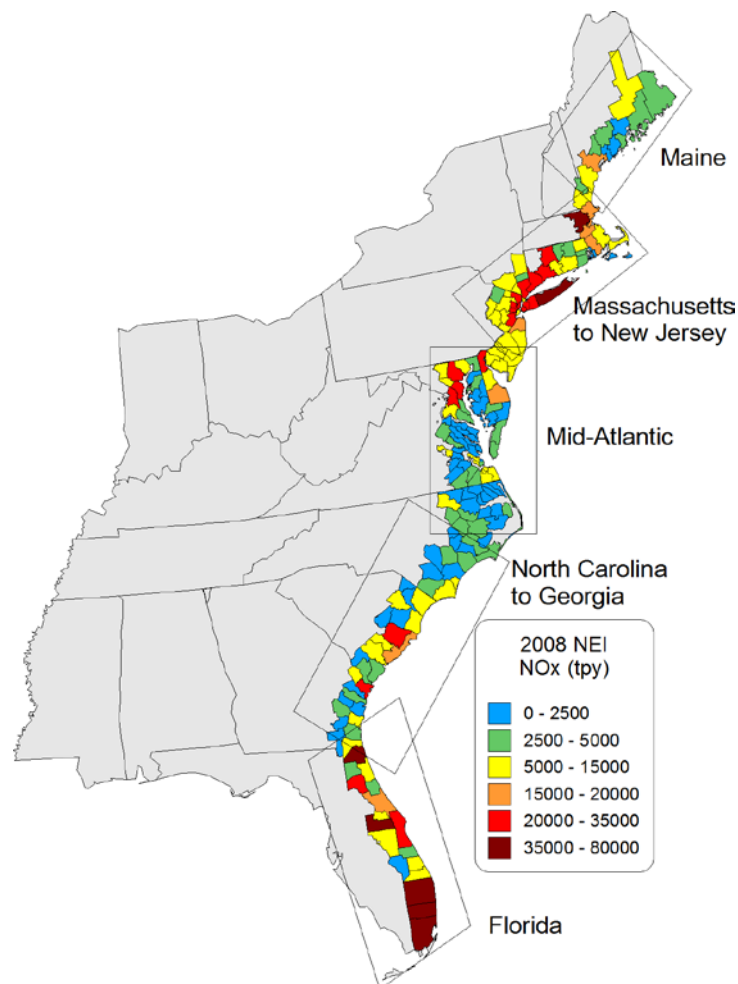# Synthesis, Analysis, and Integration of Meteorological and Air Quality Data for the Atlantic Coast Region

Volume II: Technical Reference Manual for the Atlantic Region Air Quality Database

Synthesis, Analysis, and Integration of Meteorological and Air Quality Data for the Atlantic Coast Region

Volume II: Technical Reference Manual for the Atlantic Region Air Quality Database

Authors

Betsy Davis-Noland
Jessica Ward
Joe Adlhoch

Prepared under BOEM Contract
GS-10F-0124J
by
Air Resource Specialists, Inc.
1901 Sharp Point Drive, Suite E
Fort Collins, CO 80525
and
ICF International
101 Lucas Valley Road, Suite 260
San Rafael, CA 94903

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U.S. Department of Interior
Bureau of Ocean Energy Management
Office of Renewable Energy Programs
381 Elden Avenue, HM 1328
Herndon, Virginia 20170-4817

U.S. Department of Commerce
National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161
Phone: (703) 605-6040
Fax: (703) 605-6900
Email: bookstore@ntis.gov

CITATION

Davis-Noland, B., J. Ward, and J. Adlhoch. 2014. Synthesis, analysis, and integration of meteorological and air quality data for the Atlantic coast region. Volume II: Technical reference manual for the Atlantic region air quality database. U.S. Dept. of the Interior, Bureau of Ocean Energy Management, Herndon, VA 20170. AR Study BOEM 2014-008. 47 pp.

ABOUT THE COVER

The graphic on the cover depicts county level emissions of nitrogen oxides (NO_x) for key port/harbor areas along the Atlantic Coast. The emission data are included in the Atlantic Region Air Quality Database (ARAQDB) tool.

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1.0 OVERVIEW

The Atlantic Region Air Quality Database (ARAQDB) is a custom software application developed by Air Resource Specialists, Inc. (ARS) and ICF International under Bureau of Safety and Environmental Enforcement (BSEE) Contract No. GS-10F-0124J – "Synthesis, Analysis, and Integration of Meteorological and Air Quality Data for the Atlantic Region." This Technical Reference Manual (TRM) provides the information needed by database administrators, software developers, and other information technology professionals to facilitate the installation, maintenance, and use of the ARAQDB.

The development platform chosen was based on the Statement of Work authorized by Bureau of Ocean Energy Management (BOEM). Development decisions were made to provide a useful tool for BOEM (and other interested) data analysts within the simple constraints of developing an application with an Oracle database backend and Microsoft Access 2010 interface. In addition, the expense of purchasing commercial software licenses and computer hardware for the project was avoided by utilizing the existing infrastructure at ARS for development and testing purposes.

1.1. SCOPE OF THIS MANUAL

This manual provides details on the delivered components of the ARAQDB and how the application was developed and tested. Although installation instructions are provided, it is assumed that security and other policies within BOEM 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.

