United States
Environmental
Protection
Agency

Office of Air Quality Planning and Standards
Information Transfer and Program Integration Division
Information Management Group
Research Triangle Park, NC 27711

AQS Data Coding Manual

VERSION 2.2

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Note to our users:

If you were familiar with the "old" mainframe system, you should recognize almost all of the old fields and terminology in the "new" system, because the "new" system still addresses the "old" monitoring program data needs.

The Appendices attached to this manual contain codes and descriptions from the various AQS tables. Over time, the list of code values may change, so we will routinely update this manual. Besides using these appendices, the current list of codes and descriptions can also be obtained by using drop-down lists in the AQS Client, or by using the powerful Oracle Discoverer tool.

We plan on making improvements to this manual in the future. And we hope this manual helps make the job of data entry a little more straightforward for you. If you have suggestions or see corrections that should be made, please let us know. Thank you for your cooperation, and your work to protect our Nation's air quality.

The Information Management Group, OAQPS,USEPA

AQS DATA CODING MANUAL

Version 2.2.

September 30, 2004

U.S. ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF AIR QUALITY PLANNING AND STANDARDS
INFORMATION TRANSFER AND PROGRAM INTEGRATION DIVISION
INFORMATION MANAGEMENT GROUP
RESEARCH TRIANGLE PARK, NC 27711

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1.0 Introduction

This manual explains the data coding and loading rules for the Air Quality System (AQS). AQS is a computer-based system for handling the storage and retrieval of information pertaining to airborne pollutants and related meteorological data. It is administered by the U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards (OAQPS) in Research Triangle Park, North Carolina.

This document is part of a multi volume set that describes the AQS system. The volumes of the set include the following titles:

- AQS Data Dictionary: Describes the data structure used by the AQS applicatoin
- AQS Coding Manual: Describes the transactions and business rules used to enter data into AQS.
- A simple definition of current input transaction formats can be found at http://www.epa.gov/ttn/airs/airsaqs/manuals/manuals.htm

This volume describes 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.

The remainder of this volume is organized as follows:

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

2.0 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 data entry via data screens 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. The transaction formats are available for downloading from the AQS website, along with code tables. 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 " | ". 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 (mainfame) 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.

2.2.1 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. Code values are available from the TTN web pages. The larger tables of code values are also available as drop-down lists in the AQS Client software.

2.2.2 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.

2.2.3 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 identify 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 which 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 AND a monitor associated with it that is at "P" status.
- A monitor at "P" status must have
    - A sampling start date
    - An objective
    - A monitoring type assignment.
    - If it is a criteria pollutant monitor it must have an assigned reporting agency and depending on the pollutant, a collection frequency defined.
- 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 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.

3.0 Common Fields

The AQS transaction formats contain certain fields in common. These common fields are described in this chapter.

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 a valid transaction type in the first delimited field.
Valid transaction types are:
AA, AB, AC for site transactions
MA, MB, MC, MD, ME, MF, MG, MH, MI, MJ, MK for monitor transactions
RC, RD for raw data transactions (composite and hourly, daily, sub-hourly)
RA and RP for audit transactions
RS for annual summary data
RB for Blanks Transactions

Business Rules:

Common Rules

- Transaction Type is mandatory
  Error Messages:
  1. Transaction Type is required.

- Transaction Type must be in TRANSACTION_TYPES table in database.
  Error Messages:
  1. Invalid Transaction Type.

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

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:
   1. Action Code is Required.

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

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

Transaction Type	Action Indicator	Database Processing
AA-AC	I	Insert a new site into the Site Table.
	U	Change one or more column values within a site-related table row.
AA	D	Delete a site from the Site Table (not allowed once raw data has been loaded for any monitor at the site).
MA-MK	I	Insert a new monitor into the Site Table.
	U	Change or delete one or more column values within a Monitor related table row .
MA	D	Delete a monitor from the Monitors Table (not allowed once raw data has been loaded for the monitor).
RC, RD	I	Insert new values into the Raw Data Table.

Transaction Type	Action Indicator	Database Processing
	U	Change or delete existing values in the Raw Data Table.
	D	Delete existing values from the Raw Data Table.
RP	I	Insert precision data for collected samples.
	U	Change existing precision value(s).
	D	Delete existing precision values for a specified time interval.
RA	I	Insert a new accuracy value in the Accuracy Data Table for a specified time interval.
	U	Change an existing accuracy value in the Accuracy Data Table.
	D	Delete existing accuracy values for a specified time interval from the Accuracy Data Table.
RS	I	Insert summary data for a pollutant for a year (when no corresponding raw data exists.
	U	Change existing summary values.
	D	Delete existing summary values.

3.3 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.

Attributes: Alphanumeric
2-digit code
Mandatory
Key Field

Coding Instructions: Place a valid FIPS state code in delimited field 3. A code is valid if it exists in the States Table.

Business Rules

Common Rules:

1. State Code is mandatory.
   Error Messages:
   1. State Code is required.

Insert Rules:

1. (State Code, County Code, City Code) must be in COUNTY_CITIES table.
   Error Messages:
   1. Integrity constraint (AIRSRAQS.SI_CC_FK) violated[1]
   2. Invalid State-County

2. (State Code, County Code, City Code) must be at production status.
   Error Messages:
   1. Status for CN_STT_STATE_CODE, CN_COUNTY_CODE, CI_STT_STATE_CODE, CI_CITY_CODE is inactive

   .

Update Rules:

1. (State Code, County Code, Site ID) must be in the SITES table.
   Error Messages:
   1. Unable to update or delete site.
   2. No data found.

Delete Rules:

1. (State Code, County Code, Site ID) must be in the SITES table.
   Error Messages:
   1. Unable to update or delete site.
   2. No data found.

3.4 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.

Attributes: Alphanumeric
3-digit code
Mandatory
Key Field

Coding Instructions: Place a valid county code in the fourth delimited field. A code is valid if it exists in combination with state code and city code, in the County Cities Table

[1]This is an Oracle Error. Whenever Oracle errors are generated, a second "user friendly" message is also generated to explain the first.

Business Rules

Common Rules:

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

Insert Rules:

1. (State Code, County Code, City Code) must be in COUNTY_CITIES table.
   Error Messages:
   1. Integrity constraint (AIRSRAQS.SI_CC_FK) violated
   2. Invalid State-County

2. (State Code, County Code, City Code) must be at production status.
   Error Messages:
   1. Status for CN_STT_STATE_CODE, CN_COUNTY_CODE, CI_STT_STATE_CODE, CI_CITY_CODE is inactive.

Update Rules:

1. (State Code, County Code, Site ID) must be in the SITES table.
   Error Messages:
   1. Unable to update or delete site.
   2. No data found.

Delete Rules:

1. (State Code, County Code, Site ID) must be in the SITES table.
   Error Messages:
   1. Unable to update or delete site.
   2. No data found.

3.5 Site ID

Description: A numeric identifier (ID) that uniquely identifies each air monitoring site within a county. There is no requirement that site IDs be assigned continuously or in any particular order. Local organizations are thus free to allocate site numbers in any way they chose as long as there is no duplication within a 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 ID and county 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 code in the Sites Table.

Business Rules

Common Rules:

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

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

Insert Rules:

None.

Update Rules:

1. (State Code, County Code, Site ID) must be in the SITES table.
   Error Messages:
   1. Unable to update or delete site.
   2. No data found.

Delete Rules:

1. (State Code, County Code, Site ID) must be in the SITES table.
   Error Messages:
   1. Unable to update or delete site.
   2. No data found.

4.0 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
Action Indicator
State Code
County Code
Site ID
Latitude
Longitude
UTM Zone
UTM Easting
UTM Northing
Horizontal Collection Method
Horizontal Datum
Source Scale
Horizontal Accuracy
Vertical Measure
Time Zone
Agency Code
Street Address
City Code
Urban Area Code
AQCR
Land Use Type
Location Setting
Date Site Established
Date Site Terminated
ZIP Code
Congressional District
Block
Block Group
Census Tract
Class I Area
Local Region
Local Site Name
HQ Evaluation Date
EPA Region Evaluation Date
Direction from Central Business District to Site
Distance from Central Business District to Site
Meteorological Site Type
Meteorological Site ID
Distance to Meteorological Site
Direction to Meteorological Site
Local Site ID
Vertical Collection Method
Vertical Datum
Vertical Accuracy

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

Transaction Type
Action Indicator
State Code
County Code
Site ID
Tangent Street Number
Street Name
Road Type
Traffic Count
Year of Traffic Count
Direction from Site to Street
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
Action Indicator
State Code
County Code
Site ID
Open Path Number
Direction from Receiver to Transmitter
Beam Length
Height of Transmitter
Height of Receiver
Minimum Beam Height
Maximum Beam Height
Land Use Under Path

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, while multiple AB and AC transactions can be entered. Each AB transaction supplies information for one street surrounding 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.

4.1 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:
   1. -20270 To enter a new Site record, you must enter a least one Monitor record.

4.2 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.

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 AA in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory
   Error Messages:
   1. Transaction Type is Required.

2. Transaction Type must be in TRANSACTION_TYPES table in database.
   Error Messages:
   1. Invalid Transaction Type.

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:
   1. Action Code is Required.

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

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.2.3 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.

Attributes: Alphanumeric
2-character code
Mandatory
Key Field

Coding Instructions: Place a valid FIPS state code in delimited field 3. A code is valid if it exists in the States Table.

Business Rules

Common Rules:

1. State Code is mandatory.
   Error Messages:
   1. State Code is required.

Insert Rules:

1. (State Code, County Code, City Code) must be in COUNTY_CITIES table.
   Error Messages:
   1. Integrity constraint (AIRSRAQS.SI_CC_FK) violated[2]
   2. Invalid State-County

2. A Site with (State Code, County Code, Site ID) must not already be in the database.
   Error Messages:
   1. Unique constraint (AIRSRAQS.SI_UK) violated
   2. Unable to insert Site.

3. (State Code, County Code, City Code) must be at production status.
   Error Messages:
   1. Status for CN_STT_STATE_CODE, CN_COUNTY_CODE, CI_STT_STATE_CODE, CI_CITY_CODE is inactive

   .

Update Rules:

1. (State Code, County Code, Site ID) must be in the SITES table.
   Error Messages:
   1. Unable to update or delete site.
   2. No data found.

Delete Rules:

1. (State Code, County Code, Site ID) must be in the SITES table.
   Error Messages:
   1. Unable to update or delete site.
   2. No data found.

4.2.4 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.

Attributes: Alphanumeric
3-digit code
Mandatory
Key Field

[2]This is an Oracle Error. Whenever Oracle errors are generated, a second "user friendly" message is also generated to explain the first.

Coding Instructions: Place a valid county code in the fourth delimited field. A code is valid if it exists in combination with state code and city code, in the County Cities Table.

Business Rules

Common Rules:

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

Insert Rules:

1. (State Code, County Code, City Code) must be in COUNTY_CITIES table.
   Error Messages:
   1. Integrity constraint (AIRSRAQS.SI_CC_FK) violated
   2. Invalid State-County

2. A Site with (State Code, County Code, Site ID) must not already be in the database.
   Error Messages:
   1. Unable to insert Site.
   2. Unique constraint (AIRSRAQS.SI_UK) violated

3. (State Code, County Code, City Code) must be at production status.
   Error Messages:
   1. Status for CN_STT_STATE_CODE, CN_COUNTY_CODE, CI_STT_STATE_CODE, CI_CITY_CODE is inactive.

Update Rules:

1. (State Code, County Code, Site ID) must be in the SITES table.
   Error Messages:
   1. Unable to update or delete site.
   2. No data found.

Delete Rules:

1. (State Code, County Code, Site ID) must be in the SITES table.
   Error Messages:
   1. Unable to update or delete site.
   2. No data found.

4.2.5 Site ID

Description: A numeric identifier (ID) that uniquely identifies each air monitoring site within a county. There is no requirement that site IDs be assigned continuously or in any particular order. Local organizations are thus free to allocate site numbers in any way they chose as long as there is no duplication within a 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 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 code in the Sites Table.

Business Rules

Common Rules:

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

Insert Rules:

1. A Site with (State Code, County Code, Site ID) must not already be in the database.
   Error Messages:
   1. Unable to insert Site.
   2. Unique constraint (AIRSRAQS.SI_UK) violated

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

Update Rules:

1. (State Code, County Code, Site ID) must be in the SITES table.
   Error Messages:
   1. Unable to update or delete site.
   2. No data found.

Delete Rules:

1. (State Code, County Code, Site ID) must be in the SITES table.
   Error Messages:
   1. Unable to update or delete site.
   2. No data found.

4.2.6 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[2]

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.) When latitude and longitude are provided on the transaction, the UTM coordinates are system-generated during the load step for the Sites Table (for insert and update Action Indicators). Therefore, all Sites Table rows contain both latitude/longitude and UTM coordinates.

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

Business Rules

Common Rules:

1. Latitude must be between the Min and Max Latitudes for the County
   Error Messages:
   1. Site Latitude or Longitude are not within the county.

Insert Rules

1. Either (Latitude, Longitude) or (UTM Zone, UTM Easting, UTM Northing) combinations must be provided, but not both.
   Error Messages:
   1. Either Lat-Long or UTM information must be provided

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

Update Rules
None.

Delete Rules
None.

4.2.7 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.) When latitude and longitude are provided on the transaction, the UTM coordinates are system-generated during the load step for the Sites Table (for insert and update Action Indicators). Therefore, all Sites Table rows contain both latitude/longitude and UTM coordinates.

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 between the Min and Max Longitudes for the County
   Error Messages:
   1. Site Latitude or Longitude are not within the county.

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

Insert Rules

1. Either (Latitude, Longitude) or (UTM Zone, UTM Easting, UTM Northing) combinations must be provided, but not both.

   Error Messages:

   1. Either Lat-Long or UTM information must be provided

Update Rules

None.

Delete Rules

None.

4.2.8 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, and store both UTM and 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.) 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 zone value in the eighth delimited field.

Business Rules

Common Rules:

1. Site location must be between the Min and Max Latitude-Longitude for the County

   Error Messages:

   1. Site Latitude or Longitude are not within the county.

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

Insert Rules

1. Either (Latitude, Longitude) or (UTM Zone, UTM Easting, UTM Northing) combinations must be provided, but not both.

   Error Messages:

   1. Either Lat-Long or UTM information must be provided

Update Rules

None.

Delete Rules

None.

4.2.9 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, and store both UTM and 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.) 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 easting value in the ninth delimited field.

Business Rules

Common Rules:

1. Site location must be between the Min and Max Latitude-Longitude for the County

   Error Messages:

   1. Site Latitude or Longitude are not within the county.

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

Insert Rules

1. Either (Latitude, Longitude) or (UTM Zone, UTM Easting, UTM Northing) combinations must be provided, but not both.

   Error Messages:

   1. Either Lat-Long or UTM information must be provided

Update Rules

None.

Delete Rules

None.

4.2.10 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, and store both UTM and 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 between the Min and Max Latitude-Longitude for the County

   Error Messages:

   1. Site Latitude or Longitude are not within the county.

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

Insert Rules

1. Either (Latitude, Longitude) or (UTM Zone, UTM Easting, UTM Northing) combinations must be provided, but not both.

   Error Messages:

   1. Either Lat-Long or UTM information must be provided

Update Rules

None.

Delete Rules

None.

4.2.11 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.

Horizontal Collection Method Codes as of September 11, 2003 are:

Code	Description
001	ADDRESS MATCHING-HOUSE NUMBER
002	ADDRESS MATCHING-BLOCK FACE
003	ADDRESS MATCHING-STREET CENTERLINE
004	ADDRESS MATCHING-NEAREST INTERSECTION
005	ADDRESS MATCHING-PRIMARY NAME
006	ADDRESS MATCHING-DIGITIZED
007	ADDRESS MATCHING-OTHER
008	CENSUS BLOCK-1990-CENTROID
009	CENSUS BLOCK/GROUP-1990-CENTROID
010	CENSUS BLOCK/TRACT-1990-CENTROID
011	CENSUS-OTHER
012	GPS CARRIER PHASE STATIC RELATIVE POSITION
013	GPS CARRIER PHASE KINEMATIC RELATIVE POSITION
014	GPS CODE (PSEUDO RANGE) DIFFERENTIAL
015	GPS CODE (PSEUDO RANGE) PRECISE POSITION
016	GPS CODE (PSEUDO RANGE) STANDARD POSITION (SA OFF)
017	GPS CODE (PSEUDO RANGE) STANDARD POSITION (SA

ON)
018 INTERPOLATION-MAP
019 INTERPOLATION-PHOTO
020 INTERPOLATION-SATELLITE
021 INTERPOLATION-OTHER
022 LORAN C
023 PUBLIC-LAND-SURVEY-QUARTER SECTION
024 PUBLIC-LAND-SURVEY-FOOTING
025 CLASSICAL SURVEYING TECHNIQUES
026 ZIP CODE-CENTROID
027 UNKNOWN (not accepted for new data loading)
028 GPS - UNSPECIFIED
029 GPS - WITH CANADIAN ACTINVE CONTROL SYSTEM
030 INTERPOLATION - DIGITAL MAP SRCE (TIGER)
031 INTERPOLATION - SPOT
032 INTERPOLATION-MSS
033 INTERPOLATION-TM
034 PUBLIC LAND SURVEY - EIGHTH SECTION
035 PUBLIC LAND SURVEY - SIXTEENTH SECTION
036 PUBLIC LAND SURVEY - FOOTING
037 ZIP+4 CENTROID
038 ZIP+2 CENTROID

Business Rules

Common Rules:

1. Horizontal Collection Method must be in LDP_COLLECTION_METHODS table.
   Error Messages:
   1. Integrity constraint (AIRSRAQS.SI_LDPCM_FK) violated

2. Horizontal Collection Method must be at production status.
   Error Messages:
   1. Status for LDP_COLL_METHOD_CODE is inactive

Insert Rules

1. Horizontal Collection Method is mandatory.
   Error Messages:
   1. Cannot insert NULL into ("AIRSRAQS"."SITES"."LPDCM_LDP_COLL_METHOD_CODE")

Update Rules

None.

