USER'S MANUAL FOR THE NATIONAL WATER INFORMATION SYSTEM OF THE U.S. GEOLOGICAL SURVEY

WATER-QUALITY SYSTEM

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WATER-QUALITY SYSTEM, Version 4.3

by
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1 INTRODUCTION

This user documentation is designed to be a reference for the Water-Quality System (QWDATA) within the National Water Information System (NWIS). For the new user, the "Introduction" and "Getting Started" sections are the recommended places to begin. The experienced user may want to go straight to the details provided in the program section (section 3). Code lists and some miscellaneous reference materials are provided in the Appendices. The last section, "Tip Sheets," is a collection of suggestions for accomplishing selected tasks, some of which are basic and some of which are advanced. Where appropriate, these Tip Sheets are referenced in the main text of the documentation.

1.1 NWIS Description

As part of the U.S. Geological Survey's (USGS) program of disseminating water data to the public, the Water Resources Discipline (WRD) maintains a distributed network of computers and fileservers for the storage and retrieval of water data collected through [its] activities at approximately 1.4 million sites. This system is called the National Water Information System (NWIS).

The NWIS is a distributed water database in which data can be processed over a network of workstations and fileservers at USGS offices throughout the United States. The system is composed of four subsystems: the Ground-Water Site-Inventory System (GWSI), the Water-Quality System (QWDATA), the Automated Data-Processing System (ADAPS), and the Site-Specific Water-Use Data System (SWUDS).

Many types of data are stored in the NWIS distributed, local databases, including:

- Site Information
- Time Series (flow, stage, precipitation, chemical)
- Peak Flow
- Ground Water

- Water Quality
- Water Use

The NWIS structure and the types of data available in the four subsystems are shown below in figure 1.

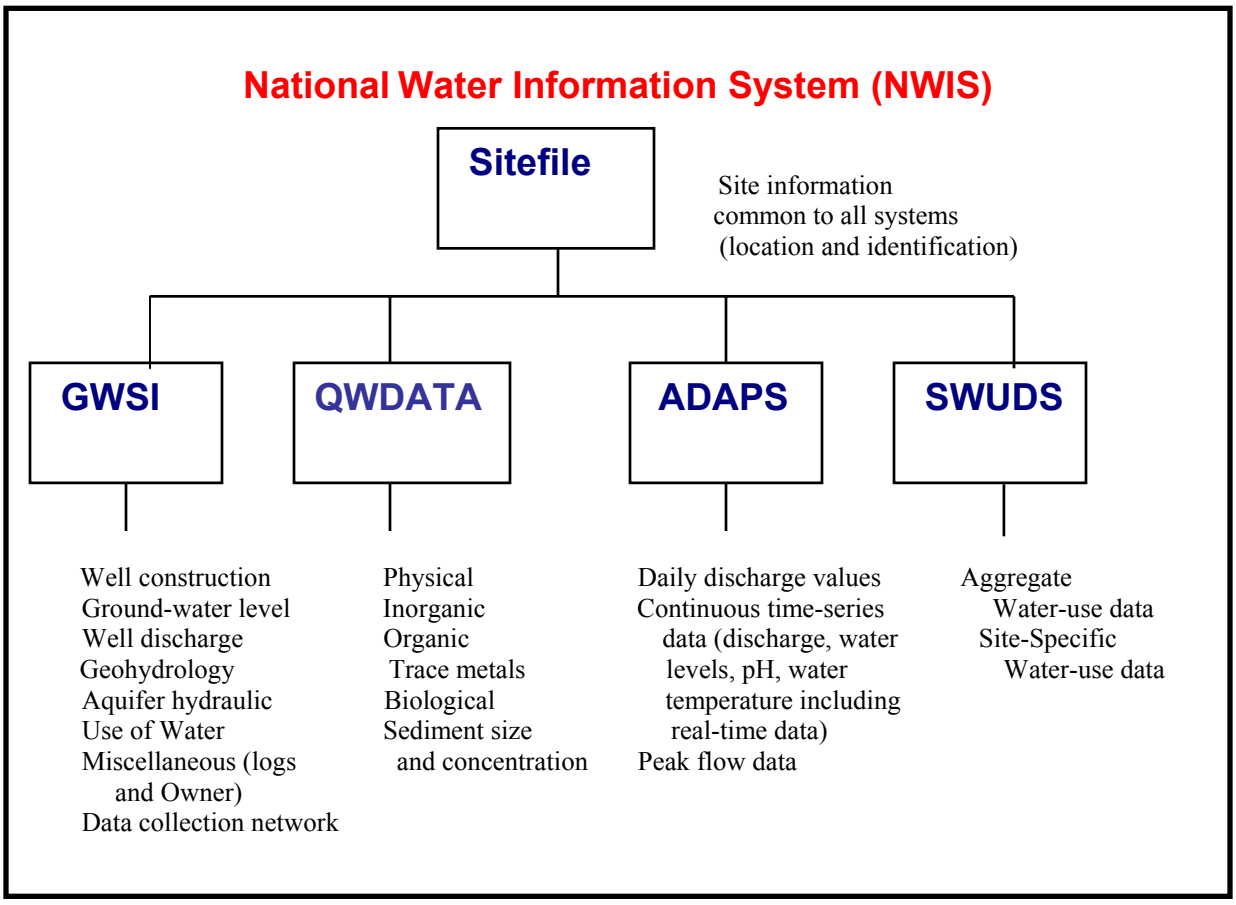

Figure 1. NWIS structure and types of stored hydrologic data.

1.2 QWDATA System Description

NWIS provides for use of one or more logical water-quality databases within one Ingres database, all accessed using one copy of the NWIS software. One logical water-quality database consists of a water-quality file (QWFILE), a station file (SITEFILE), and shared reference files. The QWFILE is a keyed-indexed file of Ingres tables managed by a UNIX-based software system. This system allows records to be retrieved efficiently on the basis of the values of selected data defined as KEY elements: agency code, site ID, begin date, begin time, end date, end time, and medium code. The SITEFILE is accessed to select water-quality records by SITEFILE data elements, such as site ID, site type, and location. Reference files, such as the parameter code file and the geologic-unit code file, are implemented as Ingres tables and are used for checking the validity of data entry values.

Each water-quality record to be stored is initialized by "logging in" the data. This is typically done when field data are available. When a sample is logged in, a record number (unique within each logical water-quality database) is automatically assigned to each analysis. The record number may be used later to access the analysis for updating or viewing. Personnel who have access rights for entering data may log in analyses.

1.3 User Access and Setup

Information on this section can be obtained by accessing the following URL:

http://wwwnwis.er.usgs.gov/nwisdocs4_3/nwis_security.pdf

1.4 Acknowledgements

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2 GETTING STARTED

2.1 Terminology

2.1.1 Sample

An environmental sample is the portion of a media (water, sediment, tissue, etc.) collected from a site for a specific date and time for analysis. A sample in the database is uniquely identified by the key variables, analyzing agency code, station number, begin date, begin time, end date, end time and medium code. The results of the chemical analyses and physical determinations for a sample are generally stored as one sample. These key variables are sometimes adjusted to separate samples that are hydrologically linked, but cannot be stored as one sample. Examples: Quality-control samples are stored as separate samples using one of the designated QC (Quality Control) medium codes. Samples from different depths or cross-sections may use time to 'off-set' samples that were collected at the same site on the same date.

2.1.2 Result

Values derived from chemical analyses or physical determinations of a sample are stored in the database as results. Results are uniquely identified in each sample by a parameter code that defines the property or constituent measured.

2.1.3 Parameter Code

Parameter Codes are five-digit codes used to identify the constituent measured and the units of measure. Some parameter code definitions include information about the methods used to measure the constituent, but this level of information is not currently consistent in the naming system.

2.1.4 Record

This is equivalent in the database to a single, uniquely identified sample.

2.1.5 Record Number

A record number is an eight-digit number assigned to a sample when the sample is logged into the database. The number is composed of a three-digit water year followed by a five-digit sequential number (Example: 00200075 is the 75th sample entered in water year 2002.) The record number is equivalent to the key variables that uniquely identify a sample, and can be used instead of the key variables in most of the NWIS QWDATA programs. These numbers are only unique within a database and must be used cautiously in an NWIS installation using multiple databases. When retrieving record numbers from the database, the file will contain the 8-digit record number followed by a two-digit database number.

2.1.6 Site

A site is the physical location where a sample is collected or a measurement is made. Information about a site must be stored in the NWIS SITEFILE before any data can be stored for that site. Equivalent terms: station.

2.1.7 Station Number

Station number is typically an eight-digit or 15-digit number assigned to a sampling site when it is established in the NWIS system (Novak, 1985). The eight-digit numbers are generally downstream order numbers used for surface-water locations on streams or rivers. Additional digits can be added to the eight-digit downstream order station numbers (up to a maximum of 15-digits) to achieve some sequencing. The 15-digit numbers are generally a combination of the latitude, longitude and sequence number of the location. A sequence number is used to separate locations that are very close to each other. Equivalent terms: site ID or station ID.

2.1.8 WATLIST

WATLIST is an output file produced by batch input programs that contain (a) a listing of the records that were updated, (b) a cation-anion balance table if the balance can be computed, and (c) a listing of any generated error messages.

2.1.9 Time definitions

In NWIS 4.3, QWDATA will require the entry of time datum during login of a sample. In an attempt to simplify the discussion within this documentation and between sub-systems of NWIS, the following definitions have been established:

Time zone - a geographic polygon where time is observed using a particular offset (in hours) from UTC (universal time).

Time datum - a variable that combines the time zone and the daylight-saving time usage associated with a time measurement.

Watch time - the time-of-day used by the person making and recording a measurement, or setting up an instrument to record measurements. The time-of-day recorded on field notes is converted to and from UTC within the database using a watch-time datum.

Site-default time datum - the time datum normally used by a USGS District office when recording time at a data collection site. The date of the time measurement must be taken into account to determine the site-default time datum, since daylight-saving time is (typically) only in effect during the summer. Note: the time-zone component of the site-default time datum may, or may not, be the same as the time zone in which the data-collection site is physically located. Similarly, the daylight-saving-time component of

the site-default time datum may not agree with the daylight-saving policy of the region surrounding the site.

Locally-observed time datum - the time datum that is commonly used by the populace in the vicinity of a data-collection site. (One might conceptualize this as the time datum used in the local television listings.) Conversion of a time measurement (in UTC) using the locally-observed time datum generates a measurement time-of-day that would be readily intelligible to a non-technical reader in the vicinity of the data-collection site.

An example is included to clarify the distinction between the site-default and the locally-observed time datums. A District in the Eastern time zone chooses to operate all gages in standard time year-round, even though the state where the district is located employs daylight-saving time. The site-default time datum in this case is EST, and the locally-observed time datum is EDT for summer-time dates.

2.2 Using the Interactive Programs

All interactive programs can be accessed from the main QWDATA menu. To start QWDATA type '**qwdata'** at the Unix prompt and the main menu will appear. Detailed information about each of the menu options within QWDATA is available in *Section 3* of this documentation.

2.2.1 Answering Prompts

When YES/NO questions are asked throughout the programs, an answer of "Y", "y", "YES", "yes", "N", "n", "NO", "no", or a blank will be accepted; any other answer should receive an error prompt and a repeat of the question. Similarly, where the user may answer a prompt with "QUIT", "Q", "q", or "quit" also will be accepted. Several programs request a numeric response to select an option (1, 2, or 3). When numeric data are requested, it is not necessary to enter final decimal points; however, imbedded decimal points must be entered.

2.2.2 Cursor Control

Cursor control screen movement allows the user to navigate from item to item, screen to screen, and to other parameters in the interactive programs. The valid cursor control characters and options are:

Enter	Action
^D	(Ctrl-D) Skip to next block
#	Delete (clear) value
/	Move back one field
/x	Continue at item number x
/+x	Move forward (x) items, default x is 1
/-x	Move back (x) items, default x is 1
/@	Continue at item with string @ in label
/p	Back up to previous page (screen)
/n	Advance to next page (screen)
/d	Delete current parameter
/a	Insert new parameter
/c	Cancel editing of current record
/q	Skip remaining items

To exit from the QWDATA system, the user can use Control-C. This will result in a query to be sure that the user wants to exit the software.

2.2.3 Default Values

A carriage return can be used to accept a default answer to a query in the interactive programs. The default answer is identified by `<CR> =' in parentheses at the end of the query. Default values for data entry are shown in the entry forms and will be used if the user does not specifically change them.

2.2.4 Mandatory Fields

Information that is required to store or retrieve data from the database is highlighted in the interactive screens.

2.2.5 Help with Valid Codes

A `**?**' may be entered in a field to obtain help on the information expected for that field. Where help is not available, a message stating that help is not available will appear.

2.2.6 Boolean Logic

In programs where criteria can be set to select sites, samples, or results, the default logic is for multiple criteria to all be 'true' for a site, sample or result to be selected. In some programs an option is provided to the user to specify that if any of the criteria are 'true' the site, sample, or result should be selected. In these programs the user selects either AND or OR as the logic. AND Boolean logic expects all criteria to be true. OR Boolean logic expects any criteria to be true.

2.2.7 Command Line Processing

A user can enter UNIX commands from most queries in the NWIS QWDATA programs and see the results of the UNIX command without leaving the NWIS software. The UNIX commands cannot be used if the user is positioned in a data entry field in the software. ***NOTE: Some optional settings may not work when used from within QWDATA. An example is the 'rm' command. If this command requires a confirmation of the action outside of QWDATA, it will not require one from within QWDATA.***

2.3 Site Level Information

Site-level information includes data associated with the site being sampled. Most information for a site is stored in the NWIS SITEFILE that can be accessed from the Ground-Water Site Inventory (GWSI) System of NWIS. All documentation for GWSI is available at: *http://wwwnwis.er.usgs.gov/nwisdocs4_3/gw/GW.user.book.html*.

A site must be established in the SITEFILE before any water-quality information can be added. A site can be established using the GWSI entry programs as discussed in the GWSI user documentation.

Most basic site-level information can be retrieved from the SITEFILE through QWDATA. For example, if parameter codes 81024 (drainage area), 72000 (datum), or 72008 (well depth) are included in output and the values are not stored with the water-quality record, the software will retrieve the stored results for these parameter codes from the SITEFILE. Also some alphabetic parameter codes are available to retrieve site-level information from the SITEFILE through QWDATA. Alphabetic parameter codes are listed in *Appendix A.*

2.4 Sample Level Information

A sample in the database is uniquely identified by the key variables, analyzing agency code, site identifier code, begin date, begin time, end date, end time and medium code. The mandatory sample information that must be entered and the optional sample information that may be entered are described below.

2.4.1 Record Number (Automatic)

This is an eight-digit number assigned to a sample when the sample is logged in to the database. The number is composed of a three-digit water year followed by a five-digit sequential number (Example: 00200075 is the 75th sample entered in water year 2002.) The record number is equivalent to the key variables that uniquely identify a sample, and can be used instead of the key variables in most of the NWIS QWDATA programs. These numbers are only unique within a database and must be used cautiously in an NWIS installation using multiple databases.

2.4.2 Agency Code (Mandatory, Key Variable)

Agency Code is a five-character code that defines the agency responsible for the data stored for a sample. The default value is USGS_ (where '_' is a blank). The other options for agency code can be found in the NWIS file: /usr/opt/nwis/support/aanwdx.all.agency.

2.4.3 Station number (Mandatory, Key Variable)

Station number is typically an eight-digit or 15-digit number assigned to a sampling site when it is established in the NWIS system. The eight-digit numbers are generally downstream order numbers used for surface water locations on streams or rivers. The 15-digit numbers are generally a combination of the latitude, longitude and sequence number of the location. A sequence number is used to separate locations that are very close to each other.

2.4.4 Begin Date (Mandatory, Key Variable) and Begin Time (Optional, Key Variable)

Begin date is the date the sample was collected (or the begin date for a sample that is collected over multiple days). The format is YYYYMMDD.

Begin time is the time the sample was collected (or the begin time for a sample that is collected over a date or time range). The format is HHMM. Although this is an optional entry, it is one of the key variables to identify a sample. If the field is not populated, then a null will be used on retrieval.

2.4.5 End Date (Optional, Key Variable) and End Time (Optional, Key Variable)

The end date is the end date of a sample that is collected over multiple days. The format is YYYYMMDD.

The end time is the end time of a sample that is collected over a date or time range. The format is HHMM.

2.4.6 Time Datum

Time datum *(see section 2.1.9)* is a required code that represents the time zone and daylight saving time indicators that define the times entered in the begin date and end date fields. This field will be automatically populated with the settings in the SITEFILE for the sampling site entered, but can be changed to any valid time datum. A complete list of valid time datums is available in *Appendix J – Table 1*.

2.4.7 Time-Datum Reliability Code

Time-datum reliability code is a required code that represents the reliability of the time datum entered for a sample. This field will be automatically populated with 'K' (Known), but can be changed to 'E' (Estimated) if desired. Descriptions of valid time-datum reliability codes are available in *Appendix J – Table 2*.

The time-datum reliability code is used by QWDATA to determine when the time datum appears on some output formats. If the code is set to 'K', the time datum will appear on all output formats. If the code is set to 'T' or 'E', the time datum will not automatically appear. Review *section 3.4.3.4* for additional details.

2.4.8 Medium Code (Mandatory, Key Variable)

Medium code is the medium from which the sample was collected (i.e. - surface water, ground water, sediment, tissue). Medium codes 0-9 and A-P are used for environmental samples. Medium codes Q-Z are used for quality-control samples. A complete list of the valid medium codes can be found in *Appendix A, Table 1*.

2.4.9 Sample Type (Mandatory)

Sample type is the type of sample collected (i.e. - regular, composite, blank, spike). The default value for this code is **`9**' (Regular). The sample type codes can be found in *Appendix A, Table 5*.

2.4.10 Analysis Status (Mandatory)

Analysis status is the review status of the sample results (i.e. - initial entry, retrieved and in review, proprietary). The default value for this code is **`H**' (Initial Entry). The analysis status codes can be found in *Appendix A, Table 7*.

2.4.11 Hydrologic Condition (Mandatory)

Hydrologic condition is the hydrologic condition that is represented by the sample collected (i.e. - falling, rising, or peak stage). The default value for this code is **`A**' (Not Determined). The hydrologic condition codes can be found in *Appendix A, Table 3*.

2.4.12 Hydrologic Event (Mandatory)

A hydrologic event that is represented by the sample collected (i.e. - storm, drought, snowmelt). The default value for this code is **`9'** (Routine Sample). The hydrologic event codes can be found in *Appendix A*.

2.4.13 Analysis Source (Mandatory)

Analysis source identifies the source of the laboratory analyses and field data in the sample as USGS or non-USGS. The default value for this code is **`A'** (not determined). The analysis source codes can be found in *Appendix A, Table 8*.

2.4.14 Analysis Types (Optional)

Analysis types identify the types of analyses that were run for a sample (i.e. - Chemical, biological, nutrients). Zero to eight of the codes may be entered. The analysis type codes can be found in *Appendix A, Table 6*.

2.4.15 District Processing Status Code (Mandatory)

District Processing Status Code identifies the review status of a sample. Historically, this flag was used to identify samples that could be transferred to the national database. It still plays a role in the samples selected for the NWIS Web database. The district processing status codes can be found in *Appendix A, Table 9*.

2.4.16 Geologic Unit Code (Optional)

Interchangeably referred to as the aquifer code, this is an eight-character code that designates the aquifer associated with ground-water samples. The codes are defined in the "Catalog of Aquifer Names and Geologic Unit Codes." Option 4 of the Support Files sub-menu can be used to help find the appropriate code.

2.4.17 Lab Number (Optional)

Lab number is the analytical laboratory identification number given to a group of bottles from one field sample that are received together in a shipment.

2.4.18 Project Number (Optional)

Project Number is the nine-character project code associated with the sample.

2.4.19 Organism Code (Optional)

Organism code is the code to identify the organism of a tissue sample.

2.4.20 Body Part Code (Optional)

Body part code is the code to further qualify the tissue analyzed for a tissue sample. The body part codes can be found in *Appendix A, Table 19*.

2.4.21 Sample Field Comment (Optional)

Sample field comment is a text field to hold information from the field about a sample that cannot be defined by the coded information in the system.

2.4.22 Sample Lab Comment (Optional)

Sample lab comment is a text field to hold information from the lab about a sample that cannot be defined by the coded information in the system.

2.5 Result Level Information

2.5.1 Remark Code

Remark codes provide additional information about the magnitude (or absence) of a value. The remark code is almost always viewed with the value in the software to avoid misinterpretation of the value. The remark codes can be found in *Appendix A, Table 10*.

2.5.2 Value Qualifier Codes

Value Qualifier Codes provide information about the process used to determine an analytical value and, often, the remark code associated with the value. Up to three value qualifiers can be stored with any single result. The value qualifier codes can be found in *Appendix A, Table 16*.

2.5.3 Data Quality Indicator Code

Data Quality Indicator Codes indicate the review status of a result, controls the ability of a batch input program to overwrite a value, and affects the inclusion of a result in output. The data quality indicator codes can be found in *Appendix A, Table 14*.

2.5.4 Null Value Qualifier Code

Null Value Qualifier Codes identify a failed measurement due to field, lab, or shipment problem. The null value qualifier codes can be found in *Appendix A, Table 15*.

2.5.5 Laboratory Standard Deviation

Laboratory standard deviations are usually determined by the laboratory as an explanation of the uncertainty associated with a result value. This field was introduced in

QWDATA to provide the ability to round values on output using this information.

2.5.6 Method Code

Method codes identify the analytical method used to determine a value. In QWDATA 4.3, a table containing parameter codes and associated method codes was established and used to validate a data entry. More information about the development of the method code list can be obtained at:
http://wwwok.cr.usgs.gov/nawqa/phoenix/www/references.html.

2.5.7 Quality Assurance Code

Quality assurance code identifies the type of agency that did the field and laboratory work and the review status of the result. This code has only been sparsely used in the system (the majority of the entries are left at the default value) because the domain is confusing and there are other fields that can be set to convey this information. It will most likely be discontinued in a future revision. The quality assurance codes can be found in *Appendix A, Table 2*.

2.5.8 Preparatory and Analysis Dates

Preparatory and analysis dates are two fields used to identify the dates (YYYYMMDD) of the preparatory step and analysis at the laboratory.

2.5.9 Preparatory and Analysis Set Identifiers

Preparatory and analysis set identifiers are two fields used to store the set identification code (up to 12 characters) of the preparatory set and analysis set at the laboratory.

2.5.10 Report Level and Report Level Type Code

The report level is the numeric value associated with the analytical method when the result is determined. The report level type is a code to identify the type of report level used for the method. The report level type codes can be found in *Appendix A, Table 17*.

2.6 Parameter Codes

The parameter codes are five-digit codes used to identify the type of result stored. The codes are documented in the NWIS Parameter Code Dictionary (PCD). The PCD can be searched or listed from options in the Support Files sub-menu of the QWDATA menu. Selecting the appropriate parameter code may require some verification with the laboratory. The schedules run by the NWQL will contain the parameter code for the data that will be generated; therefore it may be useful to check their catalogue of schedules for help identifying the parameter code(s) needed. Only numeric values can be entered for any parameter code in the NWIS system.

2.6.1 Calculated Value Parameter Codes

Calculated values are results that may be stored in the database, or may be determined on output using algorithms stored in a reference file. The parameter codes for these calculated values are requested during retrieval. If the value is not stored; the parameter codes needed for calculation must be present. All calculated parameter codes available in an analysis can be retrieved by using of the alpha code – CALCV. A list of available calculated parameters, parameters required for calculation, and descriptions of special cases can be found in *Appendix D*. Algorithms for the calculated parameter codes can be viewed in QWDATA by use of option 8 in the *Support Files* menu.

2.6.2 District Specific Parameter Codes

Twenty-six parameter codes (99900-99925) are available in the PCD for use by individual Districts. The use of a District-specific code is to store District results for constituents that do not have a valid parameter code. Being stored in QWDATA allows the results to be stored, tabled, graphed, or exported for use in statistical programs. The first five codes (99900-99904) have default rounding codes of two, the second five (99905-99909) have default rounding codes of three, and the remaining codes (99910-99925) have default rounding codes of five. For more information about rounding codes, refer to *sections 2.7.1* and *3.6.7*. If these parameter codes are included in a publication-style table, the heading for each parameter contains seven characters per line and seven lines of text. The heading may be modified with an editor to accurately describe the constituent. Following is an example of District-specific code table output:

```
WATER-QUALITY DATA, WATER YEAR OCTOBER 1997 TO SEPTEMBER 1998

                                 9990001  9990201
               SPE-              9990002  9990202
               CIFIC             9990003  9990203
               CON-    TEMPER-   9990004  9990204
               DUCT-    ATURE    9990005  9990205
  DATE         ANCE     WATER    9990006  9990206
              (US/CM)  (DEG C)   9990007  9990207
              (00095)  (00010)   (99900)  (99902)

  SEP
   11...         109     10.5      70         .01
```

Because the definitions for these parameter codes are district specific and there is no storage of these definitions in QWDATA, it is recommended that a log of the definitions applied to these codes be kept by the database manager.

2.6.3 Fixed Value Codes

There are many parameter codes in QWDATA for which the result is not the outcome of an environmental measurement but rather a subjective observation or description. These types of parameter codes are referred to as Fixed Value Codes and have a small number of valid results that are related to a description. For example, parameter code 01035 – the severity of detergent suds – has the following valid results:

0	none
1	mild
2	moderate
3	serious
4	extreme

In other cases for which the result is not the outcome of an environmental measurement, valid results refer to a list that further defines the sample. For example:

Parameter code 00027 – collecting agency has a domain ranging from 300 to 99999 and each valid discrete result refers to a specific agency.

A complete list of parameter codes that have fixed values and the corresponding valid results can be found in *Appendix B*.

2.6.4 Alpha Parameter Codes

Alpha parameter codes, which may include both alpha and numeric characters, are used in QWDATA to retrieve sample and result-level descriptions as well as groupings of other codes. The descriptions include information stored with the sample such as date, time, and sample record number. An example of an alpha parameter code that represents a grouping of parameter codes is 'ADDPC' which adds all numeric codes to a retrieval. Another example of an alpha parameter code that represents a grouping of parameter codes is 'CALCV' which adds all calculated parameter codes to a retrieval. A complete list of alpha codes can be found in Table 18 of *Appendix A*.

For output in a by-result format, only alpha parameter codes are used to define the columns in the output. For more information on this type of retrieval refer to *section 3.4.4.*

2.7 Numeric Information

Values in QWDATA are stored in the database using double-precision floating-point representation, which yields 15-17 decimal digits of precision. The retrieval programs available through the QWDATA menus provide more limited precision. Precision of results produced through QWDATA is limited by the internally defined width of the output field, the rounding method, and rounding criteria selected. Even when unrounded

results are requested, precision is limited. In general, no more than eight digits are provided with the retrieval programs in QWDATA. Results used in calculations or retrieved through other avenues, such as Sequel Query Language (SQL) or Open Database Connectivity (ODBC) will be double precision.

2.7.1 Rounding

Water-quality values from NWIS may be output as rounded or unrounded. The unrounded choice will output the values as they were received from the lab and stored in the database. There are two choices for rounding values: (1) allow the software to determine how to round the result by using an existing *laboratory standard deviation (section 2.5.5)* stored with the result or the value in the rounding array for the specific parameter and method or (2) use a rounding code stored with each value.

Only one of these rounding options can be selected per retrieval. The first one is default rounding and the second one is called user-defined rounding. Some user-defined rounding codes have been set to odd values, sometimes by input from the lab, and may produce unexpected results. The most conservative and consistent option for rounding values at present is default rounding.

User-defined rounding can be used if a rounding code is stored with the result. If a rounding code is not stored with a result, the software will use the value from the parameter-method reference table. To add a rounding code, you can use *Modify Samples or Results* from the main QWDATA menu. Adding rounding codes can be done on a large scale using batch files and the QWFIX program as described in *section 3.9.3*.

Uncensored, non-zero concentration values that round to zero are in general, converted to a null value on output, with the remark set to "**M**" (constituent identified in sample, but not quantified). However, many uncensored measurements may be reported as zero and those values will remain zero in the output. An example of an acceptable rounded-to-zero result is water temperature. Censored, non-zero concentration values that round to zero are reported with the same number of significant figures that was originally entered with the value.

A rounding code of zero is not accepted by the system. New interactive entries with rounding codes of zero, (usually generated by the software) require the user to select a different rounding code before the value will be stored. New batch entries with rounding codes of zero will replace the zero with the number of significant figures in the actual value.

Programs within QWDATA present result values using the various rounding options. The table below summarizes the rounding options used by the various QWDATA programs:

QWDATA main menu option (option number)	Sub-menu option (option number)	Rounding Behavior
Login Sample (1)	---	result
Modify Samples or Results (2)	Enter Field Results (1)	result
	Enter Laboratory Results (2)	result
	Edit Sample or Results (3)	result
Data Review (3)	List Samples and Results (3)	unrounded
	Sample list and/or Cation-Anion Balance (4)	default
	Chemical Validation Checks (5)	default
Data Output (4)	Water-Quality Table by Sample (Publication Format) (3)	choice
	Water-Quality Table by Result (4)	choice
	Flat File by Sample (5)	choice
	Flat File by Result (6)	choice
	Make a P-STAT Data Set (7)	choice
Graphs (5)	Summary statistics table (7)	choice
	Detection Limits Table (8)	choice
Batch Processing (8)	Process batch file for all logged in samples (2)	unrounded
	Process batch file for all samples (3)	unrounded
	Process batch file for all logged in QA samples (4)	unrounded
	Process batch file for all QA samples (5)	unrounded
	Produce batch output (6)	unrounded
	Review/Edit batch files (7) Review tab-delimited batch input files (1) Edit tab-delimited batch input files (2)	 unrounded unrounded
	Produce 1- and *-card output	unrounded
	Reload QWDATA from batch file, overriding DQI (9)	unrounded
	Reload QADATA from batch file, overriding DQI (10)	unrounded

[Rounding Behavior: **result**, user-rounding based on rounding code stored with the result; **unrounded**, the value displayed is the stored value in the database; **default**, rounding is based on the rounding array stored in the parameter-method table; **choice**, user can choose what type of rounding will be applied.]

2.7.2 Scientific Notation

During input, the field for entering values in QWDATA is limited to eight digits and a decimal place. Scientific notation can be used to store values that won't fit in the field because the values are very small or very big numbers. The format for storing scientific notation is: the mantissa number, E, and the logarithm value. For example, .000000000023 would be stored as 2.3E-11, and 48,900,000,000 would be stored as 4.89E10. In some cases the PCD rounding specifications cannot accommodate very small and very large numbers on output. In this case, user-defined rounding can be selected for output.

2.7.3 Negative Values

Negative values may be stored in QWDATA for selected parameters. The types of parameters that can have negative values generally are field constituents (for example, air temperature, in degrees Celsius, parameter code 00020) and chemical constituents that are isotopes (for example, radium 226 dissolved, in pci/l, parameter code 09503). Some of the district-specific codes (99900-99909) also will allow negative values to be stored. A complete listing of the parameters that allow negative values is contained in *Appendix H*.

2.7.4 Zero Values

Zero values in the database are processed in different ways. The software accepts zeros during processing for all parameters. However, a zero may or may not be a valid value from a scientific point of view. For example, zero for a temperature is a valid measurement. Whereas, for chemical constituents, laboratory methods do not actually measure zero, but rather values are censored as being less than some laboratory reporting level.

For some chemical constituents, zero may have been incorrectly stored for historical data values. Users may censor these zero values on output. If the user selects "User Specified" for "Censoring of Zero Values" in the tabling options menu, a zero value will be converted to a null value and a remark code of U (material analyzed for, but not detected) will be reported. *Section 3.4.3.4* describes the tabling options in further detail. A reference list of parameters that are known to have zeros reported for some historical data are contained in *Appendix I*.

In some cases, the rounding specifications for a parameter in the PCD do not go to a decadal unit that is small enough for some result values and may result in the value rounding to zero. This is because laboratory methods are not accurate to that level, even though a laboratory measurement was made and reported. In this case, during output processing, a small number would incorrectly round to zero, even though a number may be stored. Values that belong to constituents that have reporting units that are used to quantify the abundance of an analytical constituent within some unit of area, volume, mass, or weight cannot be zero. Where the rounding procedures cause a non-zero value to round to zero, an 'M' (presence of material verified, but not quantified) will be displayed on output for parameters with the units contained in the table below. Values that belong to constituents that have reporting units other than those shown in this table can be reported as zero.

PG/KG	MG/ML	G/SQ M
PG/ML	MG/L	G/ SQ M
NANOGRAMS/LITER	MG/SQ M	G/KG
NG/G	MG / SQ M	UEQ/L
NG/L	MG/M2	MEQ/100 G
MICROGRAMS/LITER	MG/G	MEQ/L
UG/L	MG/KG	ML/L
UG/G	G/M2	PICOCURIES/GRAM
UG/KG	G/CU CM	PCI/G
UG/M2	G/CU M	PCI/L
MILLIGRAMS/LITER	G/SQ METER	PCI/ML

Reporting Units Where Zero Values Are Unacceptable

2.8 Text Fields for Comments

Text comments can be included within QWDATA records at the sample level and at the result level. Each of these two levels has two categories of comments, those from the laboratory and those from the field. In general, messages from the laboratory are sent directly from the laboratory and should not be edited or altered, although there are circumstances where this might be necessary. Messages from the field can be used to include information relative to the entire sample or to a specific result that cannot be characterized in another field. The recommended maximum length of these comment fields is 300 characters.

To retrieve these text fields, the following alpha parameter codes can be used when retrieving records:

Code	Meaning
SCMLB	Sample-level comment from lab
SCMFL	Sample-level comment from field
RCMLB	Result-level comment from lab
RCMFL	Result-level comment from field

2.9 Field Forms

Field forms are used by interactive entry of data and edit programs in QWDATA to provide a list of parameters that are routinely collected for a particular project, field trip, a District water-quality field sheet, or data from a non-USGS laboratory. Field forms are a list of parameter codes and associated information that are accessed by various programs so that a user can enter efficiently field or laboratory data. Some national field forms are provided with the NWIS release, but any number of District-specific field forms can be added to the system. Each field form is identified by a unique number that

is part of the field form name. Entry programs for field and laboratory data are discussed in *sections 3.2.1 – Enter Field Results, 3.2.2 – Enter Laboratory Results,* and *Tip Sheet 5.2*.

2.9.1 List of Field Forms Available

A list of field forms that are available can be viewed either by going to the directory where the forms reside or by listing them within QWDATA. To view the available forms in the directory where they reside, change directories to ***/usr/opt/nwis/data/auxdata/qw_field_forms/***. In this directory there are several files with the format ***field.parmsnn.*** The ***'nn'*** represents a two-digit number that identifies the form (e.g., field.parms01). Any editor can be used to view the contents of these ASCII files.

Another way to list the available field forms is within QWDATA during data entry. The prompt shown below appears during data entry after the login of a sample and when *Enter Field Results* or *Enter Laboratory Results* has been selected:

Enter field form nn, ?nn for detail of form nn, ? for list of forms available:

At this prompt, the user can enter a '?' and a list of available field forms will appear that includes the form number followed by either a form title or a list of parameter codes in that field form. To view the details of a specific form, enter a '?nn' at the prompt above, where 'nn' is the field form number of interest. A list of parameter codes and associated information will be displayed for that field form.

2.9.2 Adding a New Field Form

New field forms can be added to be used in QWDATA by creating a form using a specific format and storing it in the ***/usr/opt/nwis/data/auxdata/qw_field_forms*** directory. New field forms should be created if none of the available field forms fit the data to be entered. Available field forms should be reviewed prior to creating a new field form so that duplication of field forms is avoided.

To make a new field form, the user should change directories to ***/usr/opt/nwis/data/auxdata/qw_field_forms.*** Choose what field form number you are going to use for the new field form by listing the field forms in the directory. Field form names are in the format ***field.parmsnn*** where 'nn' is the two-digit number that identifies the form. Choose a field form number that is not already used. Use any editor that produces an ASCII output file to create or edit a field form file. The first line of the field form should be used to document the purpose of the field form by placing a "**#**" in the first column. Additional lines can be used for comments as long as a "**#**" is in the first column of the line. The format and an example of a field form are shown below:

Format of the field form

Line 1	**Begins with a "#" in column 1 and is used to describe the purpose of the field form, name of the person who designed the form, and date created. (This line is not required but is strongly recommended because the line is displayed if a list of field forms is requested.)**
Columns 1-5	**Parameter code [five digits, use leading zeros].**
Column 6	**Method code [optional].**
Column 7	**Not used.**
Columns 8-32	**Parameter names or descriptions [could match District water-quality field sheet]**
Column 36	**Y indicates parameter is mandatory.**

Example of field form

```
#NAWQA SW field form for Biological project was created
#  by John Smith on 12-25-1999
#2345678901234567890123456789012345678901234567890 Column numbers
00061  Streamflow
00065  Gage height
00010  Temp water
00020  Temp air
00400  pH
00095  Specific Conductance
00300  Dissolved Oxygen
00025  Barometric pressure
00452B CO3 Carbonate M=B
00453B HCO3 Bicarbonate M=B
39086B Alkalinity Inc. Titration
31625  Fecal Coliform
31673  Fecal strep
84164  SAMPLER TYPE                Y
71999  PURPOSE                     Y
99105  REPLICATE
99111  QA DATA TYPE                Y
```

Any numeric parameter can be entered into a field form. Alpha parameters (such as GUNIT for geologic unit code) cannot be used in the field form. Be sure that the final line of the field form contains a carriage return at the end. If this is not included, the last parameter will not be included to enter data. A maximum of 100 parameters can be included in any field form.

As part of creating new field forms, the user can create descriptions for the parameter codes listed. The user should be careful not to create descriptions that could cause confusion when compared to the definitions in the PCD. For example, a parameter described as ‘chloride, dissolved’ in the field form and defined as ‘chloride, total’ in the

PCD could cause incorrect data storage and interpretation, as well as significant future confusion. Creating a new field form is discussed in *Tip Sheet 5.3.*

2.10 Multiple Databases

Users have access to multiple water-quality databases where each database file is associated with a generic file name and a database number. A database number is a two-digit number, ranging from 01-98. (Database number 99 is reserved for use by NWIS maintenance programs and transaction archive files.) Regardless of how many databases are implemented on each system, any user who has not been assigned an alternate database number in the database selection table will be associated with database number 01.

2.10.1 When to Use an Alternate Database

Within NWIS, users have the option to create and use multiple water-quality databases. The decision to create and maintain an alternate database is one that should be carefully considered to ensure that the needs being met by an alternate database are sufficient to outweigh the problems associated with maintaining two or more databases.
Some of the issues involved with having more than one database are:

- duplicate data stored in multiple databases require that updates be applied to more than one database to maintain data integrity;
- multiple databases may lead to confusion about which database is primary when updating NWISWeb;
- an alternate database that is created for a specific project might be abandoned if the project chief leaves;
- alternate databases require increased data management responsibilities;
- interactive and batch entry results require setting the proper database number prior to NWIS use; and
- automated loading of National Water-Quality Laboratory (NWQL) results require setup and use of a separate NWQL user code;

Prior to the release of NWIS 4.1, one of the major reasons for the creation of alternate databases was to prevent the release of data for which there should be no public access; for example: proprietary data -- either permanent or temporary, cooperator data, and QA/QC data. With the release of the 4.1 revisions of QWDATA, there are codes available to restrict access within the same database. However, sample coding must be rigorously correct if proprietary and publicly accessible data are stored in the same database. If proprietary data are segregated into an alternate database, these data can be excluded safely and easily from unauthorized users including NWISWeb.

Other reasons for having an alternate database include testing, training, and organization. For example, much National Water Quality Assessment Program (NAWQA) data is kept in an alternate database because NAWQA study units generally are not aligned with District boundaries, and the primary responsibility for serving data to the public lies with the District that has jurisdictional responsibility for the site where the data were collected.

The NWIS Program office recommends that an alternate QWDATA database be used for storage of QA/QC and proprietary data. This will protect these data from accidental release to unauthorized sources in response to a public inquiry, or the inadvertent inclusion of the data in a report or on NWISWeb.

Districts should avoid the situation where multiple copies of the same sample data are stored in separate databases on the same NWIS installation, due to the difficulty of keeping the multiple copies consistently up-to-date.

2.11 Quality-Control Samples

The recommended procedures for storing quality-control (QC) samples in NWIS are described in this section. QC data provide information about the bias and variability in the environmental data, therefore the QC samples need to be identified in a manner that relates them to corresponding environmental samples. However, the QC samples need to be stored separately from the environmental samples to prevent any unintentional retrieval of this type of data. The recommended procedures address both of these requirements.

2.11.1 Definitions of Quality-Control Samples

Blank samples are taken to ensure that environmental samples have not been contaminated by the data collection process. Any measured value/signal in a blank sample for an analyte (a specific component measured in a chemical analysis) that was absent in the blank solution is believed to be due to contamination. There are many types of blank samples possible, each designed to segregate a different part of the overall data-collection process including sampling, filtering, preserving, storing, transporting, and analyzing:

Blank solution - solution that is free of the analyte(s) of interest. Such a solution would be used to develop specific types of blank samples as described below.

Shelf (or hold) blank - a blank solution put in the same type of bottle used for an environmental sample and stored adjacent to an environmental sample in a storage area.

Refrigerator blank - a blank solution put in the same type of bottle used for an environmental sample and stored adjacent to an environmental sample in a refrigerated storage area.

Trip blank - a blank solution put in the same type of bottle used for an environmental sample and kept with the set of sample bottles both before and after sample collection.

Sampler blank - a blank solution poured or pumped through the same field sampler used for the collection of an environmental sample.

Filter blank - a blank solution filtered in the same manner and through the same filter apparatus used for an environmental sample.

Splitter blank - a blank solution mixed and separated using a field splitter in the same manner and through the same apparatus used for an environmental sample.

Preservation blank - a blank solution treated with the same preservatives used for an environmental sample.

Field blank - a blank solution subjected to all aspects of sample collection, field processing, preservation, transportation, and laboratory handling as an environmental sample.

Equipment blank - a blank solution processed through all equipment used for collecting and processing an environmental sample (similar to a field blank but normally done in the more controlled conditions of the office and not being transported to the field).

Ambient blank - a blank solution put in the same type of bottle used for an environmental sample, kept with the set of sample bottles before sample collection, and opened at the site and exposed to the ambient conditions.

Source solution blank - a blank solution sent to a laboratory to confirm that it is free of the analyte of interest.

Lab blank - a blank solution prepared in the laboratory and analyzed the same as an environmental sample.

Blind sample - a sample submitted for analysis whose composition is known to the submitter but unknown to the analyst. A double blind sample is one of known composition that is submitted to the analyst in such a manner that neither its composition nor its identification as a check sample is known to the latter. A blind sample is one way to test the proficiency of a measurement process. Blind samples can be used to monitor the performance of an analytical system, check the analytical results of more than one laboratory, more than one analytical method, or the consistency of the same laboratory and method. Every blind sample analyzed should have an associated reference to the source and the possible dilution. Blind samples may be prepared from a reference material, as defined below.

Reference material - A material or substance, one or more properties of which are sufficiently well established, to be used for the assessment of a measurement method or for assigning values to materials.

Replicate (Duplicate) samples - A group of samples, collected in a manner such that the samples are thought to be essentially identical in composition. Replicate is the general case for which duplicates are the special case consisting of two samples. There are many types of replicate samples possible, each of which may yield slightly different results in a dynamic hydrologic setting, such as a flowing stream. The types of replicate samples are:

- ✓ ***Concurrent samples*** - samples collected by two or more people collecting samples simultaneously, or by one person alternating sub-samples between two or more collection bottles.
- ✓ ***Sequential samples*** - a type of replicate sample in which the samples are collected one after the other, typically over a short time.

- ✓ ***Split sample*** - a type of replicate sample in which a sample is split into sub-samples contemporaneous in time and space.

Spike sample - A sample to which known concentrations of specific analytes have been added in such a manner as to minimize the change in the matrix of the original sample. Every spiked sample analyzed should have an associated reference to the spike solution and the volume added.

Spike solution - A solution with one or more well established analyte concentrations that are added in known quantities to an environmental sample to form a spike sample.

2.11.2 Identification of Quality-Control Samples in NWIS

A system for identifying quality-assurance samples and maintaining the relationship with corresponding environmental samples has been established. The MEDIUM CODE, DATE, TIME and SAMPLE TYPE are used in the following manner to clearly identify all QA data:

Blank

- Use actual STATION NUMBER, DATE and TIME for blanks associated with a specific site and environmental sample. Use artificial STATION NUMBER, DATE and TIME for blanks that are associated with many sites and/or environmental samples. If more than one blank is analyzed, increment the TIME by 1 minute for each blank.
- Use a MEDIUM CODE of Q.
- Use a SAMPLE TYPE of 2.
- Use 991xx parameter codes listed below to designate which type of blank solution, the source of the blank solution, and the type of blank sample.
- If more than one blank is collected, use parameters 82073 and 82074 to enter the same STARTING TIME and ENDING TIME for each blank. Parameters 99109 and 99110 can be used to enter the SAMPLE SET START DATE and SAMPLE SET END DATE for a blank associated with environmental samples collected on more than 1 day.

Blind

- Use actual STATION NUMBER, DATE and TIME for blinds associated with a specific site and environmental sample. Use artificial STATION NUMBER, DATE and TIME for blinds associated with many sites and/or environmental samples. If more than one blind is analyzed, increment the TIME by 1 minute for each blind.
- Use a MEDIUM CODE from Q-Z.
- Use a SAMPLE TYPE of 4.
- Use 991xx parameter codes listed below to designate the source of the reference material and the source code number.

- If more than one blind is collected or if a blind is related to more than one environmental sample, use parameters 82073 and 82074 to enter the same STARTING TIME and ENDING TIME for each blind. Parameters 99109 and 99110 can be used to enter the SAMPLE SET START DATE and SAMPLE SET END DATE for blind samples that are associated with environmental samples collected on more than 1 day.

Reference Material

- Assign an artificial STATION NUMBER.
- Use the DATE and TIME that material was created or received.
- Select a MEDIUM CODE from Q-Z.
- Use a SAMPLE TYPE of 6 (new code). An existing SAMPLE TYPE of 3 (reference) has been used in the past, but there were no standards for its use. The new SAMPLE TYPE of 5 (reference material) was added and should be used for all samples that fit the definition of reference material included in this documentation.
- Use 991xx parameter codes listed below to designate the source of the reference material and the source code number.