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 2010 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 a re-programmed mouse 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 ARAQDB is comprised of two primary components; an Oracle database containing meteorological, air quality, and emissions data from the Atlantic Region and a custom interactive database tool, developed with Microsoft Access 2010. In addition to this manual, the ARAQDB documentation set includes:

- *The Atlantic Region Air Quality Database (Version 1.0) User's Manual*

- *The Atlantic Region Air Quality Database Online Help* (an Adobe PDF version of the ARAQDB User's manual)

2.1. HISTORY AND PURPOSE

The ARAQDB was developed to provide the BOEM with a synthesized and integrated database containing meteorology and air quality data collected by the Environmental Protection Agency (EPA), the National Weather Service (NWS), the National Data Buoy Center (NDBC), states, and various other agencies. The resulting database contains hundreds of millions of data points collected in the Atlantic coastal and Outer Continental Shelf (OCS) region from 2000 through 2012. In addition, the database contains emissions inventories for the Atlantic onshore coastal regions for 2008. 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 ARAQDB was developed at ARS by in-house developers using available hardware and commercial software as follows:

Database Server

- HP ProLiant DL380 G5

- Oracle Linux 6.2

- Oracle Database 11g Release 2 Standard Edition One

Client

- Microsoft Windows 7

- Oracle 11g Client 11.2

- Microsoft Access 2010

2.3. TECHNICAL SUPPORT

Technical support is available during the term of BSEE Contract No. GS-10F-0124J. Contact:

Betsy Davis-Noland
Air Resource Specialists, Inc.
970-484-7941
Bdavis-noland@air-resource.com

3.0 SYSTEM

The basic design of the ARAQDB is an Oracle database backend and a frontend graphical user interface (GUI) developed with Microsoft Access 2010 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 ARAQDB was designed to provide a useful tool for BOEM data analysts within the basic constraints of developing an application with an Oracle database backend and Microsoft Access 2010 user interface. ARS developers also operated under the following assumptions:

- The ARAQDB database might need to be integrated with other BOEM databases and/or interfaces, perhaps even non-Oracle databases.

- Microsoft Access 2010 and VBA are already old technology; the ARAQDB 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.

- Clear distinction between the backend database and frontend interface:

  - All data are contained in Oracle tables and materialized views 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.

3.2. DELIVERED COMPONENTS

Database

The ARAQDB has been exported using the Oracle 11gR2 Data Pump utility in 2GB increments and written to DVD. This export type will allow BOEM to import the ARAQDB schema into an existing Oracle database. The export does not include the Oracle RDBMS software.

<u>User Interface</u>

An installation CD has been provided to install the MS Access database (.accdb file) and other components including online user help. This CD also contains the individual components. It does not contain the MS Access 2010 software or standard Microsoft Office libraries.

<u>Documentation</u>

A CD containing the following documents in MS Word 2010 and Adobe PDF format:

- *The Atlantic Region Air Quality Database (Version 1.0) User's Manual*

- *The Atlantic Region Air Quality Database (Version 1.0) Technical Reference Manual*

3.3. DATABASE SERVER REQUIREMENTS

<u>Oracle and Operating System</u>

Due to the simple design of the ARAQDB it is assumed that the minimum Oracle version required is Oracle 9i Release 2 with operating system requirements based on the Oracle compatibility matrix. See Section 2.2 for details on the development platform.

<u>Storage</u>

- ARAQDB Schema Import – approximately 10 gigabytes (gb)

3.4. USER INTERFACE (CLIENT) REQUIREMENTS

The user interface requires Microsoft Access 2010 and the following library code files, many of which are typically installed with Microsoft Office 2010:

- Visual Basic for Applications
- Microsoft Access 14.0 Object Library
- OLE Automation
- Microsoft Forms 2.0 Object Library
- Microsoft Windows Common Controls 6.0 (SP6)
- Microsoft Scripting Runtime
- Microsoft Excel 14.0 Object Library
- Microsoft Office 14.0 Object Library
- Microsoft ADO Ext. 2.8 for DDL and Security
- Microsoft ActiveX Data Objects 2.8 Library
- Microsoft Office 14.0 Access database engine Object Library
- Microsoft Visual Basic for Applications Extensibility 5.3
- Microsoft Internet Controls

These apply to both personal computers (PCs) and Apple computers (MACs).

3.5. INSTALLATION GUIDELINES

The instructions in the installation section are intended as guidelines only. Actual installation steps will 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 ARAQDB 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 2.5 gb of storage space is required.

2. Determine the target Oracle database and tablespace. The tablespace must have approximately 10 gb of disk storage available.

3. Create an Oracle Directory Object that points to the storage location in Step 1.

4. Import the ARAQDB 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 ARAQDB Interface tool, run ARAQDB.msi from the installation CD on each user's workstation. The **Typical Setup Type** will install the tool to the user's desktop location. The following files and folders are installed:

Folder	Sub-folders/Files	Files
ARAQDB	ARAQDB.accdb	
	DB Server.udl	
	output	AQS_100031003 (Example Output).xls
	pdfs	AllSites.pdf
		ARAQDB User's Manual.pdf
		CO_Counties_Map.pdf
		Emissions_All_Zones.pdf
		Emissions_by_pollutant.pdf
		Emissions_by_zone.pdf
		Emissions_Zone_1.pdf
		Emissions_Zone_2.pdf
		Emissions_Zone_3.pdf
		Emissions_Zone_4.pdf
		Emissions_Zone_5.pdf
		NH3_Counties_Map.pdf
		NOx_Counties_Map.pdf
		PM10_Counties_Map.pdf
		PM25_Counties_Map.pdf
		SO2_Counties_Map.pdf
		Suspect Data.pdf
		VOC_Counties_Map.pdf
		Zone1_piechart.pdf
		Zone2_piechart.pdf
		Zone3_piechart.pdf
		Zone4_piechart.pdf
		Zone5_piechart.pdf

3.5.3. Client/Server Connectivity

The ARAQDB.accdb programs must be able to connect to the ARAQDB 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 installed correctly and able to connect to the target database. Take the following steps to ensure client/database connectivity:

NOTE: The files referred to below must reside in the folder where the application was installed. On delivery, the user name is ARAQDB and the password is AQ1QD2. 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 ARAQDB user's workstation and a connection to the target database can be made outside of the ARAQDB user interface.

2. Modify the ODBC DSN file:

    a. Open the ARAQDB.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 the user's workstation.