Delete Rules

None.

4.2.12 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 Atlantic Datum 1927 (NAD27).

This data element is required by EPA Locational Data Policy. 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 Horizontal Datum value in the twelfth delimited field. A value is valid if it is in the LDP Horizontal Data Table. Examples of Horizontal Datum values as of September 11, 2003 are given 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:
   1. Integrity constraint (AIRSRAQS.SI_LDPHD_FK) violated.

1. LDP_HORIZONTAL_DATA (LDP_HORIZ_DATUM) must be at production status.
   Error Messages:
   1. Status for LDP_HORIZ_DATUM is inactive.

Insert Rules

1. Horizontal Datum is mandatory.
   Error Messages:
   1. Cannot insert NULL into ("AIRSRAQS"."SITES"."LDPHD_LDP_HORIZ_DATUM")

Update Rules

None.

Delete Rules
None.

4.2.13 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. This data element is required by EPA Locational Data Policy. 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)
Mandatory (for Insert)

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

Business Rules

Common Rules:
None.

Insert Rules

1. Source Scale is mandatory.
   Error Messages:
   1. Cannot insert NULL into ("AIRSRAQS"."SITES"."LDP_SOURCE_SCALE")

Update Rules
None.

Delete Rules
None.

4.2.14 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 ± 3.33 feet
1:2,400 ± 6.67 feet
1:4,800 ± 13.33 feet

1:10,000 ± 27.78 feet
1:12,000 ± 33.33 feet
1:24,000 ± 40.00 feet
1:63,360 ± 105.60 feet
1:100,000 ± 166.67 feet
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:
   1. Invalid Horizontal Accuracy Value

Insert Rules

1. Horizontal Accuracy is mandatory.
   Error Messages:
   1. Cannot insert NULL into ("AIRSRAQS"."SITES"."LDP_ACC_VALUE")

Update Rules

None.

Delete Rules

None.

4.2.15 Vertical Measure

Description: The elevation, in meters, above or below mean sea level (MSL) of the site. 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:
   1. Vertical measure must be between -10,000 and 20,000
2. Vertical Measure must be numeric.
   Error Messages:
   1. Unable to insert Site into database
   2. ORA-01722: invalid number

Insert Rules

1. Vertical Measure is mandatory.
   Error Messages:
   1. Cannot insert NULL into ("AIRSRAQS"."SITES"."LDP_VERT_MEAS")

Update Rules

None.

Delete Rules

None.

4.2.16 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
Optional

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:
   1. Integrity constraint (AIRSRAQS.SI_STZ_FK) violated

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

1. Status for STT_STATE_CODE, TZ_TIME_ZONE_NAME is inactive.

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

4.2.17 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 or update, 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:
   1. Integrity constraint (AIRSRAQS.AR1_SA_FK) violated

2. STATE_AGENCIES (STT_STATE_CODE, AG_AGENCY_CODE) must be at production status.
   Error Messages:
   1. Status for STT_STATE_CODE, AG_AGENCY_CODE is inactive.

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

4.2.18 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:
   1. Field "Street Address" is too long.

Insert Rules

1. Street Address is mandatory.
   Error Messages:
   1. Cannot insert NULL into ("AIRSRAQS"."SITES"."STREET_ADDRESS").

Update Rules

None.

Delete Rules

None.

4.2.19 City Code

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

Attributes: Alphanumeric
5-digit code
Mandatory (for Insert)

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 code in the County Cities Table. If the site is not within a city, use code 00000.

Business Rules

Common Rules:

1. (State Code, County Code, City Code) must be in COUNTY_CITIES table.
   Error Messages:
   1. Integrity constraint (AIRSRAQS.SI_CC_FK) violated

2. COUNTY_CITIES (CN_STT_STATE_CODE, CN_COUNTY_CODE, CI_CITY_CODE) must be at production status.
   Error Messages:
   1. Status for CN_COUNTY_CODE, CN_STT_STATE_CODE, CI_CITY_CODE, CI_STT_STATE_CODE is inactive.

Insert Rules

1. City Code is mandatory.
   Error Messages:
   1. Cannot insert NULL into ("AIRSRAQS"."SITES"."CC_CI_CITY_CODE")

Update Rules

None.

Delete Rules

None.

4.2.20 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
Mandatory (for Insert)

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, use code 0000.

Business Rules:

Common Rules:

1. (State Code, Urban Area Code) must be in STATE_URBANIZED_AREAS table
   Error Messages:
   1. Integrity constraint (AIRSRAQS.SI_SUA_FK) violated

2. STATE_URBANIZED_AREAS (STT_STATE_CODE, UA_UAR_CODE) must be at production status.
   Error Messages:
   1. Status for STT_STATE_CODE, UA_UAR_CODE is inactive.

Insert Rules

1. Urban Area Code is mandatory.
   Error Messages:
   1. Unable to insert Site into database
   2. Cannot insert NULL into ("AIRSRAQS"."SITES"."SUA_UA_UAR_CODE")

Update Rules

None.

Delete Rules
None.

4.2.21 AQCR

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

Attributes: Alphanumeric
3-digit code
Required

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 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:
   1. Integrity constraint (AIRSRAQS.SI_AQCRC_FK) violated

2. AQCR_COUNTIES (AQ_AQCR_CODE, CN_STT_STATE_CODE, CN_COUNTY_CODE) must be at production status.
   Error Messages:
   1. Status for AQ_AQCR_CODE, CN_STT_STATE_CODE, CN_COUNTY_CODE is inactive

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

4.2.22 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.

Business Rules:

Common Rules:

1. Land UseType must be in LAND_USE_TYPES table.
   Error Messages:
   1. Integrity constraint (AIRSRAQS.SI_LUT_FK) violated

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

Insert Rules

1. Land UseType must not be NULL
   Error Messages:
   1. Unable to insert Site into database
   2. cannot insert NULL into ("AIRSRAQS"."SITES"."LUT_LAND_USE_TYPE")

Update Rules

None.

Delete Rules

None.

4.2.23 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.

Business Rules:

Common Rules:

1. Location Setting must be in LOCATION_SETTINGS table.
   Error Messages:
   1. Integrity constraint (AIRSRAQS.SI_LS_FK) violated

2. LOCATION_SETTINGS (LOCATION_SETTING) must be at production status.
   Error Messages:
   1. Status for LOCATION_SETTING is inactive.

Insert Rules

1. Location Setting must not be Null
   Error Messages:
   1. Unable to insert Site into database
   2. cannot insert NULL into ("AIRSRAQS"."SITES"."LS_LOCATION_SETTING")

Update Rules
None.

Delete Rules
None.

4.2.24 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:
   1. The Site Established Date is not within the valid date range.

Insert Rules
1. Date Site Established is mandatory.
   Error Messages:
   1. Cannot insert NULL into ("AIRSRAQS"."SITES"."SITE_ESTAB_DATE")

Update Rules
None.

Delete Rules
None.

4.2.25 Date Site Terminated

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

Attributes: Date
8-digit date
Optional

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

Business Rules:

Common Rules:

1. Date Site Terminated must be between Date Site Established and one year from the current date.
   Error Messages:
   1. 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:
   1. All monitors must be closed to terminate a site. Open monitors: (List of open monitor Ids)

3. Date Site Terminated must be greater than, or equal to, all sample period end dates for the site's monitors.
   Error Messages:
   1. Site terminated date must be equal to or greater than Sampling Period End Date.

4. Date Site Terminated must be greater than, or equal to, all reporting organization end dates for the site's monitors.
   Error Messages:
   1. Site terminated date must be equal to or greater than Reporting Org. End Date.

5. Date Site Terminated must be greater than, or equal to, all collocation end dates for the site's monitors.
   Error Messages:
   1. The collocation period end date must be less than or equal to the site termination date.

6. Date Site Terminated must be greater than, or equal to, all monitor type assignment end dates for the site's monitors .
   Error Messages:
   1. The monitor type end date must be less than or equal to the site termination date

7. Date Site Terminated must be greater than, or equal to, all required collection frequency end dates for the site's monitors.
   Error Messages:
   1. The required collection frequency end date must be less than or equal to the site termination date.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.2.26 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

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 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:
   1. Integrity constraint (AIRSRAQS.SI_CZC_FK) violated

2. (State Code, County Code, Zip Code) must be at production status.
   Error Messages:
   1. Status for CN_STT_STATE_CODE, CN_COUNTY_CODE, ZC_ZIP_CODE is inactive.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.2.27 Congressional District

Description: The Congressional district within which the site is located.

Attributes: Alphanumeric
2-digit code
Optional

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:
   1. Integrity constraint (AIRSRAQS.SI_CD_FK) violated

2. (State Code, Congressional District) must be at production status.
   Error Messages:
   1. Status for STT_STATE_CODE, CONGR_DISTR_NUM is inactive.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.2.28 Block

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

Attributes: Alphanumeric
4-digit code
Optional

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, block group, and census tract in the Blocks Table.

Business Rules:

Common Rules:

1. (State Code, County Code, Census Tract, Block Group, Block) must be in BLOCKS table.
   Error Messages:
   1. Integrity constraint (AIRSRAQS.SI_BL_FK) violated

2. (State Code, County Code, Census Tract, Block Group, Block) must be at production status.
   Error Messages:
   1. Status for BG_CT_CN_STT_STATE_CODE, BG_CT_CN_COUNTY_CODE, BG_CT_CENSUS_TRACT_NUM, BG_BLOCK_GROUP_NUM, BLOCK_NUM is inactive.

3. Block record must not be more than 4 digits
   Error Messages:

1. Unable to insert Site into database
2. inserted value too large for column

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

4.2.29 Block Group

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

Attributes: Alphanumeric
1-digit code
Optional

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

Business Rules:
Common Rules:

1. (State Code, County Code, Census Tract, Block Group, Block) must be in BLOCKS table.
   Error Messages:
   1. Integrity constraint (AIRSRAQS.SI_BL_FK) violated
2. (State Code, County Code, Census Tract, Block Group, Block) must be at production status.
   Error Messages:
   1. Status for BG_CT_CN_STT_STATE_CODE, BG_CT_CN_COUNTY_CODE BG_CT_CENSUS_TRACT_NUM, BG_BLOCK_GROUP_NUM, BLOCK_NUM is inactive

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

4.2.30 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

Coding Instructions: Census tract information must be submitted in conjunction with block and block group. 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 code, block, and block group in the Blocks Table.

Business Rules:
Common Rules:

1. (State Code, County Code, Census Tract, Block Group, Block) must be in BLOCKS table.
   Error Messages:
   1. Integrity constraint (AIRSRAQS.SI_BL_FK) violated
2. (State Code, County Code, Census Tract, Block Group, Block) must be at production status.
   Error Messages:
   1. Status for BG_CT_CN_STT_STATE_CODE, BG_CT_CN_COUNTY_CODE BG_CT_CENSUS_TRACT_NUM, BG_BLOCK_GROUP_NUM, BLOCK_NUM is inactive

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

4.2.31 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:
   1. Integrity constraint (AIRSRAQS.SI_COA_FK) violated

2. CLASS_ONE_AREAS (CLASS_1_AREA_CODE) must be at production status.
   Error Messages:
   1. Status for CLASS_1_AREA_CODE is inactive

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

4.2.32 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:
   1. Integrity constraint (AIRSRAQS.SI_LR_FK) violated

2. (State Code, Local Region) must be at production status.
   Error Messages:
   1. Status for STT_STATE_CODE, LOCAL_REGION_CODE is inactive

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

4.2.33 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:
   1. Field "Local Site Name" is too long.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.2.34 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:
   1. The headquarters evaluation date is not within the valid range.

1. User must have HQ application role to insert or update the HQ Evaluation Date.
   Error Messages:
   1. Insufficient privileges to enter HQ_Eval_Date

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

4.2.35 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:
   1. 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:
   1. Insufficient privileges to enter Regional_Eval_Date

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

4.2.36 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.

Business Rules:

Common Rules:

1. Compass Sector must be in Compass_Sectors table
   Error Messages:
   1. Integrity constraint (AIRSRAQS.SI_CS_FK) violated

2. Compass Sector must be at production status.
   Error Messages:
   1. Status for COMPASS_SECTOR is inactive.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.2.37 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:
   1. The City Distance Measurement must be a value between 0 and 1000.

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

4.2.38 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.

Business Rules:
Common Rules:

1. Type Meteorological Site must be in MET_SITE_TYPES table
   Error Messages:
   1. Integrity constraint (AIRSRAQS.SI_MST_FK) violated

2. Type Meteorological Site must be at production status
   Error Messages:
   1. Met_Site_Type is inactive.

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

4.2.39 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 (2 characters), a FIPS county 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:
   1. Integrity constraint (AIRSRAQS.SI_SI_FK) violated

1. Met Site ID must be valued when Met Site Type is "OTHER AIRS SITE"; otherwise, it must not be valued.
   Error Messages:
   1. 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.

4.2.40 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:

   1. 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.

4.2.41 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 met site value in the forty-first delimited field. 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:

   1. Integrity constraint (AIRSRAQS.SI_CS_FK) violated

2. Direction to Meteorological Site must be at production statu8s.

   Error Messages:

   1. Status for COMPASS_SECTOR is inactive.

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:

1. 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.

4.2.42 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
Mandatory

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.

4.2.43 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. Examples of the Vertical Collection Method Codes as of September 11, 2003 are given 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:
   1. Integrity constraint (AIRSRAQS.SI_LDPVM_FK) violated

2. Vertical Collection Method must be at production status.
   Error Messages:
   1. Status for LDP_VERTICAL_METHOD_CODE is inactive.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.2.44 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 Vertical Datum Values as of September 11, 2003 are given below:

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

Business Rules:

Common Rules:

1. Vertical Datum must be in LDP_VERTICAL_DATA table.
   Error Messages:
   1. Integrity constraint (AIRSRAQS.SI_LDPVD_FK) violated.

2. Vertical Datum references must be at production status.
   Error Messages:
   1. Status for LDP_VERTICAL_DATUM is inactive.

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

4.2.45 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:
   1. Invalid Vertical Accuracy Value.

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

4.3 Site Street Information - Transaction Type AB

See the data input transaction formats at http://www.epa.gov/ttn/airs/airsaqs/manuals/manuals.htm for a list of field requirements for each transaction format.

4.3.0 Transaction Level Rules and Errors

1. The Site Tangent Street cannot be deleted if a corresponding Monitor Tangent Street has been loaded.
   Error Messages:
   1. Foreign Key (MTR_TR_ID) violated.

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 AB in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory
   Error Messages:
   1. Invalid input record format

2. Transaction Type must be in TRANSACTION_TYPES table in database.
   Error Messages:
   1. Invalid input record format

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:
   1. Invalid Action Code

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

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.3.3 State Code

Description: A FIPS code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Attributes: Alphanumeric
2-character code
Mandatory
Key Field

Coding Instructions: Place a valid FIPS state code in delimited field 3. A code is valid if it exists in the States Table.

Business Rules

Common Rules:

1. State Code is required.
   Error Messages:
   1. Invalid Site ID

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

Error Messages:

1. Invalid Site ID

Insert Rules:
None.

Update Rules:
None.

Delete Rules:
None.

4.3.4 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.

Attributes: Alphanumeric
3-digit code
Mandatory
Key Field

Coding Instructions: Place a valid county code in the fourth delimited field. A code is valid if it exists in combination with state code and city code, in the County Cities Table.

Business Rules

Common Rules:

1. County Code is required.

   Error Messages:

   1. Invalid Site ID

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

   Error Messages:

   1. Invalid Site ID

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.

Attributes: Alphanumeric
4-digit ID
Mandatory
Key Field

Coding Instructions: Place a four-digit numeric code in the fifth delimited field. A site ID value is valid if it exists in combination with state code and county code in the Sites Table.

Business Rules

Common Rules:

1. Site ID is required
   Error Messages:
   1. Invalid Site ID

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

Insert Rules:
None.

Update Rules:
None.

Delete Rules:
None.

4.3.6 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:
   1. Cannot insert NULL into ("AIRSRAQS"."TANGENT_ROADS"."TANGENT_ROAD_NUM")

2. Tangent Street Number must be greater than 0.
   Error Messages:
   1. 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:
   1. Unique constraint (AIRSRAQS.TR_SITETANRD1_UK) violated

Update Rules

1. (State Code, County Code, Site ID, Tangent Street Number) must be in database.
   Error Messages:
   1. Tangent Street Number not in database

Delete Rules

1. (State Code, County Code, Site ID, Tangent Street Number) must be in database.
   Error Messages:
   1. Tangent Street Number not in database

4.3.7 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
   1. Cannot insert NULL into TANGENT_ROADS ("AIRSRAQS"."TANGENT_ROADS"."STREET_NAME")

Update Rules
None.

Delete Rules
None.

4.3.8 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.

Business Rules:

Common Rules

1. Road Type must be in ROAD_TYPES table.
   Error Messages:
   1. Integrity constraint (AIRSRAQS.TR_RT_FK) violated

2. ROAD_TYPES (ROAD_TYPE) must be at production status
   Error Messages:
   1. Status for ROAD_TYPE is inactive

Insert Rules

1. Road Type is mandatory.
   Error Messages:
   1. Cannot insert NULL into ("AIRSRAQS"."TANGENT_ROADS"."RT_ROAD_TYPE")

Update Rules
None.

Delete Rules
None.

