AQS Data Coding Manual

Version 2.38

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Prepared for

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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 using 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:

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 (SO_2, NO_2, O_3, CO, PM_{10}, $PM_{2.5}$ 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

Twenty types of transactions are used to provide data and control information for updating the AQS database. Detailed instructions for coding 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 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

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 if 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;
  - PQAO 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 seen using Oracle® Discoverer or viewing in the List of Values (LOV) button associated with that field in the Maintain, Standard Report Request or Correct forms in AQS.

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, however, you should contact National Air Data Group (NADG) to discuss the situation. We can add new codes to reference tables, and change the range of values allowed by the numeric edit checks in AQS. To contact NADG, you can call the helpline at 1-866-411-4372, or go to the AQS website at

http://www.epa.gov/ttn/airs/airsaqs/

to get a list of contacts and phone numbers.

3   Site Transactions (AA, AB, AC)

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

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	

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 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.

<u>Update or Delete Rules:</u>
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 (±nn.nnnnnn)
                       Optional[1]

Coding Instructions: A site's coordinates must be given either as latitude/longitude or universal
                       transverse Mercator (UTM) coordinates, but not both. When latitude is
                       provided on the transaction, longitude must also be provided, and UTM
                       values must not 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
<u>Common Rules:</u>
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

<u>Insert Rules</u>
1. Either (Latitude, Longitude) or (UTM Zone, UTM Easting, UTM Northing)
    combinations must be provided, but not both.

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[*]It is mandatory that either Lat/Long or UTM values be provided, but not both.

Error Messages:
- Location must be specified with either latitude/longitude or UTM information, but not both.

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 (±nnn.nnnnnn)
                     Optional[3]

Coding Instructions: A site's coordinates must be given either as latitude/longitude or UTM coordinates, but not both. When longitude is provided on the transaction, latitude must also be provided, but UTM values must not 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.   Either (Latitude, Longitude) or (UTM Zone, UTM Easting, UTM Northing)

----

[3]It is mandatory that either Lat/Long or UTM be provided .

combinations must be provided, but not both.

Error Messages:
- Location must be specified with either latitude/longitude or UTM information, but not both.

Update Rules
None.

Delete Rules
None.

3.1.7 UTM Zone

Description: The zone of the universal transverse Mercator (UTM) system in which a site is located.   EPA Locational Data Policy requires that coordinates be provided for all sites. AQS will convert the UTM coordinates to latitude/longitude in the standard horizontal datum (WGS84) and store both the user-provided UTM and the standard latitude/longitude. 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[2]

Coding Instructions: A site's coordinates must be given either as latitude/longitude or UTM coordinates, but not both. When UTM zone is provided on the transaction, UTM easting and UTM northing must also be provided, but latitude/longitude values must not be provided.

To insert or update, place a UTM zone value in the eighth delimited field.

Business Rules
Common Rules:
1.   Site location must be within the state
      Error Messages:
- Coordinates are not within the specified state.
2.   Site location must be within the county
      Error Messages:
- Coordinates are not within the specified county

Insert Rules
1.   Either (Latitude, Longitude) or (UTM Zone, UTM Easting, UTM Northing)

---

[2]It is mandatory that either Lat/Long or UTM be provided .

combinations must be provided, but not both.
Error Messages:
- Location must be specified with either latitude/longitude or UTM information, but not both.

Update Rules
None.

Delete Rules
None.

3.1.8 UTM Easting

Description: The easting UTM coordinate, expressed in meters (i.e., the horizontal distance from the reference edge of the UTM zone) for the site. EPA Locational Data Policy requires that coordinates be provided for all sites. AQS will convert the UTM coordinates to latitude/longitude in the standard horizontal datum (WGS84) and store both the user-provided UTM and the standard latitude/longitude. 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)
                      Optional[2]

Coding Instructions: A site's coordinates must be given either as latitude/longitude or UTM coordinates, but not both. When UTM easting is provided on the transaction, UTM zone and UTM northing must also be provided, but latitude/longitude values must not be provided.

                      To insert or update, place a UTM easting value in the ninth delimited field.

Business Rules
Common Rules:
1.   Site location must be within the state
      Error Messages:
      - Coordinates are not within the specified state.
2.   Site location must be within the county
      Error Messages:
      - Coordinates are not within the specified county

Insert Rules

---

[2]It is mandatory that either Lat/Long or UTM be provided.

1.   Either (Latitude, Longitude) or (UTM Zone, UTM Easting, UTM Northing)
        combinations must be provided, but not both.
        Error Messages:
        • Location must be specified with either latitude/longitude or UTM information, but not
          both.

Update Rules
None.

Delete Rules
None.

3.1.9 UTM Northing

Description: The northing UTM coordinate expressed in meters (i.e., for the Northern
                       hemisphere, the vertical distance from the equator; for the Southern
                       hemisphere, 10,000,000 minus the vertical distance from the equator) for
                       the site. EPA Locational Data Policy requires that coordinates be
                       provided for all sites. AQS will convert the UTM coordinates to
                       latitude/longitude in the standard horizontal datum (WGS84) and store
                       both the user-provided UTM and the standard latitude/longitude.   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)
                       Optional[2]

Coding Instructions: A site's coordinates must be given either as latitude/longitude or UTM
                       coordinates, but not both. When UTM northing is provided on the
                       transaction, UTM zone and UTM easting must also be provided, but
                       latitude/longitude values must not be provided. When UTM coordinates
                       are provided on the transaction, latitude and longitude are system-
                       generated for the Sites Table during the load step (for insert and update
                       Action Indicators).   Therefore, all Sites Table rows contain both
                       latitude/longitude and UTM coordinates.

                       To insert or update, place a UTM northing value in the tenth delimited
                       field.

Business Rules
Common Rules:
1.   Site location must be within the state

---

[2]It is mandatory that either Lat/Long or UTM be provided.

Error Messages:
- Coordinates are not within the specified state.
2.   Site location must be within the county
      Error Messages:
      - Coordinates are not within the specified county

Insert Rules
1.   Either (Latitude, Longitude) or (UTM Zone, UTM Easting, UTM Northing)
      combinations must be provided, but not both.
      Error Messages:
      - Location must be specified with either latitude/longitude or UTM information, but not both.

Update Rules
None.

Delete Rules
None.

3.1.10   Horizontal Collection Method

Description: Method used to determine the latitude/longitude or UTM 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:

Code	Description
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.

3.1.11   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:

Horiz Datum	Status Ind
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:

1.   Horizontal Datum must be in LDP_HORIZONTAL_DATA table.
      Error Messages:
      • Invalid LDP Horizontal Datum.

2.   LDP_HORIZONTAL_DATA (LDP_HORIZ_DATUM) must be at production status.
      Error Messages:
      • Inactive LDP Horizontal Datum.

Insert Rules

1.   Horizontal Datum is mandatory.
      Error Messages:
      • Horizontal Datum is mandatory.

Update Rules

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

Delete Rules

None.

3.1.12   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.
        Error Messages:
        - Invalid Source Scale
2.   REQ_SOURCE_SCALE_MISSING
        Error Messages:
        - Required source scale is missing.

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

3.1.13   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 (or UTM easting or northing).

                       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.

3.1.14   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.

3.1.15   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 Rules
Common 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.

3.1.16   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.

3.1.17   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.

3.1.18   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 or UTM). 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.

3.1.19   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 or UTM). 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.

3.1.20 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, 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.

3.1.21 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.

3.1.22   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

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.

3.1.23   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.

<u>Delete Rules</u>
None

3.1.24   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:
<u>Common Rules:</u>
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)

<u>Insert Rules</u>
None

<u>Update Rules</u>
None

<u>Delete Rules</u>
None

3.1.25   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 or UTM). 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.

3.1.26   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 or UTM). 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.

3.1.27   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 or UTM). 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.

3.1.28   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 Blcok. 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.

3.1.29   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 or UTM). 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.

3.1.30   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.

3.1.31   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.

3.1.32   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.

3.1.33   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.

3.1.34   EPA Region Evaluation Date

Description: The date on which the most recent EPA EPA Region Evaluation Date 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.

3.1.35   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.

3.1.36   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.

3.1.37 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.

3.1.38 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.

3.1.39 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.

3.1.40   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.

3.1.41   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.

3.1.42   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:

Code	Description
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.

3.1.43   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.

3.1.44   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 <u>AQS Input Transaction Formats</u> at
http://www.epa.gov/ttn/airs/airsaqs/manuals/manuals.htm 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:
<u>Common Rules</u>
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.

<u>Insert Rules</u>
None.

<u>Update Rules</u>
None.

<u>Delete Rules</u>
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 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.

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

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

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:

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 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.