    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 ARAQDB tables:

    a. In Explorer, press and hold the *Shift* key and *double-click* the ARAQDB.accdb file. This will open the Access file without launching the interface application.

    b. From the Access menu, select **External Data/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. Create and test an ODBC DSN named ARAQDB that connects to the ARAQDB schema in the target database.

    2. Display **Tables** in the **Navigation Pane**.

3. *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.

4. On the Access menu, select **External Data/ODBC Database.**

5. In the Get External Data – ODBC Database dialog, click the **Link to the data source by creating a linked table** radio button then click **OK**.

6. In the Select Data Source dialog, navigate to and *double-click* the **ARAQDB.dsn** created in Step 1.

7. When prompted, enter the database password.

8. From the list of displayed tables, select those in the ARAQDB schema.

9. To prevent the user from being prompted for the password when accessing these tables, *click* the **Save Password** check box then *click* **OK**.

10. In the Tables list, *right-click* each linked table, select **Rename** and remove the **ARAQDB_ prefix** from each table name.

4.0 APPLICATION DETAILS

The ARAQDB GUI is comprised of Microsoft Access 2010 queries, forms, reports, and VBA modules. This section provides an overview of the GUI. Specific instructions for using the interface are provided in the *ARAQDB 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 2010. 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 ARAQDB Oracle database through the linked Oracle ARAQDB tables (ODBC) or the Microsoft OLE Provider for Oracle (ADO).

4.2. DATA INVENTORY

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

4.3. SCOPE OF APPLICATION FUNCTIONS

The ARAQDB 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 report tables, graphs, and maps. Data retrieval of monitoring data is accessed through the **Monitoring Data Products** button. See Section 3.0 of the *ARAQDB User's Manual* for details. Data retrieval of emissions data is accessed through the **Emissions Data Products** button. See Section 5.0 of the *ARAQDB User's Manual* for details.

Note: Some output products, the *ARAQDB User's Manual*, and the *Suspect Data* document are stored as static pdf files in the pdfs sub-folder.

4.3.2. Batch Loading of New Data

The ARAQDB 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. Although the interface is simple, successful data loading is contingent on following the requirements detailed in Sections 7.0 and

8.0 of the *ARAQDB User's Manual.* Examples of source files are provided in Appendix C of the *ARAQDB 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 ARAQDB 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 *ARAQDB Users' Manual*. The ARAQDB User's Manual.pdf file is installed in the application pdfs sub-folder and is accessed by clicking the **ARAQDB 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

The message box 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.

5.0 REFERENCES

Davis-Noland, B., J. Ward, J. Adlhoch. The Atlantic Region Air Quality Database: Users'
Manual. (Version 1.0)

APPENDIX A: ORACLE DATABASE STRUCTURES

ENTITY-RELATIONSHIP DIAGRAM
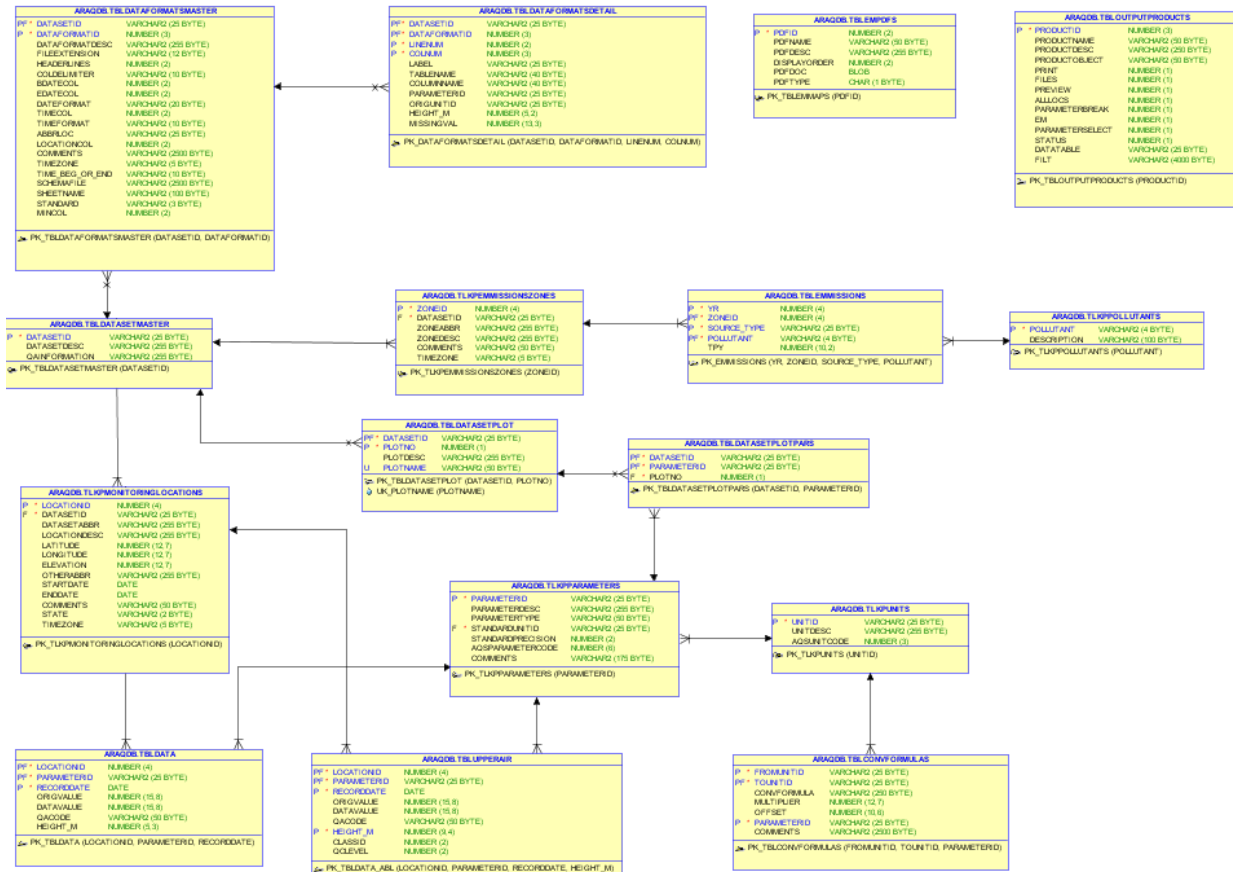
TABLES

Table Name	ARAQDB.TBLCONVFORMULAS
Description	This table is used during data loading to convert source values in non-standard measurement units to standard measurement units.

