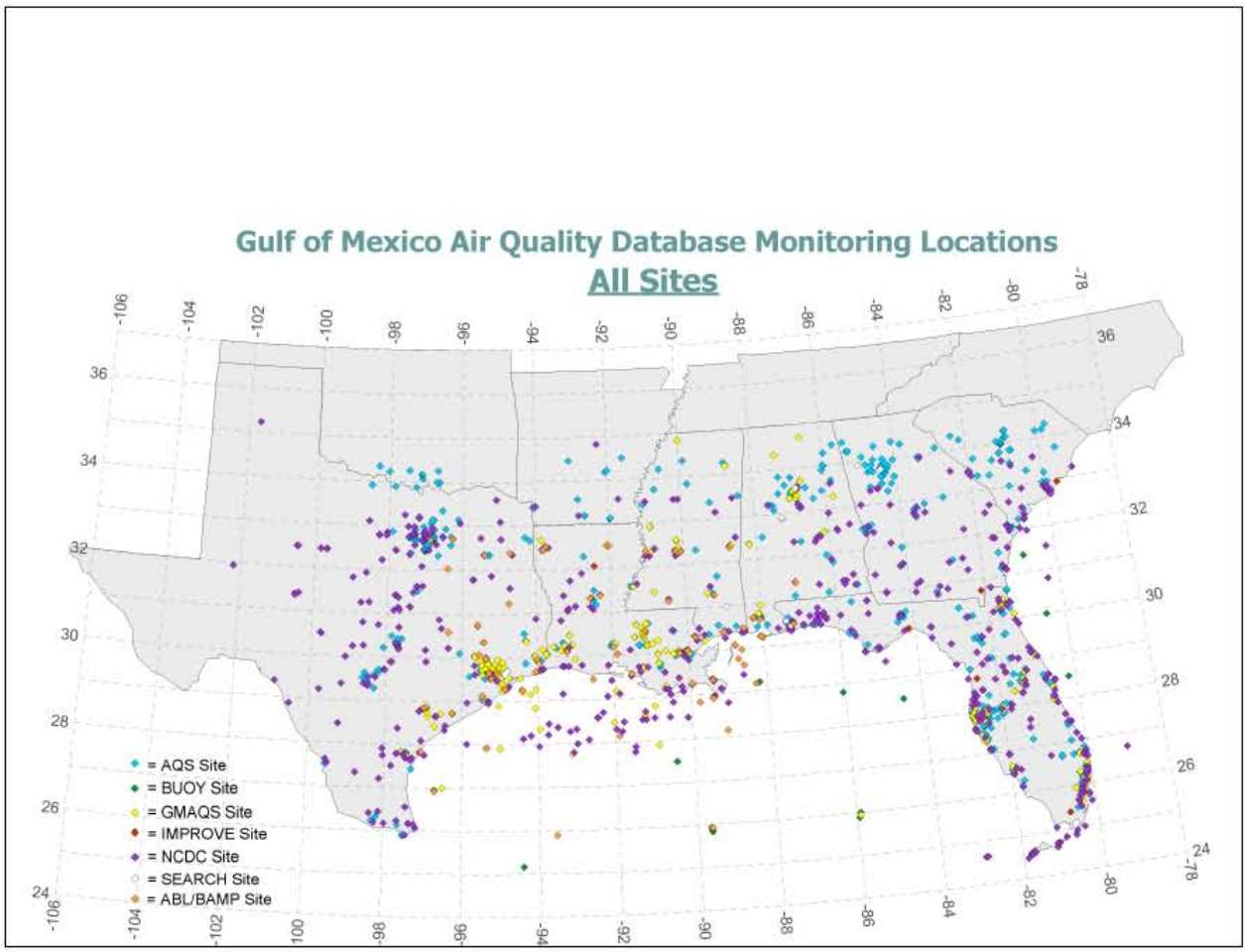
OCS Study
MMS 2009-056

# Synthesis, Analysis, and Integration of Meteorological and Air Quality Data for the Gulf of Mexico Region

## Volume II: Technical Reference Manual for the Gulf of Mexico Air Quality Database




**U.S. Department of the Interior**
**Minerals Management Service**
**Gulf of Mexico OCS Region**

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# Synthesis, Analysis, and Integration of Meteorological and Air Quality Data for the Gulf of Mexico Region

## Volume II: Technical Reference Manual for the Gulf of Mexico Air Quality Database

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This report is available only in compact disc format from the Minerals Management Service, Gulf of Mexico OCS Region, at a charge of $15.00, by referencing OCS Study MMS 2009-056. The report may be downloaded from the MMS website through the Environmental Studies Program Information System (ESPIS). You will be able to obtain this report also from the National Technical Information Service in the near future. Here are the addresses. You may also inspect copies at selected Federal Depository Libraries.

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## ABOUT THE COVER

The graphic on the cover depicts the locations of the air quality and meteorological monitoring sites that are included in the Gulf of Mexico Air Quality Database tool.

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# 1.0 OVERVIEW

The Gulf of Mexico Air Quality Database (GMAQDB) is a custom software application developed by Air Resource Specialists, Inc. (ARS) and ICF International under MMS contract 0106CT39773. This Technical Reference Manual (TRM) provides the information needed by database administrators, software developers, and other IT professionals to facilitate the installation, maintenance, and use of the GMAQDB.

The development platform chosen was based on the Statement of Work authorized by MMS. No additional technical requirements were provided. Therefore, development decisions were made to provide a useful tool for MMS data analysts within the simple constraints of developing an application with an Oracle database backend and Microsoft Access 2003 interface.

## 1.1. SCOPE OF THIS MANUAL

This manual provides details on the delivered components of the GMAQDB and how the application was developed and tested. Although installation instructions are provided, it is assumed that security and other policies within MMS will prevent the installation of a "turn-key" system. Therefore, also included are suggestions for configuration changes and source code modifications that might be helpful to meet policy requirements. Details for implementing the system as a stand-alone, single-user solution are also provided.

## 1.2. TERMS AND CONVENTIONS

This manual is written for experienced information technology users and assumes broad knowledge of Oracle server and client software, Microsoft Access 2003 and general networking.

The following notation and conventions are followed throughout this manual:

- Instructions are given for users using a mouse with standard settings. Although all procedures can be carried out via key presses, instructions for doing so have not been provided. Left-handed users or others with re-programmed mice will need to adjust the instructions accordingly.
- *Click* refers to pressing the left mouse button once and releasing it. *Right-click* refers to pressing the right mouse button once and releasing it.
- **NOTE:** indicates exceptions or special conditions.

# 2.0 INTRODUCTION

The Gulf of Mexico Air Quality Database (GMAQDB) has been developed by ICF International and Air Resource Specialists, Inc. under MMS Contract No. 0106CT39773—Synthesis, Analysis, and Integration of Meteorological and Air Quality Data Study. The GMAQDB is comprised of two primary components: 1) an Oracle database containing meteorological, air quality, and emissions data from the Gulf of Mexico and Gulf coast areas and 2) a custom interactive database tool, developed with Microsoft Access 2003. In addition to this manual, the GMAQDB documentation set includes:

- *The Gulf of Mexico Air Quality Database (Version 1.0) User's Manual* (Volume I of this report)
- *The Gulf of Mexico Air Quality Database Online Help* (an Adobe PDF version of the GMAQDB User's Manual)

## 2.1. HISTORY AND PURPOSE

The GMAQDB was developed to provide the MMS with a synthesized and integrated database containing meteorology and air quality data collected during both routine and special study monitoring periods by MMS, the oil and gas industry, EPA, states, and various other agencies. The resulting database contains hundreds of millions of data points collected in the region from 1988 through 2004. In addition, the database contains emissions inventories from the Gulf of Mexico and surrounding areas for 2002 and 2005. The interactive database tool has been designed to provide users with easy-to-use query capabilities to retrieve specific subsets of the data based on a variety of criteria such as date range, location, and parameter type.

## 2.2. DEVELOPMENT PLATFORM

The GMAQDB was developed at ARS by in-house developers using available hardware and commercial software as follows:

### *Database Server*

- HP ProLiant DL380 G5
- SUSE Linux Enterprise 10
- Oracle Database 10g Release 10.2.0.3 Standard Edition One

### *Client*

- Microsoft Windows XP SP2
- Oracle 10g Client 10.2.0.3
- Microsoft Access 2003 SP3
- Microsoft Data Access Components (MDAC) 2.8 SP1

## 2.3. TECHNICAL SUPPORT

Technical support is available during the term of MMS contract 0106CT39773. Contact:

Betsy Davis-Noland
Air Resource Specialists, Inc.
970-484-7941

# 3.0 SYSTEM

The basic design of the GMAQDB is an Oracle database backend and graphical user interface (GUI) developed with Microsoft Access 2003 and Visual Basic for Applications (VBA). This section of the manual provides a system overview followed by details on the delivered components of the system, system requirements, and installation and configuration guidelines.

## 3.1. OVERVIEW

The GMAQDB was designed to provide a useful tool for MMS data analysts within the basic constraints of developing an application with an Oracle database backend and Microsoft Access 2003 user interface. ARS developers also operated under the following assumptions:

- Delivery of a "turn-key" system is not feasible given MMS security and other policies.
- The GMAQDB database might need to be integrated with other MMS databases and/or interfaces, perhaps even non-Oracle databases.
- Microsoft Access 2003 and VBA are already older technology; the GMAQDB interface might require rewrite or update in the near future.

Therefore, some design decisions were also made with the hope of providing an application that will be relatively easy to modify. These decisions include:

- Design of a simple set of normalized, relational tables within a single Oracle schema.
- No additional Oracle users or profiles in attempt to guess security requirements.
- Clear distinction between the backend database and frontend interface:
  - All data are contained in Oracle tables and linked to the MS Access interface.
  - All application code is contained in MS Access queries, forms, reports and VBA modules. There are no Oracle stored procedures or functions.
  - Database connectivity is achieved through MS Access external table links, the Microsoft OLE Provider for Oracle and the Oracle Client.
- Development and delivery of a prototype stand-alone, single-user system delivered to MMS in April 2008. This implementation method could be used to provide the system to key users if necessary.

## 3.2. DELIVERED COMPONENTS

### *Database*

The entire database has been exported using the Oracle 10gR2 Data Pump utility in 4GB increments and written to DVD. This export type will allow MMS to either import the entire database or to import the GMAQDB schema into an existing database. The export does not include the Oracle RDBMS software.

### *User Interface*

An InstallShield installation CD provided to install the MS Access database (.mdb file) and other components including online user help. This CD also contains the individual components to allow manual installation. It does not contain the MS Access 2003 software or standard Microsoft Office libraries.

### *Documentation*

A CD containing the following documents in MS Word 2003 and Adobe PDF format:

- *The Gulf of Mexico Air Quality Database (Version 1.0) User's Manual*
- *The Gulf of Mexico Air Quality Database (Version 1.0) Technical Reference Manual*

## 3.3. DATABASE SERVER REQUIREMENTS

### *Oracle and Operating System*

Due to the simple design of the GMAQDB it is assumed that the minimum Oracle version required is Oracle 8i Release 2 with operating system requirements based on the Oracle compatibility matrix. See Section 2.2 for details on the development platform.

### *Storage*

- Full Oracle Database Import – approximately 40gb
- GMAQDB Schema Import – approximately 28gb

## 3.4. USER INTERFACE (CLIENT) REQUIREMENTS

The user interface requires Microsoft Access 2003 and the following library code files, many of which are typically installed with Microsoft Office 2003:

- Visual Basic for Applications
- Microsoft Access 11.0 Object Library
- OLE Automation
- Microsoft ActiveX Data Objects 2.1 Library
- Microsoft Data Access Components (MDAC) 2.8 SP1

- Microsoft DAO 3.6 Object Library
- Microsoft Windows Common Controls 6.0 (SP6)
- Microsoft Windows Common Controls-2 6.0 (SP4)
- Microsoft Calendar Control 11.0
- Snapshot View Control
- Microsoft Scripting Runtime
- Microsoft Forms 2.0 Object Library
- Microsoft Excel 11.0 Object Library
- Microsoft Office 11.0 Object Library

## 3.5. INSTALLATION GUIDELINES

The instructions in the section are intended as guidelines only. Actual installation steps will heavily depend on the environment into which the application will be integrated. In addition, this information must be supplemented by Oracle documentation for the specific Oracle Database platform and version.

### 3.5.1. Oracle Database

ARS suggests importing the GMAQDB using the following steps:

1. Copy the Oracle Export files from the DVD media provided to a location on the host server or a network storage location. Approximately 12gb of storage space is required.
2. Determine the target Oracle database. The host server must have approximately 28gb of disk storage available.
3. Create an Oracle Directory Object that points to the storage location in Step 1.
4. Import the GMAQDB schema using the Oracle Data Pump Import Utility in Schema Mode and referencing the Directory Object created in Step 3.