3.5 Site Primary Monitor Periods (Online Update Only)

Description: The primary monitor period identifies the primary monitor for any parameter that is defined as requiring site level raw data records that are derived from the primary monitor and any collocated sample values on days that the primary monitor did not sample.

3.5.0 Parameter

Description: The code assigned to the parameter measured by the monitor. Parameter must be defined in regulation to require site combined data.

Attributes: Alphanumeric
        5-digit code
        Mandatory
        Key Field

Coding instructions: Use the LOV to select the parameter to use.

3.5.1 POC (Parameter Occurrence Code)

Description: An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter.   For criteria pollutants, multiple monitors may be collocated to check precision. For combining data at the site level, the POC identified the primary monitor (most frequent sampling).

Attributes: Numeric
        2-digit ID
        Mandatory
        Key Field

Coding Instructions: Use the LOV for the field to select the correct POC.

3.5.2 Begin Date

Description: The date on which the POC specified began being the primary monitor.

Attributes: Date
        8-digit date
        Optional

Coding Instructions: A begin date is valid if it: is in the format of YYYYMMDD, is greater than or equal to the earliest monitor date sampling began, does not fall within any other primary monitor periods defined for the site, 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. A Begin Date must be entered.
   Error Messages:
   - BEGIN_DATE must be entered

2. Dates must have valid years.
   Error Messages:
   - Year must be 00-99 or 1000-4712

3. Primary Monitor Periods must not overlap.
   Error Messages:
   - Primary monitor period date ranges may not overlap

3.5.3 End Date

Description: The date on which the POC stopped being the primary monitor or date that monitoring ceased. If a monitor for the pollutant has an open sampling period, there must be an open primary monitor period.

Attributes: Date
8-digit date
Optional

Coding Instructions: An end date is valid if it: is in the format of YYYYMMDD, is greater than or equal to the primary monitor period begin date, does not fall within any other primary monitor periods defined for the site, 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. The primary monitor period end date must be blank as long as a monitor is reporting.

Business Rules:
Common Rules
1. Dates must have valid years.
   Error Messages:
   - Year must be 00-99 or 1000-4712

2.   Primary Monitor Periods must not overlap.
      Error Messages:
      - Primary monitor period date ranges may not overlap

4   Monitor Transactions (MA – MK)

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	Probe Location Code	Indicator
Indicator	Probe Height	Community Monitoring Zone
County Code or Tribal	Probe Horizontal Distance	Pollutant Area Code – 1
Code	Probe Vertical Distance	Pollutant Area Code – 2
Site ID	Surrogate Indicator	Pollutant Area Code – 3
Parameter	Unrestricted Air Flow Indicator	Pollutant Area Code – 4
POC	Sample Residence Time	Pollutant Area Code – 5
Project Class	Worst Site Type	Close Date
Dominant Source	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	Parameter	
Indicator	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	Parameter	Monitor Type End Date
Indicator	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	Parameter	Agency Role Begin Date
Indicator	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	Parameter	CMSA Represented
Indicator	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	Parameter	Tangent Road
Indicator	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	Parameter	Distance from Monitor to
Indicator	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	Parameter	Compliance Date
Indicator	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	Parameter	Distance from Primary Sampler
Indicator	POC	Primary Sampler Indicator

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

Transaction Type	Site ID	Method Code
Action Indicator	Parameter	Collection Frequency Code
State Code or Tribal	POC	Composite Type
Indicator	Monitor Protocol ID	Alternate Method Detectable
County Code or Tribal	Duration Code	Limit
Code	Reported Unit	

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 PQAO 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 atleast 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.

4.1 Basic Monitor Information - Transaction Type MA

See <u>AQS Input Transaction Formats</u> at <u>http://www.epa.gov/ttn/airs/airsaqs/manuals/manuals.</u>htm 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:
<u>Common Rules</u>
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.

<u>Insert Rules</u>
None.

<u>Update Rules</u>
None.

<u>Delete Rules</u>
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

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.

4. (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
1. Parameter Code is Mandatory.
   Error Messages:
   - Parameter Code is mandatory.

2. Parameter Code must be in PARAMETERS table.
   Error Messages:
   - Integrity constraint (AIRSRAQS.MO_PA_FK) violated

3. PARAMETERS (PARAMETER_CODE) must be at production status.
   Error Messages:
   - 1. Status for PARAMETER_CODE is inactive.

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.

<u>Update Rules</u>
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.

<u>Delete Rules</u>
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.

<u>Update Rules</u>
None.

<u>Delete Rules</u>
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:
<u>Common Rules</u>
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 <u>AQS Input Transaction Formats</u> at <u>http://www.epa.gov/ttn/airs/airsaqs/manuals/manuals.</u>htm
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 can not 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.
Invalid State-County

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 estab '& term 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 estab '& term 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/manuals.htm 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 administrative classification as determined by the purpose
                       for the monitor in the agency sampling strategy.

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:

                                    IMPROVE
                                    INDEX SITE
                                    INDUSTRIAL
                                    NATTS
                                    NCORE
                                    NON-EPA FEDERAL
                                    NON-REGULATORY
                                    PAMS
                                    PROPOSED NCORE
                                    QA COLLOCATED

SLAMS
SPECIAL PURPOSE
SUPPLMNTL SPECIATION
TRENDS SPECIATION
TRIBAL MONITORS
UNOFFICIAL PAMS

The assignment of the monitor types "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. 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 >= 01-JAN-2009

Insert Rules
None.

<u>Update Rules</u>
None.

<u>Delete Rules</u>
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:
<u>Common Rules</u>
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/manuals.htm 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.

<u>Delete Rules</u>
   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
<u>Common Rules</u>
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.

<u>Insert Rules</u>
   None.

<u>Update Rules</u>
   None.

<u>Delete Rules</u>
   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/manuals.htm 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.
2.

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.

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.

4.6.2 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.

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

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

1. Required Collection Frequency Code must be in COLLECTION_FREQUENCIES table.
   Error Messages:
   - Integrity constraint (AIRSRAQS.RCF_CF_FK) violated.

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

3. Required Collection Frequency Code must be '1', '3', '6', '7', or 'S' if Parameter is '88101'.
   Error Messages:
   - PM2.5 may only have required collection frequencies of 1, 3, 6, 7, or S.

4. 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

1. Required Collection Frequency Code is required.
   Error Messages:
   - Required Collection Frequency Code is mandatory.

Update Rules

1. 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.

2.   Required Collection Frequency Begin Date must be greater than, or equal to, July 1, 1987.
Error Messages:
- RCF Begin Date must be greater than, or equal to, July 1, 1987.

3.   Required Collection Frequency Begin Date must fall within a sample period for the monitor .
Error Messages:
- Date must be within a valid sample period.

4.   Required Collection Frequency Begin Date must not be greater than one year from the current date.
Error Messages:
- Begin Date must be within sampling period or today plus 1 year

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.

2.   RCF End Date must fall within a sample period for the monitor .
       Error Messages:
       • Date must be within a valid sample period.

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.

4.   RCF 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 RCF End Date.)
       Error Messages:
       • Required Collection Frequency data cannot be updated. Raw Data exists that would
         be effected by this change.

5.   RCF End Date must not be greater than 1 year from today.
       Error Messages:
       • RCF Date must be within sampling period or today plus 1 year.

Insert 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', '6', or '7' if Parameter is '88101'.
      Error Messages:
      • PM2.5 may only have required collection frequencies of 1, 3, 6, 7, or S.

5.   Monthly 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.

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.

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

4.7 Monitor Tangent Roads - Transaction Type MG

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

<u>Insert Rules</u>
None.

<u>Update Rules</u>
None.

<u>Delete Rules</u>
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.

<u>Insert Rules</u>
　　None.

<u>Update Rules</u>
　　None.

<u>Delete Rules</u>
　　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
<u>Common Rules</u>

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 <u>AQS Input Transaction Formats</u> at <u>http://www.epa.gov/ttn/airs/airsaqs/manuals/manuals</u>.htm 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:
<u>Common Rules</u>
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

<u>Common Rules</u>
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.

<u>Insert Rules</u>
     None.

<u>Update Rules</u>
     None.

<u>Delete Rules</u>
     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:
<u>Common Rules</u>
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.

<u>Insert Rules</u>
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

<u>Update Rules</u>
None.

<u>Delete Rules</u>
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:
<u>Common Rules</u>
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

<u>Insert Rules</u>
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

<u>Update Rules</u>
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 at http://www.epa.gov/ttn/airs/airsaqs/manuals/manuals.htm 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
<u>Common Rules</u>
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.

<u>Insert Rules</u>
None.

<u>Update Rules</u>
None.

<u>Delete Rules</u>
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
<u>Common Rules</u>

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.

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

<u>Insert Rules</u>
None.

<u>Update Rules</u>
None.