Columns

No	Column Name	PK	FK	M	Data Type
1	FROMUNITID	P		Y	VARCHAR (25 BYTE)
2	TOUNITID	P	F	Y	VARCHAR (25 BYTE)
3	CONVFORMULA				VARCHAR (250 BYTE)
4	MULTIPLIER				NUMERIC (12,7)
5	OFFSET				NUMERIC (10,6)
6	PARAMETERID	P		Y	VARCHAR (25 BYTE)
7	COMMENTS				VARCHAR (2500 BYTE)

Columns Comments

No	Column Name	Description
1	FROMUNITID	The unit code to convert from.
2	TOUNITID	The unit code to convert to.
3	CONVFORMULA	The conversion formula.
4	MULTIPLIER	The conversion multiplier.
5	OFFSET	The conversion offset value.
6	PARAMETERID	The ParameterID for this conversion (not all gaseous pollutants convert using the same formula). Contains "ALL" when applied to all pars, therefore, no fk.
7	COMMENTS	Additional comments for this record.

Indexes

Index Name	State	Column Name	Sort Order
PK_TBLCONVFORMULAS	PK	FROMUNITID	ASC
		TOUNITID	ASC
		PARAMETERID	ASC

Foreign Keys (referring to)

Name	Refering To	Column Name
FK_CONV_TOUNIT	TLKPUNITS	UNITID

Table Name	ARAQDB.TBLDATA				

Columns

No	Column Name	PK	FK	M	Data Type
1	LOCATIONID	P	F	Y	NUMERIC (4)
2	PARAMETERID	P	F	Y	VARCHAR (25 BYTE)
3	RECORDDATE	P		Y	Date (7)
4	ORIGVALUE				NUMERIC (15,8)
5	DATAVALUE				NUMERIC (15,8)
6	QACODE				VARCHAR (50 BYTE)
7	HEIGHT_M				NUMERIC (5,3)

Indexes

Index Name	State	Column Name	Sort Order
PK_TBLDATA	PK	LOCATIONID	ASC
		PARAMETERID	ASC
		RECORDDATE	ASC

Foreign Keys (referring to)

Name	Refering To	Column Name
FK_LOCATIONID	TLKPMONITORINGLOCATIONS	LOCATIONID
FK_PARAMETERID	TLKPPARAMETERS	PARAMETERID

Table Name	ARAQDB.TBLDATAFORMATSDETAIL
Description	Configuration details of various source files used by data loading programs.

Columns

No	Column Name	PK	FK	M	Data Type
1	DATASETID	P	F	Y	VARCHAR (25 BYTE)
2	DATAFORMATID	P	F	Y	NUMERIC (3)
3	LINENUM	P		Y	NUMERIC (2)
4	COLNUM	P		Y	NUMERIC (3)
5	LABEL				VARCHAR (25 BYTE)
6	TABLENAME				VARCHAR (40 BYTE)
7	COLUMNNAME				VARCHAR (40 BYTE)
8	PARAMETERID				VARCHAR (25 BYTE)
9	ORIGUNITID				VARCHAR (25 BYTE)
10	HEIGHT_M				NUMERIC (5,2)
11	MISSINGVAL				NUMERIC (13,3)

Columns Comments

No	Column Name	Description
1	DATASETID	Where the type of source file originated.
2	DATAFORMATID	Sequential number to track formats for each data set.
3	LINENUM	What line of the record does this config refer to? (Needed for multiline records in source files.)
4	COLNUM	What column of the record/line does this config refer to?
5	LABEL	Column header in the source file (for reference).
6	TABLENAME	In what table should the value be inserted?
7	COLUMNNAME	In what table column should the value be inserted?
8	PARAMETERID	What parameterid does this config map to?
9	ORIGUNITID	What is the source unit of measure (needed to determin value conversion)?
10	HEIGHT_M	What is the monitoring height if available?
11	MISSINGVAL	What value or set of characters indicates a missing value?

Indexes

Index Name	State	Column Name	Sort Order
PK_DATAFORMATSDETAIL	PK	DATASETID	ASC
		DATAFORMATID	ASC

Index Name	State	Column Name	Sort Order
		LINENUM	ASC
		COLNUM	ASC

Foreign Keys (referring to)

Name	Refering To	Column Name
FK_TBLDATAFORMATS	TBLDATAFORMATSMASTER	DATASETID
		DATAFORMATID

Table Name	ARAQDB.TBLDATAFORMATSMASTER
Description	Master source data format record; info regarding entire file.