4.3.9 Traffic Count

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

Attributes: Numeric
12 digits (nnnnnnnnnnnn)
Mandatory (for Insert)

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:
   1. Traffic Count must be positive

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.3.10 Year of Traffic Count

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

Attributes: Date
4-digit year (yyyy)
Mandatory (for Insert)

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:
   1. 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:
   1. 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:
   1. Daily Traffic Year is required when Daily Traffic Count is populated.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.3.11 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:
   1. Integrity constraint (AIRSRAQS.TR_CS_FK) violated.

2. COMPASS_SECTORS (COMPASS_SECTOR) must be at production status
   Error Messages:
   1. Status for COMPASS_SECTOR is inactive.

Insert Rules

1. Direction to Street is mandatory.
   Error Messages:
   1. Cannot insert NULL into ("AIRSRAQS"."TANGENT_ROADS"."CS_COMPASS_SECTOR").

Update Rules

None.

Delete Rules

None.

4.3.12 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:
   1. Integrity constraint (AIRSRAQS.TR_TVS_FK) violated

2. TRAFFIC_VOLUME_SOURCES (TVS_ID) must be at production status.
   Error Messages:
   1. Status for TVS_ID is inactive.

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

4.4 Site Open Path Information - Transaction Type AC

See the data input transaction formats at http://www.epa.gov/ttn/airs/airsaqs/manuals/manuals.htm for requirements for each transaction format.

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 AC in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory
   Error Messages:
   1. Invalid input record format

2. Transaction Type must be in TRANSACTION_TYPES table in database.
   Error Messages:
   1. Invalid input record format

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:
   1. Invalid Action Code

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

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

4.4.3 State Code

Description: A FIPS code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Attributes: Alphanumeric
2-character code
Mandatory
Key Field

Coding Instructions: Place a valid FIPS state code in delimited field 3. A code is valid if it exists in the States Table.

Business Rules

Common Rules:

1. State Code is mandatory.
   Error Messages:
   1. Invalid Site ID

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

Insert Rules:
None.

Update Rules:
None.

Delete Rules:
None.

4.4.4 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.

Attributes: Alphanumeric
3-digit code
Mandatory
Key Field

Coding Instructions: Place a valid county code in the fourth delimited field. A code is valid if it exists in combination with state code and city code, in the County Cities Table.

Business Rules

Common Rules:

1. County Code is required.
   Error Messages:
   1. Invalid Site ID

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

Insert Rules:
None.

Update Rules:
None.

Delete Rules:
None.

4.4.5 Site ID

Description: A numeric identifier (ID) that uniquely identifies each air monitoring site within a county.

Attributes: Alphanumeric
4-digit ID
Mandatory
Key Field

Coding Instructions: Place a four-digit numeric code in the fifth delimited field. A site ID value is valid if it exists in combination with state code and county code in the Sites Table.

Business Rules

Common Rules:

1. Site ID is mandatory.
   Error Messages:
   1. Invalid Site ID

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

Insert Rules:
None.

Update Rules:
None.

Delete Rules:
None.

4.4.6 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:
   1. Open Path Number must be positive

Insert Rules

1. Open Path Number is mandatory

Error Messages:

1. Cannot insert NULL into ("AIRSRAQS"."OPEN_PATHS"."OPEN_PATH_NUM")

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

Error Messages:

1. Unique constraint (AIRSRAQS.TR_SITEOPNPTH1_UK) violated

Update Rules

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

Error Messages:

1. Requested Open Path Number not in database

Delete Rules

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

Error Messages:

1. Requested Open Path Number not in database

4.4.7 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:

1. Integrity constraint (AIRSRAQS.TR_CS_FK) violated.

2. COMPASS_SECTORS (COMPASS_SECTOR) must be at production status

Error Messages:

1. Status for COMPASS_SECTOR is inactive.

Insert Rules

1. Direction to Transmitter is mandatory.

Error Messages:

1. Cannot insert NULL into ("AIRSRAQS"."OPEN_PATHS"."CS_COMPASS_SECTOR").

Update Rules

None.

Delete Rules
None.

4.4.8 Beam Length

Description: The length of the beam projected between the transmitter and the receiver at the site, in meters.

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

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

Business Rules:
Common Rules
1. Beam Length must be greater than 0.
   Error Messages:
   1. Beam Length must be positive

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

4.4.9 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:
   1. Height of Transmitter must be positive

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

4.4.10 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:
   1. Height of Receiver must be positive

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

4.4.11 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:

1. Maximum Height must be greater than Minimum Height

2. If valued Minimum Height must be greater than 0.
   Error Messages:
   1. Minimum Height must be positive

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

Insert Rules
None

Update Rules
None.

Delete Rules
None.

4.4.12 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:
   1. Maximum Height must be greater than Minimum Height

2. If valued Maximum Height must be greater than 0.
   Error Messages:
   1. Maximum Height must be positive

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

Insert Rules
None

Update Rules
None.

Delete Rules
None.

4.4.13 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.

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

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

Insert Rules
1. Land Use Under Path is mandatory
   Error Messages:
   1. Cannot insert NULL into ("AIRSRAQS"."OPEN_PATHS"."LUT_LAND_USE_TYPE")

Update Rules
None.

Delete Rules
None.

4.4 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.

5.0 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
Action Indicator
State Code
County Code
Site ID
Parameter
POC
Project Class
Dominant Source
Measurement Scale
Open Path Number
Probe Location Code
Probe Height
Probe Horizontal Distance
Probe Vertical Distance
Surrogate Indicator
Unrestricted Air Flow Indicator
Sample Residence Time
Worst Site Type
Applicable NAAQS Indicator
Spatial Average Indicator
Schedule Exemption Indicator
Community Monitoring Zone
Pollutant Area Code – 1
Pollutant Area Code – 2
Pollutant Area Code – 3
Pollutant Area Code – 4
Pollutant Area Code – 5

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

Transaction Type
Action Indicator
State Code
County Code
Site ID
Parameter
POC
Date Sampling Began
Date Sampling Ended

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

Transaction Type
Action Indicator
State Code
County Code
Site ID
Parameter
POC
Monitor Type
Monitor Type Begin Date
Monitor Type End Date

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

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

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

Transaction Type
Action Indicator
State Code
County Code
Site ID
Parameter
POC
Monitor Objective Type
Urban Area Represented
MSA Represented
CMSA 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
Action Indicator
State Code
County Code
Site ID
Parameter
POC
Required Collection Frequency Code
Required Collection Frequency Begin Date
Required Collection Frequency End Date
Monthly Required Collection Frequency Code January - December (12 instances)

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

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

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

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

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

Transaction Type
Action Indicator
State Code
County Code
Site ID
Parameter
POC
Regulation Code
Compliance Indicator
Compliance Date

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

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

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

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

Transaction Types MA, MB, MC, MD, and ME are required to create a new monitor for criteria pollutants. 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. See the transaction requirements and data input formats in the Appendices for specific requirements.

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.

5.1 Basic Monitor Information - Transaction Type MA

See the data input transaction formats at http://www.epa.gov/ttn/airs/airsaqs/manuals/manuals.htm for requirements on each transaction format. For criteria pollutant monitors, transaction types MA through ME are required.

5.1.1 Transaction Type

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

Attributes: Alphanumeric
2-character code
Mandatory

Coding Instructions: Place MA in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory
   Error Messages:
   1. Invalid input record format

2. Transaction Type must be in TRANSACTION_TYPES table in database.
   Error Messages:
   1. Invalid input record format

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

5.1.2 Action Indicator

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

Attributes: Alphanumeric
1-character code
Mandatory

Coding Instructions: Place the values I, U, or D in the second delimited field.
I - Insert a new row into the appropriate table in the database.
U - Change one or more column values for an existing row in one or more

tables.
D - Delete a row from a table(s) for the row containing the key data.

Business Rules

Common Rules

1. Action Indicator is required.
   Error Messages:
   1. Invalid Action Code

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

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5.1.3 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.

Attributes: Alphanumeric
2-character code
Mandatory
Key Field

Coding Instructions: Place a valid FIPS state code in delimited field 3. A code is valid if it exists in the States Table.

Business Rules

Common Rules:

1. State Code is mandatory.
   Error Messages:
   1. An associated Site record could not be found for this monitor.

2. A Site with (State Code, County Code, Site ID) must be in the SITES table
   Error Messages:
   1. An associated Site record could not be found for this monitor.

Insert Rules:

None.

Update Rules:
None.

Delete Rules:
None.

5.1.4 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.

Attributes: Alphanumeric
3-digit code
Mandatory
Key Field

Coding Instructions: Place a valid county code in the fourth delimited field. A code is valid if it exists in combination with state code and city code, in the County Cities Table.

Business Rules

Common Rules:

1. County Code is required.
   Error Messages:
   1. An associated Site record could not be found for this monitor.

2. A Site with (State Code, County Code, Site ID) must be in the SITES table
   Error Messages:
   1. An associated Site record could not be found for this monitor.

Insert Rules:
None.

Update Rules:
None.

Delete Rules:
None.

5.1.5 Site ID

Description: A numeric identifier (ID) that uniquely identifies each air monitoring site within a county.

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 code in the Sites Table.

Business Rules

Common Rules:

1. Site ID is mandatory.
   Error Messages:
   1. An associated Site record could not be found for this monitor.

1. (State Code, County Code, Site ID) must be in the SITES table.
   Error Messages:
   1. An associated Site record could not be found for this monitor.

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

5.1.6 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 on the Parameters Table when Inserting a new monitor ; or in combination with state code, county 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:
   1. Cannot insert NULL into ("AIRSRAQS"."MONITORS"."PA_PARAMETER_CODE")

2. Parameter Code must be in PARAMETERS table.

Error Messages:

1. 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) cannot be already in the MONITORS table in the database.

Error Messages:

1. Unique constraint (AIRSRAQS.MO_MON_UK) violated.

Update Rules

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

Error Messages:

1. Monitor ID (State, County, Site, Parameter, POC) not in database.

Delete Rules

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

Error Messages:

1. Monitor ID (State, County, Site, Parameter, POC) not in database.

5.1.7 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 were installed to replace the original instrument used as the first monitor, that would be 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.

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 code, site ID, and parameter on the Monitors Table.

Business Rules

Common Rules

1. POC is Mandatory.
   Error Messages:
   1. POC is required.

2. POC must be a number greater than 0
   Error Messages:
   1. POC must be positive

Insert Rules

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

Update Rules

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

Delete Rules

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

5.1.8 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:
   1. Integrity constraint (AIRSRAQS.MO_PTY_FK) violated.

2. PROJECT_TYPES (PROJECT_TYPE_CODE) must be at production status.
   Error Messages:
   1. Status for PROJECT_TYPE_CODE is inactive.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5.1.9 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.

Business Rules:

Common Rules

1. Dominant Source must be in DOMINANT_SOURCES table.
   Error Messages:
   1. Integrity constraint (AIRSRAQS.MO_DS_FK) violated.

2. DOMINANT_SOURCES (DOMINANT_SOURCE) must be at production status.
   Error Messages:
   1. Status for DOMINANT_SOURCE is inactive.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5.1.10 Measurement Scale

Description: A denotation of 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.

Business Rules:

Common Rules

1. Measurement Scale must be in MEASUREMENT_SCALES table.
   Error Messages:
   1. Integrity constraint (AIRSRAQS.MO_MS_FK) violated.

2. MEASUREMENT_SCALES (MEASUREMENT_SCALE) must be at production status.
   Error Messages:
   1. Status for MEASUREMENT_SCALE is inactive.

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

5.1.11 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 code, and site ID on the Open Paths Table.

Business Rules:

Common Rules

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

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

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

5.1.12 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.

Business Rules:

Common Rules

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

2. PROBE_LOCATIONS (PROBE_LOCATION) must be at production status.
   Error Messages:
   1. Status for PROBE_LOCATION is inactive.

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

5.1.13 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:
   1. Probe Height must be positive

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5.1.14 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)
Optional:

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.

Business Rules:

Common Rules

1. Probe Horizontal Distance must be greater than 0.
   Error Messages:
   1. Horizontal Distance must be positive

Insert Rules

None.

Update Rules
None.

Delete Rules
None.

5.1.15 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 vertical distance value is valid if it is greater than 0.

Business Rules:
Common Rules
1. Probe Vertical Distance must be greater than 0.
   Error Messages:
   1. Vertical Distance must be positive

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

5.1.16 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:

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

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

Error Messages:

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

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

5.1.17 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).

Business Rules:

Common Rules

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

Error Messages:

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

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

5.1.18 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:
There are no business rules for Sample Residence Time.

5.1.19 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 not worst site monitors, or 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.

For an insert, a worst site type value is valid if it exists in the Worst Site Types Table and one of the following is populated with a monitoring area code: pollutant area code 1, pollutant area code 2, pollutant area code 3, pollutant area code 4, or pollutant area code 5.

For an update, a worst site type value is valid if it exists in the Worst Site Types Table and one of the following is populated with a monitoring area code: pollutant area code 1, pollutant area code 2, pollutant area code 3, pollutant area code 4, or pollutant area code 5, or there is an existing monitoring area code for the monitor on the Pollutant Area Monitors Table. 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.

Business Rules:
Common Rules

1. Worst Site Type must be valued when Pollutant Area Code is a Monitoring Area.
   Error Messages:
   1. 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:
   1. Worst Site Type is invalid for a Monitor Planning Area

2. Worst Site Type is invalid for a Status Area

3. Worst Site Type must be in WORST_SITE_TYPES table.
   Error Messages:
   1. Integrity constraint (AIRSRAQS.PAM_WST_FK) violated.

4. WORST_SITE_TYPES (WORST_SITE_TYPE) must be at production status.
   Error Messages:
   1. Status for WORST_SITE_TYPE is inactive.

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

5.1.20 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:
   1. 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:
   1. Applicable NAAQS Indicator is invalid for a Monitoring Area
   2. Applicable NAAQS Indicator is invalid for a Status Area

3. Applicable NAAQS Indicator must be 'S', 'A', or 'B'.
   Error Messages:
   1. Value for Applicable NAAQS Indicator must be one of the following: S, A, B

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

5.1.21 Spatial Average Indicator

Description: Indicates whether spatial averaging is to be performed for the all 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:
1) it is Y (for yes), or N (for no),
2) 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
3) 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:
   1. 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:
   1. Spatial Average Indicator is invalid for a Monitoring Area
   2. Spatial Average Indicator is invalid for a Status Area

3. Spatial Average Indicator must be 'Y' or 'N'.
   Error Messages:
   1. Value for Spatial Average Indicator must be one of the following: Y, N

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

5.1.22 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:
   1. 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:
   1. Schedule Exemption Indicator is invalid for a Monitoring Area
   2. Schedule Exemption Indicator is invalid for a Status Area.

3. Schedule Exemption Indicator must be 'Y' or 'N'.
   Error Messages:
   1. Value for Schedule Exemption Indicator must be one of the following: Y, N

Insert Rules
None.

Update Rules
None.

Delete Rules

None.

5.1.23 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:
   1. 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:
   1. Community Monitoring Zone is invalid for a Monitoring Area.
   2. Community Monitoring Zone is invalid for a Status Area

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

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

Description: Designation of pollutant areas to which the monitor is assigned. Using these fields, up to five pollutant areas can be designated for an individual monitor. Pollutant areas are geographic areas defined by a program office in which a certain pollutant should be closely watched. Most are problem or non-attainment areas, but attainment areas requiring special attention may also be defined. Types of pollutant areas are status areas, monitoring

areas, and monitor planning areas.

Attributes: Alphanumeric
5-character code
Optional

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

Business Rules:

Common Rules

1. Pollutant Area Code must be in POLLUTANT_AREAS table.
   Error Messages:
   1. Integrity constraint (AIRSRAQS.PAM_PAR_FK) violated

2. (POLLUTANT_AREAS) POLLUTANT_AREA_CODE must be at production status.
   Error Messages:
   1. POLLUTANT_AREA_CODE is inactive.

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

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5.2 Monitor Sampling Periods - Transaction Type MB

See the data input transaction formats at http://www.epa.gov/ttn/airs/airsaqs/manuals/manuals.htm for requirements on each transaction format. For criteria pollutant monitors, transaction types MA through ME are required.

Multiple sampling periods may be registered in the database to allow for definition of periodic monitoring. The edit restrictions prevent more than one sampling period from having a blank date sampling ended.

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

5.2.0 Transaction Level Rules and Errors

1. The sampling period cannot be changed (update or delete) in a manner that would exclude existing Raw, Composite, Blank, Precision, Accuracy, or Summary data from the date range.
   Error Messages:
   1. Raw, precision, or accuracy data exist outside of sample periods.

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 MB in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory
   Error Messages:
   1. Invalid input record format

2. Transaction Type must be in TRANSACTION_TYPES table in database.
   Error Messages:
   1. Invalid input record format

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:
   1. Invalid Action Code

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

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

5.2.3 State Code

Description: A FIPS code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Attributes: Alphanumeric
2-character code
Mandatory
Key Field

Coding Instructions: Place a valid FIPS state code in delimited field 3. A code is valid if it exists in the States Table.

Business Rules

Common Rules:

1. State Code is mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database

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

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

5.2.4 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.

Attributes: Alphanumeric
3-digit code
Mandatory
Key Field

Coding Instructions: Place a valid county code in the fourth delimited field. A code is valid if it exists in combination with state code and city code, in the County Cities Table.

Business Rules

Common Rules:

1. County Code is required.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

2. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) 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.

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 code in the Sites Table.

Business Rules

Common Rules:

1. Site ID is mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database

1. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) 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 in the Monitors Table.

Business Rules

Common Rules

1. Parameter Code is Mandatory.
   Error Messages:
   1. Parameter Code is required.

2. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) must be in the MONITORS table in the database.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) 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.