<u>Delete Rules</u>
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

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

The database records created by this transaction will be automatically created by the load process when a new protocol is submitted for a monitor. 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.

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.

2.   Transaction Type must be in TRANSACTION_TYPES table in database.
        Error Messages:
        • Transaction type not handled.

Insert Rules

None.

<u>Update Rules</u>
None.

<u>Delete Rules</u>
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
<u>Common Rules</u>
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.

<u>Insert Rules</u>
None.

<u>Update Rules</u>
None.

<u>Delete Rules</u>
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 supercedes 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 Comments (Online Input Only)

Description: Monitor comments is a free-format field that may be used in any way. It
is normally used to describe special features of the monitor.

Attributes: 62-character field
                    Optional

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 at http://www.epa.gov/ttn/airs/airsaqs/manuals/manuals.htm 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
<u>Common Rules</u>
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.

<u>Insert Rules</u>
    None.

<u>Update Rules</u>
    None.

<u>Delete Rules</u>
    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.

<u>Update Rules</u>
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

<u>Delete Rules</u>
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
<u>Common Rules</u>
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.

<u>Insert Rules</u>
None.

<u>Update Rules</u>
None.

<u>Delete Rules</u>
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:

Para-meter	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.

Attributes: Numeric

2 digits (nn)
Optional

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
None.

Update Rules
None.

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.

<u>Delete Rules</u>
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 <u>AQS Input Transaction Formats</u> at <u>http://www.epa.gov/ttn/airs/airsaqs/manuals/manuals.</u>htm 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.   Raw data linked to collocated precision checks may not be updated or deleted.
        Error Messages:
        *   Raw data that are part of collocated precision checks may not be updated or deleted.

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
None.

Update Rules
None.

Delete Rules
None.

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.   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.

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.

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.

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 in a year greater or equal to the earliest supported year
      Error Messages:
- The sample date is not within an available year

3.   Sample Date must be less than, or equal to, the system date.
      Error Messages:
- The sample date is not within an available year

4.   Sample Date must fall within a valid sample period for the monitor.
      Error Messages:
- Monitor inactive for this date.

5.   A pre-production raw data value must not already be in the database for the Monitor, Sample Date, and Sample Time.
      Error Messages:
- A pre-production Record already exists for the Monitor - Date-Time

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.

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:

Para-meter 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 Hydro-carbons	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
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

Para-meter Code	Parameter Description	Abs Max Sample Value	Abs Min Sample Value	Fed Rel Max Sample Value	Fed Rel Min Sample Value	Reported Unit
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)
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:
   - Invalid combination of value, uncertainty, and null data code.

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:
   - Null Data Code is not at production status.

Insert Rules
None.

Update 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: Place a valid collection frequency code in the fifteenth delimited field. A
                    collection frequency is required only for PM-10 and PM-2.5. For hourly
                    data, leave collection frequency blank. 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, and unit in the
                    Protocols Table.

Business Rules
Common Rules
1.   The combination of (Duration Code, Reported Unit, Parameter, Collection Frequency,
        and Method Code) must be in the PROTOCOLS table at production status.
        Error Messages:
        • Invalid Protocol.

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.

Attributes: Numeric
                    2 digits (nn)
                    Optional

Coding Instructions: Place a valid alternate MP ID number in the sixteenth delimited field. An
                    alternate MP ID value is valid if the MP ID Value 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.)

The preferred method is to not enter an MP ID even if an alternate method detectable limit applies but to enter the alternate method detectable limit on the transaction and the system will create a new database record with a MP ID and assign that MP ID to the raw data record.

Business Rules
<u>Common Rules</u>
1.   The Alternate MP ID must exist in the database for the monitor.
        Error Messages:
        • Invalid MP_ID.

<u>Insert Rules</u>
None.

<u>Update Rules</u>
None.

<u>Delete Rules</u>
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
<u>Common Rules</u>
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:
      - 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

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 (O_3), 42101 carbon monoxide (CO), 42401 sulfur dioxide (SO_2), and 42602 nitrogen dioxide (NO_2). 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 (max - secmax)/(max -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/m^3 - milligrams per cubic meter, ppb - parts per billion, pphm - parts per hundred million, µg/m^3 - 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
	Zone 3 Regions 8, 9, 10	30	8	8 (500%)	38	25

Pollutant	Data Minimum Stratification	Maximum Hour Test	High Difference Test	Spike	Consecutive Values Test	Value*
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 (O_3), 42101 (CO), 42401 (SO_2), and 42602 (NO_2). 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 (SO_2), 42602 (NO_2), 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_threasholds 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)

The transactions in this group are used to insert, update, and delete the individual observations of parameter values in the AQS database, for audit information. The parameter values are the known and observed concentrations of air pollutants measured with the various methods and at various time intervals. These observations of parameter values are collectively called raw audit data because they are the actual, unprocessed values reported by the monitoring sites. This is contrasted with the summaries of the observations derived by AQS software. For Precision and Accuracy Data, there are two sets of fields for each possible observation: actual value, which is the known concentration of a parameter, and indicated value, which is the observed concentration of a parameter as measured by the monitor.

Insert actions are used to enter audit data values where none previously existed. The monitor reporting the audit data values must already exist in the database. Delete actions are used to remove one or more existing audit data values from the AQS database. Update actions are used to change existing audit data values.

The audit data transactions have several fields in common: transaction type, Action Indicator, state code, country code, Site ID, parameter, POC, and unit.

Transaction type RA contains accuracy data in the following fields:

Transaction Type	Year Represented	Level 1 Indicated Value
Action Indicator	Quarter Represented	Level 2 Actual Value
State Code or Tribal Indicator	Accuracy Date	Level 2 Indicated Value
County Code or Tribal Code	Audit Type	Level 3 Actual Value
Site ID	Local Primary Standard	Level 3 Indicated Value
Parameter	Audit Class	Level 4 Actual Value
POC	Accuracy Type	Level 4 Indicated Value
Accuracy Audit ID Number	Audit Sample ID	Level 5 Actual Value
Duration Code	Expiration Date	Level 5 Indicated Value
Reported Unit	Audit Scheduled	Zero Span
Method Code	Level 1 Actual Value	

Transaction type RP contains precision data in the following fields:

Transaction Type	Precision ID	Indicated Value
Action Indicator	Duration Code	Collocated POC
State Code or Tribal Indicator	Reported Unit	Precision Sample ID
County Code or Tribal Code	Actual Method	Agency Performing FRM
Site ID	Precision Date	Audit
Parameter	Actual Value	
POC	Indicated Method	

6.1 Accuracy Data - Transaction Type RA

The type RA transaction is used for parameter observations at various intervals to insert, update, or delete accuracy raw data values.

For intermittent monitors, the actual value is the known value from the audit device. The indicated value is the observation recorded by the sampler.

For continuous monitors, the actual value is the known concentration of the gas mixture used to challenge the monitor. The indicated value is the observed concentration of gas indicated when the monitor was challenged with a known concentration of gas mixture. For continuous PM monitors, the actual value is the known value for the audit device, and the indicated value is the value observed by the sampler.

An insert transaction is used to insert observations into the database. An update transaction is used to change existing observations. A delete transaction is used to remove existing observations.

6.1.0 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 RA 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.

6.1.1 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.

6.1.2 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

6.1.3 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

6.1.4 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

6.1.5 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.

   None.

6.1.6 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.

6.1.7 Accuracy Audit ID Number

Description: A sequentially assigned number used to identify (ID) a unique
                       measurement data group for a monitor on a specific date.

Attributes: Numeric
                       2-digit code (n)
                       Mandatory when using the new transaction format (pipe-delimited)
                       Optional when using the old transaction format (80 columns) and
                       reporting only one audit transaction for the day. If more than one audit is
                       performed on the same day, then this field must be valued for each
                       accuracy transaction for that day, with different values to keep the
                       transactions unique.
                       Key Field

Coding Instructions: Place a valid accuracy audit ID number in the eighth delimited field.
                       Valid values are 1 through 99.

                       For the old transaction format (80 columns): This ID is mandatory
                       in the database, but not mandatory on the old format transactions.
                       If left blank, the system will generate an ID of 1 for the transaction
                       on the load step. However, if you are submitting multiple accuracy
                       transactions for the same monitor and day, be sure to supply
                       unique accuracy audit ID numbers for each transaction. This
                       applies to the old transaction format only.

                       For the new transaction format (pipe-delimited), the accuracy audit
                       ID number must always be supplied.

Business Rules

Common Rules

1.   Accuracy Audit ID Number is required.
     Error Messages:
     - Invalid Audit ID

2.   Accuracy Audit ID Number must be greater than zero.
     Error Messages:
     - Audit ID must be positive

Insert Rules

1.   A record must not be in the database for the Monitor, Date, Audit Class, Accuracy Type, and Accuracy Audit ID Number.
     Error Messages:
     - Unique constraint (AIRSRAQS.ACA_ACCDET_FK) violated.