### 3.5.2. User Interface

To install the GMAQDB Interface tool, ARS suggests running setup.exe from the installation CD on each user's workstation. Alternatively, the individual components required by the application can be copied from the CD provided to their target locations. Also, if the GMAQDB users' workstations have the same versions of MS Office and Oracle client software installed, the GMAQDB Interface (GMAQDB.mdb) and reference files can be placed on a network drive and shared by multiple users.

### 3.5.3. Client/Server Connectivity

The GMAQDB.mdb programs must be able to connect to the GMAQDB schema in the target database chosen in step 2 of Section 3.5.1. The client interface uses a combination of Microsoft

Access external table links via ODBC and a Microsoft Data Link file that uses the Microsoft OLE Provider for Oracle. Both depend on the Oracle Client to be correctly installed and able to connect to the target database. Take the following steps to ensure client/database connectivity:

**NOTE:** The files referred to below should reside in the folder where the application was installed. On delivery, the user name is GMAQDB and the password is GM1AQ2B. If other user names and/or passwords have been created, enter them where appropriate or remove the user names and/or passwords to force user entry when the application runs.

1. Verify that the Oracle Client software is installed on each GMAQDB user's workstation and a connection to the target database can be made outside of the GMAQDB user interface.
2. Modify the ODBC DSN file:
   a. Open the GMAQDB.dsn file in notepad or other text editor.
   b. If necessary, modify the **Driver=** setting to match the name of the installed Oracle Client driver on users' workstations.
   c. If necessary, modify the **Server=** setting to match the Oracle service name that connects to the target database.
   d. Save the file.
3. Setup and test the Microsoft OLE Provider Data Link:
   a. Open the file **DB SERVER.udl** in the target location selected in Step 1 of Section 3.5.2.
   b. *Click* the **Connection** tab.
   c. Enter the Oracle service name that connects to the target database in the **Enter a server name** text box.
   d. *Click* **Test Connection** to test the connection.
4. Verify the required Microsoft Access external table links to the GMAQDB tables:
   a. In Explorer, press and hold the *Shift* key and *double-click* the GMAQDB.mdb file. This will open the Access file without launching the interface application.
   b. From the Access menu, select **Tools/Database Utilities/Linked Table Manager.**
   c. In the Linked Table Manager dialog box, *click* the **Select All** button then *click* **OK.**

**NOTE:** If an error occurs, remove the linked tables and re-link them following these steps:

1. In the Database Window, under Objects, *click* on **Tables**.
2. *Right-click* on each table name then *click* **Delete**. This action does not delete the Oracle table; it only deletes the link to the table.
3. On the Access menu, select **File/Get External Data/Link Tables.**
4. In the Files of type drop-down box, select **ODBC Databases** to display the **Select Data Source** dialog box.
5. *Click* on the **File Data Source** tab then navigate to and *double-click* the **GMAQDB.dsn** file.
6. When prompted, enter the database password.
7. From the list of displayed tables, select the following:

   GMAQDB.TBLDATA

   GMAQDB.TBLDATAFORMATSDETAIL

   GMAQDB.TBLDATAFORMATSMASTER

   GMAQDB.TBLDATASETMASTER

   GMAQDB.TBLEMMAPS

   GMAQDB.TBLMAPS

   GMAQDB.TLKPMONITORINGLOCATIONS

   GMAQDB.TBLNONPLATFORM

   GMAQDB.TLKPPARAMETERS

   GMAQDB.TLKPSCC
8. To prevent the user from being prompted for the password when accessing these tables, *click* the **Save Password** check box then *click* **OK**.
9. In the Tables list, *right-click* each linked table, select **Rename** and remove the **GMAQDB_ prefix** from the table name.

# 4.0 APPLICATION DETAILS

The GMAQDB GUI is comprised of Microsoft Access 2003 queries, forms, reports, and VBA modules. This section provides an overview of the GUI. Specific instructions for using the interface are provided in the *GMAQDB User's Manual.*

## 4.1. MICROSOFT ACCESS GUI

The interactive database tool has been designed to provide users with easy-to-use query capabilities to retrieve specific subsets of the data based on a variety of criteria such as date range, location, and parameter type. The GUI consists of menus, forms, and reports developed with Microsoft Access 2003. The form controls, such as list views, drop-down list boxes, command button, etc., are standard controls used in many Microsoft Windows applications and should be familiar to most users. The forms, reports, and export files are populated with data from the GMAQDB Oracle database through the linked Oracle GMAQDB tables (ODBC) or the Microsoft OLE Provider for Oracle (ADO).

## 4.2. DATA INVENTORY

See Appendix A of the GMAQDB User's Manual for details on the contents of the Oracle GMAQDB database.

## 4.3. SCOPE OF APPLICATION FUNCTIONS

The GMAQDB application facilitates data retrieval, data entry and loading of new data. When the application is opened, a menu main is displayed on the left side of the Access workspace. This menu contains several command buttons. When clicked, each menu button opens a separate interface in the center of the window.

### 4.3.1. Data Retrieval

The primary purpose of the GUI is to provide users with a tool to query the database and export subsets of data. In addition, users can choose from several reports tables, graphs, and maps. Retrieval of monitoring data is accessed through the **Monitoring Data Products** button. See Section 3.0 of the *GMAQDB User's Manual* for details. Retrieval of emissions data is accessed through the **Emissions Data Products** button. See Section 5.0 of the *GMAQDB User's Manual* for details.

### 4.3.2. Batch Loading of New Data

The GMAQDB has been designed to allow batch loading of new data. The source data files must come from routine monitoring data sets and are either text files or Microsoft Excel files. The loading programs use the Microsoft Jet OLEDB 4.0 provider that is installed with Microsoft Access Data Components (MDAC). Although the interface is simple, successful data loading is contingent on the following the requirements detailed in Sections 7.0 and 8.0 of the *GMAQDB User's Manual.* Examples of source files are provided in Appendix C of the *GMAQDB User's Manual.*

### 4.3.3. Data Entry

Data entry forms for inserting and updating data set information, data format configurations, monitoring locations and monitoring parameters are provided through the **Data Sets** button on the main menu. In order to insert or update data, users must either be connected to the database as the GMAQDB user or another user with insert/update privileges on the following tables:

- tblDataSetMaster
- tblDataSetFormatsMaster
- tblDataSetFormatsDetail
- tlkpMonitoringLocations
- tlkpParameters

## 4.4. USER HELP

Online user help is provided in the form of an Adobe PDF version of the *GMAQDB Users' Manual*. The GMAQDB.pdf file is installed in the application folder and is accessed by clicking the **GMAQDB Users' Manual** button from the Microsoft Access database toolbar.

## 4.5. ERROR HANDLING AND TROUBLESHOOTING

To the extent possible, error trapping has been used throughout the application modules as follows:

- **On Error Goto Err** statement used in subroutines and functions. The **Err** section contains:

  ```
  MsgBox "This Error has occurred: " & err.Number & " " & err.Description,v bCritical
  Resume ExitFunction
  Resume
  ```

which displays the error message, allows the user to click **OK**, the code resumes to the ExitFunction section where housekeeping tasks occur and then the subroutine is exited.

To troubleshoot when an error message is displayed, press **Ctrl-Break** to interrupt code execution and enter the VB debugger. Click on the **Resume** statement to skip the **Resume ExitFunction** statement then press **F8.** This will allow you to see exactly which statement in the code caused the error, to view watch variables, add debug.print statements, etc.

# APPENDIX A: ORACLE DATABASE STRUCTURES

## ENTITY-RELATIONSHIP DIAGRAM

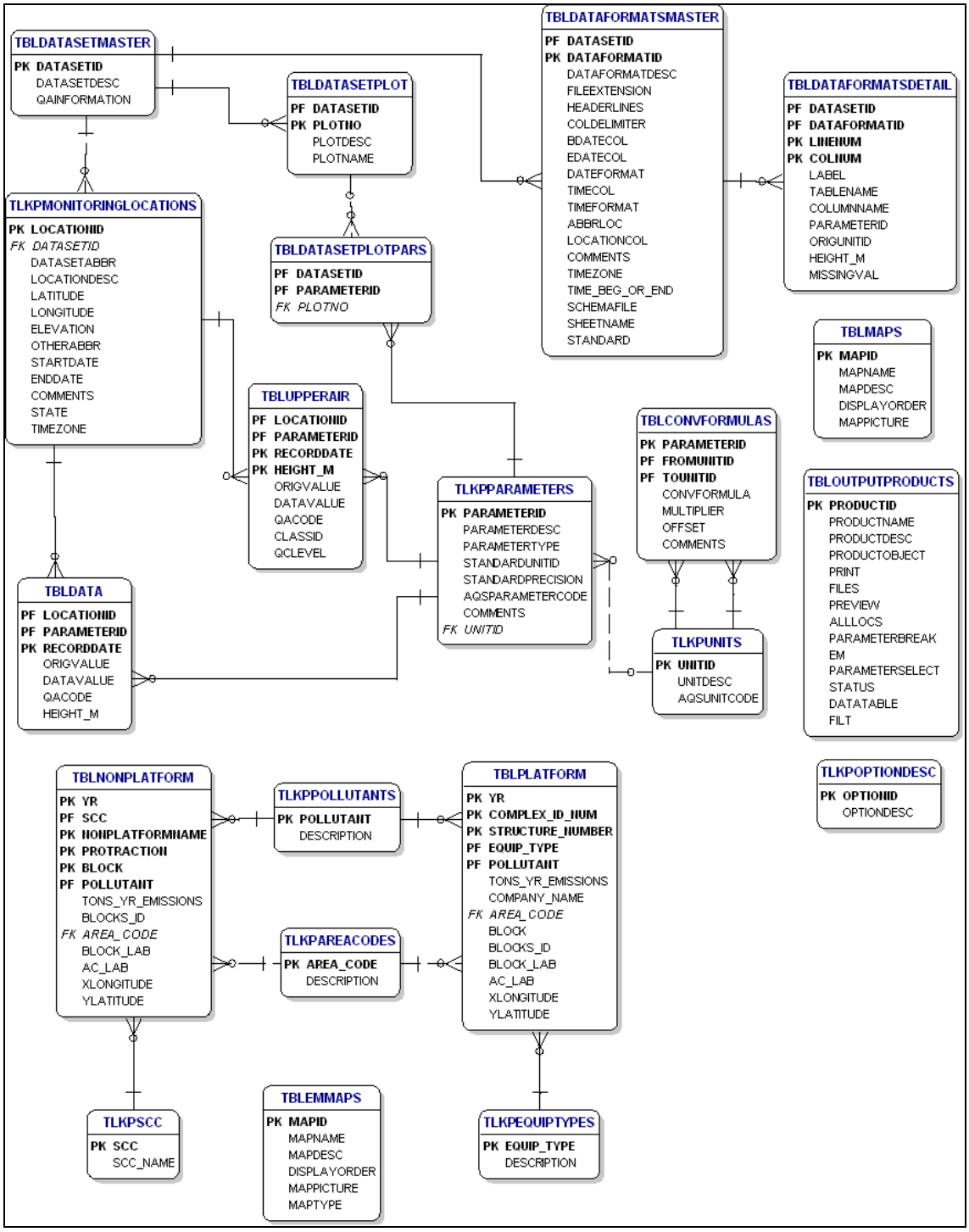


Figure A-1. Entity-Relationship Diagram

Table A-1.

Entity Details

| Entity Name | Primary Key Attributes | # Attributes | Description |
|---|---|---|---|
| TBLNONPLATFORM | YR, SCC, NONPLATFORMNAME, PROTRACTION, BLOCK, POLLUTANT | 13 | Stores Non-Platform Emissions Inventory Data. |
| TLKPOPTIONDESC | OPTIONID | 2 | Defines the options in TBLOUTPUTPRODUCTS. |
| TBLCONVFORMULAS | PARAMETERID, FROMUNITID, TOUNITID | 7 | This table is used during data loading to convert source values in non-standard measurement units to standard measurement units. |
| TBLDATAFORMATSMASTER | DATASETID, DATAFORMATID | 19 | Master source data format record; info regarding entire file. |
| TBLDATAFORMATSDETAIL | DATASETID, DATAFORMATID, LINENUM, COLNUM | 11 | Configuration details of various source files used by data loading programs. |
| TBLDATASETMASTER | DATASETID | 3 | General information about the source data set. |
| TBLOUTPUTPRODUCTS | PRODUCTID | 14 | The list of available output products and options. |
| TBLPLATFORM | YR, COMPLEX_ID_NUM, STRUCTURE_NUMBER, EQUIP_TYPE, POLLUTANT | 14 | Contains Platform Emissions Inventory data. |
| TLKPAREACODES | AREA_CODE | 2 | A lookup table for Area Codes in the emissions inventory tables (TBLNONPLATFORM and TBLPLATFORM). |
| TLKPEQUIPTYPES | EQUIP_TYPE | 2 | A lookup table of Equipment Type Codes found in the Platform emissions inventory data (TBLPLATFORM). |
| TLKPMONITORINGLOCATIONS | LOCATIONID | 13 | A lookup table of Monitoring Location information used by the monitoring data tables (TBLDATA and TBLUPPERAIR). |
| TLKPPARAMETERS | PARAMETERID | 8 | Lookup table for monitoring parameters information. |
| TLKPPOLLUTANTS | POLLUTANT | 2 | Lookup table for emissions inventory pollutants. |
| TLKPSCC | SCC | 2 | Lookup table for Source Classification Codes |
| TLKPUNITS | UNITID | 3 | |
| TBLDATASETPLOTPARS | DATASETID, PARAMETERID | 3 | Multi Time Plots - Detail configuration. |
| TBLDATASETPLOT | DATASETID, PLOTNO | 4 | Defines Multi Time Line Plots - Master Configuration. |
| TBLMAPS | MAPID | 5 | Stores Monitoring Locations Maps. |
| TBLEMMAPS | MAPID | 6 | Stores Emissions Maps. |
| TBLDATA | LOCATIONID, PARAMETERID, RECORDDATE | 7 | Contains the monitoring data (non upper-air). |
| TBLUPPERAIR | LOCATIONID, PARAMETERID, RECORDDATE, HEIGHT_M | 9 | Contains upper air monitoring data. |

### *Entity: TBLNONPLATFORM*

Table A-2.