Replicate

- Use the existing STATION NUMBER.
- Use actual DATE and TIME for the 1st sample and increment TIME by 1 minute (or actual times if greater than 1 minute) for each additional sample.
- Select a MEDIUM CODE from Q-Z.
- Use a SAMPLE TYPE of 7 for every sample, including the first one. A SAMPLE TYPE of 5 (duplicate) has been used in the past for the special case of replicates consisting of only two samples. The SAMPLE TYPE of 7 should be used for all samples that fit the definition of reference material included in this documentation.
- Use the 991xx parameter code listed below for replicates to designate which of the methods was used to create the replicates.
- Use the same STARTING TIME and ENDING TIME (parameters 82073 and 82074) for all samples.
- If the replicate samples will be stored in the regular database, use normal MEDIUM CODES (i.e., 6 or 9) and a sample type of 6.

Spike

- Use actual STATION NUMBER, DATE and TIME for spikes associated with a specific site and environmental sample. Use artificial STATION NUMBER, DATE and TIME for spikes that are associated with many sites and/or environmental samples. If more than one spike is analyzed, increment the TIME by 1 minute for each spike.

- Select a MEDIUM CODE from Q-Z.
- Use a SAMPLE TYPE of 1.
- Use the 991xx parameter codes listed below to designate the source code number of the spike solution, the spike type, and the volume of the spike. Use an existing code (32000) to designate the sample volume.
- If more than one spike is collected, use parameters 82073 and 82074 to enter the same STARTING TIME and ENDING TIME for each spike. Parameters 99109 and 99110 can be used to enter the SAMPLE SET START DATE and SAMPLE SET END DATE for blind samples that are associated with environmental samples collected on more than 1 day.

Spike Solution

- Assign an artificial STATION NUMBER.
- Use the DATE and TIME that source was created or received.
- Use a MEDIUM CODE of Q.
- Use a SAMPLE TYPE of 8.
- Use the 991xx parameter codes listed below to designate the source of the spike solution and the source code number of the spike solution.

A DISTRICT PROCESSING STATUS code of Z (local use only) should be assigned to each QA sample to prevent the data from being transferred to the national database and subsequently to the EPA's STORET database.

The following remark codes have been added to the system to allow further identification of some types of QA data:

A Average value
S Most probable value

Parameter code 99111, quality-assurance data indicator, can be stored with environmental samples to indicate that there are associated quality-assurance samples. The fixed values for 99110 indicate the type of quality-assurance samples associated with the environmental samples.

There are several existing parameter codes in addition to 82073 and 82074 mentioned in the identification of samples above that would clarify the nature of the sample (both environmental and QA samples). A list is provided below to encourage the use of these parameters. The definitions for the fixed-value parameters are in Appendix B.

00115 Sample Treatment
71999 Sample Purpose - fixed value
72005 Sample Source - fixed value
74200 Sample Preservation - fixed value
82075 Amount of rinse, in liters

82398 Sampling Method - fixed value

84164 Sampler Type - fixed value

The parameter codes referenced in the sample identification are defined below:

99100 Blank, Type of solution (fixed value)

99101 Blank, Source of solution (fixed value)

99102 Blank, Type of sample (fixed value)

99103 Reference Material, Source (fixed value)

99104 Reference Material or Spike Source, Code Number

99105 Replicate, Type (fixed value)

99106 Spike, Type (fixed value)

99107 Spike, Source (fixed value)

99108 Spike Volume, in mL

99109 Starting Date for a Set of Samples (YMDD)

99110 Ending Date for a Set of Samples (YMDD)

99111 Quality Assurance Data Type Associated with Sample (Fixed value code)

1.00 No Associated QA Data

10.00 Blank

20.00 Blind Sample

30.00

40.00

100.00 More than One Type of QA Sample

110.00 Cross-section Information Stored

200.00 Other

2.12 Data Entry Options

Two methods are available for entering data using QWDATA -- interactive data entry and batch data entry. Interactive data entry is entering data using queries and entry screens within the software. Batch data entry is using files as input to put data into the database. Both methods can be used to enter or modify data in the water-quality database if the user has the required security access. In general, interactive data entry is used to enter sample information (record creation), enter field data, and modify existing records for relatively small changes. Batch data entry is generally used for entering or modifying large amounts of data, for example the input of results from laboratories. Both methods can be used to remove data from the water-quality database.

2.12.1 Interactive Programs

Option 1 on the QWDATA main menu is used to interactively log samples into the database. This option can be used to enter sample information and field data. A *record number (see section 2.1.5)* is generated after the sample information has been entered. For specific information about using this program see *section 3.1 Option 1 – Login Samples*.

Option 2 on the QWDATA main menu contains options to enter field data, enter laboratory results, and edit samples or results. Option 2.1, Enter Field Data, allows a user to add field water-quality data to existing records in the QWDATA database. Option 2.2, Enter Laboratory Results, allows a user to add laboratory data to existing records in the QWDATA database. This option was primarily designed to enter data from non-USGS laboratories; field data can also be entered using this program. Option 2.3, Edit Samples or Results, can be used to edit and delete sample and result information for samples that exist in the QWDATA database. For more information on any of these options see *section 3.2 Option 2 – Modify Samples or Results.*

The entry of field or laboratory results, using any of the above interactive programs, is accomplished using field forms. These forms can be customized to provide parameters of interest for particular data entry needs. More information about field forms can be found in *section 2.9* and *Tip sheet 5.3.*

2.12.2 Batch Programs

Option 8 on the QWDATA main menu contains options to enter data using batch programs. The programs available from this menu work with files of water-quality data and are used for a variety of data needs. The most common application is entering data from laboratories, most typically the USGS NWQL. Other uses of the batch programs and files are output of entire records or groups of records by specifying the record information and making large scale changes to water-quality data in the QWDATA database.

Two batch file formats are accepted, a fixed format and a tab-delimited format. The fixed format, known as the '1 and *(or star)' card format, is a single file that was designed for use with NWIS versions prior to version 4.1. The tab-delimited format uses a pair of files, one for sample information and one for result information. This format was designed to accommodate new fields introduced in NWIS 4.1 and is expandable for fields introduced in future versions of the software. These two file formats are discussed in *section 3.8.* Both formats and example batch files are shown in *Appendix F*.

The programs available when using option 8 can retrieve NWQL results stored in a repository, process data into the database for existing and new records, produce batch output in either of the two formats, and review or edit a set of tab-delimited batch files. Detailed explanation of these programs is included in *section 3.8.*

3 PROGRAMS

The data entry, editing, review, retrieval, support, and utility programs in **QWDATA** are initiated by selecting a program through a series of menus. Section 3 of this user documentation describes the various programs available in QWDATA. To display the main QWDATA menu, type:

qwdata

on the command line, adding a two-digit number if a database other than the default database 01 is desired (e.g. ***qwdata02).*** In response to the **qwdata** command, the menu below is displayed showing the current installed version of the software and the database number used.

```
QWDATA PROCESSING ROUTINE   REV NWIS_4_0+20010111

 YOU ARE USING WATER-QUALITY DATABASE NUMBER 01

              Water-Quality System Main Menu

 1 -- Login Samples
 2 -- Modify Samples or Results
 3 -- Data Review
 4 -- Data Output
 5 -- Graphs
 6 -- Support Files
 7 -- Utilities
 8 -- Batch Processing

99 -- Exit system

Please enter a number from the above list or a Unix command:
```

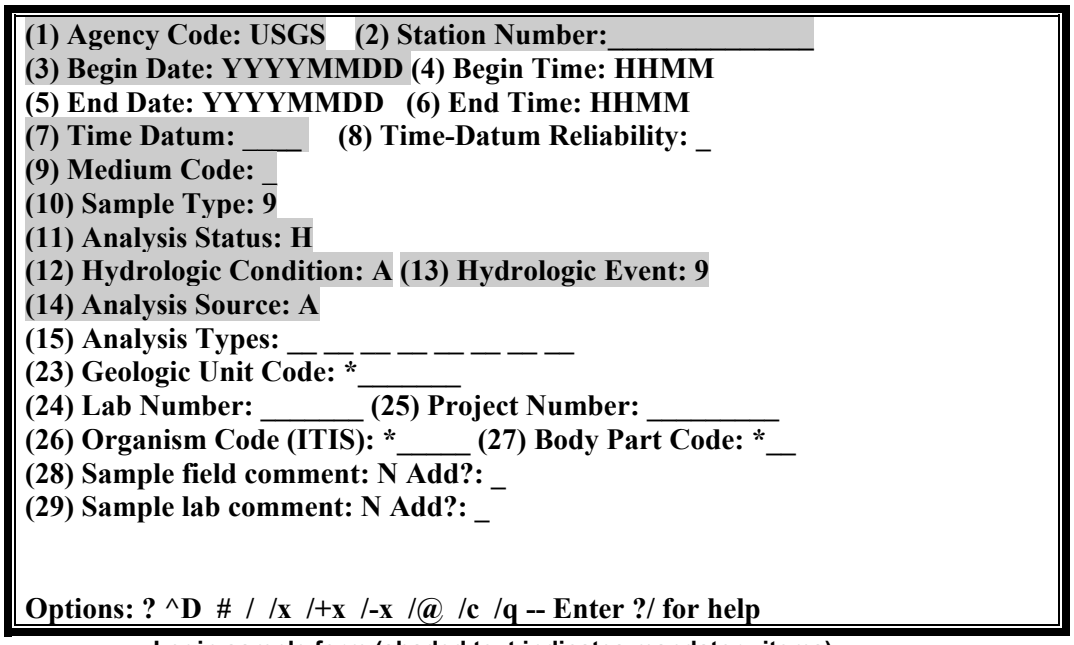
Main QWDATA Menu

This menu displays the eight main options available in QWDATA and lists the various program functions. The user can select one of the eight option numbers or type a UNIX command after the prompt at the bottom of the page.

UNIX commands, such as ***more*** or ***ls*** can be entered to look at file names or list a file from menu screens. At the conclusion of each program, the main QWDATA menu is redisplayed until ***99--EXIT TO SYSTEM*** is selected to exit and return to the UNIX prompt. The individual functions and options available in QWDATA are described on the following pages of this section.

3.1 Option 1 -- Login Samples

The login sample program can be used to enter sample information and field data and is started by selecting Option 1 on the main QWDATA menu. A *record number* is generated after the sample information has been entered. Multiple samples for a site can be logged in with this program, as well as samples for multiple sites. The login sample form is shown below:
Note : The site must exist in the *NWIS Sitefile* before samples can be logged in or water-quality data can be entered. The program for adding a new site to the NWIS database is described in the Option 7--Utilities section, *3.7.2 Option 2--Add new site or modify site information*. Access to this program may be restricted to more experienced database users.



Login sample form (shaded text indicates mandatory items)

Note : Fields containing an asterisk (*) are not available for entry unless the appropriate medium code is entered. See additional information for items 23, 26, and 27.
The options at the bottom of the screen allow the user to move from item to item, screen to screen, and to other parameters. The valid cursor control characters and options are shown at the bottom of the screen and are described in *section 2.2.2 Cursor control* and *Tip Sheet 5.1*. The items on the Login Sample screen are described below and on *Tip Sheet 5.2*.

(1) The cursor is initially positioned at the U in *USGS*. If this agency code is correct, it is accepted by entering a carriage return; if not, any valid agency code (for example, USEPA) may be entered followed by a carriage return. A list of valid codes is available in *documentation for the Ground-Water Site Inventory System*.

(2) The cursor is then positioned to the first blank following *STATION NUMBER*: and the program waits for input. Enter the station number, followed by a carriage return. At this point the program checks to determine if the agency code and *station number* (also referred to *station identification, site identification, or site id*) are in the *Site File*. If the agency code and station identification are found in the *Site File*, the station name is displayed and the cursor moves to the next item. If the agency code and station identification are not found in the *Site File*, an error message is displayed and the cursor returns to the first blank following *AGENCY CODE*.

(3) When a station number has been accepted, the cursor is moved to the first Y following *BEGIN DATE*. The begin date is a required item and must be entered in the correct format. The date is checked for validity, including if the date is less than or equal to the current date (future dates are invalid). If the begin date is more than 1 year prior to the current date, a message is displayed and there is an opportunity to reenter the date.
Note *: For sample composites, the full end date (year, month, and day) must be entered. There are no restrictions on composites that span the end of the month. The only checks made on end date are to ensure that the date is valid and the end date is not earlier than the begin date. (If a composite spans more than 30 days, a warning message is displayed*

and there is an opportunity to change the end date).

(4-6) The next three items (*BEGIN TIME, END DATE*, and *END TIME*) are optional and may be skipped by entering carriage returns.

(7) The *TIME DATUM* is a required item and is checked against a list of valid codes. This field will be automatically populated from the site file settings for the site entered. A list of valid time datums can be displayed on the screen by typing a "?". Additional information for time datums is available in *Section 2.1.9 and 2.4.6* and a list of valid time datum codes is available in *Appendix J, table 1*.

If a time datum that does not match the site file setting for the site is entered, the following warning will appear at the bottom of the screen:

Warning! Time zone does not match site file settings. Re-enter (Y/N)?

This is only a warning, because the time datum entered is unexpected and the user is given the chance to change it. There may be a valid reason for the time datum to be different and the software will store the time datum entered.

When a daylight saving time datum for a sample date that is not during the daylight saving time period is entered, the following warning will appear at the bottom of the screen:

Warning! Daylight saving time not normally used on this date. Re-enter (Y/N)?

This is an unusual circumstance and most likely is a mistake; therefore the user is given an opportunity to change it.

For composite samples that contain a time period that straddle the daylight saving time date change, the standard time datum is recommended. For example, if the begin date is April 1, 2002 and the end date is April 30, 2002, the standard time datum should be used. In the eastern time zone, EST (Eastern Standard Time) should be used. If a daylight saving time datum is used, the following warning will appear at the bottom of the screen:

Use standard time datum if Start/End date is standard time. Re-enter (Y/N)?

This gives the user the opportunity to change the value entered.

(8) The *TIME DATUM RELIABILITY* is a required item and is checked against a list of valid codes. This field will be automatically populated as 'K' (known). The value can be changed to any valid code. If the code entered is other than 'K', the time datum stored with the sample will not appear in all output formats. A list of valid reliability codes can be displayed on the screen by typing a "?". Additional information for this field is available in *Section 2.4.7* and a list of valid time datum codes is available in *Appendix J, table 2* .

(9) The *MEDIUM CODE* is a required item and is checked against a list of valid medium codes.

A list of medium codes can be displayed on the screen by typing a "?". The cursor is repositioned in the space following *MEDIUM CODE* after the list is displayed. Medium codes are described in *section 2.3.3* and a list is available in *Appendix A; table 1*.

(10-14) Default values are displayed on the screen for items: *SAMPLE TYPE* , *ANALYSIS STATUS*, *HYDROLOGIC CONDITION* , *HYDROLOGIC EVENT* , and *ANALYSIS SOURCE* . The default values are: *9*--Regular sample for *SAMPLE TYPE* ; *H*--Initial entry for *ANALYSIS STATUS* ; *A*--Not determined for *HYDROLOGIC CONDITION* ; *9*--Routine sample for *HYDROLOGIC EVENT*; and *A*--Not determined for *ANALYSIS SOURCE* . The default values can be replaced by entering the desired value. Entering a "**?**" for any of the items displays a list of valid codes on the screen. Valid codes for *SAMPLE TYPE, ANALYSIS STATUS, HYDROLOGIC CONDITION, HYDROLOGIC EVENT,* and *ANALYSIS SOURCE* are available in *Appendix A; tables 5, 7, 3,4, 8*.
Note : If a "***6***" indicating Ground Water has been entered for the medium code, the items *HYDROLOGIC CONDITION* and *HYDROLOGIC EVENT* are automatically changed to the default value X--Not applicable. On the rare occasions when some other value is desired, the items can be changed before the record is stored.

(15-22) These items are optional and may be skipped by entering a carriage return. Valid codes for *ANALYSIS TYPES* are displayed by entering a "**?**" and are available in *Appendix A; table 6*. A total of eight *ANALYSIS TYPE* codes can be entered. To enter, type in a valid analysis type followed by a carriage return.

(23) If the medium code is anything other than "**6--Ground Water**" or "**S—QA sample - Ground Water**", the *GEOLOGIC UNIT CODE* item is skipped. A valid list of *GEOLOGIC UNIT CODES* are displayed by typing a "**?**" and at least two characters of the *GEOLOGIC UNIT CODE* or name . Valid codes can be viewed through the check support files, Option 6, described in *section 3.6.4*. A complete list of valid geologic unit codes can found in the file /usr/opt/nwis/support/aageol.states.all

(24) The *LAB NUMBER* item refers to the lab identification number, which is established when the sample is received at the USGS National Water Quality Laboratory. Normally, the *LAB NUMBER* is not known when the sample is being logged in and this item should be left blank by entering a carriage return. If a value is entered at District login time, then that value will not be updated by subsequent lab-data input programs.

(25) The *PROJECT NUMBER* allows the user to enter a District project number.

(26) Samples with medium codes: *C*, animal tissue; *D*, plant tissue; *X*, quality assurance sample-animal tissue; or *Y*, quality assurance sample-plant tissue, automatically converts *ORGANISM CODE* to a required item. To search for valid *ORGANISM CODES,* type a "***?***", and at least two characters that appear in the organism name, followed by a carriage return. To improve the results of the search, enter as many characters as are known; shorter entries could result in a long list of results.

(27) Login of samples with medium codes of *C, D, X*, or *Y* automatically converts *BODY PART CODE* to a required item . Valid *BODY PART CODES* can be displayed by typing a "***?***", followed by a carriage return and are available in *Appendix A; table 19*.

(28 & 29) If a *SAMPLE COMMENT* item has not been entered, an 'N' appears between the ':' and the 'Add?' query. If the user enters a 'Y' and a carriage return after the 'Add?' query, a separate editor will appear where the user can enter the *SAMPLE COMMENT*. If a *SAMPLE COMMENT* item has already been entered, a 'Y' appears after the ':' and the 'Add?' query will appear as 'Edit?'. If the user chooses to edit the existing comment by putting a Y after the 'Edit?' query, the comment is displayed in a separate editor and the user is given the option to edit or delete the comment, or cancel, to retain the existing comment. ***NOTE: Comments may not be entered in the login screen. If anything other than a Y or y is entered after the 'Add?' or 'Edit?' queries, the entry will not be accepted, and no change will be made to the comment field.***

After completing entry of the *SAMPLE LAB COMMENT*, the user is prompted with an option to make changes to any of the previously entered items on the login sample screen. If any of the valid item numbers (1-27) are entered, the cursor is repositioned at the selected item. Changes made to any entry are subject to the same edit criteria as during initial entry. A carriage return after item 27 or a "**/q**" allows the user to complete the login sample form.

Following the carriage return after field #27 or after using "/q", the database is searched to ensure that the *header information* is unique. The *header information* is a unique combination of agency code, station number, medium code, dates, and times. If a record with the same header information is found, the entry is rejected with the following error message:

- **That RECORD already EXISTS – RECORD NUMBER ########**
- **Login another record (Y/N, <CR>=Y)?**

If the header information is unique, the next screen asks the user:

- **Do you want to add parameters 00027 and 00028 (Y/N)?**

A fixed value code is required for parameter codes 00027 (*COLLECTING AGENCY)* and 00028 (*ANALYZING AGENCY)* and acceptable fixed-value codes are listed in *Appendix B.*
If the user responds by typing a "***Y***", the default value, 1028 *(U.S. GEOLOGICAL SURVEY),* is entered for both values. There is an opportunity to change the values after answering the next question:

- **Do you want to enter any data for this record (Y/N)?**

If the user responds with an "***N***" this step is skipped. If the answer was "***Y***" for entering the *COLLECTING and ANALYZING AGENCY* and "***N***" for entering field data, an edit-entry form for 00027 and 00028 is displayed. If the user responds with a "***Y***", the following query appears:

- **Are you entering lab (L) or field (F) data? (L or F, <CR>=F):**

If "***F***" is chosen, the field data entry screen is the same as described in *section 3.2.1.*
If "***L***" is chosen, the laboratory data entry screen is the same as described in *section 3.2.2.*
After entering or not entering data, a record is created and the assigned *record number* is displayed. Many users write the record number on the National Water Quality Laboratory Analytical Services Request Form or water-quality field notes.

```
 Saving record --

STATION NAME: SWIFTCURRENT CREEK AT SHERBURNE, MONT.

AGENCY CODE: USGS   SITE NUMBER: 05016000
BEGIN DATE: 20010101  BEGIN TIME: 2001
END DATE: 20010301    END TIME: 2003
MEDIUM CODE: H


RECORD entered  -  record number = 00100010

Login another record (Y/N)?
```

Screen displaying the creation of a record number for the sample

Next, the user is asked if he or she wishes to:
Login another record (Y/N)?
An "***N***" ends the program, whereas a "***Y***" produces the prompt:
Do you wish to edit the same header (Y/N)?
and allows the user to edit the header information. If the user has chosen to edit the record header of the previous sample and a comment was entered for the sample, then the user is given an opportunity to retain or edit the sample comment on the next screen where the previous sample information is redisplayed with prompts for the item numbers the user wishes to change.
The ability to edit the previous sample information allows for the rapid login (data entry) of samples with mostly repetitious information (e.g. samples at the same site that differ only by time, such as vertical measurements in a lake). An "***N***" causes a new input form to be displayed (without the previously entered values). The dialog proceeds as before, with the cursor positioned at the U in *USGS* of the *AGENCY CODE*. A maximum of 500 parameters can be stored in a single QWDATA file record.

3.2 Option 2 -- Modify Samples or Results

Option 2 of the main menu has three options that can be used to modify samples or results through the submenus. The first option, Enter Field Data, is a program used to add field water-quality data to existing records in the QWDATA database. The second option, Enter Laboratory Results, can be used to add non-USGS laboratory data to QWDATA. The third option, Edit Samples or Results, can be used to edit existing header information or results. ***Note*** : A record must exist in the database before any of these programs can be used. The record number or agency, site number, date, time and medium code must be known before any of these programs can be used. The program for logging in a sample is described in *section 3.1*.

```
QWDATA PROCESSING ROUTINE   REV NWIS_4_0+20010111
   YOU ARE USING WATER-QUALITY DATABASE NUMBER 01

                  Modify Samples or Results

  1 -- Enter Field Results
 2 -- Enter Laboratory Results
 3 -- Edit Samples or Results

98 -- Exit menu

99 -- Exit system
Please enter a number from the above list or a Unix command:
```

Modify Samples or Results submenu options

3.2.1 Option 1 -- Enter Field Results

Field data results can be entered into QWDATA with this program as well as in the Login Sample program described in *section 3.1*, and the Enter Laboratory Results program described in *section 3.2.2*.

The Enter Field Results program uses a field form, which is a list of parameter codes and associated information in a file named ***field.parmsnn*** , stored in the directory ***/usr/opt/nwis/data/auxdata/qw_field_forms/*** , where "*nn*" represents the 2-digit form number (e.g. field.parms01). Example of the format needed for a field form is shown in appendix G. Additional information about field forms is available in *section 2.9* and *Tip sheet 5.3.*

After option 1 has been selected, the user is prompted to enter the record number for the sample or a carriage return to identify a sample by agency code, station number, start date, start time, end date, end time, and medium code. The record number and sample information are displayed and the user is asked if this is the desired record.

```
qwfield -- Water Quality Field Data Entry Program
Processing in database: 01
 Record Number: 99501617
 Station Name: ST. MARY RIVER NEAR ST. MARY, MT
 Agency Code: USGS   Site Number: 05013600
 Begin Date: 19950802  Begin Time: 1300
   End Date:           End Time:
 Medium Code: 9
Is this the desired record (Y/N,<CR>=Y)?
```

Screen displaying the sample information and asking if this is the desired record

If this is not the desired record, or the record is not found in the database, the user is given another opportunity to enter a record number or agency code, station number, dates, times, and medium code. To quit from this application a "**Q**" can be entered in place of the record number. After the desired sample is displayed and accepted by typing a "**Y**" or a carriage return, the user is prompted to enter a field form number.

Available field forms can be listed to the screen by typing a "**?**" and carriage return. Detailed contents of the field form may be displayed by entering "**?#**" where "**#**" is the number of the field form. After the number of the desired field form has been identified and entered, followed by a

carriage return, the program displays the parameter codes and names from the requested field form, with spaces for the entry of values and attributes. The cursor is positioned in the value field of the first parameter. If the sample already contains data for any of the specified parameters, the stored values are displayed as shown below:

```
 (1) 00010 WATER TEMPERATURE Meth: A  V:    13    Rd: 3    13.0
Rmk: _ QA: I  DQI: S  Null Qual: _
Val Qual Codes: _ _ _   Result field comment: N Add?: _

(2) 00020 AIR TEMPERATURE   Meth: _  V:   11.5   Rd: 3    11.5
Rmk: _ QA: I  DQI: S  Null Qual: _
Val Qual Codes: _ _ _   Result field comment: N Add?: _

(3) 00027 COLLECTING AGENCY Meth: _  V:  1028    Rd: 5  1028.0
Rmk: _ QA: I  DQI: S  Null Qual: _
Val Qual Codes: _ _ _   Result field comment: N Add?: _

(4) 00028 ANALYZING AGENCY  Meth: _  V: 80020    Rd: 5   80020
Rmk: _ QA: I  DQI: S  Null Qual: _
Val Qual Codes: _ _ _   Result field comment: N Add?: _

(5) 00061 DISCHARGE, INST.  Meth: _  V:   605    Rd: 3     605
Rmk: _ QA: I  DQI: S  Null Qual: _
Val Qual Codes: _ _ _   Result field comment: N Add?: _

Options: ? ^D # / /x /+x /-x /@ /n /d /a /c /q -- Enter ?/ for help
```

Example of the field-results data entry format (shaded values are mandatory)

The program begins at the first parameter with the cursor at the value "***V***" field. The options for moving around the screen from parameter to parameter and screen to screen are displayed at the bottom of the screen. They are also described in *section 2.2.2* and can be listed on the screen by typing a "**?/**". A description of each item in the field-data entry form follows:

Meth: The method code is not a mandatory field for the result value, but the method code is validated when entered or edited. General information on the method code can be found in section 2.5.6. To review valid method codes, use option 9 of the Support Files (*section 3.6.9)* menu to review the contents of the parameter-method table. If the method code is changed for a result, the following message will appear on the screen:

```
You have changed the method code for an existing record.
Your options are:
  1: Replace result_rd with selection from PMT
  2: Enter a new rounding code
  3: Keep the existing result_rd

Enter 1, 2, or 3 (<CR>=1):
```

This message is related to the link between the method code and the rounding behavior for that result. **Option 1** (default) will change the rounding code for that result to the value derived from the parameter-method table. **Option 2** allows you to enter any rounding code for that result.

Option 3 will result in the rounding code remaining the same as it was prior to changing the method code.
V: The value for the individual parameter. A decimal point at the end of the value is assumed for values entered without a decimal point. The decimal point for values that are not whole numbers must be entered. A carriage return with no data is interpreted as no data, and that parameter is not stored. Entry of a "**#**" signifies a null value and the user is required to qualify the null value with a null-value remark code or null-value qualifier code. If a value exists for a parameter in the field form, a carriage return retains the old value; entry of a new value replaces the old one; and an entry of "***/d***" causes the parameter to be deleted from the record.
Rd: The rounding precision is used to display the data. Rounding is described in *section 2.7.1*.
Rmk: Remark codes are used to qualify data values, as well as null values. Remark codes are listed in *Appendix A*; *table 10*, described in *section 2.5.1*, and can be listed on the screen by typing a "***?***" after the Rmk prompt.
QA: The default quality assurance code for parameters is I, indicating USGS field value in review. Quality assurance codes are listed in *Appendix A*; *table 2,* described in *section 2.5.6*, and can be listed on the screen by typing a "***?***" after the QA prompt.
DQI: The data quality indicator code is a mandatory entry for the result that indicates the review status of the result, controls whether the batch-update programs can overwrite the result, and affects whether the result will be included in retrievals. Valid DQI codes and meanings are listed in *Appendix A; table 14* , described in *section 2.5.3*, and can be listed on the screen by typing a "***?***" after the DQI prompt.
Null Qual: If the parameter value is entered as a null value, a null-value remark or a null-value qualifier is required. The valid null-value remarks and null-value qualifier codes are listed in *Appendix A; table 15* and described in *section 2.5.4*.
Val Qual Codes: The value qualifiers provide additional information about the result values, which may be used for interpretation and archival of the results. QWDATA can store as many as three value qualifiers for each result from the valid codes listed in *Appendix A*, described in *section 2.5.2*, and can be listed on the screen by typing a "***?***" after the Val Qual Codes prompt.
Result field comment: Result comments are used to describe any information that the user might want to associate with the result value. For example, if the pH meter could not be calibrated with buffer solutions and the pH value was suspect, that information could be stored with the pH value and other parameters, such as alkalinity and bicarbonate, that were measured using the same pH meter. Description of comment fields is included in *section 2.8* .
Result field comments can be added or edited by inserting a "***Y***" at the "***Add***" or "***Edit***" prompt after the "Result field comment". A new screen is displayed for adding a new comment that includes up to 900 characters of information--15 lines consisting of up to 60 characters per line. Control "***c***" cancels the comment entry and control "***e***" saves the comment and exits. The user then receives the following prompt:
Do you want to apply the comment to other parameters (Y/N)?
If the user answers "***Y***", a new screen is displayed with four options.
The first option is to enter additional parameter codes at the terminal, where the parameter codes are typed in one at a time and a carriage return ends the program. This brings the user back to the field data entry form. The comment can be applied to as many as 500 parameter codes.
The second option applies the comment to parameters contained in a file; the pathname of the file is entered at the prompt.
The third option is to update all parameters in a sample with the comment.
The fourth option is to update all the parameters in the sample but confirm each before updating.
A new screen with three options is displayed for editing an existing comment. The first option allows the user to edit the comment. The second option allows the user to delete the comment and

the third option cancels the editing process.

When data entry is complete, the user can exit the program by either using "**/q**" or inserting a carriage return after the last parameter in the form. The program provides an opportunity to modify the data by displaying the prompt:

Changes? Enter item number to change or <CR> to continue.

Additional parameters may be added to the sample without having to add them to the ***field.parmsnn*** file by entering "***/a***" at any time. The parameter appears at the next line and the cursor is positioned to accept a value.

As each value is entered, the following checks are made:

1. If the value is negative, the parameter code is checked against a list of codes for which negative values are permitted; if the entry is invalid, a message is displayed and the value is rejected. Negative Values are described in *section 2.7.3* and listed in *Appendix H*.
2. If the value is for a parameter that should contain fixed values, the fixed values file list is checked; if the value is invalid for that parameter, a message is displayed and the value is rejected. Fixed values are listed in *Appendix B* and described in *section 2.6.3*.
3. If the value for pH (parameter code 00400) is greater than 14, a message is displayed and the value is rejected. If the value for pH is outside the range of 4.5 to 9.0, a message will be displayed during data entry, but the value will be retained.

When data entry is complete, the record is stored and the dialog restarted with the request for a record number or "***Q***" to end. Users will need to run the Chemical Validation Checks program describe in *section 3.3.5* to validate updates. General information about chemical validation checks is described in *section 2.7.*

3.2.2 Option 2 -- Enter Laboratory Results

The Enter Laboratory Results program is used to interactively enter and edit data from cooperator laboratories or USGS laboratory data that are not loaded into QWDATA from other programs. (Another program is used for adding analytical data from the USGS National Water Quality Laboratory and the Ocala Water Quality and Research Laboratory and is described in *section 3.8*). Laboratory data values can be entered into QWDATA with this program as well as in the Login Sample program described in *section 3.1*, and the Enter Field Results program described in *section 3.2.1*.

The Enter Laboratory Results program uses a field form, which is a list of parameter codes and associated information in a file named ***field.parmsnn*** , stored in the directory ***/usr/opt/nwis/data/auxdata/qw_field_forms/*** , where "***nn***" represents the 2-digit form number. Information about adding and designing a field form is available in *section 2.9* and *Tip sheet 5.3*.

After option 2 has been selected, the user is prompted to enter the record number for the sample or a carriage return to identify a sample by agency code, station number, start date, start time, end date, end time, and medium code. The record number and sample information are displayed and

the user is asked if this is the desired record.

If this is not the desired record, or the record is not found in the database, the user is given another opportunity to enter a record number or agency code, station number, dates, times, and medium code. To quit from this application a `***Q***' can be entered in place of the record number. After the desired sample is displayed and accepted by typing a "***Y***" or a carriage return, the user is prompted to enter a field form number.

Available field forms can be listed to the screen by typing a "***?***" and carriage return. Detailed contents of the field form may be displayed by entering "***?#***", where "**#**" is the number of the field form. After the number of the desired field form has been identified and entered followed by a carriage return, the program displays the parameter codes and names from the requested field form, with spaces for the entry of values and attributes. The cursor is positioned in the value field of the first parameter. If the sample already contains data for any of the specified parameters, the stored values are displayed as shown below:

```
(1) 00010 WATER TEMPERATURE      Meth: _ V:     6.5  Rd: 2      6.5
    Lab Std Dev: #       Rmk: _  QA: 3  DQI: S  Null Qual: _
    Val Qual Codes: _ _ _  Rpt Lev: _________  Rpt Lev Cd: *_____
    Prep Set No: _____  Anl Set No: _____
    Prep Dt: YYYYMMDD  Anl Dt: YYYYMMDD  Result field comment: N   Add?: _
    Result lab comment: N   Add?: _

(2) 00020 AIR TEMPERATURE        Meth: _ V:     16  Rd: 3      16.0
    Lab Std Dev: #       Rmk: _  QA: 3  DQI: S  Null Qual: _
    Val Qual Codes: _ _ _  Rpt Lev: _________  Rpt Lev Cd: *_____
    Prep Set No: _____  Anl Set No: _____
    Prep Dt: YYYYMMDD  Anl Dt: YYYYMMDD  Result field comment: N   Add?: _
    Result lab comment: N   Add?: _


Options: ? ^D  #  /  /x  /+x  /-x  /@  /n  /d  /a  /c  /q -- Enter ?/ for help
```

Screen showing an example of the laboratory results data entry format (shaded values are mandatory)

The program begins at the first parameter with the cursor at the value "**V**" field. The options for moving around the screen from parameter to parameter and screen to screen are displayed at the bottom of the screen. They are also described in *section 2.2.2* and can be listed on the screen by typing a "***?/***". A list of acceptable codes for some fields can be shown on the screen by typing a "***?***" in the field. A description of each item in the field-data entry form follows:

V: The value for the individual parameter. A decimal point at the end of the value is assumed for values entered without a decimal point. The decimal point for values that are not whole numbers must be entered. A carriage return with no data is interpreted as no data, and that parameter is not stored. Entry of a "**#**" signifies a null value and the user is required to qualify the null value with a null-value remark code or null-value qualifier code. If a value exists for a parameter in the field form, a carriage return retains the old value; entry of a new value replaces the old one; and an entry of "**/d**" causes the parameter to be deleted from the record.
Rd: The rounding precision that is used to display the data. Rounding is described in *section 2.7.1*.
LSDEV: The laboratory standard deviation will be used to round the result value if default

rounding is selected and a value for laboratory standard deviation is present. The laboratory standard deviation is discussed in *section 2.5.5.*

Rmk: Remark codes are used to qualify data values, as well as null values. Remark codes are listed in *Appendix A; table 10* described in *section 2.5.1.*

QA: The default quality-assurance code for parameters is set to I, indicating USGS field value, in review. Quality assurance codes are listed in *Appendix A; table 2*, described in *section 2.5.6.*

Meth: The method code attributes are described in *section 2.5.5*.

DQI: The data quality indicator code is a mandatory entry for the result that indicates the review status of the result, controls whether the batch-update programs can overwrite the result, and affects whether the result will be included in retrievals. Valid DQI codes and definitions are listed in *Appendix A; table 14*, described in *section 2.5.3*.

Null Qual: The null-value qualifier code is mandatory if a null value is entered and a null-value remark code is not included. The valid null-value remarks and null-value qualifier codes are listed in *Appendix A; table 15,* and described in *section 2.5.4*.

Val Qual Codes: The value qualifiers provide additional information about result values, which may be used for interpretation and archival of results. QWDATA can store as many as three value qualifiers for each result from the valid codes listed in *Appendix A* and described in *section 2.5.2.*

Rpt Lev: The reporting level value field contains the reporting level in use for censoring values for the laboratory, constituent, method, and instrument at the time of analysis. Laboratory information is described in *section 2.4.4*.

Rpt Lev Cd: The report level code describes the type of analytical reporting level in use for censoring data values by the laboratory at the time of analysis. Valid report level codes are listed in *Appendix A; table 17.* Laboratory information is described in *section 2.5.9*.

Prep Set No: The preparatory set number is a laboratory identifier used for a group of field-submitted samples and laboratory-supplied quality control blank and spike samples. These samples are prepared for analytical processing at the same time using the same method and reagents. Laboratory information is described in *section 2.5*.

Anl Set No: The analytical set number is a laboratory identifier used for a group of field and laboratory samples, analyzed together by the same analyst, using the same equipment at the same time. Laboratory information is described in *section 2.5*.

Prep Dt: The preparation date is supplied by the laboratory and represents the date that sample extraction or preparation began.

Anl Dt: The analysis date is supplied by the laboratory and represents the date that analysis began.

Result field comment: Result field comments are used to describe any field information that the user might want to associate with the result value. For example, if the pH meter could not be calibrated with buffer solutions and the pH value was suspect, that information could be stored with the pH value and other parameters, such as alkalinity and bicarbonate, that were measured using the same pH meter. Description of comment fields is included in *section 2.8.*

Result field comments can be added or edited by inserting a "***Y***" at the "***Add***" or "***Edit***" prompt after the "Result field comment." A new screen is displayed for adding a new comment that includes up to 900 characters of information--15 lines consisting of up to 60 characters per line. Control "***c***" cancels the comment entry and control "***e***" saves the comment, exits, and then prompts:

Do you want to apply the comment to other parameters (Y/N)?

If the user answers "***Y***", a new screen is displayed with four options. The first option is to enter additional parameter codes at the terminal, where the parameter codes are typed in one at a time. A carriage return ends the program bringing the user back to the field data entry form. The comment can be applied to as many as 500 parameter codes. The second option applies the

comment to parameters contained in a file; the pathname of the file is entered at the prompt. The third option is to update all parameters in a sample with the comment, and the fourth option is to update all the parameters in the sample, but confirm each before updating.
A new screen with three options is displayed for editing an existing comment. The first option allows the user to edit the comment. The second option allows the user to delete the comment and the third option cancels the editing process.

Result lab comment: Result lab comments are used to describe any laboratory information that might be associated with the value. The prompts and screens are the same as the "Results field comment", which is described above. Text fields for comments are described in *section 2.8.*
When data entry is completed, the user can exit the program by either using "**/q**" or inserting a carriage return after the last parameter in the form. The program provides an opportunity to modify the data by displaying the prompt:

Changes? Enter item number to change or <CR> to continue:

Additional parameters may be added to the sample without having to add them to the ***field.parmsnn*** file by entering "**/a**" at any time. The parameter appears at the next line and the cursor is positioned to accept a value.
As each value is entered, the following checks are made:

1. If the value is negative, the parameter code is checked against a list of codes for which negative values are permitted; if the entry is invalid, a message is displayed and the value is rejected. Negative Values are described in *section 2.7.3* and listed in *Appendix H*.
2. If the value is for a parameter that should contain *fixed values*, the fixed values file list is checked; if the value is invalid for that parameter, a message is displayed and the value is rejected. Fixed values are listed in *Appendix B* and described in *section 2.6.3*.
3. If the value for pH (parameter code 00400) is greater than 14, a message is displayed and the value is rejected. If the value for pH is outside the range of 4.5 to 9.0, a message will be displayed during data entry, but the value will be retained.

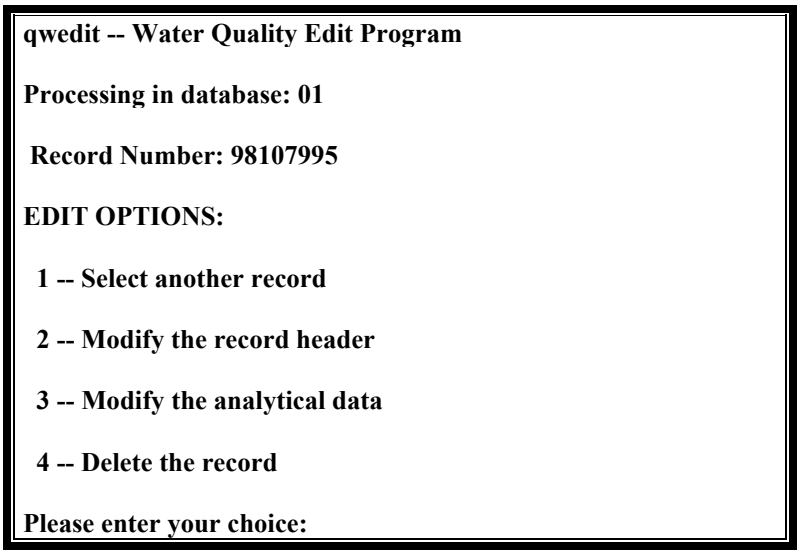
When data entry is complete, the record is stored and the dialog restarted with the request for a record number or "**Q**" to end. Users will need to run the Chemical Validation Checks program described in *section 3.3.5.* (*Option 5 of Function 3, Data Review*) to validate updates. General information about chemical validation checks is described in the table in *section 2.7.1*.

3.2.3 Option 3 -- Edit Samples or Results

The Edit Samples or Results program is used to modify the record header information for a sample, to modify the analytical results for a sample by adding, changing, or deleting parameter values or attributes, or to delete a sample record.

After option 3 has been selected, the user is prompted to enter the record number for the sample, or a carriage return to identify a sample by agency code, station number, start date, start time, end date, end time, and medium code. The record number and sample information are displayed and the user is asked if this is the desired record.

If this is not the desired record, or the record is not found in the database, the user is given another opportunity to enter either a record number or agency code, station number, dates, times, and medium code. To quit from this application a `***Q***' can be entered in place of the record number. After the desired sample is displayed and accepted by typing a "***Y***" or a carriage return, the following screen is displayed:



Screen showing the edit samples and results options and record number of the sample

When a record has been retrieved, the user is given four options: select another record, modify the record header, modify the analytical data, or delete the record. If **Option 1**, select another record is chosen, the user is prompted and taken back to the previous screen to enter a record number or sample information. **Option 2**, modify the record header, allows the users to change the sample header information and is the same program as described in the *login sample program (section 3.1)*. **Option 3**, modify the analytical data, allows the user to add, change, or delete parameter values or attributes with the sample program as described in the *enter laboratory results program (section 3.2.2)* . **Option 4**, delete the record, allows the users to completely remove all parameter values and attributes as well as the sample header information. As a precaution, the program verifies the delete request by prompting:

Are you sure you want to DELETE that record? (Must answer YES)

The user must reply by typing all of the letters in the word "***YES***" in capital letters before the record will be deleted. If the record is deleted, a line of text flashes across the bottom of the screen,

RECORD nnnnnnnn DELETED

where nnnnnnnn is the sample record number. If the response to the prompt was something other than "***YES***", the line

RECORD nnnnnnnn NOT DELETED

flashes across the bottom of the screen. ***Note*** : Deleted records or values are removed immediately and cannot be recovered except by reentering.

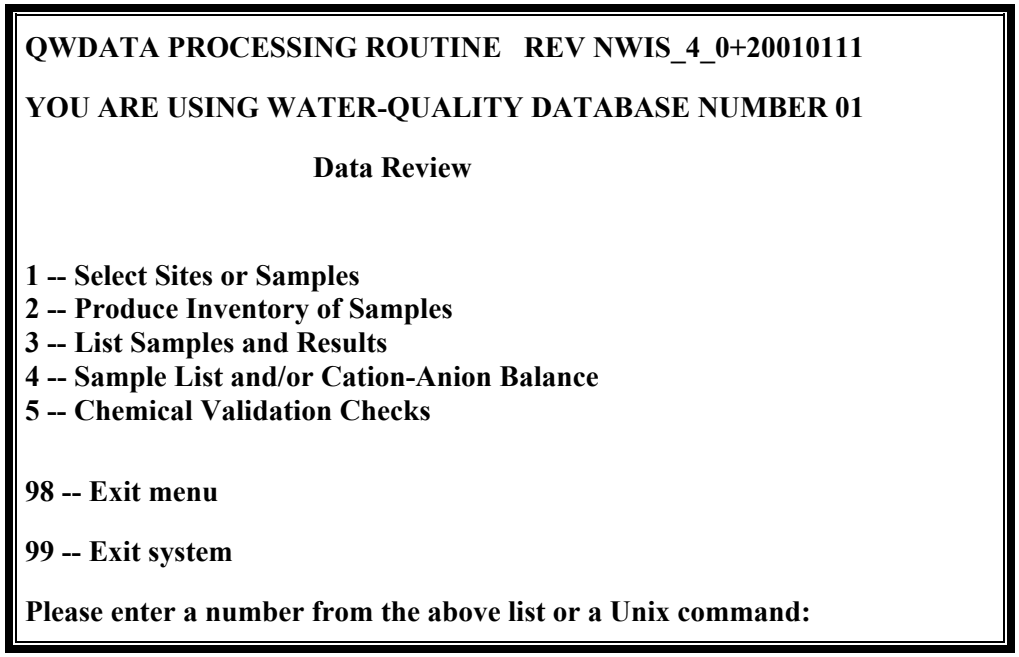
The user can exit this program by choosing **Option 1**, select another record, and then typing in a "***Q***" at the record number prompt or by entering "***/q***" in the data editing screen, then entering a "***Q***" at the record number prompt.

An alternative for deleting a record is to place the word DELETE in the GEOLOGIC UNIT CODE field (cols. 36-43) on a 1-card. This is explained in section 4.2 (***qw_enter***).

To validate any updates or edits, users will need to run the Chemical Validation Checks program in the Data Review submenu described in *section 3.3.5*.

3.3 Option 3 -- Data Review Options

Data review functions include options to provide an inventory of records that have been logged into the database, view data stored in a sample record, and provide chemical validations of sample analyses. Option 3 of the main menu invokes the following Data Review Options submenu:



Data Review Options Menu

3.3.1 Option 1 -- Select Sites and/or Samples

This option is used to create three types of files; (***1***) lists of sites that meet user-specified site selection criteria, (***2***) lists of sites that have water-quality data that meet user-specified site selection and sample selection criteria, and (***3***) lists of record numbers for water-quality data that meet user-specified sample selection criteria. These files may be used as input to other options in the NWIS QWDATA system. The record number list file is required for *generating output to files -- section 3.4 -- Data Output*.