Update Rules

1.   A record must be in the database for the Monitor, Date, Audit Class, Accuracy Type, and Accuracy Audit ID Number.
     Error Messages:
     - No data found

Delete Rules

1.   A record must be in the database for the Monitor, Date, Audit Class, Accuracy Type, and Accuracy Audit ID Number.
     Error Messages:
     - No data found

6.1.8 Duration Code

Description: The sampling period that the sample values are collected for the monitor.

Attributes: Alphanumeric
                     1-character code
                     Mandatory

Coding Instructions: Place a valid sample duration code in the ninth 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, 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.

2.   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.

6.1.9 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 tenth 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.

Update Rules
None.

Delete Rules
None.

6.1.10   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 eleventh 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.

Update Rules
None.

Delete Rules
None.

6.1.11   Year Represented

Description: The year represented by the audit.

Attributes: Date
                       4-digit year (yyyy)
                       Optional

Coding Instructions: Place a valid year represented number in the twelfth delimited field. A
                       year represented value is valid if it is in the format of YYYY and is less
                       than or equal to the accuracy date's year. The year represented is required
                       only for lead analytical audits performed in the laboratory, to link the year

to the concentration samples analyzed during the audits.

Business Rules

Common Rules

1.   Year Represented must be the year of Date or the previous year.
        Error Messages:
        - The Year Represented must be equal to or one year prior to the year of the Accuracy Date.

Insert Rules

Update Rules
None.

Delete Rules
None.

6.1.12   Quarter Represented

Description: The quarter represented by the audit.

Attributes: Alphanumeric
                        2 characters
                        Optional

Coding Instructions: Place a valid quarter represented number in the thirteenth delimited field. A quarter represented value is valid if it is Q1, Q2, Q3, or Q4, and is less than or equal to the quarter of the analysis, or any quarter of the previous year. The quarter represented is required only for lead (Pb) analytical audits performed in the laboratory, to link the quarter to the concentration samples analyzed during the audits.

Business Rules

Common Rules

1.   Quarter Represented must be between 1 and 4.
        Error Messages:
        - Qtr Represented must be qtr of Acc Date or any qtr of prior year.

2.   Quarter Represented must be for the quarter of Date or any of the previous four quarters.
        Error Messages:
        - Qtr Represented must be qtr of Acc Date or any qtr of prior year.

Insert Rules
None.

Update Rules
None.

6.1.13   Accuracy Date

Description: The calendar date for which the accuracy audit is being reported.

Attributes: Date
                     8-digit date
                     Mandatory
                     Key Field

Coding Instructions: Place a valid date in the fourteenth delimited field. An accuracy date
                     value is valid if:
                     • It is in the form of YYYYMMDD,
                     • It is between January 1, 1980 and the current date,
                     • It falls within a valid sample period defined for the monitor, **AND**,
                     • If a criteria pollutant monitor is being audited, it falls within a valid
                       reporting organization period.

Business Rules
Common Rules
1.   Accuracy Date is required.
         Error Messages:
         • Accuracy Date is mandatory.

2.   Accuracy Date must between 1/1/1980 and current date.
         Error Messages:
         • The Precision/Accuracy Date must be between Jan 1, 1980 and the current date.

3.   Accuracy Date must fall within a valid sample period for the monitor.
         Error Messages:
         • Date must be within a valid sample period.

4.   Accuracy Date must fall within a valid reporting organization period for the monitor, if
         before 1/1/2007, otherwise, it must be in a valid PQAO period.
         Error Messages:
         • No active QA agency for precision and accuracy data.

Insert Rules
1.   A record must not be in the database for the Monitor, Accuracy Date, Audit Class,
         Accuracy Type, and Accuracy Audit ID Number.
         Error Messages:
         • Unique constraint (AIRSRAQS.ACA_ACCDET_FK) violated.

Update Rules
1.   A record must be in the database for the Monitor, Accuracy Date, Audit Class, Accuracy

Type, and Accuracy Audit ID Number.
Error Messages:
- No data found

Delete Rules
1.   A record must be in the database for the Monitor, Accuracy Date, Audit Class, Accuracy Type, and Accuracy Audit ID Number.
Error Messages:
- No data found

6.1.14   Audit Type

Description: Description of who performed the audit and how the audit standard was certified.

Attributes: Alphanumeric
                         20 characters
                         Mandatory
                         Key Field

Coding Instructions: Place a valid Audit Type term in the fifteenth delimited field. A Audit Type value is valid if it exists in the Audit Types Table.
                         Valid audit types include:
                              AUDIT AND CERT BY RO
                              AUDIT BY REP ORG
                              AUDIT NOT BY RO
                              AUDIT ONLY BY RO

Business Rules
Common Rules
1.   Audit Type must be in AUDIT_TYPES table.
Error Messages:
- Integrity constraint (AIRSRAQS.AC_AUTY_FK) violated

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

Insert Rules
1.   Audit Type is mandatory.
Error Messages:
- Audit Type is mandatory.

Update Rules
1.   Audit Type may not be nullified.
Error Messages:
- Unable to Insert/Update Accuracy Record in database
- Integrity constraint (AIRSRAQS.AC_AUTY_FK) violated - parent key not found

Delete Rules
None.

6.1.15　　Local Primary Standard

Description:　　　　The source of the local primary standards used for the audit.

Attributes:　　　　Alphanumeric
　　　　　　　　　30 characters
　　　　　　　　　Mandatory

Coding Instructions:　Place a valid local primary standard term in the sixteenth delimited field. A local primary standard term is valid if it exists in the Local Primary Standards Table.
　　　　　　　　　Examples of local primary standards include:
　　　　　　　　　　　　BIOS 40K
　　　　　　　　　　　　BUBBLE FLOW METER
　　　　　　　　　　　　CALIBRATED REFERENCE HUMIDITY
　　　　　　　　　　　　CERTIFIED ORIFICE DEVICE
　　　　　　　　　　　　CHINOOK FTS
　　　　　　　　　　　　COMMERCIAL CRM

Business Rules
Common Rules
1.　　Local Primary Standard must be in LOCAL_PRIMARY_STANDARDS table.
　　　Error Messages:
　　　• Integrity constraint (AIRSRAQS.AC_LPS_FK) violated.

2.　　Local Primary Standard must be at production status.
　　　Error Messages:
　　　• Status for LOCAL_PRI_STD is inactive

Insert Rules
1.　　Local Primary Standard is required.
　　　Error Messages:
　　　• Local Primary Standard is mandatory.

Update Rules
1.　　Local Primary Standard may not be nullified.
　　　Error Messages:
　　　• Unable to Insert/Update Accuracy Record in database
　　　• Integrity constraint (AIRSRAQS.AC_LPS_FK) violated - parent key not found

Delete Rules
None.

6.1.16 Audit Class

Description: Description of the class of audit taken at the monitor.

Attributes: Alphanumeric
                    20 characters
                    Mandatory
                    Key Field

Coding Instructions: Place a valid audit class term in the seventeenth delimited field. An audit
                    class term is valid if it exists in the Audit Classes Table, and, if there is an
                    entry in the protocol Audit Classes Table for the parameter, sample
                    duration, and unit combination, it matches the prescribed audit class term
                    for that combination.

                    Values are ANALYTICAL and FLOW.

                    The following table shows the audit class values that are required for the
                    specified parameter, duration, and unit combinations.

Parameter	Durations	Units	Audit Class
11101	7	072, 083	FLOW
12128	7, 8, C	077	ANALYTICAL
12128	7, 8, C	072, 083	FLOW
42101	1	005, 007	ANALYTICAL
42401	1	001, 007, 008	ANALYTICAL
42602	1	001, 007, 008	ANALYTICAL
44201	1	001, 007, 008	ANALYTICAL
81102	1, 7	072, 073, 083	FLOW

Business Rules
Common Rules
1.   Audit Class is required.
        Error Messages:
        • Undefined Audit Class.

2.   Audit Class must be in AUDIT_CLASSES table.
        Error Messages:
        • Integrity constraint (AIRSRAQS.AC_AUC_FK) violated.

3.   Audit Class must be at production status.
        Error Messages:
        • Status for AUDIT_CLASS is inactive

4.   Audit Class must be valid for the Parameter, Duration Code, and Reported Unit
        combination.

Error Messages:
- Invalid audit class for protocol

Insert Rules
1. A record must not already be in the database for the Monitor, Date, Audit Class, Accuracy Type, and Accuracy Audit ID Number.
   Error Messages:
   - Unique constraint (AIRSRAQS.ACA_ACCDET_FK) violated.