TBLNONPLATFORM Entity Details

| | |
|---|---|
| **Description** | Stores Non-Platform Emissions Inventory Data. |
| **Primary key constraint name** | PK_TBLNONPLATFORM |

Table A-3.

TBLNONPLATFORM Attributes

| Key | Attribute Name | Data Type | Not Null | Description |
|---|---|---|---|---|
| PK | YR | NUMBER | Yes | Emissions inventory Year. |
| PK,FK | SCC | VARCHAR2 | Yes | The Source Classification Code. |
| PK | NONPLATFORMNAME | VARCHAR2 | Yes | The source description. |
| PK | PROTRACTION | VARCHAR2 | Yes | Location information. |
| PK | BLOCK | VARCHAR2 | Yes | Location information. |
| PK,FK | POLLUTANT | VARCHAR2 | Yes | Pollutant. |
| | TONS_YR_EMISSIONS | NUMBER | No | Annual emissions in tons. |
| | BLOCKS_ID | VARCHAR2 | No | Location information. |
| FK | AREA_CODE | VARCHAR2 | Yes | Location information. |
| | BLOCK_LAB | VARCHAR2 | No | Location information. |
| | AC_LAB | VARCHAR2 | No | Location information. |
| | XLONGITUDE | NUMBER | No | Location information. |
| | YLATITUDE | NUMBER | No | Location information. |

Table A-4.

TBLNONPLATFORM Relationships

| Relationship Name | Type | Parent | Child | Cardinality | Description |
|---|---|---|---|---|---|
| FK_SCC | Identifying | TLKPSCC | TBLNONPLATFORM | Zero Or More | |
| FK_AREA_CODE | Non Identifying | TLKPAREACODES | TBLNONPLATFORM | Zero Or More | |
| TLKPPOLLUTANTS_TBLNONPLATFORM | Identifying | TLKPPOLLUTANTS | TBLNONPLATFORM | Zero Or More | |

Table A-5.

TBLNONPLATFORM Indexes

| Index Name | Index Columns | Type | Sort Order |
|---|---|---|---|
| PK_TBLNONPLATFORM | SCC, NONPLATFORMNAME, PROTRACTION, BLOCK, POLLUTANT, YR | UNIQUE | ASC |

Table A-6.

TBLNONPLATFORM Constraints

| Constraint Name | Type | Level | Constraint |
|---|---|---|---|
| | Column Constraint | Not Null | YR |
| | Column Constraint | Not Null | SCC |
| | Column Constraint | Not Null | NONPLATFORMNAME |
| | Column Constraint | Not Null | PROTRACTION |
| | Column Constraint | Not Null | BLOCK |
| | Column Constraint | Not Null | POLLUTANT |
| | Column Constraint | Not Null | AREA_CODE |
| FK_SCC | Table Constraint | Foreign Key | FOREIGN KEY (SCC) REFERENCES TLKPSCC(SCC) |
| FK_AREA_CODE | Table Constraint | Foreign Key | FOREIGN KEY (AREA_CODE) REFERENCES TLKPAREACODES(AREA_CODE) |
| TLKPPOLLUTANTS_TBLNONPLATFORM | Table Constraint | Foreign Key | FOREIGN KEY (POLLUTANT) REFERENCES TLKPPOLLUTANTS(POLLUTANT) |
| PK_TBLNONPLATFORM | Table Constraint | Primary Key | PRIMARY KEY (YR, SCC, NONPLATFORMNAME, PROTRACTION, BLOCK, POLLUTANT) |
| SYS_C007939 | Table Constraint | Check | "SCC" IS NOT NULL |
| SYS_C007940 | Table Constraint | Check | "NONPLATFORMNAME" IS NOT NULL |
| SYS_C007941 | Table Constraint | Check | "PROTRACTION" IS NOT NULL |
| SYS_C007942 | Table Constraint | Check | "BLOCK" IS NOT NULL |
| SYS_C007943 | Table Constraint | Check | "POLLUTANT" IS NOT NULL |
| SYS_C0010799 | Table Constraint | Check | "YR" IS NOT NULL |

### *Entity: TLKPOPTIONDESC*

Table A-7.

TLKPOPTIONDESC Entity Details

| | |
|---|---|
| **Description** | Defines the options in TBLOUTPUTPRODUCTS. |
| **Primary key constraint name** | PK_TBLOPTIONDESC |

Table A-8.

TLKPOPTIONDESC Attributes

| Key | Attribute Name | Data Type | NOT NULL | Description |
|---|---|---|---|---|
| PK | OPTIONID | NUMBER | Yes | The option number. |
| | OPTIONDESC | VARCHAR2 | No | What the option means. |

Table A-9.

TLKPOPTIONDESC Indexes

| Index Name | Index Columns | Type | Sort Order |
|---|---|---|---|
| PK_TBLOPTIONDESC | OPTIONID | UNIQUE | ASC |

Table A-10.

TLKPOPTIONDESC Constraints

| Constraint Name | Type | Level | Constraint |
|---|---|---|---|
| | Column Constraint | Not Null | OPTIONID |
| PK_TBLOPTIONDESC | Table Constraint | Primary Key | PRIMARY KEY (OPTIONID) |
| SYS_C007944 | Table Constraint | Check | "OPTIONID" IS NOT NULL |

## *Entity: TBLCONVFORMULAS*

Table A-11.

TBLCONVFORMULAS Entity Details

| | |
|---|---|
| **Description** | This table is used during data loading to convert source values in non-standard measurement units to standard measurement units. |
| **Primary key constraint name** | PK_TBLCONVFORMULAS |

Table A-12.

TBLCONVFORMULAS Attributes

| Key | Attribute Name | Data Type | Not Null | Description |
|---|---|---|---|---|
| PK | PARAMETERID | VARCHAR2 | Yes | The ParameterID for this conversion (not all gaseous pollutants convert using the same formula). Contains "ALL" when applied to all pars, therefore, no fk. |
| PK,FK | FROMUNITID | VARCHAR2 | Yes | The unit code to convert from. |
| PK,FK | TOUNITID | VARCHAR2 | Yes | The unit code to convert to. |
| | CONVFORMULA | VARCHAR2 | No | The conversion formula. |
| | MULTIPLIER | NUMBER | No | The conversion multiplier. |
| | OFFSET | NUMBER | No | The conversion offset value. |
| | COMMENTS | VARCHAR2 | No | Additional comments for this record. |

Table A-13.

TBLCONVFORMULAS Relationships

| Relationship Name | Type | Parent | Child | Cardinality | Description |
|---|---|---|---|---|---|
| FK_CONV_TOUNIT | Identifying | TLKPUNITS | TBLCONVFORMULAS | Zero Or More | |
| FK_CONV_FROMUNIT | Identifying | TLKPUNITS | TBLCONVFORMULAS | Zero Or More | |

Table A-14.

TBLCONVFORMULAS Indexes

| Index Name | Index Columns | Type | Sort Order |
|---|---|---|---|
| PK_TBLCONVFORMULAS | FROMUNITID, TOUNITID, PARAMETERID | UNIQUE | ASC |

Table A-15.

TBLCONVFORMULAS Constraints

| Constraint Name | Type | Level | Constraint |
|---|---|---|---|
| | Column Constraint | Not Null | PARAMETERID |
| | Column Constraint | Not Null | FROMUNITID |
| | Column Constraint | Not Null | TOUNITID |
| FK_CONV_TOUNIT | Table Constraint | Foreign Key | FOREIGN KEY (TOUNITID) REFERENCES TLKPUNITS(UNITID) |
| FK_CONV_FROMUNIT | Table Constraint | Foreign Key | FOREIGN KEY (FROMUNITID) REFERENCES TLKPUNITS(UNITID) |
| PK_TBLCONVFORMULAS | Table Constraint | Primary Key | PRIMARY KEY (PARAMETERID, FROMUNITID, TOUNITID) |
| SYS_C007930 | Table Constraint | Check | "FROMUNITID" IS NOT NULL |
| SYS_C007931 | Table Constraint | Check | "TOUNITID" IS NOT NULL |

## *Entity: TBLDATAFORMATSMASTER*

Table A-16.

TBLDATAFORMATSMASTER Entity details:

| | |
|---|---|
| Description | Master source data format record; info regarding entire file. |
| Primary key constraint name | PK_TBLDATAFORMATSMASTER |

Table A-17.

TBLDATAFORMATSMASTER Attributes:

| Key | Attribute name | Data type | Not null | Description |
|---|---|---|---|---|
| PK,FK | DATASETID | VARCHAR2 | Yes | Where the source data file originated. |
| PK | DATAFORMATID | NUMBER | Yes | Sequential number to track numerous formats. |
| | DATAFORMATDESC | VARCHAR2 | No | Description of this dataset/format. |
| | FILEEXTENSION | VARCHAR2 | No | What the file extension needs to be. |
| | HEADERLINES | NUMBER | No | How many lines to skip before processing. |
| | COLDELIMITER | VARCHAR2 | No | How the columns delimited? |
| | BDATECOL | NUMBER | No | In which column does the record date start? |
| | EDATECOL | NUMBER | No | In which column does the record date end? |
| | DATEFORMAT | VARCHAR2 | No | What is the record date format? |
| | TIMECOL | NUMBER | No | In which column is the time stored? |
| | TIMEFORMAT | VARCHAR2 | No | What is the time format? |
| | ABBRLOC | VARCHAR2 | No | A number here means the location abbr is found in the first x values of the file name. |
| | LOCATIONCOL | NUMBER | No | A number here means the location abbr is found in this column of the data file. |
| | COMMENTS | VARCHAR2 | No | Comments regarding the format. |
| | TIMEZONE | VARCHAR2 | No | Timezone for the dates/times in the file. |
| | TIME_BEG_OR_END | VARCHAR2 | No | Time beginning or ending of averaged values. |
| | SCHEMAFILE | VARCHAR2 | No | Information to place in the schema file when required. |
| | SHEETNAME | VARCHAR2 | No | For Excel files, the expected name of the worksheet. |
| | STANDARD | VARCHAR2 | No | Indicates a standard (routine monitoring) data format if YES, otherwise NO. |

Table A-18.

TBLDATAFORMATSMASTER Relationships:

| Relationship name | Type | Parent | Child | Cardinality | Description |
|---|---|---|---|---|---|
| FK_TBLDATAFORMATS | Identifying | TBLDATAFORMATSMASTER | TBLDATAFORMATSDETAIL | Zero Or More | |
| FK_DATASET_FORMATMASTER | Identifying | TBLDATASETMASTER | TBLDATAFORMATSMASTER | Zero Or More | |

Table A-19.

TBLDATAFORMATSMASTER Indexes:

| Index name | Index columns | Type | Sort order |
|---|---|---|---|
| PK_TBLDATAFORMATSMASTER | DATASETID, DATAFORMATID | UNIQUE | ASC |

Table A-20.

TBLDATAFORMATSMASTER Constraints:

| Constraint name | Type | Level | Constraint |
|---|---|---|---|
| | Column Constraint | Not Null | DATASETID |
| | Column Constraint | Not Null | DATAFORMATID |
| | Column Constraint | Default | BEG |
| FK_DATASET_FORMATMASTER | Table Constraint | Foreign Key | FOREIGN KEY (DATASETID) REFERENCES TBLDATASETMASTER(DATASETID) |
| PK_TBLDATAFORMATSMASTER | Table Constraint | Primary Key | PRIMARY KEY (DATASETID, DATAFORMATID) |
| SYS_C007932 | Table Constraint | Check | "DATASETID" IS NOT NULL |
| SYS_C007933 | Table Constraint | Check | "DATAFORMATID" IS NOT NULL |

### *Entity: TBLDATAFORMATSDETAIL*

Table A-21.