Columns

No	Column Name	PK	FK	M	Data Type
1	DATASETID	P	F	Y	VARCHAR (25 BYTE)
2	DATAFORMATID	P		Y	NUMERIC (3)
3	DATAFORMATDESC				VARCHAR (255 BYTE)
4	FILEEXTENSION				VARCHAR (12 BYTE)
5	HEADERLINES				NUMERIC (2)
6	COLDELIMITER				VARCHAR (10 BYTE)
7	BDATECOL				NUMERIC (2)
8	EDATECOL				NUMERIC (2)
9	DATEFORMAT				VARCHAR (20 BYTE)
10	TIMECOL				NUMERIC (2)
11	TIMEFORMAT				VARCHAR (10 BYTE)
12	ABBRLOC				VARCHAR (25 BYTE)
13	LOCATIONCOL				NUMERIC (2)
14	COMMENTS				VARCHAR (2500 BYTE)
15	TIMEZONE				VARCHAR (5 BYTE)
16	TIME_BEG_OR_END				VARCHAR (10 BYTE)
17	SCHEMAFILE				VARCHAR (2500 BYTE)
18	SHEETNAME				VARCHAR (100 BYTE)
19	STANDARD				VARCHAR (3 BYTE)
20	MINCOL				NUMERIC (2)

Columns Comments

No	Column Name	Description
1	DATASETID	Where the source data file originated.
2	DATAFORMATID	Sequential number to track numerous formats.
3	DATAFORMATDESC	Description of this dataset/format.
4	FILEEXTENSION	What the file extension needs to be.
5	HEADERLINES	How many lines to skip before processing.
6	COLDELIMITER	How the columns delimited?

No	Column Name	Description
7	BDATECOL	In which column does the record date start?
8	EDATECOL	In which column does the record date end?
9	DATEFORMAT	What is the record date format?
10	TIMECOL	In which column is the time stored? HR where MI stored in sep column
11	TIMEFORMAT	What is the time format?
12	ABBRLOC	A number here means the location abbr is found in the first x values of the file name.
13	LOCATIONCOL	A number here means the location abbr is found in this column of the data file.
14	COMMENTS	Comments regarding the format.
15	TIMEZONE	Timezone for the dates/times in the file.
16	TIME_BEG_OR_END	Time beginning or ending of averaged values.
17	SCHEMAFILE	Information to place in the schema file when required.
18	SHEETNAME	For Excel files, the expected name of the worksheet.
19	STANDARD	Indicates a standard (routine monitoring) data format if YES, otherwise NO.
20	MINCOL	In which column is the minutes after the hour stored?

Indexes

Index Name	State	Column Name	Sort Order
PK_TBLDATAFORMATSMASTER	PK	DATASETID	ASC
		DATAFORMATID	ASC

Foreign Keys (referring to)

Name	Refering To	Column Name
FK_DATASET_FORMATMASTER	TBLDATASETMASTER	DATASETID

Foreign Keys (referred from)

Name	Referred From	Column Name
FK_TBLDATAFORMATS	TBLDATAFORMATSDETAIL	DATASETID
		DATAFORMATID

Table Name	ARAQDB.TBLDATASETMASTER
Description	General information about the source data set.

Columns

No	Column Name	PK	FK	M	Data Type
1	DATASETID	P		Y	VARCHAR (25 BYTE)
2	DATASETDESC				VARCHAR (255 BYTE)
3	QAINFORMATION				VARCHAR (255 BYTE)

Columns Comments

No	Column Name	Description
1	DATASETID	Assigned data set id.
2	DATASETDESC	Data set description.
3	QAINFORMATION	QA Information if available.

Indexes

Index Name	State	Column Name	Sort Order
PK_TBLDATASETMASTER	PK	DATASETID	ASC

Foreign Keys (referred from)

Name	Referred From	Column Name
FK_DATASET_FORMATMASTER	TBLDATAFORMATSMASTER	DATASETID
FK_LOCS_DATASET	TLKPMONITORINGLOCATIONS	DATASETID
FK_TBLDATASETPLOT	TBLDATASETPLOT	DATASETID
FK_ZONES_DATASET	TLKPEMMISSIONSZONES	DATASETID

Table Name	ARAQDB.TBLDATASETPLOT
Description	Defines Multi Time Line Plots - Master Configuration.

Columns

No	Column Name	PK	FK	M	Data Type
1	DATASETID	P	F	Y	VARCHAR (25 BYTE)
2	PLOTNO	P		Y	NUMERIC (1)
3	PLOTDESC				VARCHAR (255 BYTE)
4	PLOTNAME				VARCHAR (50 BYTE)

Columns Comments

No	Column Name	Description
1	DATASETID	The data set id.
2	PLOTNO	Sequential number for multiple plot configurations.
3	PLOTDESC	Plot description.
4	PLOTNAME	Plot name.

Indexes

Index Name	State	Column Name	Sort Order
PK_TBLDATASETPLOT	PK	DATASETID	ASC
		PLOTNO	ASC
UK_PLOTNAME	UK	PLOTNAME	ASC

Foreign Keys (referring to)

Name	Refering To	Column Name
FK_TBLDATASETPLOT	TBLDATASETMASTER	DATASETID

Foreign Keys (referred from)

Name	Referred From	Column Name
FK_DATASETPLOTS	TBLDATASETPLOTPARS	DATASETID
		PLOTNO

Table Name	ARAQDB.TBLDATASETPLOTPARS
Description	Multi Time Plots - Detail configuration.

Columns

No	Column Name	PK	FK	M	Data Type
1	DATASETID	P	F	Y	VARCHAR (25 BYTE)
2	PARAMETERID	P	F	Y	VARCHAR (25 BYTE)
3	PLOTNO		F	Y	NUMERIC (1)

Columns Comments

No	Column Name	Description
1	DATASETID	The Data Set Id.
2	PARAMETERID	The Parameter Id.
3	PLOTNO	The Plot no.

