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COA USER'S GUIDE

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September 1995

By
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January 1999

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BDM-Oklahoma, Inc.
Bartlesville, Oklahoma

**National Petroleum Technology Office
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ABSTRACT

The Department of Energy (DOE) has one of the largest and most complete collections of information on crude oil composition that is available to the public. The computer program that manages this database of crude oil analyses has recently been rewritten to allow easier access to this information. This report describes how the new system can be accessed and how the information contained in the Crude Oil Analysis Data Bank can be obtained.

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1.0 INTRODUCTION

The composition and physical properties of crude oil vary widely from one reservoir to another within an oil field, as well as from one field or region to another. Although all oils consist of hydrocarbons and their derivatives, the proportions of various types of compounds differ greatly. This makes some oils more suitable than others for specific refining processes and uses. To take advantage of this diversity, one needs access to information in a large database of crude oil analyses. The Crude Oil Analysis Database (COADB) currently satisfies this need by offering 9,056 crude oil analyses. Of these, 8,500 are United States domestic oils. Table 1-1 shows a summary of analyses by location.

Table 1-1 Summary of Analyses in COA Database by Location

Location	Number of Analyses	Location	Number of Analyses
Alabama	20	North Dakota	127
Alaska	49	Ohio	58
Arizona	4	Oklahoma	1298
Arkansas	196	Pennsylvania	148
California	454	South Dakota	5
Colorado	278	Tennessee	2
Florida	9	Texas	2492
Illinois	149	Utah	122
Indiana	21	Virginia	2
Kansas	598	Washington	3
Kentucky	49	West Virginia	49
Louisiana	673	Wyoming	910
Michigan	115	Africa	101
Mississippi	130	Asia	105
Missouri	6	Europe	107
Montana	168	North America (except U.S.)	88
Nebraska	89	South America	90
Nevada	10	West Indies	25
New Mexico	248	Oceania	48
New York	18		

1.1 HISTORY

Crude oils have been analyzed by routine methods in Bartlesville since the 1920s, when the facility was part of the United States Department of the Interior, Bureau of Mines.¹ By 1965 more than 7,000 crude oils had been analyzed, creating one of the largest collections of such information in the world.² After the data were digitized in the late 1970s, the crude oil analysis database retrieval system (COASYS) was implemented in 1980.³ This custom software application placed the COA Data Bank on-line and made it available to the public.

1.2 UPDATE

Since 1980 there have been major advances in data management software, telecommunications software, and hardware. To take advantage of these improvements, the Department of Energy (DOE) has now updated this system using a bulletin board system and a commercial relational database management system. The combination of these two components will allow continual improvements in the operation as well as expansion of the on-line services.

The new implementation has retained basic features of the old COASYS with enhanced user-friendly features to allow operation without frequent reference to the user's guide. This new implementation contains on-line help to show the user how to display location codes, county or subdivision codes, region codes, and definitions of terms needed to build a search of the data bank. The bulletin board system will allow the user to communicate with the system administrator through messaging capabilities. Information on new features and data can be announced on the bulletin board immediately after development. Thus, callers will not have to wait for the user's guide to be republished.

1.3 ANALYSIS PROCEDURES

The database contains results of analysis of the general properties and chemical composition, as well as the field, formation, and geographic location of the crude oil sample. Figure 1-1 shows the procedures used to analyze crude oil. The gravity, sulfur content, nitrogen content, viscosity, color, and pour point have been determined for most samples. The oil is also distilled up to an equivalent temperature of 418.6°C (785.5°F), obtaining fractions at 25°C (45°F) intervals. In addition to volume percent of each distillation fraction, the gravity, refractive index, viscosity, and cloud point of each fraction are obtained where appropriate. From this data, calculations can be made to determine the asphalt content, straight-run gasoline, hydrocarbon composition, and other properties. Table 1-2 lists some common oil distillation categories that are frequently used for oil correlations.

Figure 1-1 Procedure for Crude Oil Analysis

Table 1-2 Summary of Distillation Categories Used for Oil Correlations

Category	Description
Light Gasoline	Fractions up to 100°C (212°F).
Total Gasoline and Naptha	Fractions up to 200°C (392°F) except those with specific gravity greater than 0.825.
Kerosene	Fractions 200°–275°C (392°–527°F) having specific gravity below 0.825.
Gas Oil	Atmospheric distillation fractions above 0.825 specific gravity plus vacuum distillate with viscosity less than 50 SUS.
Nonviscous Lubricating Distillate	Vacuum distillate with viscosity between 50 and 100 SUS.
Medium Lubricating Distillate	Vacuum distillate with viscosity between 100 and 200 SUS.
Viscous Lubricating Distillate	Distillate with viscosity over 200 SUS.
Residuum	Remaining after distillation equivalent to 420°C (788°F).

1.4 NEW DATA

Supplemental information about crude oils currently in the data bank and information about new crude oils will be added to the data bank. Analyses of trace metals and hydrocarbon types that are of the most interest to industry—BETX (benzene, ethylbenzene, toluene, xylenes), and PNA (paraffins, naphthenes, aromatics)—have been started on oil samples that are in cold storage in Bartlesville. Additional data on the wells sampled will also be added in the future. The bulletin board screen will announce these additions and the search parameters you can use to retrieve this new data.

1.5 ACCESS

The COA Data Bank can be called from almost any computer with a modem and communication software.

The computer currently hosting this on-line data bank is a 80486 clone with an external Hayes compatible 14,400 baud modem. The computer's operating system is Microsoft DOS™ 6.22. The software leading to the COA Data Bank are PCBoard™ version 15.0a and DOORWAY™ version

2.2. Standalone FoxPro™ executable code implements users' requests for COA information and reports.

There is no charge for using the DOE/BPO COA Data Bank. However, the data bank is not available through any time-sharing system, and there is no toll-free telephone line.

1.5.1 About CBoard

PCBoard⁴ is a bulletin board system (BBS) which gives you an opportunity to exchange information. PCBoard offers a variety of services, including:

- Reading bulletins
- Leaving comments for the system operator
- Downloading files
- Opening doors to run applications
- Reading messages from the system operator.

PCBoard offers a graphic mode, which can be used by callers with computers which use ANSI graphics (including all PC-compatibles, certain Macintosh systems, and certain SUN workstations). PCBoard also offers an expert user mode.

1.5.2 About DOORWAY

DOORWAY⁵ allows you to remotely control a computer through a modem. It serves as an interface between PCBoard and the FoxPro⁶ application. To activate DOORWAY, choose **Crude Oil Analysis Data Bank** through a PCBoard door. This choice summons the application that allows callers to retrieve information from the COA Data Bank.

 

2.0 USING THE DATABANK

2.1 ACCESSING THE COA DATA BANK

Figure 2-1 displays the steps to enter and exit the program. The sections which follow will describe how to search and retrieve data. Refer to Appendix A for complete example of COA logon session.

Figure 2-1 Procedure Chart for Entering the Crude Oil Analysis Data Bank

2.2 SET UP COMMUNICATION HARDWARE AND SOFTWARE

Follow these steps to install the hardware and software:

1. Check if your computer can use ANSI graphics.
2. Install the modem hardware in your remote computer.
3. Install the communications software package.
4. Test the communications software package with the hardware.
5. Check the software to see which download protocol you will be using.
6. Configure the communications software for the following dial-in parameters:
 - Baud rate: 1200, 2400, 4800, 9600, or 19200
 - Parity: None
 - Data bits: 8
 - Stop bits: 1
7. Dial (918) 337-4440 with the dial-in parameters to connect with the COA Data Bank computer.

A connection should soon be established.

2.3 LOGIN FOR PCBOARD

Complete the login as follows.

PCBoard asks if you would like a graphical display.

1. Respond with **Y** (yes, your computer can use ANSI graphics) or **N** (no, your computer cannot use ANSI graphics).

PCBoard then displays a welcoming screen and prompts with the question: Please enter your first name?

2. Type your first name and press **<Enter>**.

PCBoard then prompts with the question: Please enter your last name?

3. Type your last name and press **<Enter>**.

After reviewing a current list of names in the users file, PCBoard finds out if you are a new caller or registered user.

If you are a registered user, PCBoard will ask you to type and enter your password. If you are a new caller, PCBoard asks you to reenter your first and last names in the event of a typing error. After the first and last names are correctly entered, type **C** to continue the logon process.

2.3.1 New Users

First-time callers will receive a new user instruction screen. This screen gives you step-by-step instructions on how to access the COA Data Bank from PCBoard. New callers are also asked to supply various registration information, including a password.

1. Select a password to use upon entering PCBoard.
Note that upper and lower case do matter for passwords but do not matter for all other entries. Subsequent calls after registration only require that you type your first and last names and the password you entered at registration.
2. Record the password here for future reference:
PASSWORD: _____
3. Type the password on the computer and press **<Enter>**.
4. Retype the password and press **<Enter>** to verify.
5. Type and enter the requested information, including:
 - city and state
 - phone numbers
 - CPU brand
6. Type **Y** (yes, you would like the screen cleared between each message) or **N** (no, you would not like the screen cleared between each message) and press **<Enter>**.
The final registration question asks for your default protocol preference. If you prefer a certain protocol and plan to use it regularly when downloading files, specify it. Choosing **None** will allow you to pick a protocol before each download.
7. Select a download protocol based on the requirements of your communication software and modem and press **<Enter>**.

2.3.2 Accessing the COA Main Menu

At the end of a login, PCBoard displays its main menu (see Fig. 2-2).

1. Note these PCBoard Main Menu options (Table 2-1) for future referenceType **DOOR** and press **<Enter>**.

Figure 2-2 PCBoard Main Menu

Table 2-1 PCBoard Main Menu Options

If you wish to do this	Type this command
Enter Crude Oil Analysis Data Bank.	DOOR
Leave a comment for system operator (sysop).	C
Read messages from the system operator.	R
Read bulletin listings.	B
Change display modes to graphic or text.	M (This command toggles between text mode and ANSI graphic mode.)
Change display mode to expert or standard—in standard mode, menus appear; in expert mode, no menus appear.	X (This command toggles between expert mode and standard mode.)
For goodbye to exit.	G (PCBoard displays an exit message and disconnects you.)
Download files you previously generated by COA application.	D (See section 2.10.)
Answer a questionnaire to add your oil sample to the database.	QU
Download a new End User's Guide.	GUI (Follow onscreen steps.)

A numbered list of doors appears. (The number of doors may change if system options increase.)

2. To reach the Crude Oil Analysis (COA) main menu through Door 1, type **1** and press **<Enter>**.

2.4 OVERVIEW OF COA DATA SEARCH

To complete a search, you will complete four main types of activities (see Fig. 2-3):

1. Retrieve the data you need by selecting the criteria for the search—**filter** (section 2.5).
2. Describe how you want the data retrieved to appear in columns—**display** (section 2.6).
3. Order the lines of data retrieved in an alphabetical or numerical sequence—**sort** (section 2.7).

Figure 2-3 Search Flow and Activities

Figure 2-4 COA Main Menu Selection

4. Convert the data retrieved into the file format of your choice for easy downloading and importing—**file format** (section 2.8).

2.5 SELECT KEYWORDS FOR FILTERING COA DATA

Follow these steps to filter COA data to your specifications:

1. Note the options at the COA Main Menu (Fig. 4), see options (see Fig. 2-2) :Type **S** and press **<Enter>** to display the COA Search Selection menu.
The Search Selection menu (see Fig. 2-5)) will appear.
2. Note the options at the Search Selection menu (Table 2-3):Type **B** and press **<Enter>** to build a new search.

Table 2-2 COA Main Menu Options

If you wish to do this	Type this command and press <Enter>
Display the Search Selection Menu.	S
Retrieve analysis reports previously created.	A
Quit and return to PCBoard.	Q

Figure 2-5 Search Selection Menu

Introductory text and a list of available keywords appear, and the screen pauses. For a printed list of keywords, see Appendix C.

3. Jot down for future reference those keywords which describe what you are seeking.
4. Type any key on the keyboard to display the Filter Selection Menu (see Fig. 2-6).
5. Note the options of the Filter Selection Menu (see Table 2-4) for future reference.

The Filter Selection Menu enables you to choose the keywords that constrain your search to specific conditions.

6. Type **A** and press <Enter>.

Table 2-3 Search Selection Menu Options

If you wish to do this	Type this command and press <Enter>
Build a new search.	B
Edit a prior search. The option is available only if a previous search was completed during the current logon session. When you select the edit option, the number of searches completed in the current session appears. Select a search number from the list of system-assigned search numbers and user-constructed descriptions.	E
Exit and return to the COA Main Menu.	X

Figure 2-6 Filter Selection Menu

Table 2-4 Commands of the Filter Selection Menu

If you wish to do this	Type this command
Add a keyword. This option allows you to add a new keyword to the query. Each keyword is used as a filtering condition.	A
Change a keyword or a filtering condition on a previously selected keyword.	C (See section 2.5.1)
Delete a keyword.	D (See section 2.5.2)
Obtain Filter Selection Menu option help.	H (See section 2.5.3)
Display a list of keywords.	K (See section 2.5.4 and Appendix B)
Cancel and return to Search Selection menu.	N
Go to the Display Selection Menu.	G (See section 2.6)

SEARCH CONDITIONS

For the filter keyword LOC, pick the number of the desired search condition

1. Equal
2. Not equal
3. Less than or equal
4. Less than
5. Greater than or equal
6. Greater than
7. Between a range of Min and Max values

Enter the number of your choice =>

Figure 2-7 Search Condition Selection

A list of keywords appears.

7. Type and enter your keyword selection.
8. Choose a search condition, type its corresponding number and press **<Enter>** (see Fig. 2-7).

If the computer prompts for a specific parameter, type the appropriate parameter and press **<Enter>**. If you selected the keywords CNTY (county), LOC (geographic location), or REGION (regions in Texas and Oklahoma), you will see specific help menus. These menus let you select a code based upon the county, location, or region name. For a listing of the numerical codes for states and counties of the United States, see Appendix C.