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 on the Monitors Table.

Business Rules

Common Rules

1. POC is Mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database

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

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

5.2.8 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:
   1. 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:
   1. 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:
   1. Samp Beg must be between date Site estab '& term or 1yr from today.

Update Rules
None.

Delete Rules
None.

5.2.9 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:
   1. 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:
   1. 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:
   1. 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:
   1. Raw, precision, or accuracy data exist outside of sample periods

Insert Rules
None.

Update Rules

None.

Delete Rules

None.

5.3 Monitor Type Information - Transaction Type MC

See the data input transaction formats at http://www.epa.gov/ttn/airs/airsaqs/manuals/manuals.htm for requirements on each transaction format. For criteria pollutant monitors, transaction types MA through ME are required.

5.3.0 Transaction Level Rules and Errors

1. The monitor type assignment cannot be changed (update or delete) in a manner that would exclude existing Raw, Composite, Blanks, Precision, Accuracy, or Summary data from the date range.
   Error Messages:
   1. Raw, precision, or accuracy data exist outside of monitor type assignment periods.

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

5.3.1 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:
   1. Invalid input record format

2. Transaction Type must be in TRANSACTION_TYPES table in database.
   Error Messages:
   1. Invalid input record format

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

5.3.2 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:
   1. Invalid Action Code

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

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5.3.3 State Code

Description: A FIPS code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Attributes: Alphanumeric
2-character code
Mandatory
Key Field

Coding Instructions: Place a valid FIPS state code in delimited field 3. A code is valid if it exists in the States Table.

Business Rules

Common Rules:

1. State Code is mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database

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

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

5.3.4 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.

Attributes:
Alphanumeric
3-digit code
Mandatory
Key Field

Coding Instructions: Place a valid county code in the fourth delimited field. A code is valid if it exists in combination with state code and city code, in the County Cities Table.

Business Rules

Common Rules:

1. County Code is required.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database

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

Insert Rules:

None.

Update Rules:
None.

Delete Rules:
None.

5.3.5 Site ID

Description: A numeric identifier (ID) that uniquely identifies each air monitoring site within a county.

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 code in the Sites Table.

Business Rules

Common Rules:

1. Site ID is mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database

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

Insert Rules:
None.

Update Rules:
None.

Delete Rules:
None.

5.3.6 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 in the Monitors Table.

Business Rules

Common Rules

1. Parameter Code is Mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database

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

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5.3.7 POC (Parameter Occurrence Code)

Description: An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter.

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 on the Monitors Table.

Business Rules

Common Rules

1. POC is Mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database

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

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

5.3.8 Monitor Type

Description: The monitor's administrative classification.

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.

Business Rules:
Common Rules

1. Monitor Type is mandatory.
   Error Messages:
   1. Cannot insert NULL into (“AIRSRAQS”.”MONITOR_TYPE_ASSIGNMENTS”.”MT_MONITOR_TYPE”)

2. Monitor Type must be in MONITOR_TYPES table.
   Error Messages:
   1. Integrity constraint (AIRSRAQS.MTA_MT_FK) violated.

3. Monitor Type must be at production status.
   Error Messages:
   1. Status for MONITOR_TYPE is inactive.

4. User must have EPA_HQ application role to assign PAMS monitor type.
   Error Messages:
   1. 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:
   1. Unique constraint (AIRSRAQS.MTA_MONTYPASG1_UK) violated.

Update Rules
None.

Delete Rules
None.

5.3.9 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:
   1. 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:
   1. 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:
   1. Begin Date must be within sampling period or today plus 1 year.

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

Error Messages:

1. 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:

1. Date cannot be within an existing date range

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5.3.10 Monitor Type End Date

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

Attributes: Date
8-digit date
Optional

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

Business Rules:

Common Rules

1. Monitor Type End Date must be greater than, or equal to, Monitor Type Begin Date.

Error Messages:

1. The end date must be greater than the start date.

2. Monitor Type End Date must fall within a valid sampling period.

Error Messages:

1. End Date must be within sampling period or today plus 1 year

3. 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:

   1. Date cannot be within an existing date range

4. 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:

   1. Monitor Type End Date will orphan data for monitor.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5.4 Monitor Agency Role - Transaction Type MD

See the data input transaction formats at http://www.epa.gov/ttn/airs/airsaqs/manuals/manuals.htm for requirements on each transaction format. For criteria pollutant monitors, transaction types MA through ME are required.

5.4.0 Transaction Level Rules and Errors

1. The Reporting Organization assignment cannot be changed (update or delete) in a manner that would exclude existing Raw, Composite, Blank, Precision, Accuracy, or Summary data from the date range.
   Error Messages:
   1. Raw, precision, or accuracy data exists outside of reporting organization periods

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

5.4.1 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:
   1. Invalid input record format

2. Transaction Type must be in TRANSACTION_TYPES table in database.
   Error Messages:
   1. Invalid input record format

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

5.4.2 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:
   1. Action Code is Indicator

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

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5.4.3 State Code

Description: A FIPS code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Attributes: Alphanumeric
2-character code
Mandatory
Key Field

Coding Instructions: Place a valid FIPS state code in delimited field 3. A code is valid if it exists in the States Table.

Business Rules

Common Rules:

1. State Code is mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database

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

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

5.4.4 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.

Attributes: Alphanumeric
3-digit code
Mandatory
Key Field

Coding Instructions: Place a valid county code in the fourth delimited field. A code is valid if it exists in combination with state code and city code, in the County Cities Table.

Business Rules

Common Rules:

1. County Code is required.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database

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

Insert Rules:

None.

Update Rules:
None.

Delete Rules:
None.

5.4.5 Site ID

Description: A numeric identifier (ID) that uniquely identifies each air monitoring site within a county.

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 code in the Sites Table.

Business Rules

Common Rules:

1. Site ID is mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database

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

Insert Rules:
None.

Update Rules:
None.

Delete Rules:
None.

5.4.6 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 in the Monitors Table.

Business Rules

Common Rules

1. Parameter Code is Mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

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

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5.4.7 POC (Parameter Occurrence Code)

Description: An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter.

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 on the Monitors Table.

Business Rules

Common Rules

1. POC is Mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

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

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

5.4.8 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.

Business Rules:
Common Rules
1. Agency Role Name must be in ROLES table.
   Error Messages:
   1. Integrity constraint (AIRSRAQS.AR1_ROL_FK) violated.

2. ROLES (ROLE) must be at production status.
   Error Messages:
   1. Status for ROLE is inactive.

3. Agency Role Name is mandatory.
   Error Messages:
   1. Cannot insert NULL into (“AIRSRAQS”.”AGENCY_ROLES”.”ROL_ROLE”)

Insert Rules
None.

Update Rules

None.

Delete Rules
None.

5.4.9 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. Agency Code is mandatory.
   Error Messages:
   1. Cannot insert NULL into (“AIRSRAQS”.”AGENCY_ROLES”.”SA_AG_AGENCY_CODE”)

2. (State Code, Agency Code) must be in STATE_AGENCIES table.
   Error Messages:
   1. Integrity constraint (AIRSRAQS.AR1_SA_FK) violated.

3. STATE_AGENCIES (STT_STATE_CODE, AG_AGENCY_CODE) must be at production status.
   Error Messages:
   1. Status for STT_STATE_CODE, AG_AGENCY_CODE is inactive

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

5.4.10 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: For the role of reporting, begin date is required. 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 required if Agency Role Name is 'REPORTING'; otherwise, it is optional.
   Error Messages:
   1. Begin Date must be specified for Reporting roles.

2. Agency Role Begin Date must fall within a valid sample period.
   Error Messages:
   1. 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:
   1. Date cannot be within an existing date range.

Update Rules

None.

Delete Rules

None.

5.4.11 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:
   1. Check constraint (AIRSRAQS.AR1_END_DATE) violated.

2. Agency Role End Date must not fall within any other Begin Date-End Date range for the same monitor and role .
   Error Messages:
   1. Date cannot be within an existing date range

3. End date must fall in a valid sampling period.
   Error Messages:
   1. End date must fall in a valid sampling 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:
   1. Raw, precision, or accuracy data exists outside of reporting organization periods

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5.5 Monitoring Objective Information - Transaction Type ME

See the data input transaction formats at http://www.epa.gov/ttn/airs/airsaqs/manuals/manuals.htm for 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.

5.5.1 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:
   1. Invalid input record format

2. Transaction Type must be in TRANSACTION_TYPES table in database.
   Error Messages:
   1. Invalid input record format

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

5.5.2 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:
   1. Invalid Action Code

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

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5.5.3 State Code

Description: A FIPS code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Attributes: Alphanumeric
2-character code
Mandatory
Key Field

Coding Instructions: Place a valid FIPS state code in delimited field 3. A code is valid if it exists in the States Table.

Business Rules

Common Rules:

1. State Code is mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database

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

Insert Rules:
None.

Update Rules:
None.

Delete Rules:
None.

5.5.4 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.

Attributes: Alphanumeric
3-digit code
Mandatory
Key Field

Coding Instructions: Place a valid county code in the fourth delimited field. A code is valid if it exists in combination with state code and city code, in the County Cities Table.

Business Rules
Common Rules:

1. County Code is required.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database

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

Insert Rules:
None.

Update Rules:
None.

Delete Rules:
None.

5.5.5 Site ID

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

within a county.

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 code in the Sites Table.

Business Rules

Common Rules:

1. Site ID is mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database

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

Insert Rules:
None.

Update Rules:
None.

Delete Rules:
None.

5.5.6 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 in the Monitors Table.

Business Rules

Common Rules

1. Parameter Code is Mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

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

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5.5.7 POC (Parameter Occurrence Code)

Description: An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter.

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 on the Monitors Table.

Business Rules

Common Rules

1. POC is Mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

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

Insert Rules

None.

Update Rules
None.

Delete Rules
None.

5.5.8 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.

Business Rules:

Common Rules

1. Monitor Objective Type is required.
   Error Messages:
   1. Cannot insert NULL into (“AIRSRAQS”.”MONITOR_OBJECTIVES”.”MOT_MONITOR_OBJ_TYPE”)

2. Monitor Objective Type must be in MONITOR_OBJECTIVE_TYPES table.
   Error Messages:
   1. Integrity constraint (AIRSRAQS.MOB_MOT_FK) violated

3. .Monitor Objective Type must be at production status.
   Error Messages:
   1. Status for MONITOR_OBJ_TYPE is inactive

Insert Rules

1. Monitor Objective Type must not already be in database for monitor.
   Error Messages:
   1. Unique constraint (AIRSRAQS.MOB_MONOBJ1_UK) violated.

Update Rules
None.

Delete Rules
None.

5.5.9 Urban Area Represented

Description: The urbanized area from which the concentrations originated (not the

location of the monitor).

Attributes: Alphanumeric
4-digit code
Optional:
Required on insert
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, Metropolitan Statistical Area (MSA) represented, or Consolidated Metropolitan Statistical Area (CMSA) 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 MSA Represented and CMSA Represented are not valued, and it must not be valued if either of the other two are valued.
   Error Messages:
   1. Urbanized Area, MSA, or CMSA must be specified

2. Urban Area Represented must be in URBANIZED_AREAS table.
   Error Messages:
   1. Integrity constraint (AIRSRAQS.MOB_UA_FK) violated.

3. URBANIZED_AREAS (UAR_CODE) must be at production status.
   Error Messages:
   1. Status for UAR_CODE is inactive

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5.5.10 MSA Represented

Description: The Metropolitan Statistical Area (MSA) from which the concentrations originated, not the location of the monitor.

Attributes: Alphanumeric

4-digit code
Optional

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, MSA represented, or CMSA represented may be used to indicate the designation. Place a valid MSA represented code in the tenth delimited field. An MSA represented value is valid if it exists in the MSAs Table.

Business Rules:

Common Rules

1. MSA Represented must be valued if both Urban Area Represented and CMSA Represented are not valued, and it must not be valued if either of the other two are valued.
   Error Messages:
   1. Urbanized Area, MSA, or CMSA must be specified

2. MSA Represented must be in MSAS table.
   Error Messages:
   1. Integrity constraint (AIRSRAQS.MOB_MSA_FK) violated.

3. MSAS (MSA_CODE) must be at production status.
   Error Messages:
   1. Status for MSA_CODE is inactive

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

5.5.11 CMSA Represented

Description: The Consolidated Metropolitan Statistical Area (CMSA) from which the concentrations originated, not the location of the monitor.

Attributes: Alphanumeric
2-digit code
Optional

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, MSA represented, or CMSA represented may be used to

indicate the designation. Place a valid CMSA represented code in the eleventh delimited field. A CMSA represented value is valid if it exists in the CMSAs Table.

Business Rules:

Common Rules

1. CMSA Represented must be valued if both MSA Represented and Urban Area Represented are not valued, and it must not be valued if either of the other two are valued.

   Error Messages:

   1. Urbanized Area, MSA, or CMSA must be specified

2. CMSA Represented must be in CMSAS table.

   Error Messages:

   1. Integrity constraint (AIRSRAQS.MOB_CMSA_FK) violated.

3. CMSAS (CMSA_CODE) must be at production status.

   Error Messages:

   1. Status for CMSA_CODE is inactive.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5.6 Monitor Sampling Schedule - Transaction Type MF

See the data input transaction formats at http://www.epa.gov/ttn/airs/airsaqs/manuals/manuals.htm for requirements on each transaction format. For criteria pollutant monitors, transaction types MA through ME are required.

5.6.0 Transaction Level Rules and Messages

1. Monitor Sampling Schedule is required for PAMS and PM monitors.
   Error Messages:
   1. No error message is generated, but the monitor will not post to production status until this information is entered.

2. The Required Collection Frequency assignment cannot be changed (update or delete) in a manner that would exclude existing Raw data from the date range.
   Error Messages:
   1. Required Collection Frequency data cannot be updated. Raw Data exists that would be effected by this change.

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

5.6.1 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:
   1. Invalid input record format

2. Transaction Type must be in TRANSACTION_TYPES table in database.
   Error Messages:
   1. Invalid input record format

Insert Rules

None.

Update Rules

None.

Delete Rules
None.

5.6.2 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:
   1. Invalid Action Code

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

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

5.6.3 State Code

Description: A FIPS code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Attributes: Alphanumeric
2-character code
Mandatory
Key Field

Coding Instructions: Place a valid FIPS state code in delimited field 3. A code is valid if it exists in the States Table.

Business Rules

Common Rules:

1. State Code is mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database

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

Insert Rules:
None.

Update Rules:
None.

Delete Rules:
None.

5.6.4 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.

Attributes:
Alphanumeric
3-digit code
Mandatory
Key Field

Coding Instructions: Place a valid county code in the fourth delimited field. A code is valid if it exists in combination with state code and city code, in the County Cities Table.

Business Rules

Common Rules:

1. County Code is required.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database

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

Insert Rules:

None.

Update Rules:
None.

Delete Rules:
None.

5.6.5 Site ID

Description: A numeric identifier (ID) that uniquely identifies each air monitoring site within a county.

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 code in the Sites Table.

Business Rules

Common Rules:

1. Site ID is mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database

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

Insert Rules:
None.

Update Rules:
None.

Delete Rules:
None.

5.6.6 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 in the Monitors Table.

Business Rules

Common Rules

1. Parameter Code is Mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

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

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5.6.7 POC (Parameter Occurrence Code)

Description: An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter.

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 on the Monitors Table.

Business Rules

Common Rules

1. POC is Mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

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

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

5.6.8 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 for certain monitors, prohibited for others.
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.

Business Rules:
Common Rules

1. Required Collection Frequency Code is required.
   Error Messages:
   1. Cannot insert NULL into (“AIRSRAQS”.”REQ_COLL_FREQUENCIES”.”CF_COLL_FREQ_CODE”)

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

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

4. Required Collection Frequency Code may not be a PAMS collection frequency if Parameter is '81102' or '88101'.
   Error Messages:
   1. PAMS collection frequency may not be assigned to a PM monitor.

5. Required Collection Frequency Code must be '1', '3', '6', '8', '9', or 'S' if Parameter is '81102'.
   Error Messages:
   1. PM2.5 may only have required collection frequencies of 1, 3, 6, 8, 9, or S.

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

5.6.9 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:
   1. RCF Begin Date must fall within a sample period for the monitor

2. Required Collection Frequency Begin Date must be greater than, or equal to, July 1, 1987.
   Error Messages:
   1. 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:
   1. RCF Begin Date must fall within a sample period for the monitor

4. Required Collection Frequency Begin Date must not be greater than one year from the current date.
   Error Messages:
   1. 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:
   1. More than one RCF defined for this monitor-date.

Insert Rules
None

Update Rules
None.

Delete Rules
None.

5.6.10 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:
   1. 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:
   1. RCF End Date must fall within a sample period for the monitor

3. RCF End Date must not fall within any other RCF Begin Date-RCF End Date range for the same monitor.
   Error Messages:
   1. 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:
   1. Required Collection Frequency data cannot be updated. Raw Data exists that would be effected by this change.

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

5.6.11 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:
   1. 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:

1. Integrity constraint (AIRSRAQS.SS_CF_FK) violated.

3. Monthly Required Collection Frequency must be at production status.
   Error Messages:
   1. Status for COLL_FREQ_CODE is inactive.

4. Monthly Required Collection Frequency must be '1', '3', or '6' if Parameter is '81102'.
   Error Messages:
   1. PM2.5 may only have required collection frequencies of 1, 3, or 6.

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

5.7 Monitor Street Description - Transaction Type MG

See the data input transaction formats at http://www.epa.gov/ttn/airs/airsaqs/manuals/manuals.htm for 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.