Sample selection is a two-step process. First, site numbers are specified using one of the first three options on the ***Select Sites and/or Samples*** submenu. By using option 4, site selection is skipped--in effect, all sites in the database are selected.

```
qwsiterec -- locate record numbers for use by QWDATA application programs
QWDATA database(s): 01

You may locate records for specific sites.

If you wish to locate records for specific sites the options are:
  1 -- You have a file containing site numbers
  2 -- You will enter site numbers at terminal
  3 -- You wish to locate sites based upon selection criteria

If you don't care which sites the option is:
  4 -- Locate QWDATA records without regard to site

Please enter option (1-4,Q to quit):
```

Site specification menu within the Select Sites and/or Samples option

In the second step, sample records are selected for the designated list of sites based on user specified criteria.

3.3.1.1 Site Selection

Station numbers may be provided to the software in three ways: ***(1)*** specified in a file provided by the user, ***(2)*** from interactive entry, or ***(3)*** selected based on user specified criteria. The user also may choose not to specify station numbers ***(4).***

(1) If the station numbers are to be read from an input file, the user will be queried for the file pathname. Station numbers must be listed using the fixed-column format shown in *Appendix G*. An output file from a previous site selection process is also an acceptable format for input. (*Appendix C*)

(2) If the station numbers will be entered interactively, the user will be queried for agency code and station number. A null entry ends interactive station number entry.

(3) If station numbers are to be selected from user-provided criteria, a list of available criteria for site selection is displayed as shown below:

```
qwsiterec -- Locate sites

Enter an X to choose an item for limiting retrieval,
Enter a # to remove an item.

(1) AGENCY CODE: _  (2) STATE CODE: _  (3) COUNTY CODE: _
(4) HYDROLOGIC UNIT:_ (5) DRAINAGE BASIN:_ (6) POLYGON: _
(7) RANGE OF STATION NUMBERS: _  (8) TYPE OF STATION: _


 Options: ? ^D  # /  /x  /+x  /-x  /@  /c  /q -- Enter ?/ for help
```

Menu for choosing the site selection criteria within the Select Sites and/or Samples option

The available selection criteria, which may be used in combination, and the specifications for each are shown below:

	Site Selection Criteria	Specifications	Source
(1)	**Agency code**	**-- up to 10 agency codes**	***GWSI documentation***
(2)	**State code**	**-- up to 10 State codes**	***FIPS code dictionary – See Sect. 3.6.5***
(3)	**County code**	**-- up to 40 county codes**	***FIPS code dictionary – See Sect. 3.6.5***
(4)	**Hydrologic unit code**	**-- up to 10 hydrologic unit codes**	***GWSI documentation***
(5)	**Drainage basin code**	**-- up to 10 drainage basin codes**	***GWSI documentation***
(6)	**Polygon**	**-- up to 50 vertices**	**user specified**
(7)	**Range of station numbers**	**-- only 1 range**	**user specified**
(8)	**Type of station**	**-- up to 10 station types**	***Appendix A***

Enter a non-blank character (other than "***/***") to choose a field for limiting retrieval, or enter a "**#**" to remove a field. The options for screen navigation may be invoked during selection of retrieval criteria.

If a State code is selected for site retrieval, an additional query is included to ask for a country code:

To select by state need to specify country.
Enter 2-character country code (<CR>=US):

For information on country codes, please refer to *GWSI documentation – Chapter 2, Section 1.11.*

(4) If records are to be retrieved by polygons, the user is queried for a file containing the vertices in fixed format. Up to 50 vertices may be specified. The vertices should be stored in the format shown below:

Column	Format	Description
1-7	**dddmmss**	**Latitude and (right-justified in column 7)**
9-16	**dddmmss**	**Longitude (right-justified in column 16)**

File format for entering polygon vertices

Vertices also may be entered or selected interactively. The user is first asked if vertices are to be stored into a file. If ***YES***, the user is queried for a file name. Next, the user may

choose to retrieve latitude-longitude values from the FIPSFILE -- the 2-digit State code and the 3-digit county code are requested. A county code of 000 will retrieve the State record values. Optionally, the user may choose to enter latitude-longitude pairs interactively from the terminal.

If records are to be qualified by Station Type Code and GW or SW or LK station types are selected, any one or more of the additional selection options shown below may be selected.

Selection criterion	Specification	Reference source
For SW (stream), LK (lake), DV (diversion), LA (land application) or OF (outfall) sites:		
Base discharge (range)	**-- only 1 range**	**user supplied**
Drainage area (range)	**-- only 1 range**	**user supplied**
For GW (ground-water), or SP (spring) or AG (aggregate ground water) sites:		
Primary geologic unit	**-- up to 20 geologic unit codes**	***Section 3.6.4***
Use of site	**-- up to 10 use-of-site codes**	***Appendix A***
Use of water	**-- up to 10 use-of-water codes**	***Appendix A***
Well depth (range)	**-- only 1 range**	**user supplied**
Ground-water project ID	**-- up to 10 project ID's**	**user supplied**

Selection criteria for surface-water and ground-water station types used for site selection

To be selected, a site record must satisfy all the selected criteria. ***[Note: These selection criteria are optional fields in the Site File record. If the selected field has not been populated in a site record, that site will fail the selection criterion.]***

The speed of the Site File retrieval will vary depending upon the degree of qualification by the selected criteria that are supplied by the user. The user is given a warning and an opportunity to abort the Site File search if the criteria are too general. If no site selection criteria are specified, the default condition is invoked and the selection criterion used is ***Agency code = USGS*** .

```
Beginning search for sites in database 01 ...
    (No selection made -- will search for ALL station types
Searching on STATION TYPE only

This may take a long time as the entire site file must be read


Do you wish to continue (Y/N,<CR>=Y)?
```

Warning message when searching the entire site file

After the Site File has been queried for sites that satisfy the user selection criteria, the user is asked if selected sites should be sorted. A response of ***YES*** , invokes a prompt to select sorting options. All of the desired sort codes must be entered on one line with no spaces. The first field will be the primary sort; the next will be the secondary sort, and so forth. In the example below, sites are sorted according to agency code, site type, and station number.

```
qwsiterec -- total number sites located:  1050

Do you wish to sort the located sites (Y/N)? Y

You may sort on any combination of the following fields:

   A -- Agency code            G -- Hydrologic unit
   B -- Station number         H -- Drainage basin
   C -- Station name           I -- Station type
   D -- Latitude-longitude     J -- Use of water
   E -- State                  K -- Geologic unit
   F -- County                 L -- Ground-water project

The first field will be the primary sort
the next will be the secondary sort 1, ...
Please enter the sort codes on one line with no embedded spaces




Enter sort code(s):
```

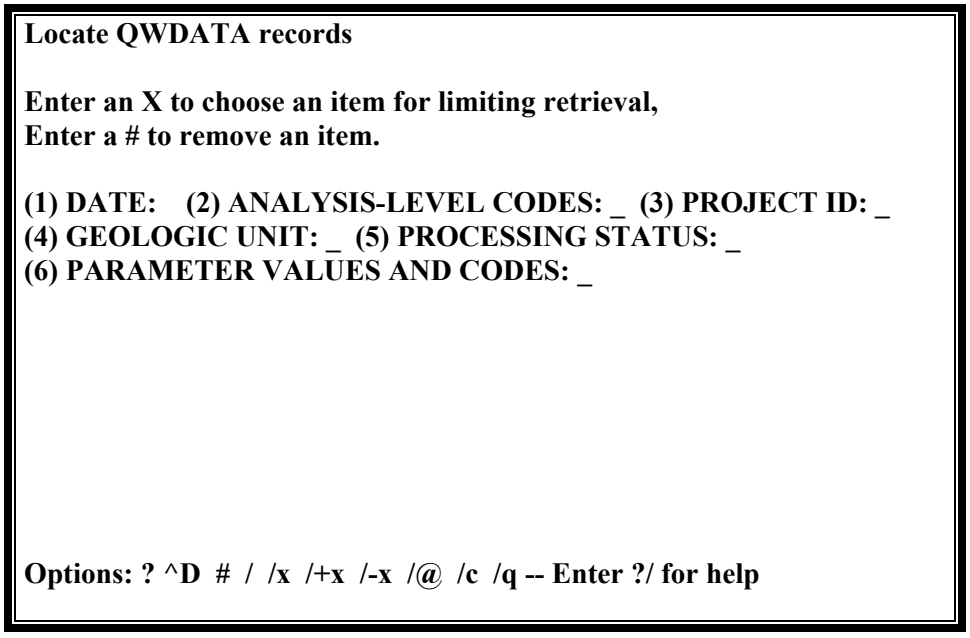
User is given the option to sort retrieved sites

When the sort is complete or if the sort option is skipped, the user is prompted to enter a file name to hold the retrieved site numbers. The site numbers and associated location and other site information are saved in a file using a fixed-column format shown in Appendix C.

(4) If the user chooses not to specify site numbers in the ***Select Sites and/or Samples*** submenu, the program moves to the option to select water-quality records.

3.3.1.2 Selecting Water-Quality Records

After sites are selected, water-quality records may be selected for the specified sites or the user may return to the "Data Review" menu. To select water-quality records, a screen is displayed to specify selection criteria. If no water-quality record selection criteria are specified, by entering a ***<cr>*** in the ***DATE*** field, the program uses a default date range from 1776 to present -- in effect, selecting all records in the database.



Selection options for locating water-quality records

Water-quality records may be selected using any combination of six selection criteria, which are shown below:

	Selection criterion	Specification	Reference source
(1)	**Date (range)**	**-- 1 date range**	**user supplied**
(2)	**Analysis-level codes**		
	Medium code	**-- up to 10 medium codes**	***Appendix A***
	Analysis source code	**-- up to 10 analysis source codes**	***Appendix A***
	Hydrologic condition code	**-- up to 6 hydrologic condition codes**	***Appendix A***
	Sample type code	**--up to 6 sample type codes**	***Appendix A***
	Hydrologic event code	**-- up to 10 hydrologic event codes**	***Appendix A***
(3)	**Project ID**	**-- up to 10 project ID's**	**user supplied**
(4)	**Geologic unit**	**-- up to 10 geologic unit codes**	***Function 6.4***
(5)	**Processing status**	**-- up to 6 processing status codes**	***Appendix A***
(6)	**Parameter codes and values**		
	Parameter codes	**-- up to 50 parameter codes**	***Function 6.2***
	Parameter values	**-- up to 50 parameter value minimums and/or maximums**	**user supplied**
	Remark codes	**-- up to 5 remark codes**	***Appendix A***
	Quality-assurance codes	**-- up to 5 quality-assurance codes**	***Appendix A***
	Method codes	**-- up to 5 method codes**	***Appendix A***
	Prep set number	**-- one prep set number**	**user supplied**
	Analysis set number	**-- one analysis set number**	**user supplied**
	Value qualifier code	**-- up to 5 value qualifier codes**	***Appendix A***

Record selection criteria, specifications, and reference source

A user can get all stored records for a site if ***DATE*** is used for the selection of records and a <CR> is entered for both the begin date and end date. In any release after NWIS 4.2, the storage of times in the Universal Time Coordinate (UTC) System may result in small number of samples not being included in retrievals limited by date. The retrieval

program will use the time variable set for the Unix environment on the local computer system. To avoid missing samples in a date range, you could include an extra day on either end of the desired date range. Some examples of this behavior include:

A) Example: Sample in Arizona database from Navajo reservation (the Navajo reservation observes daylight saving time, but the rest of the state does not)

1) Unix time variable is US/Arizona
2) Sample begin date/time logged in as: 10-01-02 @ 0030 MDT
3) Sample begin date/time stored in UTC as: 10-01-02 @ 0630 UTC
4) Retrieval of all records in a water year as entered on the screen:
   Begin date: 10-01-02
   End date: 09-30-03
5) Retrieval date range converted to:
   Begin date: 10-01-02 @ 07:00:00 UTC
   End date: 10-01-03 @ 06:59:59 UTC

Due to the conversion to UTC for retrieval this sample is *not* included in the retrieval even though it was collected in the date range selected.

B) Example: Sample from Indiana in a county near Chicago, Illinois

1) Unix time variable is US/East-Indiana
2) Sample begin date/time logged in as: 09-30-02 @ 2345 CST
3) Sample begin date/time stored in UTC as: 10-01-02 @ 0545 UTC
4) Retrieval of all records in a water year as entered on the screen:
   Begin date: 10-01-02
   End date: 09-30-03
5) Retrieval date range converted to:
   Begin date: 10-01-02 @ 05:00:00 UTC
   End date: 10-01-03 @ 04:59:59 UTC

Due to the conversion to UTC for retrieval this sample is included in the retrieval even though it was not collected in the date range selected.

C) Example: Sample from the east coast of the United States

1) Unix time variable is US/Eastern
2) Sample begin date/time logged in as: 09-30-02 @ 2300 EST
3) Sample begin date/time stored in UTC as: 10-01-02 @ 0400 UTC
4) Retrieval of all records in a water year as entered on the screen:
   Begin date: 10-01-02
   End date: 09-30-03
5) Retrieval date range converted to:
   Begin date: 10-01-02 @ 04:00:00 UTC
   End date: 10-01-03 @ 03:59:59 UTC

Due to the conversion to UTC for retrieval this sample is included in the retrieval even though it was not collected in the date range selected.

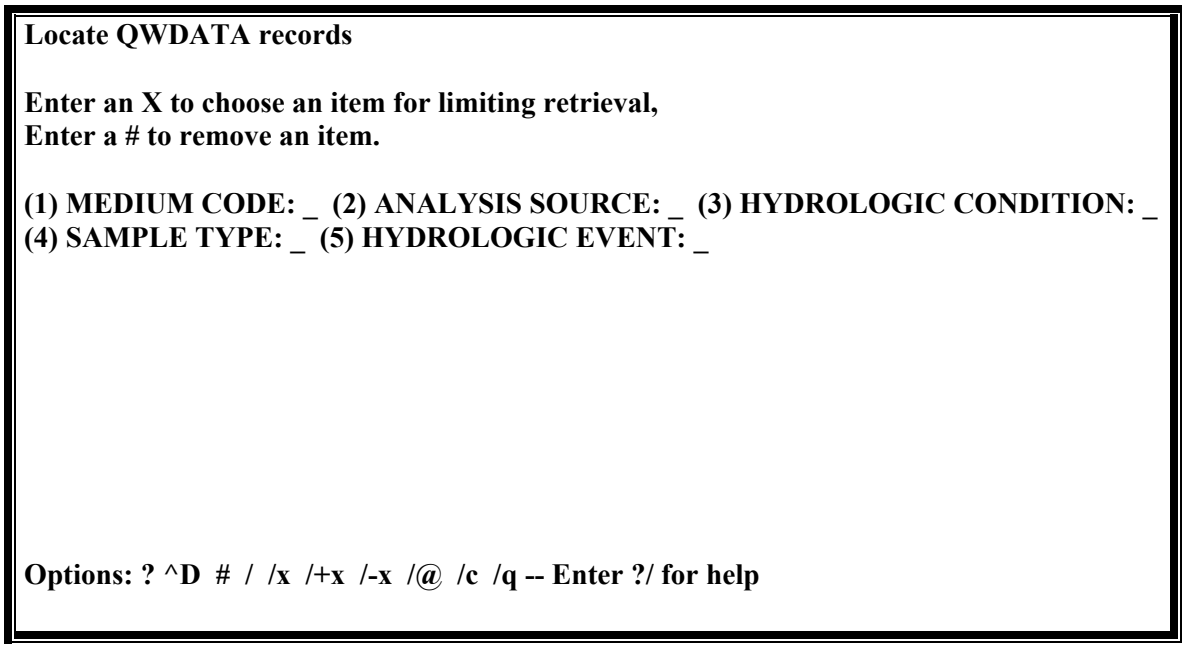
D) Example: Sample from the east coast of the United States

1) Unix time variable is US/Eastern
2) Sample begin date/time logged in as: 09-30-03 @ 2330 EST
3) Sample begin date/time stored in UTC as: 10-01-03 @ 0430 UTC
4) Retrieval of all records in a water year as entered on the screen:
   Begin date: 10-01-02
   End date: 09-30-03
5) Retrieval date range converted to:
   Begin date: 10-01-02 @ 04:00:00 UTC
   End date: 10-01-03 @ 03:59:59 UTC

Due to the conversion to UTC for retrieval this sample is *not* included in the retrieval even though it was collected in the date range selected.

Selection of criteria based on ***(2) analysis-level codes*** or ***(6) parameter codes and values*** each invoke another menu described below.

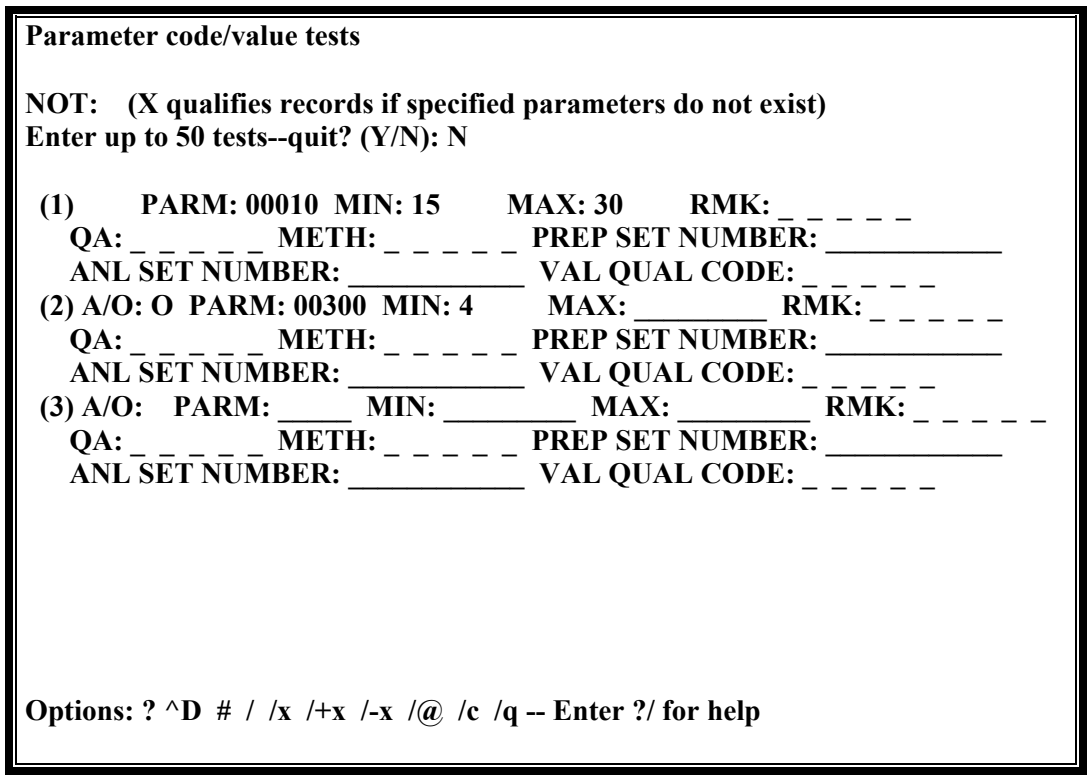
If the user specifies a selection based on ***analysis-level codes***, the following menu is invoked. The user may select one or more of the selection criteria.



Options for selecting water quality records based on analysis-level codes

If the user specifies a selection based on ***parameter codes and values*** the following series of menus are invoked. On the first menu, the user has the option of restricting parameter selection by selecting ***NOT***. This option is used to select records for which parameter(s) identified in the next step do not exist. For example, if the ***NOT*** option is selected and parameter code 00010 is selected, only records without parameter code 00010 (water temperature) are retrieved.

Next, the user is asked to specify the first parameter code for selection. The user may also specify minimum and maximum values for that parameter code as well as other result level codes listed in the screen below. Null values can be retrieved by inserting a '.' in the MIN field.



Screen for selecting water-quality records based on parameter codes

More than one parameter code may be selected. Selection by parameter codes and values is the only selection that does not require that the specified criteria must be satisfied to qualify a water-quality record for selection. If more than one parameter code is specified, for ***each parameter after the first***, the user is asked whether the relation to the previous parameter is ***AND*** or ***OR*** . The ***AND*** or ***OR*** options in combination with the ***NOT*** option results in specific actions based on the rules of *boolean logic (Getting started, 2.2.6)* . Examples are shown in the table below.

First specification	Second specification (P1=parameter code 1, etc.)	Action selects records that...
NOT	P1, *AND* P2	do not contain values for both P1 and P2
NOT	P1, *OR* P2	do not contain values for either P1 or P2
--	P1, *AND* P2	contain values for both P1 and P2
--	P1, *OR* P2	contain values for either P1 or P2
--	P1, *OR* P2, *AND* P3	contain values for either P1 or both P2 and P3
NOT	P1, *OR* P2, *AND* P3	do not contain values for either P1 or both P2 and P3

Actions of NOT, AND, and OR specifications for record selection based on result level codes

After the specifications are complete, the user is asked to select if records flagged as local use ***(code z)*** or proprietary ***(code 9)*** should be included in the retrieval. If ***1*** is entered, records with a processing status of ***"z"*** are included in the retrieval; if ***2*** is entered, records with an analysis status = ***"9"*** are included; if ***12*** is entered, both local use and proprietary records are included; a carriage return ***<cr>*** results in the default condition in which local use and proprietary records are excluded from the retrieval. Additional information about setting the processing status code is available in *section 3.7.5*; general information about analysis status codes and processing status codes is available in *section 2.4.10* and *2.4.15* respectively.

The user is notified that the database search has begun. After water-quality records are retrieved (and if the number of records retrieved is greater than zero), the number of records and number of sites are displayed to the screen:

```
qwsiterec -- locating QWDATA records

Beginning search for QWDATA records in database 01 ...
... end of search.  12227 records (   212 sites) located in database 01

Do you wish to save a list of sites that have QW data (Y/N)? Y

Enter pathname of file to hold list of sites with QW data for database /n --
:
```

User is notified of the number of water-quality records retrieved and the number of sites for those records. The user is given the option to save a list of sites for which water-quality records were selected.

The user is asked if the list of sites with water quality data should be saved. If the response is ***YES***, the user is prompted to enter the path name for the file. Next, the user is asked if the water-quality record numbers should be sorted. The retrieved record numbers may be sorted on any combination of the following fields:

```
qwsiterec -- Total number QWDATA records located: 12227

Do you wish to sort the located QWDATA records (Y/N)? Y

You may sort on any combination of the following fields:

   A -- Agency code            F -- Geologic unit code
   B -- Station number         G -- Processing status
   C -- Dates and times        H -- County code
   D -- Medium code            I -- Station name
   E -- Project ID             J -- Station type

The first field will be the primary sort
the next will be the secondary sort 1, ...
Please enter the sort codes on one line with no embedded spaces



Enter sort code(s):
```

User is notified of the number of water-quality records retrieved and given the option to sort the record numbers

All of the desired sort codes must be entered on one line with no spaces. The first field will be the primary sort; the next will be the secondary sort, and so forth. When the sort is complete or if the sort option is skipped, the user is prompted to enter a file name to hold the retrieved list of record numbers. An example of output of record numbers from this program are shown in *Appendix C*.

3.3.2 Option 2 -- Produce Inventory of Samples

This option is used to produce a table of information for records that have been logged into the database for samples collected within a specific water year. This program has historically been identified as the `loglist' program. The table may be limited to a user-supplied list of station numbers (up to 50) and/or range of dates within the specified water year. An example of the output from this program is included in *Appendix C*. This tabular output is written to a file and may be spooled to a printer at the user's request.

Some of the information included in this output indicates the storage of results for some types of analyses. Column entries in the types of analyses can be marked as R, which means that when the sample was logged in, the indicated type of analyses was included in the sample header information; C, which means that when the sample was logged in, the indicated type of analyses was included in the sample header information and at least one of the parameter codes in the type of analysis group has a result stored for the record; or 'blank', which means that nothing was done during login. In the table below are the types of analyses and the parameter codes that are included in each group:

Type of Analyses	Parameter Codes
CH, Chemical	00915, 00925, 00930, 00940, 00945, 00955, 90095
NU, Nutrients	00608, 00610, 00625, 00630, 00631, 00665, 00666
ME, Metals	01025, 01027, 01030, 01034, 01040, 01042, 01045, 01046, 01049, 01051, 01056, 01065, 01067, 01090, 01092
BI, Biological	00573, 60050, 70943, 70944, 70945, 70946, 70949, 70950, 70960, 70964, 70968, 71100, 81354, 82555, 95100, 95200
PE, Pesticides	39370, 39516, 00550, 06801
RA, Radiological	80050, 80060, 80030, 80040
SE, Sediment	80154, 70344, 70346
BE, Bed material	80160, 80162, 80169, 80171

Note: This feature should be used with caution, because it does not indicate when all results for requested analyses have been stored in the database. The results in the types of analyses columns are based on a very limited set of parameters.

The user is first queried for the name of a file to hold the output. The file name may include the pathname if the user does not wish to save the file in the current directory. If the specified file already exists, it may be either appended or overwritten, according to the user response. The water year is entered next. Within the selected water year, the table may be restricted to specific station numbers and a range of dates. Station numbers may be entered interactively or from a *fixed-column format file* . Station numbers also are accepted in the format used to output stations under *menu option 3.3.1* . Sites may also be input without an agency code.

```
QW LOGLIST PROGRAM
    THU, MAR 22 2001

PLEASE ENTER NAME OF FILE TO HOLD THE OUTPUT: loglist

  PLEASE ENTER THE WATER YEAR (4 DIGITS)
1973
 DO YOU WANT INFORMATION FOR SPECIFIC STATIONS (YES OR NO) ?
N
 DO YOU WANT INFORMATION FOR A RANGE OF DATES (YES OR NO) ?
N
Searching ...
    1715 RECORDS RETRIEVED
 RECORDS ARE ORDERED BY RECORD NUMBER
  DO YOU WANT THEM SORTED ON SOME OTHER FIELD (YES OR NO)?
```

Screen queries for producing an inventory of samples in the water-quality database

When the selected records have been retrieved, they are ordered by record number. The user is given the option to sort the records by up to seven sort fields (station number, project code, processing status code (*Appendix A*, date of last update, record number, sample start date, and lab ID). Sort selections are entered one at a time. The first sort option entered is the secondary sort; the primary sort is on the record number, the second sort option entered is the tertiary sort, and so forth.

```
RECORDS ARE ORDERED BY RECORD NUMBER

  DO YOU WANT THEM SORTED ON SOME OTHER FIELD (YES OR NO)?
y
   POSSIBLE SORT FIELDS ARE:
      1 -- STATION NUMBER,
      2 -- PROJECT CODE,
      3 -- PROCESSING STATUS,
      4 -- DATE OF LAST UPDATE,
      5 -- RECORD NUMBER
      6 -- SAMPLE START DATE
      7 -- LAB-ID

  PLEASE ENTER A NUMBER FROM THE ABOVE LIST
1
  DO YOU WANT A SECONDARDY SORT ON ANOTHER FIELD (YES OR NO)?
y
   POSSIBLE SORT FIELDS ARE:
      1 -- STATION NUMBER,
      2 -- PROJECT CODE,
      3 -- PROCESSING STATUS,
      4 -- DATE OF LAST UPDATE,
      5 -- RECORD NUMBER
      6 -- SAMPLE START DATE
      7 -- LAB-ID

  PLEASE ENTER A NUMBER FROM THE ABOVE LIST
6
  DO YOU WANT A SECONDARDY SORT ON ANOTHER FIELD (YES OR NO)?
```

Screen queries for sorting the sample inventory file

When the sort request is complete, the user is asked if data for another water year are to be retrieved. If a response of ***YES*** is provided, the queries described above are repeated beginning with entry of station numbers and/or date range. If the response is ***NO***, the name of the file containing the output is displayed to the screen and the user is given the option to spool the output file to a printer. The user may enter a destination printer or print to the default local printer. Upon completion of the inventory table, the user is returned to the Data Review menu.

3.3.3 Option 3 -- List Samples and Results

Sample information and analytical results for requested records can be displayed to the screen or a file. Records may be identified by record number or by agency, station number, date, time, and medium code. The user is first given the option to enter record selection information interactively or to input this information using an existing file. **Note:** The minimum identifying information needed to uniquely identify a sample is agency code, station number, date, and medium code.

To retrieve a record using sample identification information, all information that has been entered for a particular sample must be specified. The fields that could be completed are agency, station number, date, medium code, time, end date, and end time. For example, if all of these fields were populated for a particular sample, then all of the fields must be used to identify and retrieve the sample. Typically, samples are uniquely identified with agency, station number, date, time, and medium code.

If the list of records is to be entered from a file, the user is prompted for the file name and input format (1 -- record number, or 2 -- agency code, station number, date, time, and medium code).

```
qwlist program -- processing in database: 01

Do you want to enter record selection info at the terminal (Y/N,<CR>=Y)? N

Enter the pathname of the input file (99 to end)--
test3

What is the format of this file?  That is, does it
contain record numbers or agency-site-date-medium?



Do you want to identify records by:

  1 -- Record Number
  2 -- Agency Code, Station Number, Date, Time

Please enter option (1/2,<CR>=1):
```

Entering a file to retrieve a list of sample information

If the records are to be identified by record number, the format of the file is one record number per line, with the 8-digit record number beginning in column 1 of each line as shown in *Appendix G*.

Additional information may be included beyond column 8 so that output from other options (such as the record file output from the *Select Sites and/or Samples* option shown in *Appendix C*).

Input files containing records identified by agency, station number, date, time, and medium code must follow the format shown in Appendix G:

The next query gives the user the option to print the output to the screen or to a file. The user is queried for an output file name if the file output option is selected. If the output is to a file, the file will contain the long form (132 characters wide) of the output; footnotes for remarks and qualifiers and result comments can be included. There are three options for display to the screen. An example of each display is in *Appendix C*. After selection of the display to the screen, if either of the long output formats (options 2 and 3) are selected, the user may choose to include footnotes at the bottom of the page to define remarks and qualifiers that appear with the sample information. If the short form (option 1) is chosen, footnotes to define remarks and qualifiers cannot be included. Next, the user is given the option to include result comments (field and/or lab text comments pertaining to a result). Note: The analytical results are displayed using unrounded values from the database.

```
Do you want output to terminal (T) or to a file (F) (<CR>=T)? T

You have 3 options for display of parameters:
  1 -- short form, 2-columns
  2 -- long form, folded into 80 characters
  3 -- long form, 132 characters

Enter option desired (1-3,<CR>=1): 3
Do you want to include footnotes for remarks and qualifiers (Y/N,<CR>=Y)?
Do you want to include result comments (Y/N,<CR>=N)?
```

Output option queries for List Samples and Results. This example specifies output to the terminal using the 132-character, long-form to include footnotes explaining remark and qualifier codes.

If the user has chosen to input record information interactively, the next screen allows the user to enter record numbers or agency code station number, date, time, and medium code.

```
qwlist program -- processing in database: 01



Enter record number:

(Q to quit, <CR> to select by agency-site-date-time-medium)
```

Interactive record input screen for producing output from the List Samples and Results option

```
qwlist program -- processing in database: 01



(1) Agency Code: USGS   (2) Site Number: _____________
(3) Begin Date: YYYYMMDD  (4) Begin Time: HHMM
(5)   End Date: YYYYMMDD  (6)   End Time: HHMM
(7) Medium Code: _


Options: ? ^D  #  /  /x  /+x  /-x  /@  /c  /q -- Enter ?/ for help
```

Screen for entering agency-site number-date-time-medium code for producing output from the List Samples and Results option (shaded text indicates mandatory items)

Note: Begin time, end time, and end date are not required fields on input. However, if these fields have been populated in a sample record, they must be entered here in order to retrieve the record.

The requested record information will be listed on the screen or to a file in the specified format until a response of "***q***" is entered for record number to end the program

3.3.4 Option 4 -- Sample List and/or Cation-Anion Balance

From this option, output is produced that includes: ***1)*** a list of parameters and their values, ***2)*** a cation-anion balance table, or ***3)*** both for specific samples.

Unless sample identification is to be entered from the terminal, the user is queried for the name of a file (full pathname allowed, up to 32 characters) that contains a list of sample identifiers. This file should contain the necessary identification information. This information may be record numbers or agency code, station number, date, time, and medium code in the format shown above. Next, the user is queried for the name of a file to hold the output.

```
qwbal program – processing in database:   01

Do you want to enter record selection numbers from the terminal (Y/N, <CR>=Y)? y



Enter name of file to hold output –
:  output.file
Do you want a listing of parameters and values (Y/N, <CR>=Y)? y
Do you want a cation-anion balance table (Y/N, <CR>=Y)? y
```

Queries for producing a sample list and/or cation-anion balance

The user may select from two output options--parameter list and values and/or an anion-cation balance table. If the user chooses to enter sample identifications from the terminal, there will be a request for the next record identifier after processing each record. An entry of ***q*** or ***quit*** in the record or station number field terminates processing. The user is asked if the file should be sent to the printer. If so, the user is asked for the destination printer. A ***<cr>*** sends output to the default printer. The file is saved with fortran page-control characters and should be printed using these page-control characters. The following Unix command usually works:

asa filename|lp -ylandscape -dprintername

An example of output from this program is shown in *Appendix C.*

Note: Analytical results are included in this output using *rounding* as identified in the *parameter code dictionary*.

3.3.5 Option 5 -- Chemical Validation Checks

Chemical logic and validation checks are performed for specified samples when this option is selected. The user must specify samples by record number. These may be entered from the terminal or a file. The user is queried for an output file name. If record numbers are entered from the terminal, the program queries the user for another record number after each sample is processed. An entry of ***q*** or ***quit*** in the record number field terminates processing. The output file name is displayed to the screen and the user is asked if the file should be sent to the printer. If so, the user is asked for the destination printer. A ***<cr>*** sends output to the default printer. The file is saved with fortran page-control characters. To print the file, the following Unix command usually works:

asa filename |lp -ylandscape -dprintername

Data written to the output file include:

sample identifying information:

- record number,
- station number and name,
- collection date and time,
- analysis level codes, and
- number of parameters stored for the analysis;

notations of regulatory alerts and chemical logic checks, including:

- parameters and values that exceed USEPA Drinking-water maximum contaminant levels (MCL), and
- failed chemical logic checks;
- a list of parameters and their values is produced; and
- a table showing the sum of cations and anions and the ionic balance is produced.

Alerts are based on USEPA drinking-water MCLs and are referenced to all relevant parameter codes (*Appendix E*).

NOTE: In some cases, the alert may be for a constituent that does not exactly match the constituent to which the MCL applies. For example, the MCL for nitrate is compared to values for nitrate plus nitrite as well as to nitrate alone.

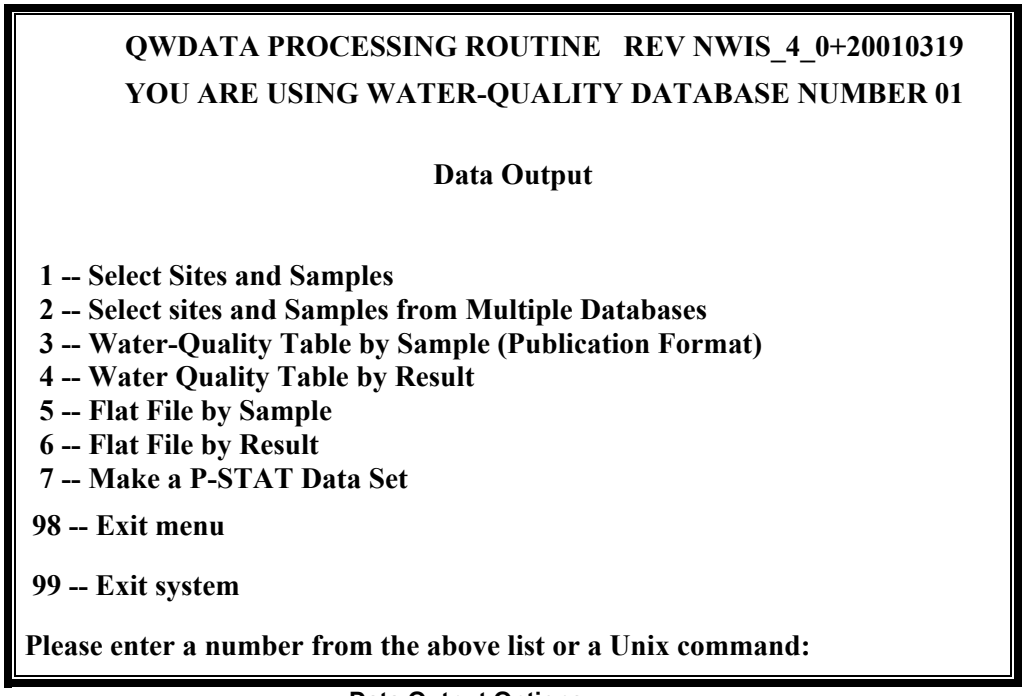
The chemical validation and logic checks are identical to the checks performed when the laboratory data are stored in the database and *WATLIST* tables are produced. These checks *(see QWDATA table - Section 2.7.1)* include comparisons of total and dissolved values of the same constituent, computed and analyzed values, and logic checks such as verifying that the concentration reported for ammonia is less than that for ammonia plus total nitrogen. When comparing computed values to stored values, both values are first rounded using the precision information stored in the *Parameter Code Dictionary*.

An error message is generated only if the rounded values do not match. Invalid parameters (not in the Parameter Code Dictionary), parameters with invalid negative values, invalid fixed value codes, and results with a remark code of 'X' are deleted from the record. Sample output from this program is included in *Appendix C*.

Note: This program may require a relatively long time to execute; if many analyses are to be checked, a script file should be prepared with answers to the program queries and run in the background or as a batch job. The analytical results that appear in output from this program are rounded using the information stored in the parameter-code dictionary.

3.4 Option 4 -- Data Output

Option 4 of the main menu accesses a submenu with options to output data (***1***) in tables for publication in reports, (***2***) in files that can be loaded into other applications, and (***3***) in files that can be used for the P-STAT statistical package. Tables for publication and files that can be loaded into other applications can be retrieved in two formats: by-sample or by-result. Additional information about tabling options can be found in the Getting Started section. To retrieve any of these output formats, a file of record numbers is required, which can be produced using option 1 or 2 from the Data Output menu.



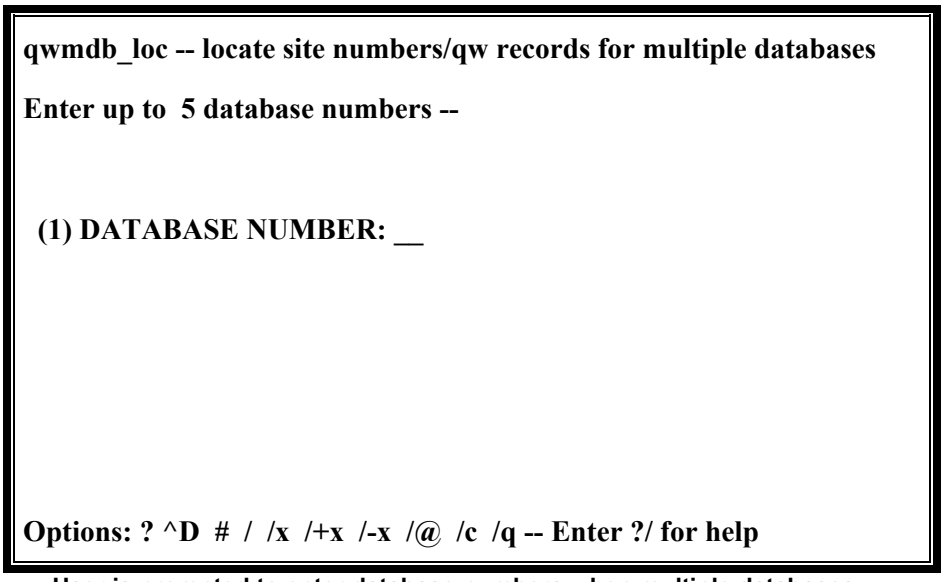
Data Output Options

3.4.1 Option 1 -- Select Sites and Samples

See description in Section 3.3.1.

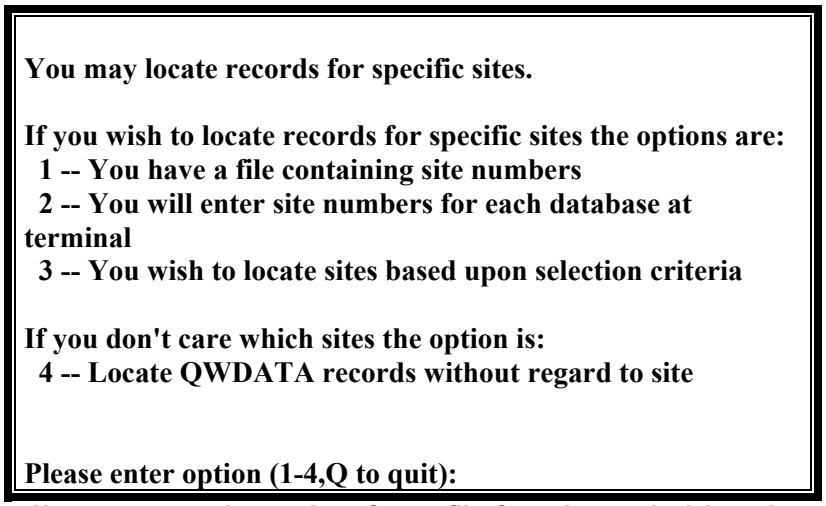
3.4.2 Option 2 -- Select sites and Samples from Multiple Databases

Water-quality data from as many as five databases may be retrieved, as shown on the following screen. The multiple database retrieval option is used, most often, when data must be retrieved from the environmental database and the quality-assurance database. Database numbers may be entered in any order. After the desired database numbers are entered, the user input is the same as that described in *Section 3.3.1*. The output to the screen informs the user of the results of selections for each database specified by the user.



User is prompted to enter database numbers when multiple databases need to be accessed

If selection criteria are used to retrieve a site list (option 3, below), a single set of criteria is used for all databases. After the sites are retrieved, the user is prompted to sort the list of sites and save a file for the list of sites from each database.



User may enter site numbers from a file, from the terminal, based on selection criteria, or may locate records without specifying site numbers

If water-quality records are retrieved, one file is output that contains the record numbers from all databases and a database number is attached to each record number to identify the location of the data (*Appendix G*). The user is prompted to save a list of sites that have water-quality data for each database.

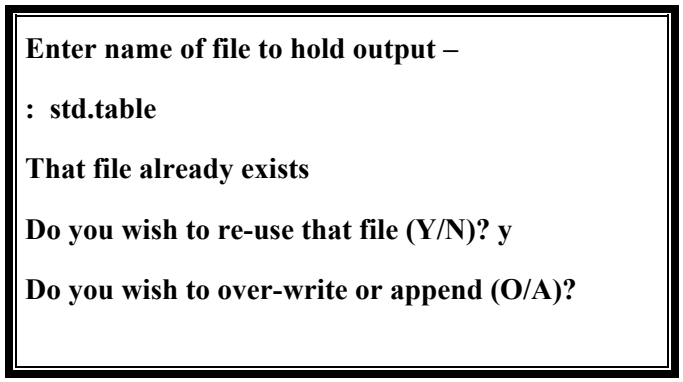
3.4.3 Option 3 -- Water-Quality Tables by Sample (Publication Format)

This option is used to prepare tables of water-quality data in the format required by USGS for publication in the District Annual Data Report. Four table styles are available with Option 3 and Option 4 - Water Quality Table by Result.

1. **Single-station format:** Data for each station are tabled separately so that each new station starts at the top of a page. This is the most commonly used format for surface water-quality data published with streamflow gage record in the District Annual Data Report.
2. **Miscellaneous-station format:** Data for all stations are tabled together. Each new set of parameters begins at the top of a page. Station numbers, names, and latitude/longitude are printed on a single line that precedes the data for that station. This is the most commonly used format for publishing miscellaneous records of surface water-quality.
3. **Multiple-station format:** Data for all stations are tabled together in sequence just as for the Miscellaneous-station format. Station numbers and dates, if requested, are printed in the first columns of the table. This is the most commonly used format for miscellaneous ground-water data.
4. **Biologic data format:** Data for each station are tabled separately so that each new station starts at the top of a page. For each sample, the output tabulates the taxonomic biological identification, counts, and percent of population. This format was developed for and used to display data produced during the 1970's and early 1980's by the biologic section of the Atlanta Central Laboratory.

3.4.3.1 Specify the Sample Records for Tabling

After selecting option 3, the user is asked to provide the name of the file that contains the list of record numbers to be tabled. This list is usually generated by the Select Sites and/or Samples -- *section 3.3.1* option or Select Sites and/or Samples from multiple databases -- *section 3.4.2*. A list also may be created with an editor *Appendix G*. Each 8-digit record number is entered on a separate line, beginning in column 1. If the records are from multiple databases, the database number is a 2-digit number in columns 9 to 10. After the input file is identified and opened, the user must provide the name of a file that will contain the output table. If the specified output file already exists, the user may replace the data in the file (overwrite), leave the file intact and add the new table to the end of the file (append), or type in a new file name.



User is prompted to provide the name of a file that will contain the output table

3.4.3.2 Specify the Table Definition

The user assembles a "table definition" by selecting a table type and specifying output options. The table definition sets up the specification parameters that determine the table format. The table definition may be entered from an existing table definition file or may be specified by answering several queries. If yes is entered, the user is prompted to enter the file pathname. If the specified table definition file exists, the table definition is retrieved and displayed. The user is asked if this is the desired definition and if so, are changes to be made to the definition.