TBLDATAFORMATSDETAIL Entity details:

| | |
|---|---|
| Description | Configuration details of various source files used by data loading programs. |
| Primary key constraint name | PK_TBLDATAFORMATS |

Table A-22.

TBLDATAFORMATSDETAIL Attributes:

| Key | Attribute name | Data type | Not null | Description |
|---|---|---|---|---|
| PK,FK | DATASETID | VARCHAR2 | Yes | Where the type of source file originated. |
| PK,FK | DATAFORMATID | NUMBER | Yes | Sequential number to track formats for each data set. |
| PK | LINENUM | NUMBER | Yes | What line of the record does this config refer to? (Needed for multiline records in source files.) |
| PK | COLNUM | NUMBER | Yes | What column of the record/line does this config refer to? |
| | LABEL | VARCHAR2 | No | Column header in the source file (for reference). |
| | TABLENAME | VARCHAR2 | No | In what table should the value be inserted? |
| | COLUMNNAME | VARCHAR2 | No | In what table column should the value be inserted? |
| | PARAMETERID | VARCHAR2 | No | What parameterid does this config map to? |
| | ORIGUNITID | VARCHAR2 | No | What is the source unit of measure (needed to determin value conversion)? |
| | HEIGHT_M | NUMBER | No | What is the monitoring height if available? |
| | MISSINGVAL | NUMBER | No | What value or set of characters indicates a missing value? |

Table A-23.

TBLDATAFORMATSDETAIL Relationships:

| Relationship name | Type | Parent | Child | Cardinality | Description |
|---|---|---|---|---|---|
| FK_TBLDATAFORMATS | Identifying | TBLDATAFORMATSMASTER | TBLDATAFORMATSDETAIL | Zero Or More | |

Table A-24.

TBLDATAFORMATSDETAIL Indexes:

| Index name | Index columns | Type | Sort order |
|---|---|---|---|
| PK_TBLDATAFORMATS | DATAFORMATID, LINENUM, COLNUM, DATASETID | UNIQUE | ASC |

Table A-25.

TBLDATAFORMATSDETAIL Constraints:

| Constraint name | Type | Level | Constraint |
|---|---|---|---|
| | Column Constraint | Not Null | DATASETID |
| | Column Constraint | Not Null | DATAFORMATID |
| | Column Constraint | Not Null | LINENUM |
| | Column Constraint | Not Null | COLNUM |
| FK_TBLDATAFORMATS | Table Constraint | Foreign Key | FOREIGN KEY (DATASETID,DATAFORMATID) REFERENCES TBLDATAFORMATSMASTER(DATASETID,DATAFORMATID) |
| PK_TBLDATAFORMATS | Table Constraint | Primary Key | PRIMARY KEY (DATASETID, DATAFORMATID, LINENUM, COLNUM) |
| SYS_C007934 | Table Constraint | Check | "DATASETID" IS NOT NULL |
| SYS_C007935 | Table Constraint | Check | "DATAFORMATID" IS NOT NULL |
| SYS_C007936 | Table Constraint | Check | "LINENUM" IS NOT NULL |
| SYS_C007937 | Table Constraint | Check | "COLNUM" IS NOT NULL |

### *Entity: TBLDATASETMASTER*

Table A-26.

TBLDATASETMASTER Entity details:

| | |
|---|---|
| Description | General information about the source data set. |
| Primary key constraint name | PK_TBLDATASETMASTER |

Table A-27.

TBLDATASETMASTER Attributes:

| Key | Attribute name | Data type | Not null | Description |
|---|---|---|---|---|
| PK | DATASETID | VARCHAR2 | Yes | Assigned data set id. |
| | DATASETDESC | VARCHAR2 | No | Data set description. |
| | QAINFORMATION | VARCHAR2 | No | QA Information if available. |

Table A-28.

TBLDATASETMASTER Relationships:

| Relationship name | Type | Parent | Child | Cardinality | Description |
|---|---|---|---|---|---|
| FK_TBLDATASETPLOT | Identifying | TBLDATASETMASTER | TBLDATASETPLOT | Zero Or More | |
| FK_DATASET_FORMATMASTER | Identifying | TBLDATASETMASTER | TBLDATAFORMATSMASTER | Zero Or More | |
| FK_LOCS_DATASET | Non Identifying | TBLDATASETMASTER | TLKPMONITORINGLOCATIONS | Zero Or More | |

Table A-29.

TBLDATASETMASTER Indexes:

| Index name | Index columns | Type | Sort order |
|---|---|---|---|
| PK_TBLDATASETMASTER | DATASETID | UNIQUE | ASC |

Table A-30.

TBLDATASETMASTER Constraints:

| Constraint name | Type | Level | Constraint |
|---|---|---|---|
| | Column Constraint | Not Null | DATASETID |
| PK_TBLDATASETMASTER | Table Constraint | Primary Key | PRIMARY KEY (DATASETID) |
| SYS_C007938 | Table Constraint | Check | "DATASETID" IS NOT NULL |

### *Entity: TBLOUTPUTPRODUCTS*

Table A-31.

TBLOUTPUTPRODUCTS Entity details:

| Description | The list of available output products and options. |
|---|---|
| Primary key constraint name | PK_TBLOUTPUTPRODUCTS |

Table A-32.

TBLOUTPUTPRODUCTS Attributes:

| Key | Attribute name | Data type | Not null | Description |
|---|---|---|---|---|
| PK | PRODUCTID | NUMBER | Yes | Sequential number. |
| | PRODUCTNAME | VARCHAR2 | No | Product name. |
| | PRODUCTDESC | VARCHAR2 | No | Product description. |
| | PRODUCTOBJECT | VARCHAR2 | No | Which report or export object is used? |
| | PRINT | NUMBER | No | Print option. See tlkpoptiondesc. |
| | FILES | NUMBER | No | Make file option. See tlkpoptiondesc. |
| | PREVIEW | NUMBER | No | Preview option. See tlkpoptiondesc. |
| | ALLLOCS | NUMBER | No | All selected locations in one file? See tlkpoptiondesc. |
| | PARAMETERBREAK | NUMBER | No | One product per parameter? |
| | EM | NUMBER | No | Emissions product? 1=Yes |
| | PARAMETERSELECT | NUMBER | No | Allow selection of parameters? 1=Yes |
| | STATUS | NUMBER | No | Availability status. -1 means not available. |
| | DATATABLE | VARCHAR2 | No | Which data table to pull data from? |
| | FILT | VARCHAR2 | No | Apply data filter. Added to where clause. |

Table A-33.

TBLOUTPUTPRODUCTS Indexes:

| Index name | Index columns | Type | Sort order |
|---|---|---|---|
| PK_TBLOUTPUTPRODUCTS | PRODUCTID | UNIQUE | ASC |

Table A-34.

TBLOUTPUTPRODUCTS Constraints:

| Constraint name | Type | Level | Constraint |
|---|---|---|---|
| | Column Constraint | Not Null | PRODUCTID |
| PK_TBLOUTPUTPRODUCTS | Table Constraint | Primary Key | PRIMARY KEY (PRODUCTID) |
| SYS_C007945 | Table Constraint | Check | "PRODUCTID" IS NOT NULL |

### *Entity: TBLPLATFORM*

Table A-35.

TBLPLATFORM Entity details:

| | |
|---|---|
| Description | Contains Platform Emissions Inventory data. |
| Primary key constraint name | PK_TBLPLATFORM |

Table A-36.

TBLPLATFORM Attributes:

| Key | Attribute name | Data type | Not null | Description |
|---|---|---|---|---|
| PK | YR | NUMBER | Yes | Emissions inventory year. |
| PK | COMPLEX_ID_NUM | VARCHAR2 | Yes | Location ID |
| PK | STRUCTURE_NUMBER | VARCHAR2 | Yes | Location information. |
| PK,FK | EQUIP_TYPE | VARCHAR2 | Yes | Equipment type. |
| PK,FK | POLLUTANT | VARCHAR2 | Yes | Pollutant. |
| | TONS_YR_EMISSIONS | NUMBER | No | Annual emissions in tons. |
| | COMPANY_NAME | VARCHAR2 | No | Reporting company name. |
| FK | AREA_CODE | VARCHAR2 | Yes | Location information. |
| | BLOCK | VARCHAR2 | No | Location information. |
| | BLOCKS_ID | VARCHAR2 | No | Location information. |
| | BLOCK_LAB | VARCHAR2 | No | Location information. |
| | AC_LAB | VARCHAR2 | No | Location information. |
| | XLONGITUDE | NUMBER | No | Location information. |
| | YLATITUDE | NUMBER | No | Location information. |

Table A-37.

TBLPLATFORM Relationships:

| Relationship name | Type | Parent | Child | Cardinality | Description |
|---|---|---|---|---|---|
| FK_EQUIP_TYPE | Identifying | TLKPEQUIPTYPES | TBLPLATFORM | Zero Or More | |
| FK_AREA_CODE2 | Non Identifying | TLKPAREACODES | TBLPLATFORM | Zero Or More | |
| TLKPPOLLUTANTS_TBLPLATFORM | Identifying | TLKPPOLLUTANTS | TBLPLATFORM | Zero Or More | |

Table A-38.

TBLPLATFORM Indexes:

| Index name | Index columns | Type | Sort order |
|---|---|---|---|
| PK_TBLPLATFORM | COMPLEX_ID_NUM, STRUCTURE_NUMBER, EQUIP_TYPE, POLLUTANT, YR | UNIQUE | ASC |

Table A-39.

TBLPLATFORM Constraints:

| Constraint name | Type | Level | Constraint |
|---|---|---|---|
| | Column Constraint | Not Null | YR |
| | Column Constraint | Not Null | COMPLEX_ID_NUM |
| | Column Constraint | Not Null | STRUCTURE_NUMBER |
| | Column Constraint | Not Null | EQUIP_TYPE |
| | Column Constraint | Not Null | POLLUTANT |
| | Column Constraint | Not Null | AREA_CODE |
| FK_EQUIP_TYPE | Table Constraint | Foreign Key | FOREIGN KEY (EQUIP_TYPE) REFERENCES TLKPEQUIPTYPES(EQUIP_TYPE) |
| FK_AREA_CODE2 | Table Constraint | Foreign Key | FOREIGN KEY (AREA_CODE) REFERENCES TLKPAREACODES(AREA_CODE) |
| TLKPPOLLUTANTS_TBLPLATFORM | Table Constraint | Foreign Key | FOREIGN KEY (POLLUTANT) REFERENCES TLKPPOLLUTANTS(POLLUTANT) |
| PK_TBLPLATFORM | Table Constraint | Primary Key | PRIMARY KEY (YR, COMPLEX_ID_NUM, STRUCTURE_NUMBER, EQUIP_TYPE, POLLUTANT) |
| SYS_C007946 | Table Constraint | Check | "COMPLEX_ID_NUM" IS NOT NULL |
| SYS_C007947 | Table Constraint | Check | "STRUCTURE_NUMBER" IS NOT NULL |
| SYS_C007948 | Table Constraint | Check | "EQUIP_TYPE" IS NOT NULL |
| SYS_C007949 | Table Constraint | Check | "POLLUTANT" IS NOT NULL |
| SYS_C0010803 | Table Constraint | Check | "YR" IS NOT NULL |

### *Entity: TLKPAREACODES*

Table A-40.

TLKPAREACODES Entity details:

| | |
|---|---|
| Description | A lookup table for Area Codes in the emissions inventory tables (TBLNONPLATFORM and TBLPLATFORM). |
| Primary key constraint name | PK_TLKPAREACODES |

Table A-41.

TLKPAREACODES Attributes:

| Key | Attribute name | Data type | Not null | Description |
|---|---|---|---|---|
| PK | AREA_CODE | VARCHAR2 | Yes | The code. |
| | DESCRIPTION | VARCHAR2 | No | The description. |

Table A-42.

TLKPAREACODES Relationships:

| Relationship name | Type | Parent | Child | Cardinality | Description |
|---|---|---|---|---|---|
| FK_AREA_CODE | Non Identifying | TLKPAREACODES | TBLNONPLATFORM | Zero Or More | |
| FK_AREA_CODE2 | Non Identifying | TLKPAREACODES | TBLPLATFORM | Zero Or More | |

Table A-43.

TLKPAREACODES Indexes:

| Index name | Index columns | Type | Sort order |
|---|---|---|---|
| PK_TLKPAREACODES | AREA_CODE | UNIQUE | ASC |

Table A-44.

TLKPAREACODES Constraints:

| Constraint name | Type | Level | Constraint |
|---|---|---|---|
| | Column Constraint | Not Null | AREA_CODE |
| PK_TLKPAREACODES | Table Constraint | Primary Key | PRIMARY KEY (AREA_CODE) |
| SYS_C007955 | Table Constraint | Check | "AREA_CODE" IS NOT NULL |

### *Entity: TLKPEQUIPTYPES*

Table A-45.

