a record associated with inactive protocol, update should be allowed if protocol fields are not updated.

Error Messages:

- Inactive protocols may not be newly associated with sample values

Delete Rules

None.

12.1.8 Reported Unit

Description: The dimensional system in which the pollutant concentration or parameter reading is expressed.

Attributes: Alphanumeric
3-digit code
Mandatory

Coding Instructions: Place a valid unit code in the ninth delimited field. A unit value is valid if it exists in the Units Table and if it exists in combination with parameter, sampling duration, and method in the Protocols Table.

Business Rules

Common Rules

1. The combination of (Duration Code, Reported Unit, Parameter, and Method Code) must be in PROTOCOLS table.

Error Messages:

- Invalid Protocol.

Insert Rules

1. Reported Unit is required

Error Messages:

- Invalid Protocol.

2. Data associated with inactive protocol cannot be inserted in AQS.

Error Messages:

- Inactive protocols may not be newly associated with sample values

Update Rules

1. For update transaction of a record associated with inactive protocol, update should be allowed if protocol fields are not updated.

Error Messages:

- Inactive protocols may not be newly associated with sample values

Delete Rules

None.

12.1.9 Method Code

Description: Identifies a particular method for collecting and analyzing samples of the monitor's parameter.

Attributes: Alphanumeric
3-digit code
Mandatory

Coding Instructions: Place a valid method code in the tenth delimited field. A method code is valid if it exists in combination with parameter in the Sampling Methodologies Table, and if it exists in combination with parameter, sampling duration, and units in the Protocols Table.

Business Rules

Common Rules

1. The combination of (Duration Code, Reported Unit, Parameter, and Method Code) must be in PROTOCOLS table.

Error Messages:

- Invalid Protocol.

Insert Rules

1. Method Code is required.

Error Messages:

- Invalid Protocol.

2. Data associated with inactive protocol cannot be inserted in AQS.

Error Messages:

- Inactive protocols may not be newly associated with sample values

Update Rules

1. For update transaction of a record associated with inactive protocol, update should be allowed if protocol fields are not updated.

Error Messages:

- Inactive protocols may not be newly associated with sample values

Delete Rules

None.

12.1.10 Blank Type

Description: The blank type describes how the un-exposed filter was handled. It has possible values of FIELD, LAB, TRIP, BACKUP FILTER, or FIELD 24HR.. A type of FIELD means that the filter was placed in the instrument and removed before operation of the instrument. A type of LAB means that the filter has not been taken to the site. A type of TRIP means that the filter was taken to the site, but not placed in the instrument. A type of BACKUP FILTER is a quartz filter that is collected behind the routine quartz filter to assess organic carbon sampling artifact. A type of FIELD 24HR is a blank filter that is placed in the sampling device for the entire period of sampling, which is 24 hours in this case. These blanks remain in the sampling device for the duration of sampling and are shipped, handled, and analyzed in an identical manner to the routine sample filter.

Attributes: Alphanumeric
5 character code
Mandatory
Key Field

Coding Instructions: Place one of FIELD, LAB, TRIP, BACKUP FILTER, or FIELD 24HR in the eleventh delimited field on the transaction as appropriate for the value.

Business Rules:

Common Rules

1. Blank Type is required.
Error Messages:
 - Blank Type field is required.
 - Invalid blanks type.
2. Blank Type must be in the BLANKS_TYPES table.
Error Messages:
 - Invalid blanks type.
3. Blank Type must be at production status.
Error Messages:
 - Invalid blanks type.

Insert Rules

1. The combination of Blank Type, Date, and Time must not already be in database for Monitor.
Error Messages:
 - Attempted to insert a value for an existing date and time.

Update Rules

1. The combination of Blank Type, Date, and Time must already be in database for Monitor.
Error Messages:
 - Unable to insert/update blanks data

Delete Rules

1. The combination of Blank Type, Date, and Time must already be in database for Monitor.
Error Messages:
 - Unable to insert/update blanks data

12.1.11 Blank Date

Description: The calendar date for which the observation is being reported.

Attributes: Date
8-digit date
Mandatory
Key Field

Coding Instructions: Place a valid date in the twelfth delimited field. A date value is valid if it is in the form of YYYYMMDD, it is between 1957 and the current date, and it falls within a valid sample period defined for the monitor.

Business Rules

Common Rules

1. Date is required.
Error Messages:
 - Date Required.
2. Date must be in a year greater or equal to the earliest supported year
Error Messages:
 - The sample date is not within an available year
3. Date must be less than, or equal to, the system date
Error Messages:
 - Date must be less than current date.
4. Date must fall within a valid sample period for the monitor.
Error Messages:
 - Monitor inactive for this date.

Insert Rules

1. The combination of Blank Type, Date, and Time must not already be in database for Monitor.
Error Messages:
 - Attempted to insert a value for an existing date and time.

Update Rules

1. The combination of Blank Type, Date, and Time must be in database for Monitor.
Error Messages:
 - Unable to insert/update blanks data.