9. Repeat steps 8 through 10 until all your keywords and their search conditions have been entered.
10. Choose option **G** to proceed to the Display Selection menu.

The keywords will be retained, and your list of keywords and the Display Selection Menu will appear. This menu's arrangement resembles that of the Filter Selection Menu.

Now go to Section 2.6 to continue the search.

2.5.1 Changing Your Keyword

Selecting option **C** gives you two ways to change keyword selection:

- Replace the current keyword by selecting a different one
- Modify the filtering condition of a previously selected keyword

When you choose **C**, a numbered list of currently selected filter keywords appears. A prompt asks you to enter a number. When you enter a valid number, a prompt asks you if you want to select a new keyword. You may answer **Y** (yes) or **N** (no). If **Y**, a list of keywords is displayed. If you select **N**, you will be immediately prompted to pick one of seven search conditions (see Fig. 2-7).

After you enter a search condition number, the system informs you of the data type of the keyword and then asks for a value. It displays a list of keywords, search conditions, and values. Then the Filter Selection Menu appears again.

2.5.2 Deleting a Keyword

Choose option **D** to delete a previously selected keyword. Enter the number associated with the keyword on the listing.

2.5.3 Help Menu

Choose **H** to display information about each of the Filter Selection Menu options. This information will be displayed one screen at a time for each option. You will be asked if you need the keyword definition display.

If you type **Y**, the Keyword Help Menu will appear. You can obtain a list of keywords with a short description of each or complete definitions of keywords from this menu. Choose the last option on the Keyword Help Menu to return to the Filter Selection Menu.

2.5.4 Keyword List

Choose option **K** to display all available filtering keywords.

2.5.5 Canceling Filter Selection

Choose option **N** to cancel the filter selection process and return to the Search Selection Menu. If you choose this option, your selected filter keywords will be lost.

Figure 2-8 Display Selection Menu

2.6 SELECT KEYWORDS FOR SCREEN DISPLAY

The Display Selection Menu (see Fig. 2-8) enables you to specify how columns of retrieved data will be arranged in the report.

Follow these steps to set up your retrieved data records:

1. Note the options are described in Table 2-5

Table 2-5 Display Selection Menu Options

If you wish to do this	Type this command
Add a keyword. This option allows you to arrange data columns in the report to your needs.	A
Replace one keyword with another. Select the keyword to be replaced from a list of current selections.	C
Delete a keyword.	D
Obtain Screen Display Menu option help. You can reach the Keywords Help Menu from this screen.	H
Display a list of all available keywords.	K (Appendix B)
Cancel and return to Search Selection menu. With this option, your selected display keywords and filter keywords will be lost.	N
Go to the Sort Selection Menu.	G (Section 2.7)

2. Decide the sequence in which columns of data should be displayed.
3. At the Display Selection Menu, type **A** and press **<Enter>** to add a new keyword.
Lists of currently selected keywords and all display keywords will appear.
4. Type a keyword from the list and press **<Enter>**.
After your new selection, the Display Selection Menu will reappear.
5. Repeat steps 3 and 4 until all your keywords have been entered.
6. Type **G** and press **<Enter>** to display the available sort keywords, followed by the Sort Selection Menu (see Fig. 2-9).

Now go to Section 2.7 to continue formatting the data.

2.7 SELECTING SORT METHODS

The Sort Selection menu allows you to define different ways to sort the retrieved data. It resembles the Filter Selection and Display Selection menus.

Follow these steps to order your retrieved data record:

1. Note the menu options described in Figure 2-6 for future reference.

Figure 2-9 Sort Selection Menu

Table 2-6 Sort Methods Menu Options

If you wish to do this	Type this command
Add a keyword. This option allows you to order the data in the report.	A
Replace one keyword with another.	C
Delete a previously selected keyword.	D
Obtain Screen Display Menu option help. You can reach the Keywords Help Menu from this screen.	H
Display a list of all available keywords.	K (See Appendix B)
Cancel and return to Search Selection menu. All previously selected filter, display, and sort keywords will be discarded.	N
Retrieve the data and complete the listing.	F (See section 2.7)

2. Decide the order in which data should be listed.
3. Type **A** and press <Enter> to select the first keyword you wish to sort by from a list of available keywords.
A list of currently selected screen display keywords will appear. You will be prompted to enter a keyword from the list.
4. Type a keyword and press <Enter>.
After your selection the Sort Selection Menu reappears.
5. Repeat steps 3 and 4 until you have chosen all your sort keywords.
6. Type **F** and press <Enter> to build the query.
You will be prompted to enter a description of your search. This description will be used as the search name and as a heading for each screen of output information.
7. Type description of your search (80 characters or less) and press <Enter>.
The system will display a message asking you to wait while it builds the query. Wait times will vary because some queries take longer than others to generate.
The screen will display the total number of analyses that meet the filter conditions, as well as the filter, display, and sort keywords that you selected. Then the computer will ask: Do you want to view the selected information? (Y/N)
8. Type **Y** (for yes) and press <Enter>.
The computer will ask: Do you want to pause between each screen of data? (Y/N)
9. Type **Y** (for yes if you have more than a few lines to view) or type **N** (for no) and press <Enter>.
10. Review the screen information and jot down any information you need immediately, plus the unique **sample_id** of any crude oil samples for which you want detailed analytical reports.

The **sample_id** numbers are used to generate reports containing Bureau of Mines analyses for crude oil samples.

IMPORTANT: Because you can download retrieved data only after exiting the COA application, you may wish to take notes or print from computer screen now to save redialing and a second login.

Now go to Section 2.8 to select a file format.

2.8 MAKING FORMATTED FILES

You can choose from five file formats for your retrieved data using the File Format Menu.

The computer prompts: Do you want to make a file of the results of the query that is read into a spreadsheet program? (Y/N).

IMPORTANT: This is your only chance to save the search data into a *formatted* file. The computer will give you the name of the formatted file upon your exit from the COA application, at which time you may download the file. Search data is saved into an *unformatted* log file when—and only when—you view the search data onscreen. The log file has an eight-integer name followed by the extension **.dat**. This log file can be also downloaded after exiting the COA application. Both formatted and log data files are kept for 30 days. After 30 days, the files are erased.

1. Type **Y** (for yes) and press **<Enter>**.
2. Select a file format from this list:
 - Microsoft EXCEL (extension **.XLS**)⁷
 - FoxPro/dBASE (extension **.DBF**)⁸
 - Data Interchange Format (extension **.DIF**)⁹
 - Lotus 1-2-3 rev.2.x (extension **.WK1**)
 - Lotus 1-2-3 rev.1-A (extension **.WKS**)
3. Type a number corresponding to the desired file format and press **<Enter>**.

The COA Main Menu (see Fig. 2-4) will appear. Go to section 2.9 if you wish to generate an analytical report for a crude oil, or to section 2.10 to download search data and exit.

2.9 HOW TO GENERATE A REPORT

To generate a report for a crude oil, you need the oil's unique *sample id*. (obtained through the search process). The analyses that comprise the reports conform to the Bureau of Mines's

REPORT MENU

1. Routine Analysis
2. Hydrocarbon-Type Analysis
3. Both Analyses
4. Go Back to the COA Main Menu

Please type the number of your choice ==>

Figure 2-10 Report Menu

Routine Method for the Analysis of Crude Petroleum. You may select a routine analysis report, a hydrocarbon analysis report, or both types of reports.

Follow these steps to generate a report.

1. Select option **A** (Analysis Reports) from the COA Main Menu.
The Report Menu (see Fig. 2-10) will appear.
2. Select the option using Table 2-7.

The computer prompts: Please enter the sample id.

Table 2-7 Options for Report Menu

If you want	Type this and press <Enter>
Routine analysis report (see Appendix D for an example) containing the physical properties of the 15 fractions of crude oil.	1
Hydrocarbon-type analysis report (see Appendix D for an example) containing fraction numbers and the volume of aromatics, paraffins-naphthenes, etc.	2
Both types of reports for a single sample	3
To return to the COA Main Menu (Fig. 5).	4

3. Type the **sample id** number for the crude oil and press <Enter>.

IMPORTANT: The report will appear on the screen. You may print directly from screen or obtain a text of the report from the log file. Report data is saved into an unformatted log file. The log file has an eight-integer name followed by the extension **.dat**. This log file can be also downloaded after exiting the COA application.

At the end of the report, the computer prompts: End of report...press enter to continue.

4. Press <Enter> to return to the Report Menu.
5. Repeat the previous steps until you have obtained the necessary reports.
6. Type **4** and press <Enter> to return to the COA Main Menu.

2.10 HOW TO DOWNLOAD FILES AND EXIT PCBOARD

Follow these steps to download the files you need and exit.

1. Type **Q** at the Crude Oil Databank COA Main Menu and press <Enter>.

The screen shows a list of file names and prompts: Several files have been created for you.

2. **WRITE DOWN** the names of all the files you wish to download.

The computer will return to PCBoard, which will ask you to reenter your password.

3. Type your password and press <Enter>.

The computer will display the PCBoard Main Menu.

4. Type **D** (for download) and press <Enter>.

The computer prompts: Enter the filename to be downloaded.

5. Type in a *single* filename and press <Enter>.

6. Repeat step 5 until you have recorded all the files you need to download.

7. Press <Enter> at PCBoard download prompt to exit.

A screen appears that contains the total number of files, the total size in bytes, and the current download protocol.

8. Press <Enter> to start downloading all the specified files.

The communication software on your computer will tell you what files it has received and other miscellaneous messages.

The PCB Main Menu will now appear. You may choose any menu option at this point.

3.0 REFERENCES

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APPENDIX A

The following excerpt depicts a typical logon session. All user response is underlined while computer display is in bold text. Explanations are preceded with an astrick (*)

*The following menu is displayed after the user has choosen "S" option of the main menu.

CRUDE OIL DATABANK COA SEARCH SELECTION MENU

B	Build a New Search
X	Exit to Main Menu

Enter the letter of your choice -> B

*By choosing option "B" of the Search Selection Menu, you initiate the query building process for a new search. Please note, any option of any menu can be upper or lower case. In the preceeding menu, "B" can be upper or lower case.

You will now be asked a series of questions based upon the selection of keywords. Your response to these questions will allow you to specify filtering (search) conditions, screen display, and sorted output information.

Press Enter to continue

* "...Press Enter to continue..." causes the screen display to pause until the enter key is pressed. This allows any messages or displayed information to be read at your discretion.

AVAILABE SELECTION KEYWORDS

API	LGS	SGGO
CNTY	LOC	SGG SNP
CRRES	MVLD	SGKD
CRCO	N2CO	SGLGS
DEPTH	N2RES	GRR
FIELD	NVLD	SRES
FORM	PRPT	SU77
GEOCODE	REGION	SU100
GO	RES	VLD
GSNP	SCO	YEAR
KD		SGCO

Press Enter to Continue

No keywords are selected.

FILTER SELECTION MENU

A - Add a new Keyword
H - Filter Selection Help
K - Display a List of Keywords
N - Cancel and return to Search Selection Menu

Filter Selection choice -> H

*The "H" option of the Filter Selection Menu displays help text about each of the options for this menu.

Filter Selection Help

The selection of one or more keywords will allow you to specify filtering conditions for the query currently being built.

Explanation of Filter Selection Menu

'A - Add a Keyword' menu option allows you to add a new keyword to the query. Each selected keyword is used as a filtering condition.

Press Enter to continue

*The screen is paused to allow reading of the help text .

'K - Display a List of Keywords' selection of this menu option displays a list of all available filtering keywords.

'N - Cancel and return to Search Selection Menu' menu option allows you to cancel the filter selection process and return to the Search

Selection Menu.

'G - Go to Display Selection Menu'. Select this menu option when you are finished choosing filtering keywords. The Display Menu allows you to select which keywords will be displayed on the screen.

Please note, if you have mistyped a menu option or the modem picks up line noise, you will be asked to re-enter the information.

Do you need keyword definitions ? (Y or N) -> Y

*By answering "Y" to this question, the Keyword Help Menu is displayed. There are three options on this menu. The first lists all keywords with a short definition. Option two asks you for a keyword. After the keyword is supplied, a complete definition is displayed. The last option exits the keyword help menu and returns you back to the Filter Selection Menu.

Keywords Help Menu

1.	Listing of Keywords
2.	Keyword Description
3.	Go back to Filter Selection Menu

Please type the number of your choice -> 1

KEYWORD	SHORT DESCRIPTION
API	API GRAVITY OF CRUDE
CNTY	COUNTY CODE
CRRES	CARBON RESIDUE WT. % RESIDUUM
CRCO	CARBON RESIDUE WT. % CRUDE OIL
DEPTH	DEPTH FORMATION TOP
FIELD	FIELD NAME
FORM	FORMATION NAME
GEOCODE	FORMATION CODE
SGGSP	SPECIFIC GRAVITY GASOLINE/NAPHTHA
SGGO	SPECIFIC GRAVITY GAS OIL
GSNP	GASOLINE/NAPHTHA VOL
GO	GAS OIL VOLUME
SGKD	SPECIFIC GRAVITY KEROSENE DIST
KD	KEROSENE DISTILLATE VOL
LGS	LT GASOLINE VOL
SGLGS	SPECIFIC GRAVITY LT GASOLINE
LOC	STATE/COUNTRY CODE
MVLD	MED VISC LUB DISTILLATE VOL
N2CO	NITROGEN CRUDE OIL WT
N2RES	NITROGEN RESIDUE
NVLD	NON VISC LUB DISTILLATE VOL

Press Enter to continue

KEYWORD	SHORT DESCRIPTION
NVLD	NON VISC LUB DISTILLATE VOL
PRPT	POUR POINT
RES	RESIDUUM VOL
SGRES	SPECIFIC GRAVITY RESIDUE
SGCO	SPECIFIC GRAVITY CRUDE OIL
SRES	SULFUR RESIDUE
SCO	SULFUR CRUDE OIL
SU100	SU VISCOSITY 100
SU77	SU VISCOSITY 77
VLD	VISCOUS LUB DISTILLATE VOL
YEAR	

Press Enter to continue

KEYWORDS HELP MENU

1.	Listing of Keywords
2.	Keyword Description
3.	Go back to Filter Selection Menu

Please type the number of your choice -> 2

Please enter the keyword -> LOC

*After the keyword "loc" is entered, the complete description is displayed

Complete Keyword Description

Keyword Short Description

LOC STATE/COUNTRY CODE

Long Description

Location Name Code--each state in the U.S., each Canadian Province and each foreign country for which the COA bank has sample data is given a numeric code.