Indexes

Index Name	State	Column Name	Sort Order
PK_TBLDATASETPLOTPARS	PK	DATASETID	ASC
		PARAMETERID	ASC

Foreign Keys (referring to)

Name	Refering To	Column Name
FK_DATASETPLOTS	TBLDATASETPLOT	DATASETID
		PLOTNO
FK_PARPLOTS	TLKPPARAMETERS	PARAMETERID

Table Name	ARAQDB.TBLEMMISSIONS				

Columns

No	Column Name	PK	FK	M	Data Type
1	YR	P		Y	NUMERIC (4)
2	ZONEID	P	F	Y	NUMERIC (4)
3	SOURCE_TYPE	P		Y	VARCHAR (25 BYTE)
4	POLLUTANT	P	F	Y	VARCHAR (4 BYTE)
5	TPY				NUMERIC (10,2)

Indexes

Index Name	State	Column Name	Sort Order
PK_EMMISSIONS	PK	YR	ASC
		ZONEID	ASC
		SOURCE_TYPE	ASC
		POLLUTANT	ASC

Foreign Keys (referring to)

Name	Refering To	Column Name
FK_ZONES	TLKPEMMISSIONSZONES	ZONEID
FK_ZONE_POLLS	TLKPPOLLUTANTS	POLLUTANT

Table Name	ARAQDB.TBLEMPDFS
Description	Stores Pointers to Emissions Charts

Columns

No	Column Name	PK	FK	M	Data Type
1	PDFID	P		Y	NUMERIC (2)
2	PDFNAME				VARCHAR (50 BYTE)
3	PDFDESC				VARCHAR (255 BYTE)
4	DISPLAYORDER				NUMERIC (2)
5	PDFDOC				BLOB (4000)
6	PDFTYPE				CHAR (1 BYTE)

Columns Comments

No	Column Name	Description
1	PDFID	The PDF ID
2	PDFNAME	The PDF Name.
3	PDFDESC	The PDF description.
4	DISPLAYORDER	Order of display.
5	PDFDOC	Stores the file
6	PDFTYPE	Product (P) or Map (M)

Indexes

Index Name	State	Column Name	Sort Order
PK_TBLEMMAPS	PK	PDFID	ASC

Table Name	ARAQDB.TBLOUTPUTPRODUCTS
Description	The list of available output products and options.

Columns

No	Column Name	PK	FK	M	Data Type
1	PRODUCTID	P		Y	NUMERIC (3)
2	PRODUCTNAME				VARCHAR (50 BYTE)
3	PRODUCTDESC				VARCHAR (250 BYTE)
4	PRODUCTOBJECT				VARCHAR (50 BYTE)
5	PRINT				NUMERIC (1)
6	FILES				NUMERIC (1)
7	PREVIEW				NUMERIC (1)
8	ALLLOCS				NUMERIC (1)
9	PARAMETERBREAK				NUMERIC (1)
10	EM				NUMERIC (1)
11	PARAMETERSELECT				NUMERIC (1)
12	STATUS				NUMERIC (1)
13	DATATABLE				VARCHAR (25 BYTE)
14	FILT				VARCHAR (4000 BYTE)

Columns Comments

No	Column Name	Description
1	PRODUCTID	Sequential number.
2	PRODUCTNAME	Product name.
3	PRODUCTDESC	Product description.
4	PRODUCTOBJECT	Which report or export object is used?
5	PRINT	Print option. See tlkpoptiondesc.
6	FILES	Make file option. See tlkpoptiondesc.
7	PREVIEW	Preview option. See tlkpoptiondesc.
8	ALLLOCS	All selected locations in one file? See tlkpoptiondesc.
9	PARAMETERBREAK	One product per parameter?
10	EM	Emissions product? 1=Yes
11	PARAMETERSELECT	Allow selection of parameters? 1=Yes
12	STATUS	Availability status. -1 means not available.
13	DATATABLE	Which data table to pull data from?

No	Column Name	Description
14	FILT	Apply data filter. Added to where clause.

Indexes

Index Name	State	Column Name	Sort Order
PK_TBLOUTPUTPRODUCTS	PK	PRODUCTID	ASC

Table Name	**ARAQDB.TLKOPTIONDESC**
Description	Defines the options in TBLOUTPUTPRODUCTS.

Columns

No	Column Name	PK	FK	M	Data Type
1	OPTIONID	P		Y	NUMERIC (3)
2	OPTIONDESC				VARCHAR (50 BYTE)

Columns Comments

No	Column Name	Description
1	OPTIONID	The option number.
2	OPTIONDESC	What the option means.

Indexes

Index Name	State	Column Name	Sort Order
PK_OPTIONDESC	PK	OPTIONID	ASC

Table Name	ARAQDB.TBLUPPERAIR

Columns

No	Column Name	PK	FK	M	Data Type
1	LOCATIONID	P	F	Y	NUMERIC (4)
2	PARAMETERID	P	F	Y	VARCHAR (25 BYTE)
3	RECORDDATE	P		Y	Date (7)
4	ORIGVALUE				NUMERIC (15,8)
5	DATAVALUE				NUMERIC (15,8)
6	QACODE				VARCHAR (50 BYTE)
7	HEIGHT_M	P		Y	NUMERIC (9,4)
8	CLASSID				NUMERIC (2)
9	QCLEVEL				NUMERIC (2)

Indexes

Index Name	State	Column Name	Sort Order
PK_TBLDATA_ABL	PK	LOCATIONID	ASC
		PARAMETERID	ASC
		RECORDDATE	ASC
		HEIGHT_M	ASC

Foreign Keys (referring to)

Name	Refering To	Column Name
FK_ULOCATIONID	TLKPMONITORINGLOCATIONS	LOCATIONID
FK_UPARAMETERID	TLKPPARAMETERS	PARAMETERID

Table Name	ARAQDB.TLKPEMMISSIONSZONES
Description	A lookup table of Zone information used by the emissions data tables.