Update Rules
1. A record must already be in the database for the Monitor, Date, Audit Class, Accuracy Type, and Accuracy Audit ID Number.
   Error Messages:
   - No data found.

Delete Rules
1. A record must already be in the database for the Monitor, Date, Audit Class, Accuracy Type, and Accuracy Audit ID Number.
   Error Messages:
   - No data found

6.1.17   Accuracy Type

Description: A description of the type of accuracy test performed.

Attributes: Alphanumeric
                        20 characters
                        Mandatory

Coding Instructions: Place a valid accuracy type term in the eighteenth delimited field. An accuracy type term is valid if it exists in the Accuracy Types Table.

Business Rules
Common Rules
1. Accuracy Type is required.
   Error Messages:
   - Accuracy Type is mandatory.

2. Accuracy Type must be in ACCURACY_TYPES table.
   Error Messages:
   - Integrity constraint (AIRSRAQS.AC_ACT_FK) violated.

3. Accuracy Type must be at production status.
   Error Messages:
   - Status for ACC_TYPE is inactive.

Insert Rules

1. A record must not already be in the database for the Monitor, Date, Audit Class, Accuracy Type, and Accuracy Audit ID Number.
   Error Messages:
   - Unique constraint (AIRSRAQS.ACA_ACCDET_FK) violated.

Update Rules
1. A record must not already be in the database for the Monitor, Date, Audit Class, Accuracy Type, and Accuracy Audit ID Number.
   Error Messages:
   - No data found

Delete Rules
1. A record must already be in the database for the Monitor, Date, Audit Class, Accuracy Type, and Accuracy Audit ID Number.
   Error Messages:
   - No data found

6.1.18   Audit Sample ID

Description: The unique identity (ID) number of the reference sample used to challenge the instrument.

Attributes: Alphanumeric
                     10 characters
                     Optional

Coding Instructions: Place the audit sample ID alphanumeric text in the nineteenth delimited field. No edit checks are performed on an audit sample ID value.

Business Rules
There are no business rules for Audit Sample ID.

6.1.19   Expiration Date

Description: The expiration date for the local primary standard.

Attributes: Date
                     8-digit date
                     Optional

Coding Instructions: Place a valid expiration date in the twentieth delimited field. An expiration date value is valid if it is in the format of YYYYMMDD.

Business Rules
Common Rules
1. The expiration date must be in the format 'YYYYMMDD'.
   Error Messages:
   - Invalid input record format

- Not a valid month
- Day of month must be between 1 and last day of month

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

6.1.20   Audit Scheduled

Description: The initial date that the performance audit was scheduled.

Attributes: Alphanumeric
                       8 characters
                       Optional

Coding Instructions: Place a valid audit scheduled date in the twenty-first delimited field. An
                       audit scheduled value is valid if it is in the format of YYYYMMDD.

Business Rules
Common Rules
1.   The expiration date must be in the format 'YYYYMMDD'.
        Error Messages:
        - Invalid input record format
        - Not a valid month
        - Day of month must be between 1 and last day of month

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

6.1.21   Level 1-5 Actual Value

Description: The true observation of the parameter value at the prescribed audit level.

Attributes: Numeric
                       10 digits, including 5 decimal places (nnnnn.nnnnn)
                       Conditionally Required

Coding Instructions: The accuracy data transaction format allows for the specification of actual values for five levels. At least one pair of Indicated and Actual values is required for a valid accuracy record. In batch entry, the levels are position-dependent and coordinate with the audit levels defined for the parameter and the method's recording mode (continuous or intermittent) in the Audit Levels Table. Each actual value must be submitted with a corresponding indicated value for the same level. The level 1 actual value is assigned to the twenty-second delimited field; level 2, to the twenty-fourth; level 3 to the twenty-sixth; level 4, to the twenty-eighth; level 5, to the thirtieth.

Place the true values of parameter concentrations being used to challenge the monitor according to the defined levels in the appropriate field. An actual value is valid if it falls within the corresponding range of values defined for the parameter and recording mode (Intermittent or Continuous instrument) in the Audit Levels Table.

If the value entered is outside the range defined in the Audit Levels Table, the value will be accepted and a warning given.

For parameters listed below, a range of expected values has been established for observations. Actual Value concentrations reported outside the range may be data for another audit level. Ranges are specified in 40 Code of Federal Regulations (CFR) Part 58 Appendix A. In AQS, however, exceptional out of range values are accepted into the database and a warning will be given.

Parameter Code	Parameter Description	Level Number	Range
12128	Lead (TSP)	1	0.5 - 1.5 µg/m3 (25 c)
12128	Lead (TSP)	2	3 - 5 µg/m3 (25 c)
42101	Carbon Monoxide	1	3 - 8 ppm
42101	Carbon Monoxide	2	15 - 20 ppm
42101	Carbon Monoxide	3	35 - 45 ppm
42101	Carbon Monoxide	4	80 - 90 ppm
42401	Sulfur Dioxide	1	0.03 - 0.08 ppm
42401	Sulfur Dioxide	2	0.15 - 0.20 ppm
42401	Sulfur Dioxide	3	0.35 - 0.45 ppm
42401	Sulfur Dioxide	4	0.80 - 0.90 ppm
42602	Nitrogen Dioxide	1	0.03 - 0.08 ppm
42602	Nitrogen Dioxide	2	0.15 - 0.20 ppm
42602	Nitrogen Dioxide	3	0.35 - 0.45 ppm

Parameter Code	Parameter Description	Level Number	Range
42602	Nitrogen Dioxide	4	----------------------
44201	Ozone	1	0.03 - 0.08 ppm
44201	Ozone	2	0.15 - 0.20 ppm
44201	Ozone	3	0.35 - 0.45 ppm
44201	Ozone	4	0.80 - 0.90 ppm

For some parameters, percent differences are utilized to reject data that could be in error as a result of transcription errors. The maximum percent differences and parameters are listed below:

Parameter Code	Maximum Percent Difference
44201	$\pm$ 90 %
42602	$\pm$ 90 %
42401	$\pm$ 90 %
42101	$\pm$ 90 %
12128	$\pm$ 90 %

The percent difference is calculated using the following formula:

$$\left\{ \frac{(indicated - actual)}{actual} \right\} \times 100$$

Business Rules

Common Rules

1. The Actual Value must be a number with no more than 5 digits either before or after the decimal point.
   Error Messages:
   - Value larger than specified precision allows for this column

2. Actual Value must fall within the value range defined for the corresponding audit level.
   Warning Messages:
   - The value must be within the min and max concentration levels for the parameter.

3. The relative percent difference of Actual Value and Indicated Value may not exceed the maximum allowed for the parameter.
   Error Messages:
   - Maximum Percent Difference defined for the parameter was exceeded.

Insert Rules

1. At least one of the 5 levels must have a data entry. Up to five actual/indicated pairs can

be entered. One of any of the pairs is mandatory.
Error Messages:
- There is no Accuracy Audit for this Accuracy Data record.

2. An Indicated Value must be paired with an Actual Value at each level. One of any of the pairs is mandatory. An Actual Value may not be null if an Indicated Value is given.
    Error Messages:
    - Invalid Actual Value.

Update Rules
None.

Delete Rules
None.

6.1.22   Level 1-5 Indicated Value

Description: The recorded observation of the parameter value at the prescribed audit level.

Attributes: Numeric
                      10 digits, including 5 decimal places (nnnnn.nnnnn)
                      Conditionally Required

Coding Instructions: The accuracy data transaction format allows for the specification of actual values for five levels. At least one pair of Indicated and Actual values is required for a valid accuracy record. In batch entry, the levels are position-dependent and coordinate with the audit levels defined for the parameter and the method's recording mode (continuous or intermittent) in the Audit Levels Table. Each indicated value must be submitted with a corresponding actual value for the same level. The level 1 Indicated Value is assigned to the twenty-third delimited field; level 2, to the twenty-fifth; level 3 to the twenty-seventh; level 4, to the twenty-ninth; level 5, to the thirty-first.

Place the actual values of parameter concentrations being used to challenge the monitor according to the defined levels in the appropriate field. The indicated, or reported values should be paired with their associated actual values. An indicated value is expected to fall within the corresponding range of values defined for the parameter and recording mode in the Audit Levels Table.

If the value entered is outside the range defined in the Audit Levels Table, the value will still be accepted and an Informational warning given when using the data entry form. Warnings are given during batch load of this data but the Session Status of the load will be listed as "COMPLETED" meaning the job loaded successfully even though warning messages were

generated.

For parameters listed below, a range of expected values has been established for observations. Actual Value concentrations reported outside the range may be data for another audit level. Ranges are specified in 40 Code of Federal Regulations (CFR) Part 58 Appendix A. In AQS, however, exceptional out of range values, both indicated and actual, are accepted into the database. When entering data through the interactive "Maintain" form, warnings will be given if values are out of range for a particular level. In Batch, warnings are provided and, because they are not errors, the batch status will be listed as "COMPLETED".