5.7.1 Transaction Type

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

Attributes: Alphanumeric
2-character code
Mandatory

Coding Instructions: Place MG in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory
   Error Messages:
   1. Invalid input record format

2. Transaction Type must be in TRANSACTION_TYPES table in database.
   Error Messages:
   1. Invalid input record format

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

5.7.2 Action Indicator

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

Attributes: Alphanumeric

1-character code
Mandatory

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

Business Rules

Common Rules

1. Action Indicator is required.
   Error Messages:
   1. Invalid Action Code

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

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5.7.3 State Code

Description: A FIPS code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Attributes: Alphanumeric
2-character code
Mandatory
Key Field

Coding Instructions: Place a valid FIPS state code in delimited field 3. A code is valid if it exists in the States Table.

Business Rules

Common Rules:

1. State Code is mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

2. The Monitor ID (State Code, County Code, Site ID, Parameter Code, POC) must be in the

MONITORS table in the database.

Error Messages:

1. Monitor ID (State, County, Site, Parameter, POC) not in database.

Insert Rules:
None.

Update Rules:
None.

Delete Rules:
None.

5.7.4 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.

Attributes: Alphanumeric
3-digit code
Mandatory
Key Field

Coding Instructions: Place a valid county code in the fourth delimited field. A code is valid if it exists in combination with state code and city code, in the County Cities Table.

Business Rules

Common Rules:

1. County Code is required.

   Error Messages:

   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

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

   Error Messages:

   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

Insert Rules:
None.

Update Rules:
None.

Delete Rules:
None.

5.7.5 Site ID

Description: A numeric identifier (ID) that uniquely identifies each air monitoring site within a county.

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 code in the Sites Table.

Business Rules

Common Rules:

1. Site ID is mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

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

Insert Rules:
None.

Update Rules:
None.

Delete Rules:
None.

5.7.6 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 in the Monitors Table.

Business Rules

Common Rules

1. Parameter Code is Mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

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

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

5.7.7 POC (Parameter Occurrence Code)

Description: An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter.

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 on the Monitors Table.

Business Rules

Common Rules

1. POC is Mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

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

Insert Rules
None.

Update Rules

None.

Delete Rules

None.

5.7.8 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 code, and site ID on the Tangent Roads Table.

Business Rules:

Common Rules

1. Tangent Street Number is required.
   Error Messages:
   1. Integrity constraint (AIRSRAQS.MTR_TR_FK) violated.

2. Tangent Street number must be in the TANGENT_ROADS table for the site.
   Error Messages:
   1. 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:
   1. Unique constraint (AIRSRAQS.MTR_UK) violated.

Update Rules

None.

Delete Rules

None.

5.7.9 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 to Tangent Road is mandatory.

   Error Messages:

   1. Cannot insert NULL into (“AIRSRAQS”.”MONITOR_TANGENT_ROADS”.”DIST_TO_TANGENT_ROAD”)

2. Distance from monitor must be greater than 0.

   Error Messages:

   1. Distance from monitor must be positive.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5.8 Monitor Obstruction Information - Transaction Type MH

See the data input transaction formats at http://www.epa.gov/ttn/airs/airsaqs/manuals/manuals.htm for 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.

5.8.0 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:
   1. Probe Obstruction information is not valid for the given Unrestricted Air Flow indicator.

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

5.8.1 Transaction Type

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

Attributes: Alphanumeric
2-character code
Mandatory

Coding Instructions: Place MH in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory
   Error Messages:
   1. Invalid input record format

2. Transaction Type must be in TRANSACTION_TYPES table in database.
   Error Messages:
   1. Invalid input record format

Insert Rules

None.

Update Rules

None.

Delete Rules
None.

5.8.2 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:
   1. Invalid Action Code

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

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

5.8.3 State Code

Description: A FIPS code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Attributes: Alphanumeric
2-character code
Mandatory
Key Field

Coding Instructions: Place a valid FIPS state code in delimited field 3. A code is valid if it

exists in the States Table.

Business Rules

Common Rules:

1. State Code is mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

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

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

5.8.4 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.

Attributes: Alphanumeric
3-digit code
Mandatory
Key Field

Coding Instructions: Place a valid county code in the fourth delimited field. A code is valid if it exists in combination with state code and city code, in the County Cities Table.

Business Rules

Common Rules:

1. County Code is required.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

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

Insert Rules:
None.

Update Rules:
None.

Delete Rules:
None.

5.8.5 Site ID

Description: A numeric identifier (ID) that uniquely identifies each air monitoring site within a county.

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 code in the Sites Table.

Business Rules

Common Rules:

1. Site ID is mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

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

Insert Rules:
None.

Update Rules:
None.

Delete Rules:
None.

5.8.6 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 in the Monitors Table.

Business Rules

Common Rules

1. Parameter Code is Mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

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

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5.8.7 POC (Parameter Occurrence Code)

Description: An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter.

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 on the Monitors Table.

Business Rules

Common Rules

1. POC is Mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

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

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

5.8.8 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.

Business Rules:
Common Rules
1. Type of Obstruction is required.
   Error Messages:
   1. Cannot insert NULL into (“AIRSRAQS”.”PROBE_OBSTRUCTIONS”.”POT_PROBE_OBSTR_TYPE”)

2. Type of Obstruction must be in PROBE_OBSTRUCTION_TYPES table.
   Error Messages:
   1. Integrity constraint (AIRSRAQS.POB_POT_FK) violated.

3. Type of Obstruction must be at production status.
   Error Messages:
   1. Status for PROBE_OBSTR_TYPE is inactive.

Insert Rules
1. The combination of Type of Obstruction and Direction From Monitor must not already exist in database for monitor.
   Error Messages:
   1. Unique constraint (AIRSRAQS.POB_UK) violated

Update Rules

None.

Delete Rules

None.

5.8.9 Direction from Monitor to Probe Obstruction

Description: The direction from the monitor to the obstruction.

Attributes: Alphanumeric
3-character code
Mandatory

Coding Instructions: Place a valid direction from monitor in the ninth delimited field. A direction from monitor value is valid if it exists in the Compass Sectors Table.

Business Rules:

Common Rules

1. Direction From Monitor is required.
   Error Messages:
   1. Cannot insert NULL into (“AIRSRAQS”.”PROBE_OBSTRUCTIONS”.”CS_COMPASS_SECTOR”)

2. Direction From Monitor must be in COMPASS_SECTORS table.
   Error Messages:
   1. Integrity constraint (AIRSRAQS.POB_CS_FK) violated.

3. Direction From Monitor must be at production status (in COMPASS_SECTORS).
   Error Messages:
   1. Integrity constraint (AIRSRAQS.POB_CS_FK) violated

Insert Rules

1. The combination of Type of Obstruction and Direction From Monitor must not already exist in database for monitor.
   Error Messages:
   1. Unique constraint (AIRSRAQS.POB_UK) violated

Update Rules

None.

Delete Rules

None.

5.8.10 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 is required.
   Error Messages:
   1. Cannot insert NULL into (“AIRSRAQS”.”PROBE_OBSTRUCTIONS”.”PROBE_OBSTR_DIST”)

2. Distance from Monitor to Probe Obstruction must be greater than 0.
   Error Messages:
   1. Distance To Monitor must be positive.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5.8.11 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:
   1. Height of Obstruction must be positive.

Insert Rules

1. Probe Obstruction Height is required.
   Error Messages:
   1. Cannot insert NULL into

("AIRSRAQS"."PROBE_OBSTRUCTIONS"."PROBE_OBSTR_HEIGHT").

Update Rules
None.

Delete Rules
None.

5.9 Monitor Regulatory Compliance - Transaction Type MI

See the data input transaction formats at http://www.epa.gov/ttn/airs/airsaqs/manuals/manuals.htm for 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.

5.9.1 Transaction Type

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

Attributes: Alphanumeric
2-character code
Mandatory

Coding Instructions: Place MI in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory
   Error Messages:
   1. Invalid input record format

2. Transaction Type must be in TRANSACTION_TYPES table in database.
   Error Messages:
   1. Invalid input record format

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

5.9.2 Action Indicator

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

Attributes: Alphanumeric
1-character code
Mandatory

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

Business Rules

Common Rules

1. Action Indicator is required.
   Error Messages:
   1. Invalid Action Code

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

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5.9.3 State Code

Description: A FIPS code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Attributes: Alphanumeric
2-character code
Mandatory
Key Field

Coding Instructions: Place a valid FIPS state code in delimited field 3. A code is valid if it exists in the States Table.

Business Rules

Common Rules:

1. State Code is mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

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

Insert Rules:
None.

Update Rules:
None.

Delete Rules:
None.

5.9.4 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.

Attributes: Alphanumeric
3-digit code
Mandatory
Key Field

Coding Instructions: Place a valid county code in the fourth delimited field. A code is valid if it exists in combination with state code and city code, in the County Cities Table.

Business Rules
Common Rules:

1. County Code is required.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

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

Insert Rules:
None.

Update Rules:
None.

Delete Rules:
None.

5.9.5 Site ID

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

within a county.

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 code in the Sites Table.

Business Rules

Common Rules:

1. Site ID is mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

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

Insert Rules:
None.

Update Rules:
None.

Delete Rules:
None.

5.9.6 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 in the Monitors Table.

Business Rules

Common Rules

1. Parameter Code is Mandatory.

Error Messages:

1. Monitor ID (State, County, Site, Parameter, POC) not in database.

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

Error Messages:

1. Monitor ID (State, County, Site, Parameter, POC) not in database.

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

5.9.7 POC (Parameter Occurrence Code)

Description: An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter.

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 on the Monitors Table.

Business Rules

Common Rules

1. POC is Mandatory.

Error Messages:

1. Monitor ID (State, County, Site, Parameter, POC) not in database.

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

Error Messages:

1. Monitor ID (State, County, Site, Parameter, POC) not in database.

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

5.9.8 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.

Business Rules:

Common Rules

1. Regulation Code is required.
   Error Messages:
   1. Cannot insert NULL into (“AIRSRAQS”.”REGULATION_COMPLIANCES”.”RE_REGULATION_CODE”)

2. Regulation Code must be in REGULATIONS table.
   Error Messages:
   1. Integrity constraint (AIRSRAQS.RC_RE_FK) violated.

3. Regulation Code must be at production status.
   Error Messages:
   1. Status for REGULATION_CODE is inactive.

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

5.9.9 Compliance Indicator

Description: The compliance status of a monitor with respect to an EPA regulation.

Attributes: Alphanumeric
1-character code
Mandatory

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:
   1. 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:
   1. 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:
   1. The Compliance Indicator must be Y, N, or C when the Regulation Code is QC.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5.9.10 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
Mandatory
Key Field

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:
   1. 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:
   1. 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:
   1. 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:
   1. 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:
   1. 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:
   1. 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:
   1. The Compliance Date must be null when the Compliance Indicator is N and the Regulation Code is SC, QC, RM, or ST.

9. 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:
   1. 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.

10. If Regulation Code is 'ST' and Compliance Indicator is 'N' then Compliance Date is not allowed.
    Error Messages:
    1. The Compliance Date must be null when the Compliance Indicator is N and the Regulation Code is SC, QC, RM, or ST.

11. Compliance Date must fall within a sampling period of the monitor.
    Error Messages:
    1. The compliance date is not within the valid range.

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

5.10 Monitor Collocation Period - Transaction Type MJ

See the data input transaction formats at http://www.epa.gov/ttn/airs/airsaqs/manuals/manuals.htm for 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.

5.10.1 Transaction Type

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

Attributes: Alphanumeric
2-character code
Mandatory

Coding Instructions: Place MJ in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory
   Error Messages:
   1. Invalid input record format

2. Transaction Type must be in TRANSACTION_TYPES table in database.
   Error Messages:
   1. Invalid input record format

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

5.10.2 Action Indicator

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

Attributes: Alphanumeric
1-character code
Mandatory

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

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

Business Rules

Common Rules

1. Action Indicator is required.
   Error Messages:
   1. Invalid Action Code

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

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5.10.3 State Code

Description: A FIPS code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Attributes: Alphanumeric
2-character code
Mandatory
Key Field

Coding Instructions: Place a valid FIPS state code in delimited field 3. A code is valid if it exists in the States Table.

Business Rules

Common Rules:

1. State Code is mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

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

Insert Rules:
None.

Update Rules:
None.

Delete Rules:
None.

5.10.4 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.

Attributes: Alphanumeric
3-digit code
Mandatory
Key Field

Coding Instructions: Place a valid county code in the fourth delimited field. A code is valid if it exists in combination with state code and city code, in the County Cities Table.

Business Rules

Common Rules:

1. County Code is required.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

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

Insert Rules:
None.

Update Rules:
None.

Delete Rules:
None.

5.10.5 Site ID

Description: A numeric identifier (ID) that uniquely identifies each air monitoring site within a county.

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 code in the Sites Table.

Business Rules

Common Rules:

1. Site ID is mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

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

Insert Rules:
None.

Update Rules:
None.

Delete Rules:
None.

5.10.6 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 in the Monitors Table.

Business Rules

Common Rules

1. Parameter Code is Mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

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

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

5.10.7 POC (Parameter Occurrence Code)

Description: An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter.

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 on the Monitors Table.

Business Rules
Common Rules
1. POC is Mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

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

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

5.10.8 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:
1) 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
2) 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:
   1. The begin date must fall within an existing sampling period.

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

3. Collocation Begin Date must fall within a sampling period of the monitor.
   Error Messages:
   1. The begin date must fall within an existing sampling period.

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

5.10.9 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:
1) 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
2) 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:
   1. 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:
   1. Date cannot be within an existing date range.

3. Collocation End Date must fall within a sampling period of the monitor.
   Error Messages:
   1. Collocation End Date must fall within a valid sample period.

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

5.10.10 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:
   1. 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:
   1. 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:
   1. Distance from Primary Sampler must be between 1 and 4.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5.10.11 Primary 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 is required.
   Error Messages:
   1. Cannot insert NULL into ("AIRSRAQS"."MONITOR_COLLOCATIONS"."PRI_MONITOR_IND")

2. Primary Sampler Indicator must be 'Y' or 'N'.
   Error Messages:
   1. Value for Primary Monitor Indicator must be one of the following: Y, N.

3. 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:

   1. No primary monitor found for this collocated monitor

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

5.11 Monitor Protocol - Transaction Type MK

See the data input transaction formats at http://www.epa.gov/ttn/airs/airsaqs/manuals/manuals.htm for requirements on each transaction format. For criteria pollutant monitors, transaction types MA through ME are required.

This transaction is needed only to specify an alternate method detectable limit when the Federal default is not used.

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

5.11.0 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

5.11.1 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:
   1. Invalid input record format

2. Transaction Type must be in TRANSACTION_TYPES table in database.
   Error Messages:
   1. Invalid input record format

Insert Rules

None.

Update Rules

None.

Delete Rules
None.

5.11.2 Action Indicator

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

Attributes: Alphanumeric
1-character code
Mandatory

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

Business Rules

Common Rules

1. Action Indicator is required.
   Error Messages:
   1. Invalid Action Code

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

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

5.11.3 State Code

Description: A FIPS code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Attributes: Alphanumeric
2-character code
Mandatory
Key Field

Coding Instructions: Place a valid FIPS state code in delimited field 3. A code is valid if it exists in the States Table.

Business Rules

Common Rules:

1. State Code is mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database

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

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

5.11.4 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.

Attributes: Alphanumeric
3-digit code
Mandatory
Key Field

Coding Instructions: Place a valid county code in the fourth delimited field. A code is valid if it exists in combination with state code and city code, in the County Cities Table.

Business Rules

Common Rules:

1. County Code is required.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database

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

Insert Rules:
None.

Update Rules:
None.

Delete Rules:
None.

5.11.5 Site ID

Description: A numeric identifier (ID) that uniquely identifies each air monitoring site within a county.

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 code in the Sites Table.

Business Rules
Common Rules:

1. Site ID is mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database

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

Insert Rules:
None.

Update Rules:
None.

Delete Rules:
None.

5.11.6 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 in the Monitors Table.

Business Rules

Common Rules

1. Parameter Code is Mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database

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

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

5.11.7 POC (Parameter Occurrence Code)

Description: An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter.

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 on the Monitors Table.

Business Rules

Common Rules

1. POC is Mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database

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

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

5.11.8 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:
   1. Alternate MP ID must be positive

Insert Rules

1. Alternate MP ID cannot already be in database for monitor.
   Error Messages:
   1. Unique constraint (AIRSRAQS.MP_PK) violated

Update Rules
None.

Delete Rules
None.

5.11.9 Duration Code

Description: The length of time used to acquire raw samples that are analyzed by monitors and documented in the Raw Data, Precision, or Accuracy Tables. (Formerly: interval)

Attributes: Alphanumeric
1-character code
Mandatory
Key Field

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, collection frequency, 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:
   1. 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 Reported Unitable Limit) cannot already be in database for the monitor.
   Error Messages:
   1. Unique constraint (AIRSRAQS.MP_UK) violated.

Update Rules

1. Duration Code is not an updatable field.
   Error Messages:
   1. Duration Code is not an updatable field.

Delete Rules
None.

5.11.10 Reported Unit

Description: The dimensional system in which a pollutant concentration or parameter reading is expressed.

Attributes: Alphanumeric
3-digit code
Mandatory

Key Field

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 sample duration, parameter, method, collection frequency, 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:
   1. 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:
   1. Unique constraint (AIRSRAQS.MP_UK) violated.

Update Rules

1. Reported Unit is not an updatable field.
   Error Messages:
   1. Reported Unit is not an updatable field.

Delete Rules

None.

5.11.11 Method Code

Description: Specification of a particular method for collecting and analyzing samples of the monitor's parameter.

Attributes: Alphanumeric
3-digit code
Mandatory
Key Field

Coding Instructions: Place a valid method code in the eleventh 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 sample duration, unit, collection frequency, 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:

1. 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:

   1. Unique constraint (AIRSRAQS.MP_UK) violated.

Update Rules

1. Method Code is not an updateable field.

   Error Messages:

   1. Method Code is not an updateable field.

Delete Rules

None.