Columns

No	Column Name	PK	FK	M	Data Type
1	ZONEID	P		Y	NUMERIC (4)
2	DATASETID		F	Y	VARCHAR (25 BYTE)
3	ZONEABBR				VARCHAR (255 BYTE)
4	ZONEDESC				VARCHAR (255 BYTE)
5	COMMENTS				VARCHAR (50 BYTE)
6	TIMEZONE				VARCHAR (5 BYTE)

Indexes

Index Name	State	Column Name	Sort Order
PK_TLKPEMMISSIONSZONES	PK	ZONEID	ASC

Foreign Keys (referring to)

Name	Refering To	Column Name
FK_ZONES_DATASET	TBLDATASETMASTER	DATASETID

Foreign Keys (referred from)

Name	Referred From	Column Name
FK_ZONES	TBLEMMISSIONS	ZONEID

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Table Name	ARAQDB.TLKPMONITORINGLOCATIONS
Description	A lookup table of Monitoring Location information used by the monitoring data tables (TBLDATA and TBLUPPERAIR).

Columns

No	Column Name	PK	FK	M	Data Type
1	LOCATIONID	P		Y	NUMERIC (4)
2	DATASETID		F	Y	VARCHAR (25 BYTE)
3	DATASETABBR				VARCHAR (255 BYTE)
4	LOCATIONDESC				VARCHAR (255 BYTE)
5	LATITUDE				NUMERIC (12,7)
6	LONGITUDE				NUMERIC (12,7)
7	ELEVATION				NUMERIC (12,7)
8	OTHERABBR				VARCHAR (255 BYTE)
9	STARTDATE				Date (7)
10	ENDDATE				Date (7)
11	COMMENTS				VARCHAR (50 BYTE)
12	STATE				VARCHAR (2 BYTE)
13	TIMEZONE				VARCHAR (5 BYTE)

Columns Comments

No	Column Name	Description
1	LOCATIONID	The system assigned locationid.
2	DATASETID	The originating source of data for this location.
3	DATASETABBR	The identifier used within the originating data source for this location.
4	LOCATIONDESC	The location's description as provided by the originating data source.
5	LATITUDE	The location's latitude as provided by the originating data source.
6	LONGITUDE	The location's longitude as provided by the originating data source.
7	ELEVATION	The location's elevation as provided by the originating data source.
8	OTHERABBR	Other abbreviations or identifiers that have been used to identify this location.
9	STARTDATE	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.
10	ENDDATE	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.
11	COMMENTS	Comments regarding the location information.

No	Column Name	Description
12	STATE	The location's two character USA state abbreviation
13	TIMEZONE	The location's timezone as determined by the provided coordinates and timezone maps.

Indexes

Index Name	State	Column Name	Sort Order
PK_TLKPMONITORINGLOCATIONS	PK	LOCATIONID	ASC

Foreign Keys (referring to)

Name	Refering To	Column Name
FK_LOCS_DATASET	TBLDATASETMASTER	DATASETID

Foreign Keys (referred from)

Name	Referred From	Column Name
FK_LOCATIONID	TBLDATA	LOCATIONID
FK_ULOCATIONID	TBLUPPERAIR	LOCATIONID

Table Name	ARAQDB.TLKPPARAMETERS
Description	Lookup table for monitoring parameters information.

Columns

No	Column Name	PK	FK	M	Data Type
1	PARAMETERID	P		Y	VARCHAR (25 BYTE)
2	PARAMETERDESC				VARCHAR (255 BYTE)
3	PARAMETERTYPE				VARCHAR (50 BYTE)
4	STANDARDUNITID		F	Y	VARCHAR (25 BYTE)
5	STANDARDPRECISION				NUMERIC (2)
6	AQSPARAMETERCODE				NUMERIC (6)
7	COMMENTS				VARCHAR (175 BYTE)

Columns Comments

No	Column Name	Description
1	PARAMETERID	Parameter identifier
2	PARAMETERDESC	Description
3	PARAMETERTYPE	Parameter type (met, gaseous, etc.)
4	STANDARDUNITID	Standard unit of measurement
5	STANDARDPRECISION	Standard decimal precision
6	AQSPARAMETERCODE	AQS Parameter code (needed for loading AQS data and for reference)
7	COMMENTS	Comments

Indexes

Index Name	State	Column Name	Sort Order
PK_TLKPPARAMETERS	PK	PARAMETERID	ASC

Foreign Keys (referring to)

Name	Refering To	Column Name
FK_PARS_UNIT	TLKPUNITS	UNITID

Foreign Keys (referred from)

Name	Referred From	Column Name
FK_PARAMETERID	TBLDATA	PARAMETERID
FK_PARPLOTS	TBLDATASETPLOTPARS	PARAMETERID
FK_UPARAMETERID	TBLUPPERAIR	PARAMETERID

Table Name	ARAQDB.TLKPPOLLUTANTS
Description	Lookup table for emissions inventory pollutants.

Columns

No	Column Name	PK	FK	M	Data Type
1	POLLUTANT	P		Y	VARCHAR (4 BYTE)
2	DESCRIPTION				VARCHAR (100 BYTE)

Columns Comments

No	Column Name	Description
1	POLLUTANT	Pollutant identifier
2	DESCRIPTION	Description

Indexes

Index Name	State	Column Name	Sort Order
PK_TLKPPOLLUTANTS	PK	POLLUTANT	ASC

Foreign Keys (referred from)

Name	Referred From	Column Name
FK_ZONE_POLLS	TBLEMMISSIONS	POLLUTANT

Table Name	ARAQDB.TLKPUNITS				

Columns

No	Column Name	PK	FK	M	Data Type
1	UNITID	P		Y	VARCHAR (25 BYTE)
2	UNITDESC				VARCHAR (255 BYTE)
3	AQSUNITCODE				NUMERIC (3)

Indexes

Index Name	State	Column Name	Sort Order
PK_TLKPUNITS	PK	UNITID	ASC

Foreign Keys (referred from)

Name	Referred From	Column Name
FK_CONV_TOUNIT	TBLCONVFORMULAS	UNITID
FK_PARS_UNIT	TLKPPARAMETERS	UNITID