If no existing definition is to be used, the following screen is displayed:

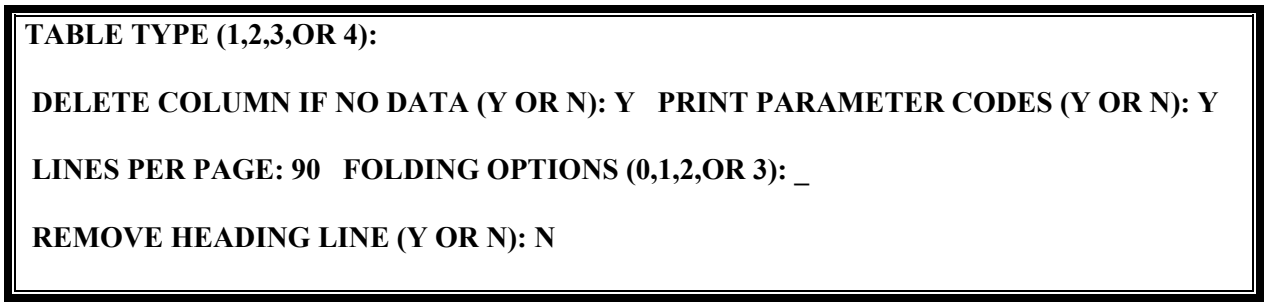
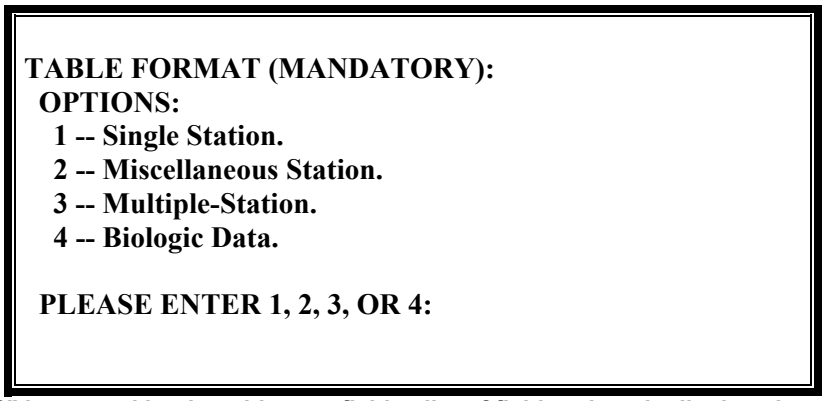


Table definition screen allows the user to select from formatting options for tables output in publication format

If uncertain about the meaning of a field on the screen, an entry of question mark (**?**) will produce an explanation of the field and the effect of each option to be displayed; the cursor then returns to the same field for entry of the option value.



When a "?" is entered in the table type field, a list of field options is displayed to the screen

After the table type code is entered, default options are placed after the colon **(:)** in each succeeding field. A carriage return is entered to accept the default value.

- ***TABLE TYPE (1,2,3,OR 4)*** : Examples of each table type are found in *Appendix C*.

- ***DELETE COLUMN IF NO DATA (Y OR N): Y*** **:** If none of the selected samples contain a result for one of the requested parameters, the columns associated with that parameter will be removed entirely unless an ***"N"*** is entered here. In that case, the column headings will be retained and the no-value indicator of **"--"** will be printed for each analysis ***(N)***.

- ***PRINT PARAMETER CODES (Y OR N): Y*** **:** Parameter codes will be included with the parameter name in the column headings unless an ***"N"*** is entered.

- ***LINES PER PAGE: 90*** **:** This determines the number of lines printed per page of output. The default page length of 90 lines produces a page with the proper proportions for reduction to the standard District Annual Data Report page size. To modify the 90 lines per page, enter the appropriate number of lines, left-justified.

- ***FOLDING OPTIONS (0,1,2, OR 3)***
  - ⇒ 0 -- No folding, applicable to all table types
  - ⇒ 1 -- Horizontal folding, 24 to 100 parameters per page, applicable to type 1 tables only
  - ⇒ 2 -- Horizontal folding, 11 to 100 parameters per page, applicable to type 1 and type 3 tables only
  - ⇒ 3 -- Vertical folding, maximum of 5 parameters (including date), applicable to type 1 and type 2 tables only

- ***REMOVE HEADING LINE (Y or N):N*** : The top line of the table will include a heading line with the District code, **"United States Department of Interior - Geological Survey,"** and processing date unless a ***Y*** is entered here.

Each table type results in a different list of formatting options. Additional fields may appear as options depending on the table type selected.

If table type 1, Single-station format is selected, two additional fields, ***REPORTING YEAR*** and ***TABLE TITLE*** are added to the screen.

- ***REPORTING YEAR (W=WATER,C=CALENDAR,BLANK=NO BREAK)*** : Allows the user to specify if page breaks with new headings should occur or should be suppressed at changes in the water year or calendar year. A ***<cr>*** enters the default (blank) and suppresses a page break.
- ***TABLE TITLE:*** Allows the user to select any of the following standard titles to be placed on each page of the table. There are 13 table titles available:

Table title selections	Title text
0	WATER-QUALITY DATA
1	CHEMICAL ANALYSES
2	PARTICLE-SIZE DISTRIBUTION OF SUSPENDED SEDIMENT
3	PARTICLE-SIZE DISTRIBUTION OF SURFACE BED MATERIAL
4	SUSPENDED SEDIMENT DISCHARGE
5	SPECTROGRAPHIC ANALYSES
6	RADIOCHEMICAL ANALYSES
7	PESTICIDE ANALYSES
8	WATER LEVEL, IN FEET, BELOW LAND-SURFACE DATUM
9	ELEVATION IN FEET, NGVD
A	WATER LEVEL, IN FEET ABOVE OR BELOW LAND-SURFACE DATUM
X	WATER LEVEL, IN FEET ABOVE OR BELOW LAND-SURFACE DATUM
Z	ENTER YOUR OWN HEADING (80 CHARACTERS MAXIMUM)

Table titles that may be selected for publication style tables

Selection ***Z*** allows the user to supply any title text up to 80 characters. When ***Z*** is selected ***" TITLE:"*** is displayed, and the user can enter the desired text.

Once the table definition has been defined for table type 1, processing passes to the next step -- storing the table definition.

When table type 2 is selected (miscellaneous-station format), available fields are the same as for a *type 1 table,* and processing passes to the next step -- *storing the table definition*.

When table type 3 is selected (multiple-station list format), 7 additional fields are added to the table definition screen shown for a type1 and type 2 table:

- ***COUNTY SKIP OPTION:_***
  - ***0*** -- No skip; table is not sorted by county (default).
  - ***L*** -- Sort by county; place 3 blank lines between counties; do not print county name.
  - ***P*** -- Sort by county; place a page break between counties; do not print county name.
  - ***Q*** -- Sort by county; place 3 blank lines between counties; print county name.
  - ***R*** -- Sort by county; place a page break between counties; print county name.

  Note: The alpha parameter code CNTYC must be included in the parameter list to use this option. If CNTYC is the last parameter in the list, county codes are used but not included in the table. If one of the skip options is invoked and CNTYC is not in the parameter list, it is added as the last parameter in the parameter code list.

- ***LEFT-ADJUST LOCAL ID (Y OR N):N*** This is applicable only if the alpha parameter LOCAL is included in the parameter list; the local identifier (usually well number) may be left-justified under the column heading ***(Y)*** or printed verbatim with any blanks that may be included in the Site File retained ***(N)***.
- ***PRINT DATES (Y OR N):Y*** A column containing sample dates is printed unless the ***N*** is entered. If the alpha parameter DATES is not included in the parameter list, it is added automatically after the last alpha parameter.
- ***CENTER STATION ID (Y OR N):N*** option affects the alpha parameters STAID (station number) and SNAME (station name). These values may be centered under their column heading ***(Y)*** or printed exactly as they are found in the Site File, with any blanks retained ***(N).***
- ***REPEAT DUPLICATE ID'S (Y OR N):N*** Values for sample identifiers STAID (station identification number), LOCAL (local station identifier), and/or LATLG (latitude-longitude) are printed for only the first line in a group of samples with the same ID. Samples must be sorted on one of these fields. These values may be printed for every sample by entering ***Y***.
- ***SKIP A LINE ON CHANGE OF STATION (Y OR N):N*** A blank line is inserted between every 5 analyses, regardless of station number. To have a blank line also inserted between each new station number, enter *Y* . This option is valid only if the records numbers are sorted by the alpha parameter STAID (station identification number).
- ***DATA FOR CONTINUING PAGES:1*** When the number of parameters selected for tabling requires more than one page per sample, the user can specify what identifier will be used on the continuation pages. The seven available options are shown below:

Selection	Description
1	Date (default)
2	Station number
3	Station name
4	Local well number
5	Latitude and longitude
6	Station number and date
7	Local well number and date

Available selections for identifying samples on continuation pages in multiple-station format tables

Once the table definition has been constructed for table type 3, processing passes to the next step-- *storing the table definition*.

When table type 4 is selected, four changes are made to the *basic menu*.

- ***DELETE LINE*** replaces ***DELETE COLUMN*** .
- ***PRINT PARAMETER CODES (Y OR N):Y*** The user does not have the option to make a selection.
- ***FOLDING OPTIONS (0,1,2, OR 3)*** The user does not have the option to make a selection.
- ***TABLE TITLE:0*** The user may select one of the four table title selections shown below: Selection ***Z*** allows the user to supply any title text up to 80 characters. When ***Z*** is selected, ***" TITLE:"*** is displayed, and the user can enter the desired text.

Table title selection	Title text
B	BENTHIC INVERTEBRATE ANALYSES
C	PHYTOPLANKTON ANALYSES
D	PERIPHYTON ANALYSES
Z	Enter the heading text (80 characters maximum)

Table titles that may be specified for biologic style tables

Once the table definition for table type 1, 2, 3, or 4 is completed, the user may make changes to the definition. To do so, the cursor is positioned on the first field after ***TABLE TYPE*** . The user may enter a ***<cr>*** in fields that do not need to be changed and may retype the entry for fields that do need to be changed. This loop is continued until the user is satisfied with the table definition and responds with a ***No*** or ***N*** when prompted to change the table definition. The table definition may be saved for reuse on another table retrieval.

3.4.3.3 Specify Parameter Codes for Tabling

Parameter codes for output may be input from a file of parameter codes in a specific format *Appendix G*, or may be entered interactively. A maximum of 1,000 parameters may be included in a table. The number of parameters may be reduced slightly when required parameters are automatically included by the tabling software. ***For single-station format only,*** composites that span the end of a month are permitted and are printed with the proper dates.

Next the user is prompted to enter parameter codes for tabling:

Select one of the following options to identify the columns in the table (parameter codes are used to identify columns):

1 -- Enter parameter codes at the terminal

2 -- Enter a filename that contains a list of parameter codes

Enter option desired (1-2, or Q to quit):

If parameter codes are entered from the terminal, the following prompt appears:

Enter up to 1000 parameter codes:
(1) P: 00400
(2) P: _____

The next prompt is given the sequence number 2 and so forth until interactive entry is ended. Interactive parameter code entry is ended when a carriage return **<cr>** is entered for a parameter code. When interactive entry of parameter codes is completed, the user is given the opportunity to make changes to any entry by entering the sequence number of the parameter code to be changed. Parameter codes are checked against the parameter code dictionary so that invalid parameter codes are rejected upon entry. If parameter codes ***81024 (drainage area), 72000 (datum), or 72008 (well depth)*** are included in the list of parameters and are not present in the water-quality record, they will be retrieved from the sitefile record. All numeric parameters contained in the parameter code dictionary are supported. Alpha parameter codes also may be tabled. A complete list of alpha parameter codes is available in *Appendix A*.

Below are characteristics to remember about parameters used in table publication format:

- Parameters are placed in the table in publication order unless the user chooses to place them in the order they are supplied. If only one parameter is selected to be included in the table, there is no option to place the parameters in publication order.

- When the alpha parameter CALCV (include all possible calculated parameters) is specified, all calculated parameters, in ascending numeric order, are inserted at the point where the CALCV parameter was listed.

- When the alpha parameter ADDPC is specified, all ***numeric*** parameters (including calculated parameters that have been stored) are printed in ascending numeric order.

- When the alpha parameter ALPHA is specified, the alpha codes are sorted alphabetically.

- A maximum of 1,000 parameters may be included in a single table (the number of parameters may be reduced slightly when required parameters are automatically included by the tabling software).

- If an invalid numeric parameter is requested, an error message is written and the requested parameter is ignored.

- Date printing may be suppressed for type 3 tables ***only***. If the alpha parameter DATES is not in the parameter list, it is automatically inserted as the first parameter.

- The vertical folding option is limited to 5 parameters (including DATES). If more than five parameters are listed when the vertical folding option has been specified, the user receives an error message and a parameter count. Parameters must be reentered from the terminal, or reread from a file.

- Multiple occurrences of the same parameter are not permitted. If a parameter is entered more than once, the first occurrence is retained and others are deleted from the list.

- Parameters other than ***biological (taxonomic)*** parameters, and medium codes other than ***L, M, N, O,*** and ***P***, will be substituted by the program for table type 4.

3.4.3.4 Water Quality Table Options

Eight options are available for formatting standard water-quality tables. These can be specified from the following menu:

```
qwtable -- current selections for options

(1) Limit Results by DQI Code:     X_Historical, Accepted, or presumed OK
                                   __ User Specified

(2) Parameter Order:               X_Publication Order __As Supplied

(3) Rounding of Result Values:     X_Default __User __None

(4) Censoring of Zero Values:      X_None __User Specified

(5) Recensoring of Values:         X_None __User Specified

(6) Qualifiers in Output:          __Yes X_No

(7) Footnotes:                     __None X_Remarks __Qualifiers

(8) Create Parnames File:          __Yes X_No

(9) Time Datum:                   X_Watch Time  __User Specified


Enter item(s) to change (1-7) or <CR> to continue:
```

Screen with default specifications for specifying how parameter results will be printed in a table

The default specifications are marked with an ***X*** as on shown on the above screen. The default specifications can be accepted by entering a ***<cr>***. Each option can be changed by entering numbers 1 through 7, to access one of the submenus described below:

1. Limit Results by DQI Code:

This allows the user to specify samples that will be tabled according to the data quality indicator ***(DQI)*** associated with each sample. By default, only samples that are marked as approved, accepted, or presumed satisfactory will be tabled. By selecting this option, the user may choose to include data that are in review, are not approved (rejected), or are proprietary. Data that are marked proprietary may not be published or made available to the public. If rejected results (DQI = Q or X) are included in water-quality table output, a '#' symbol will be included with the value to indicate that the result has been rejected.

NOTE: If calculated values are included in the output, the DQI associated with the calculated value will be determined by the DQI's of the parameters used in the calculation *Appendix D.* The DQI for the calculated value will be applied from left to right in the following list:

X P O Q I SA R

For example, if the parameters used in the calculated value had DQIs of P, S, and R, the calculated value would have a DQI of P applied at output.

NOTE: If results have DQI codes that indicate they are proprietary (P, O, X) or that they are awaiting review or from unapproved methods (I), the results may not be available for retrieval by all users. Only users with certain access will be able to retrieve results with these DQI code

qwtable -- select result inclusion by DQI

The following categories are available:
A -- Historical
S -- Presumed satisfactory
R -- Reviewed and accepted
Q -- Reviewed and rejected
I -- Method in review
P -- Proprietary, unreviewed
O -- Proprietary and approved
X -- Proprietary and rejected

Enter 'all' or letters for categories desired, no space between:

2. Parameter Order

Allows the user to specify if data will be tabled in approved USGS publication order or in the order specified by the user on input.

qwtable -- select constituent ordering

Do you want numeric parameters in "publication" order (Y/N, <CR>=Y)?

NOTE: If alpha parameter codes are included in the list of parameters to be included in the output and publication ordering is selected, the parameters will not be included in publication order. To include alpha parameter codes with publication ordering, include the alpha parameter codes at the beginning of the parameter list.

3. Rounding of Result Values

```
qwtable -- select  rounding
You have 3 options for rounding of parameter values--
  D --PCD, from parameter code dictionary
  U --User, use rounding stored with parameter
  N -- None, output analysis value as stored

Enter option desired (<CR>=D):
```

Default rounding (D) produces tables with each parameter value rounded using the rounding instructions array in the Parameter-Method Table. A discussion of the rounding is included in the *Getting Started Section* and in the *Support Files (section 3.6.7)*. The precision of results is based on an analysis of the variability of replicate measurements. Lacking such an analysis, users should select the "Default" rounding when preparing tables of water-quality data for publication. The "Default" rounding is based on laboratory analysis of the most precise method currently available, and uses precision data stored in the parameter-method table.

User-defined rounding (U) produces tables with each parameter value rounded using the rounding instruction stored with the analysis at the result level. If this option is selected, and the rounding code is not stored with a sample, the software will use the rounding code stored in the parameter-method table.

No rounding (N) produces tables in which each parameter is written as stored in the database.

4. Censoring of Zero Values:

Selecting to censor zero values makes available three other options. **Option 1** is the default -- zero values are not censored. **Option 2** allows the user to censor stored zero-value measurements based on a reference list *Appendix I*; zero values will be converted to a null value and the remark code will be changed to ***U*** (material was analyzed for, but not detected.) for parameters in this list. **Option 3** allows the user to enter parameter codes and values interactively so that each parameter code and value pair can be set individually. **Option 4** allows the user to enter a file that contains individual parameter code and value pairs. The file must be in fixed-column format shown in *Appendix G*.

```
qwtable -- set up user censoring of stored zero values

You have 4 options:
  1 – no censoring of zero values
  2 -- censor by reference list only
  3 -- specify parameter code & value for selected parameters
       at the terminal
  4 -- load a set of parameter codes with value from a file

Enter option desired (1-4, <CR>=1):
```

5. Recensoring of values:

By selecting option 5, six options are available for censoring data at a new censoring level (recensoring). Recensoring does not change anything stored in the database. In output tables, however, any stored values less than the recensoring value is displayed as the recensored value and qualified with a '<' (less than) remark code. Recensoring may be useful to focus the data user's attention on the higher data values and away from visual differences that are not relevant to understanding environmental processes.

```
qwtable -- set up user re-censoring

You have 6 options for recensoring of constituents:
  1 – No recensoring
  2 – Recensor all constituents to a specified value
  3 – Recensor each constituent to the highest lab reporting level stored
       for the constituent-method
  4 – Recensor values for specified parameters and methods
  5 – Recensor each value that is below associated lab reporting level
  6 -- Recensor each constituent to the highest censored level
Enter recensor option desired (1-6, <CR>=1):
```

Option 1, the default selection, includes results in output the way they are stored in the database. Results in the database are censored by the laboratory at a specified reporting level. This reporting level varies depending on the

constituent and the analytical method. In addition, the reporting level can change over time, due to conditions under which the sample is analyzed, or because of the chemical characteristics of the sample.

Option 2 allows the user to recensor all constituents in the data output to user-specified value. The output will display all results that are below the selected recensoring level as less-than the recensored value chosen. This option would most likely be used for comparisons among constituents, methods, and (or) laboratories. NOTE: If option 2 is selected and *fixed-value codes* are included in the parameter list, the value associated with the fixed value could be recensored if the recensoring value is greater than the stored value.

In the example below, the user has chosen a recensoring level = 10. The values in bold have been recensored for output.

Parameter code	Stored value	Output
01020	**2**	**<10**
01046	**3**	**<10**
00915	10	10
00930	15	15
00940	22	22

In the example below, the user has chosen a recensoring level = 0.1. The values in bold have been recensored for output.

Parameter code	Stored value	Output
46342	**<0.05**	**<0.1**
77825	<0.1	<0.1
46342	**<0.08**	**<0.1**

Option 3 allows the user to recensor all constituents to the highest stored associated reporting level for each unique constituent-method combination. If none of the measurements for a constituent-method combination are associated with a stored reporting level (e.g., data stored prior to NWIS 4_1 or transmitted by a laboratory with no reporting level), then no recensoring is performed on those results.

In the example below, parameter code 01046(B), 46342(A), 77825(C), and 46342(D) have stored reporting levels; the highest for each constituent-

method combination is used to censor results in the output. The values in bold have been recensored for output.

Parameter code	Method Code	Reporting level	Stored value	Output
01046	B	5	**2**	**<5**
01046	B	4	**3**	**<5**
01046	A		3	3
01046	A		10	10
01046			15	15
01046	B		22	22
46342	A	0.05	<0.05	<0.05
46342	A	0.05	E0.06	E0.06
46342	A	0.05	0.19	0.19
77825	C	0.1	<0.1	<0.1
77825	C	0.1	V0.15	V0.15
77825	C	0.1	0.2	0.2
46342	D	0.06	<0.08	<0.08
46342	D	0.06	E0.05	**<0.06**
46342	D	0.06	0.21	0.21

Option 4 allows the user to specify a new censoring level for each constituent-method combination. This may be done interactively by entering parameter code, method code, and recensoring value at the terminal or an input file may be used. The input file must use the fixed-column format shown in *Appendix G*. This technique would most likely be used for spatial or trend analysis without regarding effects from compound interferences or changes in laboratory performance. This option provides the user with the maximum amount of control over recensoring. Constituents not specifically identified in the user-specified recensoring limits will not be recensored.

In the example below, the user has entered the following measurement-specific recensoring levels: 01046(A) = 5; 46342(A) = none; 77825(C) = 0.2; 46342(D) = 0.15. The values in bold have been recensored for output.

Parameter code	Method Code	Stored value	Output
01046	B	2	2
01046	B	3	3
01046	A	3	**<5**
01046	A	10	10
01046		15	15
01046	B	22	22
46342	A	<0.05	<0.05
46342	A	E0.06	E0.06
46342	A	0.19	0.19
77825	C	<0.1	**<0.2**
77825	C	V0.15	**V0.2**
77825	C	0.2	0.2
46342	D	<0.08	**<0.15**
46342	D	E0.05	**<0.15**
46342	D	0.21	0.21

Option 5 allows the user to censor each result that is below the associated reporting level for that result. The most common application of this option is to remove the results coded with an 'E'-remark code that identify results below the reporting level. This technique would be used to reduce the probability of false positive detections in the data reporting. If no reporting level is stored with the result, then no recensorng is performed on the value.

In the example below, reporting levels for 01046(B) and 46342(D) affect the output of result values.

Parameter code	Method Code	Reporting level	Stored value	Output
01046	B	5	2	**<5**
01046	B	4	3	**<4**
01046	A		3	3
01046	A		10	10
01046			15	15
01046	B		22	22
46342	A	0.05	<0.05	<0.05
46342	A	0.05	E0.06	E0.06
46342	A	0.05	0.19	0.19
77825	C	0.1	<0.1	<0.1
77825	C	0.1	V0.15	V0.15
77825	C	0.1	0.2	0.2
46342	D	0.06	<0.08	<0.08
46342	D	0.06	E0.05	**<0.06**
46342	D	0.06	0.21	0.21

Option 6 allows the user to recensor using the highest censored value for each constituent in the data retrieved. The associated method code is not considered.

Parameter code	Method Code	Stored value	Output
34653		<0.021	**<0.03**
34653		E0.003	**<0.03**
34653	A	E0.021	**<0.03**
34653	A	0.4	0.4
34653		<0.03	<0.03
34653	B	0.05	0.05
46342	A	<0.05	**<0.08**
46342	A	E0.06	**<0.08**
46342	A	0.19	0.19
77825	C	<0.1	<0.1
77825	C	V0.15	V0.15
77825	C	0.2	0.2
46342	D	<0.08	<0.08
46342	D	E0.05	**<0.08**
46342	D	0.21	0.21

6. Qualifiers in Output:

qwtable -- select value qualifier inclusion

Do you want to include value qualifiers (Y/N, <CR>=Y)?

Value qualifiers are codes used to provide additional information about the value reported by the laboratory. The user may select to add or remove footnotes for remark codes and value qualifier codes with this option. The default for this option does not include value qualifiers in the table; however, they may be included if specified by the user here.

7. Footnotes:

```
Qwtable – select footnote inclusion

Do you want to create footnotes for remark codes (Y/N, <CR>=Y)?
Do you want to create footnotes for value qualifiers (Y/N, <CR>=Y)?
```

The default option will include only footnotes that define any remark codes that appear in the table.

8. Create a Parnames File:

```
qwtable – select parnames file creation
Do you want to create a parnames file (Y/N, <CR>=Y)?
```

A parnames files contains a listing of the parameter names included in the output for the current retrieval. The name of the file will be the output file name.*parnames*. This file can be used as input for parameter names for another retrieval.

9. Time Datum:

```
qwtable -- select output time datum

Such as:

GMT   AST   EST   CST   MST   PST   AKST
HST
BST   ADT   EDT   CDT   MDT   PDT   AKDT
HDT

Enter the acronym of the time-datum desired
(<CR>=watch time):
```

This option allows for times in the output file to appear in any time datum chosen. The default option is to display the times using the watch time *(section 2.1.9)*, which is equivalent to the time datum entered during login of the sample.

NOTE: Time datum will appear in output for a sample if the time-datum reliability code is 'K'; otherwise it will be blank in output unless the alphabetic parameter for time datum is specifically requested in the list of parameters.

3.4.3.5 Table Processing

Once the user is satisfied with the selections for tabling, a ***<cr>*** is entered and the table is processed. A list of the requested parameter codes, the total number of parameter codes, the database being accessed, and the number of records retrieved are displayed.

```
Checking (037)  01090 …
Checking (038)  38260 …
Checking (039)  80154 …
Checking (040)  00063 …
Checking (041)  50280 …
Checking (042)  72104 …
Checking (043)  72105 …
Checking (044)  71999 …
Checking (045)  84164 …
Checking (046)  82398 …

  46 parameters loaded.

Output specifications complete, retrieving data …
Retrieving from database 01 …
    17 records retrieved

Processing complete

Output is in the file: output

Do you wish to run again (Y/N, <CR>=N)?
```

Table processing display screen

When processing has completed, the output file name is displayed and the user may repeat the steps described above for developing a *Water-Quality Table by Sample* table or return to the *Option 4 -- Data Output* menu.

3.4.4 Option 4 -- Water Quality Table by Result

This option produces a table of result-level data from the Water-Quality File in columnar format. Each water-quality parameter for a particular sample is listed on a separate row with result-level codes listed in columns across the row. *Appendix C* has an example of this output.

Upon invoking this option, the user is prompted to enter the name of the file containing record numbers and the name of an output file to which the table will be written. After these filenames have been entered, the table definition is entered. These queries are described in detail in *Section 3.4.3.1* and *Section 3.4.3.2*. ***Note: This option cannot be used to make a type 4 – Biological table.***

3.4.4.1 Specifying the Result-Level Parameter Codes

The user next must enter alpha (sample and result-level) parameter codes. These will comprise the table columns. These codes may be entered interactively from the terminal or from an existing file that contains parameter codes in fixed-column format. All valid sample and result-level alpha codes (*Appendix A*) and the code ALPHA, which brings in all alpha codes, are acceptable for entry. If ALPHA is not entered, the alpha code

PCODE must be entered so that parameter codes are printed. If the parameter code REMRK is not included in the parameter code list, remark codes will not be included in the output when the parameter code VALUE is included in the list. If the parameter code PLNAM is included in the list for output, the field will be restricted to 54 characters in the table.

Select one of the following options to identify the columns in the table (alpha codes are used to identify columns):

1 -- Enter alpha codes at the terminal

2 -- Enter a filename that contains a list of alpha codes

Enter option desired (1-2, or Q to quit):

Enter alpha parameter codes (include "PCODE" for parameter numbers):

(1) P: PCODE
(2) P: VALUE
(3) P: DQIND
(4) P: _____

Once the parameter codes have been entered, they are checked against the parameter code dictionary to make sure that they are valid codes. During interactive input, parameter codes are checked before the next entry and invalid entries must be reentered.

3.4.4.2 Specify Table Options

After the record numbers, output file name, and result-level parameter codes have been designated, a tabling specification screen comes up:

```
qwtable -- current selections for options

(1) Limit Results by DQI Code:      X_Historical, Accepted, or presumed
OK
                                    __ User Specified

(2) Rounding of Result Values:      X_Default __User __None

(3) Censoring of Zero Values:       X_None __User Specified

(4) Recensoring of Values:          X_None __User Specified

(5) Qualifiers in Output:           __Yes X_No

(6) Footnotes:                      __None X_Remarks __Qualifiers

(7) Identify Rows in Table:         X_All  __User Specified

(8) Create Parnames File:           __Yes  X_No

(9) Time Datum:                     X_Watch Time  __User Specified


Enter item(s) to change (1-7) or <CR> to continue:
```

Table options available with default settings for a result-level table

Options 1 through 6 and 8 through 9 are identical to those described in *Section 3.4.3.4*. Option 7 invokes the following submenu, which allows the user to limit the by-result output. **Option 1**, the default, results in all parameters to be included in the output. **Option 2** allows the user to enter a list of the parameters from the terminal to be included in the output. **Option 3** allows the user to enter a file name that contains the parameter codes to be included.

```
qwtable -- set up to identify the rows in the table

Select one of the following options to identify the rows in
the table (numeric parameters are used to identify rows):
     1 -- accept all parameters available in a sample
     2 -- Enter parameter codes at the terminal
     3 -- Enter a filename that contains a list of parameter codes

Enter option desired (1-3,<CR>=1):
```

3.4.4.3 Table Processing

Once the user is satisfied with the selections for tabling, a ***<cr>*** is entered and the table is processed. A list of the requested alpha parameter codes, the database number accessed, and the number of records retrieved is displayed to the screen. If numeric parameter codes were specified in the output options, they are not displayed.

```
Loading selected parameters…
Checking (001)  PCODE   …
Checking (002)  VALUE   …
Checking (003)  REMRK   …
Checking (004)  ADATE   …
Checking (005)  DQIND   …
Checking (006)  DSTAT   …
Checking (007)  LABNO   …
Checking (008)  METHD   …
Checking (009)  NULLQ   …
Checking (010)  PDATE   …
Checking (011)  PRPNO   …
Checking (012)  QACOD   …
Checking (013)  QUAL1   …
Checking (014)  QUAL2   …
Checking (015)  QUAL3   …
Checking (016)  RCMFL   …
Checking (017)  RCMLB   …
Checking (018)  RNDCD   …
Checking (019)  RLTYP   …
Checking (020)  RPLEV   …
         20 Parameters loaded
Output specifications complete, retrieving data…
Retrieving from database 01 …
               1 records retrieved
Processing complete
Output is in the file:  table
```

Table processing display screen

When processing has completed, the output file name is displayed and the user may repeat the steps described above for developing a *Water-Quality Table by Result (section 3.4.4)* table or return to the *Option 4 -- Data Output (section 3.4)* menu.

3.4.5 Option 5 -- Flat File by Sample

If this option is selected, the user can output data to an ASCII file (flat file) that may be used to enter data to another application, such as a statistics or graphics application. This option is similar to the ***Water-Quality Tables by Sample (Publication Format)*** option (see *Section 3.4.3*) except that output is in ASCII file format rather than in table format. Examples of this type of output are in *Appendix C*.

3.4.5.1 Selecting the Output Format

There are six format options: fixed-column flat files with and without method codes, tab-delimited RDB files with and without method codes, or flat files with user-specified delimiters with and without method codes:

```
qwtable -- Flat file (by sample)

You have 6 options for flatfile output:
  1 -- Fixed column flat file (qwflatout)
  2 -- Flat file with TAB delimiter (RDB format)
  3 -- Flat file with user-specified delimiter
(Following options include method code in output)
  4 -- Fixed column flat file (qwflatoutm)
  5 -- Flat file with TAB delimiter (RDB format)
  6 -- Flat file with user-specified delimiter

Enter option desired (1-6, <CR>=1):
```

If a fixed-column format is selected (option 1 or 4), data are output to equally-spaced columns (*Appendix C*). If a fixed-column format is chosen with method code included, the method code is included adjacent to the remark code. For example, "<B 10." indicates a less-than 10 value using method "B." If delimited files are selected (options 2, 3, 5, or 6), the user is asked if the value and associated remark codes should be delimited. ***[NOTE: If the user selects No, the remark code will appear as the first column in the value field (for example <0.05). For most applications, this will cause the value to be read as a character rather than as a number.]*** If user-specified delimiter is selected (options 3 and 6), the user is prompted to enter the character that will be used to delimit the data. If no delimiter is entered, the default delimiter is a space.

```
qwtable --Flat file (by sample)

You have 6 options for flatfile output:
  1 -- Fixed column flat file (qwflatout)
  2 -- Flat file with TAB delimiter (RDB format)
  3 -- Flat file with user-specified delimiter
(Following options include method code in output)
  4 -- Fixed column flat file (qwflatoutm)
  5 -- Flat file with TAB delimiter (RDB format)
  6 -- Flat file with user-specified delimiter

Enter option desired (1-6, <CR>=1):  6
Enter column separator char or TAB for tab char:
Do you want remarks and values to be delimited (Y/N, <CR>=Y)?  Y
```

3.4.5.2 Specifying the Retrieval Criteria

Once the desired output format has been selected, the user is prompted for the pathname of the file containing the record numbers, for a filename for the output file, and for parameter codes. Parameter codes may be entered interactively or from a fixed-column file. These queries are described in detail in *Section 3.4.3.1* through *Section 3.4.3.3*.

3.4.5.3 Specify Output Options

When the parameter codes have been entered, a screen for selecting output specifications is displayed:

qwtable – current selections for options

(1) Results Included in Table: X_Historical, Accepted, or presumed OK
__User Specified

(2) Parameter Order: X__Publication Order __As Supplied
(3) Rounding of Result Values: X__PCD __User __None
(4) Censoring of Zero Values: X__None __User Specified
(5) Recensoring of Values: X__None __User Specified

Enter item(s) to change (1-5) or <CR> to continue:

These output options are the same as those for tabling data by sample and are described in detail in *Section 3.4.3.4*.

3.4.5.4 Output Processing

When specifications are complete, processing begins. The screen displays the parameter codes being retrieved, the number of parameter codes loaded, the database number being accessed, and the number of records retrieved. When processing has completed, the output filename is displayed and the user may repeat the steps described above for developing a *Flat File by Sample* or return to the *Option 4 -- Data Output* menu.

3.4.6 Option 6 -- Flat File by Result

If this option is selected, the user is able to output data to an ASCII file (flat file) in a columnar format that uses one row (line) for each parameter. This format may be used to enter data to another application. This option is similar to *Option 4 -- Water Quality Table by Result (see Section 3.4.4)* except that output is in ASCII format rather than in table format.

3.4.6.1 Selecting the Output Format

Three formats are available for output to an ASCII file. Output may be written in fixed-column format, tab-delimited format, or with a user-specified delimiter. The user first selects the desired output format:

qwtable -- Flat file (by result)

You have 3 options for flatfile output:

1 -- Fixed column flat file

2 -- Flat file with TAB delimiter (RDB format)

3 -- Flat file with user-specified delimiter

Enter option desired (1-3, <CR>=1):

If a fixed-column format is selected, data are output to equally-spaced columns (*Appendix C*). If a user-specified delimiter is selected (option 3), the user is prompted to enter the character that will be used to delimit the data. If no delimiter is entered, the default delimiter is a space.

3.4.6.2 Specifying the Retrieval Criteria

Once the desired output format has been selected, the user is prompted for the pathname of the file containing the record numbers and for a filename of the output file. These queries are described in detail in *Section 3.4.3.1.* Next the user is queried for alpha (result-level) parameter codes. Parameter codes may be entered interactively or from a file. These queries are described in detail in *Section 3.4.4.2.*

3.4.6.3 Specify Output Options

When the result-level alpha parameter codes have been entered, a screen for selecting output specifications is displayed. These five output specifications are identical to options 1, 2, 3, 4, and 7 for tabling result-level data and are described in detail in *Section 3.4.4.3*.
Note: Options 5 and 6, in the corresponding menu in the tabling options, pertain only to tabling and are not included on this menu.

```
qwtable – current selections for options
(1) Results Included in Table:      X__Approved  X__In Review  __Rejected
                                    __Proprietary
(2) Rounding of Result Values:      X__PCD  __User  __None
(3) Censoring of Zero Values:       X__None  __User Specified
(4) Recensoring of Values:          X__None  __User Specified

(5) Identify Rows in Table:         X_All  __User Specified
Enter item(s) to change (1-5) or <CR> to continue:
```

3.4.6.4 Output Processing

Once the user is satisfied with the selections for tabling, a ***<cr >*** is entered and the table is processed. A list of the requested alpha parameter codes, the number of alpha parameter codes, the database number accessed, and the number of records retrieved is displayed to the screen. If numeric parameter codes were specified in the output options (*Section 3.4.6.3*), they are not displayed.

```
Loading selected parameters…
Checking (001)  PCODE  …
Checking (002)  VALUE  …
Checking (003)  REMRK  …
Checking (004)  ADATE  …
Checking (005)  DQIND  …
Checking (006)  DSTAT  …
Checking (007)  LABNO  …
Checking (008)  METHD  …
Checking (009)  NULLQ  …
Checking (010)  PDATE  …
Checking (011)  PRPNO  …
Checking (012)  QACOD  …
Checking (013)  QUAL1  …
Checking (014)  QUAL2  …
Checking (015)  QUAL3  …
Checking (016)  RCMFL  …
Checking (017)  RCMLB  …
Checking (018)  RNDCD  …
Checking (019)  RLTYP  …
Checking (020)  RPLEV  …

        20 Parameters loaded.
Output specifications complete, retrieving data…
Retrieving from database 01 …
            1 records retrieved
Processing complete

Output is in the file:  table
```

Output processing display screen

When processing has completed, the output filename is displayed and the user may repeat the steps described above for developing a *Flat File by Result – Section 3.4.6* or return to the *Option 4 -- Data Output (section 3.4)* menu.

3.4.7 Option 7 -- Make a P-STAT Data Set

When this option is chosen, selected data from specified records may be written to a sequential file that may be read by the standard P-STAT input routines. When this option is chosen, 'no rounding' should be selected. If 'no rounding' is not selected the data output file will contain blanks and the P-STAT software will not be able to read the file. Examples of this type of output are available in *Appendix C*.

3.4.7.1 Specifying the Retrieval and Output Criteria

The user is first queried for the pathname of a file containing record numbers and the pathname of an output file. These queries are the same as those for the other options in Data Output options and are described in detail in *Section 3.4.3.1*.

When these files have been specified, the user is prompted to enter an output format option. Three options are available for handling values that include remark codes:

```
qtable -- P-stat format

p-stat output format

You have 3 options for handling remarks codes

  1 -- Remarks (<, ND, etc.) included with the data
  2 -- Remarks deleted but values retained (a remark code
       of "ND" or "M" will yield a value of "-", a missing value
       of the first kind
  3 -- Values with remarks codes set to "--", a missing value
       of the second kind

A count of the remarked values will be provided

Enter your choice ( 1-3):
```

1. **Option 1** - Remark codes may be included with the associated values in the output file. ***Note : This format is invalid for input to P-STAT because P-STAT cannot handle remarks in this manner; it is provided for data verification only.***
2. **Option 2** - Remark codes may be suppressed and only the associated values included in the output file. For a remark code of ND (not detected)

there is no associated value; the output file will contain **"-"** (defined in P-STAT as a missing value of the first kind).

3. **Option 3** - All values associated with remark codes may be replaced with **"--"** (defined in P-STAT as a missing value of the second kind).

Regardless of which option is chosen, a summary list of remarked values is produced in a separate output file.

Next the user is queried for a list of parameter codes either entered interactively or from a file that contains a list of parameters (*Appendix G*). If the parameter list is not in a file, each parameter is entered from the terminal; a null entry (carriage return) ends the list. Only numeric parameters and the three *alpha parameters (Appendix A)* ADDPC, CALCV and SAMPL are valid. A maximum of 1,000 parameters may be included. These queries are described in detail in *Section 3.4.3.3*.

3.4.7.2 Specify Output Options

When the parameter codes have been entered, a screen for specifying output options is displayed.

qwtable – current selections for options

(1) Results Included in Table:	**X_Historical, Accepted, or presumed OK**
	__User Specified
(2) Parameter Order:	**X__Publication Order __As Supplied**
(3) Rounding of Result Values:	**X__PCD __User __None**
(4) Censoring of Zero Values:	**X__None __User Specified**
(5) Recensoring of Values:	**X__None __User Specified**

Enter item(s) to change (1-5) or <CR> to continue:

These output options are the same as those for tabling data by sample and are described in detail in *Section 3.4.3.4*.

3.4.7.3 Output Processing

When specifications are complete, processing begins. The screen displays the parameter codes being retrieved, the number of parameter codes loaded, the database number being accessed, and the number of records retrieved.

```
Checking  (038)  38260 …
Checking  (039)  80154 …
Checking  (040)  00063 …
Checking  (041)  50280 …
Checking  (042)  72104 …
Checking  (043)  72105 …
Checking  (044)  71999 …
Checking  (045)  84164 …
Checking  (046)  82398 …

    46 parameters loaded.

Output specifications complete,  retrieving data …
Retrieving from database 01 …
          17 records retrieved

Processing complete
Your summary of parameters with remarks is in output.stats

Output is in the file:  output


Do you wish to run again (Y/N, <CR>=N)?
```

Three output files should be created. The first file contains data retrieved for each record number requested and is given the name specified by the user. There are at least two 80-character lines per record. The first line for each record contains the station number, begin date, begin time, end date, and end time. If date or time are missing, as they may be for some historic samples, they are represented by **"-"** (defined by P-STAT as a missing value of the first kind). The remaining lines for each analysis each contain a maximum of eight data values. Each value occupies nine spaces and is preceded by a blank. If there is no value for a requested parameter, the value is represented by **"-"** (defined by P-STAT as a missing value of the first kind). *See section 2.7.1* for information on rounding.

A second output file is named by adding "***.CMND***" to the file name supplied by the user. This file contains the P-STAT commands that are needed to identify the variables and the commands to read the data into P-STAT.

The third output file is named by adding ***".STATS"*** to the user-supplied file name and contains a summary of all values that have remark codes. The list includes (for each parameter code) every unique combination of remark code and value found, and a count of occurrences of that combination.

When processing has completed, the name of the file containing the data is displayed and the user may repeat the steps described above for developing a P-STAT File *(see section 3.4.7)* or return to the Option 4 -- Data Output *(see section 3.4)* menu.

3.5 Graphs

--System Command qwgraph

The programs in the **QWGRAPH** menu may be invoked either by entering the command:

qwgraph

or by using Option 5 Graphs, from the main QWDATA menu. The following graph routines are displayed:

```
QW GRAPHIC ROUTINES   REV NWIS -4_0+20010615
YOU ARE USING WATER-QUALITY DATA BASE NUMBER 01

                    -Graphs

 1 --  X,Y Plot
 2 --  Boxplots
 3 --  Stiff Diagrams
 4 --  Piper Diagrams
 5 --  Regression Plots
 6 --  Summary Statistics Table
 7 --  Detection Limits Table


98 -- -Exit Menu

99 -- - Exit System

Please enter a number from the above list or a Unix command:
```

Graphic Programs Menu

When in the QWGRAPH menu, UNIX commands such as "ls" or "more" can be used to list a directory or examine the contents of a file. When the selected program has completed, the user will be returned to the QWGRAPH menu shown above. Use option 99 -- -Exit System to exit the software and option 98 -- Exit Menu to return to the previous menu.

Options 1 and 5, qwplot and qwregress, require that a UNIX environment variable called DISPLAY be set to allow the program to plot in a separate window on your screen. The variable must be set from outside of QWGRAPH. The first message after invoking either of these programs is a message asking you to confirm that the variable DISPLAY has been set correctly.

INPUT and OUTPUT FILES for QWGRAPH

All programs in the QWGRAPH menu require an input file of either record numbers or data to operate and an output file. Options 1-5 require a file containing record numbers

from the QWDATA database. This file has the format of one record number per line in columns 1-8 and can be generated through QWDATA (*see section 3.3.1)* or created with an editor.

Examples of this input file is shown in *Appendix G*.

GRAPHICS OUTPUT

Options 1-5 generate graphics that require the user to specify the output format. Options 1 and 5 use TKG2 to produce the plots, and the other options use S_PLUS.

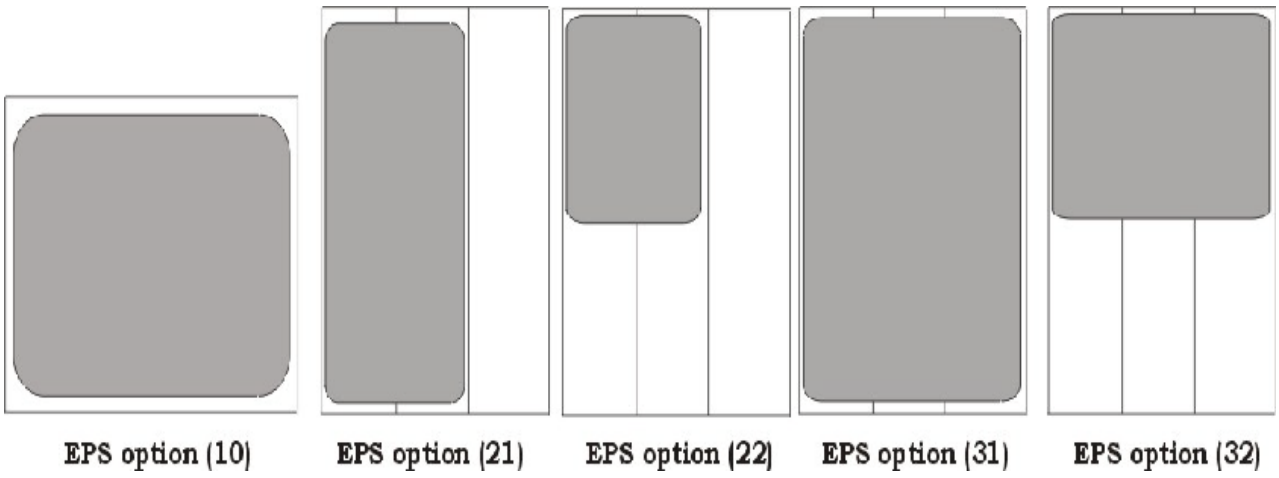
From the TKG2 window, the plot can be printed, saved as a TKG2 or G2 file, or exported into a Framemaker Interchange Format (*mif), portable document format (pdf), bitmap (bmp), portable network graphics (png), or postscript file. If a plot is saved as a Framemaker Interchange Format (*mif), the user will need to complete some editing of the graph, so that the entire plot can be seen on the page. To do this, open the *mif file in Framemaker; use 'Select All on Page' from the Edit pull-down menu; then choose 'Group' from the Graphics pull-down menu; finally choose 'Scale' from the Graphics menu and make the scale factor 80%. The entire plot can be moved to center it on the page after it has been scaled down in size. When a plot is saved in TKG2 format, it can be edited using TKG2. Open the plot in TKG2 and double click on the axis you would like to edit or double click on the explanation to edit the data points in the plot. Use the editing windows that are displayed to change the appearance. For more information about TKG2, go to *http://tx.cr.usgs.gov/tkg2*. To continue with the plotting program, exit from the TKG2 window.