TLKPEQUIPTYPES Entity details:

| | |
|---|---|
| Description | A lookup table of Equipment Type Codes found in the Platform emissions inventory data (TBLPLATFORM). |
| Primary key constraint name | PK_TLKPEQUIPTYPES |

Table A-46.

TLKPEQUIPTYPES Attributes:

| Key | Attribute name | Data type | Not null | Description |
|---|---|---|---|---|
| PK | EQUIP_TYPE | VARCHAR2 | Yes | The code. |
| | DESCRIPTION | VARCHAR2 | No | The description. |

Table A-47.

TLKPEQUIPTYPES Relationships:

| Relationship name | Type | Parent | Child | Cardinality | Description |
|---|---|---|---|---|---|
| FK_EQUIP_TYPE | Identifying | TLKPEQUIPTYPES | TBLPLATFORM | Zero Or More | |

Table A-48.

TLKPEQUIPTYPES Indexes:

| Index name | Index columns | Type | Sort order |
|---|---|---|---|
| PK_TLKPEQUIPTYPES | EQUIP_TYPE | UNIQUE | ASC |

Table A-49.

TLKPEQUIPTYPES Constraints:

| Constraint name | Type | Level | Constraint |
|---|---|---|---|
| | Column Constraint | Not Null | EQUIP_TYPE |
| PK_TLKPEQUIPTYPES | Table Constraint | Primary Key | PRIMARY KEY (EQUIP_TYPE) |
| SYS_C007956 | Table Constraint | Check | "EQUIP_TYPE" IS NOT NULL |

### *Entity: TLKPMONITORINGLOCATIONS*

Table A-50.

TLKPMONITORINGLOCATIONS Entity details:

| | |
|---|---|
| Description | A lookup table of Monitoring Location information used by the monitoring data tables (TBLDATA and TBLUPPERAIR). |
| Primary key constraint name | PK_TLKPMONITORINGLOCATIONS |

Table A-51.

TLKPMONITORINGLOCATIONS Attributes:

| Key | Attribute name | Data type | Not null | Description |
|---|---|---|---|---|
| PK | LOCATIONID | NUMBER | Yes | The system assigned locationid. |
| FK | DATASETID | VARCHAR2 | Yes | The originating source of data for this location. |
| | DATASETABBR | VARCHAR2 | No | The identifier used within the originating data source for this location. |

| Key | Attribute name | Data type | Not null | Description |
|---|---|---|---|---|
| | LOCATIONDESC | VARCHAR2 | No | The location's description as provided by the originating data source. |
| | LATITUDE | NUMBER | No | The location's latitude as provided by the originating data source. |
| | LONGITUDE | NUMBER | No | The location's longitude as provided by the originating data source. |
| | ELEVATION | NUMBER | No | The location's elevation as provided by the originating data source. |
| | OTHERABBR | VARCHAR2 | No | Other abbreviations or identifiers that have been used to identify this location. |
| | STARTDATE | DATE | No | Occasionally the same identifier (DataSetAbbr) is used to identify different physical locations at different points in time. In these cases, this field indicates the effective start date. |
| | ENDDATE | DATE | No | Occasionally the same identifier (DataSetAbbr) is used to identify different physical locations at different points in time. In these cases, this field indicates the effective end date. |
| | COMMENTS | VARCHAR2 | No | Comments regarding the location information. |
| | STATE | VARCHAR2 | No | The location's two character USA state abbreviation. If blank, the location is in the Gulf. |
| | TIMEZONE | VARCHAR2 | No | The location's timezone as determined by the provided coordinates and timezone maps. |

Table A-52.

TLKPMONITORINGLOCATIONS Relationships:

| Relationship name | Type | Parent | Child | Cardinality | Description |
|---|---|---|---|---|---|
| FK_UA_LOCID | Identifying | TLKPMONITORINGLOCATIONS | TBLUPPERAIR | Zero Or More | |
| FK_LOCATIONID | Identifying | TLKPMONITORINGLOCATIONS | TBLDATA | Zero Or More | |
| FK_LOCS_DATASET | Non Identifying | TBLDATASETMASTER | TLKPMONITORINGLOCATIONS | Zero Or More | |

Table A-53.

TLKPMONITORINGLOCATIONS Indexes:

| Index name | Index columns | Type | Sort order |
|---|---|---|---|
| UK_DATASET_ABBR | DATASETID, DATASETABBR, STARTDATE | UNIQUE | ASC |
| PK_TLKPMONITORINGLOCATIONS | LOCATIONID | UNIQUE | ASC |
| TLKPMONITORINGL_IDX$$_3F8C0001 | DATASETABBR, DATASETID, LOCATIONID, STATE, LOCATIONDESC, LATITUDE, LONGITUDE, ELEVATION, OTHERABBR | | ASC |

Table A-54.

TLKPMONITORINGLOCATIONS Constraints:

| Constraint name | Type | Level | Constraint |
|---|---|---|---|
| | Column Constraint | Not Null | LOCATIONID |
| | Column Constraint | Not Null | DATASETID |
| FK_LOCS_DATASET | Table Constraint | Foreign Key | FOREIGN KEY (DATASETID) REFERENCES TBLDATASETMASTER(DATASETID) |
| PK_TLKPMONITORINGLOCATIONS | Table Constraint | Primary Key | PRIMARY KEY (LOCATIONID) |
| SYS_C007958 | Table Constraint | Check | "LOCATIONID" IS NOT NULL |
| UK_DATASET_ABBR | Table Constraint | Unique | UNIQUE (DATASETID, DATASETABBR, STARTDATE) |

### *Entity: TLKPPARAMETERS*

Table A-55.

TLKPPARAMETERS Entity details:

| | |
|---|---|
| Description | Lookup table for monitoring parameters information. |
| Primary key constraint name | PK_TLKPPARAMETERS |

Table A-56.

TLKPPARAMETERS Attributes:

| Key | Attribute name | Data type | Not null | Description |
|---|---|---|---|---|
| PK | PARAMETERID | VARCHAR2 | Yes | Parameter identifier |
| | PARAMETERDESC | VARCHAR2 | No | Description |
| | PARAMETERTYPE | VARCHAR2 | No | Parameter type (met, gaseous, etc.) |
| | STANDARDUNITID | VARCHAR2 | No | Standard unit of measurement |
| | STANDARDPRECISION | NUMBER | No | Standard decimal precision |
| | AQSPARAMETERCODE | NUMBER | No | AQS Parameter code (needed for loading AQS data and for reference) |
| | COMMENTS | VARCHAR2 | No | Comments |
| FK | UNITID | VARCHAR2 | No | |

Table A-57.

TLKPPARAMETERS Relationships:

| Relationship name | Type | Parent | Child | Cardinality | Description |
|---|---|---|---|---|---|
| FK_PARPLOTS | Identifying | TLKPPARAMETERS | TBLDATASETPLOTPARS | Zero Or More | |
| FK_PARAMETERID | Identifying | TLKPPARAMETERS | TBLDATA | Zero Or More | |
| FK_UA_PARID | Identifying | TLKPPARAMETERS | TBLUPPERAIR | Zero Or More | |
| FK_PARS_UNIT | Non Identifying | TLKPUNITS | TLKPPARAMETERS | Zero Or More | |

Table A-58.

TLKPPARAMETERS Indexes:

| Index name | Index columns | Type | Sort order |
|---|---|---|---|
| IDX_DATAPARS | PARAMETERID, PARAMETERDESC, PARAMETERTYPE, STANDARDUNITID, STANDARDPRECISION, AQSPARAMETERCODE, COMMENTS | | ASC |
| PK_TLKPPARAMETERS | PARAMETERID | UNIQUE | ASC |

Table A-59.

TLKPPARAMETERS Constraints:

| Constraint name | Type | Level | Constraint |
|---|---|---|---|
| | Column Constraint | Not Null | PARAMETERID |
| FK_PARS_UNIT | Table Constraint | Foreign Key | FOREIGN KEY (UNITID) REFERENCES TLKPUNITS(UNITID) |
| PK_TLKPPARAMETERS | Table Constraint | Primary Key | PRIMARY KEY (PARAMETERID) |
| SYS_C007960 | Table Constraint | Check | "PARAMETERID" IS NOT NULL |

### *Entity: TLKPPOLLUTANTS*

Table A-60.

TLKPPOLLUTANTS Entity details:

| | |
|---|---|
| Description | Lookup table for emissions inventory pollutants. |
| Primary key constraint name | PK_TLKPPOLLUTANTS |

Table A-61.

TLKPPOLLUTANTS Attributes:

| Key | Attribute name | Data type | Not null | Description |
|---|---|---|---|---|
| PK | POLLUTANT | VARCHAR2 | Yes | Pollutant identifier |
| | DESCRIPTION | VARCHAR2 | No | Description |

Table A-62.

TLKPPOLLUTANTS Relationships:

| Relationship name | Type | Parent | Child | Cardinality | Description |
|---|---|---|---|---|---|
| TLKPPOLLUTANTS_TBLPLATFORM | Identifying | TLKPPOLLUTANTS | TBLPLATFORM | Zero Or More | |
| TLKPPOLLUTANTS_TBLNONPLATFORM | Identifying | TLKPPOLLUTANTS | TBLNONPLATFORM | Zero Or More | |

Table A-63.

TLKPPOLLUTANTS Indexes:

| Index name | Index columns | Type | Sort order |
|---|---|---|---|
| PK_TLKPPOLLUTANTS | POLLUTANT | UNIQUE | ASC |

Table A-64.

TLKPPOLLUTANTS Constraints:

| Constraint name | Type | Level | Constraint |
|---|---|---|---|
| | Column Constraint | Not Null | POLLUTANT |
| PK_TLKPPOLLUTANTS | Table Constraint | Primary Key | PRIMARY KEY (POLLUTANT) |
| SYS_C007961 | Table Constraint | Check | "POLLUTANT" IS NOT NULL |

### *Entity: TLKPSCC*

Table A-65.

TLKPSCC Entity details:

| Description | Lookup table for Source Classification Codes |
|---|---|
| Primary key constraint name | PK_TLKPSCC |

Table A-66.

TLKPSCC Attributes:

| Key | Attribute name | Data type | Not null | Description |
|---|---|---|---|---|
| PK | SCC | VARCHAR2 | Yes | Source Classification Code |
| | SCC_NAME | VARCHAR2 | No | Name |

Table A-67.

TLKPSCC Relationships:

| Relationship name | Type | Parent | Child | Cardinality | Description |
|---|---|---|---|---|---|
| FK_SCC | Identifying | TLKPSCC | TBLNONPLATFORM | Zero Or More | |

Table A-68.

TLKPSCC Indexes:

| Index name | Index columns | Type | Sort order |
|---|---|---|---|
| PK_TLKPSCC | SCC | UNIQUE | ASC |

Table A-69.

TLKPSCC Constraints:

| Constraint name | Type | Level | Constraint |
|---|---|---|---|
| | Column Constraint | Not Null | SCC |
| PK_TLKPSCC | Table Constraint | Primary Key | PRIMARY KEY (SCC) |
| SYS_C007962 | Table Constraint | Check | "SCC" IS NOT NULL |

### *Entity: TLKPUNITS*

Table A-70.

TLKPUNITS Entity details:

| Description | |
|---|---|
| Primary key constraint name | PK_TLKPUNITS |

Table A-71.

TLKPUNITS Attributes:

| Key | Attribute name | Data type | Not null | Description |
|---|---|---|---|---|
| PK | UNITID | VARCHAR2 | Yes | |
| | UNITDESC | VARCHAR2 | No | |
| | AQSUNITCODE | NUMBER | No | |

Table A-72.

TLKPUNITS Relationships:

| Relationship name | Type | Parent | Child | Cardinality | Description |
|---|---|---|---|---|---|
| FK_CONV_TOUNIT | Identifying | TLKPUNITS | TBLCONVFORMULAS | Zero Or More | |
| FK_CONV_FROMUNIT | Identifying | TLKPUNITS | TBLCONVFORMULAS | Zero Or More | |
| FK_PARS_UNIT | Non Identifying | TLKPUNITS | TLKPPARAMETERS | Zero Or More | |

Table A-73.

TLKPUNITS Indexes:

| Index name | Index columns | Type | Sort order |
|---|---|---|---|
| PK_TLKPUNITS | UNITID | UNIQUE | ASC |

Table A-74.

TLKPUNITS Constraints:

| Constraint name | Type | Level | Constraint |
|---|---|---|---|
| | Column Constraint | Not Null | UNITID |
| PK_TLKPUNITS | Table Constraint | Primary Key | PRIMARY KEY (UNITID) |
| SYS_C007963 | Table Constraint | Check | "UNITID" IS NOT NULL |

### *Entity: TBLDATASETPLOTPARS*

Table A-75.

TBLDATASETPLOTPARS Entity details:

| Description | Multi Time Plots - Detail configuration. |
|---|---|
| Primary key constraint name | PK_TBLDATASETPLOTPARS |

Table A-76.