Parameter Code	Parameter Description	Level Number	Range
12128	Lead (TSP)	1	0.5 - 1.5 µg/m3 (25 c)
12128	Lead (TSP)	2	3 - 5 µg/m3 (25 c)
42101	Carbon Monoxide	1	3 - 8 ppm
42101	Carbon Monoxide	2	15 - 20 ppm
42101	Carbon Monoxide	3	35 - 45 ppm
42101	Carbon Monoxide	4	80 - 90 ppm
42401	Sulfur Dioxide	1	0.03 - 0.08 ppm
42401	Sulfur Dioxide	2	0.15 - 0.20 ppm
42401	Sulfur Dioxide	3	0.35 - 0.45 ppm
42401	Sulfur Dioxide	4	0.80 - 0.90 ppm
42602	Nitrogen Dioxide	1	0.03 - 0.08 ppm
42602	Nitrogen Dioxide	2	0.15 - 0.20 ppm
42602	Nitrogen Dioxide	3	0.35 - 0.45 ppm
42602	Nitrogen Dioxide	4	-----------------------
44201	Ozone	1	0.03 - 0.08 ppm
44201	Ozone	2	0.15 - 0.20 ppm
44201	Ozone	3	0.35 - 0.45 ppm
44201	Ozone	4	0.80 - 0.90 ppm

For some parameters, percent differences are utilized to reject data that could be in error as a result of transcription errors. The maximum percent differences and parameters are listed below:

Parameter Code	Maximum Percent Difference
44201	± 90 %
42602	± 90 %

42401	$\pm$ 90 %
42101	$\pm$ 90 %
12128	$\pm$ 90 %

The percent difference is calculated using the following formula:

$$\left\{ \frac{(indicated - actual)}{actual} \right\} \times 100$$

Business Rules

Common Rules

1. The Indicated Value must be a number with no more than 5 digits either before or after the decimal point.
   Error Messages:
   - Value larger than specified precision allows for this column

2. Indicated Value must fall within the value range defined for the corresponding audit level.
   Warning Messages:
   - The value must be within the min and max concentration levels for the parameter.

3. The relative percent difference of Actual Value and Indicated Value may not exceed the maximum allowed for the parameter.
   Error Messages:
   - Maximum Percent Difference defined for the parameter was exceeded.

Insert Rules

1. At least one of the 5 levels must have a data entry. Up to five actual/indicated pairs can be entered. One of any of the pairs is mandatory.
   Error Messages:
   - There is no Accuracy Audit for this Accuracy Data record.

2. An Actual Value must be paired with an Indicated Value at each level. One of any of the pairs is mandatory. An Indicated Value may not be null if an Actual Value is given.
   Error Messages:
   - Invalid Indicated Value.

Update Rules
None.

Delete Rules
None.

6.1.23   Zero Span

Description: A measurement obtained with gas from a zero concentration. Zero span is
                     the observed value read from the instrument when the concentration of the
                     specific parameter used to test the monitor was zero.

Attributes: Numeric
                     10 digits, including 5 decimals (nnnnn.nnnnn)
                     Optional

Coding Instructions: Place the zero span value in the thirty-second delimited field.

Business Rules
Common Rules
1.   The Zero Span must be a number with no more than 5 digits either before or after the
        decimal point.
        Error Messages:
        • Value larger than specified precision allows for this column

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

6.2 Precision Data - Transaction Type RP

The type RP transaction is used for reporting quality control information. The values reported by
intermittent collocated monitors are checked for agreement among the collocated monitors.
Continuous monitors are challenged with a known concentration of gas. See below for a list of
fields on the RP transaction.

An insert transaction is used to insert an observation into the database where it does not currently
exist.

An update transaction is used to change or delete existing observations. The actual method and
actual value fields on this transaction pertain to the designated monitor, and the indicated method
and indicated value fields pertain to the collocated sampler (monitor). For continuous monitors,
the indicated method and indicated value fields pertain to a known gas mixture.

If both the indicated and actual values from the intermittent collocated samplers are reported to
the raw data files and the monitors are updated with the monitor collocated transaction (MJ) to
indicate that they are collocated, the post process for the raw data will also create precision
records without the use of the RP transaction.

If both the indicated and actual values from the intermittent collocated samplers are reported to the raw data files, then only the monitor ID (State-County-Site-Parameter-POC) and the collocated POC ID are required on the RP transaction, along with the date.

In other words, precision data from collocated monitors can be submitted in three different ways:

1.   Allow the system to create precision records when the raw data is psoted by submitting RJ transactions to register the monitors as collocated.

2.   Include the actual and indicated values on the precision transaction. In this case, there must be a daily raw data observation value in the database for the primary monitor, and this value must match the actual value on the precision transaction. If there is a raw data observation for the collocated POC ID, then the value supplied for indicated value must match that raw data observation value.

3.   Submit the precision data transaction to refer to existing daily raw data values in the database. To submit data this way, the following fields are left null: sample duration, unit, actual method, actual value, indicated method, and indicated value. The transaction identifies the primary monitor using state, county, site, parameter, and POC; and identifies the duplicate sampler using collocated POC ID, along with the same state, county, site, and parameter values as the primary monitor. In this case, the database must contain daily raw data values for both samplers for the same day. The system will populate the precision data using those raw data values for that day.

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

6.2.0 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 RP 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.

6.2.1 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.

6.2.2 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

6.2.3 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

6.2.4 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

6.2.5 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

<u>Common Rules</u>
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.

<u>Insert Rules</u>
   None.

<u>Update Rules</u>
   None.

<u>Delete Rules</u>
   None.

6.2.6 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.

6.2.7 Precision ID

Description: A sequentially assigned number used to identify (ID) a particular precision check from others, when multiple checks are performed on the same day.

Attributes: Numeric
                   2-digit ID (nn)
                   Optional when using the old transaction format (80 columns)
                   Mandatory when using the new transaction format (pipe-delimited)
                   Key Field

Coding Instructions: Place a valid precision ID number in the eighth delimited field. A precision ID value is valid if it is greater than 0.

                   For the old transaction format (80 columns): This ID is mandatory in the database, but not mandatory on the transaction. If left blank on the transaction, the system will generate a "1" for the field as part of the load step. If precision data for the same monitor on the same date already exists (in the database or in the transaction set), the system will not increment the number being generated for the field. A "1"will still be system-generated for each blank precision ID field on the transactions.

                   Therefore, if an agency is attempting to submit multiple precision transactions for the same day and monitor, and is leaving this field blank, then all of the RP transactions in the job will get a system-generated "1" in this field. Then the transactions for the same day and monitor will reject because they are not unique (they will all have a precision ID of "1").

So be sure to manually supply unique values for this field if you are submitting more than one set of precision data values for the same day and monitor.

The above applies to the old transaction format only.
For the new transaction format (pipe-delimited), the precision ID must be supplied.

Business Rules
Common Rules
1.   Precision ID is required.
        Error Messages:
        • Precision ID Required.

2.   Precision ID must be between 1 and 99.
        Error Messages:
        • Precision ID must be between 1 and 99.

Insert Rules
1.   The combination of Date and Precision ID must not already be in the database for the Monitor.
        Error Messages:
        • Unique constraint (AIRSRAQS.PD_UK) violated

Update Rules
1.   The combination of Date and Precision ID must be in the database for the Monitor.
        Error Messages:
        • No data found.

Delete Rules
1.   The combination of Date and Precision ID must be in the database for the Monitor.
        Error Messages:
        • No data found.

6.2.8 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 ninth 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.   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.

6.2.9 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 tenth 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.

Update Rules
None.

Delete Rules
None.

6.2.10   Actual 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 eleventh 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 Actual Method
        Code) must be in PROTOCOLS table.
        Error Messages:
        - Invalid Protocol.

2.   The Actual Method's recording mode must be the same as for all other methods used for
        the monitor in the calendar year.
        Error Messages:
        - Methods reported for a monitor-year must use the same recording modes.

Insert Rules
1.   Method Code is required.
        Error Messages:
        - Invalid Protocol.

Update Rules
None.

Delete Rules
None.

6.2.11   Precision Date

Description: The calendar date for which the precision check 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 January 1, 1980 and the current date,
- It falls within a valid sample period defined for the monitor, and,
- It falls within a valid QA agency period.

Business Rules
Common Rules
1.   Precision Date is Required.
        Error Messages:
- Date Required.

2.   Precision Date must between 1/1/1980 and current date.
        Error Messages:
- The Precision/Accuracy Date must be between Jan 1, 1980 and the current date.