Delete Rules

1. The combination of Blank Type, Date, and Time must be in database for Monitor.
Error Messages:
 - Unable to insert/update blanks data.

12.1.12 Time

Description: Indicates the beginning of the sampling period in standard time at the location of the monitoring site.

Attributes: Alphanumeric
5 characters
Mandatory

Coding Instructions: Place a valid start time in the twelfth delimited field. A start time value is valid if it is in the format of HH:MM, and does not overlap another sampling period for the monitor.

Business Rules

Common Rules

1. Start Time is required.
Error Messages:
 - Start Time is required.
2. Start time must be in the format: HH:MM.
Error Messages:
 - Invalid time format.

Insert Rules

1. The combination of Blank Type, Date, and Time must not already be in database for Monitor.
Error Messages:
 - Attempted to insert a value for an existing date and time.

Update Rules

1. The combination of Blank Type, Date, and Time must be in database for Monitor.
Error Messages:
 - Unable to insert/update blanks data.

Delete Rules

1. The combination of Blank Type, Date, and Time must be in database for Monitor.
Error Messages:
 - Unable to insert/update blanks data.

12.1.13 Blank Value

Description: The Blank Value is the measured value of the parameter in the un-exposed filter.

Attributes: Numeric.
10 digits with up to 5 digits either before or after the decimal point.
Required for inserts.
Blank Value may be negative.

Coding Instructions: Place the blank value in the 14th delimited field on the transaction. Note: Trailing zeros after the decimal point are preserved as significant figures. (E.g. .100 is marked as having a scale of 3.)

Business Rules:

Common Rules

1. Blank Value must be a number with no more than 5 digits either before or after the decimal point.
Warning Messages:
 - Precision beyond 5 decimal places will be lost**Error Messages:**
 - Value larger than specified precision allows for this column
 - Field "Sample Value" is too long

- Blank value must be valued if Qualifier Code -Null Data is not valued, and must not be valued if Qualifier Code -Null Data is valued.

Error Messages:

- Invalid combination of value, uncertainty, and null data code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

12.1.14 Null Data Code

Description: This is a code to explain why no blank value was reported.

Attributes: Alphanumeric
2-character code
Conditionally required

Coding Instructions: Place a valid null data code in the fifteenth delimited field. A null data code value is valid if it exists in the Qualifiers Table with the qualifier type of null.

Business Rules

Common Rules

- Null Data Code is required if the Blank Value is Null.

Error Messages:

- Invalid combination of value, uncertainty, and null data code.

- Null Data Code must be in QUALIFIERS table.

Error Messages:

- Invalid Null Data Code.

- Null Data Code must be at production status.

Error Messages:

- Inactive Null Data Code.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

12.1.15 Qualifier Code 1-10

- Description:** Qualifications used to describe the blank data. They may document exceptional data, or quality assurance exceptions.
- Attributes:** Alphanumeric
1- or 2-character code
Optional
- Coding Instructions:** Ten fields (delimited fields 16-25), are allocated for the designation of blank data qualifiers. It is valid to designate one, and only one, exceptional (EX or NAT) data qualifier, and as many quality assurance qualifiers as are necessary. To designate qualifiers, use the available fields in sequence: place the first qualification in field 16, the second in field 17, and so on. A particular qualifier value is valid if it exists in the Qualifiers Table.

Business Rules

Common Rules

1. Qualifier Code must be in QUALIFIERS table.
Error Messages:
 - Invalid Raw Data Qualifier.
2. QUALIFIERS (QUALIFIER_CODE) must be at production status.
Error Messages:
 - Qualifier Code is inactive.
3. Qualifier Code must not be a Null Data code.
Error Messages:
 - • Invalid Raw Data Qualifier.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

12.1.16 Alternate Method Detectable Limit (Alt-MDL)

- Description:** Alternate method detectable limit (Alt-MDL) is the minimum detectable level defined for the monitoring device and method.

Attributes: Numeric
 10 digits, including 5 decimal places (nnnnn.nnnnn)
 Optional

Coding Instructions: Place a valid Alt-MDL in the 26th delimited field.

Business Rules

Common Rules

1. MDL must be a number with no more than 5 digits before or after the decimal point.

Warning Messages:

- Precision beyond 5 decimal places will be lost

Error Messages:

- Value larger than specified precision allows for this column

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

12.1.17 Uncertainty Value

Description: The measure of method uncertainty associated with the blank data point, which will include all components of the measurement process.

Attributes: Numeric
 11 digits, including 5 decimal places (nnnnnn.nnnnn)

Coding Instructions:

Business Rules

Common Rules

1. Uncertainty Value must be a positive number with no more than 6 digits before, and no more than 5 after, the decimal point.

Warning Messages:

- Precision beyond 5 decimal places will be lost

Error Messages:

- Value larger than specified precision allows for this column

Insert Rules

None.

Update Rules

None.

Delete Rules

None.