TBLDATASETPLOTPARS Attributes:

| Key | Attribute name | Data type | Not null | Description |
|---|---|---|---|---|
| PK,FK | DATASETID | VARCHAR2 | Yes | The Data Set Id. |
| PK,FK | PARAMETERID | VARCHAR2 | Yes | The Parameter Id. |
| FK | PLOTNO | NUMBER | No | The Plot no. |

Table A-77.

TBLDATASETPLOTPARS Relationships:

| Relationship name | Type | Parent | Child | Cardinality | Description |
|---|---|---|---|---|---|
| FK_PARPLOTS | Identifying | TLKPPARAMETERS | TBLDATASETPLOTPARS | Zero Or More | |
| FK_DATASETPLOTS | Non Identifying | TBLDATASETPLOT | TBLDATASETPLOTPARS | Zero Or More | |

Table A-78.

TBLDATASETPLOTPARS Indexes:

| Index name | Index columns | Type | Sort order |
|---|---|---|---|
| PK_TBLDATASETPLOTPARS | DATASETID, PARAMETERID | UNIQUE | ASC |

Table A-79.

TBLDATASETPLOTPARS Constraints:

| Constraint name | Type | Level | Constraint |
|---|---|---|---|
| | Column Constraint | Not Null | DATASETID |
| | Column Constraint | Not Null | PARAMETERID |
| FK_PARPLOTS | Table Constraint | Foreign Key | FOREIGN KEY (PARAMETERID) REFERENCES TLKPPARAMETERS(PARAMETERID) |
| FK_DATASETPLOTS | Table Constraint | Foreign Key | FOREIGN KEY (DATASETID,PLOTNO) REFERENCES TBLDATASETPLOT(DATASETID,PLOTNO) |
| PK_TBLDATASETPLOTPARS | Table Constraint | Primary Key | PRIMARY KEY (DATASETID, PARAMETERID) |
| SYS_C007973 | Table Constraint | Check | "DATASETID" IS NOT NULL |
| SYS_C007974 | Table Constraint | Check | "PARAMETERID" IS NOT NULL |

### *Entity: TBLDATASETPLOT*

Table A-80.

TBLDATASETPLOT Entity details:

| | |
|---|---|
| Description | Defines Multi Time Line Plots - Master Configuration. |
| Primary key constraint name | PK_TBLDATASETPLOT |

Table A-81.

TBLDATASETPLOT Attributes:

| Key | Attribute name | Data type | Not null | Description |
|---|---|---|---|---|
| PK,FK | DATASETID | VARCHAR2 | Yes | The data set id. |
| PK | PLOTNO | NUMBER | Yes | Sequential number for multiple plot configurations. |
| | PLOTDESC | VARCHAR2 | No | Plot description. |
| | PLOTNAME | VARCHAR2 | No | Plot name. |

Table A-82.

TBLDATASETPLOT Relationships:

| Relationship name | Type | Parent | Child | Cardinality | Description |
|---|---|---|---|---|---|
| FK_DATASETPLOTS | Non Identifying | TBLDATASETPLOT | TBLDATASETPLOTPARS | Zero Or More | |
| FK_TBLDATASETPLOT | Identifying | TBLDATASETMASTER | TBLDATASETPLOT | Zero Or More | |

Table A-83.

TBLDATASETPLOT Indexes:

| Index name | Index columns | Type | Sort order |
|---|---|---|---|
| PK_TBLDATASETPLOT | DATASETID, PLOTNO | UNIQUE | ASC |
| UK_PLOTNAME | PLOTNAME | UNIQUE | ASC |

Table A-84.

TBLDATASETPLOT Constraints:

| Constraint name | Type | Level | Constraint |
|---|---|---|---|
| | Column Constraint | Not Null | DATASETID |
| | Column Constraint | Not Null | PLOTNO |
| FK_TBLDATASETPLOT | Table Constraint | Foreign Key | FOREIGN KEY (DATASETID) REFERENCES TBLDATASETMASTER(DATASETID) |
| PK_TBLDATASETPLOT | Table Constraint | Primary Key | PRIMARY KEY (DATASETID, PLOTNO) |
| SYS_C007975 | Table Constraint | Check | "DATASETID" IS NOT NULL |
| SYS_C007976 | Table Constraint | Check | "PLOTNO" IS NOT NULL |
| UK_PLOTNAME | Table Constraint | Unique | UNIQUE (PLOTNAME) |

### *Entity: TBLMAPS*

Table A-85.

TBLMAPS Entity details:

| | |
|---|---|
| Description | Stores Monitoring Locations Maps. |
| Primary key constraint name | PK_TBLMAPS |

Table A-86.

TBLMAPS Attributes:

| Key | Attribute name | Data type | Not null | Description |
|---|---|---|---|---|
| PK | MAPID | NUMBER | Yes | Sequential number |
| | MAPNAME | VARCHAR2 | No | The map name. |
| | MAPDESC | VARCHAR2 | No | The map decription. |
| | DISPLAYORDER | NUMBER | No | Order of display. |
| | MAPPICTURE | BLOB | No | Stores the image. |

Table A-87.

TBLMAPS Indexes:

| Index name | Index columns | Type | Sort order |
|---|---|---|---|
| PK_TBLMAPS | MAPID | UNIQUE | ASC |

Table A-88.

TBLMAPS Constraints:

| Constraint name | Type | Level | Constraint |
|---|---|---|---|
| | Column Constraint | Not Null | MAPID |
| PK_TBLMAPS | Table Constraint | Primary Key | PRIMARY KEY (MAPID) |
| SYS_C007977 | Table Constraint | Check | "MAPID" IS NOT NULL |

### *Entity: TBLEMMAPS*

Table A-89.

TBLEMMAPS Entity details:

| Description | Stores Emissions Maps. |
|---|---|
| Primary key constraint name | PK_TBLEMMAPS |

Table A-90.

TBLEMMAPS Attributes:

| Key | Attribute name | Data type | Not null | Description |
|---|---|---|---|---|
| PK | MAPID | NUMBER | Yes | The MapID |
| | MAPNAME | VARCHAR2 | No | The Map Name. |
| | MAPDESC | VARCHAR2 | No | The Map description. |
| | DISPLAYORDER | NUMBER | No | Order of display. |
| | MAPPICTURE | BLOB | No | Stores the images. |
| | MAPTYPE | VARCHAR2 | No | Type for drop-down filter. |

Table A-91.

TBLEMMAPS Indexes:

| Index name | Index columns | Type | Sort order |
|---|---|---|---|
| PK_TBLEMMAPS | MAPID | UNIQUE | ASC |

Table A-92.

TBLEMMAPS Constraints:

| Constraint name | Type | Level | Constraint |
|---|---|---|---|
| | Column Constraint | Not Null | MAPID |
| PK_TBLEMMAPS | Table Constraint | Primary Key | PRIMARY KEY (MAPID) |
| SYS_C007978 | Table Constraint | Check | "MAPID" IS NOT NULL |

### *Entity: TBLDATA*

Table A-93.

TBLDATA Entity details:

| Description | Contains the monitoring data (non upper-air). |
|---|---|
| Primary key constraint name | PK_TBLDATA_1 |

Table A-94.

TBLDATA Attributes:

| Key | Attribute name | Data type | Not null | Description |
|---|---|---|---|---|
| PK,FK | LOCATIONID | NUMBER | Yes | Where monitoring took place. |
| PK,FK | PARAMETERID | VARCHAR2 | Yes | The monitored parameter. |
| PK | RECORDDATE | DATE | Yes | The date and time of the value or averaged value (time beginning) |
| | ORIGVALUE | NUMBER | No | The original value in the source file (prior to conversion or substitution). For reference only. |
| | DATAVALUE | NUMBER | No | The data value after conversion or substitution. This is the value used in all output products. |
| | QACODE | VARCHAR2 | No | When available, the QA code from the source file. |
| | HEIGHT_M | NUMBER | No | If available, the height in meters of the monitoring instrument. |

Table A-95.

TBLDATA Relationships:

| Relationship name | Type | Parent | Child | Cardinality | Description |
|---|---|---|---|---|---|
| FK_PARAMETERID | Identifying | TLKPPARAMETERS | TBLDATA | Zero Or More | |
| FK_LOCATIONID | Identifying | TLKPMONITORINGLOCATIONS | TBLDATA | Zero Or More | |

Table A-96.

TBLDATA Indexes:

| Index name | Index columns | Type | Sort order |
|---|---|---|---|
| PK_TBLDATA_1 | LOCATIONID, PARAMETERID, RECORDDATE | UNIQUE | ASC |
| IDX_RECORDDATE | RECORDDATE | | ASC |

Table A-97.

TBLDATA Constraints:

| Constraint name | Type | Level | Constraint |
|---|---|---|---|
| | Column Constraint | Not Null | LOCATIONID |
| | Column Constraint | Not Null | PARAMETERID |
| | Column Constraint | Not Null | RECORDDATE |
| FK_PARAMETERID | Table Constraint | Foreign Key | FOREIGN KEY (PARAMETERID) REFERENCES TLKPPARAMETERS(PARAMETERID) |
| FK_LOCATIONID | Table Constraint | Foreign Key | FOREIGN KEY (LOCATIONID) REFERENCES TLKPMONITORINGLOCATIONS(LOCATIONID) |
| PK_TBLDATA_1 | Table Constraint | Primary Key | PRIMARY KEY (LOCATIONID, PARAMETERID, RECORDDATE) |
| SYS_C007759 | Table Constraint | Check | "LOCATIONID" IS NOT NULL |
| SYS_C007760 | Table Constraint | Check | "PARAMETERID" IS NOT NULL |
| SYS_C007761 | Table Constraint | Check | "RECORDDATE" IS NOT NULL |

### *Entity: TBLUPPERAIR*

Table A-98.

TBLUPPERAIR Entity details:

| Description | Contains upper air monitoring data. |
|---|---|
| Primary key constraint name | PK_TBLDATA_ABL |

Table A-99.

TBLUPPERAIR Attributes:

| Key | Attribute name | Data type | Not null | Description |
|---|---|---|---|---|
| PK,FK | LOCATIONID | NUMBER | Yes | Where the monitoring took place. |
| PK,FK | PARAMETERID | VARCHAR2 | Yes | The monitored parameterid. |
| PK | RECORDDATE | DATE | Yes | The date and time monitoring occurred (time beginning). |
| PK | HEIGHT_M | NUMBER | Yes | The height in meters of the instrument when the reading occurred. |
| | ORIGVALUE | NUMBER | No | The original value from the source data file prior to conversion or substitution. |
| | DATAVALUE | NUMBER | No | The data value after conversion to standard units or missing value substitution. |
| | QACODE | VARCHAR2 | No | The QA Code if available from the source file. Contains TC if corrected RASS temperature replaced Temp. |
| | CLASSID | NUMBER | No | The classid from the ABL_BAMP study. |
| | QCLEVEL | NUMBER | No | The QCLevel from the ABL_BAMP study. |

Table A-100.

TBLUPPERAIR Relationships:

| Relationship name | Type | Parent | Child | Cardinality | Description |
|---|---|---|---|---|---|
| FK_UA_LOCID | Identifying | TLKPMONITORINGLOCATIONS | TBLUPPERAIR | Zero Or More | |
| FK_UA_PARID | Identifying | TLKPPARAMETERS | TBLUPPERAIR | Zero Or More | |

Table A-101.

TBLUPPERAIR Indexes:

| Index name | Index columns | Type | Sort order |
|---|---|---|---|
| PK_TBLDATA_ABL | LOCATIONID, PARAMETERID, RECORDDATE, HEIGHT_M | UNIQUE | ASC |

Table A-102.

TBLUPPERAIR Constraints:

| Constraint name | Type | Level | Constraint |
|---|---|---|---|
| | Column Constraint | Not Null | LOCATIONID |
| | Column Constraint | Not Null | PARAMETERID |
| | Column Constraint | Not Null | RECORDDATE |
| | Column Constraint | Not Null | HEIGHT_M |
| FK_UA_LOCID | Table Constraint | Foreign Key | FOREIGN KEY (LOCATIONID) REFERENCES TLKPMONITORINGLOCATIONS(LOCATIONID) |
| FK_UA_PARID | Table Constraint | Foreign Key | FOREIGN KEY (PARAMETERID) REFERENCES TLKPPARAMETERS(PARAMETERID) |
| PK_TBLDATA_ABL | Table Constraint | Primary Key | PRIMARY KEY (LOCATIONID, PARAMETERID, RECORDDATE, HEIGHT_M) |
| SYS_C0010272 | Table Constraint | Check | "LOCATIONID" IS NOT NULL |
| SYS_C0010273 | Table Constraint | Check | "PARAMETERID" IS NOT NULL |
| SYS_C0010274 | Table Constraint | Check | "RECORDDATE" IS NOT NULL |
| SYS_C0010275 | Table Constraint | Check | "HEIGHT_M" IS NOT NULL |

# APPENDIX B: MICROSOFT ACCESS OBJECTS

The Microsoft objects used in the GMAQDB interface are listed and described in the tables of this Appendix. Table B-1 lists queries. Each query is of one the following types:

- Form – the query is the data source of a form.
- Static – the query is a static query used for reporting. The SQL does not change and is as provided in the SQL/Example SQL column.
- Dynamic – the query is a dynamic query used for reporting. The SQL changes, and example of which is provided in the SQL/Example SQL column.