5.11.12 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:

   1. 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:

   1. Unique constraint (AIRSRAQS.MP_UK) violated.

Update Rules

1. Collection Frequency Code is not an updateable field.
   Error Messages:
   1. Collection Frequency Code is not an updateable field.

Delete Rules

None.

5.11.13 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:
   1. 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:
   1. Unique constraint (AIRSRAQS.MP_UK) violated.

Update Rules

1. Collection Frequency Code is not an updateable field.
   Error Messages:
   1. Sampling Frequency is not an updateable field.

Delete Rules

None.

5.11.14 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:

   1. Unique constraint (AIRSRAQS.MP_UK) violated.

Update Rules

None.

Delete Rules

None.

5.12 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

6.0 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-5
Action Indicator	Number of Samples	Qualifier-6
State Code	Composite Type	Qualifier-7
County Code	Reported Sample Value	Qualifier-8
Site ID	Monitor Protocol ID	Qualifier-9
Parameter	Qualifier-1	Qualifier-10
POC	Qualifier-2	Alternate Method
Reported Unit	Qualifier-3	Detectable Limit
Method Code	Qualifier-4	Uncertainty Value
Composite Year		

Transaction type RD contains simple data with the following fields:

Transaction Type	Date	Qualifier-5
Action Indicator	Sample Time	Qualifier-6
State Code	Reported Sample Value	Qualifier-7
County 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.

6.1 Composite Raw Data - Transaction Type RC

See the data input transaction formats at http://www.epa.gov/ttn/airs/airsaqs/manuals/manuals.htm for 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.

6.1.1 Transaction Type

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

Attributes: Alphanumeric
2-character code
Mandatory

Coding Instructions: Place RC in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory
   Error Messages:
   1. Invalid input record format

2. Transaction Type must be in TRANSACTION_TYPES table in database.
   Error Messages:
   1. Invalid input record format

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

6.1.2 Action Indicator

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

Attributes: Alphanumeric

1-character code
Mandatory

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

Business Rules

Common Rules

1. Action Indicator is required.
   Error Messages:
   1. Invalid Action Code

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

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

6.1.3 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.

Attributes: Alphanumeric
2-character code
Mandatory
Key Field

Coding Instructions: Place a valid FIPS state code in delimited field 3. A code is valid if it exists in the States Table.

Business Rules

Common Rules:

1. State Code is mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database

2. A Site with (State Code, County Code, Site ID) must be in the SITES table
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database

Insert Rules:
None.

Update Rules:
None.

Delete Rules:
None.

6.1.4 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.

Attributes: Alphanumeric
3-digit code
Mandatory
Key Field

Coding Instructions: Place a valid county code in the fourth delimited field. A code is valid if it exists in combination with state code and city code, in the County Cities Table.

Business Rules
Common Rules:
1. County Code is required.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database

2. A Site with (State Code, County Code, Site ID) must be in the SITES table
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database

Insert Rules:
None.

Update Rules:
None.

Delete Rules:
None.

6.1.5 Site ID

Description: A numeric identifier (ID) that uniquely identifies each air monitoring site within a county.

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 code in the Sites Table.

Business Rules

Common Rules:

1. Site ID is mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database

2. (State Code, County Code, Site ID) must be in the SITES table.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database

Insert Rules:
None.

Update Rules:
None.

Delete Rules:
None.

6.1.6 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 in the Monitors Table.

Business Rules

Common Rules

1. Parameter Code is Mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database

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

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

6.1.7 POC (Parameter Occurrence Code)

Description: The code used to distinguish between multiple monitors at the same site that are measuring the same parameter.

Attributes: Numeric
2-digit code
Mandatory
Key Field

Coding Instructions: Place a valid POC value in the seventh delimited field. A POC value is valid if it is between 1 and 99.

Business Rules

Common Rules

1. POC is Mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database

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

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

6.1.8 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 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:
   1. Invalid Protocol

Insert Rules

1. Reported Unit is required
   Error Messages:
   1. Invalid Protocol

Update Rules
None.

Delete Rules
None.

6.1.9 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 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 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:
   1. Invalid Protocol.

Insert Rules

1. Method Code is required.
   Error Messages:
   1. Invalid Protocol

Update Rules

None.

Delete Rules

None.

6.1.10 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:
   1. Not a valid month

2. Composite Year must be in the format 'YYYY'.
   Error Messages:
   1. The sample date is not within an available year

3. Composite Year must be less than, or equal to, the current year.
   Error Messages:
   1. The sample date is not within an available year

4. Composite Year must be greater or equal to the earliest supported year.
   Error Messages:
   1. 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:
   1. 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:
   1. 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:
   1. 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:
   1. Production record doesn't exist to update or delete.

6.1.11 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 withing the minimum and maximum period defined for composite type in the Composite Types Table.

Valid period codes depend on composite type as follows:

Comp Type	Valid Period Code
1 (Quarterly)	01-04
2 (Seasonal)	01-04
3 (Monthly)	01-12
4 (Weekly)	01-53

5 (Annually)	01

Business Rules

Common Rules

1. Composite Period is Required.
   Error Messages:
   1. 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:
   1. 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:
   1. 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:
   1. 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:
   1. 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:
   1. 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:
   1. Production record doesn't exist to update or delete.

6.1.12 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:
   1. Invalid Sample Count

2. Number of samples must be a positive integer.
   Error Messages:
   1. Invalid Sample Count

3. Number of Samples must be less than or equal to the maximum count defined for Composite Type.
   Error Messages:
   1. Sample Count must be between 1 and the maximum allowed for the Composite Type.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

6.1.13 Composite Type

Description: Indicates the time period over which samples are composited or the frequency of submitting composite samples.

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.

Business Rules

Common Rules

1. Composite Type is required.
   Error Messages:

1. Invalid Composite Type

2. Composite Type must exist in the COMPOSITE_TYPES table.
   Error Messages:
   1. 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:
   1. 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:
   1. Composite Type may only change for first sample of year.

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

6.1.14 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)	200	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:
   1. 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:
   1. Standard value falls outside absolute value range for the parameter.

3. Reported Sample Value is required.
   Error Messages:
   1. Invalid combination of Reported Sample Value, Uncertainty Value, and Qualifier Code -Null Data

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

6.1.15 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 alternate MP ID number in the fifteenth delimited field. An alternate 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.

Business Rules

Common Rules

1. The Alternate MP ID must exist in the database for the monitor.
   Error Messages:
   1. Invalid MP_ID

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

6.1.16 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:

1. Invalid Raw Data Qualifier.

2. QUALIFIERS (QUALIFIER_CODE) must be at production status.
   Error Messages:
   1. Invalid Raw Data Qualifier.

3. Qualifier Code must not be a Null Data type.
   Error Messages:
   1. Invalid Raw Data Qualifier

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

6.1.17 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.

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:
   1. 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:
   1. MP_ID and MDL may not both be specified.

Insert Rules

None.

Update Rules

None.

6.1.18 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)

Coding Instructions:

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:
   1. Value larger than specified precision allows for this column

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

6.2 Hourly, Daily, Sub-Hourly Raw Data - Transaction Type RD

The type RD ("Raw Data") transaction is used for individual parameter observations. See the data input transaction formats at http://www.epa.gov/ttn/airs/airsaqs/manuals/manuals.htm for 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.

6.2.0 Transaction Level Rules and Errors

1. Raw data linked to collocated precision checks may not be updated or deleted.

   Error Messages:

   1. Raw data that are part of collocated precision checks may not be updated or deleted.

6.2.1 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:
   1. Invalid input record format

2. Transaction Type must be in TRANSACTION_TYPES table in database.
   Error Messages:
   1. Invalid input record format

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

6.2.2 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:
   1. Invalid Action Code

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

Insert Rules

None.

Update Rules
None.

Delete Rules
None.

6.2.3 State Code

Description: A FIPS code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Attributes: Alphanumeric
2-character code
Mandatory
Key Field

Coding Instructions: Place a valid FIPS state code in delimited field 3. A code is valid if it exists in the States Table.

Business Rules

Common Rules:

1. State Code is mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

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

Insert Rules:
None.

Update Rules:
None.

Delete Rules:
None.

6.2.4 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.

Attributes: Alphanumeric
3-digit code
Mandatory

Key Field

Coding Instructions: Place a valid county code in the fourth delimited field. A code is valid if it exists in combination with state code and city code, in the County Cities Table.

Business Rules

Common Rules:

1. County Code is required.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

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

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

6.2.5 Site ID

Description: A numeric identifier (ID) that uniquely identifies each air monitoring site within a county.

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 code in the Sites Table.

Business Rules

Common Rules:

1. Site ID is mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

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

Error Messages:

1. Monitor ID (State, County, Site, Parameter, POC) not in database.

Insert Rules:
None.

Update Rules:
None.

Delete Rules:
None.

6.2.6 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 in the Monitors Table.

Business Rules

Common Rules

1. Parameter Code is Mandatory.

   Error Messages:

   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

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

   Error Messages:

   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

6.2.7 POC (Parameter Occurrence Code)

Description: An identifier used to distinguish between multiple monitors at the same

site that are measuring the same parameter.

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 is between 1 and 99.

Business Rules

Common Rules

1. POC is Mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

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

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

6.2.8 Duration Code

Description: The period of time during which the raw 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, Collection Frequency, and Method Code) must be in the PROTOCOLS table at production status.
   Error Messages:
   1. Invalid Protocol.

2. Sample duration must be an observed rather than a computed duration.
   Error Messages:
   1. Raw data must be submitted with an observed duration.

3. Duration Code must not be different than the one used for any other raw data for the monitor in the year.
   Error Messages:
   1. Sample duration cannot change within a calendar year

Insert Rules

1. Duration Code is required.
   Error Messages:
   1. 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 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, Collection Frequency, and Method Code) must be in the PROTOCOLS table at production status.
   Error Messages:
   1. Invalid Protocol.

Insert Rules

1. Reported Unit is required

   Error Messages:

   1. Invalid Protocol.

Update Rules

None.

Delete Rules

None.

6.2.10 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, Collection Frequency, and Method Code) must be in the PROTOCOLS table at production status.

   Error Messages:

   1. Invalid Protocol.

Insert Rules

1. Method Code is required.

   Error Messages:

   1. Invalid Protocol.

Update Rules

None.

Delete Rules

None.

6.2.11 Sample 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 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:
   1. 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:
   1. The sample date is not within an available year

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

4. Sample Date must fall within a valid sample period for the monitor.
   Error Messages:
   1. 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:
   1. 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:
   1. 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:
   1. 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:
   1. 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:
   1. Production record doesn't exist to update or delete.

6.2.12 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:
   1. A non-numeric character was found where a numeric was expected

2. Start time must be in the format: HH:MM.
   Error Messages:
   1. 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:
   1. 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:
   1. 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:
   1. 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:

   1. 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:

   1. Production record doesn't exist to update or delete.

6.2.13 Reported Sample Value

Description: The value of an observation being reported.

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

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 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.

The relevant maximum 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)	200	0	100	0	µg/meter^3 (25 c)
42101	Carbon Monoxide	150	0	75	0	parts per million (ppm)
42401	Sulfur Dioxide	5	0	1	0	ppm
42601	Nitric Oxide	5	0	1	0	ppm
42602	Nitrogen Dioxide	3	0	1	0	ppm
42603	Oxides of Nitrogen	5	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	0.7	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:

   1. 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:

   1. 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:
   1. Standard value falls outside absolute value range for the parameter.

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

6.2.14 Qualifier Code -Null Data

Description: 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. Qualifier Code -Null Data must be valued if Reported Sample Value is not valued, and must not be valued if Reported Sample Value is valued.
   Error Messages:
   1. The null data qualifier code or the reported sample value must exist.

2. Qualifier Code -Null Data must be in QUALIFIERS table.
   Error Messages:
   1. Integrity constraint (AIRSRAQS.QD_QU_FK) violated.

3. Qualifier Code -Null Data must be at production status.
   Error Messages:
   1. The null data qualifier code or the reported sample value must exist.

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

6.2.15 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:
   1. Invalid Protocol.

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

6.2.16 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 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.)

Business Rules

Common Rules

1. The Alternate MP ID must exist in the database for the monitor.
   Error Messages:
   1. Invalid MP_ID.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

6.2.17 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 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.

Business Rules

Common Rules

1. Qualifier Code must be in QUALIFIERS table.
   Error Messages:
   1. Invalid Raw Data Qualifier.

2. QUALIFIERS (QUALIFIER_CODE) must be at production status.
   Error Messages:
   1. Invalid Raw Data Qualifier.

3. Qualifier Code must not be a Null Data code
   Error Messages:
   1. Invalid Raw Data Qualifier

Insert Rules

None.

Update Rules
None.

Delete Rules
None.

6.2.18 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.

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:
   1. 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:
   1. MP_ID and MDL may not both be specified.

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

6.2.19 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)

Coding Instructions:

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:
   1. Value larger than specified precision allows for this column

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

6.3 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.

6.3.1 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 that Table 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
Nitrogen Dioxide (pphm)	None	64	27	11 (300%)	53	12

* Values below the minimum are excluded from the high difference and spike tests.

6.3.2 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.

6.3.3 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).

6.3.4 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.

6.4 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:

6.4.1 Criteria Pollutants

1. 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.

2. The first maximum of the dataset is 125% greater than second maximum on a per monitor-year basis.

3. Value exceeds of the NAAQS times the critical review factor located in the state_threasholds table.

4. NAAQS exceedances that are deleted from the database.

6.4.2 Non-Criteria Pollutants

1. Any monitor/quarter whose first maximum is 175% greater than the 3-year historical maximum

2. The first maximum of the dataset is 150% greater than second maximum on a per monitor-year basis.

6.4.3 Certified Data

1. 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.

7.0 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	Accuracy Date	Level 2 Indicated Value
County 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	Audit Sample ID	Level 5 Actual Value
Number	Expiration Date	Level 5 Indicated Value
Duration Code	Audit Scheduled	Zero Span
Reported Unit	Level 1 Actual Value	
Method Code		

Transaction type RP contains precision data in the following fields:

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

7.1 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.

7.1.1 Transaction Type

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

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:
   1. Invalid input record format

2. Transaction Type must be in TRANSACTION_TYPES table in database.
   Error Messages:
   1. Invalid input record format

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.1.2 Action Indicator

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

Attributes: Alphanumeric
1-character code
Mandatory

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

Business Rules

Common Rules

1. Action Indicator is required.
   Error Messages:
   1. Invalid Action Code

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

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.1.3 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.

Attributes: Alphanumeric
2-character code
Mandatory
Key Field

Coding Instructions: Place a valid FIPS state code in delimited field 3. A code is valid if it exists in the States Table.

Business Rules

Common Rules:

1. State Code is mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

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

Insert Rules:
None.

Update Rules:
None.

Delete Rules:
None.

7.1.4 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.

Attributes: Alphanumeric
3-digit code
Mandatory
Key Field

Coding Instructions: Place a valid county code in the fourth delimited field. A code is valid if it exists in combination with state code and city code, in the County Cities Table.

Business Rules
Common Rules:
1. County Code is required.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

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

Insert Rules:
None.

Update Rules:
None.

Delete Rules:
None.

7.1.5 Site ID

Description: A numeric identifier (ID) that uniquely identifies each air monitoring site within a county.

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 code in the Sites Table.

Business Rules

Common Rules:

1. Site ID is mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

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

Insert Rules:
None.

Update Rules:
None.

Delete Rules:
None.

7.1.6 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 in the Monitors Table.

Business Rules

Common Rules

1. Parameter Code is Mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

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

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.1.7 POC (Parameter Occurrence Code)

Description: An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter.

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 is between 1 and 99.

Business Rules

Common Rules

1. POC is Mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

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

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

7.1.8 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
1-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 5.
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 a 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:
   1. Invalid Audit ID

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:
   1. 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:
   1. 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:
   1. No data found

7.1.9 Duration Code

Description: The period of time during which the raw sample value was collected.

Attributes: Alphanumeric
1-character code
Mandatory

Coding Instructions: Place a valid sample duration code in the ninth delimited field. A duration code 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 (Parameter, Duration Code, Reported Unit, and Method Code) must be in PROTOCOLS table.
   Error Messages:
   1. Invalid Protocol.

2. Sample duration must be an observed rather than a computed duration.
   Error Messages:
   1. Invalid Protocol.

3. Duration Code must not be different than the one used for any other precision or accuracy data for the monitor in the year.
   Error Messages:
   1. Duration Code does not match the annual summary duration.

Insert Rules

1. Duration Code is required.
   Error Messages:
   1. Invalid Protocol.

Update Rules

None.

Delete Rules

None.

7.1.10 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 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, method, and collection frequency in the Protocols Table.

Business Rules

Common Rules

1. The combination of (Parameter, Duration Code, Reported Unit, and Method Code) must be in PROTOCOLS table.
   Error Messages:
   1. Invalid Protocol.

2. The unit type must be flow if the Audit Class is FLOW.
   Error Messages:
   1. Flow audits must be submitted with flow units.

3. The unit type cannot be flow if the Audit Class is not FLOW.
   Error Messages:
   1. Flow units may only be used for flow audits

Insert Rules

1. Reported Unit is required
   Error Messages:
   1. Invalid Protocol.

Update Rules

None.

Delete Rules

None.

7.1.11 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 eleventh delimited field. A method code value is valid if it exists in combination with parameter in the Sampling Methodologies Table, and if it exists in combination with the parameter, sampling duration, and unit in the Protocols Table.

Business Rules

Common Rules

1. The combination of (Parameter, Duration Code, Reported Unit, and Method Code) must be in PROTOCOLS table.
   Error Messages:
   1. Invalid Protocol.