When the programs that invoke S_PLUS are used, a directory named NWIS_Swork is created in the user's home directory. This directory will contain any files that are made while using the S_PLUS graphics programs. When the graphics that invoke S_PLUS are selected, the following list of device types is displayed:

Enter the number of the device wanted
1 motif (X-window) graphics
2 pdf file
4 HP Laser Jet file
5 PostScript file
7 Tektronix 4010 window (from X-term or TerraPro)
9 EPS file

If option ***(1)*** is selected, a separate S-Plus window appears that includes the plot. To exit cleanly from this window, the user should include all responses in the Unix window, not in the S-Plus window. If option ***(2)*** is selected, a pdf file is generated after a file name is entered. Known bugs exist for diagrams generated in a pdf format from the S_PLUS window. For boxplots (option 2 from the main QWGRAPH menu), the y-axis label is missing. If option ***(4)*** is selected, a plot file in HP Laser-Jet format is produced that can

be plotted to printers that accept HP formatted graphics. If option ***(5)*** is selected, a postscript file is produced that can be plotted to printers that accept postscript format. If option ***(7)*** is selected, the plot will appear on a Tektronix 4010 window. To use a Tektronix 4010 window, you must be using an xterm window. When option ***(7)*** is selected a message appears in the Unix window: "Enable Tek window output now." Activate the Tektronix window by selecting “Switch to Tek mode” after pressing the CTRL and middle mouse button combination while in the Unix window. To view each plot, hit enter in the Tektronix window after each plot. To return to the Unix window, deselect “Switch to Tek mode” and deselect "Show Tek window" after pressing the CTRL and middle mouse button combination. If option ***(9)*** is selected, you can choose the size of the plot you want and plot the file to printers that accept encapsulated postscript format. A total of 5 different sizes can be made. The list of options include:(10) – landscape – full page; (21) – portrait – 2-column wide, full page; (22) – portrait – 2-column wide, half-page; (31) – portrait – 3-column wide, full page; (32) – portrait – 3-column wide, half-page. The different options are shown in the figure below:



3.5.1 Option 1 -- X,Y Plot (/usr/opt/nwis/bin/qwplot)

The qwplot program (option 1) creates an X,Y plot in three stages: ***(1)*** by retrieving data from the QWDATA database that are written to an ASCII file, ***(2)*** by using data in the ASCII file to create the plot in a separate graphics (TKG2) window, and **(3)** from the TKG2 window, the plot can be printed or saved to a file. All data are used in the plot, including remarked (i.e., less or greater than) results. Plots created with QWPLOT are limited to 5,000 data points.

The three stages used to complete the plot are described, and the software requests the name of the file containing the record numbers. The next prompt asks for the name of the output file name.

Three options exist for plotting the data: ***(1)*** 1-7 parameters by one parameter, ***(2)*** 1-7 parameters by sample date, and **(3)** Multiple stations by sample date for one parameter. All three options will handle data from multiple stations; however, only option ***(3)*** will identify the individual stations on the plot.

If option ***(1)*** is chosen, a 5-digit parameter code for the x-axis must be entered followed by as many as seven parameters that will be plotted on the y-axis. If option ***(2)*** is chosen, the x-axis parameter is sample data and as many as seven parameters can be entered to be plotted on the y-axis. If option ***(3)*** is chosen, the program reminds you that the file containing the record numbers must be sorted by station-id, date, and time. The x-axis parameter is sample data, and one y-axis parameter can be entered.

After the plot type is chosen, the data are retrieved, some basic statistics (e.g., n, minimum, and maximum) are displayed on the screen, and you are asked if the data are to be listed to the screen. These data are the same data included in the ASCII output file and in the plot. A title then can be entered for the plot, and the x-axis and y-axis labels can be edited if the default choices are not acceptable. Although there is no limit on the length of the plot title or axis labels that can be entered, there is a practical limit because all text entered may not be visible on the plot. Editing of the font size in another application may be needed to see the entire title or label. You then can choose whether the plot points will be connected with lines. Several seconds after this response, a separate TKG2 window will appear that contains the plot you requested.

3.5.2 Option 2 – Boxplots
(/usr/opt/nwis/bin/qwboxplot)

The qwboxplot program (option 2) creates boxplots in two stages: ***(1)*** by retrieving data from the QWDATA database that are written to an ASCII file and ***(2)*** by using data in the ASCII file to create the plot in a separate graphics (S-Plus) window and write the output to a file. A boxplot (fig. 10) is a simple graphic means of displaying statistics for the distribution of reported concentrations for a constituent. This program can generate several types of boxplots. The ends of the box (hinges) define the range of the middle 50 percent of the data which is that part of the data between the 25th and 75th percentiles (the interquartile range). The median value of the data, the 50th percentile, is defined by a line across the box. The lines beyond each end of the box are called whiskers, and, in a schematic boxplot, extend to the last value within 1.5 times the interquartile range beyond the ends of the box. Data points beyond the whiskers are called outliers because their values differ greatly from the rest of the data. Outliers that extend from 1.5 to 3 times the range of the 25th and 75th percentiles are plotted as an "x," and outliers that extend more than 3 times are plotted as an "o." In a truncated boxplot, the whiskers extend to the 10th and 90th percentiles.

This program requires the standard input file of record numbers and an output file. The output file documents the retrieved data and is used as input to the plotting routine. The program then asks if you want to make a boxplot with one station with one or more

parameters, multiple stations with one parameter, or multiple stations treated as one station.

```
-----------------------------------------------------------
Data-retrieval options                          Code
-----------------------------------------------------------
One station with one or more parameters         1
Multiple stations with one parameter            2
Multiple stations treated as one                3
-----------------------------------------------------------
  Enter code for option                         >
```

For any of the three options, the next request is for parameter codes that will be included in the boxplot. If option 1 or 3 is selected, you can enter as many as 15 different parameter codes. The data values for each parameter code will be used to complete a boxplot for that parameter. If option 1 is selected and the record number file includes data for more than one station, only the first station listed in the record number file will be used. If option 2 is selected, one parameter code is entered, and the data values for each station will be used to complete a boxplot. If more than 15 stations are included in the record number file for option (2), 16 stations will be shown on the x axis, but only 15 boxplots will be drawn. Boxplots drawn for groups with less than 10 data values may not be complete. For example, if only one data value is available, only the median line is displayed. If plots for less than 10 data values are used for other than exploratory data analysis, groups with less than 5 data values should be displayed using the individual points. The data are retrieved, and summary statistics are displayed on the screen like those displayed below:

```
RETRIEVAL OPTION 3:  2 PARAMETERS FOR A GROUP OF STATIONS
-----------------------------------------------------------
GROUPS RETRIEVED   2     MIN VALUE   -10.000
GROUPS WITH DATA   2     MAX VALUE   758.000
-----------------------------------------------------------

SUMMARY OF VALUES BY GROUP:
-------------------------------------------------------------------------------------------
GROUP          NUM OF                    25TH                  75TH
IDENTIFIER     VALUES    MINIMUM         PCTILE     MEDIAN     PCTILE     MAXIMUM
-------------------------------------------------------------------------------------------
00010             165        -10.000        2.500      6.500     12.000      20.500
00095             154         36.000      132.000    178.000    213.000     758.000
-------------------------------------------------------------------------------------------
```

If any censored values are found in the retrieved data, the software asks the user if they should be estimated and what method should be used:

RETRIEVING DATA ... RETRIEVAL COMPLETED

Censored values found in the data set.

Estimate censored values? Ans: y / n, <cr> = n >

Censored values can be estimated by either of two methods

Select the method you want:

1 - LOG-PROBABILITY REGRESSION

2 - ADJUSTED LOGNORMAL MAXIMUM LIKELIHOOD (default)

For more information on these two methods see *Statistical Methods in Water Resources* by D.R. Helsel and R.M. Hirsch.

The next queries are for whether you want the data listed to the screen and whether you want to plot the data. If the data are to be plotted, then the options for the type of boxplots are displayed (schematic or truncated). After you select the type of boxplot, you can supply the title of the plot, the y-axis label (if you want it changed), and the x-axis label (if you want it changed). The S_PLUS list of devices is displayed and you must select an output option as described above.

The data for the most recent boxplot are saved in the NWIS_Swork directory as an S-plus data set called spgu.boxplt. These data can be used in any S-plus analysis.

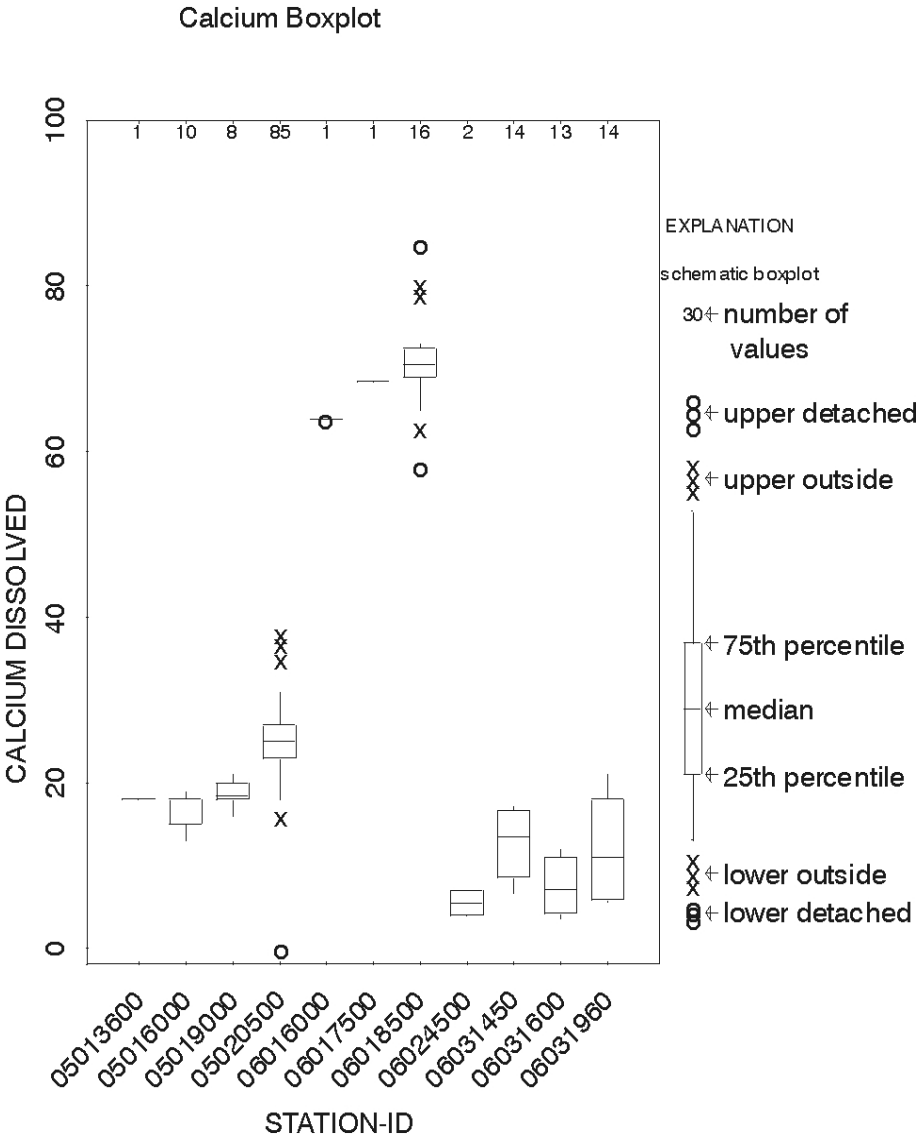


Figure 11. Boxplot

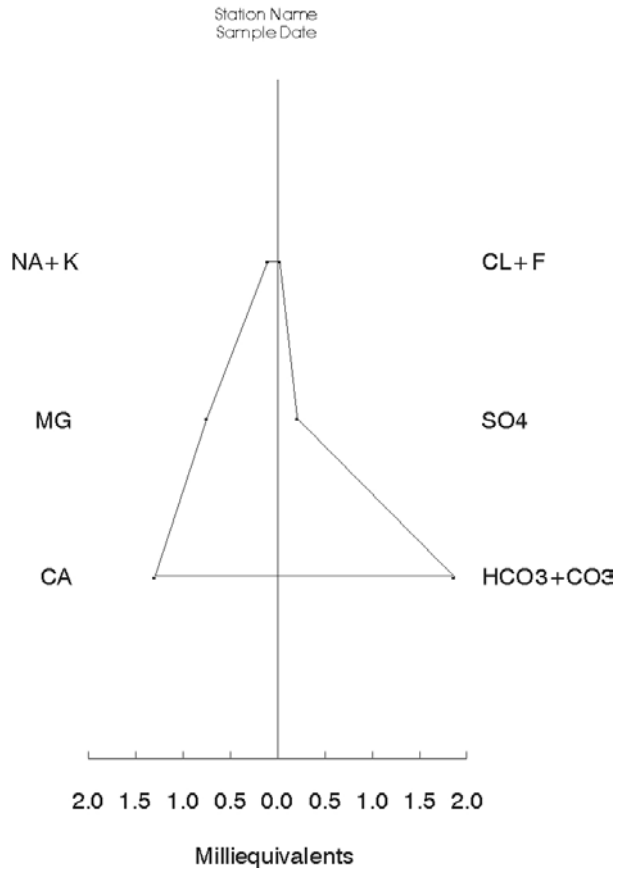
3.5.3 Option 3 -- Stiff Diagrams (/usr/opt/nwis/bin/qwstiff)

The qwstiff program (option 3) creates Stiff diagrams (Stiff, 1951) in two stages: ***(1)*** by retrieving data from the QWDATA database that are written to an ASCII file and ***(2)*** by using data in the ASCII file to create the plot in a separate graphics (S-Plus) window and write the output to a file. Using S-Plus, Stiff diagrams are plotted in a separate window by using an input file of record numbers.

The Stiff diagram is a graphical representation of the cations and anions of an analysis in milliequivalents per liter. The Stiff plotting technique uses parallel horizontal axes

extending on each side of a vertical zero axis (Hem, 1985, p. 175). Concentrations of the cations are plotted to the left of the vertical axis and anions to the right. The points are then connected, and an irregular pattern results. Thus, the patterns can be compared among analyses as well as among sites to illustrate similarities and differences.

The NWIS software plots the cations calcium and magnesium alone, and combines the cations sodium and potassium. The anions, bicarbonate and carbonate are combined, chloride and fluoride are combined, and sulfate is plotted alone. Each plot represents one analysis. All data are used in the plot including remarked (i.e., less or greater than) results. The software will not plot a Stiff diagram if any of the parameters are missing. Below is an example of a Stiff diagram produced from the software.



When the program is invoked, a query appears and asks if you want to plot station name (local well number) instead of the station number. The program then requests the input file name of record numbers and the output file name. The S_PLUS list of devices is displayed, and you must select an output option as described above.

The output file (ASCII) contains the station number, date, and time for each record and a list of cations and anions. A missing value is represented by "-1". An asterisk (*) indicates that the bicarbonate value was computed from alkalinity, and a message is included at the end of the cation and anion list.

3.5.4 Option 4 -- Piper Diagrams (/usr/opt/nwis/bin/qwpiper)

The qwpiper program (option 4) creates Piper diagrams (Piper, 1983). Piper diagrams can be used to show the chemical character of water. In a Piper diagram, selected cations (positively charged ions--calcium, magnesium, and sodium plus potassium) and anions (negatively charged ions--bicarbonate plus carbonate, sulfate, and chloride) for each analysis are shown as a percentage of the total cations and anions, in milliequivalents per liter. The cations are plotted as single points in the triangle on the left side and anions in the triangle on the right side. Cation and anion plots for each sample then are projected into the central diamond field. A water type can be described depending on the location of the projected point in the central diamond. The Piper diagram can be used to determine whether a particular water is ***(1)*** chemically similar to some other water or ***(2)*** a simple mixture of two chemically different water types (Hem, 1985, p. 177-179).

A water type in which one cation and one anion dominate (each amounts to 50 percent or more of the cations or anions, respectively) is designated by the names of the dominant cation and anion. A water type in which no cation or anion dominates is designated a mixed-cation or mixed-anion type (Piper and others, 1953, p. 26).

When the qwpiper program is invoked, the program asks for the file containing the record numbers (same format as option 1), and then for the output file name. This output file is the ASCII file created for use with the plotting routine. If the file name exists in the working directory, the program asks if you want to overwrite the current file. Up to 2,000 points can be plotted using qwpiper. The program then displays the following options:

```
YOU HAVE THE FOLLOWING SYMBOL OPTIONS
  FOR STATIONS:
************************************************
   1. USE ONE SYMBOL, ONE COLOR
   2. USE A DIFFERENT SYMBOL, ONE COLOR
   3. USE ONE SYMBOL, DIFFERENT COLORS
   4. USE DIFFERENT SYMBOL, DIFFERENT COLORS
************************************************
   ENTER YOUR CHOICE:
```

If option 1 or 3 is selected, you are prompted for a symbol (marker) number from 0-18 that corresponds to symbols listed in table 10. If a carriage return is entered, the default is 0, a square symbol. If option 4 is selected, the program displays the following two options that allow the user to choose when the symbols change:

```
CHANGE SYMBOLS ON:
****************************************
 1. EACH SITE (STATION)
 2. EACH SAMPLE, REGARDLESS OF SITE
   (COLOR CHANGES ON EACH SITE ONLY)
****************************************
```

0	Square	10	Circle with + inside
1	Circle	11	Four small triangles joined
2	Triangle	12	Square with + inside
3	Plus symbol	13	Circle with X inside
4	X symbol	14	Square with a triangle inside
5	Diamond	15	Filled-in square
6	Upside-down triangle	16	Filled-in circle
7	Square with X inside	17	Filled-in triangle
8	Asterisk	18	Filled-in diamond
9	Diamond with + inside		

Table 10. Symbols used for data values in Piper diagrams

When symbol options 2 or 4 are selected, symbols can be changed for each site or each sample. A choice of two symbol sets is available with options 2 and 4. One set of symbols is the S-Plus symbol set, shown in table 10; the second set of symbols contains small and capitalized letters of the alphabet (52 different symbols). When symbol options 3 or 4 are chosen, different colors are used to show a change of station (or possibly samples when option 4 is used). The colors in the order they will be displayed are black, red, green, blue, yellow, cyan, and magenta. For option 3, the user picks a symbol and a different color is used for each station in the plot. If more than 7 stations are plotted, the colors start over, so that the first and eighth stations will be black. The following table shows the colors that will be shown given the number of stations plotted (the station order is the same as in the record number file):

Station order number	Color used
1, 8, 15…	Black
2, 9, 16…	Red
3, 10, 17…	Green
4, 11, 18…	Blue
5, 12, 19…	Yellow
6, 13, 20…	Cyan
7, 14, 21…	Magenta

For option 4, the colors are used in the same order and symbols are used in the order shown in *Table 10*. The colors and symbols are repeated when all have been used. The following example shows the colors and symbols that would be plotted if option ***(1)*** –

CHANGE SYMBOLS ON: Each site is chosen and 10 stations are plotted (the station order is the same as in the record number file):

Station order number	Color/Symbol used
1	**Black/Square**
2	**Red/Circle**
3	**Green/Triangle**
4	**Blue/Plus symbol**
5	**Yellow/X**
6	**Cyan/Diamond**
7	**Magenta/Upside down triangle**
8	**Black/Square with X inside**
9	**Red/Asterisk**
10	**Green/Diamond with + inside**

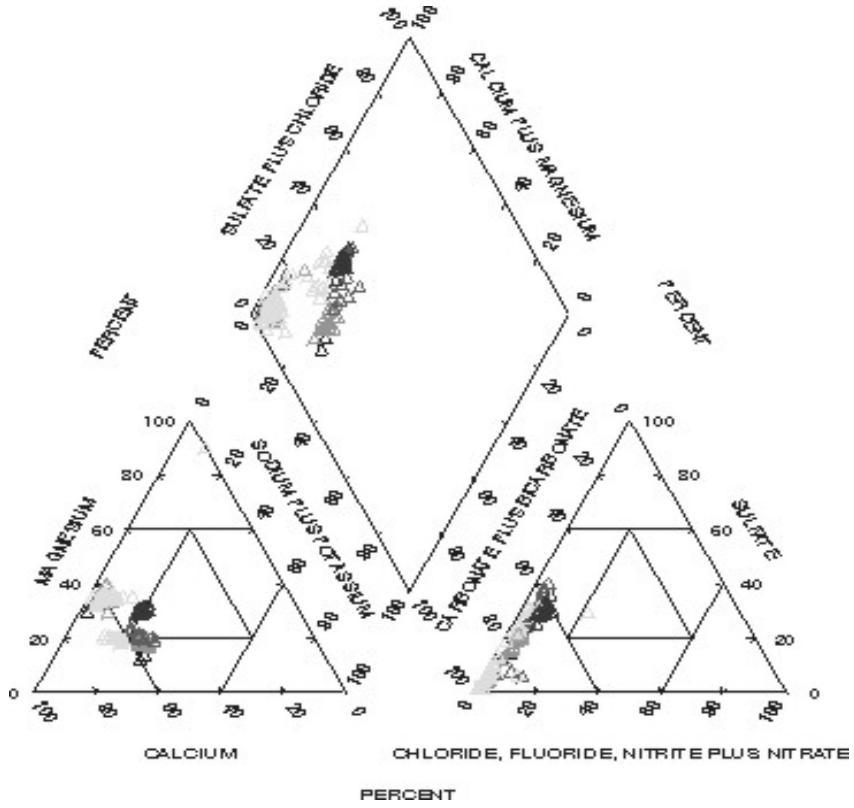
The final option is the size of the symbol to be plotted.

After the options for the plot have been entered, the S_PLUS list of devices is displayed, and the user must choose an output option as described above.

After these options are entered, an output file and plot are produced. The output file contains a list of cations and anions, the station number, date, and time for each record. A missing value is represented by "-1". An asterisk (*) signifies that the bicarbonate value was computed from alkalinity.

The data for the most recent plot are saved in the NWIS_Swork directory as an S-plus data set called spgu.piper. These data can be used in any S-plus analysis.

The figure below is an example of a Piper diagram produced from this program:



3.5.5 Option 5 -- Regression Plots (/usr/opt/nwis/bin/qwregress)

The qwregress program (option 6) creates an X,Y plot that can include a line calculated from a linear regression computation to fit a line through a set of results. The linear regression is performed by the IMSL subroutine RLONE and is described in the IMSL Reference Manual, v.4 (IMSL, Inc., 1982). The confidence interval for the coefficient and for the intercept is 95 percent. In the output file, the results of the regression computation are included with the data used in the computation.

The regression plot and output file are created in three stages: ***(1)*** by retrieving data from the QWDATA database that are written to an ASCII file and the linear regression is computed, ***(2)*** by using data in the ASCII file to create the plot in a separate graphics (TKG2) window, and ***(3)*** from the TKG2 window, the plot can be printed or saved to a file. All data are used in the plot, including remarked (i.e., less or greater than) results. Plots created with qwregress are limited to 9,999 data points. You must have at least three values for the program to work. After describing the three stages used to complete the plot, the software requests the name of the input file of record numbers. The next prompt asks for the name of the output data file, which is an ASCII file that contains the data and results from the regression computation.

A code must be entered that describes whether one plot should be made for all stations or if one plot should be made for each station in the record number file. After the code is entered, you have the option to include the regression line on the plot. One parameter code is entered for the x axis and one is entered for the y axis. After each parameter code is entered, a multiplier can be entered that will be used on the values for that parameter. The next prompt asks whether log transformations should be performed on the values for the x and y axes. A summary of the variables to be used in the regression computation and plot is shown on the screen. You can use this summary to determine if the choices are correct. If the choices are not correct, you can re-enter the information.

Several seconds after answering yes to whether the regression variables are correct, a separate TKG2 window appears that contains the plot you requested. To continue with the plotting program, exit the TKG2 window. After the TKG2 window is closed, you are asked if you would like another set of parameters processed. If ***YES***, the program asks for the x-axis parameter code and follows the steps described above; if ***NO***, the program ends.

3.5.6 Option 6 -- Summary Statistics Table (/usr/opt/nwis/bin/qwprcntl)

This option runs a program that reads data and parameter-name files created by using option 5 from the data output menu. To create these files, select a fixed-column flat file from the output format selection (*see Section 3.4.5.1 Selecting the Output Format*). These output files are used to produce a table of summary statistics. The heading on the summary table requires information from the site file that is obtained by using the following alpha codes as the first three codes in the parameter list used to make a flat file by sample:

AGNCY, STAID, DATES

The above three codes must be present in the parameter list. The following code also may be present:

> **81024 (DRAINAGE AREA)** may be included and will be used as the drainage area in place of the contributing drainage area.

The program asks for the name of the fixed column, space-delimited file. The program then asks for the parameter-list file name. This file is created by a run of qwflatout, or you may create your own file by using the format described in *Section 3.4.5.1*. The names need to be in the same order as the input data. The program then prompts for the output file name and asks if you wish to report estimated percentiles for censored parameters.

At this point, the interactive portion of the qwprcntl program is finished. This program may run for a long time, depending on the number of parameters that are to be processed and the number of records.

A log-probability regression procedure is used to estimate the mean (and the percentiles, if requested) of censored parameters. This procedure handles multiple-detection limits. The methods used are as follows:

Uncensored parameters:

1. The data are ranked in ascending order, and positions for the percentiles are found using the following formula:

   K = Pct * (N + 1)/100
   where K is the expected position, Pct is the integer percentile (e.g., for the 5th percentile, Pct = 5; for the 25th percentile, Pct = 25) and N is the number of observations. If the position K is a whole number, then the value in that position in the rank-ordered data is the value used for the percentile. If K is not a whole number, then the following interpolation is used:
   P(Pct) = X(trunc(K)) + (K-trunc(K)) * (X(trunc(K)+1) - X(trunc(K)))
   where P(Pct) is the desired percentile, X() is the rank order data set, trunc(K) is the truncated value of K and Pct is as above.

2. If the number of observations is greater than 1 and less than or equal to 5, only the maximum, minimum, and mean are reported.
3. If the number of observations is equal to 1, only the maximum is reported.
4. If the maximum is equal to 0.0, only the maximum is reported, regardless of the number of observations.
5. All values in uncensored parameters are treated the same regardless of any codes associated with those values.

Censored parameters:

1. If the percent of values flagged with "<" or "U" is greater than 5 percent of the total number of data values for a parameter, the parameter is considered censored.
2. The mean of censored parameters is estimated with a log-probability regression procedure. The method estimates the values below a detection limit and uses these values and the detected values of a parameter to estimate the mean. The FORTRAN implementation of this method was done by the Systems Analysis Group, WRD, USGS. This method was chosen as the best way to handle the problems presented by multiple-detection limits in water-quality data. The estimated mean is flagged with an "*" and explained in a footnote on the statistical summary table.
3. If estimated percentiles are requested, the same procedure that is used to estimate data below the detection limit for the calculation of the mean is used to estimate the data below the detection limit and to calculate the percentiles. The percentile values are calculated using the same method as described in Part 1 of the previously mentioned uncensored methods. These values also are flagged with "*" to indicate that they are based on an estimated data set, and the "*" is explained in a footnote.

4. If nonestimated percentiles are requested, only actual values are used for the percentile values in the statistical table. The percentiles retain a "<" flag if one is associated with the value originally and no interpolation between values is used. To establish the set of sorted data that the percentiles are selected from, all values flagged with "<" or "U" are assumed to be less than any value without a flag. For example, the following values are shown in the ascending order that would be used:

   <0.1 <1 <20 .01 17 500

   a) Only "<" and "U" remark codes are used to distinguish censored from uncensored parameters and subsequently are established as less-than values in the statistical procedures. Other remark codes are processed as follows:

      K - treated as a detected value
      E - treated as a detected value
      > - values dropped from statistical procedures
      M - values dropped from statistical procedures
      N - values dropped from statistical procedures

   b) If the average of two values must be taken to obtain the value for a percentile, the remark code of the greater value is associated with the percentile.
   c) Any values equal to 0 in a censored parameter are replaced with the value of the nearest less-than value (in time-order) and the remark code is set to "<."
   d) If the number of observations above the detection limit is less than 5, the estimated values are considered unreliable and are not reported.
   e) If the total number of observations (above and below the detection limit) is greater than 1 and less than or equal to 5, only the maximum and minimum are reported.
   f) If the total number of observations is equal to 1, only the maximum is reported.

Effective limits of the program:

1. The maximum number of parameters (header and water quality) cannot exceed 1,000.
2. The maximum number of values per parameter per station is set to 5,000.

3.5.7 Option 7 -- Detection-Limits Table (/usr/opt/nwis/bin/qwdetlims)

The qwdetlims program (option 7) reads the data and parameter-name files created by a run of qwflatout (*Section 3.4.5.1*) and produces a table of detection limits. The heading on the table requires information from the QWDATA database that is obtained by using DATES in the parameter list passed to qwflatout.

The qwdetlims program produces a table of detection limits encountered in the input data file for each parameter in the parameter list file, excluding the alpha parameter codes and the numeric codes for mean discharge, instantaneous discharge, and drainage area (00060, 00061, and 81024, respectively). A maximum of 350 valid numeric parameter codes can be handled by the program, and a maximum of 19 years can be processed for each run.

The program asks for the input data file name created by qwflatout. The program then asks for the parameter list file name. This file is created by qwflatout, or you may create your own file by using the format described in *Section 3.4.5.1*. The names need to be in the same order as the input data.

The program then asks for the output file name and asks if you want to specify the period of record to be used (19 years, maximum) or to use the dates from the input data file (only the last 19 years will be counted). If specifying the period of record, you are then asked for the beginning year and the ending year.

At this point, the interactive portion of the qwdetlims program is finished. This program may run for a long time depending on the number of parameters that are to be processed and the number of records.

The output table is headed by the name of the parameter from the parameter-list file, the corresponding parameter code, and the total of the nonmissing values encountered for that parameter. The table consists of a column of detection limits encountered (a data value with a remark code of "<" or "U"), columns of counts of detection limits encountered for each selected year (up to a maximum of 19 years), a summary column (the total of the counts for that detection limit), and a final column giving the percent of the total, nonmissing values represented by that detection limit. The rows are in the order of detection limits as they are encountered in the input data.

The input data file is considered as a whole. By selecting appropriate record numbers to be used by qwflatout, qwdetlims can be used to show detection limits encountered for a single station, a single county, a specific project, a single year, or any period of years up to 19. If the output from qwflatout had 50 years of data, it could be processed by qwdetlims in three runs.

One use of the detection limits table is for locating probable order-of-magnitude data errors. For example, if a parameter has a detection limit of <0.5 for a period of years and a single (or few) detection limit(s) of <50, the single-data value probably should be reviewed. Another use is for evaluating the data before or as they are used in statistical analyses.

3.6 Support Files

Options in the Support Files Menu include access to files that a user may need to reference while using QWDATA.

```
          QWDATA PROCESSING ROUTINE   REV NWIS-4_2_0-20020726

 YOU ARE USING WATER-QUALITY DATABASE NUMBER 01

        Support Files

 1 -- List Site Records
 2 -- Check Parameter Code Dictionary
 3 -- List Parameter Code Dictionary
 4 -- Check Geologic Unit Code File
 5 -- Check Federal Information Processing Standards (FIPS) Code
 6 -- List State/County Data
 7 -- Dump Parameter Code Dictionary (optionally with Precision Codes)
 8 -- Display Contents of Algorithm File
 9 -- Display Contents of Parm Method Table

 98 -- Exit menu

 99 -- Exit system

Please enter a number from the above list or a Unix command:
```

Support Files Menu Options

3.6.1 Option 1 -- List Site Records

Option 1, List site records, produces a list of the contents of the site information for selected sites from the Site File. If the output is selected to go to a file, the program asks for the output file name; if you do not enter a file name, the output will be put into a file named SITE_FILE. The output can also be directed to the screen. You are then asked if station numbers will be entered from the terminal. A maximum of 400 station numbers are accepted; if more than 400 are submitted, only the first 400 will be used. If the station numbers are entered from the terminal, a blank line is displayed. Enter the five-character code (a blank space will follow if a four-character agency code is entered) and the station number. Depending on the agency code and length of station ID, the input would look like the following example:

USGS 01123456
USEPA01123457
USGS 390000110300001

If ***NO***, you are prompted for the name of a file that contains a list of station numbers. The input file should be in the following format:

Agency code -- 5 characters (left-justified)
Station number -- 15 characters (left-justified)

The output file includes carriage-control characters, and should be spooled with the "asa" U command. Example output is included in *Appendix C*.

3.6.2 Option 2 -- Check Parameter Code Dictionary

Option 2, check parameter code dictionary, retrieves records from the parameter code dictionary and displays the parameter code and descriptive name on the screen. *Parameter codes (section 2.1.3)* are 5-digit numbers used to identify water-quality constituents and properties. Two types of retrievals are available: by parameter name or by parameter code.

After starting the ***qwckpcd*** routine, the user must decide if the records will be retrieved by parameter name or parameter code from the following menu:

```
Parameter Name and Code Retrieval Routine:

Options for Retrieving Parameter Name or Code:

    1 – Retrieve/Select a Parameter by Code
    2 – Retrieve/Select a Parameter by Name

    0 – Quit

What do you want to do (0-2)?
```

Screen to check the parameter code dictionary

If option 1 is selected, one parameter is retrieved when a valid parameter code is entered. If option 2 is selected, a list of parameters that contain the name entered is displayed on the screen. To exit this program, enter a 0, and you will return to the Support Files menu.

3.6.3 Option 3 -- List Parameter Code Dictionary

Option 3, list parameter code dictionary, retrieves and lists the entire parameter code dictionary and is somewhat time consuming, depending on system activity. When the dictionary has been read, it can be sorted by combinations of parameter code, long name, table order number, and short name. Again, the sort requires some time to run because of the size of the dictionary. After the sort finishes, you have the option to eliminate the long name from the output (to save paper and/or viewing and printing time). Once again, time to create the output is lengthy. The output file is ***qwpcdlist*** and a warning message about its length is included in the program-ending message. Example output is included in

Appendix C. If you would like to retrieve the Parameter Code Dictionary with precision codes, see *option 7* below.

3.6.4 Option 4 -- Check Geologic Unit Code File

Option 4, check geologic unit code file, retrieves geologic unit codes and formation names and displays them at the terminal. The program asks for a geologic unit code and retrieves the associated name.

You can either provide the entire geologic unit code (for example, 111ALVM) and, if that code exists, get back the formation name (Holocene alluvium), or a partial geologic unit code (from one to eight characters). An entry of the partial geologic unit code (12) results in retrieval (by partial key search) of all geologic unit codes and associated formation names between 120xxxxx and 129xxxxx. A blank geologic unit code terminates the program. The file of valid geologic unit codes is located at: */usr/opt/nwis/support/aageol.states.all.*

3.6.5 Option 5 -- Check Federal Information Processing Standards (FIPS) Code File

Option 5, check FIPS code file, is used to browse the FIPS Code File and retrieve a State code given a State name, a State name given a State code, a county code given a State-county name, and a county name given a State-county code. The following options are displayed on the screen:

FIPS CHECK OPTIONS :

1 -- Exit the program,
2 -- Get a State code,
3 -- Get a State name,
4 -- Get a county code, or
5 -- Get a county name.

Please enter 1, 2, 3, 4, or 5.

Screen to Browse FIPS Code File

After the user makes a choice from the menu, the program requires the user to enter the required information from the terminal. All responses from the program are to the screen only.

3.6.6 Option 6 -- List State/County Data

Option 6, list state/county data, interacts with the FIPS file, and is used to retrieve a tabular list of State names, State abbreviations, State codes, minimum and maximum latitudes, minimum and maximum longitudes, and minimum and maximum altitudes.You

may also retrieve county names, county codes, minimum and maximum latitudes, minimum and maximum longitudes for a single State, and both of the previous lists of data for all counties for all States (this is long and time-consuming). The output can be to the terminal or to a file. Example output is included in *Appendix C*.

3.6.7 Option 7 -- Dump Parameter Code Dictionary (optionally with Precision Codes)

Option 7, dump parameter code dictionary, retrieves and lists (dumps) selected columns of the entire parameter code dictionary. Within the QWDATA software, the term 'precision code' is analogous to 'rounding code'. There are two output options, the long name or the short name. The long name output includes the parameter code, the short name, and the full long name (up to 170 characters). The short name output includes the parameter code, the short name, the table order, the first 40 characters of the long name, the units, and the rounding array.

When the program is initiated, the user must decide to include the long-name or the short-name output. This program takes a few minutes to execute and creates an output file called ***pcddump***. This file is 300 to 400 UNIX records, depending on the option selected. An example of the short name output is in *Appendix C.*

The following query will appear to determine whether you would like the long or short version of the dump:

> **You have two output options long name or short name. The long name option returns parameter code, short name, and full long name (up to 170 characters).**
>
> **The short name option returns parameter code, short name, table order, first 40 characters of the long name, units, and precision code.**
>
> **Do you want the full long name output (Y/N,<CR>=Y)**

For each parameter code in the parameter code dictionary, a rounding array is stored for a range of expected values. **This rounding array is not used by the QWDATA software** unless an entry for a specific parameter-method code combination is missing from the parameter-method table. Information about the parameter-method table is available in *Sections 3.6.9* and *2.5.6*. The parameter code dictionary contains one ten-element integer array (PROUND) that contains the default rounding codes for a parameter. The magnitude of the greatest significant figure in a result determines which PROUND element (1-9) is used to round the result. The tenth element of the array (MAXDEC) indicates the maximum number of decimal places that may be used to display a value for the parameter. The other nine elements of the PROUND array have definitions as shown below:

An example of precision code output for parameter code 00010, water temperature, is 0012333331:

For values in the range	Display number of significant digits
<0.01	0 (values this small not expected)
>=0.01 - <0.1	0 (values this small not expected)
>=0.1 - <1.0	1
>=1.0 - <10.0	2
>=10.0 - <100.0	3
>=100.0 - <1000.0	3
>=1000.0 - <10000.0	3
>=10000.0 - <100000.0	3
>=100000.000	3
Max Decimal Places	1

For more information on rounding codes, see *section 2.7.1 - Rounding*. Rounding codes for 10-16 are represented by the symbols ':', ';', '<', '=', '>', '?', and '@'.

3.6.8 Option 8 -- Display Contents of Algorithm File

Option 8, Display Contents of Algorithm file, retrieves and lists the algorithms for calculated parameters. Additional information about the algorithms is included in *Appendix D*. There are two output options, the algebraic equation form or a report that lists the steps used to perform the calculation. This calculation includes preferences when more than one parameter code can be used in the calculation (for example: 00902--noncarbonate hardness uses either 00916 Calcium Total Recoverable mg/L as Ca or 00918, Calcium, Total Recoverable mg/L, preferring 00916). Limitations on the calculations include the exclusion of results that have an accompanying remark code; this may result in no calculated value appearing in output. The algebraic equation output prompts you for a specific algorithm or all of the algorithms to be converted.

```
Algorithm display/report program
You have 2 options for reporting from the algorithm file:

 1 Display algorithm in equation form
2 Create report listing operations

Enter option desired: 1
        DO YOU WISH TO WRITE RESULTS TO A FILE (YES OR NO)? n
 WHAT ALGORITHM DO YOU WISH TO SEE (A FOR ALL)? 00902

PARAMETER 00902 CONVERTED ALGORITHM
(((((((00916.!00918.)*0.0499)+((00927.!00921.)*0.08229))+(((01082.!01084.)*0.00002283)!0.0))+
((01007.!01009)*0.00001456)!0.0))-((((00450.!(00440.!99440.))*0.01639)+
0(((00447.0!(00445.!99445.))*0.03333)!0.0002))!((00419.!(00410.!(29813.!(99430.!00431.))))/50.05)
))* 50.05)
```

Screen displaying contents of algorithm file

Following is an example of the report that lists the steps used to perform the calculation:

```
Algorithm display/report program
You have 2 options for reporting from the algorithm file--
1 Display algorithm in equation form
2 Create report listing operations
Enter option desired: 2
Algorithm Report
Enter start algorithm (<CR>=first available): 00607
Enter end algorithm (<CR>=last available: 00607
Enter name for report file (<CR>=algfile.listing):
```

Below is the output included in algfile.listing:

```
00607 T 1 0.000000000 2 [#] Constant
2 623.000000000 11 [P] Quit if parameter absent
3 608.000000000 11 [P] Quit if parameter absent
4 0.000000000 4 [-] Subtraction of right from left
5 0. 15 [V] Set to missing if right < left
```

Note : In the example above, if "Type" is coded with a T and all the required parameters are present, the parameter is calculated on output when you request CALCV. If "Type" is left* blank, *it is* not *calculated on output when you request CALCV, even if all the required parameters are present (for example: 90851, Trihalomethane, Water, Unfiltered, Calculated Total mg/L).

3.6.9 Option 9 -- Display Contents of Parm Method Table

Option 9, Display Contents of Parm Method Table, lists contents of the parameter-method reference table used for rounding of results when default rounding is selected. The contents of this reference table are parameter code, method code, parameter name, and rounding array. A description of the rounding array is included in *section 3.6.7*. The output can include all parameter-method pairs in the output or you can select specific parameters and methods. Sample output can be found in *Appendix C*. When this option is selected, the following menu is displayed:

```
      1: Dump all parm method pairs displaying long names
      2: Dump all parm method pairs displaying short names
      3: Dump selected parm method pairs displaying long names
      4: Dump selected parm method pairs displaying short names

  Please enter (1,2,3,4,<CR> to quit):
```

When option 1 or 2 is selected, the user is able to direct the output to the screen or to a file that is named by the user. If option 3 or 4 is selected, the selected parameters can be entered interactively or using an input file. The format of the input file is described in *Appendix G.* Below are the queries when the parameter-method combinations are entered interactively for option 3 or 4:

```
Do you want to enter parm method pairs from the terminal? (y,n, CR>=y): y
Enter parameter code-method code combinations (<CR> to quit):

(Method code entry is optional.  If method code is not included,
all method codes will be retrieved for that parameter.
To retrieve a range of parameter codes,enter the following:
PCODE [METHOD] - PCODE [METHOD] on one line below)

 1: 00025 _
 2: 00095 – 00400

Do you want the output to go to the terminal? (y,n, <CR>=y):
```

When selected parameters are entered either with a file or interactively, the following tips might be helpful:

1) If the method code is not included, all method codes for the valid parameter code are included in the output.
2) Between the parameter and method code, there must be space. If no space is included, an error message will appear that the input data are not in a valid format.
3) If a range of parameters is entered, they should be entered in the following format (with or without a method code):

00025 A - 01020

3.7 Option 7 -- Utilities

The Utilities menu is used to complete several tasks that are not generally part of the common uses of QWDATA.

```
                QWDATA PROCESSING ROUTINE   REV NWIS_4_0+20010525

 YOU ARE USING WATER-QUALITY DATABASE NUMBER 01

       Utilities

 1 -- Change Database Number
 2 -- Add new site or modify site information
 3 -- Station Change: Inventory, Change, or Delete
 4 -- Count Water Quality Records
 5 -- Set District Processing Status Flag
 6 -- Set Data Quality Indicator (DQI) Code
 7 -- Inventory DQI Codes
 8 -- Produce Drinking-Water Alert Limit Table

98 -- Exit menu

99 -- Exit system

Please enter a number from the above list or a Unix command:
```

Utilities Menu Options

3.7.1 Option 1 – Change Database Number

The details of this option are described in the *GWSI Database Administrator's Manual – Chapter 11.*

3.7.2 Option 2 -- Add New Site or Modify Site Information

Option 2 is used to add a new site to the GWSI database or to modify the site header information for an existing site. When option 2 is selected, the user is prompted by software described at:

http://wwwnwis.er.usgs.gov/nwisdocs4_3/gw/GW.user.book.html

Any information entered by the user is entered into the GWSI database. The output from this entry is described at:

http://wwwnwis.er.usgs.gov/nwisdocs4_3/gw/GW.user.book.html

3.7.3 Option 3 -- Station Change: Inventory, Change, or Delete

The Station Change program (stnchange) was written and is maintained by the GWSI work group. Instructions for using this program are located at the following URL:

http://wwwnwis.er.usgs.gov/nwisdocs4_3/gw/gwinvt_Sect12.pdf

The Station Change program allows a user with proper access to inventory, delete, or change a station number. The station number is the primary key used to identify locations approved for WRD data collection. An entry in the Sitefile is required for data stored in the NWIS databases. Updates that affect a station number are to be applied not only to the Sitefile, but also to associated databases (QWDATA, GWSI, ADAPS, and/or SWUDS) where data for the site exist. If program stnchange is used to delete a station number in the Sitefile, the NWIS databases are searched and data located in the NWIS that are identified as collected at that site will be deleted. The delete transaction in the NWIS is an immediate, physical delete. The only way to recover deleted records is by reentering them. An update to a station number is also performed in the Sitefile and the associated databases. Because the updates performed by stnchange have the possibility of affecting data in the NWIS and the national databases, this function should be closely coordinated and monitored within your District.

3.7.4 Option 4 -- Count Water Quality Records

Option 4 is used to count the number of records in the Water-Quality File for selected stations and optionally displays a list of the parameters present in all the analyses. When option 4 is selected, the following prompts are displayed:

```
THIS PROGRAM LISTS THE COUNT OF QWDATA RECORDS FOR A STATION

 DO YOU WANT A LIST OF PARAMETERS (USING ADDPC) ?

 DO YOU WANT TO ENTER SITE ID'S FROM THE TERMINAL (YES OR NO) ?

 DO YOU WANT THE OUTPUT

 TO YOUR TERMINAL(T) OR TO A FILE(F)?

PLEASE ENTER   T -- FOR TERMINAL
               OR   F -- FOR FILE.
```

Program to count water quality records

A list of parameters can be included in the output if desired. If the station numbers are entered from the terminal, the agency code and station number must be entered for each

site of interest. If the station numbers are entered from a file, the file format needed is described in *Appendix G.* If the output is directed to a file, a filename must be provided.

3.7.5 Option 5 -- Set District Processing Status Flag

Option 5 is used by the person(s) responsible for water-quality data management to set District Processing Status for samples. Valid district processing status codes are shown in *Appendix A; table 9*. When selecting option 5, the following submenu is displayed:

```
THIS PROGRAM SETS THE RECORD STATUS FLAG

  DO YOU WANT TO FLAG RECORDS AS:

     1 -- (R)  READY TO TRANSMIT
     2 -- (Z)  COMPLETE, BUT DO NOT TRANSMIT
     3 -- (N)  NEW RECORD
     4 -- (F)  FIELD DATA
     5 -- (L)  LABORATORY DATA
     6 -- (P)  PENDING APPROVAL

 PLEASE ENTER 1-6 :
```

Program to set district processing status flag

Upon data input, the flag is automatically set to `***R***' to indicate that the sample is ready to transmit. Analyses of local interest may have the flag set to `***Z***' to indicate that the sample is complete, but not to be transmitted. After a selection is made from the submenu above, the program requires entry of record numbers either from the terminal or a file. The records can be identified by record number, or by station number, date, time, medium code, and agency code. If a file is used, the format should be the same as shown in *Appendix G*. If the selected record has the flag set to `***Z***' and a request is made to change the flag, the following message is displayed giving you the option of changing the flag or not:

Record 97905711 is currently flagged "local file only (Z)"
Do you want to set it to "transmit" (R) (Yes or No)?