3.   Precision Date must fall within a valid sample period for the monitor.
        Error Messages:
- Date must be within a valid sample period.

4.   Precision Date must fall within a valid reporting organization period for the monitor if prior to 1/1/2007; otherwise, it must be in a PQAO period .
        Error Messages:
- No active QA agency for precision and accuracy data..

Insert Rules
1.   The combination of Precision Date and Precision ID must not already be in the database for the Monitor.
        Error Messages:
- Unique constraint (AIRSRAQS.PD_UK) violated

Update Rules
1.   The combination of Precision Date and Precision ID must be in the database for the Monitor.
        Error Messages:
- No data found

Delete Rules

1. The combination of Precision Date and Precision ID must be in the database for the Monitor.
   Error Messages:
   - No data found

6.2.12   Actual Value

Description: The true value of the parameter concentration with which the monitor was challenged. For a collocated data pair, the sample value from the primary sampler.

Attributes: Numeric
                    10 digits, including 5 decimal places (nnnnn.nnnnn)
                    Mandatory (Not required if value is stored as raw data. If reported, it must equal the value in the Raw Data Table)

Coding Instructions: Place the true value in the thirteenth delimited field.

For some parameters, upper limits have been established for non-flow precision observations, and the numeric value entered cannot exceed that maximum. Those maximum values and parameters are listed below:

Parameter Code	Parameter Description	Maximum Precision Value
11101	Suspended particulate (TSP)	2000 ug/m3 SC
12128	Lead (TSP)	80 ug/m3 SC
42101	Carbon monoxide	20 ppm
42401	Sulfur dioxide	.22 ppm
42602	Nitrogen dioxide	.21 ppm
43166	1,1-Dichloroethylididene bis (4-Chlorobenzene)	3 ng/m3 SC
43167	Phosphorotrithioic acid,S,S,S-tributylester	3 ng/m3 SC
44201	Ozone	.21 ppm
81102	PM10 Total 0-10um STP	2000 ug/m3 SC
85101	PM10 - LC	2000 ug/m3 LC
88101	PM2.5 - Local Conditions	2000 ug/m3 LC
88390	Levoglucosan PM2.5 LC	200 ug/m3 LC
88391	Mannosan PM2.5 LC	200 ug/m3 LC
88392	Galactosan PM2.5 LC	200 ug/m3 LC
88500	PM2.5 Total Atmospheric	200 ug/m3 LC
88501	PM2.5 Raw Data	200 ug/m3 LC
88502	Acceptable PM2.5 AQI & Speciation Mass	200 ug/m3 LC
88503	PM2.5 Volatile Channel	200 ug/m3 LC

For some parameters, relative percent difference (RPD) is utilized to reject data that could be in error as a result of transcription errors. The maximum RPDs and parameters are listed below:

Parameter Code	Parameter Description	Maximum RPD
11101	Suspended particulate (TSP)	$\pm$160%
12128	Lead (TSP)	$\pm$201%
42101	Carbon monoxide	$\pm$90%
42401	Sulfur dioxide	$\pm$90%
42602	Nitrogen dioxide	$\pm$90%
44201	Ozone	$\pm$80%
81102	PM10 Total 0-10um STP	$\pm$201%
85101	PM10 - LC	$\pm$201%
88101	PM2.5 - Local Conditions	$\pm$160%
88390	Levoglucosan PM2.5 LC	$\pm$160%
88391	Mannosan PM2.5 LC	$\pm$160%
88392	Galactosan PM2.5 LC	$\pm$160%
88500	PM2.5 Total Atmospheric	$\pm$160%
88501	PM2.5 Raw Data	$\pm$160%
88502	Acceptable PM2.5 AQI & Speciation Mass	$\pm$160%
88503	PM2.5 Volatile Channel	$\pm$160%

For collocated precision pairs, the RPD is calculated using the following formula:

$$\left\{ \frac{actual - indicated)}{((actual + indicated)/2)} \right\} \times 100$$

For gaseous, flow, and FRM precision checks, the RPD is calculated using the following formula:

$$\left\{ \frac{(indicated - actual)}{actual} \right\} \times 100$$

Business Rules

Common Rules

1. If supplied, the actual value must be a number with no more than 6 digits before or after the decimal point.
    Error Messages:
    *   Precision scale is greater than 6.

2. Actual Value must be less than the maximum defined for the parameter.
    Error Messages:
    *   The Test Conc exceeds the Max Precision Check Value for the parameter..

3. The relative percent difference of Actual Value and Indicated Value may not exceed the maximum allowed for the parameter.
    Error Messages:
    *   Maximum Percent Difference defined for the parameter was exceeded

4.   If an Agency code is supplied on the Precision Data Transaction, then the Actual Value is required.
      Error Messages:
      - Actual Value required for PEP Precision Data.

5.   If the Duration Code is X, the Actual Value is required.
      Error Messages:
      - Actual_Value required for Collocated_Continuous Data.

6.   If the Reported Unit is type FLOW, the Actual Value is required.
      Error Messages:
      - Actual_Value required for Flow Audit Data.

7.   If the Parameter type is "Gaseous" then the Actual Value is required.
      Error Messages:
      - Actual_Value required for Gaseous Data

8.   If supplied for Collocated intermittent data, the Actual Value must match the value of the corresponding Raw Data point.
      Error Messages:
      - Value on Precision Transaction does not match Raw Data value in database.

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

6.2.13   Indicated Method

Description: Identifies the particular method for collecting and analyzing the sample value from the duplicate sampler. Only applies to collocated data.

Attributes: Alphanumeric
                      3-digit code
                      Optional

Coding Instructions: Place a valid method code in the fourteenth delimited field. An indicated method value is valid if it matches the method associated with the daily raw data point collected by the duplicate sampler on the precision date. (The duplicate sampler is identified by state code, County/Tribal Code, Site ID, parameter, and collocated POC.)

Business Rules

<u>Common Rules</u>
1. If supplied, the combination of (Duration Code, Reported Unit, Parameter, and Indicated Method) must be in PROTOCOLS table.
    Error Messages:
    - Invalid Protocol.

2. Indicated Method must be of the same recording mode (i.e., continuous or intermittent) as all other methods used for the monitor in the year.
    Error Messages:
    - Methods reported for a monitor-year must use the same recording modes.

3. If the Duration Code is 'X', then the method's recording mode must be CONTINUOUS.
    Error Messages:
    - Indicated method recording mode must be continuous for Duration X

4. If a Collocated POC is specified on the transaction, then the method's recording mode must be INTERMITTENT.
    Error Messages:
    - Collocated data must have an Intermittent recording mode or Duration X.

5. If an Agency Code is supplied on the transaction, the Indicated Method must be blank.
    Error Messages:
    - Indicated Method not allowed for PEP Precision Data.

6. If the Reported Unit is of type FLOW, then Indicated method must be blank.
    Error Messages:
    - Indicated_Method not allowed for Flow Precision Data.

7. If the Parameter's type is Gaseous, then the Indicated method must be blank.
    Error Messages:
    - Indicated_Method not allowed for Gaseous Precision Data

<u>Insert Rules</u>
None.

<u>Update Rules</u>
None.

<u>Delete Rules</u>
None.

6.2.14   Indicated Value

Description: The observed value of the parameter concentration with which the monitor was challenged. For a collocated data pair, the sample value from the duplicate sampler.

Attributes: Numeric
                    10 digits, including 5 decimal places (nnnnn.nnnnn)
                    Mandatory

Coding Instructions: Place the indicated value in the fifteenth delimited field.   An indicated
                    value is valid if its percentage difference relative to the test value does not
                    exceed the level defined for the parameter on the Parameters Table.