Press Enter to continue

KEYWORDS HELP MENU

-
1.	Listing of Keywords
2.	Keyword Description
3.	Go back to Filter Selection Menu
-

Please type the number of your choice -> 3

*When option three is chosen, the you are returned to the Filter Selection Menu to continue building the query.

No keywords are selected.

*The "No keywords are selected." message is displayed when there are no selected keywords chosen for the current query.

FILTER SELECTION MENU

-
A - Add a new Keyword
H - Filter Selection Help
K - Display a List of Keywords
N - Cancel and return to Search Selection Menu
-

Filter Selection choice -> A

*Menu option "A" prompts you to enter a keyword from a list of available keywords. The entire keyword must be typed in at the prompt.

FILTER SELECTION KEYWORDS

API	LGS	SGGO
CNTY	LOC	SGGSNP
CRRES	MVLD	SGKD
CRCO	N2CO	SGLGS
DEPTH	N2RES	GRR
FIELD	NVLD	SRES
FORM	PRPT	SU77
GEOCODE	REGION	SU100
GO	RES	VLD

FILTER SELECTION KEYWORDS

GSPN	SCO	YEAR
KD	SGCO	

Enter Filter Selection Keyword -> LOC

For the filter keyword LOC, pick the number of the desired search condition.

After a choice is made, the keyword is restricted to the selected search condition.

1. Equal
2. Not equal
3. Less than or equal
4. Less than
5. Greater than or equal
6. Greater than
7. Between a range of Min and Max values

Enter the number of your choice -> 1

LOC is a integer with a total length of 5

*The above message informs you of the type information acceptable to the currently selected keyword. For each keyword choosen in this phase of query construction, a similar message is displayed. In this case, the message tells you that "LOC" is a five digit number.

Do you need a listing of state/country codes ? (Y/N) Y

*An answer of "Y" displays the Location Menu which consists of five options. The last option allows you to return to the Filter Selection Menu.

Location Menu

1.	Listing of all Locations (USA and foreign)
2.	Listing of USA Locations
3.	Listing of foreign Locations only
4.	Listing of a single Location
5.	Go back to Filter Selection Menu
-

Please type the number of your choice -> 1

*Option one displays all location codes and the associated state/country currently in the data bank

STATE CODE		STATE
1.		ALABAMA
2.		ARIZONA
3.		ARKANSAS
4.		CALIFORNIA
5.		COLORADO
6.		CONNECTICUT
7.		DELAWARE
8.		DIST OF COLUMBIA
9.		FLORIDA
10.		GEORGIA
11.		IDAHO
12.		ILLINOIS
13.		INDIANA
14.		IOWA
15.		KANSAS
16.		KENTUCKY
17.		LOUISIANA
18.		MAINE
19.		MARYLAND
20.		MASSACHUSETTS

Please enter the numeric code or press Enter to see more codes ->

*At this point, you have the option of viewing more codes or entering the code number from information currently displayed. If more codes are needed, pressing enter displays more codes. Each of the screens has the same prompt.

STATE CODE	STATE
20.	MASSACHUSETTS
21.	MICHIGAN
22.	MINNESOTA
23.	MISSISSIPPI
24.	MISSOURI
25.	MONTANA
26.	NEBRASKA
27.	NEVADA
28.	NEW HAMPSHIRE
29.	NEW JERSEY
30.	NEW MEXICO
31.	NEW YORK
32.	NORTH CAROLINA
33.	NORTH DAKOTA
34.	OHIO
35.	OKLAHOMA
36.	OREGON
37.	PENNSYLVANIA
38.	RHODE ISLAND
39.	SOUTH CAROLINA

Please enter the numeric code or press Enter to see more codes ->

*Enter was pressed to view more location codes.

STATE CODE	STATE
39.	SOUTH CAROLINA
40.	SOUTH DAKOTA
41.	TENNESSEE
42.	TEXAS
43.	UTAH
44.	VERMONT
45.	VIRGINIA
46.	WASHINGTON
47.	WEST VIRGINIA
48.	WISCONSIN
49.	WYOMING
50.	ALASKA
51.	HAWAII
52.	UNKNOWN
53.	ALBERTA
54.	BRITISH COLUMBIA
55.	MANITOBA
56.	NEW BRUNSWICK
57.	NEWFOUNDLAND
58.	N.W. TERRITORIES

Please enter the numeric code or press Enter to see more codes ->

*Enter was pressed to view more location codes.

STATE CODE	STATE
66	N.W. TERRITORIES
67	NOVA SCOTIA
68	ONTARIO
69	YUKON
70	QUEBEC
71	SASKATCHEWAN
72	ALGERIA
73	ANGOLA
74	EGYPT
75	GABON
76	LIBYA
78	MALAGASY
79	MOROCCO
80	NIGERIA
81	U. ARAB EMIRATES
82	BAHRAIN
83	INDIA
84	BORNEO
85	JAVA
86	SUMATRA

Please enter the numeric code or press Enter to see more codes ->

*Enter was pressed to view more location codes.

STATE CODE	STATE
85	SUMATRA
86	IRAN
87	IRAQ
88	ISRAEL
89	JAPAN
90	KUWAIT
91	PAKISTAN
92	PALESTINE
93	QATAR
94	SAUDI ARABIA
95	TAIWAN
96	THAILAND
97	ALBANIA
98	CZECHOSLOVAKIA
99	POLAND
100	RUMANIA
101	U.S.S.R.
102	AUSTRALIA
103	FRANCE
104	WEST GERMANY

Please enter the numeric code or press Enter to see more codes ->

*Enter was pressed to view more location codes.

STATE CODE	STATE
104	WEST GERMANY
105	GREECE
106	ITALY
107	NETHERLANDS
108	NORWAY
109	NEW ZEALAND
110	UNITED KINGDOM
111	MEXICO
112	ARGENTINA
113	CHILE
114	COLOMBIA
115	ECUADOR
116	PERU
117	VENEZUELA
118	CUBA
119	TRINIDAD
120	BURMA
121	YUGOSLAVIA
122	SARAWAK
123	BRAZIL

Please enter the numeric code or press Enter to see more codes ->

*Enter was pressed to view more location codes.

Please enter the numeric code or press Enter to see more codes ->

*Enter is pressed but there are no more location codes. When this happens the location menu is displayed to allow the choice of a new menu option.

STATE CODE	STATE
123	BRAZIL
124	CHIA

LOCATION MENU

1.	Listing of all Locations (USA and foreign)
2.	Listing of USA Locations
3.	Listing of foreign Locations only
4.	Listing of a single Location
5.	Go back to Filter Selection Menu

Please type the number of your choice -> 2

*Option two displays location codes and state names for the United States.

LOCATION MENU

1.	Listing of all Locations (USA and foreign)
2.	Listing of USA Locations
3.	Listing of foreign Locations only
4.	Listing of a single Location
5.	Go back to Filter Selection Menu

Please type the number of your choice -> 3

*Option three displays location codes of foreign countries.

LOCATION MENU

1.	Listing of all Locations (USA and foreign)
2.	Listing of USA Locations
3.	Listing of foreign Locations only
4.	Listing of a single Location
5.	Go back to Filter Selection Menu

Please type the number of your choice -> 4

*With the choice of option 4, you can find the location code for a single state/country.

For which state/country do you need the code? TEXAS

*Type in the state/country name at the prompt. Please note, the entire name must be entered. If the name is mistyped, the error message "Invalid entry. Please enter a valid "state/country name" is displayed and then the Location Menu is activated.

Location code is equal to 42

*The location code is displayed on the screen.

The following Filter Keyword is defined:

1. LOC = 42

*This informative message is displayed as each filter keyword is added to the query. The Filter selection menu is re-displayed. You may now make a choice from the Filter menu

FILTER SELECTION ON MENU

A - Add a new Keyword
C - Change a Keyword
D - Delete a Keyword
H - Filter Selection Help
K - Display a List of Keywords
N - Cancel and return to Search Selection Menu
G - Go to Display Selection Menu

Filter Selection choice -> A

*Option "A" allows the selection of another keyword to the filter selection process. A list of filter selection keywords are displayed from which the you make a selection.

FILTER SELECTION KEYWORDS

API	LGS	SGGO
CNTY	LOC	SGG SNP
CRRES	MVLD	SGKD
CRCO	N2CO	SGLGS
DEPTH	N2RES	GRR
FIELD	NVLD	SRES
FORM	PRPT	SU77
GEOCODE	REGION	SU100
GO	RES	VLD
G SNP	SCO	YEAR
KD	SGCO	

Enter Filter Selection Keyword -> CNTY

For the filter keyword CNTY, pick the number of the desired search condition.

1. Equal
2. Not equal
3. Less than or equal
4. Less than
5. Greater than or equal
6. Greater than
7. Between a range of Min and Max values

Enter the number of your choice -> 1

CNTY is a integer with a total length of 3

Do you need a listing of counties? (Y/N) Y

*The "Counties Menu" is similar to the location menu. This menu also has five options from which you may choose. When finished, choose option five to return to the "Filter Selection Menu".

COUNTIES MENU

1.	Listing of all counties/provinces (USA and foreign)
2.	Listing of USA states and counties
3.	Listing of Foreign provinces
4.	Listing of a single county/province
5.	Go back to Filter Selection Menu

Please type the number of your choice -> 4

The following two questions will ask for county and state names.

*Leaving the county question blank with an answer to only the state question will result in a listing of all counties in the specified state. The converse is also true. Leaving the state blank will result in a listing of all the counties by that name regardless of the state.

What county do you want ->

*Press the Enter key if you don't know the county

Please enter the full state name which this county is in -> TEXAS

*From the above example, all county codes, names, and state name would be displayed on the screen for the state of Texas.

COUNTY CODE	COUNTY NAME	STATE/COUNTRY
1	ANDERSON	TEXAS
3	ANDREWS	TEXAS
7	ARANSAS	TEXAS
9	ARCHER	TEXAS
13	ATASCOSA	TEXAS
15	AUSTIN	TEXAS
21	BASTROP	TEXAS
25	BEE	TEXAS
29	BEXAR	TEXAS
33	BORDEN	TEXAS
37	BOWIE	TEXAS
39	BRAZORIA	TEXAS
43	BREWSTER	TEXAS
47	BROOKS	TEXAS
49	BROWN	TEXAS
55	CALDWELL	TEXAS
57	CALHOUN	TEXAS
59	CALLAHAN	TEXAS
63	CAMP	TEXAS
65	CARSON	TEXAS

Please enter the numeric code or press Enter to see more codes => 63

*You have entered code number "63". At this point, the application returns to the "Filter Selection Keywords Menu". Prior to displaying this menu, all currently selected filter keywords are displayed in a numbered list.

The following Filter Keywords are defined:

1. LOC = 42

2. CNTY = 63

FILTER SELECTION ON MENU

A - Add a new Keyword

C - Change a Keyword

D - Delete a Keyword

H - Filter Selection Help

K - Display a List of Keywords

N - Cancel and return to Search Selection Menu

G - Go to Display Selection Menu

Filter Selection choice -> D

*When option "D" is selected, a numbered list of filter keywords are displayed to you. From this list, you choose one keyword to delete from the group of filter keywords.

Currently Selected Filter Keywords

1. LOC = 42

2. CNTY = 63

To delete a keyword, pick a number from the list above -> 2

*The number entered will delete the keyword associated with it. A list of filter keywords is then displayed. This list also confirms that the deletion was successful.

The following Filter Keyword is defined:

1. LOC = 42

Filter Selection choice -> A

FILTER SELECTION ON MENU

A - Add a new Keyword
C - Change a Keyword
D - Delete a Keyword
H - Filter Selection Help
K - Display a List of Keywords
N - Cancel and return to Search Selection Menu
G - Go to Display Selection Menu

FILTER SELECTION KEYWORDS

API	LGS	SGGO
CNTY	LOC	SGGSNP
CRRES	MVLD	SGKD
CRCO	N2CO	SGLGS
DEPTH	N2RES	GRR
FIELD	NVLD	SRES
FORM	PRPT	SU77
GEOCODE	REGION	SU100
GO	RES	VLD
GSNP	SCO	YEAR
KD	SGCO	

Enter Filter Selection Keyword -> REGION

*For the filter keyword REGION, pick the number of the desired search condition.

1. Equal
2. Not equal
3. Less than or equal
4. Less than
5. Greater than or equal
6. Greater than
7. Between a range of Min and Max values

Enter the number of your choice -> 1

REGION is a integer with a total length of 2

Do you need a listing of regions ? (Y/N) Y

*Region information is available for Texas and Oklahoma. By answering "Y" to the above question, the "Region Menu" is displayed.

REGION MENU

1.	Oklahoma Region List
2.	Texas Region List
3.	Oklahoma and Texas Regions List
4.	Go back to Filter Selection Menu

Please type the number of your choice -> 2

*Selecting menu option two, displays the Region Number, County Code, County Name, and State for the state of Texas.