Currently (2001), one program is being used to retrieve samples for a national aggregation of USGS water-quality data (NWISWeb). This program sets the flag to `***T***' to indicate that the sample has been selected. Information about the use of this flag for the national aggregation of water-quality data is available at:

http://wwwnwis.er.usgs.gov/special/nwisweb_refresh.htm

3.7.6 Option 6 -- Set Data Quality Indicator (DQI) Code

Option 6 is used by the person(s) responsible for water-quality data management to set the DQI code. Valid DQI codes are listed in *Appendix A; table 14*. The DQI code of S is the default setting. When option 6 is selected the following submenu is displayed:

```
This program will set the DQI code for a given set of:
  station selection
  date selection
  measurement selection
  DQI remapping scenarios

Do you want to enter station numbers at the terminal (Y/N,<CR>=Y)?
```

Program for water-quality data management to set the DQI code

Station numbers can be entered on the screen or from a file. After all the desired station numbers have been entered, the user is queried for a range of dates. The date prompts are:

```
Enter begin sample date/time (time is optional): (yyyymmddhhmm) 20000101
Enter end sample date/time (time is optional): (yyyymmddhhmm) 200101011200
```

Time is **optional** when providing the date range; if no time is entered, the software will include all results for the dates entered. After the sample date range is entered, a measurement selection is entered from the following list:

```
qwdqiflag -- enter measurement selection

You have 3 options:
  1 -- accept all parameters and method codes
  2 -- enter parameters, optionally with method at terminal
  3 -- load parameters, optionally with method from a file

Enter option desired (1-3,<CR>=1):
```

Program to enter measurement selection

If **option 1--accept all parameters and method codes--** is selected as the measurement method, the user enters a selection from the eight options listed above. After the selection is entered, the user must enter a file name for the report that contains the listing of the DQI remappings that will occur. In addition to this output file, a short report of the changes to be made to DQI codes is printed to the terminal. Before any changes are made to any DQI codes, the user must verify that the changes listed in the output file. A user should review the report that describes the changes to be made before verifying the remappings.

If **option 2--enter parameters**, **optionally with method codes--** is selected as the measurement method, the program queries for individual parameter codes and associated method codes. The entry of a specific method code is optional. If no method code is entered, all method codes will be included for that parameter. After the parameter and method codes have been entered, a selection from the eight options listed above is required. The report that contains the listing of the DQI remappings and updating of DQI codes is the same as described for option 1.

If **option 3--load parameters, optionally with method from a file--** is selected from the menu above, the program queries for an input file that uses a format described in *Appendix G*. After the file name is entered, a selection from the eight options listed above is required. The report that contains the listing of the DQI remappings and updating of DQI codes is the same as described for option 1.

For each of these three options, eight options for DQI remapping scenarios are available as displayed on the following screen:

```
qwdqiflag -- select from DQI remap scenarios

You have 8 options:
 1 -- Typical records approval:              OLD=[A/S]    => NEW=R
 2 -- In-review records approval:            OLD=I        => NEW=R
 3 -- In-review records rejection:           OLD=I        => NEW=Q
 4 -- Proprietary record identification:     OLD=[A,S]    => NEW=P
 5 -- Proprietary record approval:           OLD=P        => NEW=O
 6 -- Proprietary record rejection:          OLD=P        => NEW=X
 7 -- Systematic rejection:                  OLD=[A,R,S] => NEW=Q
 8 -- User-specified:                        OLD set      => NEW x

Enter option (1-8, <CR>=1):
```

DQI remapping scenarios

A report containing the selections for changing the DQI codes is prepared for the user to review prior to applying the changes. An example of this report is included in *Appendix C*. It is recommended that the user review this report before applying the changes to the DQI values. The report can be reviewed by printing the file or viewing it in a separate window.

```
qwdqiflag specifications are complete.

A report will be generated listing the remappings that will occur.
You will be given an opportunity to review that report before the changes are made.

Enter name of file to hold report --
: dqi_report

The QWDATA tables have been scanned.
Number of DQI codes to be changed:    341
         Number of QWDATA records:     50

A detailed report of DQI changes is available in the file--
dqi_report

Do you want the file spooled (Y/N,<CR>=N)?

NOTE!  Please review the report before responding to the next query...

Do you want to update (Y) or cancel (N) (Y/N,<CR>=N)?
```

3.7.7 Option 7 -- Inventory DQI Codes

Option 7 is used by the person(s) responsible for water-quality data management to check or inventory DQI codes. Valid DQI codes are included in *Appendix A; table 14*. When this option is selected, the user is asked if the output is to be to the terminal or to a file. The program checks each database, counts the number of DQI codes, and writes the output to either the terminal or a file. The program provides specific occurrences for DQI codes of ***I*** (awaiting review) and ***Q*** (reviewed and rejected). These two codes are displayed with the count, parameter code and name, and the begin and end dates. The output should look like this:

```
DQI Distribution for QWDATA Database: 01

 ------------
 DQI    Count
-------------

 A   1801599
 S      302
 I        7
 Q        8
 X        1

------------------------------------------------------------
```

```
Distribution for DQI code: I
-------------------------------------------------------------
   Count  Parameter                  Begin      End
-------------------------------------------------------------

       1  (00452) CARBONATE,DIS,IT,F    1999-12-25  1999-12-25
       1  (00453) BICARBONATE,DIS,IT,F  1999-12-25  1999-12-25
       1  (00925) MAGNESIUM DISSOLVED   1956-11-05  1956-11-05
       1  (31625) COLIFORM FECAL 0.7    1999-12-25  1999-12-25
       1  (31673) FECAL STRPT KF AGAR   1999-12-25  1999-12-25
       1  (39086) ALKALINITY,DIS,IT,F   1999-12-25  1999-12-25
       1  (84164) SAMPLER TYPE CODE     1999-12-25  1999-12-25

-------------------------------------------------------------
Distribution for DQI code: Q
-------------------------------------------------------------
   Count  Parameter                  Begin      End
-------------------------------------------------------------

       1  (00400) PH, WH, FIELD         1956-11-05  1956-11-05
       7  (31673) FECAL STRPT KF AGAR   1990-07-18  1998-05-05
1==============================================================================
DQI Distribution for QWDATA Database: 02

 -----------
DQI    Count
-------------

 A     42125
1==============================================================================
DQI Distribution for QWDATA Database: 10

 -----------
DQI    Count
-------------

 A    887096
1==============================================================================
DQI Distribution for QWDATA Database: 11

 -----------
DQI    Count
-------------

 A     28703
1==============================================================================
```

```
DQI Distribution for QWDATA Database: 50

------------
DQI    Count
------------

 A    199056
1================================================================================
DQI Distribution for QW Database: 51

------------
DQI    Count
------------

 A       61
1================================================================================
DQI Distribution for QWDATA Database: 54

------------
DQI    Count
------------

 A     2868
 S        3

Processing complete.
```

3.7.8 Option 8 -- Produce Drinking-Water Alert Limit Table

Option 8 is used to generate a table of constituents that exceed the USEPA Drinking Water Maximum Contaminant Levels and secondary maximum contaminant levels (*Appendix E*). As input, the program uses a Watlist report created during batch processing of samples (*see section 3.8*). An output file is created with a name selected by the user. If no constituents exceed the maximum levels, the following message is displayed: No ALERTS found in the file: <Watlist filename>. An example of output from the qwalert program is shown below:

```
STATION NAME= SAND COULEE AT SAND COULEE MT
DATE= 10-10-1995 16:50
SITE ID= 06078270                  RECORD NUMBER= 99600004
HYD. CONDITION=  Stable, Normal stage   HYD. EVENT=  Routine sample
MEDIUM=  Surface water
**********

  PARAMETER 01025   VALUE        17  EXCEEDS DW ALERT LIMIT OF      10.000
[ CADMIUM DISSOLVED (UG/L AS CD)                ]
********************

1


STATION NAME= MINE DRAIN TO SAND COULEE NEAR SAND COULEE MT
DATE= 10-11-1995 16:15
SITE ID= 472313111104901              RECORD NUMBER= 99600016
HYD. CONDITION=  Stable, Normal stage   HYD. EVENT=  Routine sample
MEDIUM=  Surface water
**********

  PARAMETER 01030   VALUE        87  EXCEEDS DW ALERT LIMIT OF      50.000
[ CHROMIUM DISSOLVED (UG/L AS CR)               ]

  PARAMETER 01090   VALUE     11000  EXCEEDS DW ALERT LIMIT OF    5000.000
[ ZINC DISSOLVED (UG/L AS ZN)                   ]
********************

1
```

3.8 Option 8 -- Batch Processing

```
YOU ARE USING WATER-QUALITY DATABASE NUMBER 01

      Batch Processing

 1 -- Retrieve National Water-Quality Laboratory Data
 2 -- Process Batch File for All Logged In Samples
 3 -- Process Batch File for All Samples
 4 -- Process Batch File for All Logged In QA Samples
 5 -- Process Batch File for All QA Samples
 6 -- Produce Batch Output
 7 -- Review/Edit Batch files
 8 -- Produce 1- and *-Card Output
 9 -- Reload QW data from batch file, overriding DQI
 10 -- Reload QA data from batch file, overriding DQI

 98 -- Exit menu

 99 -- Exit system

Please enter a number from the above list or a Unix command:
```

Batch Processing Menu

The options in this menu work with batch files of water-quality data. Batch files are used for many purposes such as entering data from laboratories, making large-scale changes to the water-quality data, or output of entire records by specifying only the record information. The most common application is entering data from laboratories.

Batch File Format

The NWIS software accepts two batch file formats:

(1) A fixed-format of '1' and '*' records (also referred to as 'cards'). All information is in a file named either ***qwcards*** or ***qacards***. The 1-card contains all the *sample level information* including station ID, date, time, and medium code. The *-cards follow the 1-card and contain the *result level information* including parameter codes, parameter values, and value remark codes. This format was the batch format designed for versions of NWIS prior to NWIS 4_1. Although the format is still accepted by the software, it does not contain any of the sample and result information added in release 4_1 or later. The format of the 1- and *-cards for this type of batch file is defined in *Appendix F*.

(2) A tab-delimited format uses a pair of files (***qwsample*** and ***qwresult*** or ***qasample*** and ***qaresult***) to hold all the sample and result information. This batch file pair will contain all sample and result level information currently stored in the water-quality database. The related data in the file pair is connected by a 'sample integer' generated when the two files are created. Although the sample integer does not have any meaning beyond the

batch file pair, it is critical to keeping the sample and result information properly connected. The sample and result file formats are defined in *Appendix F*.

The batch input programs look for the batch files in the directory where the program is initiated. Both the 1- and *-card and tab-delimited batch file formats are accepted by the batch input programs in ***Options 1-5, 9, and 10*** of the Batch Processing Menu, and both will be processed if present in the working directory simultaneously. The 1- and *-card files will be processed first.

Environmental and QC Data

Environmental and quality-control data are entered with the batch entry programs available in this menu. A process is initiated to separate the environmental data from the QC data (***qa_sep***) so that slightly different protocols can be applied to the entry of each and the data can be written to separate databases, if they exist. Samples with a medium code of Q-Z are written to the file ***qacards*** or the file pair ***qasample/qaresult***, depending on the format of the input file(s). (If those filenames exist, the existing filenames are changed to include an extension of '***.old.yymmdd.hhmm***') Environmental samples are entered into the default environmental database and *QA* samples are entered into the default quality-assurance database. The only difference in the data entered in each database, is that the District Processing Status code (DSTAT) is set to 'Local Only' for the QC data. The separate processes produce separate output files with different filenames (a '.qa' is added to the filenames) to distinguish the environmental output files from the QC output files.

The association of environmental and quality assurance water-quality databases and related data entry behavior can be a little complicated. The program used, the database the user is 'pointing to', the type of data contained in the batch files (environmental, QC, or a combination), and the existence or non-existence of the environmental database and an associated QC database all affect the actions taken by the software. The typical conditions and expected actions are described for each program. Although the programs will accept other conditions, the actions may be both unexpected and less than desirable.

Data Entry Behavior

The behavior of the batch input processes for the tab-delimited files with respect to overwriting existing data, treatment of nulls, and the use of default values can be found in the format table in *Appendix F*.

Most of the entries allowed in the batch file fields are self explanatory or defined in the domain lists for the coded fields. There are some 'tricks' that might be useful:

1- and *-card files:

1. To delete a result value, enter a ‘,’(comma) after the ‘=’ sign in the *-card. It would look like this to delete the result value for parameter 00095: *00095=,
2. Set a remark code to ‘X’ to delete a result and all of the associated attributes.
3. A #-card can be inserted after the 1-card to add project codes to the input. The ‘#” should be in the first column, and the project code should be in columns 2-10.
4. To delete an entire sample, enter ‘DELETE’ for GUNIT.
5. To enter a null value with a remark code, enter a ‘#’ in the value field and a valid null-value remark code in the remark field.

Tab-delimited files:

1. Set a remark code to ‘X’ to delete a result and all of the associated attributes.
2. To delete a value qualifier code, set the value qualifier code to ‘#(code to be deleted)’. For example, to delete a value qualifier code of ‘a’, the value qualifier code should be ‘#a’ in the batch file.
3. If a time datum is included in a batch file, the time datum will be updated in the database, but the UTC sample time will not be changed. The result may not be desired, so consider carefully before including a time datum in a batch file. If you want to change the stored time, consider changing the time using *Modify Sample or Results (section 3.2)* or a separate program *qwtimeshift (section 3.9.4)*.
4. Batch files may be prepared using computer systems running Microsoft (TM) operating systems. Often such files need additional processing to be interpreted properly on a computer running the Unix operating system (such as your NWIS system). You can test one of these files using the following Unix command to determine if additional processing is needed (replace *filename* with the name of the file you want to test).

   ```
   perl -ne 'if (/\r\n$/) {print "MS-DOS file\n";exit;}' < filename
   ```

   You may safely ignore messages regarding “keyboard type.” All the files in the current directory can be rewritten with their Unix-format equivalents, using the following Unix command:

   ```
   ksh -c 'for x in * ; do dos2unix $x $x ; done'
   ```

   Explanation: MS-DOS text files are formatted with lines that end with a carriage return, followed by a linefeed. Unix text files are formatted with lines that end with a linefeed only. Data-processing programs in Unix interpret the carriage return (a non-printing control character) as data, which often causes confusing errors. In some instances, the QWDATA batch processing software might print error messages regarding apparently valid codes as being invalid when MS-DOS formatted batch files are supplied. The “dos2unix” command removes the unwanted carriage return.

   If the batch files are obtained using “ftp,” then the files should be transferred using “type ascii.” Use of this option will cause the ftp operation to perform the conversion from MS-DOS format to Unix format.

Record of Actions Taken (WATLIST)

A record of the actions taken when a batch file is processed with a batch file program is written to the files named *watlist.yymmdd.hhmm* and *watlist.qa.yymmdd.hhmm*. The records created or modified, the cation/anion balance (if it can be computed), and any error information generated for samples and results are recorded in these files. Samples that are not processed are shown in this file and are differentiated from processed samples by a blank record number field and an error message stating why the sample wasn't processed. . The WATLIST is automatically sorted by project code. A sample WATLIST output can be found in *Appendix C*.

The parameter codes for the parameters listed in the WATLIST output are preceded by a one-letter code that informs the user if any changes were made to the stored result for that value. The column header for this code is '*' in the WATLIST output.

Code	Definition
N	New parameter
U	Updated parameter
C	Calculated parameter

In the error section, messages for those results that are greater than defined limits (*see appendix E)* will appear. As of NWIS 4.3, a result with any remark code other than a less-than symbol (<) will be compared to the list of defined limits. If the result is greater than the defined limit, an error message will appear.

Rejected Samples and Results

Samples will not be processed for the following reasons: (a) invalid formats, (b) invalid site ID's, dates, times, or medium codes, (c) results for samples that do not already exist in the water-quality file (except menu options 3 and 4), and (d) samples that contain results that are overwrite protected with a DQI value (except menu options 9 and 10). All results are rejected for a sample if a rejection error is found for one or more results. After the necessary steps are taken to correct any problems, the corrected samples can be entered by renaming the files to an appropriate batch filename and initiating one of the batch input programs.

Rejected samples from 1-and *-card files:

The files, ***badqw.yymmdd.hhmm*** and/or ***badqa.yymmdd.hhmm*** are created when samples are rejected from a ***qwcards*** batch file.

An E-card is inserted in the ***badqw*** files to describe an error after the card causing the error. The E-card is treated as a comment and ignored by the input programs.

Rejected samples from tab-delimited files:

The files, ***rejected.sample.yyyymmdd.hhmmss*** and ***rejected.result.yyyymmdd.hhmmss*** and/or ***rejected.sample.qa.yyyymmdd.hhmmss*** and ***rejected.result.qa.yyyymmdd.hhmmss*** are created when samples are rejected from a ***qwsample/qwresult*** batch file pair.

A '#' followed by a sample integer is used to insert error messages in the rejected sample and result files. The error message is included before the record causing the error. The format of the error messages in the sample file is:

#SINT<tab>error message

The format of the error messages in the result file is:

#SINT<tab>parameter code<tab>error message

These error messages are treated as comments and ignored by the batch input programs. However, the program in Option 7 to review or edit the tab-delimited batch files will show the error messages.

Additional Output from the Batch Programs

A command output file, ***program.como.yymmdd.hhmmss,*** is produced to capture runtime information and errors encountered during the run of the program. This file should be checked to verify successful processing.

3.8.1 Option 1 -- Retrieve National Water-Quality Laboratory Data

The ***qwgetlab_cmd*** program is used by the person(s) responsible for water-quality data management to process data that has been analyzed by the NWQL (National Water-Quality Laboratory). The NWQL sends completed laboratory data to the District server and it is placed in the ***/var/ftp/incoming/.wrd_only/nwis.nwql*** directory.

The NWIS 4_1 tab-delimited formatted files are named:

SAMPLE.uc.111.111.111.11.222.222.222.2.yymmdd.hhmmss.checksum.t.a and
RESULT.uc.111.111.111.11.222.222.222.2.yymmdd.hhmmss.checksum.t.a
Where:
uc = user code
111.111.111.11 = IP address of the machine where the data came from
222.222.222.2 = IP address of the machine where the data is transferred to
yymmdd = date
hhmmss = time
checksum = the checksum value used to make sure no data were lost in the transfer

The NWIS 3_2 card-image formatted files (1 and * cards) are named:

ADATA.uc.111.111.111.11.222.222.222.2.yymmdd.hhmmss.checksum.t.a
Where:
uc = user code

111.111.111.11 = IP address of the machine where the data came from
222.222.222.2 = IP address of the machine where the data is transferred to
yymmdd = date
hhmmss = time
checksum = the checksum value used to make sure no data were lost in the transfer

Generally, the user will not need to know the names of the files being transferred from the ***nwis.nwql*** directory. The ***qwgetlab_cmd*** program is invoked as an interactive process and searches for the lab data in the ***/var/ftp/incoming/.wrd_only/nwis.nwql*** directory. A file named ***qwgetlab.como.yymmdd.hhmmss*** is produced showing the results of the ***qwgetlab_cmd*** program.

If the files ***qwcards, qwsample,*** or ***qwresult*** already exist in the working directory, the names of the existing files are changed to ***qwcards.old.yymmdd.hhmmss,*** ***qwsample.old.yymmdd.hhmmss***, and ***qwresult.old.yymmdd.hhmmss***.

The following messages are displayed on the screen when no lab data are found:

Enter user/district code if required:

qwgetlab initiated: Thu Mar 15 13:47:35 EST 2001

Working in directory: /home/tester/qwgetlab_dir

Searching for any lab data in: /var/ftp/incoming/.wrd_only/nwis.nwql

No lab data found.

Output will be logged to: qwgetlab.como.010315.134733

If laboratory data exist in the ***/var/ftp/incoming/.wrd_only/nwis.nwql***, the files are moved to the working directory where the user was attached when the ***qwgetlab_cmd*** was invoked, and renamed to ***qwcards, qwsample****, or* ***qwresult***, depending on what file formats were found. The following types of messages are displayed on the screen:

Enter user/district code if required:

qwgetlab initiated: Thu Mar 15 18:48:01 EST 2001

Working in directory: /home/tester/qwgetlab_dir

Renaming old copy of qwsample to qwsample.old.010315.184801

Renaming old copy of qwresult to qwresult.old.010315.184801

Searching for any lab data in: /var/ftp/incoming/.wrd_only/nwis.nwql

Checksum OK for: ADATA.08.130.118.109.93.136.177.8.2.20000310.083438.4949.t.a
Moving to qwcards

found lab SAMPLE file: SAMPLE.30.130.118.109.93.136.177.224.5.20000306.140951.t.a
Moving to qwsample

found lab RESULT file: RESULT.30.130.118.109.93.136.177.224.5.20000306.140951.t.a
Moving to qwresult

Found 1 files containing lab ADATA data.
Found 1 files containing lab SAMPLE data.
Found 1 files containing lab RESULT data.

Output will be logged to: qwgetlab.como.010315.184800

If more than one batch file is found in the ***nwis.nwql*** directory, the files of the same format are appended to each other. The total number of files found is displayed to the screen and included in the ***qwgetlab.como*** file.
This program also may be invoked by entering ***qwgetlab_cmd*** from the Unix prompt. There are four arguments that may be supplied to the command:

- **-u** user/district code, if any is required.
- **-w** working directory (generally a directory under ***/usr/opt/nwis/data/auxdata)***
- **-p** processing program (***qw_cardsin*** / ***qw_enter***) if processing is desired
- **-d** database number

Application of the **-u** option allows the user to specify the user/district code, located in the batch filename, so that only those files are retrieved. If no code is specified, all user/district codes will be merged into one set of batch files. Application of the **-w** option will allow output from the ***qwgetlab_cmd*** program and from the processing programs to be written to the directory specified. If no directory is specified, the default is the current working directory. Application of the **-p** option will allow the ***qwgetlab_cmd*** program to move the data to the working directory and then process the data using one of the batch entry programs. Application of the **-d** option allows the user to specify a database number (the default database is 01).

The processing of laboratory-transmitted data can also be set up as an operation that is completed in off-hours. An example of a cron job file is available in /usr/opt/nwis/data/auxdata/qwgetlab_cronjob.master and qwgetlab_crontab.master. To set up this retrieval to run in off-hours (as a cron job), please contact the NWIS help (email: GS-W Help NWIS) for instructions.

3.8.2 Option 2-- Process Batch File for All Logged-In Samples

This option runs ***qw_cardsin***, a program that *updates* sample records with sample and result information from batch files. Thus, an entry for each sample (environmental and QC) must already exist in NWIS.

Generally, the NWQL or other laboratories transfer data to a District and ***qw_cardsin*** is used to enter the data into NWIS. The user will 'point' to the appropriate environmental database number. QC data will be separated and written to an associated QA database.

3.8.3 Option 3-- Process Batch File for All Samples

This option runs ***qw_enter***, a program that *enters or updates* analytical data into NWIS. This program is different from ***qw_cardsin*** in that a record for a sample does not have to be in the database for the data to be successfully processed.

This program may be used to update existing records with USGS laboratory analytical data, create new records, add analytical data from non-USGS sources, and perform limited editing functions. Using ***qw_enter*** to create records is not recommended. Erroneous information entered in key identification fields (site ID, date, time, and medium code) can create unintended records instead of updating the intended records. These erroneous records are sometimes difficult to detect and are time-consuming to repair.

To appropriately use ***qw_enter***, the user will 'point' to the appropriate environmental database number. QC data will be separated and written to an associated QA database.

3.8.4 Option 4 -- Process Batch File for all Logged in QA Samples

This option runs ***qa_cardsin***, a program that *updates* QA sample records with sample and result information from batch files. Thus, an entry for each sample must already exist in NWIS.

This program is identical to ***qw_cardsin***, but is tailored to process a batch file containing only QC data. The user should 'point' to the appropriate QC database. The program to separate the environmental data and the QC data (***qa_sep***) is run, so all data in the batch file is written to the QC database and flagged as 'local only' with the District.

3.8.5 Option 5 -- Process Batch File for All QA Samples

This option runs ***qa_enter***, a program that *enters and updates* QA sample records with sample and result information from batch files. A record for a sample does not have to be in the database for the data to be successfully processed.

This program is identical to ***qw_enter***, but is tailored to process a batch file containing only QC data. The user should 'point' to the appropriate QC database. The program to separate the environmental data and the QC data (***qa_sep***) is run, so all data in the batch file is written to the QC database and flagged as 'local only' with the District.

3.8.6 Option 6 -- Produce Batch Output

This option is used to produce ***qwsample*** and ***qwresult*** files from the database. The format of these files is described in *Appendix F*. The program will use record numbers or agency code, station ID, date, time and medium code to generate the output file. This information can be entered from the terminal or from an existing file. The format of the

optional input files is described in *Appendix G*. The output files can be specifically named or defaulted to ***qwsample*** and ***qwresult.***

3.8.7 Option 7 -- Review / Edit Batch Files

This option is used to review or edit the ***qwsample*** and ***qwresult*** batch input files. These files are paired and both are necessary for the review/edit of the input files. When this option is selected, the following submenu is displayed:

```
QWDATA PROCESSING ROUTINE REV NWIS_4_0+20010328

YOU ARE USING WATER-QUALITY DATABASE NUMBER 01

Review/Edit Batch files

1 -- Review tab-delimited batch input files
2 -- Edit tab-delimited batch input files

98 -- Exit menu

99 -- Exit system

Please enter a number from the above list or a Unix command:
```

Option 1, to review the batch files, combines the sample and result information and displays it to the screen in increments of the number of lines specified. The user moves through the records with carriage returns, and enters a '**Q**' to quit the review.

Option 2, to edit the batch files, will let the user edit either the sample information or the result information. The choices for editing the sample information are:

```
Transaction number: 1 Sample identifier: 315

You have several options:

1 -- edit this record
2 -- go to next record
3 -- quit and save
4 -- skip to another sample by transaction number
5 -- skip to another sample by sample identifier
Enter option 1-5, <CR> = 1:
```

The choices for editing result information are:

```
Transaction number: 1 Sample identifier: 315

Parameter code:00681

You have several options:
1 -- edit this record
2 -- go to next record
3 -- quit and save
4 -- skip to another sample by transaction number
5 -- skip to another sample by sample identifier
6 -- skip to another parameter in this sample

Enter option 1-6, <CR> = 1:
```

Carriage returns and/or the *cursor control commands* displayed at the bottom of the screen can be used to move through the various fields in both the sample and result screens.

Once the user has completed edits in the batch files, option 3 should be selected to quit and save the edited file. The screen display states the input has ended, shows the name of the edited file, and queries the user if there are other files to edit. A ***Y*** response returns the user to the screen for selecting samples or results to edit. An ***N*** response returns the user to the original submenu for reviewing or editing batch input files.

3.8.8 Option 8 -- Produce 1 - and * Card Output

This option is used to produce ***qwcards*** files from the database. The format of these files is described in *Appendix F*. The program will use record numbers to generate the output file. The format of the input file is described in *Appendix G*.

3.8.9 Reload QWDATA from Batch File, Overriding DQI

This option runs a program that *updates* sample records with sample and result information from batch files and overrides any DQI values (*Appendix A, Table 14*) that would have protected existing values from update. This program is a modification of the ***qw_cardsin*** program, so an entry for each sample (environmental and QC) must already exist in NWIS.

Generally, this program will be used to enter reloaded data from the laboratory or other large-scale changes to the water-quality data. The user will 'point' to the appropriate environmental database number. QC data will be separated and written to an associated QA database. This program can only be used by those with sufficient access rights (e.g. database administrators).

3.8.10 Reload QA Data from Batch File, Overriding DQI

This option runs a program that *updates* QA sample records with sample and result information from batch files and overrides any DQI values (*Appendix A, Table 14*) that would have protected existing values from update. This program is a modification of the qa_cardsin program, so an entry for each sample must already exist in NWIS.

Generally, this program will be used to enter large-scale changes to QC data only. The user will 'point' to the appropriate QA database number. This program can only be used by those with sufficient access rights (e.g. database administrators).

3.9 Miscellaneous Programs

Some programs that can be used with QWDATA are available command line prompts, but are not available from within the QWDATA menus. The three programs discussed in this section can be used to manipulate tab-delimited batch files and to edit precision codes using a batch process.

3.9.1 Program to Concatenate Tab-Delimited Batch Files (qwcat)

A program to concatenate multiple 'qwsample' and qwresult' file pairs into a single file pair can be initiated by typing the following at the command line prompt:

```
qwcat [-q] file1 [ file2 .. fileN ]
```

Where:
"-q" is an optional argument that causes suppression of some of the messages written by the program,

"file1 file2 fileN" is a mandatory list of filenames for NWIS-QWDATA tab-delimited sample files, or a shell-interpreted wildcard string. The list might contain only one filename, which is useful for validating the contents of the batch. The program will determine the filename of each matching NWIS-QWDATA result file by replacing the text "sample" in the sample filename with the text "result".

An example of this command is:

```
qwcat rejected.sample*
```

Where: "rejected.sample*" is a shell-interpreted wild-card string that matches all files in the current directory that begin with the text: "rejected.sample".

Output is written to the current directory in files named "qwsample.cat" and "qwresult.cat". Any existing files of these names are renamed using a current date-time suffix.

The following errors can cause the program to stop:

- No write access to the current directory.
- Inability to rename pre-existing output files: "qwsample" & "qwresult".
- Inability to open files in temporary directory (/tmp or $TMPDIR).
- Invalid optional argument flag.
- No valid qwsample filename specified.

The following errors can cause the program to stop processing the batch files:

- qwsample filename does not contain the text "sample".
- qwsample or qwresult files do not exist in current directory.
- qwsample or qwresult files are not readable by current userid.
- qwsample or qwresult files do not contain text in 1st 10 bytes.
- qwsample records with duplicative sample integers.
- qwresult records with duplicative combination of sample integer + pcode.
- qwresult record with sample integer not present in qwsample file.

The following can cause unexpected and undesirable behavior:

- Duplicative command-line specification of the same qwsample filename (eg. with wildcards) is silently reduced to one inclusion.
- Batch-file pairs may not be processed in the order entered; they are processed in ASCII sort order by qwsample filenames.
- qwsample records are not sorted within each file; they are added in order of the qwsample file.
- qwresult records are processed in the same order as the qwsample records and secondarily sorted using ASCII sort order by parameter code.
- qwsample and qwresult zero-length records are silently ignored.
- If records exist in qwsample or qwresult files without tab delimiters they are counted, but ignored. The count of these records is printed.
- qwsample record with sample integer not matching qwresult records is included. Count of such records printed.
- qwsample and qwresult records with too few tabs are padded (to the right) with empty fields delimited with tabs. Count of such records printed.
- Program does not track orphaned sample/result messages and they are ignored.

3.9.2 Program to Subset Tab-Delimited Batch Files (qwsplit)

A program to subset one or more tab-delimited batch-file pairs using project code and (or) station-identification number can be initiated using the following:

```
qwsplit [-p fileP] [-s fileS] file1 [ file2 .. fileN ]
```

Where: -p fileP specifies an optional filename that provides data on how to split the data by project,

-s fileS specifies an optional filename that provide data on how to split the data by station, and

"file1 file2 .. fileN" is a mandatory list of one or more tab-delimited batch filenames of sample data. The matching result filenames are assumed to be the same, except the filename text: "sample" is altered to "result".

An example of this command is:

```
qwsplit rejected.sample
```

If neither a "-p file" nor an "-s file" is supplied, then the program will use all the project codes found in the qwsample files to subset the data. One pair of subset-data files will be created for each unique project code found in the data. Output files will be named according to the pattern: "qwsample.PROJECT" and "qwresult.PROJECT", where "PROJECT" is a project code found in the data. Data found in the input file(s) without a project code will be automatically associated with the project code "misc"; and thus will be written to files named "qwsample.misc" and "qwresult.misc".

More control over how the data are split can be obtained by using one or both of the optional split-specification files. Project-split specifications may be supplied in a file named after "-p" on the command line, as in:

```
qwsplit -p qwsplit.projects rejected.sample
```

Likewise, station-split specifications may be supplied in a file named after "-s" on the command line. Both the "-p" and "-s" command-line options may be used, however the project-split specifications have precedence over the station-split specifications when both apply to the same sample.

The split-specification files consist of records for which projects or stations belong in separate output files, and how those files should be named. In a project-split file, a project-identification number is specified, followed by one or more blank (or whitespace) characters, followed by a filename component. Additional projects may be specified on subsequent lines in the file. The same project should not be specified more than once in the file, however multiple projects may be assigned to the same filename component. Filename components should not contain blanks (or shell metacharacters, such as "*" or "?").

The following is an example project-split file:

```
404000300   bds
00300       bds
404039000   jim
39000       jim
```

This file would split any "qwsample" records with project code of "404000300" or project code "00300" into a file named "qwsample.bds". New data will be concatenated onto the end of the file, if it already exists. Similarly, "qwresult" records associated with either of these project codes will be concatenated to the end of a file named “qwresult.bds". All sample and result records with a project code not identified in the project-split file are appended to the files named "qwsample.misc" and "qwresult.misc".

The station-split file is prepared in the same manner, except that station-identification numbers are presented where project codes appear in the above example.

The following errors can cause the program to stop:

- No write access to the current directory.
- No filename specified afterwards when "-p" or "-s" on the command line.
- An invalid (unknown) command-line option flag.
- No qwsample filename is given on the command line.
- Station-split or project-split file specified cannot be opened.
- Inability to concatenate data to a temporary qwsample or qwresult file.

The following errors can cause the program to stop processing the batch files:

- qwsample filename does not contain the text "sample".
- qwsample or qwresult files do not exist in current directory.
- qwsample or qwresult files are not readable by current userid.
- qwsample or qwresult files do not contain text in first10 bytes.
- qwsample records with duplicative sample integer exist.
- qwresult records with duplicative combination of sample integer + pcode.
- qwresult record with sample integer not present in qwsample file.

The following can cause unexpected and undesirable behavior:

- Duplicative command-line specification of the same qwsample filename (eg. with wildcards) is silently reduced to one inclusion.
- Warning printed if station-split or project-split file contains records where split data are duplicative or incomplete.
- Zero-length qwsample, qwresult, or split-file records are silently ignored.
- Warning printed of the count of ignored untabbed sample & result records.
- All blanks are removed from project and station-id found in sample records prior to applying subsetting rules.
- Because the program qwcat is used by qwsplit, errors that may cause qwcat to operate incorrectly, also apply to qwsplit.

3.9.3 Program to Edit Existing Precision Codes in Field Values (qwfix)

A program to edit existing precision codes in field values can be initiated using the following command:

```
qwfix
```

The user is prompted for three items:

1. file name of input file (1 and *-cards format)
2. list of parameters to check and desired precision codes

3. name of output file

The file of 1&*-cards should contain the data that you want to edit. The file can be created using option 8 in the Batch Processing menu within QWDATA (*see Section 3.8.8*). Extra data, including parameters and methods, can be included in this file and not be affected, and the extra data will not be copied to the output file.

The format for the list of the rounding editions to be made is: parameter code in columns 1-5, method code in column 6 (field parameters will not have method codes), and rounding specifications in columns 8-18, with a decimal point in column 15.

Here is an example parameter file:

```
00095  3333321.000
00400  0000032.100
00950B 2222222.100
00950D 2222222.220
```

Note on rounding specifications: As used above, the numbers indicate the number of significant figures for the specified range. 00095 3333321.000 will result in the following:

```
1234567.000  will display as 1230000
 123456.000  will display as  123000
  12345.000  will display as   12300
   1234.000  will display as    1230
    123.000  will display as     123
     23.000  will display as      23
      2.000  will display as       2
       .123  will display as       0
       .12   will display as       0
        .1    will display as       0
```

An example of the program dialog follows:

```
/srv2/owq/home$ qwfix
PLEASE ENTER NAME OF INPUT QW_CARD FILE: qwcards
PLEASE ENTER NAME OF INPUT PRECISION-DATA FILE: list.field
PLEASE ENTER NAME OF FILE TO HOLD THE OUTPUT: out
```

Only changes to the input data will be written to the output file.

NOTES*:* Use the qwcardsin program to enter the corrected data into NWIS. To output tables of the values with the edited precision codes, you will need to use the "user-defined" rounding option. This program will not change the precision code for values that are less than 0.000009.

3.9.4 Program to Convert 1 and * Card Batch Files to Tab-Delimited Batch Files (star2pair)

This program is not part of a usual NWIS installation, and this documentation is included for users' convenience. The program and up-to-date documentation are available from a Web page maintained by Phoenix:

http://wwwok.cr.usgs.gov/nawqa/phoenix/reload/reload.html

This program will convert a 1-and-*-format batch file to tab-delimited batch files when the following command is entered:

```
star2pair < input file
```

where ***input file*** is the name of the 1-and-* card batch file to convert.

The program creates tab-delimited files named 'qwsample' and 'qwresult'. If these files exist in the working directory, they are overwritten. This program might be useful to add information to a sample that cannot be added using the 1-and* card format, such as value qualifiers.

Some things you should know about this program:

- The program does NOT VERIFY the input data.
- The program does syntactically verify the *-record and the X-record.
- When a syntax failure occurs, the program prints an error message, the line number, and contents of the offensive input record; then stops.
- Date conversion, case translation, and blank removal are provided.
- Syntactical conversion of result deletions, and null-value qualifiers is provided.
- Special handling of the non-standard syntax used by the NWQL for end-of-file and sample laboratory-identification number (such as P99998).

3.9.5 Program to Convert RDB Output Files to Excel Files (rdb2excel)

This program is not part of a usual NWIS installation and this documentation is included for users' convenience. The program and up-to-date documentation are available from the Web page:

http://ok.water.usgs.gov/nawqa/excel/install.html

This program would be helpful for preparation of data retrievals for internal or external users. The program will convert an RDB file to an Excel-workbook file when the following command is entered:

```
rdb2excel rdb_file_name excel_file_name
```

where ***rdb_file_name*** is the input file and ***excel_file_name*** is the output file.

Functions of this program are:

- Include RDB comments (in blue) above the column headings.
- Include column names (in red) above the first line of data.
- Convert RDB dates to Excel dates, inferred from: column-definition specification of [Dd] and actual field length of 10 or less.
- Convert RDB date-time to Excel date-time, inferred from: column-definition specification of [Dd] and actual field length greater than 10.
- Convert RDB text fields to Excel text, inferred from: column-definition of [Ss] or "" (null).
- Convert RDB numeric fields to Excel numeric data, inferred from: column-definition spec. of [Nn].
- Convert RDB missing values to Excel missing values, note that one or more blanks is -not- missing.
- Set column widths using the wider of: column-definition specification or the column-name length.
- Enforce the Excel limits on the number of rows/sheet, columns/sheet, and characters/cell.
- Name the worksheet within the workbook with the basename of the input RDB file.
- Create an output binary file when run under UNIX, that is compatible with Excel versions: 5, 95, 97, 2000, and 2002.

Functions not included in this program (intentionally):

- Convert the RDB data type of Month ("M") to anything other than text.
- Ensure that a consistent number of fields is present on each line.
- Include the column-definition row in the output.
- Read/write STDIN/STDOUT (though STDERR is used).
- Append to an existing Excel file.
- Write Excel formula.
- Convert an Excel file to an RDB file (some day, perhaps).
- Automatically append an ".xls" suffix to the output filename.

The following conditions will cause errors when running this program:

- Failure to specify exactly two command-line arguments
- Too many rows or columns for Excel
- Any RDB column definition other than: [dmns].
- Output file size exceeding 7-MB.

3.9.6 Program to Adjust Stored Sample Times (qwtimeshift)

A program to adjust stored sample times can be initiated using the following command at the Unix prompt:

```
qwtimeshift [file]
```

qwtimeshift can be used to modify the sample start and end times stored in the database. Beginning in NWIS 4.3, two new fields are available to compute the stored UTC time in the database. See sections *2.4.6, 2.4.7, and 2.1.9* for more detailed information about these time-related fields. This program is provided so that users can fix those samples that may have been changed prior to the release of NWIS 4.3.

The input file format has the following conditions:

- Lines starting with '#' are ignored and are treated as comments.
- Each line in the input file contains two fields separated by white-space. White-space characters can be either spaces or tabs.
- The first field is a sequence of 10 digits--the first 8 digits are the record number of the sample to be updated and the last 2 digits represent the database number used to locate the sample.
- The second field is one or more digits preceded by an optional sign-- "+" or "-". This field is the offset in hours by which the sample time in the database is adjusted.

Example of an input file:

```
0020000201      1       #  Begin date
0020000301      -1      #  Begin and end date
```

Possible error messages:

- **Invalid format:**
  A line in the input file was not in the correct format.
- **Problem parsing the filename, please reenter**.
  This probably indicates that some control characters or a space are in the filename that was entered.
- **QW_SAMPLE_## does not exist in database <db_no>**
  This probably indicates that the wrong database number was specified in the input file.
- **Sample <record_no> does not exist in database <db_no>**

The sample listed in the message could not be found in the specified database. Update the input file with the correct record_no and/or database number. All other records in the input file will still be processed.

- **SQL Error:**
  This indicates there was a problem executing the SQL statement.

- **Unable to compile <regex name> regex**:
  This is an internal program error. The regular expression named in the error message could not be compiled.

- **Unable to determine if QW_SAMPLE_## exists in database <db_no>**
  This probably indicates that the wrong database number was specified in the input file. It may also indicate an RDBMS problem.

- **Unable to open <file>: <msg>**
  The specified file could not be opened for the reason stated in the message.

- **You do not have write access to the QW_SAMPLE_## table in ...**
  You do not have sufficient privileges to update the specified database.

Additional information about the application of UTC time and QWDATA-related fields and issues can be found at:

http://phoenix.cr.usgs.gov/www/utc.html

4 APPENDICES

4.1 Appendix A: Codes Used in Water-Quality System

Tables in Appendix A	Description
1	Medium Codes
2	Quality-Assurance Codes
3	Hydrologic Condition Codes
4	Hydrologic Event Codes
5	Sample Type Codes
6	Analysis Types
7	Analysis Status Codes
8	Analysis Source Codes
9	District Processing Status Codes
10	Remark Codes
11	Station Type Codes
12	Primary Use of Site Codes
13	Primary Use of Water Codes
14	Data Quality Indicator Codes
15	Null Value Qualifiers
16	Value Qualifier Codes
17	Report Level Codes
18	Alpha Parameter Codes
19	Body Part Codes

Table 1. Medium Codes

Medium Code	Description	Definition
0	Not determined	
A	Artificial	Any substance that is not part of an aquatic environment and cannot be described by the Sample Medium Codes B-J or I-9
B	Solids	Unconsolidated materials that may be soils, cores, borehole cuttings, sediments, matter suspended in water or wastewater, street sweepings, other particulate matter, or the total array of materials that are collected as part of a "clean sweep"
C	Animal tissue	Any type of tissue that comprises either whole or parts of insects, fish, or other organisms living in an aquatic environment, or warm bodied animals that may or may not have been collected from a water body.
D	Plant tissue	Any type of non-animal tissue that comprises either whole or parts of plants, aquatic or non-aquatic.
E	Core material	Consolidated or unconsolidated material removed from a pipe or casing during a drilling (coring) operation.
F	Interstitial water	Water occurring in the small openings, spaces, and voids between particles of unconsolidated materials in that portion of the vadose water zone between the root zone and the water table. The water is held in place by entrapment, ionic attraction, and capillary or adhesive forces, rather than from upward pressure components of saturation.
G	Soil	A wet or dry substance composed of unconsolidated fine grain rock fragments (minerals) and organic material that has been modified sufficiently by physical, chemical, or biological processes to support terrestrial plant growth.
H	Bottom material	A mixture of mineral and organic matter that compose the top bed deposits (usually the first few inches) underlying a body of water.
J	Sludge	An unconsolidated material, from an anthropogenic source, covering the ground or the bed of a water body, usually originating as a result of processes such as domestic or industrial waste treatment.

Table 1. Medium Codes (Continued)

Medium Code	Description	Definition
K	Soil moisture	Water occupying voids between loose soil particles within the aerated root zone. The water is held in place by surface tension, capillary and hydroscopic forces in opposition to the pull of gravitational forces.
L-P	Taxonomic data	Biological data distinct from non-taxonomic data which cannot be described by Sample Medium Codes A-K, Q-Z, or 1-9.
L	Phytoplankton (quantitative)	Phytoplanktonic species composition and enumeration
M	Phytoplankton (qualitative)	Phytoplanktonic species composition
N	Periphyton (qualitative)	Periphytic species composition
O	Benthic invertebrates (quantitative)	Benthic invertebrates species composition and enumeration
P		Periphytic diatoms species composition and enumeration
Q-Z	Quality-control sample	Quality-control sample used to estimate bias and variability in the environment samples.
Q	Artificial	
R	Surface water	
S	Ground water	
T	Wet deposition	
U	Bulk deposition	
V	Suspended sediment	
W	Bottom material	
X	Animal tissue	
Y	Plant tissue	

Table 1. Medium Codes (Continued)

Medium Code	Description	Definition
Z	Interstitial water	
1	Suspended sediment	Sediment carried in suspension by the turbulent components of the fluid or by the Brownian movement (a law of physics).
2	Leachate	A solution obtained by passing a liquid (usually aqueous) through an unconsolidated solid medium, thereby dissolving materials (from the solid medium) which become a part of the solution. It also contains those precipitates that are the result of the solution process and subsequent chemical or biological reactions.
3	Dry deposition	Solid, aerosol or gaseous materials deposited from the atmosphere during dry weather periods.
4	Landfill effluent	A liquid material (usually water) that is drained or pumped from a landfill. It usually is a liquid that has percolated through solid landfill material to become a transport medium for materials dissolved from the landfill.
5	Elutriation	A process by which a mixture of an unconsolidated solid medium (usually soil) and a liquid medium (usually water) has been agitated for a given period of time to dissolve materials from the solid. The solid/liquid mixture is finally separated and the resulting solution is analyzed for materials dissolved during the elutriation process.
6	Ground water	Water below the surface of the earth contained in the saturated zone. It does not include soil moisture or interstitial water.
7	Wet deposition	Water reaching the earth's surface through precipitation as rain, snow, sleet, hail or condensation of fog and dew. The water may contain undissolved particulate and gaseous materials acquired from the atmosphere during precipitation.
8	Bulk deposition	A mixture of undesignated proportions of wet and dry deposition sampled by a continuously open container.
9	Surface water	Water on the surface of the earth stored or transported in rivers, streams, estuaries, lakes, ponds, swamps, glaciers or other aquatic areas. It also may refer to water in urban drains and storm-sewer systems.