                    For some parameters, upper limits have been established for non-flow
                    precision observations, and the numeric value entered cannot exceed that
                    maximum. Those maximum values and parameters are listed below:

Parameter Code	Parameter Description	Maximum Precision Value
11101	Suspended particulate (TSP)	2000 ug/m3 SC
12128	Lead (TSP)	80 ug/m3 SC
42101	Carbon monoxide	20 ppm
42401	Sulfur dioxide	.22 ppm
42602	Nitrogen dioxide	.21 ppm
43166	1,1-Dichloroethylididene bis (4-Chlorobenzene)	3 ng/m3 SC
43167	Phosphorotrithioic acid,S,S,S-tributylester	3 ng/m3 SC
44201	Ozone	.21 ppm
81102	PM10 Total 0-10um STP	2000 ug/m3 SC
85101	PM10 - LC	2000 ug/m3 LC
88101	PM2.5 - Local Conditions	2000 ug/m3 LC
88390	Levoglucosan PM2.5 LC	200 ug/m3 LC
88391	Mannosan PM2.5 LC	200 ug/m3 LC
88392	Galactosan PM2.5 LC	200 ug/m3 LC
88500	PM2.5 Total Atmospheric	200 ug/m3 LC
88501	PM2.5 Raw Data	200 ug/m3 LC
88502	Acceptable PM2.5 AQI & Speciation Mass	200 ug/m3 LC
88503	PM2.5 Volatile Channel	200 ug/m3 LC

                    For some parameters, relative percent difference (RPD) is utilized to reject
                    data that could be in error as a result of transcription errors. The
                    maximum RPDs and parameters are listed below:

Parameter Code	Parameter Description	Maximum RPD
11101	Suspended particulate (TSP)	±160%
12128	Lead (TSP)	±201%
42101	Carbon monoxide	±90%
42401	Sulfur dioxide	±90%
42602	Nitrogen dioxide	±90%
44201	Ozone	±80%
81102	PM10 Total 0-10um STP	±201%
85101	PM10 - LC	±201%
88101	PM2.5 - Local Conditions	±160%
88390	Levoglucosan PM2.5 LC	±160%
88391	Mannosan PM2.5 LC	±160%

Parameter Code	Parameter Description	Maximum RPD
88392	Galactosan PM2.5 LC	$\pm$160%
88500	PM2.5 Total Atmospheric	$\pm$160%
88501	PM2.5 Raw Data	$\pm$160%
88502	Acceptable PM2.5 AQI & Speciation Mass	$\pm$160%
88503	PM2.5 Volatile Channel	$\pm$160%

For collocated precision pairs, the RPD is calculated using the following formula:

$$\left\{ \frac{actual - indicated)}{((actual + indicated)/2)} \right\} \times 100$$

For gaseous, flow, and FRM precision checks, the RPD is calculated using the following formula:

$$\left\{ \frac{(indicated - actual)}{actual} \right\} \times 100$$

Business Rules

Common Rules

1. If supplied, the indicated value must be a number with no more than 6 digits before or after the decimal point.
   Error Messages:
   - Precision scale is greater than 6.

2. Indicated Value must be less than the maximum defined for the parameter.
   Error Messages:
   - The Ind Value exceeds the Max Precision Check Value for the parameter.

3. The relative percent difference of Actual Value and Indicated Value may not exceed the Maximum allowed for the parameter.
   Error Messages:
   - Maximum Percent Difference defined for the parameter was exceeded

4. If an Agency code is supplied on the Precision Data Transaction, then the Indicated Value is not allowed.
   Error Messages:
   - Indicated Value not allowed for PEP Precision Data.

5. If the Duration Code is X, the Actual Value is required.
   Error Messages:
   - Indicated Value required for Collocated_Continuous Data.

6. If the Reported Unit is type FLOW, the Indicated Value is required.
   Error Messages:
   - Indicated Value required for Flow Audit Data.

7. If the Parameter type is "Gaseous" then the Indicated Value is required.
   Error Messages:
   - Indicated Value required for Gaseous Data

8. If supplied with a Collocated POC, , the Indicated Value must match the value of the corresponding Raw Data point.
   Error Messages:
   - Value on Precision Transaction does not match Raw Data value in database.

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

6.2.15   Collocated POC

Description: The POC of the duplicate sampler. Only applies to collocated data where the duplicate value is a recorded daily raw data point.

Attributes: Numeric
                     2-digit ID
                     Optional

Coding Instructions: Place a valid collocated POC ID in the sixteenth delimited field. A collocated POC is valid if it exists in combination with state code, County/Tribal Code, Site ID, and parameter on the Monitors Table, and if there is a sample value recorded for that monitor in raw data on the precision date.

Business Rules
Common Rules
1. Collocated POC must be a number in the range of 1 to 99.
   Error Messages:
   - Invalid Collocated POC.

2. The Combination of Parameter and Collocated POC must exist on the Monitors table for the Site.
   Error Messages:
   - No Monitor present for Collocated POC.

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

6.2.16   Precision Sample ID

Description: The unique identity (ID) number of the reference sample used to challenge the instrument.

Attributes: Alphanumeric
                      10 characters
                      Optional

Coding Instructions: Place the precision check sample ID alphanumeric text in the seventeenth delimited field. No edit checks are performed on an precision sample ID value.

Business Rules
There are no business rules for Precision Sample ID.

6.2.17   Agency Performing FRM Audit

Description: The agency submitting precision data resulting from a Federal Reference Method Code (FRM) audit of the manual method for PM-2.5 monitoring. This agency is commonly an EPA laboratory or independent laboratory.

                      Do not use this field to identify the air pollution control agency that is responsible for the monitor, its data, and routine precision and accuracy data, because precision data submitted on this transaction (RP) with this field (agency performing audit) populated will not be included in the summary statistical data for the monitor.

Attributes: Alphanumeric
                      4-digit code
                      Optional

Coding Instructions: Place a valid agency performing audit code in the eighteenth delimited field. An agency performing audit value is valid if it exists in combination with state code in the State Agencies Table.

This transaction will be rejected if the precision audit is not an FRM audit. The actual value must be blank and must have been reported by the reporting agency as raw data.

Business Rules

Common Rules

1.   The combination of State Code and Agency Performing FRM Audit must be in the STATE_AGENCIES table.
        Error Messages:
        - Integrity constraint (AIRSRAQS.QAD_SA_FK) violated.

2.   The State_Agencies table row must be at production status.
        Error Messages:
        - Status for STT_STATE_CODE, AG_AGENCY_CODE is inactive

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

6.3 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:

- Precision checks or accuracy audits whose Relative Percent Difference (RPD) is greater than or equal to 50% for a single precision check.

  For collocated precision pairs, the RPD is calculated using the following formula:

  $$\left\{ \frac{actual - indicated)}{((actual + indicated)/2)} \right\} \times 100$$

  For other types of precision checks or accuracy audits, the RPD is calculated using the following formula:

  $$\left\{ \frac{(indicated - actual)}{actual} \right\} \times 100$$

- Precision data whose quarterly RSD is greater than or equal to 50% on a per monitor basis as the summary record is generated from the update process.

- Precision data whose quarterly RSD is greater than or equal to 40% on a reporting organization, per quarter basis as the summary record is generated from the update process.

7   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

7.1.0 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.

7.1.1 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.

7.1.2 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

7.1.3 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

7.1.4 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

7.1.5 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.

7.1.6 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.

7.1.7 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.

Update Rules
None.

Delete Rules
None.

7.1.8 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.

Update Rules
None.

Delete Rules
None.

7.1.9 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.

Update Rules
None.

Delete Rules
None.

7.1.10   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.

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

7.1.11 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

7.1.12   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.

7.1.13 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.

7.1.14 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.

7.1.15 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.

7.1.16 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.

7.1.17   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.

7.1.18 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.

7.1.19 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.

7.1.20   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.

7.1.21 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.

7.1.22 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.

7.1.23   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.

7.1.24   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.

7.1.25   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.

7.1.26   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.

7.1.27   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.

7.1.28   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.

7.1.29   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.

7.1.30   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.

7.1.31   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.

7.1.32 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.

7.1.33 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.

7.1.34   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.

7.1.35   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.

7.1.36   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.

7.1.37   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.

8   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:

8.1.0 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.

8.1.1 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.

8.1.2 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

8.1.3 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

8.1.4 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

8.1.5 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.

8.1.6 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.

8.1.7 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.

Update Rules
None.

Delete Rules
None.

8.1.8 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.

Update Rules
None.

Delete Rules
None.

8.1.9 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.

Update Rules
None.

Delete Rules

None.

8.1.10   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

8.1.11   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.

<u>Update Rules</u>
1.   The combination of Blank Type, Date, and Time must be in database for Monitor.
        Error Messages:
        - Unable to insert/update blanks data.

<u>Delete Rules</u>
1.   The combination of Blank Type, Date, and Time must be in database for Monitor.
        Error Messages:
        - Unable to insert/update blanks data.

8.1.12   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
<u>Common Rules</u>
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.

<u>Insert Rules</u>
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.

<u>Update Rules</u>
1.   The combination of Blank Type, Date, and Time must be in database for Monitor.
        Error Messages:
        - Unable to insert/update blanks data.

<u>Delete Rules</u>
1.   The combination of Blank Type, Date, and Time must be in database for Monitor.

Error Messages:
- Unable to insert/update blanks data.

8.1.13　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

2.　　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.

8.1.14　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
1.   Null Data Code is required if the Blank Value is Null.
      Error Messages:
      • Invalid combination of value, uncertainty, and null data code.

2.   Null Data Code must be in QUALIFIERS table.
      Error Messages:
      • Invalid Null Data Code.

3.   Null Data Code must be at production status.
      Error Messages:
      • Inactive Null Data Code.

Insert Rules
None.
Update Rules
None.

Delete Rules
None.

8.1.15   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.

8.1.16   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.

8.1.17   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.