Insert Rules

1. Method Code is required.
   Error Messages:
   1. Invalid Protocol.

Update Rules

None.

Delete Rules

None.

7.1.12 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 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:
   1. The Year Represented must be equal to or one year prior to the year of the Accuracy Date.

Insert Rules

1. Year Represented must be valued when Quarter Represented is valued.
   Error Messages:
   1. The Year Represented is required when the Qtr Represented is given.

Update Rules

None.

Delete Rules

None.

7.1.13 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:
   1. 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:
   1. Qtr Represented must be qtr of Acc Date or any qtr of prior year.

Insert Rules

1. Quarter Represented must be valued when Year Represented is valued.
   Error Messages:
   1. Quarter Represented must be valued when Year Represented is valued

Update Rules

None.

Delete Rules

None.

7.1.14 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:
   1. This monitor was not being sampled during the defined Accuracy Date.

2. Accuracy Date must between 1/1/1980 and current date.
   Error Messages:
   1. The 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:
   1. This monitor was not being sampled during the defined Accuracy Date.

4. Accuracy Date must fall within a valid monitor type assignment period for the monitor .
   Error Messages:
   1. Attempt to add data for which there is no corresponding Monitor Type Date Range

5. Accuracy Date must fall within a valid reporting organization period for the monitor .
   Error Messages:
   1. No active reporting organization for criteria pollutant 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:
   1. 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:

1. 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:

   1. No data found

7.1.15 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.

Business Rules

Common Rules

1. Type Audit must be in AUDIT_TYPES table.

   Error Messages:

   1. Integrity constraint (AIRSRAQS.AC_AUTY_FK) violated

2. AUDIT_TYPES (AUDIT_TYPE) must be at production status.

   Error Messages:

   1. Status for AUDIT_TYPE is inactive

Insert Rules

1. Type Audit is required.

   Error Messages:

   1. Cannot insert NULL into (“AIRSRAQS”.”ACCURACY_DATA”.AUTY_AUDIT_TYPE”).

Update Rules

None.

Delete Rules

None.

7.1.16 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.

Business Rules

Common Rules

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

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

Insert Rules

1. Local Primary Standard is required.
   Error Messages:
   1. Cannot insert NULL into (“AIRSRAQS”.”ACCURACY_DATA”.LPS_LOCAL_PRI_STD”).

Update Rules

None.

Delete Rules

None.

7.1.17 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, Flow, and Span.

Please note that, for the parameter-interval-units combination indicated in

the following table, an audit class of Analytical is always required.

Parameter	Interval	Units	Audit Class
12128	7, 8, C	077	Analytical

Business Rules

Common Rules

1. Audit Class is required.
   Error Messages:
   1. Undefined Audit Class.

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

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

4. The combination of Audit Class, Parameter, Duration Code, and Reported Unit, must be defined in the PROTOCOL_AUDIT_CLASSES table.
   Error Messages:
   1. 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:
   1. 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:
   1. 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:
   1. No data found

7.1.18 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:
   1. Cannot insert NULL into (“AIRSRAQS”.”ACCURACY_DATA”.”ACT_ACC_TYPE”).

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

3. Accuracy Type must be at production status.
   Error Messages:
   1. 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:
   1. 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:
   1. 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:
   1. No data found

7.1.19 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.

7.1.20 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:
   1. Invalid input record format
   2. Not a valid month
   3. Day of month must be between 1 and last day of month

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.1.21 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:

1. Invalid input record format
2. Not a valid month
3. Day of month must be between 1 and last day of month

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

7.1.22 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)
Optional

Coding Instructions: The accuracy data transaction format allows for the specification of actual values for four levels. 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 in the Audit Levels Table. If no range is defined for the level, than the value is considered to be valid, but is not included in data completeness determinations.

For some parameters, a range of expected values has been established for observations. Concentrations reported outside the range may be data for another audit level. The relevant ranges and parameters are listed below. Ranges are specified in 40 Code of Federal Regulations (CFR) Park 58 Appendix A. The ranges included in AQS, however, have been expanded to allow data entry.

Parameter Code	Parameter Description	Level Number	Range
12128	Lead (TSP)	1	0.5 - 2.5 µg/m^3 (25 c)
12128	Lead (TSP)	2	2 - 5 µg/m^3 (25 c)

Parameter Code	Parameter Description	Level Number	Range
42101	Carbon Monoxide	1	2.7 - 10.5 ppm
42101	Carbon Monoxide	2	13.5 - 22 ppm
42101	Carbon Monoxide	3	21.1 - 49.5 ppm
42101	Carbon Monoxide	4	72 - 99 ppm
42401	Sulfur Dioxide	1	0.027 - 0.095 ppm
42401	Sulfur Dioxide	2	0.135 - 0.31 ppm
42401	Sulfur Dioxide	3	0.221 - 0.495 ppm
42401	Sulfur Dioxide	4	0.72 - 0.99 ppm
42602	Nitrogen Dioxide	1	0.027 - 0.088 ppm
42602	Nitrogen Dioxide	2	0.135 - 0.22 ppm
42602	Nitrogen Dioxide	3	0.221 - 0.51 ppm
42602	Nitrogen Dioxide	4	0.72 - 0.99 ppm
44201	Ozone	1	0.027 - 0.09 ppm
44201	Ozone	2	0.135 - 0.26 ppm
44201	Ozone	3	0.22 - 0.495 ppm
44201	Ozone	4	0.72 - 0.99 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	± 90 %
42101	± 90 %
12128	± 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:
   1. Value larger than specified precision allows for this column

2. Actual Value must fall within the value range defined for the corresponding audit level.
   Error Messages:
   1. The value must be with 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:
   1. Maximum Percent Difference defined for the parameter was exceeded.

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

7.1.23 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)
Optional

Coding Instructions: The accuracy data transaction format allows for the specification of indicated values for four levels. 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 recorded values of parameter concentrations that were used to challenge the monitor according to the defined levels in the appropriate field. An indicated value is valid if its percentage difference relative to the actual value does not exceed the level defined for the parameter on the Parameters Table.

For some parameters, a range of expected values has been established for

observations. Concentrations reported outside the range may be data for another audit level. The relevant ranges and parameters are listed below. Ranges are specified in 40 CFR Park 58 Appendix A. The ranges included in AQS, however, have been expanded to allow data entry.

Parameter Code	Parameter Description	Level Number	Range
12128	Lead (TSP)	1	0.5 - 2.5 µg/cubicmeter (25 c)
12128	Lead (TSP)	2	2 - 5 µg/cubicmeter (25 c)
42101	Carbon Monoxide	1	2.7 - 10.5 ppm
42101	Carbon Monoxide	2	13.5 - 22 ppm
42101	Carbon Monoxide	3	21.1 - 49.5 ppm
42101	Carbon Monoxide	4	72 - 99 ppm
42401	Sulfur Dioxide	1	0.027 - 0.095 ppm
42401	Sulfur Dioxide	2	0.135 - 0.31 ppm
42401	Sulfur Dioxide	3	0.221 - 0.495 ppm
42401	Sulfur Dioxide	4	0.72 - 0.99 ppm
42602	Nitrogen Dioxide	1	0.027 - 0.088 ppm
42602	Nitrogen Dioxide	2	0.135 - 0.22 ppm
42602	Nitrogen Dioxide	3	0.221 - 0.51 ppm
42602	Nitrogen Dioxide	4	0.72 - 0.99 ppm
44201	Ozone	1	0.027 - 0.09 ppm
44201	Ozone	2	0.135 - 0.26 ppm
44201	Ozone	3	0.22 - 0.495 ppm
44201	Ozone	4	0.72 - 0.99 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	± 90 %
42101	± 90 %
12128	± 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:
   1. Value larger than specified precision allows for this column

2. Indicated Value must fall within the value range defined for the corresponding audit level.
   Error Messages:
   1. The value must be with 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:
   1. Maximum Percent Difference defined for the parameter was exceeded.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.1.24 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:
   1. Value larger than specified precision allows for this column

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

7.2 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 Section 7.0 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, 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 two different ways:

1) One way is to 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.

2) The second way to submit precision data is 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 the data input transaction formats at
http://www.epa.gov/ttn/airs/airsaqs/manuals/manuals.htm for requirements on each transaction format.

7.2.1 Transaction Type

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

Attributes: Alphanumeric
2-character code
Mandatory

Coding Instructions: Place RP in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory
   Error Messages:
   1. Invalid input record format

2. Transaction Type must be in TRANSACTION_TYPES table in database.
   Error Messages:
   1. Invalid input record format

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.2.2 Action Indicator

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

Attributes: Alphanumeric
1-character code
Mandatory

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

Business Rules

Common Rules

1. Action Indicator is required.
   Error Messages:
   1. Action Code is Required.

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

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

7.2.3 State Code

Description: A FIPS code that identifies one of the 50 states, U. S. territories, Washington, DC, or foreign countries.

Attributes: Alphanumeric
2-character code
Mandatory
Key Field

Coding Instructions: Place a valid FIPS state code in delimited field 3. A code is valid if it exists in the States Table.

Business Rules
Common Rules:

1. State Code is mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

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

Insert Rules:
None.

Update Rules:
None.

Delete Rules:
None.

7.2.4 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.

Attributes: Alphanumeric
3-digit code
Mandatory
Key Field

Coding Instructions: Place a valid county code in the fourth delimited field. A code is valid if it exists in combination with state code and city code, in the County Cities Table.

Business Rules

Common Rules:

1. County Code is required.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

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

Insert Rules:
None.

Update Rules:
None.

Delete Rules:
None.

7.2.5 Site ID

Description: A numeric identifier (ID) that uniquely identifies each air monitoring site within a county.

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 code in the Sites Table.

Business Rules

Common Rules:

1. Site ID is mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

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

Insert Rules:
None.

Update Rules:
None.

Delete Rules:
None.

7.2.6 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 in the Monitors Table.

Business Rules
Common Rules
1. Parameter Code is Mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

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

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

7.2.7 POC (Parameter Occurrence Code)

Description: An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter.

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 is between 1 and 99.

Business Rules

Common Rules

1. POC is Mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

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

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.2.8 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:
   1. Precision ID Required.

2. Precision ID must be between 1 and 99.
   Error Messages:
   1. 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:
   1. 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:
   1. No data found.

Delete Rules

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

7.2.9 Duration Code

Description: The period of time during which the raw 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:
   1. Invalid Protocol.

2. Duration Code must not be different than the one used for any other precision or accuracy data for the monitor (State Code, County Code, Site ID, Parameter, POC) in the year.
   Error Messages:
   1. Duration Code does not match the annual summary duration.

3. Continuous PM data must be submitted in Flow units or Duration X
   Error Messages:
   1. Continuous PM data must be reported in Flow units or Duration X.

4. Except for Continuous PM data, Duration Code must be an observed, rather than computed, duration.
   Error Messages:
   1. Raw data must be submitted with an observed duration.

Insert Rules

1. Duration Code is required.
   Error Messages:
   1. Duration Code is required.

Update Rules

None.

Delete Rules

None.

7.2.10 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 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, 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:
   1. Invalid Protocol.

2. Continuous PM data must be reported in Flow units or Duration X.
   Error Messages:
   1. Continuous PM data must be reported in Flow units or Duration X.

3. Flow units not allowed for Collocated_Continuous Data
   Error Messages:
   1. Flow units not allowed for Collocated_Continuous Data

4. Flow units not allowed for Collocated_Intermittent Data.
   Error Messages:
   1. Flow units not allowed for Collocated_Intermittent Data.

Insert Rules

1. Reported Unit is required
   Error Messages:
   1. Unit is required.

Update Rules

None.

Delete Rules

None.

7.2.11 Actual Method

Description: Identifies the particular method for collecting and analyzing the indicated precision check value. For a collocated data pair, this represents the method used to collect and analyze the sample value from the primary sampler.

Attributes: Alphanumeric
3-digit code
Mandatory

Coding Instructions: Place a valid method code in the eleventh delimited field.

For a precision check that is not a collocated data pair, an actual method value is valid if it exists in combination with parameter in the Sampling Methodologies Table, and if it exists in combination with sample duration, unit, and collection frequency in the Protocols Table.

For a collocated data pair, it is valid if it matches the method associated with the daily raw data point collected by the primary sampler on the precision date.

Business Rules

Common Rules

1. The combination of (Duration Code, Reported Unit, Parameter, and Actual Method) must be in PROTOCOLS table.
   Error Messages:
   1. Invalid Protocol.

2. Actual 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:
   1. Methods reported for a monitor-year must use the same recording modes.

3. For collocated data, the Actual Method must equal the method code of the corresponding raw data point.
   Error Messages:
   1. .

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.2.12 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,
If a criteria pollutant monitor is being audited, it falls within a valid reporting organization period.

Business Rules

Common Rules

1. Precision Date is Required.
   Error Messages:
   1. Date Required.

2. Precision Date must between 1/1/1980 and current date.
   Error Messages:
   1. The 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:
   1. This monitor was not being sampled during the defined Accuracy Date.

4. Precision Date must fall within a valid monitor type assignment period for the monitor .
   Error Messages:
   1. Attempt to add data for which there is no corresponding Monitor Type Date Range

5. Precision Date must fall within a valid reporting organization period for the monitor .
   Error Messages:
   1. No active reporting organization for criteria pollutant data.

Insert Rules

1. The combination of Precision Date and Precision ID must not already be in the database for the Monitor.
   Error Messages:
   1. 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:
   1. No data found

Delete Rules

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

7.2.13 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 precision observations, and the numeric value entered cannot exceed that maximum. The relevant maximum values and parameters are listed below:

Parameter Code	Parameter Description	Maximum Precision Value
11101	Suspended Particulate (TSP)	2000 µg/m^3 (25 c)
12128	Lead (TSP)	80 µg/m^3 (25 c)
42101	Carbon Monoxide	20 ppm
42401	Sulfur Dioxide	0.2 ppm
42602	Nitrogen Dioxide	0.2 ppm
44201	Ozone	0.2 ppm
81102	PM-10 Total 0 - 10 um	2000 µg/m^3 (25 c)
88101	PM-2.5 Local Conditions	2000 µg/m^3 (LC)

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	Parameter Description	Maximum Percent Difference
11101	Suspended Particulate (TSP)	± 160 %
12128	Lead (TSP)	± 160 %
42101	Carbon Monoxide	± 90 %
42401	Sulfur Dioxide	± 90 %
42602	Nitrogen Dioxide	± 90 %
44201	Ozone	± 90 %
81102	PM-10 Total 0 - 10 um	± 160 %

88101	PM-2.5 Local Conditions	± 160 %

For 11101, 12128, and 81102, the percent difference is calculated using the following formula:

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

For 42101, 42401, 42602, and 44201, the percent difference 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 5 digits before or after the decimal point.
   Error Messages:
   1. Value larger than specified precision allows for this column

2. Actual Value must be less than the maximum defined for the parameter.
   Error Messages:
   1. 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:
   1. 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:
   1. Actual Value required for PEP Precision Data.

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

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

7. If the Parameter type is “Gaseous” then the Actual Value is required.
   Error Messages:

1. 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:
   1. Value on Precision Transaction does not match Raw Data value in database.

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

7.2.14 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 code, site ID, parameter, and collocated POC.)

Business Rules
Common Rules

1. If supplied, the combination of (Duration Code, Reported Unit, Parameter, and Indicated Method) must be in PROTOCOLS table.
   Error Messages:
   1. 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:
   1. 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:
   1. 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:

1. 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:

1. 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:

1. Indicated_Method not allowed for Flow Precision Data.

7. If the Paramter's type is Gaseous, then the Indicated method must be blank.

Error Messages:

1. Indicated_Method not allowed for Gaseous Precision Data

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

7.2.15 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 precision observations, and the numeric value entered cannot exceed that maximum. The relevant maximum values and parameters are listed below:

Parameter Code	Parameter Description	Maximum Precision Value
11101	Suspended Particulate (TSP)	2000 µg/m^3 (25 c)
12128	Lead (TSP)	80 µg/m^3 (25 c)
42101	Carbon Monoxide	20 ppm

Parameter Code	Parameter Description	Maximum Precision Value
42401	Sulfur Dioxide	0.2 ppm
42602	Nitrogen Dioxide	0.2 ppm
44201	Ozone	0.2 ppm
81102	PM-10 Total 0 - 10 um	2000 µg/m^3 (25 c)
88101	PM-2.5 Local Conditions	2000 µg/m^3 (LC)

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	Parameter Description	Maximum Percent Difference
11101	Suspended Particulate (TSP)	± 160 %
12128	Lead (TSP)	± 160 %
42101	Carbon Monoxide	± 90 %
42401	Sulfur Dioxide	± 90 %
42602	Nitrogen Dioxide	± 90 %
44201	Ozone	± 90 %
81102	PM-10 Total 0 - 10 um	± 160 %
88101	PM-2.5 Local Conditions	± 160 %

For 11101, 12128, and 81102, the percent difference is calculated using the following formula:

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

For 42101, 42401, 42602, and 44201, the percent difference 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 5 digits before or after the decimal point.

   Error Messages:

   1. Value larger than specified precision allows for this column

2. Indicated Value must be less than the maximum defined for the parameter.
   Error Messages:
   1. 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:
   1. 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:
   1. Indicated Value not allowed for PEP Precision Data.

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

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

7. If the Parameter type is "Gaseous" then the Indicated Value is required.
   Error Messages:
   1. 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:
   1. Value on Precision Transaction does not match Raw Data value in database.

<u>Insert Rules</u>
None.

<u>Update Rules</u>
None.

<u>Delete Rules</u>
None.

7.2.16 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 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:
   1. Invalid Collocated POC.

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

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

7.2.17 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.