Table 1. Medium Codes (Continued)

Medium Code	Description	Definition
$	Treated water supply	Water after being processed for some particular use(s)
%	Effluent	Waste water after use at some point source; such an industrial facility or sewage treatment plant
*	Air	Sample of atmospheric gases
&	Soil gas	Gases occurring in the small openings, spaces, and voids between articles of unconsolidated materials in that portion of the vadose water zone between the root zone and the water table
{	QC sample for treated water supply	
}	QC sample for effluent	
[	QC sample for air	
]	QC sample for soil gas	

Table 2. Quality Assurance Codes

Code	Description
A	Not reported
B	Non-USGS lab value--failed edit
C	Non-USGS field value--failed edit
D	USGS lab value--failed edit
E	USGS field value--failed edit
F	Non-USGS lab value--in review
G	Non-USGS field value--in review
H	USGS lab value--in review
I	USGS field value--in review
1	Non-USGS lab value--approved for transfer
2	Non-USGS field value--approved for transfer
3	USGS lab value--approved for transfer
4	USGS field value--approved for transfer
6	Non-USGS lab value--proprietary
7	Non-USGS field value--proprietary
8	USGS lab value--proprietary
9	USGS field value--proprietary

Table 3. Hydrologic Condition Codes

Code	Description
A	Not determined
4	Stable, low stage
5	Falling stage
6	Stable, high stage
7	Peak stage
8	Rising stage
9	Stable, normal stage
X	Not applicable

Table 4. Hydrologic Event Code

Code	Description
A	Spring breakup
B	Under ice cover
C	Glacial lake outbreak
D	Mudflow
E	Tidal action
F	Drainage Basin for Sample Was Affected by Fire Prior to Sampling
H	Dambreak
J	Storm
K	Backwater
1	Drought
2	Spill
3	Regulated flow
4	Snowmelt
5	Earthquake
6	Hurricane
7	Flood
8	Volcanic action
9	Routine sample
X	Not applicable
Z	Not determined (for historical data only; not valid during sample login)

Table 5. Sample Type Codes

Code	Description
A	Not determined
B	Other QA
H	Composite
1	Spike
2	Blank
3	Reference
4	Blind
5	Duplicate
6	Reference Material
7	Replicate
8	Spike solution
9	Regular

Table 6. Analysis Types

Type	Description
CH	Chemical
BI	Biological
SE	Sediment
NU	Nutrients
PE	Pesticides
BE	Bed material
ME	Metals
RA	Radiochemical

Table 7. Analysis Status Codes

Code	Description
A	Not determined
H	Initial entry
1	Retrieved, in review
3	Data in temporary hold status
7	Reviewed, approved for transfer
9	Proprietary data (Regional Hydrologist approval required)

Table 8. Analysis Source Codes

Code	Description
A	Not determined
B	Non-USGS field only
C	Non-USGS lab only
D	Non-USGS lab and field
F	USGS field and non-USGS field
G	USGS field and non-USGS lab
H	USGS field and non-USGS lab and field
1	USGS lab and non-USGS field
2	USGS lab and non-USGS lab
3	USGS lab and non-USGS lab and field
4	USGS lab and field and non-USGS field
5	USGS lab and field and non-USGS lab
6	USGS lab and field and non-USGS lab and field
7	USGS field only
8	USGS lab only
9	USGS lab and field

Table 9. District Processing Status Codes

Code	Description	Codes used in sample inventory table
N	New record	NEW
F	Field data	FIELD
L	Laboratory data	LAB
P	Pending approval	FD+LB
R	Ready to transmit	APPRO
T	Transmitted (This setting is only available for transfer programs and is not available to the user)	TRANS
Z	Complete, but do not transmit (Local-use data)	LOCAL

Table 10. Remark Codes

Code		Description
E	Estimated value	Value is estimated
<	Less than	Actual value is known to be less than the value shown.
>	Greater than	Actual value is known to be greater than the value shown.
M	Presence verified, not quantified	Presence of material verified but not quantified
N	Presumptive evidence of presence	Presumptive evidence of presence of material
U	Analyzed for, not detected	Material specifically analyzed for but not detected
A	Average value	Value is an average
V	Value affected by contamination	Analyte was detected in both the environmental sample and the associated blanks. (see Office of Water Quality Memorandum 97.8)
S	Most probable value	Most probable value

Table 11. Station Type Codes

Codes	Types
SW	Stream
GW	Well
SP	Spring
LK	Lake or reservoir
ES	Estuary
ME	Meteorological
SS	Specific source
OF	Outfall
DV	Diversion
LA	Land application
AG	Aggregate ground water
AS	Aggregate surface water
PU	Water use/Place of use

Table 12. Primary Use of Site Codes

Code	Description	Definition
A	Anode	Anode is a hole used as an electrical anode. Include in this category wells used solely to ground pipelines or electronic relays and other installations.
C	Standby emergency supply	Standby emergency supply refers to a water-supply source that is used only when the principal supplier of water is unavailable.
D	Drain	Drainage refers to the drainage of surface water underground.
E	Geothermal	Geothermal well is a hole drilled for geothermal energy development. Use this category for "dry" geothermal wells or wells into which water is injected for heating. For "wet" geothermal wells, through which water is withdrawn, use "W - withdrawal of water" for the use of site, and "E - power generation" for the primary use of water.
G	Seismic	Seismic hole is one drilled for seismic exploration. If it has been converted to water supply, it is used to withdraw water. A seismic hole used as an observation well should be in the observation-well category.
H	Heat	Heat reservoir refers to a well in which a fluid is circulated in a closed system. Water is neither added to, nor removed from, the aquifer.

Table 12. Primary Use of Site Codes (Continued)

Code	Description	Definition
M	Mine	Mine includes any tunnel, shaft, or other excavation constructed for the extraction of minerals.
O	Observation	Observation well is a cased test-hole or well, drilled for either water-level or water-quality observations. Do not use this category for an oil-test hole, or water-supply well used only incidentally as an observation well.
P	Oil or gas well	Oil or gas well is any well or hole drilled in search of, or for production of, petroleum or gas. It includes any oil or gas production well, dry hole, core hole, injection well drilled for secondary recovery of oil, etc. An oil-test hole converted to a water-supply well should be classified as withdrawal (W).
R	Recharge	Recharge site is a site constructed or converted for use in replenishing the aquifer. An irrigation well used to return water to the aquifer during nonpumping periods is a well for withdrawing water, not a drainage or recharge well. Use this category for wells that are used to return water to the aquifer after use, such as those for returning air-conditioning water.
S	Repressurize	Repressurize refers to pumping water into an aquifer in order to increase the pressure in the aquifer for a specific purpose; for example, water flood purposes in oil fields.
T	Test	Test hole is an uncased hole (or one cased only temporarily) that was drilled for water, or for geologic or hydrogeologic testing. It may be equipped temporarily with a pump in order to make a pumping test, but if the well is destroyed after testing is completed, it is still a test hole. A core hole drilled as a part of mining or quarrying exploration work should be in this class.
U	Unused	An unused site is an abandoned water-supply site or one for which no use is contemplated. At an abandoned farmstead, a well originally used for domestic purposes may be classed as unused, even though it is equipped with a pump. Similarly, a stock well with a pump may become unused when a pasture or corral is put into cultivation. An irrigation well that is not equipped with a pump, nor used because the yield is too low or the water is too mineralized, belongs in this class.
W	Withdrawal of water	Withdrawal of water refers to a site that supplies water for one of the purposes shown under use of water. It includes a dewatering well, if the dewatering is accomplished by pumping ground water.

Table 12. Primary Use of Site Codes (Continued)

Code	Description	Definition
X	Waste disposal	A waste-disposal site is one used to convey industrial waste, domestic sewage, oil-field brine, mine drainage, radioactive waste, or other waste fluid into an underground zone. An oil-test or deep-water well converted to waste disposal should be in this category.
Z	Destroyed	A destroyed site is one that is no longer in existence. The casing of most destroyed wells will be pulled, but some may be plugged or filled. Do not use this category for an abandoned site that merely is not in use.

Table 13. Primary Use of Water Codes

Code	Description	Definition
B	Bottling	Bottling refers to the storage of water in bottles and use of the water for potable purposes (see Medicinal).
C	Commercial	Commercial use refers to use by a business establishment that does not fabricate or produce a product. Filling stations and motels are examples of commercial establishments. If some product is manufactured, assembled, remodeled, or otherwise fabricated, use of water for that plant should be considered industrial, even though the water is not used directly in the product or in the manufacturing of the product.
D	Dewater	Dewatering means the water is pumped for dewatering a construction or mining site, or to lower the water table for agricultural purposes. In this respect, it differs from a drainage well that is used to drain surface water underground. If the main purpose for which the water is withdrawn is to provide drainage, dewatering should be indicated even though the water may be discharged into an irrigation ditch and subsequently used to irrigate land.
E	Power	Power generation refers to use of water for generation of any type of power.
F	Fire	Fire protection refers to the principal use of the water and should be indicated if the site was constructed principally for this purpose, even though the water may be used at times to supplement an industrial or defense supply, to irrigate a golf course, fill a swimming pool, or for other use.
H	Domestic	Domestic use is water used to supply household needs, principally for drinking, cooking, washing, and sanitary purposes, but including watering a lawn and caring for a few pets. Most domestic wells will be at suburban or farm homes, but wells supplying small quantities of water for domestic purposes for one-classroom schools, turnpike gates, and similar installations, should be in the domestic category.

Table 13. Primary Use of Water Codes (Continued)

Code	Description	Definition
I	Irrigation	Irrigation refers to the use of water to irrigate cultivated plants. Most irrigation sites will supply water for farm crops, but the category should include wells used to water the grounds of schools, industrial plants, or cemeteries, if more than a small amount of water is pumped and that is the sole use of the water.
J	Industrial (cooling)	Industrial cooling refers to a water supply used solely for industrial cooling.
K	Mining	Mining refers to a water supply used solely for mining purposes.
M	Medicinal	Medicinal refers to water purported to have therapeutic value. Water may be used for bathing and/or drinking. If use of water is mainly because of its claimed therapeutic value, use this category even though the water is bottled.
N	Industrial	Industrial use is within a plant that manufactures or fabricates a product. The water may or may not be incorporated into the product being manufactured. Industrial water may be used to cool machinery, to provide sanitary facilities for employees, to air-condition the plant, and to irrigate the ground at the plant.
P	Public supply	Public Supply use is water that is pumped and distributed to several homes. Such supplies may be owned by a municipality or community, a water district, or a private concern. In most States, public supplies are regulated by departments of health which enforce minimum safety and sanitary requirements. If the system supplies five or more homes, it should be considered a public supply, as four or less classify use as domestic. Water supplies for trailer or summer camps with five or more living units should be in this category, but motels and hotels are classified as commercial. Most public supply systems also furnish water for a variety of other uses, such as industrial, institutional, and commercial.
Q	Aquaculture	Aquaculture refers to a water supply used solely for aquaculture, such as fish farms.
R	Recreation	Recreation refers to water discharged into pools (or channels which are dammed downstream to form pools), for swimming, boating, fishing, ice rinks, and other recreational uses.
S	Stock	Stock Supply refers to the watering of livestock.
T	Institutional	Institutional refers to water used in the maintenance and operation of institutions such as large schools, universities, hospitals, rest homes, or similar installations. Owners of institutions may be individuals, corporations, churches, or governmental units.

Table 13. Primary Use of Water Codes (Continued)

Code	Description	Definition
U	Unused	Unused means water is not being removed from the site for one of the purposes described above. A test hole, oil or gas well, recharge, drainage, observation, or waste-disposal well will be in this category. Do not use this classification for an irrigation, domestic, stock, or other well during "off season" or temporary periods of nonuse. The use of water from a newly constructed site should be considered as the use for which it is intended even though it may not yet be in use when inventoried.
Y	Desalination	Desalination refers to water used in a desalting process whereby dissolved solids are removed to make water potable or suitable for other uses. Enter the type of use of the desalinated water in the next column, "Secondary Water Use".
Z	Other (explain in remarks)	Other refers to miscellaneous uses not included in the listed categories.

Table 14. Data Quality Indicator (DQI) Codes

DQI code	Description	Batch overwrite allowed*	Default public release
A	Historical data	No	Yes
I	Awaiting review/unapproved methods	Yes	No
S	Presumed satisfactory	Yes	Yes
R	Reviewed and accepted	No	Yes
Q	Reviewed and rejected	No	No
P	Proprietary, not reviewed	No	No
O	Proprietary, reviewed and accepted	No	No
U	Unapproved method or laboratory	No	No
X	Proprietary, reviewed and rejected	No	No

*** Any DQI-protected value may be overwritten using the following batch processing menu options:**
9 -- Reload QW data from batch file, overriding DQI
10 -- Reload QA data from batch file, overriding DQI

Table 15. Null-Value Qualifiers

Null-value Qualifiers	Description
b	Sample broken/spilled in shipment
c	Sample lost in lab
e	Required equipment not functional or available

Table 15. Null-Value Qualifiers (Continued)

Null-value Qualifiers	Description
f	Sample discarded: improper filter used
i	Required sample type not received
l	Analysis discarded: Lab QC failure
m	Results sent by separate memo
o	Insufficient amount of water
p	Sample discarded: improper preservation
q	Sample discarded: holding time exceeded
r	Sample ruined in preparation
u	Unable to determine – matrix interference
w	Sample discarded: warm when received
x	Result failed quality assurance review

Table 16. Value-Qualifier Codes

Value-qualifier codes	Definition	Description
	Raised Reporting Level	
d	Diluted sample: method hi range exceeded	Diluted sample: method high range exceeded
x	Analyte interf from env sample matrix	Analyte interference from environmental sample matrix
v	Analyte detected in laboratory blank	Analyte detected in laboratory blank
s	Instrument sensitivity problem	
q	Insufficient sample received	Insufficient sample received
	Method Problems	
m	Highly var comp using method, ? prec	Highly variable compound using this method, questionable precision and (or) accuracy. Citation of OFR or NWQL Technical Memo in result comment.
w	High variability: ? prec and acc	High variability: questionable precision and (or) accuracy. Cause explained in result comment.
f	Sample field preparation problem	Sample field preparation problem. Problem described in result comment.
l	Sample lab preparation problem	Sample lab preparation problem. Problem described in result comment.
o	Result determined by alternate method	Result determined by alternate method. Reason described in result comment.

Table 16. Value-Qualifier Codes

Value-qualifier	Definition	Description
	Method Problems	
i	Result may be affected by interference	Result may be affected by interference(s).
a	Value was extrapolated above	Value was extrapolated above highest calibration standard, method range, or instrument linear range.
b	Value was extrapolated below	Value was extrapolated below lowest calibration standard, method range, or instrument linear range
n	Below the LRL and above the LT-MDL	Below the laboratory reporting level and above the long-term method detection level.
t	Below the long-term MDL	Below the long-term MDL.
	Rerun	
r	Value verified by rerun, same method	Quantification verified by rerun using the same method
z	Value verified by rerun, diff method	Quantification verified by rerun using a different method
h	Comp ident verified rerun, diff method	Compound identification verified by rerun using a different method; Alternate method identified in result comments.
p	Value reported is preferred	Value reported is preferred; explanation in result comments
u	Value reported not confirmable, interf	Value reported not confirmable due to interference
y	Sample variability described in comment	Sample variability described in result comment.
	Other	
c	See laboratory comment	See laboratory comments for this result
e	See field comment	See field comments for this result
+	Improper preservation	Improper preservation
@	Holding-time violation	Holding-time violation
*	Warm when received	Warm when received
	Biological	
k	Counts outside the acceptable range	Results based upon colony counts outside the acceptable range
g	Count < 0.5 percent	Biological organism count less than 0.5 percent; may be only observed.
j	Count >= 15 percent (dominant)	Biological organism count > or = 15 percent (dominant)
&	Biological organism est as dominant	Biological organism estimated as dominant

Table 17. Report Level Codes

Report Level Code	Definition	Description
MRL	Minimum Reporting Level	Smallest measured concentration of a constituent that can be reliably measured using a given analytical method (Timme, 1995)
MDL	Method Detection Limit	Minimum concentration of a substance that can be measured and reported with a 99% confidence that the analyte concentration is greater than zero. It is determined from the analysis of a sample in a given matrix containing the analyte (U.S. Environmental Protection Agency, 1997)
LT-MDL	Long-Term Method Detection Limit	A detection level derived by determining the standard deviation of a minimum of 24 MDL spike sample measurements over an extended period of time. LT-MDL data are collected on a continuous basis to assess year-to-year variations in the LT-MDL.
LRL	Laboratory Reporting Level	Equal to twice the yearly-determined LT-MDL. At the LRL, the probability of a false negative is less than or equal to 1 percent. The reporting level is set equivalent to the LRL when an analyte is not detected in a sample. (Formerly referred to as Non-Detection Value (NDV))
IRL	Interim Reporting Level	A temporary reporting level used for new or custom schedules when LT-MDL data are unavailable and a LRL has not yet been established.
SSMDC	Sample-Specific Minimum Detectable Concentration	A reporting level that varies for each sample, primarily used in radiochemical analyses. Radiochemical measurements are not typically censored by the laboratory.
Blank	---	A blank report level code should only be stored when no report level is stored. If a report level value is entered, a report level code must also be stored.

Table 18: Alpha Parameter Codes Used in QWDATA
[n/a, not applicable; dashes indicate that no information is needed.]

Alpha Parameter Code	Source	Length	Limitations	Description
ANULL	n/a	**8**	**---**	NULL column
Sample-level codes				
AGNCY	site	**5**	**---**	Agency code
ASRCE	sample	**1**	**---**	Analysis source code
ASTAT	sample	**1**	**---**	Analysis status code
ATYPE	sample	**5**	**---**	Analysis type code
BDPRT	sample	**3**	**---**	Body part code
CNTYC	site	**3**	**---**	County code
CTBDA	site	**8**	**---**	Contributing drainage area
DATES	sample	**9**	**---**	Sampling date
DATTD	sample	**18**	**---**	Sample-start date, time, and time datum **NOTE**: **This will appear in output if the time-datum reliability code is 'K'; otherwise it will be blank in output**
DATTM	sample	**12**	**---**	Sample date-time (see also DATES & TIMES)
DBNUM	NWIS	**2**	**---**	Database number
DISTR	site	**3**	**---**	District code
DSTAT	sample	**1**	**---**	District processing-status code
EDATE	sample	**8**	**---**	Ending date
ETIME	sample	**4**	**---**	Ending time
EVENT	sample	**1**	**---**	Hydrologic event code
GUNIT	site and (or) sample	**8**	**---**	Geologic unit code
HDATM	site	**9**	**---**	Horizontal datum (of LATLG)
HSTAT	sample	**1**	**---**	Hydrologic condition code
HSTNM	NWIS	**10**	**---**	NWIS hostname of machine
HUNIT	site	**8**	**---**	Hydrologic unit code
LABNO	sample	**7**	**---**	Laboratory identification number
LATLG	site	**24**	**---**	Latitude-longitude (in DMS)
LOCAL	site	**26**	**---**	Local identifier (see also SNAME)

Table 18: Alpha Parameter Codes Used in QWDATA (Continued)
[n/a, not applicable; dashes indicate that no information is needed.]

Alpha Parameter Code	Source	Length	Limitations	Description
M1LAB	sample	**300**	---	Laboratory-supplied sample comment (same as SCMLB)
M2LAB	sample	**300**	---	Field-supplied sample comment (same as SCMFL)
MEDIM	sample	**1**	---	Medium code
PRIME	NWIS	**10**	---	NWIS Hostname of processing machine (same as HSTNM)
PRJCT	sample	**9**	---	Project code
SAMPL	NWIS	**8**	---	NWIS QWFILE record number
SCDAT	sample	**8**	---	Sample creation date
SCMFL	sample	**300**	---	Field sample comment (same as M2LAB)
SCMLB	sample	**300**	---	Lab sample comment (same as M1LAB)
SCUSR	sample	**8**	---	Sample creation userid
SITEC	site	**8**	---	St type code
SMDAT	sample	**8**	---	Sample modification date
SMUSR	sample	**8**	---	Sample modification userid
SNAME	site	**50**	---	Station name
STAID	sample	**15**	---	Station identification number
STATE	site	**2**	---	State code
STRMK	site	**50**	---	Site remark
STYPE	sample	**1**	---	Sample-type code
TAXON	sample	**9**	---	ITIS taxonomic unit code
TDRCD	sample	**1**	---	Time-datum reliability code
TIMED	sample	**10**	---	Sample-start time and time datum **NOTE:** This will appear in output if the time-datum reliability code is 'K'; otherwise it will be blank in output.
TIMES		**4**	---	Sample start time as HHMM
TMDTM	sample	**6**	---	Time Datum
ADATE	result	**8**	by-result only	Result analysis date
ANLNO	result	**12**	by-result only	Laboratory analysis-set number
DQIND	result	**1**	by-result only	Data-quality indicator code

Table 18: Alpha Parameter Codes Used in QWDATA (Continued)
[n/a, not applicable; dashes indicate that no information is needed.]

Alpha Parameter Code	Source	Length	Limitations	Description
LSDEV	result	**8**	by-result only	Laboratory standard deviation
METHD	result	**1**	by-result only	Method code
NULLQ	result	**1**	by-result only	NULL-result qualifier code
PCODE	result	**5**	by-result only	Parameter code
PDATE	result	**8**	by-result only	Sample preparation date
PLNAM	parameter-code dictionary	**54**	by-result only	Parameter long name
PRPNO	result	**12**	by-result only	Laboratory preparation-set number
QACOD	result	**1**	by-result only	Quality-assurance code
QUAL1	result	**1**	by-result only	Result-qualifier code 1
QUAL2	result	**1**	by-result only	Result-qualifier code 2
QUAL3	result	**1**	by-result only	Result-qualifier code 3
RCDAT	result	**8**	by-result only	Result creation date
RCMFL	result	**300**	by-result only	Field result comment
RCMLB	result	**300**	by-result only	Lab result comment
RCUSR	result	**8**	by-result only	Result creation userid
REMRK	result	**1**	by-result only	Remark code
RLTYP	result	**6**	by-result only	Reporting-level type code
RMDAT	result	**8**	by-result only	Result modification date
RMUSR	result	**8**	by-result only	Result modification userid
RNDCD	result	**1**	by-result only	Rounding code
RPLEV	result	**9**	by-result only	Reporting level
UNITS	parameter code dictionary	**16**	by-result only	Reporting units
VALUE	result	**9**	by-result only	Parameter value

Table 18: Alpha Parameter Codes Used in QWDATA (Continued)
[n/a, not applicable; dashes indicate that no information is needed.]

Output Selection codes					
ADDPC	result		---	by-sample only	Add all available numeric parameters
CALCV	n/a		---	by-sample only	Add calculated values
ALPHA	n/a		---	by-sample or by-result	Add all alphabetic parameters available

Table 19. Body Part Codes

Fixed Value	Parameter Name
1	Alimentary
2	Mouth
3	Teeth
4	Esophagus
5	Stomach
6	Liver
7	Intestine
8	Bladder, gall
9	Anus
10	Cardio-vascular
11	Heart
12	Heart/ventricle
13	Heart/bulb art
14	Heart/auricle
15	Heart/conus art
16	Arteries
17	Veins
18	Endocrine
19	Cyclic change
20	Pituitary
21	Renal body
22	Adrenal
23	Suprarenal
25	Ultimabran body
26	Pseudobranch
27	Corp of stan
28	Thyroid
29	Pancreas
30	Sac vascule

Table 19. Body Part Codes (Continued)

Fixed Value	Parameter Name
31	Excretory
32	Kidney
33	Kidney/glom
34	Kidney/aglom
35	Kidney/urin tub
36	Kidney/coll tub
37	Bladder
38	Ureters
39	Urinary pore
40	Hemopoietic
41	Head kidney
42	Thymus
43	Spleen
44	Lymphocytes
45	Nucleated rbs's
46	Thrombocytes
47	Eosinophiles
48	Heterophiles
49	Granulocytes
50	Musco-skel
51	Muscle/somatic
52	Muscle/visceral
53	Bone/cellular
54	Bone/acellular
55	Cartilage
56	Conn tissue
57	Scale
58	Skin
59	Organism, whole
60	Nervous
61	Brain
62	Spinal cord
63	Ganglions
64	Neurons
65	Nerve fibers
66	Reproductive
67	Repro cyc chan
68	Male
69	Female
70	Ovary
71	Respiratory
72	Gills

Table 19. Body Part Codes (Continued)

73	Resp epithelium
74	Cells, chloride
75	Cells, secretory
76	Gill rakers
77	Sensory
78	Lateral line
79	Nasal passages
80	Tentacles
81	Eyes
82	Ears
83	Neuroepithelium
84	Bladder, swim
85	System, lymph
86	Fillet
87	Edible portion
88	Headless whole fish
89	Organism, whole, eviscerated
90	Viscera
91	Lipid tissue
92	Fry
93	Eggs
94	Unknown
95	No head or visc
96	No skin,hd,visc
97	Exoskeleton
98	Lips
99	Pharynx
100	Caeca
101	Capillaries
102	System, central nervous
103	Testes
104	Gill lamellae
105	Gill filaments
106	Neuromasts
107	Pit organ
108	Taste buds
109	Hypophysis
110	Saccus vasculosus
111	Urophysis
112	Pineal gland
113	Choroid gland

Table 19. Body Part Codes (Continued)

114	Plasma
115	Larvae
116	Carcass
117	Filet/skin
118	Filet dorsal piece

4.2 Appendix B: Fixed Value Codes

00027--COLLECTING AGENCY

Fixed Value	Description
300	NAPD/NTN - NAT.ATMOS.DEPOSITION PROGRAM/NAT.TRENDS NETWORK
500	DEPARTMENT OF AGRICULTURE
504	AGRICULTURAL RESEARCH SERVICE
520	SOIL CONSERVATION SERVICE
596	FOREST SERVICE
600	DEPARTMENT OF COMMERCE
642	NATIONAL INDUSTRIAL POLLUTION CONTROL COUNCIL
648	NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
655	NATIONAL BUREAU OF STANDARDS
700	DEPARTMENT OF DEFENSE - MILITARY
701	AIR FORCE
702	ARMY
703	MARINES
704	NAVY
800	DEPARTMENT OF DEFENSE - CIVIL
810	CORPS OF ENGINEERS
900	DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
910	FOOD AND DRUG ADMINISTRATION
915	ENVIRONMENTAL HEALTH SERVICE
930	NATIONAL INSTITUTES OF HEALTH
1000	DEPARTMENT OF THE INTERIOR
1004	BUREAU OF LAND MANAGEMENT
1008	BUREAU OF INDIAN AFFAIRS
1016	BUREAU OF OUTDOOR RECREATION
1028	GEOLOGICAL SURVEY
1032	BUREAU OF MINES

	00027--COLLECTING AGENCY
1050	BUREAU OF SPORT FISHERIES AND WILDLIFE
1053	NATIONAL PARK SERVICE
1060	BUREAU OF RECLAMATION
1062	ALASKA POWER ADMINISTRATION
1064	BONNEVILLE POWER ADMINISTRATION
1068	SOUTHEASTERN POWER ADMINISTRATION
1072	SOUTHWESTERN POWER ADMINISTRATION
1076	OFFICE OF SALINE WATER
1086	OFFICE OF WATER RESOURCES RESEARCH
1800	ATOMIC ENERGY COMMISSION
2000	ENVIRONMENTAL PROTECTION AGENCY
2100	DEPARTMENT OF TRANSPORTATION
2300	GENERAL SERVICES ADMINISTRATION
2500	DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
2555	U.S. PUBLIC HEALTH SERVICE, DIVISION OF INDIAN HEALTH
2700	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
3315	TENNESSEE VALLEY AUTHORITY
3335	WATER RESOURCES COUNCIL
6001	ASSOCIATION OF BAY AREA GOVERNMENTS, CALIFORNIA
6003	ALAMEDA CO. FLOOD CONTROL AND WATER CONSERVATION DIST., CA
6005	EAST BAY REGIONAL PARK DISTRICT, CA
6006	EAST BAY MUNICIPAL UTILITY DISTRICT, OAKLAND CA
6010	CA REGIONAL WATER QUALITY CONTROL BOARD NORTH COAST REGION
6015	UNITED WATER CONSERVATION DISTRICT, SANTA PAULA CA
6020	SANTA CLARA VALLEY WATER DISTRICT, CALIFORNIA
6021	LA COUNTY AG. COMM. WEIGHTS & MEAS. DEPT. ENV. TOXICOLOGY
6022	ANTELOPE VALLEY EAST KERN WATER AGENCY LABORATORY
9700	STATE HEALTH LABORATORY (00 = STATE CODE)
9701	ALABAMA
9702	ALASKA
9704	ARIZONA

	00027--COLLECTING AGENCY
9705	ARKANSAS
9706	CALIFORNIA
9708	COLORADO
9709	CONNECTICUT
9710	DELAWARE
9711	DISTRICT OF COLUMBIA
9712	FLORIDA
9713	GEORGIA
9715	HAWAII
9716	IDAHO
9717	ILLINOIS
9718	INDIANA
9719	IOWA
9720	KANSAS
9721	KENTUCKY
9722	LOUISIANA
9723	MAINE
9724	MARYLAND
9725	MASSACHUSETTS
9726	MICHIGAN
9727	MINNESOTA POLLUTION CONTROL COUNCIL
9728	MISSISSIPPI
9729	MISSOURI
9730	MONTANA
9731	NEBRASKA
9732	NEVADA
9733	NEW HAMPSHIRE
9734	NEW JERSEY
9735	NEW MEXICO
9736	NEW YORK
9737	NORTH CAROLINA

	00027--COLLECTING AGENCY
9738	NORTH DAKOTA
9739	OHIO
9740	OKLAHOMA
9741	OREGON
9742	PENNSYLVANIA
9744	RHODE ISLAND
9745	SOUTH CAROLINA
9746	SOUTH DAKOTA
9747	TENNESSEE
9748	TEXAS
9749	UTAH
9750	VERMONT
9751	VIRGINIA
9753	WASHINGTON
9754	WEST VIRGINIA
9755	WISCONSIN
9756	WYOMING
9760	AMERICAN SAMOA
9761	CANAL ZONE
9762	CANTON AND ENDERBURY ISLANDS
9766	GUAM
9767	JOHNSTON ATOLL
9771	MIDWAY ISLANDS
9772	PUERTO RICO
9773	RYUKYU ISLANDS, SOUTHERN
9774	SWAN ISLANDS
9775	TRUST TERRITORIES OF THE PACIFIC ISLANDS
9776	U.S. MISCELLANEOUS CARIBBEAN ISLANDS
9777	U.S. MISCELLANEOUS PACIFIC ISLANDS
9778	VIRGIN ISLANDS
9779	WAKE ISLAND

	00027--COLLECTING AGENCY
9780	MEXICO
9781	TAMAULIPAS
9782	NUEVO LEON
9783	COAHUILA
9784	CHIHUAHUA
9785	SONORA
9786	BAJA CALIFORNIA NORTE
9790	NEW BRUNSWICK
9791	QUEBEC
9792	ONTARIO
9793	MANITOBA
9794	SASKATCHEWAN
9795	ALBERTA
9796	BRITISH COLUMBIA
9797	YUKON
9801	PRIVATE LABORATORY
9802	SALT RIVER VALLEY USERS ASSOCIATION
9803	METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA
9804	FLORIDA DEPARTMENT OF POLLUTION CONTROL
9805	CENTRAL AND SOUTHERN FLORIDA FLOOD CONTROL DISTRICT
9806	FLORIDA GAME AND FRESH WATER FISH COMMISSION
9807	FLORIDA DEPARTMENT OF HEALTH AND REHABILITATIVE SERVICES
9808	SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
9809	CITY OF JACKSONVILLE, FLORIDA
9810	REEDY CREEK IMPROVEMENT DISTRICT, FLORIDA
9811	ORANGE COUNTY POLLUTION CONTROL DEPARTMENT, FLORIDA
9812	BREVARD COUNTY POLLUTION CONTROL DEPARTMENT, FLORIDA
9813	PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES
9814	ALASKA DEPARTMENT OF FISH AND GAME
9815	ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
9816	CALIFORNIA DEPARTMENT OF WATER RESOURCES

	00027--COLLECTING AGENCY
9817	ORANGE COUNTY WATER DISTRICT, CALIF.
9818	HILLSBOROUGH COUNTY ENVIRONMENTAL PROTECTION COMM. FL
9819	NASSAU COUNTY DEPARTMENT OF HEALTH, NY
9820	SUFFOLK COUNTY DEPARTMENT OF HEALTH, NY
9821	SUFFOLK COUNTY DEPARTMENT OF ENVIR. CONTROL, NY
9822	SUFFOLK COUNTY WATER AUTHORITY, NY
9823	ALAMEDA COUNTY WATER DISTRICT, CA
9824	ALAMEDA CO. FLOOD CONTROL & WATER CONSER. DIST, ZONE 7, CA
9825	VALLEY COMMUNITY SERVICES DISTRICT (LIVERMORE), CA
9826	CITY OF LIVERMORE WASTE TREATMENT PLANT, CA
9827	ARKANSAS DEPARTMENT OF POLLUTION CONTROL AND ECOLOGY
9828	ARKANSAS GAME AND FISH COMMISSION
9829	NASSAU COUNTY DEPARTMENT OF PUBLIC WORKS, N.Y.
9831	UNIVERSITY OF IOWA, STATE HYGIENIC LABORATORY
9902	UNIVERSITY OF ARIZONA
9903	UNIVERSITY OF FLORIDA
9904	FLORIDA STATE UNIVERSITY
9905	FLORIDA TECHNOLOGICAL UNIVERSITY
9906	UNIVERSITY OF ALASKA
12001	CITY OF TAMPA, FLORIDA
12002	CITY OF VERO BEACH, FLORIDA
12005	CITY OF TALLAHASSEE, FLORIDA
12007	ITT COMMUNITY DEVELOPMENT CORPORATION, FLORIDA
12010	PALM BEACH COUNTY ENGINEER
12020	PALM BEACH COUNTY HEALTH DEPT.
12030	DADE COUNTY DEPT. OF ENV. RESOURCES MAN.
16001	IDAHO DEPARTMENT OF WATER RESOURCES
16002	IDAHO DEPARTMENT OF HEALTH AND WELFARE
17001	METROPOLITAN SANITARY DIST. OF GREATER CHICAGO(MSD)
17002	ILLINOIS ENVIRONMENTAL PROTECTION AGENCY (IEPA)
17003	ILLINOIS STATE WATER SURVEY (ISWS)

	00027--COLLECTING AGENCY
17004	INTERSURVEY GEOTECHNICAL LAB, IGS
18001	INDIANA DEPT. ENV. MGMT., DRINKING WATER BRANCH, GW SECTION
18002	INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT (IDEM)
18003	INDIANA GEOLOGICAL SURVEY (IGS)
18004	INDIANA DEPARTMENT OF NATURAL RESOURCES (IDNR)
18005	INDIANAPOLIS DEPARTMENT OF PUBLIC WORKS, INDIANA (IDPW)
18006	PURDUE UNIVERSITY, LAFAYETTE, INDIANA
18007	INDIANA UNIVERSITY, BLOOMINGTON, INDIANA
18008	BALL STATE UNIVERSITY, MUNCIE, INDIANA
18009	ST. JOSEPH RIVER BASIN COMMISSION, INDIANA
20001	KANSAS STATE GEOLOGICAL SURVEY
21001	GEOLOGICAL SURVEY OF KENTUCKY
25001	BARNSTABLE COUNTY HEALTH DEPARTMENT, MASS.
25003	LEO LAB, MASS
27001	MINN. DEPARTMENT OF NATURAL RESOURCES (DNR), ST. PAUL, MN
27002	MINN. DNR, WATERS DIVISION, ST. PAUL, MN
27003	MINN. DNR, FISH AND WILDLIFE DIVISION, ST. PAUL, MN
27004	MINN. DNR, FORESTRY DIVISION, ST. PAUL, MN
27005	MINN. DNR, MINERALS DIVISION, ST. PAUL, MN
27010	MINN. POLLUTION CONTROL AGENCY (PCA), ST. PAUL, MN
27011	MINN. PCA, WATER QUALITY DIVISION, ST. PAUL, MN
27012	MINN. PCA, SOLID/HAZARDOUS WASTE DIVISION, ST. PAUL, MN
27013	MINN. PCA, AIR QUALITY DIVISION, ST. PAUL, MN
27020	MINN. DEPARTMENT OF HEALTH, MINNEAPOLIS, MN
27030	MINN. GEOLOGICAL SURVEY, ST. PAUL, MN
27035	UNIV. OF MINN. MINNEAPOLIS-ST. PAUL, MN
27036	UNIV. OF MINN. GEOLOGY AND GEOPHYSICS, MINNEAPOLIS, MN
27038	UNIV. OF MINN. GRAY FRESHWATER BIO. INST., NAVARRE, MN
27039	UNIV. OF MINN. SOIL SCIENCE
27040	UNIV. OF MINN. AGRICULTURAL ENGINEERING, ST. PAUL, MN
27041	UNIV. OF MINN. ECOL., EVOL., AND BEHAVIOR, ST. PAUL, MN

	00027--COLLECTING AGENCY
27050	METROPOLITAN WASTE CONTROL COMMISSION, ST. PAUL, MN
28001	OFFICE OF POLLUTION CONTROL, MISSISSIPPI
28001	OFFICE OF POLLUTION CONTROL, MISSISSIPPI
28002	OFFICE OF GEOLOGY, MISSISSIPPI
28003	OFFICE OF LAND AND WATER RESOURCES, MISSISSIPPI
29001	MISSOURI DEPT OF NATURAL RESOURCES, DIV OF ENVIR. QUALITY
30010	MONTANA BUREAU OF MINES AND GEOLOGY
30020	MONTANA DEPT. OF FISH WILDLIFE AND PARKS
30030	MONTANA DEPT. OF HEALTH/ENV. SCIENCES, WATER QUALITY BUREAU
30040	MONTANA AGRICULTURAL RESEARCH CENTER
30050	MONTANA TUNNELS MINING, INC., WICKES, MT
30060	WATER CONSULTING, INC., HAMILTON, MT
31001	NEBRASKA DEPARTMENT OF ENVIRONMENTAL CONTROL LABORATORY
32001	NEVADA DIVISION OF ENVIRONMENTAL PROTECTION
32003	NEVADA DIVISION OF WATER RESOURCES
32005	UNIV. OF NEV., DIV. OF RENEW. NAT. RESOURCES
32006	NEVADA BUREAU OF ENVIRONMENTAL HEALTH
32007	NEVADA BUREAU OF MINES & GEOLOGY
32009	NEVADA DEPARTMENT OF FISH & GAME
32010	NEVADA DIVISION OF FORESTRY
32011	NEVADA DIVISION OF PARKS
32012	NEVADA CONSUMER HEALTH PROTECTION SERVICE
32013	UNIV. OF NEV. DESERT RESEARCH INSTITUTE
32014	UNIV. OF NEV. COLLEGE OF AGRICULTURE
32015	CLARK COUNTY DISTRICT HEALTH DEPARTMENT, NEVADA
32016	WASHOE COUNTY DISTRICT HEALTH DEPARTMENT, NEVADA
32017	LAS VEGAS VALLEY WATER DISTRICT, NEVADA
32018	SIERRA PACIFIC POWER CO., NEVADA
32019	NEVADA BUREAU OF LABORATORIES AND RESEARCH
32020	WASHOE COUNTY UTILITIES, RENO, NV
32021	CARSON CITY PUBLIC WORKS, CARSON CITY, NV

	00027--COLLECTING AGENCY
32022	TRUCKEE MEADOWS WATER RECLAMATION FACILITY, RENO, NV
32091	WASHOE COUNTY COG, NEVADA
32092	CLARK COUNTY COG, NEVADA
32093	MUNICIPAL WATER COMPANY, NEVADA
34001	NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
34002	ROY F. WESTON INC. WEST CHESTER, PA
34003	BOOTH, GARRETT, AND BLAIR INC., AMBLER, PA
34004	CAPE MAY COUNTY, NJ, DEPARTMENT OF HEALTH
34005	CAPE MAY COUNTY, NJ, PLANNING BOARD
34009	NEW JERSEY WATER SUPPLY AUTHORITY
36010	NEW YORK DEPARTMENT OF HEALTH
36012	NEW YORK DEPT. OF ENVIRONMENTAL CONSERVATION, ALBANY, NY
36020	NASSAU COUNTY, DEPARTMENT OF PUBLIC WORKS
38001	NORTH DAKOTA GEOLOGICAL SURVEY
38002	NORTH DAKOTA STATE WATER COMMISSION
38003	NORTH DAKOTA STATE HEALTH DEPARTMENT
38004	SPIRIT LAKE TRIBE, NORTH DAKOTA
39002	NORTHEASTERN OHIO REGIONAL SEWER DISTRICT, OHIO
39003	LAKE COUNTY GENERAL HEALTH DISTRICT, OHIO
39004	CUYAHOGA COUNTY BOARD OF HEALTH, OHIO
40810	CORPS OF ENGINEERS, TULSA DISTRICT
41000	CITY OF PORTLAND, BUREAU OF WATER WORKS
42010	CITY OF PHILADELPHIA, PA.
42011	SUSQUEHANNA RIVER BASIN COMMISSION
42012	VOLUNTEER CITIZEN GROUP, LANCASTER, PA
46001	SOUTH DAKOTA STATE UNIVERSITY SOILS LABORATORY
46002	SOUTH DAKOTA WATER RESOURCES INSTITUTE
46003	SOUTH DAKOTA AGRICULTURAL EXPERIMENT STATION
46004	SOUTH DAKOTA STATE CHEMIST
46005	SOUTH DAKOTA SCHOOL OF MINES AND TECHNOLOGY
46006	SOUTH DAKOTA STATE UNIVERSITY, DEPT. STATION BIOCHEMISTRY

	00027--COLLECTING AGENCY
46007	SOUTH DAKOTA DIVISION OF WATER RIGHTS
46008	SOUTH DAKOTA GEOLOGICAL SURVEY, VERMILLION, SD
46009	SOUTH DAKOTA DEPARTMENT OF HEALTH
47001	UNIVERSITY OF TENNESSEE AT KNOXVILLE
49001	KENNECOTT ENVIRONMENTAL LAB, SALT LAKE CITY, UT
51005	VIRGINIA TECH., OCCOQUAN WATERSHED MONITORING LABORATORY
51006	JAMES MADISON UNIVERSITY, STAUNTON, VA
55555	INDIVIDUAL
66666	DRILLER
80000	QA PROJECT
80003	INST. TECH. HERNPHYSIK, DORMSTADT, FEDERAL REPUBLIC OF GERM
80010	ATLANTA CENTRAL LABORATORY, GA
80020	DENVER CENTRAL LABORATORY, CO
80055	IEAE, VIENNA, AUSTRIA
80088	RADIOACTIVE DATING LAB, GEOL. SURVEY, SWEDEN-FRESCATI
80095	USGS-NATIONAL RESEARCH PROGRAM LAB, MENLO PARK, CA
80113	DISTRICT WATER-QUALITY LAB, TUSCALOOSA, ALABAMA
80141	GEOLOGICAL SURVEY OF ALABAMA
80201	ALASKA DIVISION OF GEOLOGIC AND GEOPHYSICAL SURVEYS (DGGS)
80203	CHEMICAL AND GEOLOGICAL LABORATORIES OF ALASKA
80205	NORTHERN TEST LAB (SOLDOTNA, ALASKA)
80213	DISTRICT WATER-QUALITY LAB, ANCHORAGE, ALASKA
80410	CITY OF TUCSON, AZ
80413	DISTRICT WATER-QUALITY LAB, YUMA, ARIZONA
80415	ARIZ. DEPT. OF ENVIRONMENTAL QUALITY
80417	ARIZ. DEPT. OF WATER RESOURCES
80501	OUACHITA BAPTIST UNIVERSITY, ARKADELPHIA, ARKANSAS
80503	UNIVERSITY OF ARKANSAS, DEPT. OF ENGINEERING, FAYETTEVILLE
80505	UNIVERSITY OF ARKANSAS, DEPT. OF GEOLOGY, FAYETTEVILLE
80513	DISTRICT WATER-QUALITY LAB, LITTLE ROCK, ARKANSAS
80515	ARKANSAS GEOLOGICAL COMMISSION

	00027--COLLECTING AGENCY
80601	HEALTH AND HUMAN SERVICES INDIAN HEALTH SERVICES, CA
80613	DISTRICT WATER-QUALITY LAB, SACRAMENTO, CALIFORNIA
80623	CITY OF SAN DIEGO LAB, CALIFORNIA
80641	LAWRENCE LIVERMORE LAB, CALIFORNIA
80650	UNIVERSITY OF CALIFORNIA, BERKELEY
80670	UNIVERSITY OF CALIFORNIA, DAVIS
80671	UNIVERSITY OF CALIFORNIA, SAN DIEGO, LA JOLLA
80672	UNIVERSITY OF CALIFORNIA, LOS ANGELES
80801	CITY OF ARVADA, CO
80820	PINE RIVER WATERSHED STAKEHOLDERS GROUP, CO
80839	ENV.HEALTH DIV. VET.SCIENCE COLLEGE, CSU, FORT COLLINS, CO
80841	DAVIS LABORATORIES, COLORADO
80843	DENVER REGIONAL COUNCIL OF GOVERNMENT
80845	METROPOLITAN DENVER SEWAGE DISPOSAL DISTRICT LAB. NO. 1
80849	ROCKY MOUNTAIN ANALYTICAL LABORATORY (ARVADA, COLORADO)
80851	UPPER CLEAR CREEK ADVISORY GROUP, IDAHO SPRINGS, CO
81113	DISTRICT WATER-QUALITY LAB, WASHINGTON, D.C.
81210	ST. JOHNS WATER MANAGEMENT DISTRICT, FLORIDA
81213	DISTRICT WATER-QUALITY LAB, OCALA, FLORIDA
81223	INSTITUTE OF MARINE SCIENCE, MIAMI, FLORIDA
81227	VOLUSIA COUNTY ENVIRONMENTAL CONTROL, FL
81230	SUWANNEE RIVER WATER MANAGEMENT DISTRICT, LIVE OAK, FL
81231	NORTHWEST FLORIDA WATER MANAGEMENT DISTRICT, QUINCY, FL
81232	SOUTH FLORIDA WATER MANAGEMENT DISTGRICT, W. PALM BEACH, FL
81233	FLORIDA INTERNATIONAL UNIVERSITY, MIAMI, FL
81341	GEORGIA STATE NATURAL RESOURCES DEPARTMENT
81513	DISTRICT WATER-QUALITY LAB, HONOLULU, HAWAII
81601	RADIOLOGICAL & ENV. SCIENCES LAB, DOE, INEL, IDAHO FALLS,ID
81603	ENVIRONMENTAL CHEMISTRY LAB, E.G.&G., INEL, IDAHO FALLS, ID
81605	RADIATION MEASUREMENTS LAB, E.G.&G., INEL, IDAHO FALLS, ID
81607	ENVIRONMENTAL ANALYSIS GROUP, WINCO, INEL, IDAHO FALLS, ID