Table B-2 lists forms and subforms used, Table B-3 lists report objects, and Table B-4 provides a list of code modules.

Table B-1.

Dynamic and Static Query Objects used in the GMAQDB Application.

| Name | Type | Control | Description | SQL / Example SQL |
|---|---|---|---|---|
| frmDataSets | Form | frmDataFormatsMaster | | PARAMETERS __DataSetID Value; SELECT DISTINCTROW * FROM tblDataFormatsMaster AS frmDataSets WHERE ([__DataSetID] = DataSetID); |
| frmDataSetsMain | Form | frmDataFormatsMasterEntry | | SELECT * FROM tblDataFormatsMaster WHERE tblDataFormatsMaster.STANDARD='YES'; |
| frmDataSetsMain | Form | frmDataSets | | SELECT DISTINCTROW * FROM tblDataSetMaster; |
| frmDataSetsMain | Form | frmMonitoringLocationsEntry | | SELECT DISTINCTROW * FROM TLKPMONITORINGLOCATIONS; |
| frmDataSetsMain | Form | frmParametersEntry | | SELECT DISTINCTROW * FROM TLKPPARAMETERS; |
| frmLoadData | Form | cboDataFormat | | SELECT tblDataFormatsMaster.DATASETID, tblDataFormatsMaster.DATAFORMATID, tblDataFormatsMaster.DATAFORMATDESC, tblDataFormatsMaster.FILEEXTENSION, tblDataFormatsMaster.STANDARD FROM tblDataFormatsMaster WHERE (((tblDataFormatsMaster.STANDARD)='YES')) ORDER BY tblDataFormatsMaster.DATAFORMATDESC; |
| frmLocationsByDataSet | Form | cboDataSet | | SELECT tblDataSetMaster.DATASETID, tblDataSetMaster.DATASETDESC FROM tblDataSetMaster WHERE ((InStr([datasetid],"Emissions")="0")) ORDER BY tblDataSetMaster.DATASETID; |
| qryCrosstab | Static | - | | TRANSFORM Min(qrySelectTblData.DataValue) AS Data_Value SELECT qrySelectTblData.DataSetID, qrySelectTblData.DataSetAbbr, qrySelectTblData.RecordDate FROM qrySelectTblData GROUP BY qrySelectTblData.DataSetID, qrySelectTblData.DataSetAbbr, qrySelectTblData.RecordDate PIVOT qrySelectTblData.ParameterID; |
| qryDataCollectionStatistics | Static | - | Used by qryPercentValid for rptDataAvailabilty. | SELECT qrySelectTblData.LocationID, qrySelectTblData.ParameterDesc, qrySelectTblData.ParameterID, Count(qrySelectTblData.DataValue) AS [#Obs], Sum(Switch(qrySelectTblData.DataValue<>-999,1)) AS [#Valid], qryMinMaxDate.MinOfRecordDate, qryMinMaxDate.MaxOfRecordDate, qrySelectTblData.DataSetAbbr, qrySelectTblData.DataSetID FROM qrySelectTblData, qryMinMaxDate GROUP BY qrySelectTblData.LocationID, qrySelectTblData.ParameterDesc, qrySelectTblData.ParameterID, qryMinMaxDate.MinOfRecordDate, qryMinMaxDate.MaxOfRecordDate, qrySelectTblData.DataSetAbbr, qrySelectTblData.DataSetID; |
| qryDiurnals | Static | - | Used by rptDiurnal. | SELECT qrySelectTblData.LocationID, qrySelectTblData.ParameterID, qrySelectTblData.StandardUnitID, Format([RecordDate],"hh""00""") AS [Time], Max(qrySelectTblData.DataValue) AS Maximum, Min(qrySelectTblData.DataValue) AS Minimum, Avg(qrySelectTblData.DataValue) AS Average, qrySelectTblData.DataSetID, qrySelectTblData.DataSetAbbr, qrySelectTblData.ParameterDesc FROM qrySelectTblData WHERE (((qrySelectTblData.DataValue)<>-999)) GROUP BY qrySelectTblData.LocationID, qrySelectTblData.ParameterID, qrySelectTblData.StandardUnitID, Format([RecordDate],"hh""00"""), qrySelectTblData.DataSetID, qrySelectTblData.DataSetAbbr, qrySelectTblData.ParameterDesc; |
| qryFormatsStandard | Static | - | Used by function ReadAndInsert in module LoadData. | SELECT tblDataFormatsDetail.DATASETID, tblDataFormatsDetail.DATAFORMATID, tblDataFormatsDetail.LINENUM, tblDataFormatsDetail.COLNUM, tblDataFormatsDetail.LABEL, tblDataFormatsDetail.TABLENAME, tblDataFormatsDetail.COLUMNNAME, tblDataFormatsDetail.PARAMETERID, tblDataFormatsDetail.ORIGUNITID, tblDataFormatsDetail.HEIGHT_M, tlkpParameters.STANDARDUNITID, tblDataFormatsDetail.MISSINGVAL FROM tlkpParameters INNER JOIN tblDataFormatsDetail ON tlkpParameters.PARAMETERID=tblDataFormatsDetail.PARAMETERID; |
| qryMaptoPrint | Dynamic | - | Used by rptMap. | SELECT TBLEMMAPS.MAPPICTURE FROM TBLEMMAPS WHERE (((TBLEMMAPS.MAPID)=25)); |
| qryMetLocsPlot | Dynamic | - | | SELECT TLKPMONITORINGLOCATIONS.LOCATIONID, TLKPMONITORINGLOCATIONS.DATASETABBR AS ABBR, TLKPMONITORINGLOCATIONS.LOCATIONDESC AS Location, TLKPMONITORINGLOCATIONS.LATITUDE AS Lat, TLKPMONITORINGLOCATIONS.LONGITUDE AS Lon, TLKPMONITORINGLOCATIONS.ELEVATION AS Elev, ((Lat - 33.993611 )^2 + (Lon - 85.991111)^2) AS Proximity FROM TLKPMONITORINGLOCATIONS WHERE LOCATIONID IN (SELECT LOCATIONID FROM TBLDATA WHERE LOCATIONID IN (SELECT LOCATIONID FROM TLKPMONITORINGLOCATIONS WHERE TLKPMONITORINGLOCATIONS.LATITUDE Between 31.993611 And 34.993611 AND TLKPMONITORINGLOCATIONS.LONGITUDE Between 83.991111 And 86.991111 AND TLKPMONITORINGLOCATIONS.DATASETID='NCDC') AND TBLDATA.RECORDDATE Between #7/1/2004# And #7/31/2004#) ORDER BY ((TLKPMONITORINGLOCATIONS.LATITUDE - 33.993611)^2 + (TLKPMONITORINGLOCATIONS.LONGITUDE - 85.991111)^2); |
| qryMinMaxDate | Static | - | Used by qryDataCollectionStatistics. | SELECT Min(qrySelectTblData.RecordDate) AS MinOfRecordDate, Max(qrySelectTblData.RecordDate) AS MaxOfRecordDate FROM qrySelectTblData; |
| qryNonPlatformNamesSCC | Static | - | Used by sub FillSCC in module OutputEMForms. | SELECT DISTINCT tblNonPlatform.NONPLATFORMNAME, tblNonPlatform.SCC, tlkpScc.SCC_NAME FROM tblNonPlatform INNER JOIN tlkpScc ON tblNonPlatform.SCC=tlkpScc.SCC ORDER BY tblNonPlatform.NONPLATFORMNAME, tblNonPlatform.SCC; |
| qryPercentValid | Static | - | Used by rptDataAvailability. | SELECT qryDataCollectionStatistics.LocationID, qryDataCollectionStatistics.ParameterID + " - " + qryDataCollectionStatistics.ParameterDesc AS ParameterID, Nz(qryDataCollectionStatistics.[#Valid],0) AS [#Valid], qryDataCollectionStatistics.[#Obs] AS Available, Round(([#Valid]/[#Obs])*100,1) AS [%Valid], qryDataCollectionStatistics.DataSetAbbr, qryDataCollectionStatistics.DataSetID, qryDataCollectionStatistics.MinOfRecordDate, qryDataCollectionStatistics.MaxOfRecordDate FROM qryDataCollectionStatistics; |
| qrySelectTblData | Dynamic | - | | SELECT tblData.LocationID, tblData.ParameterID, tlkpParameters.ParameterDesc, tlkpParameters.StandardUnitID, tblData.RecordDate, tblData.OrigValue, tblData.DataValue, tblData.QACode, tblData.Height_M, tlkpMonitoringLocations.DataSetID, tlkpMonitoringLocations.DataSetAbbr, tlkpMonitoringLocations.LocationDesc, tlkpMonitoringLocations.Latitude, tlkpMonitoringLocations.Longitude, tlkpMonitoringLocations.Elevation, tlkpMonitoringLocations.OtherAbbr, tlkpMonitoringLocations.StartDate, tlkpMonitoringLocations.EndDate, tlkpMonitoringLocations.Comments, tblDataSetMaster.DataSetDesc FROM tlkpParameters INNER JOIN ((tblDataSetMaster INNER JOIN tlkpMonitoringLocations ON tblDataSetMaster.DataSetID = tlkpMonitoringLocations.DataSetID) INNER JOIN tblData ON tlkpMonitoringLocations.LocationID = tblData.LocationID) ON tlkpParameters.ParameterID = tblData.ParameterID WHERE tblData.LocationID IN (876) And ((tblData.ParameterID) IN ('CO','NO2','NOX','NOY','O3','SO2','WS','WD','T','RH','RNF','SR','PM2.5','PM10','TD','P','SLP','VR','ALT','CEIL','CLDC') AND ((tblData.RecordDate) >= #2004-07-01# And (tblData.RecordDate) < #2004-08-01#)); |
| qrySelectTblDataEM | Dynamic | - | | SELECT tblNonPlatform.* FROM tblNonPlatform WHERE Pollutant in ('SO2','SOX'); |
| qryTblDataEMComp | Static | - | Used by sub GenOutput in module OutputEM to produce the Emissions inventory comparison export file. | SELECT qryTblDataEMComp1.COMPLEX_ID_NUM, qryTblDataEMComp1.STRUCTURE_NUMBER, qryTblDataEMComp1.EQUIP_TYPE, qryTblDataEMComp1.POLLUTANT, qryTblDataEMComp1.TONS_2000, qryTblDataEMComp1.TONS_2005, TONS_2005-TONS_2000 AS DIFF, ROUND((((TONS_2005-TONS_2000)/TONS_2000)*100),0) AS PCT_DIFF FROM qryTblDataEMComp1; |
| qryTblDataEMComp1 | Static | - | Used by qryTblDataEMComp. | TRANSFORM Min(Round([qrySelectTblDataEM].[TONS_YR_EMISSIONS],7)) AS MinOfTONS_YR_EMISSIONS SELECT qrySelectTblDataEM.COMPLEX_ID_NUM, qrySelectTblDataEM.STRUCTURE_NUMBER, qrySelectTblDataEM.EQUIP_TYPE, qrySelectTblDataEM.POLLUTANT FROM qrySelectTblDataEM GROUP BY qrySelectTblDataEM.COMPLEX_ID_NUM, qrySelectTblDataEM.STRUCTURE_NUMBER, qrySelectTblDataEM.EQUIP_TYPE, qrySelectTblDataEM.POLLUTANT PIVOT "TONS_"+Format([qrySelectTblDataEM].[yr],"####") In ("TONS_2000","TONS_2005"); |

| Name | Type | Control | Description | SQL / Example SQL |
|---|---|---|---|---|
| qryTblDataEMNonComp | Static | - | Used by sub GenOutput in module OutputEM to produce the Emissions inventory comparison export file. | SELECT qryTblDataEMNonComp1.SCC, qryTblDataEMNonComp1.NONPLATFORMNAME, qryTblDataEMNonComp1.PROTRACTION, qryTblDataEMNonComp1.BLOCK, qryTblDataEMNonComp1.POLLUTANT, qryTblDataEMNonComp1.TONS_2000, qryTblDataEMNonComp1.TONS_2005, TONS_2005-TONS_2000 AS DIFF, ROUND((((TONS_2005-TONS_2000)/TONS_2000)*100),1) AS PCT_DIFF FROM qryTblDataEMNonComp1; |
| qryTblDataEMNonComp1 | Static | - | Used by qryTblDataEMNonComp. | TRANSFORM Min(qrySelectTblDataEM.TONS_YR_EMISSIONS) AS MinOfTONS_YR_EMISSIONS SELECT qrySelectTblDataEM.SCC, qrySelectTblDataEM.NONPLATFORMNAME, qrySelectTblDataEM.PROTRACTION, qrySelectTblDataEM.BLOCK, qrySelectTblDataEM.POLLUTANT FROM qrySelectTblDataEM GROUP BY qrySelectTblDataEM.SCC, qrySelectTblDataEM.NONPLATFORMNAME, qrySelectTblDataEM.PROTRACTION, qrySelectTblDataEM.BLOCK, qrySelectTblDataEM.POLLUTANT PIVOT "TONS_" & FORMAT(qrySelectTblDataEM.YR,"####") IN ("TONS_2000","TONS_2005"); |

Table B-2.