REGION NO.	COUNTY CODE	COUNTY NAME	STATE
1	13	ATASCOSA	TEXAS
1	21	BASTROP	TEXAS
1	29	BEXAR	TEXAS
1	55	CALDWELL	TEXAS
1	127	DIMMIT	TEXAS
1	163	FRIO	TEXAS
1	187	GUADALUPE	TEXAS
1	283	LA SALLE	TEXAS
1	311	MC MULLEN	TEXAS
1	323	MAVERICK	TEXAS
1	325	MEDINA	TEXAS
1	331	MILAM	TEXAS
1	453	TRAVIS	TEXAS
1	491	WILLIAMSON	TEXAS
1	493	WILSON	TEXAS
2	25	BEE	TEXAS

REGION NO.	COUNTY CODE	COUNTY NAME	STATE
2	57	CALHOUN	TEXAS
2	123	DE WITT	TEXAS
2	175	GOLIAD	TEXAS
2	239	JACKSON	TEXAS

Please enter the numeric code or press Enter to see more codes -> 1

The following Filter Keywords are defined:

1. LOC = 42
2. REGION = 1

FILTER SELECTION ON MENU

A - Add a new Keyword
 C - Change a Keyword
 D - Delete a Keyword
 H - Filter Selection Help
 K - Display a List of Keywords
 N - Cancel and return to Search Selection Menu
 G - Go to Display Selection Menu

Filter Selection choice -> A

FILTER SELECTION KEYWORDS

API	LGS	SGGO
CNTY	LOC	SGG SNP
CRRES	MVLD	SGKD
CRCO	N2CO	SGLGS
DEPTH	N2RES	GRR
FIELD	NVLD	SRES
FORM	PRPT	SU77
GEOCODE	REGION	SU100
GO	RES	VLD
GSNP	SCO	YEAR
KD	SGCO	

Enter Filter Selection Keyword -> API

For the filter keyword API, pick the number of the desired search condition.

-
1.	Equal
2.	Not equal
3.	Less than or equal
4.	Less than
5.	Greater than or equal
6.	Greater than
7.	Between a range of Min and Max values
-

Enter the number of your choice -> 6

API is a decimal number with a total length of 5. The length includes the decimal point and 1 places to the right.

API is greater than 60

*You have selected search condition number 6 (greater than) and the nentered "60". With this selection, the data bank will be searched for api that is greater than 60.0.

The following Filter Keywords are defined:

1. LOC = 42
2. REGION = 1
3. API > 60

FILTER SELECTION ON MENU

-
A - Add a new Keyword
C - Change a Keyword
D - Delete a Keyword
H - Filter Selection Help
K - Display a List of Keywords
N - Cancel and return to Search Selection Menu
G - Go to Display Selection Menu
-

Filter Selection choice -> G

*At this point, all keywords are defined for filtering of the search. "The next menu, "Display Selection", allows the selection of keywords for screen display.

No Display Keywords are selected

DISPLAY SELECTION MENU	
A	Add a new Keyword
H	Display Selection Help
K	Display a List of Keywords
N	Cancel and return to Search Selection Menu

Display Selection choice -> H

*Selecting "H" displays help text for the "Display Selection Menu". The look of this menu is similar to the 'Filter Selection Menu'.

Display Selection Help

The selection of one or more keywords will allow you to specify all display keywords for the query currently being built.

Explanation of Display Selection Menu

'A - Add a Keyword' menu option allows you to add a new keyword for screen display. The data for each selected keyword is displayed in columnar format on the screen.

Press Enter to continue

'K - Display a List of Keywords' selection of this menu option displays a list of all available display keywords.

'N - Cancel and return to Search Selection Menu' menu option allows you to cancel the display selection process and return to the Search

Selection Menu.

'G - Go to Sort Selection Menu'. Select this menu option when you are finished choosing display keywords. The Sort Menu allows you to select which keywords to sort upon. Please note: Sorting the output data is optional.

Please note, if you have mistyped a menu option or the modem picks up line noise, you will be asked to re-enter the information.

Do you need keyword definitions ? (Y or N) - N

*If "Y" is entered, the "Keyword Help Menu" is displayed and selections can be made. In this example, you have selected not to view the definitions. The "Display Selection Keyword" menu is re-displayed.

FILTER SELECTION KEYWORDS

API	LGS	SGGO
CNTY	LOC	SGG SNP
CRRES	MVLD	SGKD
CRCO	N2CO	SGLGS
DEPTH	N2RES	GRR
FIELD	NVLD	SRES
FORM	PRPT	SU77
GEOCODE	REGION	SU100
GO	RES	VLD
G SNP	SCO	YEAR
KD	SGCO	

No Display Keywords are selected

DISPLAY SELECTION MENU

A	Add a new Keyword
H	Display Selection Help
K	Display a List of Keywords
N	Cancel and return to Search Selection Menu

Display Selection choice -> A

*When menu option "A" is selected, the list of keywords is displayed.

FILTER SELECTION KEYWORDS

API	LGS	SGGO
CNTY	LOC	SGGSPN
CRRES	MVLD	SGKD
CRCO	N2CO	SGLGS
DEPTH	N2RES	GRR
FIELD	NVLD	SRES
FORM	PRPT	SU77
GEOCODE	REGION	SU100
GO	RES	VLD
GSNP	SCO	YEAR
KD	SGCO	

Enter Display Selection Keyword -> FIELD

The following Display Keyword is defined:

1. FIELD

DISPLAY SELECTION MENU

A	Add a new Keyword
C	Change a Keyword
D	Delete a Keyword
H	Display Selection Help
K	Display a List of Keywords
N	Cancel and return to Search Selection Menu
G	Go to Sort Selection Menu

Display Selection choice -> A

*Each time you select option "A", all currently selected keywords are displayed as well as the complete list of Display keywords.

Currently Selected Display Keywords

1. FIELD

Enter Display Selection Keyword -> REGION

DISPLAY SELECTION KEYWORDS

API	LGS	SGGO
CNTY	LOC	SGG SNP
CRRES	MVLD	SGKD
CRCO	N2CO	SGLGS
DEPTH	N2RES	GRR
FIELD	NVLD	SRES
FORM	PRPT	SU77
GEOCODE	REGION	SU100
GO	RES	VLD
G SNP	SCO	YEAR
KD	SGCO	

The following Display Keywords are defined:

1. FIELD
2. REGION

DISPLAY SELECTION MENU

A	Add a new Keyword
C	Change a Keyword
D	Delete a Keyword
H	Display Selection Help
K	Display a List of Keywords
N	Cancel and return to Search Selection Menu
G	Go to Sort Selection Menu

Display Selection choice -> A

Currently Selected Display Keywords

1. FIELD
2. REGION

Enter Display Selection Keyword -> API

DISPLAY SELECTION KEYWORDS

API	LGS	SGGO
CNTY	LOC	SGGSP
CRRES	MVLD	SGKD
CRCO	N2CO	SGLGS
DEPTH	N2RES	GRR
FIELD	NVLD	SRES
FORM	PRPT	SU77
GEOCODE	REGION	SU100
GO	RES	VLD
GSP	SCO	YEAR
KD	SGCO	

The following Display Keywords are defined:

1. FIELD
2. REGION
3. API

DISPLAY SELECTION MENU

A	Add a new Keyword
C	Change a Keyword
D	Delete a Keyword
H	Display Selection Help
K	Display a List of Keywords
N	Cancel and return to Search Selection Menu
G	Go to Sort Selection Menu

Display Selection choice -> A

Currently Selected Display Keywords

1. FIELD
2. REGION
3. API

Enter Display Selection Keyword -> DEPTH

DISPLAY SELECTION KEYWORDS

API	LGS	SGGO
CNTY	LOC	SGG SNP
CRRES	MVLD	SGKD
CRCO	N2CO	SGLGS
DEPTH	N2RES	GRR
FIELD	NVLD	SRES
FORM	PRPT	SU77
GEOCODE	REGION	SU100
GO	RES	VLD
GSNP	SCO	YEAR
KD	SGCO	

The following Display Keywords are defined:

1. FIELD
2. REGION
3. API
4. DEPTH

DISPLAY SELECTION MENU

A	Add a new Keyword
C	Change a Keyword
D	Delete a Keyword
H	Display Selection Help
K	Display a List of Keywords
N	Cancel and return to Search Selection Menu
G	Go to Sort Selection Menu

Display Selection choice -> G

*You have selected all display keywords. Menu option "g" goes to the sort selection menu. The sort menu allows the selection of keywords to sort the output information based upon selected display keywords.

You may now choose a keyword or keywords to sort the display

Available Sort Keywords

FIELD

CNTY

API

DEPTH

No Sort Keywords are currently selected

SORT SELECTION MENU

A	Add a Keyword
C	Change a Keywor
D	Delete a Keyword
H	Sort Selection Help
N	Cancel and return to Search Selection Menu
F	Finished

Sort Selection choice -> H

Sort Selection Help

**** Sorting is Optional ****

The selection of one or more keywords will sort the information displayed on the screen in the same order as chosen.

Explanation of Sort Selection Menu

'A - Add a Keyword' menu option allows you to add a keyword to order the output information. When you are finished, the data is sorted starting at the first keyword chosen and ending at the last selected sort keyword.

'C - Change a Keyword' menu option lets you replace the current sort keyword by selecting a different keyword

'D - Delete a Keyword' menu option enables the deletion of a previously selected sort keyword.

Press Enter to continue

* The screen is paused so all help text can be read.

'N - Cancel and return to Search Selection Menu' menu option allows you to cancel the sort selection process and return to the Search Selection Menu.

'F - Finished' Select this menu option when you are finished choosing sort keywords.

Please note, if you have mistyped a menu option or the modem picks up line noise, you will be asked to re-enter the information.

Press Enter to continue

Available Sort Keywords

FIELD

REGION

API

DEPTH

No Sort Keywords are defined

SORT SELECTION MENU

	Sorting is Optional
A	Add a Keyword
H	Sort Selection Help
N	Cancel and return to Search Selection Menu
X	Exit, no sort keywords choosen

Sort Selection choice -> A

*The selection of menu option "A" will display a list of available sort keywords. Please note, the keywords in this list are the only ones available for sorting because they have been selected for screen display.

Available Sort Keywords

FIELD

REGION

API

DEPTH

Enter Sort Selection Keyword -> FIELD

The following Sort Keyword is defined

FIELD

SORT SELECTION MENU

A	Add a Keyword
C	Change a Keyword
D	Delete a Keyword
H	Sort Selection Help
N	Cancel and return to Search Selection Menu
F	Finished

Sort Selection choice -> F

*When finished, option "F" is chosen. This completes the query building process.

***** Working ... Please wait *****

*The preceding message is displayed to you. Some queries take longer than others to generate. Therefore, the wait time will vary.

Please enter a description (80 characters or less) of this search.

Description -> Region 1 of Texas with API>60

*The description is used as a heading for each screen of output information. It is also identifies the query when it is edited.

*All filtering, display, and sorting information is displayed. This display echoes back to you all selections made for this search.

The following filter condition(s) have been defined:

LOC = 42

REGION = 1

API > 60

The following display keywords have been selected:

FIELD, REGION, API, DEPTH

The selected keywords are sorted by:

FIELD

The total number of analyses choosen is : 0

No analyses choosen . . returning to Search Menu

*In this example, no samples were found that satisfied the filtering criteria.
When this occurs, the COA Search Selection Menu is activated.

CRUDE OIL DATABANK COA SEARCH SELECTION MENU

B	Build a New Search
E	Edit a Search
X	Exit to Main Menu

Enter the letter of your choice -> E

*If one or more seaches have been defined, you are given the opportunity to edit or re-run the search.

There has been 1 search performed in this session. The search number and name will be displayed on the screen. To edit or re-run a search please type in the search number at the prompt.

Search No. Search Name

1 Region 1 of Texas with API>60

Enter the search number -> 1

You will now be asked a series of questions based upon the selection of keywords. Your response to these questions will allow you to specify filtering (search) conditions, screen display, and sorted output information.

Press Enter to continue

AVAILABLE KEYWORDS

API	LGS	SGGO
CNTY	LOC	SGG SNP
CRRES	MVLD	SGKD
CRCO	N2CO	SGLGS
DEPTH	N2RES	GRR
FIELD	NVLD	SRES
FORM	PRPT	SU77
GEOCODE	REGION	SU100
GO	RES	VLD
G SNP	SCO	YEAR
KD	SGCO	

Press Enter to Continue

*The previously selected keywords for this query are displayed.

The following Filter Keywords are defined:

1. LOC = 42
2. REGION = 1
3. API > 60

FILTER SELECTION MENU

A	Add a new Keyword
C	Change a Keyword
D	Delete a Keyword
H	Filter Selection Help
K	Display a list of Keywords
N	Cancel and Return to Search Selection Menu
G	Go to Display Selection Menu

Filter Selection choice -> C

*Option "C" (change) allows you to change a keyword in one of two ways.

*You can replace the current keyword by selecting a different one or you can modify the filtering condition of a previously selected keyword

Currently Selected Filter Keywords

1. LOC = 42
2. REGION = 1
3. API > 60

Please enter an Edit Filter Selection Number -> 2

*Entering a number from the list of currently chosen keywords selects it. The selected keyword can then be modified.

Do you want to select a different Keyword ? (Y/N) => N

*In this example, you have chosen not to select a different keyword. If "Y" were entered, a list of keywords is displayed from which a selection is made.

For the filter keyword REGION, pick the number of the desired search condition.

1. Equal
2. Not equal
3. Less than or equal
4. Less than
5. Greater than or equal
6. Greater than
7. Between a range of Min and Max values

Enter the number of your choice -> 7

REGION is a integer with a total length of 2

Do you need a listing of regions ? (Y/N) N

Min value: 1

*The "Min value:" prompt allows you to input a minimum value.

REGION is a integer with a total length of 2

Do you need a listing of regions ? (Y/N) N

Max value: 5

*You must enter data for maximum value. This is an inclusive range used to search the data bank. In this example, you have chosen regions one through five inclusive.

The following Filter Keywords are defined:

1. LOC = 42
2. REGION between 1 and 5
3. API > 60

*The new search criterion for "REGION" is reflected in the currently defined list of filter keywords.