7.2.18 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:
   1. Integrity constraint (AIRSRAQS.QAD_SA_FK) violated.

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

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

7.3 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:

1. Precision data whose Relative Percent Difference (RPD) is greater than or equal to 50% for a single precision check.

2. 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.

3. 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.

4. Accuracy data whose percent difference between the Actual and Theoretical Values is greater than or equal to 50% on a per monitor, per occurrence basis.

8.0 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
County 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

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 the text RS in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory
   Error Messages:
   1. Invalid input record format

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

Error Messages:

1. Invalid input record format

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

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 summary row into the Annual Summaries Table and associated rows in the Summary Maximums, Summary Percentiles, and Summary Protocols Tables.
U - Change one or more columns within related annual summaries, summary maximums, summary percentiles, and summary protocols rows.
D - Delete an annual summary row from the Annual Summaries Table and associated rows in the Summary Maximums, Summary Percentiles, and Summary Protocols Tables.

Business Rules

Common Rules

1. Action Indicator is required.

   Error Messages:

   1. Invalid Action Code.

2. Action Indicator must be either ‘I’, ‘U’, or ‘D’.

   Error Messages:

   1. Invalid Action Code.

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

8.3 State Code

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

Attributes: Alphanumeric
2-character code
Mandatory
Key Field

Coding Instructions: Place a valid FIPS state code in delimited field 3. A code is valid if it exists in the States Table.

Business Rules

Common Rules:

1. State Code is mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

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

Insert Rules:
None.

Update Rules:
None.

Delete Rules:
None.

8.4 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.

Attributes: Alphanumeric
3-character code
Mandatory
Key Field

Coding Instructions: Place a valid county code in the fourth delimited field. A code is valid if it exists in combination with state code and city code, in the County Cities Table.

Business Rules

Common Rules:

1. County Code is required.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

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

Insert Rules:

None.

Update Rules:

None.

Delete Rules:

None.

8.5 Site ID

Description: A numeric identifier (ID) that uniquely identifies each air monitoring site within a county.

Attributes: Alphanumeric
4-digit ID
Mandatory
Key Field

Coding Instructions: Place a four-digit side ID in the fifth delimited field. A site ID value is valid if it exists in combination with state code and county code in the Sites Table.

Business Rules

Common Rules:

1. Site ID is mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

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

Insert Rules:

None.

Update Rules:
None.

Delete Rules:
None.

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 in the Monitors Table.

Business Rules

Common Rules

1. Parameter Code is Mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

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

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

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.

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 on the Monitors Table.

Business Rules

Common Rules

1. POC is Mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

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

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

8.8 Duration Code

Description: The period of time during which all the raw data sample values being summarized were 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, and method in the Protocols Table.

Business Rules

Common Rules

1. The combination of (Duration Code, Reported Unit, Parameter, and Sampling Methodology) must be in PROTOCOLS table.
   Error Messages:
   1. Invalid Protocol.

2. Sample duration must be an observed rather than a computed duration.
   Error Messages:

1. Raw data must be submitted with an observed duration.

3. Only one observed Duration Code per Monitor per Summary Year is allowed.
   Error Messages:
   1. Another observed duration exists for this monitor year.

Insert Rules
1. Duration Code is required.
   Error Messages:
   1. Duration Code is required.

Update Rules
None.

Delete Rules
None.

8.9 Reported Unit

Description: The dimensional system in which the summary values are 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 sample duration, parameter, and method in the Protocols Table.

Business Rules
Common Rules
1. The combination of (Duration Code, Reported Unit, Parameter, and Sampling Methodology) must be in PROTOCOLS table.
   Error Messages:
   1. Invalid Protocol.

Insert Rules
1. Reported Unit is required
   Error Messages:
   1. Reported Unit is required.

Update Rules
None.

Delete Rules
None.

8.10 Method Code

Description: Identifies the particular method for collecting and analyzing the raw data values that are the basis of the summary values.

Attributes: Alphanumeric
3-digit code
Mandatory

Coding Instructions: Place a valid method code in the tenth 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 sample duration, unit, and collection frequency in the Protocols Table.

Business Rules

Common Rules

1. The combination of (Duration Code, Reported Unit, Parameter, and Sampling Methodology) must be in PROTOCOLS table.
   Error Messages:
   1. Invalid Protocol.

Insert Rules

1. Sampling Methodology is required.
   Error Messages:
   1. Method Code is required.

Update Rules

None.

Delete Rules

None.

8.11 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:
   1. Year is required.

2. Summary Year must be in the format 'YYYY'.
   Error Messages:
   1. Invalid Year.

3. The monitor must have been active for some portion of the Summary Year.
   Error Messages:
   1. Monitor not active during Annual Summary Year

4. Summary Year must less than, or equal to, the current year.
   Error Messages:
   1. 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:
   1. 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:
   1. 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:
   1. No Annual Summary data to update or delete

8.12 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:
   1. Exceptional Data Type is required.

2. Exceptional Data Type ID must be in EXCEPTIONAL_DATA_TYPES table.
   Error Messages:
   1. Integrity constraint (AIRSRAQS.ANS_EDT_FK) violated

3. Exceptional Data Type ID must be at production status.
   Error Messages:
   1. 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:
   1. 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:
   1. 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:
   1. 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:
   1. 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:
   1. No Annual Summary data to update or delete

8.13 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:
   1. 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:
   1. Observation Count is an invalid value.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

8.14 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:
1) it is 0 and the exceptional data type is 0 or 1; or
2) 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:
   1. Check constraint (AIRSRAQS.ANS_EX_DATA_CNT) violated.

Insert Rules

None.

Update Rules

None.

Delete Rules
None.

8.15 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:
   1. Invalid Summary Maximum.

2. Maximum Value must be greater than or equal to the Second Maximum Value.
   Error Messages:
   1. 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.

8.16 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:
   1. Invalid Date.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

8.17 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:
   1. Invalid Time.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

8.18 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:
   1. 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:
   1. 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.

8.19 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:

1. Invalid Date.

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

8.20 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:
   1. Invalid Time.

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

8.21 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:
   1. 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:
   1. 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.

8.22 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:
   1. 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:
   1. 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.

8.23 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:
   1. Invalid Summary 5th Highest Value.

2. The 5th Highest Sample Value must not be greater than the 4th Highest Sample Value.
   Error Messages:
   1. 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.

8.24 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:
   1. Invalid Lowest Sample Value.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

8.25 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:
   1. Invalid Arithmetic Mean.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

8.26 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:
   1. Invalid Arithmetic Standard Deviation.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

8.27 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:
   1. Invalid geometric mean.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

8.28 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:
   1. Invalid Geometric Standard Deviation.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

8.29 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:
   1. Invalid Summary Percentile

2. The 10th Percentile must not be greater than the 25th Percentile.
   Error Messages:
   1. Percentile Sample Value is not greater than prior percentile sample value.

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

8.30 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:
   1. Invalid Summary Percentile

2. The 25th Percentile must not be greater than the 50th Percentile, nor less than the 10th Percentile.
   Error Messages:
   1. Percentile Sample Value is not greater than prior percentile sample value.

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

8.31 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:
   1. Invalid Summary Percentile

2. The 50th Percentile must not be greater than the 75th Percentile, nor less than the 25th Percentile.
   Error Messages:
   1. Percentile Sample Value is not greater than prior percentile sample value.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

8.32 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:
   1. Invalid Summary Percentile

2. The 75th Percentile must not be greater than the 90th Percentile, nor less than the 50th Percentile.
   Error Messages:
   1. Percentile Sample Value is not greater than prior percentile sample value.

Insert Rules

None.

Update Rules

None.

Delete Rules
None.

8.33 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:
   1. Invalid Summary Percentile

2. The 90th Percentile must not be greater than the 95th Percentile, nor less than the 75th Percentile.
   Error Messages:
   1. Percentile Sample Value is not greater than prior percentile sample value.

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

8.34 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:
   1. Invalid Summary Percentile

2. The 95th Percentile must not be greater than the 98th Percentile, nor less than the 90th Percentile.
   Error Messages:
   1. Percentile Sample Value is not greater than prior percentile sample value.

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

8.35 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:
   1. Invalid Summary Percentile

2. The 98th Percentile must not be greater than the 99th Percentile, nor less than the 95th Percentile.
   Error Messages:
   1. Percentile Sample Value is not greater than prior percentile sample value.

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

8.36 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:
   1. Invalid Summary Percentile

2. The 99th Percentile must not be less than the 98th Percentile.
   Error Messages:
   1. Percentile Sample Value is not greater than prior percentile sample value.

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

8.37 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:
   1. Invalid Percent of Observations.

Insert Rules

None.

Update Rules
None.

Delete Rules
None.

8.38 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:
   1. Invalid Number < MDL.

2. Number < MDL must be less than, or equal to, Count of Observations.
   Error Messages:
   1. Check constraint (AIRSRAQS.ANS_OBS_CNT_LT_HALF_MDL) violated

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

9.0 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	Qualifier Code -Null Data
Action Indicator	Qualifier-1
State Code	Qualifier-2
County Code	Qualifier-3
Site ID	Qualifier-4
Parameter	Qualifier-5
POC	Qualifier-6
Duration Code	Qualifier-7
Reported Unit	Qualifier-8
Method Code	Qualifier-9
Blank Type	Qualifier-10
Date	Alternate Method Detectable Limit
Time	Uncertainty Value
Blank 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:

9.1 Transaction Type

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

Attributes: Alphanumeric
2-character code
Mandatory

Coding Instructions: Place RB in the first delimited field.

Business Rules:

Common Rules

1. Transaction Type is mandatory
   Error Messages:
   1. Invalid input record format

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

Error Messages:

1. Invalid input record format

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

9.2 Action Indicator

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

Attributes: Alphanumeric
1-character code
Mandatory

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

Business Rules

Common Rules

1. Action Indicator is required.

   Error Messages:

   1. Invalid Action Code.

2. Action Indicator must be either 'I', 'U', or 'D'.

   Error Messages:

   1. Invalid Action Code.

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

9.3 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.

Attributes: Alphanumeric
2-character code
Mandatory
Key Field

Coding Instructions: Place a valid FIPS state code in delimited field 3. A code is valid if it exists in the States Table.

Business Rules

Common Rules:

1. State Code is mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

2. A Site with (State Code, County Code, Site ID) must be in the SITES table
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

Insert Rules:
None.

Update Rules:
None.

Delete Rules:
None.

9.4 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.

Attributes: Alphanumeric
3-digit code
Mandatory
Key Field

Coding Instructions: Place a valid county code in the fourth delimited field. A code is valid if it exists in combination with state code and city code, in the County Cities Table.

Business Rules

Common Rules:

1. County Code is required.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

2. A Site with (State Code, County Code, Site ID) must be in the SITES table
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

Insert Rules:
None.

Update Rules:
None.

Delete Rules:
None.

9.5 Site ID

Description: A numeric identifier (ID) that uniquely identifies each air monitoring site within a county.

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 code in the Sites Table.

Business Rules
Common Rules:
1. Site ID is mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

2. (State Code, County Code, Site ID) must be in the SITES table.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

Insert Rules:
None.

Update Rules:
None.

Delete Rules:
None.

9.6 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 in the Monitors Table.

Business Rules

Common Rules

1. Parameter Code is Mandatory.
   Error Messages:
   1. Monitor ID (State, County, Site, Parameter, POC) not in database.

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

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

9.7 POC (Parameter Occurrence Code)

Description: An identifier used to distinguish between multiple monitors at the same site that are measuring the same parameter.

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 is between 1 and 99.

Business Rules

Common Rules

1. POC is Mandatory.

Error Messages:

1. Monitor ID (State, County, Site, Parameter, POC) not in database.

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

Error Messages:

1. Monitor ID (State, County, Site, Parameter, POC) not in database.

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

9.8 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:

1. Invalid Protocol.

2. Sample duration must be an observed rather than a computed duration.

Error Messages:

1. 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:

1. Duration Code does not match the annual summary duration.

Insert Rules

1. Duration Code is required.

Error Messages:

1. Invalid Protocol.

Update Rules

None.

Delete Rules

None.

9.9 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 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:

   1. Invalid Protocol.

Insert Rules

1. Reported Unit is required

   Error Messages:

   1. Invalid Protocol.

Update Rules

None.

Delete Rules

None.

9.10 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:
   1. Invalid Protocol.

Insert Rules

1. Method Code is required.
   Error Messages:
   1. Invalid Protocol.

Update Rules

None.

Delete Rules

None.

9.11 Blank Type

Description: The blank type describes how the un-exposed filter was handled. It has possible values TRIP and FIELD. A type of TRIP means that the filter was taken to the site, but not placed in the instrument, while a type of FIELD means that the filter was placed in the instrument and removed before operation of the instrument.

Attributes: Alphanumeric
5 character code
Mandatory
Key Field

Coding Instructions: Place either TRIP or FIELD in the eleventh delimited field on the transaction as appropriate for the value.

Business Rules:

Common Rules

1. Blank Type is required.
   Error Messages:
   1. Blank Type field is required.
   2. Invalid blanks type.

2. Blank Type must be in the BLANKS_TYPES table.
   Error Messages:

1. Invalid blanks type.

3. Blank Type must be at production status.
   Error Messages:
   1. Invalid blanks type.

Insert Rules

1. The combination of Blank Type, Date, and Time must not already be in database for Monitor.
   Error Messages:
   1. 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:
   1. No data found

Delete Rules

1. The combination of Blank Type, Date, and Time must already be in database for Monitor.
   Error Messages:
   1. No data found

9.12 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 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. Date is required.
   Error Messages:
   1. Date Required.

2. Date must be in a year greater or equal to the earliest supported year
   Error Messages:
   1. The sample date is not within an available year

3. Date must be in a year greater or equal to the earliest supported year
   Error Messages:

1. Date must be less than current date.

4. Date must fall within a valid sample period for the monitor.
   Error Messages:
   1. 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:
   1. Attempted to insert a value for an existing date and time.

2. Date and Start Time for the sample may not fall within the duration period of the sample immediately preceding it, nor span into the duration period of the sample immediately succeeding it.
   Error Messages:
   1. Sample duration overlaps immediately preceding or succeeding sample value

Update Rules

1. The combination of Blank Type, Date, and Time must be in database for Monitor.
   Error Messages:
   1. No data found.

Delete Rules

1. The combination of Blank Type, Date, and Time must be in database for Monitor.
   Error Messages:
   1. No data found.

9.13 Blank Time

Description: Indicates the beginning of the sampling period in standard time at the location of the monitoring site.

Attributes: Alphanumeric
5 characters
Mandatory

Coding Instructions: Place a valid start time in the twelfth delimited field. A start time value is valid if it is in the format of HH:MM, and does not overlap another sampling period for the monitor.

Business Rules

Common Rules

1. Start Time is required.
   Error Messages:
   1. Start Time is required.

2. Start time must be in the format: HH:MM.

Error Messages:

1. Invalid time format.

Insert Rules

1. The combination of Blank Type, Date, and Time must not already be in database for Monitor.

   Error Messages:

   1. Attempted to insert a value for an existing date and time.

2. Date and Start Time for the sample may not fall within the duration period of the sample immediately preceding it, nor span into the duration period of the sample immediately succeeding it.

   Error Messages:

   1. Sample duration overlaps immediately preceding or succeeding sample value

Update Rules

1. The combination of Blank Type, Date, and Time must be in database for Monitor.

   Error Messages:

   1. No data found.

Delete Rules

1. The combination of Blank Type, Date, and Time must be in database for Monitor.

   Error Messages:

   1. No data found.

9.14 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.

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:

   1. Precision beyond 5 decimal places will be lost

   Error Messages:

   1. Value larger than specified precision allows for this column
   2. 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:
   1. Invalid combination of value, uncertainty, and null data code.

3. Blank Value, when converted to standard units, must fall within the absolute value range defined for Parameter.
   Error Messages:
   1. Standard value falls outside absolute value range for the parameter

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

9.15 Qualifier Code -Null Data

Description: Code to explain why no blank value was reported.

Attributes: Alphanumeric
2-character code
Optional

Coding Instructions: Place a valid null value 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. Qualifier Code -Null Data must be valued if Blank Value is not valued, and must not be valued if Blank Value is valued.
   Error Messages:
   1. Invalid combination of value, uncertainty, and null data code.

2. Qualifier Code -Null Data must be in QUALIFIERS table.
   Error Messages:
   1. Please enter a valid 'NULL' Data Type Code.

3. Qualifier Code -Null Data must be at production status.
   Error Messages:
   1. Please enter a valid 'NULL' Data Type Code.

Insert Rules
None.

Update Rules
None.

Delete Rules
None.

9.16 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:
   1. Invalid Raw Data Qualifier.

2. QUALIFIERS (QUALIFIER_CODE) must be at production status.
   Error Messages:
   1. Invalid Raw Data Qualifier.

3. Qualifier Code must not be a Null Data code.
   Error Messages:
   1. The null data qualifier code is not valid when a reported sample value exists.
   2. Invalid combination of value, uncertainty, and null data code.

4. No more than one EX or NULL qualifier code.
   Error Messages:
   1. A sample may be qualified by no more than one event or null qualifier.

Insert Rules
None.

Update Rules
None.

Delete Rules

None.

9.17 Alternated Method Detectable Limit (Alt-MDL)

Description: Method detectable limit (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 MDL in the 26th delimited field. A user can report MDL on the Blank Data (RB) transaction, or leave it blank. If it is reported on the blank 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 blank 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 blank data value.

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:
   1. Value larger than specified precision allows for this column

Insert Rules

None.

Update Rules

None.

Delete Rules

None.

9.18 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)

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 4 after, the decimal point.

   Error Messages:

   1. Value larger than specified precision allows for this column

Insert Rules

None.

Update Rules

None.

Delete Rules

None.