MATERIALIZED VIEWS

Name	Definition	Purpose
LOCSBYPARDATE	select a.locationid, a.datasetid, a.datasetabbr, a.state, nls_initcap(a.locationdesc) locationdesc,a.latitude,a.longitude,a.elevation,a.otherabbr,parameterid,min(recorddate) mindate, max(recorddate) maxdate from tlkpmonitoringlocations a,tbldata b where a.locationid=b.locationid and datavalue<>-999 group by a.locationid,a.datasetid,a.datasetabbr,a.state,a.locationdesc,a.latitude,a.longitude,a.elevation,a.otherabbr,parameterid;	Quickly populate the **Select Locations** list based on the date range and parameter ids selected in the **Monitoring Data Products** UI.
PARSBYDATE	select a.parameterid, b.parameterdesc, b.parametertype, b.standardunitid, b.standardprecision,b.aqsparametercode, b.comments,min(recorddate) mindate,max(recorddate) maxdate from tlkpparameters b,tbldata a where a.parameterid = b.parameterid and datavalue<>-999 group by a.parameterid, b.parameterdesc, b.parametertype, b.standardunitid, b.standardprecision,b.aqsparametercode, b.comments;	Quickly populate the **Select Parameters** list based on the date range selected in the **Monitoring Data Products** UI.
UPPERLOCSBYPARDATE	select a.locationid, a.datasetid, a.datasetabbr, a.state,nls_initcap(a.locationdesc) locationdesc,a.latitude,a.longitude, a.elevation,a.otherabbr,parameterid,min(recorddate) mindate, max(recorddate) maxdate from tlkpmonitoringlocations a,tblupperair b where a.locationid=b.locationid and datavalue<>-999 group by a.locationid, a.datasetid, a.datasetabbr,a.state,a.locationdesc,a.latitude,a.longitude, a.elevation,a.otherabbr,parameterid;	When the selected product is **Upper Air Data – Export,** quickly populate the **Select Locations** list based on the date range and parameter ids selected in the **Monitoring Data Products** UI.
UPPERPARSBYDATE	```select a.parameterid, b.parameterdesc,b.parametertype, b.standardunitid,b.standardprecision ,b.aqsparametercode, b.comments, min(recorddate)mindate, max(recorddate) maxdate from tlkpparameters b,tblupperair a where a.parameterid = b.parameterid group by a.parameterid, b.parameterdesc, b.parametertype, b.standardunitid,b.standardprecision, b.aqsparametercode, b.comments;```	When the selected product is **Upper Air Data – Export,** quickly populate the **Select Parameters** list based on the date range selected in the **Monitoring Data Products** UI.

APPENDIX B: MICROSOFT ACCESS OBJECTS

The Microsoft objects used in the ARAQDB 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, an example of which is provided in the SQL/Example SQL column.

Table B-2 lists forms and sub-forms 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 ARAQDB Microsoft 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;
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;
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	Static	-		SELECT TBLEMMISSIONS.* FROM TBLEMMISSIONS ORDER BY TBLEMMISSIONS.ZoneId, TBLEMMISSIONS.Source_Type, TBLEMMISSIONS.Pollutant;

Table B-2. Form Objects used in the ARAQDB Interface.

Form Name	Description	Record Source
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.	
frmEMProducts	Main form opened form the Emissions Data Products menu command.	
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.	
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.	
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.	
frmSwitchBoard	The Main Switchboard Menu.	

Table B-3. Report Objects used in the ARAQDB 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;
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;
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
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

Table B-4. Code Modules used in the ARAQDB Interface.

Name	Description
LoadData	Procedures and functions for loading data.
OuputForms	Procedures and functions for filling frmOutput and its sub-forms.
Output	Procedures and functions for generating monitoring data output products.
Utility	Utility subroutines and functions used by other modules.

APPENDIX C: ADDITIONAL COMPONENTS

Name	Description	File Name	Version	Windows Registry GUID
VBA	Visual Basic for Applications	Vbe7.dll	4.1	{000204EF-0000-0000-C000-000000000046}
VBIDE	Microsoft Visual Basic for Applications Extensibility 5.3	Vb6ext.olb	5.3	{0002E157-0000-0000-C000-000000000046}
Access	Microsoft Access 14.0 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 2.8 Library	msado28.tlb	2.8	{2A75196C-D9EB-4129-B803-931327F72D5C}
DAO	Microsoft Data Access Objects	acedao.dll	12	{4A9E1DA-5BAD-4AC7-86E3-24F4CDCECA28}
MSComctlLib	Microsoft Windows Common Controls 6.0 (SP6)	mscomctl.ocx	2.1	{831FDD16-0C5C-11D2-A9FC-0000F8754DA1}
Excel	Microsoft Excel 14.0 Object Library	excel.exe	1.7	{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 14.0 Object Library	Mso.dll	2.5	{2DF8D04C-5BFA-101B-BDE5-00AA0044DE52}
ADOX	Microsoft ADO Ext. 2.8 for DDL and Security	Msadox.dll	2.8	{00000600-0000-0010-8000-00AA006D2EA4}
Ieframe	Microsoft Internet Controls	Ieframe.dll	1.1	{EAB22AC0-30C1-11CF-A7EB-0000C05BAE0B}

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 Bureau of Ocean Energy Management Mission

The Department of the Interior's Bureau of Ocean Energy Management (BOEM) manages the exploration and development of the nation's offshore resources. It seeks to appropriately balance economic development, energy independence, and environmental protection through oil and gas leases, renewable energy development and environmental reviews and studies. The Office of Renewable Energy Programs (OREP) is responsible for the renewable energy activities and alternate energy-related programs on the OCS. The OREP oversees the development and implementation of renewable energy leases and provides policy direction, coordination, and oversight. The OREP embraces a "cradle to grave" approach for managing renewable energy projects to ensure orderly, safe, and environmentally responsible renewable energy development on the OCS. The OREP and BOEM together strive 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 BOEM assistance and expertise to economic development and environmental protection.