FILTER SELECTION MENU

A	Add a new Keyword
C	Change a Keyword
D	Delete a Keyword
H	Filter Selection Help
K	Display a list of Keywords
N	Cancel and Return to Search Selection Menu
G	Go to Display Selection Menu

Filter Selection choice -> G

AVAILABLE KEYWORDS

API	LGS	SGGO
CNTY	LOC	SGGSP
CRRES	MVLD	SGKD
CRCO	N2CO	SGLGS
DEPTH	N2RES	GRR
FIELD	NVLD	SRES
FORM	PRPT	SU77
GEOCODE	REGION	SU100
GO	RES	VLD
GSP	SCO	YEAR
KD	SGCO	

The following Display Keywords are defined:

1. FIELD
2. REGION
3. API
4. DEPTH

DISPLAY SELECTION MENU

A	Add a new Keyword
C	Change a Keyword
D	Delete a Keyword
H	Filter Selection Help
K	Display a list of Keywords
N	Cancel and Return to Search Selection Menu
G	Go to Display Selection Menu

Display Selection choice -> G

You may now choose a keyword or keywords to sort the display

Available Sort Keywords

- FIELD
- REGION
- API
- DEPTH

The following Sort Keyword is defined

FIELD

SORT SELECTION MENU

A	Add a Keyword
C	Change a Keyword
D	Delete a Keyword
H	Sort Selection Help
N	Cancel and return to Search Selection Menu
F	Finished

Selection choice -> A

Available Sort Keywords

FIELD

REGION

API

DEPTH

Enter Sort Selection Keyword -> REGION

Available Sort Keywords

FIELD

REGION

API

DEPTH

The following Sort Keywords are defined

FIELD, REGION

SORT SELECTION MENU

A	Add a Keyword
C	Change a Keyword
D	Delete a Keyword
H	Sort Selection Help
N	Cancel and return to Search Selection Menu
F	Finished

Sort Selection choice -> F

***** Working . . . Please wait *****

Please enter a description (80 characters or less) of this search.

Description -> Regions 1 thru 5 of Texas with API>60

The following filter condition(s) are defined:

LOC = 42

REGION between 1 and 5

API > 60

The following display keywords are selected:

FIELD, REGION, API, DEPTH

The selected keywords are sorted by:

FIELD, REGION

The total number of analyses choosen is : 11

Do you want to view the selected information (Y/N) ? Y

*You can choose not to view the data. For example, if the total number of selected analyses is large, viewing of this data can be very time consuming.

Do you want to pause between each screen of data ? (Y/N) Y

*If the answer to this prompt is "y", each screenfull of information will be paused until an enter is pressed.

REGIONS 1 THRU 5 OF TEXAS WITH API>60

LAB	CODE FIELD	REGION	API	DEPTH
B37049	ARANSAS PASS	4	62.6	6527
B46147	GILLOCK	3	62.6	8070
B36054	GRETA	2	62.6	5615
B41230	OPELIKA	5	61.0	8064
B41379	OPELIKA	5	62.6	8065
B41424	OPELIKA	5	62.1	8064
B41425	OPELIKA	5	61.8	8064
B41426	OPELIKA	5	62.9	8065
B41428	OPELIKA	5	62.9	8065
B45085	OPELIKA	5	65.9	0
B69113	REILLY SPRINGS	5	60.2	0

Press Enter to Continue

*When finished viewing data, you can save the information in spreadsheet format, DIF format, or FoxPro 2.x/dBASE 4.x format. The following menu is displayed.

Do you want to make a file from the current query that can be read into a spreadsheet program ? (Y/N) -> Y

FILE FORMAT MENU

1.	XLS	Microsoft Excel
2.	WK1	Lotus 1-2-3, rev. 2.x
3.	WKS	Lotus 1-2-3, rev. 1-A
4.	DBF	FoxPro 2.x/dBASE 4.x
5.	DIF	Data Interchange Format

Please enter a format number => 1

*From the file format menu, 1 was selected. A file will be created that can be read into Excel.

CRUDE OIL DATABANK COA SEARCH SELECTION MENU

B	Build a New Search
E	Edit a Search
X	Exit to Main Menu

Enter the letter of your choice -> X

CRUDE OIL DATABANK COA MAIN MENU

S	Search and Display COA Information
A	Analysis Reports
Q	Quit the Crude Oil Databank

Enter the single letter of your choice -> A

REPORT MENU

1.	Routine Analysis
2.	Hydrocarbon-Type Analysis
3.	Both Analyses
4.	Go back to COA Main Menu

Please type the number of your choice -> 1

*Please note, the sample id must be known before running the report menu.

Prior to choosing an analysis, the sample id must be supplied. This ID consists of one letter (B or L), the year (65), and three digits for the sequential number within that year.

Example of a sample ID: B68090

Please enter the sample ID: -> B68090

***** Working ... Please wait *****

*The preceeding message informs you that the computer is processing the report request.

APPENDIX A

BPO CRUDE OIL DATA BANK
MAINTAINED BY NATIONAL INSTITUTE FOR PETROLEUM AND ENERGY RESEARCH (NIPER)
BARTLESVILLE, OK
CRUDE OIL ANALYSIS NO. B68090

IDENTIFICATION

LAKE RACCOURCI FIELD

LOUISIANA

LAFOURCHE

12404 - 13456 FEET

GENERAL CHARACTERISTICS

GRAVITY, SPECIFIC: 0.832	API: 38.6	POUR POINT, DEG F: < 5
SULFUR, WT PCT: 0.190		NITROGEN, WT PCT: 0.043
VISCOSITY, SAYBOLT UNIV SEC:		COLOR: GREENISH-BROWN
AT 77 F 38		
AT 100 F 37		

WELL INFORMATION

WELL NUMBER: 4, 4D, 15	LOCATION:
SECTION:	TOWNSHIP:
LONGITUDE:	RANGE:
ADDITIONAL WELL INFORMATION:	LATITUDE:
	COMPLETION DATE:

DISTILLATION, BUREAU OF MINES ROUTINE METHOD

STAGE 1-DISTILLATION AT ATMOSPHERIC PRESSURE 747 MM HG
FIRST DROP AT 77 DEGREES F.

FRAC CUT NO.	CUT TEMP F	VOL PCT	SUM VOL PCT	GRAVITY SPEC (60/60 F)	API	CORR INDEX	REFRACT INDEX, ND (20 C)	SPEC DISP	SU VISC SECS (100 F)	CLOUD POINT F
1	122	1.7	1.7	0.633	92.0					
2	167	2.3	4.0	0.660	82.9	2	1.37372	131.1		
3	212	4.2	8.2	0.702	70.1	12	1.39646	133.0		
4	257	6.4	14.6	0.732	61.8	17	1.40997	132.1		
5	302	5.7	20.3	0.754	56.2	20	1.42099	136.7		
6	347	5.6	25.9	0.772	51.8	22	1.43013	137.9		
7	392	5.2	31.1	0.788	48.1	23	1.43818	138.4		
8	437	6.0	37.1	0.802	44.9	24	1.44565	138.6		
9	482	6.1	43.2	0.817	41.7	26	1.45354	140.8		
10	527	6.2	49.4	0.831	38.8	28	1.46101	145.2		

STAGE 2-DISTILLATION CONTINUED AT 40 MM HG

11	392	7.9	57.3	0.852	34.6	34	1.46972	144.5	43	< 5
12	437	7.7	65.0	0.865	32.1	36	1.47503	147.5	52	30
13	482	6.2	71.2	0.880	29.3	40	1.48269	151.4	73	40
14	527	4.6	75.8	0.890	27.5	42	1.48838		120	60
15	572	4.6	80.4	0.899	25.9	43			255	70
RESIDUUM		18.2	98.6	0.959	16.0					

CARBON RESIDUE, WT PCT: OF RES: 5.6 SULFUR, WT PCT OF RES:
 (CONRADSON) OF CRUDE: 1.2 NITROGEN, WT PCT OF RES:

	APPROXIMATE SUMMARY			
	VOL PCT	SP GRAV	API	VISCOSITY
LIGHT GASOLINE	8.2	0.676	77.8	
TOTAL GASOLINE AND NAPHTHA	31.1	0.738	60.3	
KEROSINE DISTILLATE	12.1	0.810	43.3	
GAS OIL	16.3	0.842	36.5	
NONVISCIOUS LUBE DISTILLATE	11.8	0.862-0.886	32.6-28.3	50-100
MEDIUM LUBE DISTILLATE	5.0	0.886-0.895	28.3-26.5	100-200
VISCOUS LUBE DISTILLATE	4.2	0.895-0.904	26.5-25.1	> 200
RESIDUE	18.2	0.959	16.0	
DISTILLATION LOSS	1.4			

End of Report

Report Menu

1. Routine Analysis
2. Hydrocarbon-Type Analysis
3. Both Analyses
4. Go back to COA Main Menu

Please type the number of your choice=> 2

Prior to choosing an analysis, the sample id must be supplied. This ID consists of one letter (B or L), the year (65), and three digits for the sequential number within that year.

Example of a sample ID: B68090

Please enter the sample ID => B68090

***** Working . . . Please wait *****

BPO CRUDE OIL DATA BANK
MAINTAINED BY NATIONAL INSTITUTE FOR PETROLEUM AND ENERGY RESEARCH (NIPER)
BARTLESVILLE, OK

HYDROCARBON-TYPE ANALYSIS
CRUDE OIL ANALYSIS NO. B68090

FRAC	VOL PCT	SPEC	CORR	AROMATICS	PAR-NAPH	CORR	SPEC
NO.	OF CRUDE	GRAV	INDEX	OF FRAC	OF FRAC	OF P-N	OF P-N
1	1.7	0.633	-		100		0.633
2	2.3	0.660	3	5.3	94.7		0.648
3	4.2	0.702	13	7.1	92.9	7	0.689
4	6.4	0.732	18	6.8	93.2	13	0.722
5	5.7	0.754	21	11.1	88.9	14	0.739
6	5.6	0.772	22	12.8	87.2	15	0.756
7	5.2	0.788	24	13.3	86.7	16	0.772
8	6.0	0.802	25	13.3	86.7	17	0.785
9	6.1	0.817	27	14.0	86.0	17	0.797
10	6.2	0.831	29	15.4	84.6	19	0.810
11	7.9	0.852	35	15.5	84.5	26	0.833
12	7.7	0.865	37	17.9	82.1	28	0.845

ANALYSIS OF NAPHTHA FRACTIONS					FRAC	NO. OF RINGS PER MOL:		
FR	VOL PCT OF PN	VOL PCT OF FR	NO.	TOTAL	AROM	NAPHTHENES		
NO.	NAPH	PAR	NAPH	PAR				
2	0.0	100.0	0.0	94.7	12	1.7	0.2	1.5
3	9.3	90.7	8.6	84.3	14	2.3	0.4	1.9
4	32.3	67.7	30.1	63.1				
5	35.3	64.7	31.4	57.5				
6	35.4	64.6	30.9	56.3				
7	43.0	57.0	37.3	49.4				

SUMMARY DATA FOR BLENDS

	NAPHTHA	GAS OIL
	BLEND	BLEND
	(FR1-7)	(FR 8-12)
VOLUME PERCENT OF CRUDE IN BLEND	31.1	33.9
AROMATIC, VOL PCT OF BLEND	9.3	15.4
PARAFFIN-NAPHTHENE, VOL PCT OF BLEND	90.7	84.6
NAPHTHENE, VOL PCT OF BLEND	25.3	
PARAFFIN, VOL PCT OF BLEND	65.4	
NAPHTHENE, VOL PCT OF P-N IN BLEND	27.9	
PARAFFIN, VOL PCT OF P-N IN BLEND	72.1	
NAPHTHENE RING, WT PCT OF P-N IN BLEND	14.4	32.7
PAR + SIDE CHAINS, WT PCT OF P-N IN BLEND	85.6	67.3

End of Report . . . Press Carriage Return to Continue

REPORT MENU

-
1.	Routine Analysis
2.	Hydrocarbon-Type Analysis
3.	Both Analyses
4.	Go back to COA Main Menu
-

Please type the number of your choice -> 3

*Selecting option "3" displays the "Routine Analysis" and "Hydrocarbon-Type Analysis" reports for a chosen sample-id.

REPORT MENU

-
1.	Routine Analysis
2.	Hydrocarbon-Type Analysis
3.	Both Analyses
4.	Go back to COA Main Menu
-

Please type the number of your choice -> 4

CRUDE OIL DATABANK COA MAIN MENU

-
S	Search and Display COA Information
A	Analysis Reports
Q	Quit the Crude Oil Databank
-

Enter the single letter of your choice -> Q

*When Q is selected, the system responds with the following message.

The following files have been created. Please WRITE DOWN the names of the files that you want to download. To download them from PCBoard, choose Download Files' option of the Main Menu by typing D at the menu prompt. The system will then respond with 'Enter the filename to Download (Enter)=none?' prompt. At this prompt, type in a single file name from the list you made. Continue to enter all other file names in the same manner. When finished, press enter at the prompt without entering a file name. Once all file names are entered, a screen is displayed that contains the total number of files, total size in bytes, and the currently selected protocol. You begin the transfer of the files by pressing Enter.

Press Enter to continue

File Name	Description
33948678.dat	Log file of current logon session
12856051.xls	A query file saved in Excel format

*At this point, the COA application returns you to PCBoard. You will be asked to enter your password before you can download files.