Form Objects used in the GMAQDB Interface.

| Form Name | Description | Record Source |
|---|---|---|
| frmAC | Sub-form of frmOutputEM. | |
| frmComID | Sub-form of frmOutputEM. | |
| frmDataFormatsDetail | Sub-form of frmDataFormatsMasterEntry. | tblDataFormatsDetail |
| frmDataFormatsMasterEntry | Sub-form of frmDataSetsMain. | SELECT * FROM tblDataFormatsMaster WHERE tblDataFormatsMaster.STANDARD='YES'; |
| frmDataSetFormats | Sub-form of frmDataSets. | tblDataFormatsMaster |
| frmDataSets | Sub-form of frmDataSetsMain | tblDataSetMaster |
| frmDataSetsMain | Main form opened from the Data Sets menu command. | |
| frmEMMaps | Main form opened form the Emissions Data Maps menu command. | SELECT tblEMMaps.MAPTYPE, * FROM tblEMMaps ORDER BY tblEMMaps.MAPTYPE, tblEMMaps.DISPLAYORDER; |
| frmLoadData | Main form opened from the Load Data menu command. | |
| frmLoadRecsProgress | Sub-form of frmLoadData. | |
| frmLocationsByDataSet | Sub-form of frmOutput. | |
| frmMaps | Main form opened from the Monitoring Location Maps menu command. | SELECT * FROM tblMaps ORDER BY tblMaps.DisplayOrder; |
| frmMetLocsforPlot | Dialog form opened by sub MakeQueryM in module Output to prompt user to select a met location. | |
| frmMonitoringLocationsEntry | Sub-form of frmDataSetsMain. | TLKPMONITORINGLOCATIONS |
| frmOutput | Main form opened by the Monitoring Data Products menu command. | |
| frmOutputEM | Main form opened by the Emissions Data Products menu command. | |
| frmParametersEntry | Sub-form of frmDataSetsMain. | TLKPPARAMETERS |
| frmParsLv | Sub-form of frmOutput and frmOutputEM containing the Parameters list view control. | |
| frmProdsLv | Sub-form of frmOutput and frmOutputEM containing the Output Products list view control. | |
| frmSCC | Sub-form of frmOutputEM. | |
| frmSwitchBoard | The Main Switchboard Menu. | |

Table B-3.

Report Objects used in the GMAQDB Interface.

| Name | Description | RecordSource |
|---|---|---|
| rptDataAvailability | Monitoring Output Products - Summary Report of Available Data/Percent Valid. | qryPercentValid |
| rptDiurnal | Monitoring Output Products - Diurnal plot. | SELECT DISTINCT qryDiurnals.ParameterID, qryDiurnals.DataSetID, qryDiurnals.DataSetAbbr, qryDiurnals.ParameterDesc, qryDiurnals.StandardUnitID FROM qryDiurnals; |
| rptMap | Opened by cmdPrint on frmMaps when clicked. | qryMaptoPrint |
| rptMetSummary | Monitoring Output Products - Summary report of min,max, and mean. | qrySelectTblData |
| rptTimeline | Monitoring Output Products - Timeline plot, single parameter. | SELECT DISTINCT qrySelectTblData.DataSetID, qrySelectTblData.DataSetAbbr, qrySelectTblData.ParameterDesc, qrySelectTblData.StandardUnitID FROM qrySelectTblData; |
| rptTimelineABL_BAMP | Monitoring Output Products - Multi Timeline plot for data from the ABL_BAMP data set. | SELECT DISTINCT First([DataSetID] & " - " & [DataSetAbbr]) AS FirstID, Last([DataSetID] & " - " & [DataSetAbbr]) AS LastID, Min(CDate(Format([RecordDate],"mm/dd/yyyy"))) AS [First], Max(CDate(Format([RecordDate],"mm/dd/yyyy"))) AS [last] FROM qrySelectTb |
| rptTimelineAQS | Monitoring Output Products - Multi Timeline plot for data from the AQS data set. | SELECT DISTINCT First([DataSetID] & " - " & [DataSetAbbr]) AS FirstID, Last([DataSetID] & " - " & [DataSetAbbr]) AS LastID, Min(CDate(Format([RecordDate],"mm/dd/yyyy"))) AS [First], Max(CDate(Format([RecordDate],"mm/dd/yyyy"))) AS [last] FROM qrySelectTb |
| rptTimelineAQSNCDC | Monitoring Output Products - Multi Timeline plot for data from two locations, one from the AQS data set and one from the NDCD data set. | SELECT DISTINCT First([DataSetID] & " - " & [DataSetAbbr]) AS FirstID, Last([DataSetID] & " - " & [DataSetAbbr]) AS LastID, Min(CDate(Format([RecordDate],"mm/dd/yyyy"))) AS [First], Max(CDate(Format([RecordDate],"mm/dd/yyyy"))) AS [last] FROM qrySelectTb |
| rptTimelineBuoy | Monitoring Output Products - Multi Timeline plot for data from the BUOY data set. | SELECT DISTINCT qrySelectTblData.DataSetID, qrySelectTblData.DataSetAbbr, Min(CDate(Format([RecordDate],"mm/dd/yyyy"))) AS [First], Max(CDate(Format([RecordDate],"mm/dd/yyyy"))) AS [last] FROM qrySelectTblData GROUP BY qrySelectTblData.DataSetID, qrySele |
| rptTimelineGMAQS | Monitoring Output Products - Multi Timeline plot for data from the GMAQS data set. | SELECT DISTINCT qrySelectTblData.DataSetID, qrySelectTblData.DataSetAbbr, Min(CDate(Format([RecordDate],"mm/dd/yyyy"))) AS [First], Max(CDate(Format([RecordDate],"mm/dd/yyyy"))) AS [last] FROM qrySelectTblData GROUP BY qrySelectTblData.DataSetID, qrySele |
| rptTimelineIMPROVEmass | Monitoring Output Products - Multi Timeline plot for Mass data from the IMPROVE data set. | SELECT DISTINCT qrySelectTblData.DataSetID, qrySelectTblData.DataSetAbbr, Min(CDate(Format([RecordDate],"mm/dd/yyyy"))) AS [First], Max(CDate(Format([RecordDate],"mm/dd/yyyy"))) AS [last] FROM qrySelectTblData GROUP BY qrySelectTblData.DataSetID, qrySele |
| rptTimelineIMPROVEvis | Monitoring Output Products - Multi Timeline plot for Visibility data from the IMPROVE data set. | SELECT DISTINCT qrySelectTblData.DataSetID, qrySelectTblData.DataSetAbbr, Min(CDate(Format([RecordDate],"mm/dd/yyyy"))) AS [First], Max(CDate(Format([RecordDate],"mm/dd/yyyy"))) AS [last] FROM qrySelectTblData GROUP BY qrySelectTblData.DataSetID, qrySele |
| rptTimelineNCDC | Monitoring Output Products - Multi Timeline plot for data from the NCDC data set. | SELECT DISTINCT First([DataSetID] & " - " & [DataSetAbbr]) AS FirstID, Last([DataSetID] & " - " & [DataSetAbbr]) AS LastID, Min(CDate(Format([RecordDate],"mm/dd/yyyy"))) AS [First], Max(CDate(Format([RecordDate],"mm/dd/yyyy"))) AS [last] FROM qrySelectTb |

| Name | Description | RecordSource |
|---|---|---|
| rptTimelineSEARCHgas | Monitoring Output Products - Multi Timeline plot for Gaseous data from the SEARCH data set. | SELECT DISTINCT qrySelectTblData.DataSetID, qrySelectTblData.DataSetAbbr, Min(CDate(Format([RecordDate],"mm/dd/yyyy"))) AS [First], Max(CDate(Format([RecordDate],"mm/dd/yyyy"))) AS [last] FROM qrySelectTblData GROUP BY qrySelectTblData.DataSetID, qrySele |
| rptTimelineSEARCHmass | Monitoring Output Products - Multi Timeline plot for Mass data from the SEARCH data set. | SELECT DISTINCT qrySelectTblData.DataSetID, qrySelectTblData.DataSetAbbr, Min(CDate(Format([RecordDate],"mm/dd/yyyy"))) AS [First], Max(CDate(Format([RecordDate],"mm/dd/yyyy"))) AS [last] FROM qrySelectTblData GROUP BY qrySelectTblData.DataSetID, qrySele |

Table B-4.

Code Modules used in the GMAQDB Interface.

| Name | Description | Line Count |
|---|---|---|
| LoadData | Procedures and functions for loading data. | 951 |
| OuputForms | Procedures and functions for filling frmOutput and its sub-forms. | 539 |
| Output | Procedures and functions for generating monitoring data output products. | 621 |
| OutputEM | Procedures and functions for generating emissions data output products. | 323 |
| OutputEMForms | Procedures and functions for filling frmOutputEM and its sub-forms. | 336 |
| Utility | Utility subroutines and functions used by other modules. | 449 |

# APPENDIX C: ADDITIONAL COMPONENTS

| Name | Description | File Name | Version | Windows Registry GUID |
|---|---|---|---|---|
| VBA | Visual Basic for Applications | vbe6.dll | 4 | {000204EF-0000-0000-C000-000000000046} |
| Access | Microsoft Access 11.0 Object Library | msacc.olb | 9 | {4AFFC9A0-5F99-101B-AF4E-00AA003F0F07} |
| stdole | OLE Automation | stdole2.tlb | 2 | {00020430-0000-0000-C000-000000000046} |
| ADODB | Microsoft ActiveX Data Objects 2.1 Library | msado21.tlb | 2.1 | {00000201-0000-0010-8000-00AA006D2EA4} |
| DAO | Microsoft Data Access Objects 3.6 Object Library | dao360.dll | 5 | {00025E01-0000-0000-C000-000000000046} |
| MSComctlLib | Microsoft Windows Common Controls 6.0 (SP6) | mscomctl.ocx | 2 | {831FDD16-0C5C-11D2-A9FC-0000F8754DA1} |
| MSACAL | Microsoft Calendar Control 11.0 | mscal.ocx | 7 | {8E27C92E-1264-101C-8A2F-040224009C02} |
| MSComCtl2 | Microsoft Windows Common Controls-2 6.0 (SP4) | mscomct2.ocx | 2 | {86CF1D34-0C5F-11D2-A9FC-0000F8754DA1} |
| SnapshotViewerControl | Snapshot Viewer Control | snapview.ocx | 1 | {ED53EA70-368C-11D0-AD81-00A0C90DC8D9} |
| ComctlLib | Microsoft Windows Common Controls 5.0 (SP2) | comctl32.ocx | 1.3 | {6B7E6392-850A-101B-AFC0-4210102A8DA7} |
| Excel | Microsoft Excel 11.0 Object Library | excel.exe | 1.5 | {00020813-0000-0000-C000-000000000046} |
| Scripting | Microsoft Scripting Runtime | scrrun.dll | 1 | {420B2830-E718-11CF-893D-00A0C9054228} |
| MSForms | Microsoft Forms 2.0 Object Library | fm20.dll | 2 | {0D452EE1-E08F-101A-852E-02608C4D0BB4} |
| Office | Microsoft Office 11.0 Object Library | Mso.dll | 2.3 | {2DF8D04C-5BFA-101B-BDE5-00AA0044DE52} |
| ADOX | Microsoft ADO Ext. 2.8 for DDL and Security | Msadox.dll | 2.8 | {00000600-0000-0010-8000-00AA006D2EA4} |


**The Department of the Interior Mission**

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The Department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.


**The Minerals Management Service Mission**

As a bureau of the Department of the Interior, the Minerals Management Service's (MMS) primary responsibilities are to manage the mineral resources located on the Nation's Outer Continental Shelf (OCS), collect revenue from the Federal OCS and onshore Federal and Indian lands, and distribute those revenues.

Moreover, in working to meet its responsibilities, the **Offshore Minerals Management Program** administers the OCS competitive leasing program and oversees the safe and environmentally sound exploration and production of our Nation's offshore natural gas, oil and other mineral resources. The MMS **Minerals Revenue Management** meets its responsibilities by ensuring the efficient, timely and accurate collection and disbursement of revenue from mineral leasing and production due to Indian tribes and allottees, States and the U.S. Treasury.

The MMS strives to fulfill its responsibilities through the general guiding principles of: (1) being responsive to the public's concerns and interests by maintaining a dialogue with all potentially affected parties and (2) carrying out its programs with an emphasis on working to enhance the quality of life for all Americans by lending MMS assistance and expertise to economic development and environmental protection.