APPENDIX B

KEYWORDS AND DESCRIPTIONS

Keyword	Long Description
API	API gravity. Directly related to specific gravity at 60°F. As shown by this formula: $^{\circ}\text{API} = (141.5/\text{SPGR}) - 131.5$
CNTY	County or district code. For the United States, each state's counties are numerically coded. Foreign countries have numeric codes assigned for the various districts or provinces. See Appendix B for an index of these codes.
CRRES	Weight % carbon residue of residuum from vacuum distillation, obtained by Ramsbottom method and converted to Conradson equivalent
CRCO	Weight % carbon residue of crude—directly related to CRRES by the formula: $\text{CRCO} = (\text{RES}) (\text{SGRES}) (\text{CRRES}) / (\text{SGCO}) (100)$
DEPTH	Depth or first value of depth range
FIELD	Oil field name
FORM	Geological formation name
GEOCODE	Geological formation (AAPG mnemonic code, 4 characters)
SGGSP	Specific gravity at 60°F of total gasoline and naphtha fractions
SGGO	Specific gravity at 60°F of gas oil fraction
GSP	Total volume % gasoline and naphtha fraction
GO	Volume % gas oil

APPENDIX B

Keyword	Long Description
SGKD	Specific gravity at 60°F of kerosene distillate
KD	Volume % kerosene distillate
LGS	Volume % light gasoline
SGLGS	Specific gravity at 60°F of light gasoline distillate
LOC	Location Name Code. Each state in the U.S., each Canadian Province, and each foreign country for which the COA Database has sample data are given numeric codes. For a list of names and codes see Appendix B. (For offshore, search county code 900 and adjacent landward counties of appropriate state.)
MVLD	Volume % medium viscous lubricating distillate
N2CO	Weight % nitrogen in crude
N2RES	Weight % nitrogen in residue
NVLD	Volume % nonviscous lubricating distillate
PRPT	Pour point. Maximum temperature in °F at which a liquid will not pour
REGION	Geographical subdivisions within the states of Oklahoma or Texas
RES	Volume % residuum from vacuum distillation
SGRES	Specific gravity at 60°F of the residue
SGCO	Specific gravity. Ratio of the density of crude at 60°F to the density of water at 60°F
SRES	Weight % sulfur in residue
SCO	Weight % sulfur in crude

Keyword	Long Description
SU100	Viscosity (Saybolt Universal Seconds) at 100°F
SU77	Viscosity (Saybolt Universal Seconds) at 77°F
VLD	Volume % viscous lubricating distillate
YEAR	<p>The keyword for year and sample identification code. The identification code is divided into three parts:</p> <ul style="list-style-type: none"> • One letter for laboratory B Bartlesville L Laramie • Two digits for year For example 54 equals 1954 Samples prior to 1923 are numbered sequentially: 01, 02, etc. • Three digits for sequential numbering within a year 001-999 <p>e.g., B75003: Bartlesville, 1975, Sample No. 3</p>

APPENDIX C

Numerical Code for States and Counties of the United States

ALABAMA	STATE	COUNTY	ALABAMA (Cont.)	STATE	COUNTY
Autauga.....	1	1	Jackson.....	1	71
Baldwin.....	1	3	Jefferson.....	1	73
Barbour.....	1	5	Lamar.....	1	75
Bibb.....	1	7	Lauderdale.....	1	77
Blount.....	1	9	Lawrence.....	1	79
Bullock.....	1	11	Jackson.....	1	71
Butler.....	1	13	Jefferson.....	1	73
Calhoun.....	1	15	Lamar.....	1	75
Chambers.....	1	17	Lauderdale.....	1	77
Cherokee.....	1	19	Lawrence.....	1	79
Chilton.....	1	21	Lee.....	1	81
Choctaw.....	1	23	Limestone.....	1	83
Clarke.....	1	25	Lowndes.....	1	85
Clay.....	1	27	Macon.....	1	87
Cleburne.....	1	29	Madison.....	1	89
Coffee.....	1	31	Marengo.....	1	91
Colbert.....	1	33	Marion.....	1	93
Conecuh.....	1	35	Marshall.....	1	95
Coosa.....	1	37	Mobile.....	1	97
Covington.....	1	39	Monroe.....	1	99
Crenshaw.....	1	41	Montgomery.....	1	101
Cullman.....	1	43	Morgan.....	1	103
Dale.....	1	45	Perry.....	1	105
Dallas.....	1	47	Pickens.....	1	107
De Kalb.....	1	49	Pike.....	1	109
Elmore.....	1	51	Randolph.....	1	111
Escambia.....	1	53	Russell.....	1	113
Etowah.....	1	55	St Clair.....	1	115
Fayette.....	1	57	Shelby.....	1	117
Franklin.....	1	59	Sumter.....	1	119
Geneva.....	1	61	Talladega.....	1	121
Greene.....	1	63	Tallapoosa.....	1	123
Hale.....	1	65	Tuscaloosa.....	1	125
Henry.....	1	67	Walker.....	1	127
Houston.....	1	69	Washington.....	1	129

APPENDIX C

ALASKA STATE COUNTY

Wilcox	1	131
Winston.....	1	133
Aleutian Islands	50	5
Anchorage.....	50	10
Barrow	50	15
Bethel	50	20
Bristol Bay	50	25
Cordova McCarthy	50	30
Fairbanks.....	50	35
Juneau.....	50	40
Kenai Cook Inlet.....	50	45
Kenai Peninsula.....	50	46
Ketchikan	50	50
Kobuk	50	55
Kodiak	50	60
Kuskokwim.....	50	65
Lynn Canal Icy.....	50	70
Nome	50	75
North Slope.....	50	77
Palmer Wasilla Talke	50	80
Prince Of Wales	50	85
Seward	50	90
Sitka.....	50	95
Upper Yukon.....	50	100
Valdez Chitina Whitt	50	105
Wade Hampton	50	110
Wrangell Petersburg	50	115
Yukon Koyukuk	50	120

ARIZONA STATE COUNTY

Apache.....	2	1
Cochise	2	3
Coconino	2	5
Gila.....	2	7
Graham.....	2	9
Greenlee.....	2	11
Maricopa	2	13
Mohave.....	2	15
Navajo.....	2	17
Pima	2	19

Pinal	2	21
Santa Cruz.....	2	23
Yavapai	2	25
Yuma	2	27

ARKANSAS STATE COUNTY

Arkansas.....	3	1
Ashley	3	3
Baxter	3	5
Benton.....	3	7
Boone	3	9
Bradley.....	3	11
Calhoun	3	13
Carroll	3	15
Chicot.....	3	17
Clark.....	3	19
Clay	3	21
Cleburne	3	23
Cleveland	3	25
Columbia.....	3	27
Conway.....	3	29
Craighead	3	31
Crawford	3	33
Crittenden	3	35
Cross.....	3	37
Dallas	3	39
Desha	3	41
Drew.....	3	43
Faulkner.....	3	45
Franklin	3	47
Fulton.....	3	49
Garland.....	3	51
Grant	3	53
Greene.....	3	55
Hempstead	3	57
Hot Springs	3	59
Howard.....	3	61
Independence	3	63
Izard	3	65
Jackson.....	3	67
Jefferson.....	3	69

Arkansas (Cont.)

State	County
Johnson.....3	71
Lafayette.....3	73
Lawrence.....3	75
Lee.....3	77
Lincoln.....3	79
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Barton	24	11
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Bollinger	24	17
Boone	24	19
Buchanan	24	21
Butler	24	23
Caldwell	24	25
Callaway	24	27
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Carroll	24	33
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Christian	24	43
Clark	24	45
Clay	24	47
Clinton	24	49
Cole	24	51
Cooper	24	53
Crawford	24	55
Dade	24	57
Dallas	24	59
Daviess	24	61
De Kalb	24	63
Dent	24	65
Douglas	24	67
Dunklin	24	69
Franklin	24	71
Gasconade	24	73
Gentry	24	75
Greene	24	77
Grundy	24	79
Harrison	24	81
Henry	24	83
Hickory	24	85
Holt	24	87
Howard	24	89
Howell	24	91
Iron	24	93
Jackson	24	95
Jasper	24	97
Jefferson	24	99
Johnson	24	101
Knox	24	103
Laclede	24	105
Lafayette	24	107
Lawrence	24	109
Lewis	24	111
Lincoln	24	113
Linn	24	115
Livingston	24	117
Mc Donald	24	119

Missouri (Cont.)	State	County
Macon	24	121
Madison	24	123
Maries	24	125
Marion	24	127
Mercer	24	129
Miller	24	131
Mississippi	24	133
Moniteau	24	135
Monroe	24	137
Montgomery	24	139
Morgan	24	141
New Madrid	24	143
Newton	24	145
Nodaway	24	147
Oregon	24	149
Osage	24	151
Ozark	24	153
Pemiscot	24	155
Perry	24	157
Pettis	24	159
Phelps	24	161
Pike	24	163
Platte	24	165
Polk	24	167
Pulaski	24	169
Putnam	24	171
Ralls	24	173
Randolph	24	175
Ray	24	177
Reynolds	24	179
Ripley	24	181
St Charles	24	183
St Clair	24	185
St Francois	24	187
St Louis	24	189
St Louis City	24	191
Ste Genevieve	24	193
Saline	24	195
Schuyler	24	197
Scotland	24	199

Missouri (Cont.)	State	County
Scott	24	201
Shannon	24	203
Shelby	24	205
Stoddard	24	207
Stone	24	209
Sullivan	24	211
Taney	24	213
Texas	24	215
Vernon	24	217
Warren	24	219
Washington	24	221
Wayne	24	223
Webster	24	225
Worth	24	227
Wright	24	229

MONTANA	STATE	COUNTY
Beaverhead	25	1
Big Horn	25	3
Blaine	25	5
Broadwater	25	7
Carbon	25	9
Carter	25	11
Cascade	25	13
Chouteau	25	15
Custer	25	17
Daniels	25	19
Dawson	25	21
Deer Lodge	25	23
Fallon	25	25
Fergus	25	27
Flathead	25	29
Gallatin	25	31
Garfield	25	33
Glacier	25	35
Golden Valley	25	37
Granite	25	39
Hill	25	41
Jefferson	25	43
Judith Basin	25	45
Lake	25	47

APPENDIX C

Montana (Cont.) State County

Lewis And Clark	25	49
Liberty	25	51
Lincoln	25	53
Mc Cone	25	55
Madison	25	57
Meagher	25	59
Mineral	25	61
Missoula	25	63
Musselshell	25	65
Park	25	67
Petroleum	25	69
Phillips	25	71
Pondera	25	73
Powder River	25	75
Powell	25	77
Prairie	25	79
Ravalli	25	81
Richland	25	83
Roosevelt	25	85
Rosebud	25	87
Sanders	25	89
Sheridan	25	91
Silver Bow	25	93
Stillwater	25	95
Sweet Grass	25	97
Teton	25	99
Toole	25	101
Treasure	25	103
Valley	25	105
Wheatland	25	107
Wibaux	25	109
Yellowstone	25	111
Yellowstone Natl Park	25	113

NEBRASKA

STATE COUNTY

Adams	26	1
Antelope	26	3
Arthur	26	5
Banner	26	7
Blaine	26	9

Nebraska (Cont.) State County

Boone	26	11
Box Butte	26	13
Boyd	26	15
Brown	26	17
Buffalo	26	19
Burt	26	21
Butler	26	23
Cass	26	25
Cedar	26	27
Chase	26	29
Cherry	26	31
Cheyenne	26	33
Clay	26	35
Colfax	26	37
Cuming	26	39
Custer	26	41
Dakota	26	43
Dawes	26	45
Dawson	26	47
Deuel	26	49
Dixon	26	51
Dodge	26	53
Douglas	26	55
Dundy	26	57
Fillmore	26	59
Franklin	26	61
Frontier	26	63
Furnas	26	65
Gage	26	67
Garden	26	69
Garfield	26	71
Gosper	26	73
Grant	26	75
Greeley	26	77
Hall	26	79
Hamilton	26	81
Harlan	26	83
Hayes	26	85
Hitchcock	26	87
Holt	26	89

Nebraska (Cont.)	State	County
Hooker.....	26	91
Howard.....	26	93
Jefferson.....	26	95
Johnson.....	26	97
Kearney.....	26	99
Keith.....	26	101
Keya Paha.....	26	103
Kimball.....	26	105
Knox.....	26	107
Lancaster.....	26	109
Lincoln.....	26	111
Logan.....	26	113
Loup.....	26	115
Mc Pherson.....	26	117
Madison.....	26	119
Merrick.....	26	121
Morrill.....	26	123
Nance.....	26	125
Nemaha.....	26	127
Nuckolls.....	26	129
Otoe.....	26	131
Pawnee.....	26	133
Perkins.....	26	135
Phelps.....	26	137
Pierce.....	26	139
Platte.....	26	141
Polk.....	26	143
Red Willow.....	26	145
Richardson.....	26	147
Rock.....	26	149
Saline.....	26	151
Sarpy.....	26	153
Saunders.....	26	155
Scotts Bluff.....	26	157
Seward.....	26	159
Sheridan.....	26	161
Sherman.....	26	163
Sioux.....	26	165
Stanton.....	26	167
Thayer.....	26	169

Nebraska (Cont.)	State	County
Thomas.....	26	171
Thurston.....	26	173
Valley.....	26	175
Washington.....	26	177
Wayne.....	26	179
Webster.....	26	181
Wheeler.....	26	183
York.....	26	185

NEVADA STATE COUNTY

Churchill.....	27	1
Clark.....	27	3
Douglas.....	27	5
Elko.....	27	7
Esmeralda.....	27	9
Eureka.....	27	11
Humboldt.....	27	13
Lander.....	27	15
Lincoln.....	27	17
Lyon.....	27	19
Mineral.....	27	21
Nye.....	27	23
Ormsby.....	27	25
Pershing.....	27	27
Storey.....	27	29
Washoe.....	27	31
White Pine.....	27	33

NEW MEXICO STATE COUNTY

Bernalillo.....	30	1
Catron.....	30	3
Chaves.....	30	5
Colfax.....	30	7
Curry.....	30	9
De Baca.....	30	11
Dona Ana.....	30	13
Eddy.....	30	15
Grant.....	30	17
Guadalupe.....	30	19
Harding.....	30	21
Hidalgo.....	30	23

APPENDIX C

New Mexico (Cont.) State County

Lea	30	25
Lincoln	30	27
Luna	30	29
McKinley	30	31
Mora	30	33
Otero	30	35
Quay	30	37
Rio Arriba	30	39
Roosevelt	30	41
Sandoval	30	43
San Juan	30	45
San Miguel	30	47
Santa Fe	30	49
Sierra	30	51
Socorro	30	53
Taos	30	55
Torrance	30	57
Union	30	59
Valencia	30	61

NEW YORK STATE COUNTY

Albany	31	1
Allegany	31	3
Bronx	31	5
Broome	31	7
Cattaraugus	31	9
Cayuga	31	11
Chautauqua	31	13
Chemung	31	15
Chenango	31	17
Clinton	31	19
Columbia	31	21
Cortland	31	23
Delaware	31	25
Dutchess	31	27
Erie	31	29
Essex	31	31
Franklin	31	33
Fulton	31	35
Genesee	31	37

New York (Cont.) State County

Greene	31	39
Hamilton	31	41
Herkimer	31	43
Jefferson	31	45
Kings	31	47
Lewis	31	49
Livingston	31	51
Madison	31	53
Monroe	31	55
Montgomery	31	57
Nassau	31	59
New York	31	61
Niagara	31	63
Oneida	31	65
Onondaga	31	67
Ontario	31	69
Orange	31	71
Orleans	31	73
Oswego	31	75
Otsego	31	77
Putnam	31	79
Queens	31	81
Rensselaer	31	83
Richmond	31	85
Rockland	31	87
St Lawrence	31	89
Saratoga	31	91
Schenectady	31	93
Schoharie	31	95
Schuyler	31	97
Seneca	31	99
Steuben	31	101
Suffolk	31	103
Sullivan	31	105
Tioga	31	107
Tompkins	31	109
Ulster	31	111
Warren	31	113
Washington	31	115

Wayne	31	117
Westchester	31	119
Wyoming.....	31	121
Yates.....	31	123

NORTH DAKOTA STATE COUNTY

Adams	33	1
Barnes	33	3
Benson	33	5
Billings.....	33	7
Bottineau	33	9
Bowman	33	11
Burke.....	33	13
Burleigh.....	33	15
Cass.....	33	17
Cavalier	33	19
Dickey.....	33	21
Divide	33	23
Dunn.....	33	25
Eddy.....	33	27
Emmons	33	29
Foster	33	31
Golden Valley	33	33
Grand Forks.....	33	35
Grant.....	33	37
Griggs	33	39
Hettinger	33	41
Kidder.....	33	43
La Moure.....	33	45
Logan.....	33	47
Mc Henry	33	49
Mc Intosh	33	51
Mc Kenzie	33	53
McLean.....	33	55
Mercer.....	33	57
Morton.....	33	59
Mountrail	33	61
Nelson	33	63
Oliver.....	33	65
Pembina.....	33	67
Pierce	33	69

North Dakota (Cont.) State County

Ramsey	33	71
Ransom.....	33	73
Renville.....	33	75
Richland	33	77
Rolette.....	33	79
Sargent.....	33	81
Sheridan	33	83
Sioux	33	85
Slope.....	33	87
Stark	33	89
Steele	33	91
Stutsman.....	33	93
Towner	33	95
Traill	33	97
Walsh	33	99
Ward.....	33	101
Wells.....	33	103
Williams.....	33	105

OHIO STATE COUNTY

Adams.....	34	1
Allen.....	34	3
Ashland	34	5
Ashtabula	34	7
Athens.....	34	9
Auglaize	34	11
Belmont	34	13
Brown.....	34	15
Butler	34	17
Carroll.....	34	19
Champaign	34	21
Clark	34	23
Clermont	34	25
Clinton.....	34	27
Columbiana	34	29
Coshocton	34	31
Crawford	34	33
Cuyahoga	34	35
Darke	34	37
Defiance.....	34	39

APPENDIX C

Ohio (Cont.)	State	County
Delaware	34	41
Erie	34	43
Fairfield	34	45
Fayette	34	47
Franklin	34	49
Fulton.....	34	51
Gallia.....	34	53
Geauga.....	34	55
Greene.....	34	57
Guernsey	34	59
Hamilton	34	61
Hancock.....	34	63
Hardin.....	34	65
Harrison	34	67
Henry	34	69
Highland	34	71
Hocking	34	73
Holmes	34	75
Huron.....	34	77
Jackson.....	34	79
Jefferson.....	34	81
Knox.....	34	83
Lake.....	34	85
Lawrence	34	87
Licking	34	89
Logan	34	91
Lorain.....	34	93
Lucas	34	95
Madison.....	34	97
Mahoning	34	99
Marion	34	101
Medina.....	34	103
Meigs.....	34	105
Mercer.....	34	107
Miami.....	34	109
Monroe	34	111
Montgomery	34	113
Morgan	34	115
Morrow	34	117
Muskingum.....	34	119

Ohio (Cont.)	State	County
Noble.....	34	121
Ottawa	34	123
Paulding	34	125
Perry	34	127
Pickaway	34	129
Pike.....	34	131
Portage.....	34	133
Preble	34	135
Putnam.....	34	137
Richland.....	34	139
Ross	34	141
Sandusky	34	143
Scioto.....	34	145
Seneca	34	147
Shelby.....	34	149
Stark	34	151
Summit	34	153
Trumbull.....	34	155
Tuscarawas	34	157
Union	34	159
Van Wert	34	161
Vinton.....	34	163
Warren.....	34	165
Washington	34	167
Wayne	34	169
Williams.....	34	171
Wood	34	173
Wyandot.....	34	175

OKLAHOMA	STATE	COUNTY
Adair	35	1
Alfalfa	35	3
Atoka.....	35	5
Beaver	35	7
Beckham	35	9
Blaine	35	11
Bryan.....	35	13
Caddo.....	35	15
Canadian	35	17
Carter	35	19

Oklahoma (Cont.)	State	County
Cherokee	35	21
Choctaw	35	23
Cimarron	35	25
Cleveland	35	27
Coal	35	29
Comanche	35	31
Cotton	35	33
Craig	35	35
Creek	35	37
Custer	35	39
Delaware	35	41
Dewey	35	43
Ellis	35	45
Garfield	35	47
Garvin	35	49
Grady	35	51
Grant	35	53
Greer	35	55
Harmon	35	57
Harper	35	59
Haskell	35	61
Hughes	35	63
Jackson	35	65
Jefferson	35	67
Johnston	35	69
Kay	35	71
Kingfisher	35	73
Kiowa	35	75
Latimer	35	77
Le Flore	35	79
Lincoln	35	81
Logan	35	83
Love	35	85
Mc Clain	35	87
Mc Curtain	35	89
Mc Intosh	35	91
Major	35	93
Marshall	35	95
Mayes	35	97
Murray	35	99

Oklahoma (Cont.)	State	County
Muskogee	35	101
Noble	35	103
Nowata	35	105
Okfuskee	35	107
Oklahoma	35	109
Okmulgee	35	111
Osage	35	113
Ottawa	35	115
Pawnee	35	117
Payne	35	119
Pittsburg	35	121
Pontotoc	35	123
Pottawatomie	35	125
Pushmataha	35	127
Rogers Mills	35	129
Rogers	35	131
Seminole	35	133
Sequoyah	35	135
Stephens	35	137
Texas	35	139
Tillman	35	141
Tulsa	35	143
Wagoner	35	145
Washington	35	147
Washita	35	149
Woods	35	151
Woodward	35	153

PENNSYLVANIA	STATE	COUNTY
Adams	37	1
Allegheny	37	3
Armstrong	37	5
Beaver	37	7
Bedford	37	9
Berks	37	11
Blair	37	13
Bradford	37	15
Bucks	37	17
Butler	37	19
Cambria	37	21

APPENDIX C

Pennsylvania (Cont.)	State	County
Cameron.....	37	23
Carbon.....	37	25
Centre.....	37	27
Chester.....	37	29
Clarion.....	37	31
Clearfield.....	37	33
Clinton.....	37	35
Columbia.....	37	37
Crawford.....	37	39
Cumberland.....	37	41
Dauphin.....	37	43
Delaware.....	37	45
Elk.....	37	47
Erie.....	37	49
Fayette.....	37	51
Forest.....	37	53
Franklin.....	37	55
Fulton.....	37	57
Greene.....	37	59
Huntingdon.....	37	61
Indiana.....	37	63
Jefferson.....	37	65
Juniata.....	37	67
Lackawanna.....	37	69
Lancaster.....	37	71
Lawrence.....	37	73
Lebanon.....	37	75
Lehigh.....	37	77
Luzerne.....	37	79
Lycoming.....	37	81
Mc Kean.....	37	83
Mercer.....	37	85
Mifflin.....	37	87
Monroe.....	37	89
Montgomery.....	37	91
Montour.....	37	93
Northampton.....	37	95
Northumberland.....	37	97
Perry.....	37	99

Pennsylvania (Cont.)	State	County
Philadelphia.....	37	101
Pike.....	37	103
Potter.....	37	105
Schuylkill.....	37	107
Snyder.....	37	109
Somerset.....	37	111
Sullivan.....	37	113
Susquehanna.....	37	115
Tioga.....	37	117
Union.....	37	119
Venango.....	37	121
Warren.....	37	123
Washington.....	37	125
Wayne.....	37	127
Westmoreland.....	37	129
Wyoming.....	37	131
York.....	37	133

SOUTH DAKOTA STATE COUNTY

Aurora.....	40	3
Beadle.....	40	5
Bennett.....	40	7
Bon Homme.....	40	9
Brookings.....	40	11
Brown.....	40	13
Brule.....	40	15
Buffalo.....	40	17
Butte.....	40	19
Campbell.....	40	21
Charles Mix.....	40	23
Clark.....	40	25
Clay.....	40	27
Codington.....	40	29
Corson.....	40	31
Custer.....	40	33
Davison.....	40	35
Day.....	40	37
Deuel.....	40	39
Dewey.....	40	41
Douglas.....	40	43

South Dakota (Cont.)	State	County
Edmunds.....	40	45
Fall River.....	40	47
Faulk.....	40	49
Grant.....	40	51
Gregory.....	40	53
Haakon.....	40	55
Hamlin.....	40	57
Hand.....	40	59
Hanson.....	40	61
Harding.....	40	63
Hughes.....	40	65
Hutchinson.....	40	67
Hyde.....	40	69
Jackson.....	40	71
Jerauld.....	40	73
Jones.....	40	75
Kingsbury.....	40	77
Lake.....	40	79
Lawrence.....	40	81
Lincoln.....	40	83
Lyman.....	40	85
Mc Cook.....	40	87
Mc Pherson.....	40	89
Marshall.....	40	91
Meade.....	40	93
Mellette.....	40	95
Miner.....	40	97
Minnehaha.....	40	99
Moody.....	40	101
Pennington.....	40	103
Perkins.....	40	105
Potter.....	40	107
Roberts.....	40	109
Sanborn.....	40	111
Shannon.....	40	113
Spink.....	40	115
Stanley.....	40	117
Sully.....	40	119
Todd.....	40	121

South Dakota (Cont.)	State	County
Tripp.....	40	123
Turner.....	40	125
Union.....	40	127
Walworth.....	40	129
Washabaugh.....	40	131
Yankton.....	40	135
Ziebach.....	40	137

TENNESSEE STATE COUNTY

Anderson.....	41	1
Bedford.....	41	3
Benton.....	41	5
Bledsoe.....	41	7
Blount.....	41	9
Bradley.....	41	11
Campbell.....	41	13
Cannon.....	41	15
Carroll.....	41	17
Carter.....	41	19
Cheatham.....	41	21
Chester.....	41	23
Claiborne.....	41	25
Clay.....	41	27
Cocke.....	41	29
Coffee.....	41	31
Crockett.....	41	33
Cumberland.....	41	35
Davidson.....	41	37
Decatur.....	41	39
De Kalb.....	41	41
Dickson.....	41	43
Dyer.....	41	45
Fayette.....	41	47
Fentress.....	41	49
Franklin.....	41	51
Gibson.....	41	53
Giles.....	41	55
Grainger.....	41	57
Greene.....	41	59
Grundy.....	41	61

APPENDIX C

Tennessee (Cont.)	State	County
Hamblen.....	41	63
Hamilton	41	65
Hancock.....	41	67
Hardeman	41	69
Hardin.....	41	71
Hawkins	41	73
Haywood.....	41	75
Henderson.....	41	77
Henry	41	79
Hickman	41	81
Houston.....	41	83
Humphreys.....	41	85
Jackson.....	41	87
Jefferson.....	41	89
Johnson.....	41	91
Knox.....	41	93
Lake.....	41	95
Lauderdale.....	41	97
Lawrence	41	99
Lewis.....	41	101
Lincoln.....	41	103
Loudon	41	105
Mc Minn	41	107
Mc Nairy	41	109
Macon	41	111
Madison.....	41	113
Marion	41	115
Marshall.....	41	117
Maury	41	119
Meigs.....	41	121
Monroe	41	123
Montgomery	41	125
Moore.....	41	127
Morgan	41	129
Obion	41	131
Overton.....	41	133
Perry.....	41	135
Pickett	41	137
Polk	41	139

Tennessee (Cont.)	State	County
Putnam.....	41	141
Rhea.....	41	143
Roane	41	145
Robertson	41	147
Rutherford.....	41	149
Scott.....	41	151
Sequatchie	41	153
Sevier.....	41	155
Shelby.....	41	157
Smith.....	41	159
Stewart.....	41	161
Sullivan.....	41	163
Sumner.....	41	165
Tipton.....	41	167
Trousdale.....	41	169
Unicoi.....	41	171
Union	41	173
Van Buren	41	175
Warren.....	41	177
Washington	41	179
Wayne	41	181
Weakley	41	183
White.....	41	185
Williamson	41	187
Wilson	41	189

TEXAS

STATE COUNTY

Anderson.....	42	1
Andrews	42	3
Angelina	42	5
Aransas	42	7
Archer	42	9
Armstrong.....	42	11
Atascosa.....	42	13
Austin	42	15
Bailey.....	42	17
Bandera.....	42	19
Bastrop.....	42	21
Baylor	42	23
Bee	42	25
Bell.....	42	27

Texas (Cont.)	State	County
Bexar	42	29
Blanco	42	31
Borden	42	33
Bosque	42	35
Bowie	42	37
Brazoria	42	39
Brazos	42	41
Brewster	42	43
Briscoe	42	45
Brooks	42	47
Brown	42	49
Burleson	42	51
Burnet	42	53
Caldwell	42	55
Calhoun	42	57
Callahan	42	59
Cameron	42	61
Camp	42	63
Carson	42	65
Cass	42	67
Castro	42	69
Chambers	42	71
Cherokee	42	73
Childress	42	75
Clay	42	77
Cochran	42	79
Coke	42	81
Coleman	42	83
Collin	42	85
Collingsworth	42	87
Colorado	42	89
Comal	42	91
Comanche	42	93
Concho	42	95
Cooke	42	97
Coryell	42	99
Cottle	42	101
Crane	42	103
Crockett	42	105

Texas (Cont.)	State	County
Crosby	42	107
Culberson	42	109
Dallam	42	111
Dallas	42	113
Dawson	42	115
Deaf Smith	42	117
Delta	42	119
Denton	42	121
De Witt	42	123
Dickens	42	125
Dimmit	42	127
Donley	42	129
Duval	42	131
Eastland	42	133
Ector	42	135
Edwards	42	137
Ellis	42	139
El Paso	42	141
Erath	42	143
Falls	42	145
Fannin	42	147
Fayette	42	149
Fisher	42	151
Floyd	42	153
Foard	42	155
Fort Bend	42	157
Franklin	42	159
Freestone	42	161
Frio	42	163
Gaines	42	165
Galveston	42	167
Garza	42	169
Gillespie	42	171
Glasscock	42	173
Goliad	42	175
Gonzales	42	177
Gray	42	179
Grayson	42	181
Gregg	42	183

APPENDIX C

Texas (Cont.)	State	County
Grimes	42	185
Guadalupe.....	42	187
Hale.....	42	189
Hall.....	42	191
Hamilton	42	193
Hansford	42	195
Hardeman	42	197
Hardin.....	42	199
Harris.....	42	201
Harrison	42	203
Hartley.....	42	205
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Bedford.....	45	19
Bland.....	45	21
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Cabell	47	11
Calhoun	47	13
Clay	47	15
Doddridge.....	47	17
Fayette	47	19
Gilmer	47	21
Grant	47	23
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Hampshire	47	27
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Pocahontas.....	47	75
Preston.....	47	77
Putnam.....	47	79
Raleigh.....	47	81
Randolph.....	47	83
Ritchie.....	47	85
Roane.....	47	87
Summers.....	47	89
Taylor.....	47	91
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Table C-1 Oklahoma Sections and County Codes

Region 1	Region 2	Region 3	Region 4	Region 5	Region 6	Region 7
Alfalfa3	Osage113	Adair1	Cleveland27	Canadian17	Atoka5	Caddo15
Beaver7		Cherokee21	Grady51	Logan83	Bryan13	Comanche31
Beckham9		Craig35	Hughes63	Oklahoma109	Carter19	Cotton33
Blaine11		Creek37	Lincoln81		Choctaw23	Greer55
Cimarron25		Delaware41	McClain87		Coal29	Harmon57
Custer39		LeFlore79	Okfuskee107		Garvin49	Jackson65
Dewey43		McIntosh91	Payne119		Haskell61	Jefferson67
Ellis45		Mayes97	Pottawatomie125		Johnston69	Kiowa75
Garfield47		Muskogee101	Seminole133		Latimer77	Stephens137
Grant53		Nowata105			Love85	Tillman141
Harper59		Okmulgee111			McCurtain89	Washita149
Kay71		Ottawa115			Marshall95	
Kingfisher73		Pawnee117			Murray99	
Major93		Rogers131			Pittsburg121	
Noble103		Sequoyah135			Pontotoc123	
Roger Mills129		Tulsa143			Pushmataha127	
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Table C-2 Texas Sections and County Codes

Region 1	Region 2	Region 3	Region 4	Region 5	Region 6
Atascosa13	Bee25	Austin15	Aransas7	Bosque35	Anderson1
Bandera19	Calhoun57	Brazoria39	Brooks47	Collin85	Angelina5
Bastrop21	Dewitt123	Brazos41	Cameron61	Dallas113	Bowie37
Bell27	Goliad175	Burleson51	Duval131	Delta119	Camp63
Bexar29	Jackson239	Chambers71	Hidalgo215	Ellis139	Cass67
Blanco31	Karnes255	Colorado89	Jim Hogg247	Falls145	Cherokee73
Burnet53	Lavaca285	Fayette149	Jim Wells249	Fannin147	Franklin159
Cladwell55	Live Oak297	Fort Bend157	Kenedy261	Freestone161	Gregg183
Comal91	Refugio391	Galveston167	Kleberg273	Henderson213	Harrison203
Dimmit127	Vistoria469	Grimes185	Nueces355	Hill217	Houston225
Edwards137		Hardin199	San Patricio409	Hopkins223	Marion315
Frio163		Harris201	Starr427	Hunt231	Morris343
Gillespie171		Jasper241	Webb479	Johnson251	Nacogdoches347
Gonzales177		Jefferson245	Willacy489	Kaufman257	Panola365
Guadalupe187		Lee287	Zapata505	Lamar277	Red River387
Hays209		Liberty291		Leon289	Rusk401
Kendall259		Madison313		Limestone293	Sabine403
Kerr265		Matagorda321		McLennan309	San Augustine405
Kinney271		Montgomery339		Navarro349	Shelby419
LaSalle283		Newton351		Rains379	Smith423
Llano299		Orange361		Robertson395	Titus449
McMullen311		Polk373		Rockwell397	Upshur459
Mason319		San Jacinto407		Tarrant439	Wood499
Maverick323		Trinity455		Van Zandt467	
Medina325		Tyler457			
Milam331		Walker471			
Real385		Waller473			
Travis453		Washington477			
Uvalde463		Wharton481			
ValVerde465					
Williamson491					
Wilson493					
Zavala507					

Region 7	Region 8	Region 9	Region 10	Region 11	Region 12
Brown49	Coke81	Andrews3	Bailey17	Archer9	Armstrong11
Callahan59	Concho95	Brewster43	Borden33	Baylor23	Briscoe45
Coleman83	Crockett105	Crane103	Cochran79	Clay77	Carson65
Comanche93	Irion235	Culberson109	Cottle101	Cooke97	Castro69
Coryell99	Kimble267	Ector135	Crosby107	Denton121	Childress75
Eastland133	McCulloch307	El Paso141	Dawson115	Foard155	Collingsworth87
Erath143	Menard327	Glasscock173	Dickens125	Grayson181	Dallam111
Fisher151	Reagan383	Howard227	Floyd153	Hardeman197	Deaf Smith117
Hamilton193	Runnels399	Hudspeth229	Gaines165	Jack237	Donley129
Haskell207	Schleicher413	Jeff Davis243	Garza169	Knox275	Gray179
Hood221	Sutton435	Loving301	Hale189	Montague337	Hall191
Jones253	Terrell443	Martin317	Hockley219	Wichita485	Hansford195
Lampasas281	Tom Green451	Midland329	Kent263	Wilbarger487	Hartley205
Mills333	Upton461	Mitchell335	King269	Wise497	Hemphill211
Nolan353		Pecos371	Lamb279	Young503	Hutchinson233
Palo Pinta363		Presidio377	Lubbock303		Lipscomb295
Parker367		Reeves389	Lynn305		Moore341
San Saba411		Sterling431	Motley345		Ochiltree357
Shackelford417		Ward475	Scurry415		Oldham359
Somervell425		Winkler495	Terry445		Parmer369
Stephens429			Yoakum501		Potter375
Stonewall433					Randall381
Taylor441					Roberts393
Throckmorton447					Sherman421
					Swisher437
					Wheeler483

APPENDIX D

Example of an Analysis by the Bureau of Mines Routine Method

BPO CRUDE OIL DATA BANK
MAINTAINED BY NATIONAL INSTITUTE FOR PETROLEUM AND ENERGY RESEARCH (NIPER)
BARTLESVILLE, OK
CRUDE OIL ANALYSIS NO. B68090

IDENTIFICATION

LAKE RACCOURCI FIELD

LOUISIANA

LAFOURCHE

12404 - 13456 FEET

GENERAL CHARACTERISTICS

GRAVITY, SPECIFIC: 0.832 API: 38.6 POUR POINT, DEG F: < 5
SULFUR, WT PCT: 0.190 NITROGEN, WT PCT: 0.043
VISCOSITY, SAYBOLT UNIV SEC: COLOR: GREENISH-BROWN
 AT 77 F 38
 AT 100 F 37

WELL INFORMATION

WELL NUMBER: 4, 4D, 15 LOCATION:
SECTION: TOWNSHIP: RANGE:
LONGITUDE: LATITUDE: COMPLETION DATE:
ADDITIONAL WELL INFORMATION:

DISTILLATION, BUREAU OF MINES ROUTINE METHOD

STAGE 1-DISTILLATION AT ATMOSPHERIC PRESSURE 747 MM HG
FIRST DROP AT 77 DEGREES F.

FRAC NO.	CUT TEMP F	VOL PCT	SUM VOL PCT	GRAVITY SPEC (60/60 F)	API	CORR INDEX	REFRACT INDEX, ND (20 C)	SPEC DISP	SU VISC SECS (100 F)	CLOUD POINT F
1	122	1.7	1.7	0.633	92.0					
2	167	2.3	4.0	0.660	82.9	2	1.37372	131.1		
3	212	4.2	8.2	0.702	70.1	12	1.39646	133.0		
4	257	6.4	14.6	0.732	61.8	17	1.40997	132.1		
5	302	5.7	20.3	0.754	56.2	20	1.42099	136.7		
6	347	5.6	25.9	0.772	51.8	22	1.43013	137.9		
7	392	5.2	31.1	0.788	48.1	23	1.43818	138.4		
8	437	6.0	37.1	0.802	44.9	24	1.44565	138.6		
9	482	6.1	43.2	0.817	41.7	26	1.45354	140.8		
10	527	6.2	49.4	0.831	38.8	28	1.46101	145.2		

STAGE 2-DISTILLATION CONTINUED AT 40 MM HG

11	392	7.9	57.3	0.852	34.6	34	1.46972	144.5	43	< 5
12	437	7.7	65.0	0.865	32.1	36	1.47503	147.5	52	30
13	482	6.2	71.2	0.880	29.3	40	1.48269	151.4	73	40
14	527	4.6	75.8	0.890	27.5	42	1.48838		120	60
15	572	4.6	80.4	0.899	25.9	43			255	70
RESIDUUM		18.2	98.6	0.959	16.0					

APPENDIX D

CARBON RESIDUE, WT PCT: OF RES: 5.6 SULFUR, WT PCT OF RES:
 (CONRADSON) OF CRUDE: 1.2 NITROGEN, WT PCT OF RES:

APPROXIMATE SUMMARY				
	VOL PCT	SP GRAV	API	VISCOSITY
LIGHT GASOLINE	8.2	0.676	77.8	
TOTAL GASOLINE AND NAPHTHA	31.1	0.738	60.3	
KEROSINE DISTILLATE	12.1	0.810	43.3	
GAS OIL	16.3	0.842	36.5	
NONVISCIOUS LUBE DISTILLATE	11.8	0.862-0.886	32.6-28.3	50-100
MEDIUM LUBE DISTILLATE	5.0	0.886-0.895	28.3-26.5	100-200
VISCOUS LUBE DISTILLATE	4.2	0.895-0.904	26.5-25.1	> 200
RESIDUE	18.2	0.959	16.0	
DISTILLATION LOSS	1.4			

End of Report . . .

Example of a Hydrocarbon-Type Analysis

BPO CRUDE OIL DATA BANK
MAINTAINED BY NATIONAL INSTITUTE FOR PETROLEUM AND ENERGY RESEARCH (NIPER)
BARTLESVILLE, OK

HYDROCARBON-TYPE ANALYSIS CRUDE OIL ANALYSIS NO. B68090

FRAC NO.	VOL PCT OF CRUDE	SPEC GRAV	CORR INDEX	AROMATICS		PAR-NAPH		CORR INDEX	SPEC GRAV
				VOL PCT OF FRAC		VOL PCT OF FRAC			
1	1.7	0.633	-			100			0.633
2	2.3	0.660	3	5.3		94.7			0.648
3	4.2	0.702	13	7.1		92.9	7		0.689
4	6.4	0.732	18	6.8		93.2	13		0.722
5	5.7	0.754	21	11.1		88.9	14		0.739
6	5.6	0.772	22	12.8		87.2	15		0.756
7	5.2	0.788	24	13.3		86.7	16		0.772
8	6.0	0.802	25	13.3		86.7	17		0.785
9	6.1	0.817	27	14.0		86.0	17		0.797
10	6.2	0.831	29	15.4		84.6	19		0.810
11	7.9	0.852	35	15.5		84.5	26		0.833
12	7.7	0.865	37	17.9		82.1	28		0.845

ANALYSIS OF NAPHTHA FRACTIONS					FRAC NO.	NO. OF RINGS PER MOL:		
FR	VOL PCT OF PN	VOL PCT OF FR				TOTAL	AROM	NAPHTHENES
NO.	NAPH	PAR	NAPH	PAR				
2	0.0	100.0	0.0	94.7	12	1.7	0.2	1.5
3	9.3	90.7	8.6	84.3	14	2.3	0.4	1.9
4	32.3	67.7	30.1	63.1				
5	35.3	64.7	31.4	57.5				
6	35.4	64.6	30.9	56.3				
7	43.0	57.0	37.3	49.4				

SUMMARY DATA FOR BLENDS

	NAPHTHA BLEND (FR1-7)	GAS OIL BLEND (FR 8-12)
VOLUME PERCENT OF CRUDE IN BLEND	31.1	33.9
AROMATIC, VOL PCT OF BLEND	9.3	15.4
PARAFFIN-NAPHTHENE, VOL PCT OF BLEND	90.7	84.6
NAPHTHENE, VOL PCT OF BLEND	25.3	
PARAFFIN, VOL PCT OF BLEND	65.4	
NAPHTHENE, VOL PCT OF P-N IN BLEND	27.9	
PARAFFIN, VOL PCT OF P-N IN BLEND	72.1	
NAPHTHENE RING, WT PCT OF P-N IN BLEND	14.4	32.7
PAR + SIDE CHAINS, WT PCT OF P-N IN BLEND	85.6	67.3

End of Report . . .