	00027--COLLECTING AGENCY
81641	IDAHO DEPT. OF HEALTH AND WELFARE, BUREAU OF LABORATORIES
81700	USGS - ILLINOIS DISTRICT
81741	BLOOMINGTON NORMAL SANITARY DISTRICT, ILLINOIS
81777	UNIVERSITY OF CHICAGO, ILLINOIS
81941	IOWA STATE HYGIENIC LABORATORY
81951	IOWA DEPARTMENT OF ENVIRONMENTAL QUALITY
82041	KANSAS STATE DEPARTMENT OF HEALTH AND ENVIRONMENT
82101	KENTUCKY CABINET FOR HUMAN RESOURCES
82103	BECKMAR ENVIRONMENTAL LABORATORY, KENTUCKY
82213	DISTRICT WATER-QUALITY LAB, BATON ROUGE, LOUISIANA
82241	LOUISIANA, GULF SOUTH RESEARCH INSTITUTE
82301	UNIVERSITY OF MAINE LABORATORY, ORONO, ME
82303	HOULTON BAND OF MALISEET INDIANS, MAINE
82340	MAINE DEPARTMENT OF CONSERVATION
82341	MAINE, DEPT. OF ENVIRONMENTAL PROTECTION
82410	MARYLAND DEPARTMENT OF THE ENVIRONMENT
82420	MARYLAND GEOLOGIC SURVEY
82430	MARYLAND DEPARTMENT OF NATURAL RESOURCES
82641	WASHTENAW COUNTY HEALTH DEPARTMENT, MICHIGAN
82901	UNIV. OF MISSOURI ENVIRONMENTAL TRACE SUBSTANCES LAB
83011	MT DEPARTMENT OF ENVIRONMENTAL QUALITY
83101	HARRIS LABORATORIES, LINCOLN, NEBRASKA
83113	DISTRICT WATER-QUALITY LAB, LINCOLN, NEBRASKA
83241	SIERRA ENVIRONMENTAL MONITORING SERVICE, NEVADA
83341	WATER SUPPLY & POLLUTION CONTROL COMM. LAB., N.H.
83401	TELEDYNE ISOTOPES, INC. NEW JERSEY
83441	NEW JERSEY DEPT. OF HEALTH LABORATORY
83513	DISTRICT WATER-QUALITY LAB, ALBUQUERQUE, NEW MEXICO
83523	NEW MEXICO INSTITUTE OF MINING AND TECHNOLOGY - SOCORRO
83541	UNIVERSITY OF NEW MEXICO
83542	USBIA SOIL, WATER, & MATERIAL TESTING LAB., NEW MEXICO

	00027--COLLECTING AGENCY
83611	MONROE COUNTY HEALTH DEPARTMENT, NEW YORK
83613	DISTRICT WATER-QUALITY LAB, ALBANY, NEW YORK
83620	UPSTATE FRESHWATER INSTITUTE, NEW YORK
83621	O'BRIEN AND GERE, NEW YORK
83630	SYRACUSE UNIVERSITY, DEPT. OF CIVIL ENGINEERING
83631	METROPOLITAN LABORATORY, NEW YORK
83650	ERIE COUNTY LABORATORY, NEW YORK
83660	STATE UNIVERSITY OF NEW YORK AT CORTLAND, NEW YORK
83671	COLUMBIA UNIVERSITY, NEW YORK
83713	DISTRICT WATER-QUALITY LAB, RALEIGH, NORTH CAROLINA
83741	NORTH CAROLINA DEPT. OF NATURAL AND ECONOMIC RESOURCES
83751	MECKLENBURG CO. DEPT. OF ENVIRONMENTAL HEALTH LAB, N.C.
83841	NORTH DAKOTA STATE LABORATORY
83901	NATIONAL TESTING LABORATORY, WATER CHECK DIVISION, OHIO
83913	DISTRICT WATER-QUALITY LAB, COLUMBUS, OHIO
84001	OKLAHOMA WATER RESOURCES BOARD
84003	OKLAHOMA STATE UNIVERSITY
84005	OKLAHOMA STATE HEALTH DEPT. RADIOCHEMISTRY LABORATORY
84007	OKLAHOMA STATE DEPARTMENT OF AGRICULTURE
84009	ASSOCIATION OF CENTRAL OKLAHOMA GOVERNMENTS
84011	OKLAHOMA CORPORATION COMMISSION
84013	DISTRICT WATER-QUALITY LAB, OKLAHOMA CITY, OKLAHOMA
84015	OKLAHOMA CONSERVATION COMMISSION, OKLAHOMA CITY, OK
84017	OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY (ODEQ)
84041	OKLAHOMA GEOLOGICAL SURVEY
84042	OKLAHOMA STATE HEALTH DEPARTMENT
84113	DISTRICT WATER-QUALITY LAB, PORTLAND, OREGON
84213	DISTRICT WATER-QUALITY LAB, HARRISBURG, PENNSYLVANIA
84215	CHESTER COUNTY HEALTH DEPARTMENT LAB, PA.
84240	CITY OF PHILADELPHIA, PA AND USGS
84540	SOUTH CAROLINA WATER RESOURCES COMMISSION

	00027--COLLECTING AGENCY
84541	SAVANNAH RIVER LAB, SOUTH CAROLINA
84610	URE PROJECT LABORATORY, OAK RIDGE, TN
84699	PUBLIC ENTITY
84813	DISTRICT WATER-QUALITY LAB, AUSTIN, TEXAS
84823	INTERNATIONAL BOUNDARY WATER COMMISSION
84833	GUADALUPE-BLANCO RIVER AUTHORITY
84913	DISTRICT WATER-QUALITY LAB, SALT LAKE CITY, UTAH
85113	HEADQUARTERS TRITIUM LAB, RESTON, VIRGINIA
85114	DISTRICT WATER-QUALITY LAB, CHARLOTTESVILLE, VIRGINIA
85115	UNIV. OF VIRGINIA DEPT. OF ENVIRONMENTAL SCIENCES LAB
85116	VIRGINIA DIVISION OF CONSOLIDATED LABORATORY SERVICES
85117	JAMES CITY SERVICE AUTHORITY, JAMES CITY COUNTY, VA
85313	DISTRICT WATER-QUALITY LAB, TACOMA, WASHINGTON
85341	AM TEST INC., WASHINGTON
85342	MUNICIPALITY OF METROPOLITAN SEATTLE, WASHINGTON
85343	WASHINGTON STATE DEPT. OF ECOLOGY
85344	WASHINGTON STATE DEPT. OF SOCIAL AND HEALTH SERVICES
85345	ANALYTICAL RESOURCES INCORPORATED (SEATTLE, WASHINGTON)
85346	ECOLOGY AND ENVIRONMENT INC (SEATTLE, WASHINGTON)
85348	EDGE ANALYTICAL (MTC), INC.
85349	SOUND ANALYTICAL SERVICES, INC. FIFE, WA
85350	INLAND ENVIRONMENTAL LABORATORY, INC. SPOKANE, WA
85360	WASHINGTON STATE UNIVERSITY, DEPT. OF GEOLOGY
85411	DISTRICT WATER-QUALITY LAB, CHARLESTON, WV
85540	ROBERT E. LEE AND ASSOC. GREEN BAY, WISC.
85541	MAYO CLINIC, UNIVERSITY OF WISCONSIN
85542	UNIVERSITY OF WISCONSIN EXTENSION
85543	STATE LABORATORY OF HYGIENE, WISCONSIN
85544	HAZELTON LABORATORIES AMERICA (MADISON, WISCONSIN)
85545	WISCONSIN DEPARTMENT OF NATURAL RESOURCES
85546	LAC DU FLAMBEAU BAND OF LAKE SUPERIOR CHIPPEWA INDIANS

	00027--COLLECTING AGENCY
85547	MILWAUKEE METROPOLITAN SEWERAGE DISTRICT, MILWAUKEE, WI
85613	DISTRICT WATER-QUALITY LAB, CHEYENNE, WYOMING
85614	WYOMING DEPARTMENT OF AGRICULTURE
87213	DISTRICT WATER-QUALITY LAB, SAN JUAN, PUERTO RICO
89201	ENVIRONMENT CANADA, WATER QUALITY BR., BURLINGTON, ONTARIO
89213	CHALK RIVER NUCLEAR LABORATORIES, CHALK RIVER, CANADA
89301	MANITOBA ENVIRONMENT, WATER STANDARDS SEC., WINNIPEG, MAN.
89401	SASKATCHEWAN ENVIRONMENT, WATER QUALITY BR., REGINA, SASK.
99001	PRIVATE CONTRACTOR
99999	OTHER

	00028--ANALYZING AGENCY
300	NAPD/NTN – NAT. ATMOS. DEPOSITION PROGRAM/NAT. TRENDS NETW.
500	DEPARTMENT OF AGRICULTURE
504	AGRICULTURAL RESEARCH SERVICE
520	SOIL CONSERVATION SERVICE
596	FOREST SERVICE
600	DEPARTMENT OF COMMERCE
642	NATIONAL INDUSTRIAL POLLUTION CONTROL COUNCIL
648	NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
655	NATIONAL BUREAU OF STANDARDS
700	DEPARTMENT OF DEFENSE - MILITARY
701	AIR FORCE
702	ARMY
703	MARINES
704	NAVY
800	DEPARTMENT OF DEFENSE - CIVIL
810	CORPS OF ENGINEERS
900	DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
910	FOOD AND DRUG ADMINISTRATION
915	ENVIRONMENTAL HEALTH SERVICE
920	FISH & WILDLIFE SERVICE

	00028--ANALYZING AGENCY
930	NATIONAL INSTITUTES OF HEALTH
1000	DEPARTMENT OF THE INTERIOR
1004	BUREAU OF LAND MANAGEMENT
1008	BUREAU OF INDIAN AFFAIRS
1016	BUREAU OF OUTDOOR RECREATION
1028	GEOLOGICAL SURVEY
1032	BUREAU OF MINES
1050	BUREAU OF SPORT FISHERIES AND WILDLIFE
1053	NATIONAL PARK SERVICE
1060	BUREAU OF RECLAMATION
1062	ALASKA POWER ADMINISTRATION
1064	BONNEVILLE POWER ADMINISTRATION
1068	SOUTHEASTERN POWER ADMINISTRATION
1072	SOUTHWESTERN POWER ADMINISTRATION
1076	OFFICE OF SALINE WATER
1086	OFFICE OF WATER RESOURCES RESEARCH
1800	ATOMIC ENERGY COMMISSION
2000	ENVIRONMENTAL PROTECTION AGENCY
2010	USEPA, REGION 1, NEW ENGLAND REGIONAL LABORATORY, LEXINGTON
2020	USEPA, REGION 2, EDISON, NEW JERSEY
2100	DEPARTMENT OF TRANSPORTATION
2300	GENERAL SERVICES ADMINISTRATION
2500	DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
2555	U.S. PUBLIC HEALTH SERVICE, DIVISION OF INDIAN HEALTH
2700	NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
3315	TENNESSEE VALLEY AUTHORITY
3335	WATER RESOURCES COUNCIL
6001	ASSOCIATION OF BAY AREA GOVERNMENTS, CALIFORNIA
6003	ALAMEDA CO. FLOOD CONTROL AND WATER CONSERVATION DIST., CA
6005	EAST BAY REGIONAL PARK DISTRICT, CA
6006	EAST BAY MUNICIPAL UTILITY DISTRICT, OAKLAND CA

	00028--ANALYZING AGENCY
6010	CA REGIONAL WATER QUALITY CONTROL BOARD NORTH COAST REGION
6015	UNITED WATER CONSERVATION DISTRICT, SANTA PAULA CA
6020	SANTA CLARA VALLEY WATER DISTRICT, CALIFORNIA
6021	LA COUNTY AG. COMM. WEIGHTS & MEAS. DEPT. ENV. TOXICOLOGY
6022	ANTELOPE VALLEY EAST KERN WATER AGENCY LABORATORY
6040	QUANTERRA ENVIRONMENTAL SERVICES, WEST SACRAMENTO, CA
8001	CHADWICK AND ASSOCIATES, INC., LITTLETON, CO
9700	STATE HEALTH LABORATORY (00 = STATE CODE)
9701	ALABAMA
9702	ALASKA
9704	ARIZONA
9705	ARKANSAS
9706	CALIFORNIA
9708	COLORADO
9709	CONNECTICUT
9710	DELAWARE
9711	DISTRICT OF COLUMBIA
9712	FLORIDA
9713	GEORGIA
9715	HAWAII
9716	IDAHO
9717	ILLINOIS
9718	INDIANA
9719	IOWA
9720	KANSAS
9721	KENTUCKY
9722	LOUISIANA
9723	MAINE
9724	MARYLAND
9725	MASSACHUSETTS
9726	MICHIGAN

	00028--ANALYZING AGENCY
9727	MINNESOTA POLLUTION CONTROL COUNCIL
9728	MISSISSIPPI
9729	MISSOURI
9730	MONTANA
9731	NEBRASKA
9732	NEVADA
9733	NEW HAMPSHIRE
9734	NEW JERSEY
9735	NEW MEXICO
9736	NEW YORK
9737	NORTH CAROLINA
9738	NORTH DAKOTA
9739	OHIO
9740	OKLAHOMA
9741	OREGON
9742	PENNSYLVANIA
9744	RHODE ISLAND
9745	SOUTH CAROLINA
9746	SOUTH DAKOTA
9747	TENNESSEE
9748	TEXAS
9749	UTAH
9750	VERMONT
9751	VIRGINIA
9753	WASHINGTON
9754	WEST VIRGINIA
9755	WISCONSIN
9756	WYOMING
9760	AMERICAN SAMOA
9761	CANAL ZONE
9762	CANTON AND ENDERBURY ISLANDS

	00028--ANALYZING AGENCY
9766	GUAM
9767	JOHNSTON ATOLL
9771	MIDWAY ISLANDS
9772	PUERTO RICO
9773	RYUKYU ISLANDS, SOUTHERN
9774	SWAN ISLANDS
9775	TRUST TERRITORIES OF THE PACIFIC ISLANDS
9776	U.S. MISCELLANEOUS CARIBBEAN ISLANDS
9777	U.S. MISCELLANEOUS PACIFIC ISLANDS
9778	VIRGIN ISLANDS
9779	WAKE ISLAND
9780	MEXICO
9781	TAMAULIPAS
9782	NUEVO LEON
9783	COAHUILA
9784	CHIHUAHUA
9785	SONORA
9786	BAJA CALIFORNIA NORTE
9790	NEW BRUNSWICK
9791	QUEBEC
9792	ONTARIO
9793	MANITOBA
9794	SASKATCHEWAN
9795	ALBERTA
9796	BRITISH COLUMBIA
9797	YUKON
9801	PRIVATE LABORATORY
9802	SALT RIVER VALLEY USERS ASSOCIATION
9803	METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA
9804	FLORIDA DEPARTMENT OF POLLUTION CONTROL
9805	CENTRAL AND SOUTHERN FLORIDA FLOOD CONTROL DISTRICT

	00028--ANALYZING AGENCY
9806	FLORIDA GAME AND FRESH WATER FISH COMMISSION
9807	FLORIDA DEPARTMENT OF HEALTH AND REHABILITATIVE SERVICES
9808	SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT
9809	CITY OF JACKSONVILLE, FLORIDA
9810	REEDY CREEK IMPROVEMENT DISTRICT, FLORIDA
9811	ORANGE COUNTY POLLUTION CONTROL DEPARTMENT, FLORIDA
9812	BREVARD COUNTY POLLUTION CONTROL DEPARTMENT, FLORIDA
9813	PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL RESOURCES
9814	ALASKA DEPARTMENT OF FISH AND GAME
9815	ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
9816	CALIFORNIA DEPARTMENT OF WATER RESOURCES
9817	ORANGE COUNTY WATER DISTRICT, CALIF.
9818	HILLSBOROUGH COUNTY ENVIRONMENTAL PROTECTION COMM., FL
9819	NASSAU COUNTY DEPARTMENT OF HEALTH, NY
9820	SUFFOLK COUNTY DEPARTMENT OF HEALTH, NY
9821	SUFFOLK COUNTY DEPARTMENT OF ENVIR. CONTROL, NY
9822	SUFFOLK COUNTY WATER AUTHORITY, NY
9823	ALAMEDA COUNTY WATER DISTRICT, CA
9824	ALAMEDA CO. FLOOD CONTROL & WATER CONSER. DIST, ZONE 7, CA
9825	VALLEY COMMUNITY SERVICES DISTRICT (LIVERMORE), CA
9826	CITY OF LIVERMORE WASTE TREATMENT PLANT, CA
9827	ARKANSAS DEPARTMENT OF POLLUTION CONTROL AND ECOLOGY
9828	ARKANSAS GAME AND FISH COMMISSION
9829	NASSAU COUNTY DEPARTMENT OF PUBLIC WORKS, N.Y.
9830	CITY OF ITHACA WASTEWATER TREATMENT PLANT LABORATORY, NY
9831	UNIVERSITY OF IOWA, STATE HYGIENIC LABORATORY
9902	UNIVERSITY OF ARIZONA
9903	UNIVERSITY OF FLORIDA
9904	FLORIDA STATE UNIVERSITY
9905	FLORIDA TECHNOLOGICAL UNIVERSITY
9906	UNIVERSITY OF ALASKA

	00028--ANALYZING AGENCY
10001	UNIVERSITY OF DELAWARE, COLLEGE OF MARINE STUDIES, LEWES, DE
10003	DELAWARE DEPT. NAT. RESOURCES AND ENVIR. CONTROL, DOVER, DE
12001	CITY OF TAMPA, FLORIDA
12002	CITY OF VERO BEACH, FLORIDA
12005	CITY OF TALLAHASSEE, FLORIDA
12007	ITT COMMUNITY DEVELOPMENT CORPORATION, FLORIDA
12010	PALM BEACH COUNTY ENGINEER
12020	PALM BEACH COUNTY HEALTH DEPT.
12030	DADE COUNTY DEPT. OF ENV. RESOURCES MAN.
12040	UNIVERSITY OF MIAMI, TRITIUM LABORATORY, MIAMI, FL
12050	QUANTERRA ENVIRONMENTAL SERVICES, TAMPA, FL
16001	IDAHO DEPARTMENT OF WATER RESOURCES
16002	IDAHO DEPARTMENT OF HEALTH AND WELFARE
17001	METROPOLITAN SANITARY DIST. OF GREATER CHICAGO(MSD)
17002	ILLINOIS ENVIRONMENTAL PROTECTION AGENCY (IEPA)
17003	ILLINOIS STATE WATER SURVEY (ISWS)
17004	INTERSURVEY GEOTECHNICAL LAB, IGS
18001	INDIANA DEPT. ENV. MGMT., DRINKING WATER BRANCH, GW SECTION
18002	INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT (IDEM)
18003	INDIANA GEOLOGICAL SURVEY (IGS)
18004	INDIANA DEPARTMENT OF NATURAL RESOURCES (IDNR)
18005	INDIANAPOLIS DEPARTMENT OF PUBLIC WORKS, INDIANA (IDPW)
18006	PURDUE UNIVERSITY, LAFAYETTE, INDIANA
18007	INDIANA UNIVERSITY, BLOOMINGTON, INDIANA
18008	BALL STATE UNIVERSITY, MUNCIE, INDIANA
18009	ST. JOSEPH RIVER BASIN COMMISSION, INDIANA
20001	KANSAS STATE GEOLOGICAL SURVEY
20003	CITY OF TOPEKA, KANSAS WASTEWATER LABORATORY
20005	CITY OF WICHITA, KANSAS WATER AND WASTEWATER LABORATORY
21001	GEOLOGICAL SURVEY OF KENTUCKY
25001	BARNSTABLE COUNTY HEALTH DEPARTMENT, MASS.

	00028--ANALYZING AGENCY
25003	LEO LAB, MASS
25005	BIOLOGY DEPARTMENT, WOODS HOLE OCEANOGRAPHIC INST., MA
25007	MASS. WRA, SEWERAGE DIVISION CENTRAL LAB, WINTHROP, MA
25009	ALPHA ANALYTICAL LABS, WESTBOROUGH, MA
26001	PHYCOTECH, ST JOSEPH, MI
27001	MINN. DEPARTMENT OF NATURAL RESOURCES (DNR), ST. PAUL, MN
27002	MINN. DNR, WATERS DIVISION, ST. PAUL, MN
27003	MINN. DNR, FISH AND WILDLIFE DIVISION, ST. PAUL, MN
27004	MINN. DNR, FORESTRY DIVISION, ST. PAUL, MN
27005	MINN. DNR, MINERALS DIVISION, ST. PAUL, MN
27010	MINN. POLLUTION CONTROL AGENCY (PCA), ST. PAUL, MN
27011	MINN. PCA, WATER QUALITY DIVISION, ST. PAUL, MN
27012	MINN. PCA, SOLID/HAZARDOUS WASTE DIVISION, ST. PAUL, MN
27013	MINN. PCA, AIR QUALITY DIVISION, ST. PAUL, MN
27020	MINN. DEPARTMENT OF HEALTH, MINNEAPOLIS, MN
27030	MINN. GEOLOGICAL SURVEY, ST. PAUL, MN
27035	UNIV. OF MINNESOTA, MINNEAPOLIS-ST. PAUL, MN
27036	UNIV. OF MINN., GEOLOGY AND GEOPHYSICS, MINNEAPOLIS, MN
27037	UNIV. OF MINN., RESEARCH ANALYTICAL LAB, ST. PAUL, MN
27038	UNIV. OF MINN., GRAY FRESHWATER BIO. INST., NAVARRE, MN
27039	UNIV. OF MINN., SOIL SCIENCE
27040	UNIV. OF MINN., AGRICULTURAL ENGINEERING, ST. PAUL, MN
27041	UNIV. OF MINN., ECOL., EVOL., AND BEHAVIOR, ST. PAUL, MN
27050	METROPOLITAN WASTE CONTROL COMMISSION, ST. PAUL, MN
28001	OFFICE OF POLLUTION CONTROL, MISSISSIPPI
28002	OFFICE OF GEOLOGY, MISSISSIPPI
28003	OFFICE OF LAND AND WATER RESOURCES, MISSISSIPPI
28004	MISSISSIPPI STATE CHEMICAL LABORATORY, MISS. STATE UNIV.
29001	MISSOURI DEPT OF NATURAL RESOURCES, DIV OF ENVIR. QUALITY
30010	MONTANA BUREAU OF MINES AND GEOLOGY
30020	MONTANA DEPT. OF FISH WILDLIFE AND PARKS

	00028--ANALYZING AGENCY
30030	MONTANA DEPT. OF HEALTH/ENV. SCIENCES, WATER QUALITY BUREAU
30040	MONTANA AGRICULTURAL RESEARCH CENTER
30050	MONTANA TUNNELS MINING, INC., WICKES, MT
30060	WATER CONSULTING, INC., HAMILTON, MT
31001	NEBRASKA DEPARTMENT OF ENVIRONMENTAL CONTROL LABORATORY
32001	NEVADA DIVISION OF ENVIRONMENTAL PROTECTION
32003	NEVADA DIVISION OF WATER RESOURCES
32005	UNIV. OF NEV., DIV. OF RENEW. NAT. RESOURCES
32006	NEVADA BUREAU OF ENVIRONMENTAL HEALTH
32007	NEVADA BUREAU OF MINES & GEOLOGY
32009	NEVADA DEPARTMENT OF FISH & GAME
32010	NEVADA DIVISION OF FORESTRY
32011	NEVADA DIVISION OF PARKS
32012	NEVADA CONSUMER HEALTH PROTECTION SERVICE
32013	UNIV. OF NEV., DESERT RESEARCH INSTITUTE
32014	UNIV. OF NEV., COLLEGE OF AGRICULTURE
32015	CLARK COUNTY DISTRICT HEALTH DEPARTMENT, NEVADA
32016	WASHOE COUNTY DISTRICT HEALTH DEPARTMENT, NEVADA
32017	LAS VEGAS VALLEY WATER DISTRICT, NEVADA
32018	SIERRA PACIFIC POWER CO., NEVADA
32019	NEVADA BUREAU OF LABORATORIES AND RESEARCH
32020	WASHOE COUNTY UTILITIES, RENO, NV
32021	CARSON CITY PUBLIC WORKS, CARSON CITY, NV
32022	TRUCKEE MEADOWS WATER RECLAMATION FACILITY, RENO, NV
32091	WASHOE COUNTY COG, NEVADA
32092	CLARK COUNTY COG, NEVADA
32093	MUNICIPAL WATER COMPANY, NEVADA
34001	NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
34002	ROY F. WESTON INC., WEST CHESTER, PA
34003	BOOTH, GARRETT, AND BLAIR INC., AMBLER, PA
34004	CAPE MAY COUNTY, NJ, DEPARTMENT OF HEALTH

	00028--ANALYZING AGENCY
34005	CAPE MAY COUNTY, NJ, PLANNING BOARD
34006	QUANTERRA ENVIRONMENTAL SERVICES, SUMMERSET, NJ
34007	ACCUTEST LABORATORIES, DAYTON, NJ
34008	ANALAB INC, EDISON, NJ
34010	NEW JERSEY, DEP, BUREAU OF MARINE WATER MONITORING LAB
36010	NEW YORK DEPARTMENT OF HEALTH
36012	NEW YORK DEPT. OF ENVIRONMENTAL CONSERVATION, ALBANY, NY
36015	ENVIRONMENTAL ASSOCIATES, ITHACA, NY
36020	NASSAU COUNTY, DEPARTMENT OF PUBLIC WORKS
38001	NORTH DAKOTA GEOLOGICAL SURVEY
38002	NORTH DAKOTA STATE WATER COMMISSION
38003	NORTH DAKOTA STATE HEALTH DEPARTMENT
38004	SPIRIT LAKE TRIBE, NORTH DAKOTA
39001	HEIDELBERG COLLEGE QW LAB, TIFFIN, OHIO
39002	NORTHEASTERN OHIO REGIONAL SEWER DISTRICT, OHIO
39003	LAKE COUNTY GENERAL HEALTH DISTRICT, OHIO
39004	CUYAHOGA COUNTY BOARD OF HEALTH, OHIO
40810	CORPS OF ENGINEERS, TULSA DISTRICT
41000	CITY OF PORTLAND, BUREAU OF WATER WORKS
42010	CITY OF PHILADELPHIA, PA.
42011	SUSQUEHANNA RIVER BASIN COMMISSION
42015	THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA, PA
42016	PENN STATE HARRISBURG, MIDDLETOWN, PA
42020	QUANTERRA ENVIRONMENTAL SERVICES, PITTSBURGH, PA
44001	PHILIP J. HOLTON WATER PURIFICATION PLANT, SCITUATE, RI
46001	SOUTH DAKOTA STATE UNIVERSITY SOILS LABORATORY
46002	SOUTH DAKOTA WATER RESOURCES INSTITUTE
46003	SOUTH DAKOTA AGRICULTURAL EXPERIMENT STATION
46004	SOUTH DAKOTA STATE CHEMIST
46005	SOUTH DAKOTA SCHOOL OF MINES AND TECHNOLOGY
46006	SOUTH DAKOTA STATE UNIVERSITY, DEPT. STATION BIOCHEMISTRY

	00028--ANALYZING AGENCY
46007	SOUTH DAKOTA DIVISION OF WATER RIGHTS
46008	SOUTH DAKOTA GEOLOGICAL SURVEY, VERMILLION, SD
46009	SOUTH DAKOTA DEPARTMENT OF HEALTH
47001	UNIVERSITY OF TENNESSEE AT KNOXVILLE
48001	TEXAS A&M U., TRACE ELEMENT RESEARCH LAB., COLLEGE STA., TX
49001	KENNECOTT ENVIRONMENTAL LAB, SALT LAKE CITY, UT
51001	HAMPTON ROADS SANITATION DIST, CENT ENVIR LAB, VIRG BCH, VA
51003	GEORGE MASON UNIVERSITY, FAIRFAX, VA
51005	VIRGINIA TECH., OCCOQUAN WATERSHED MONITORING LABORATORY
55555	INDIVIDUAL
66666	DRILLER
80000	QA PROJECT
80003	INST. TECH. HERNPHYSIK, DORMSTADT, FEDERAL REPUBLIC OF GERM
80010	ATLANTA CENTRAL LABORATORY, GA
80020	USGS-NATIONAL WATER QUALITY LAB, DENVER, CO
80030	ALBANY CENTRAL LABORATORY, NY
80040	USGS GEOLOGIC DIVISION, BRANCH OF GEOCHEMISTRY, ARVADA, CO
80042	USGS, BIOLOGY DEPT., WOODS HOLE OCEANOGRAPHIC INS, MA
80045	USGS-GEOLOGIC DIVISION RADIONUCLIDE LAB, DENVER, CO
80055	IEAE, VIENNA, AUSTRIA
80088	RADIOACTIVE DATING LAB, GEOL. SURVEY, SWEDEN-FRESCATI
80090	USGS-NATIONAL RESEARCH PROGRAM LAB, RESTON, VA
80093	USGS-NATIONAL RESEARCH PROGRAM LAB, DENVER/BOULDER, CO
80095	USGS-NATIONAL RESEARCH PROGRAM LAB, MENLO PARK, CA
80113	DISTRICT WATER-QUALITY LAB, TUSCALOOSA, ALABAMA
80141	GEOLOGICAL SURVEY OF ALABAMA
80201	ALASKA DIVISION OF GEOLOGIC AND GEOPHYSICAL SURVEYS (DGGS)
80203	CHEMICAL AND GEOLOGICAL LABORATORIES OF ALASKA
80205	NORTHERN TEST LAB (SOLDOTNA, ALASKA)
80213	DISTRICT WATER-QUALITY LAB, ANCHORAGE, ALASKA
80410	CITY OF TUCSON, AZ

	00028--ANALYZING AGENCY
80413	DISTRICT WATER-QUALITY LAB, YUMA, ARIZONA
80415	ARIZ. DEPT. OF ENVIRONMENTAL QUALITY
80417	ARIZ. DEPT. OF WATER RESOURCES
80501	OUACHITA BAPTIST UNIVERSITY, ARKADELPHIA, ARKANSAS
80503	UNIVERSITY OF ARKANSAS, DEPT. OF ENGINEERING, FAYETTEVILLE
80505	UNIVERSITY OF ARKANSAS, DEPT. OF GEOLOGY, FAYETTEVILLE
80513	DISTRICT WATER-QUALITY LAB, LITTLE ROCK, ARKANSAS
80515	ARKANSAS GEOLOGICAL COMMISSION
80601	HEALTH AND HUMAN SERVICES INDIAN HEALTH SERVICES, CALIFORNIA
80613	DISTRICT WATER-QUALITY LAB, SACRAMENTO, CALIFORNIA
80618	DISTRICT WATER-QUALITY LAB, SAN DIEGO, CALIFORNIA
80620	SEVERN-TRENT LABORATORY – SACRAMENTO: WEST SACRAMENTO, CALIFORNIA
80623	CITY OF SAN DIEGO LAB, CALIFORNIA
80630	SEVERN-TRENT LABORATORY – LOS ANGELES: SANTA ANA, CALIFORIA
80641	LAWRENCE LIVERMORE LAB, CALIFORNIA
80642	GLOBAL GEOCHEMISTRY CORPORATION, CANOGA PARK, CALIFORNIA
80643	EBERLINE SERVICES, RICHMOND, CALIFORNIA
80650	UNIVERSITY OF CALIFORNIA, BERKELEY
80670	UNIVERSITY OF CALIFORNIA, DAVIS
80671	UNIVERSITY OF CALIFORNIA, SAN DIEGO, LA JOLLA
80672	UNIVERSITY OF CALIFORNIA, LOS ANGELES
80801	CITY OF ARVADA, CO
80810	COLORADO DIVISION OF WILDLIFE
80820	PINE RIVER WATERSHED STAKEHOLDERS GROUP, CO
80839	ENV.HEALTH DIV. VET.SCIENCE COLLEGE, CSU, FORT COLLINS, CO
80841	DAVIS LABORATORIES, COLORADO
80843	DENVER REGIONAL COUNCIL OF GOVERNMENT
80845	METROPOLITAN DENVER SEWAGE DISPOSAL DISTRICT LAB. NO. 1
80847	SOILS TESTING LABORATORY, COLO STATE UNIV, FT. COLLINS, CO
80849	ROCKY MOUNTAIN ANALYTICAL LABORATORY (ARVADA, COLORADO)
80851	UPPER CLEAR CREEK ADVISORY GROUP, IDAHO SPRINGS, CO

	00028--ANALYZING AGENCY
80853	CITY OF COLORADO SPRINGS, ENVIRONMENTAL QUALITY LAB
80855	SEVERN-TRENT LABORATORY, DENVER, CO
80857	CITY OF FORT COLLINS, CO
80859	ACCULABS, INC., GOLDEN, CO
81113	DISTRICT WATER-QUALITY LAB, WASHINGTON, D.C.
81210	ST. JOHNS WATER MANAGEMENT DISTRICT, FLORIDA
81213	DISTRICT WATER-QUALITY LAB, OCALA, FLORIDA
81223	INSTITUTE OF MARINE SCIENCE, MIAMI, FLORIDA
81227	VOLUSIA COUNTY ENVIRONMENTAL CONTROL, FL
81229	UNIVERSITY OF MIAMI, MIAMI, FL
81232	SOUTH FLORIDA WATER MANAGEMENT DISTRICT, W. PALM BEACH, FL
81233	FLORIDA INTERNATIONAL UNIVERSITY, MIAMI, FL
81320	SEVERN-TRENT LABORATORY – SAVANNAH: SAVANNAH, GEORGIA
81341	GEORGIA STATE NATURAL RESOURCES DEPARTMENT
81345	USGS, PANOLA MOUNTAIN RESEARCH (WEBB) LAB, GEORGIA
81350	USGS, SEDIMENT-PARTITIONING RESEARCH LAB, GEORGIA
81513	DISTRICT WATER-QUALITY LAB, HONOLULU, HAWAII
81601	RADIOLOGICAL & ENV. SCIENCES LAB, DOE, INEL, IDAHO FALLS, ID
81603	ENVIRONMENTAL CHEMISTRY LAB, E.G.&G., INEL, IDAHO FALLS, ID
81605	RADIATION MEASUREMENTS LAB, E.G.&G., INEL, IDAHO FALLS, ID
81607	ENVIRONMENTAL ANALYSIS GROUP, WINCO, INEL, IDAHO FALLS, ID
81641	IDAHO DEPT. OF HEALTH AND WELFARE, BUREAU OF LABORATORIES
81700	USGS - ILLINOIS DISTRICT
81720	SEVERN-TRENT LABORATORY – CHICAGO: CHICAGO, ILLINOIS
81741	BLOOMINGTON NORMAL SANITARY DISTRICT, ILLINOIS
81777	UNIVERSITY OF CHICAGO, ILLINOIS
81941	IOWA STATE HYGIENIC LABORATORY
81951	IOWA DEPARTMENT OF ENVIRONMENTAL QUALITY
81960	USGS-IOWA DISTRICT SEDIMENT LAB, IOWA CITY, IA
82013	DISTRICT RESEARCH WATER-QUALITY LAB, LAWRENCE, KS
82041	KANSAS STATE DEPARTMENT OF HEALTH AND ENVIRONMENT

	00028--ANALYZING AGENCY
82043	JOHNSON COUNTY ENVIRONMENTAL LABORATORY, LENEXA, KANSAS
82101	KENTUCKY CABINET OF HUMAN RESOURCES
82103	BECKMAR ENVIRONMENTAL LABORATORY, KENTUCKY
82213	DISTRICT WATER-QUALITY LAB, BATON ROUGE, LOUISIANA
82241	LOUISIANA, GULF SOUTH RESEARCH INSTITUTE
82301	UNIVERSITY OF MAINE LABORATORY, ORONO, ME
82303	HOULTON BAND OF MALISEET INDIANS, MAINE
82341	MAINE, DEPT. OF ENVIRONMENTAL PROTECTION
82440	DISTRICT WATER-QUALITY LAB, BALTIMORE, MARYLAND
82520	SEVERN-TRENT LABORATORY – ON-SITE TECHNOLOGY: WESTFIELD, MASSACHUSETTS
82641	WASHTENAW COUNTY HEALTH DEPARTMENT, MICHIGAN
82810	UNIVERSITY OF SOUTHERN MISSISSIPPI
82901	UNIV. OF MISSOURI ENVIRONMENTAL TRACE SUBSTANCES LAB
82913	DISTRICT WATER-QUALITY LAB, ROLLA, MISSOURI
83011	MT DEPARTMENT OF ENVIRONMENTAL QUALITY
83101	HARRIS LABORATORIES, LINCOLN, NEBRASKA
83105	OLSEN'S AGRICULTRUAL LABORATORY, INC., MCCOOK, NE
83107	UNIVERSITY OF NEBRASKA, LIMNOLOGY LABORATORY, LINCOLN, NB
83113	DISTRICT WATER-QUALITY LAB, LINCOLN, NEBRASKA
83241	SIERRA ENVIRONMENTAL MONITORING SERVICE, NEVADA
83341	WATER SUPPLY & POLLUTION CONTROL COMM. LAB., N.H.
83401	TELEDYNE ISOTOPES, INC. NEW JERSEY
83405	SUSSEX COUNTY HEALTH DEPARTMENT, NEW JERSEY
83410	RUTGERS UNIVERSITY, GEOLOGY DEPARTMENT, STABLE ISOTOPE LAB, NJ
83441	NEW JERSEY DEPT. OF HEALTH LABORATORY
83481	EMSL ANALYTICAL SERVICES, WESTMONT, NEW JERSEY
83513	DISTRICT WATER-QUALITY LAB, ALBUQUERQUE, NEW MEXICO
83523	NEW MEXICO INSTITUTE OF MINING AND TECHNOLOGY - SOCORRO
83541	UNIVERSITY OF NEW MEXICO
83542	USBIA SOIL, WATER, & MATERIAL TESTING LAB., NEW MEXICO
83611	MONROE COUNTY HEALTH DEPARTMENT, NEW YORK

	00028--ANALYZING AGENCY
83613	DISTRICT WATER-QUALITY LAB, ALBANY, NEW YORK
83620	UPSTATE FRESHWATER INSTITUTE, NEW YORK
83621	O'BRIEN AND GERE, NEW YORK
83630	SYRACUSE UNIVERSITY, DEPT. OF CIVIL ENGINEERING
83631	METROPOLITAN LABORATORY, NEW YORK
83650	ERIE COUNTY LABORATORY, NEW YORK
83660	STATE UNIVERSITY OF NEW YORK AT CORTLAND, NEW YORK
83671	COLUMBIA UNIVERSITY, NEW YORK
83713	DISTRICT WATER-QUALITY LAB, RALEIGH, NORTH CAROLINA
83741	NORTH CAROLINA DEPT. OF NATURAL AND ECONOMIC RESOURCES
83751	MECKLENBURG CO. DEPT. OF ENVIRONMENTAL HEALTH LAB, N.C.
83841	NORTH DAKOTA STATE LABORATORY
83901	NATIONAL TESTING LABORATORY, WATER CHECK DIVISION, OHIO
83905	OHIO ENVIRONMENTAL PROTECTION AGENCY, COLUMBUS, OHIO
83913	DISTRICT WATER-QUALITY LAB, COLUMBUS, OHIO
83914	DISTRICT MICROBIOLOGICAL LABORATORY, COLUMBUS, OHIO
83915	CITY OF COLUMBUS, WATER QUALITY ASSURANCE LABORATORY, OHIO
83920	SEVERN-TRENT LABORATORY – NORTH CANTON: NORTH CANTON, OHIO
84001	OKLAHOMA WATER RESOURCES BOARD
84003	OKLAHOMA STATE UNIVERSITY
84005	OKLAHOMA STATE HEALTH DEPT. RADIOCHEMISTRY LABORATORY
84007	OKLAHOMA STATE DEPARTMENT OF AGRICULTURE
84009	ASSOCIATION OF CENTRAL OKLAHOMA GOVERNMENTS
84011	OKLAHOMA CORPORATION COMMISSION
84013	DISTRICT WATER-QUALITY LAB, OKLAHOMA CITY, OKLAHOMA
84015	OKLAHOMA CONSERVATION COMMISSION, OKLAHOMA CITY, OK
84017	OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY (ODEQ)
84041	OKLAHOMA GEOLOGICAL SURVEY
84042	OKLAHOMA STATE HEALTH DEPARTMENT
84101	OREGON GRADUATE INSTITUTE, BEAVERTON, OREGON
84113	DISTRICT WATER-QUALITY LAB, PORTLAND, OREGON

	00028--ANALYZING AGENCY
84213	DISTRICT WATER-QUALITY LAB, HARRISBURG, PENNSYLVANIA
84215	CHESTER COUNTY HEALTH DEPARTMENT LAB, PA.
84217	ALLEGHENY COUNTY HEALTH DEPARTMENT LAB, PITTSBURGH, PA
84220	SEVERN-TRENT LABORATORY – PITTSBURGH: PITTSBURGH, PA
84240	CITY OF PHILADELPHIA, PA AND USGS
84250	LANCASTER LABORATORIES, LANCASTER, PENNSYLVANIA
84540	SOUTH CAROLINA WATER RESOURCES COMMISSION
84541	SAVANNAH RIVER LAB, SOUTH CAROLINA
84610	URE PROJECT LABORATORY, OAK RIDGE, TN
84699	PUBLIC ENTITY
84813	DISTRICT WATER-QUALITY LAB, AUSTIN, TEXAS
84820	SEVERN-TRENT LABORATORY – AUSTIN: AUSTIN, TEXAS
84823	INTERNATIONAL BOUNDARY WATER COMMISION
84833	GUADALUPE-BLANCO RIVER AUTHORITY
84913	DISTRICT WATER-QUALITY LAB, SALT LAKE CITY, UTAH
85020	SEVERN-TRENT LABORATORY – BURLINGTON: COLCHESTER, VERMONT
85113	HEADQUARTERS TRITIUM LAB, RESTON, VIRGINIA
85114	DISTRICT WATER-QUALITY LAB, CHARLOTTESVILLE, VIRGINIA
85115	UNIV. OF VIRGINIA DEPT. OF ENVIRONMENTAL SCIENCES LAB
85116	VIRGINIA DIVISION OF CONSOLIDATED LABORATORY SERVICES
85313	DISTRICT WATER-QUALITY LAB, TACOMA, WASHINGTON
85341	AM TEST INC., WASHINGTON
85342	MUNICIPALITY OF METROPOLITAN SEATTLE, WASHINGTON
85343	WASHINGTON STATE DEPT. OF ECOLOGY
85344	WASHINGTON STATE DEPT. OF SOCIAL AND HEALTH SERVICES
85345	ANALYTICAL RESOURCES INCORPORATED (SEATTLE, WASHINGTON)
85346	ECOLOGY AND ENVIRONMENT INC (SEATTLE, WASHINGTON)
85347	INTERNATIONAL TECHNOLOGY CORPORATION, RICHLAND, WA
85348	EDGE ANALYTICAL (MTC), INC.
85349	SOUND ANALYTICAL SERVICES, INC. FIFE, WA
85350	INLAND ENVIRONMENTAL LABORATORY, INC. SPOKANE, WA

	00028--ANALYZING AGENCY
85351	FRONTIER GEOSCIENCES, SEATTLE, WA
85411	DISTRICT WATER-QUALITY LAB, CHARLESTON, WV
85540	ROBERT E. LEE AND ASSOC. GREEN BAY, WISC.
85541	MAYO CLINIC, UNIVERSITY OF WISCONSIN
85542	UNIVERSITY OF WISCONSIN EXTENSION
85543	STATE LABORATORY OF HYGIENE, WISCONSIN
85544	HAZELTON LABORATORIES AMERICA (MADISON, WISCONSIN)
85547	MILWAUKEE METROPOLITAN SEWERAGE DISTRICT, MILWAUKEE, WI
85548	MADISON DEPARTMENT OF PUBLIC HEALTH, MADISON, WI
85550	USGS-WISCONSIN DISTRICT MERCURY LAB, MADISON, WI
85613	DISTRICT WATER-QUALITY LAB, CHEYENNE, WYOMING
85614	LOUISVILLE & JEFFERSON COUNTY METRO SEWER DISTRICT LAB
85641	WYOMING DEPARTMENT OF AGRICULTURE
87213	DISTRICT WATER-QUALITY LAB, SAN JUAN, PUERTO RICO
89201	ENVIRONMENT CANADA, QATER QUALITY BR., BURLINGTON, ONTARIO
89202	XRAL LABORATORY SERVICES, DON MILLS, ONTARIO, CANADA
89203	ACTIVATION LABS, LTD., ANCASTER, ONTARIO, CANADA
89213	CHALK RIVER NUCLEAR LABORATORIES, CHALK RIVER, CANADA
89301	MANITOBA ENVIRONMENT, WATER STANDARDS SEC., WINNIPEG, MAN.
89401	SASKATCHEWAN ENVIRONMENT, WATER QUALITY BR., REGINA, SASK.
92001	UNIV. OF WATERLOO, ISOTOPE LAB, WATERLOO, ONTARIO, CANADA
99001	PRIVATE CONTRACTOR
99999	OTHER

	00041--WEATHER
0	CLOUDLESS
1	PARTLY CLOUDY
2	CLOUDY
3	OVERCAST
10	PRECIPITATION WITHIN SIGHT
13	UGLY, THREATENING SKY
40	FOG

	00041--WEATHER
50	DRIZZLE
51	SLIGHT DRIZZLE, INTERMITTENT
52	SLIGHT DRIZZLE, CONTINUOUS
53	MODERATE DRIZZLE, INTERMITTENT
54	MODERATE DRIZZLE, CONTINUOUS
55	THICK DRIZZLE, INTERMITTENT
56	THICK DRIZZLE, CONTINUOUS
57	DRIZZLE AND FOG
58	SLIGHT OR MODERATE DRIZZLE AND RAIN
59	THICK DRIZZLE AND RAIN
60	RAIN
61	SLIGHT RAIN, INTERMITTENT
62	SLIGHT RAIN, CONTINUOUS
63	MODERATE RAIN, INTERMITTENT
64	MODERATE RAIN, CONTINUOUS
65	HEAVY RAIN, INTERMITTENT
66	HEAVY RAIN, CONTINUOUS
67	RAIN AND FOG
68	SLIGHT OR MODERATE MIXED RAIN AND SNOW
69	HEAVY MIXED RAIN AND SNOW
70	SNOW OR SLEET
71	SLIGHT SNOW IN FLAKES, INTERMITTENT
72	SLIGHT SNOW IN FLAKES, CONTINUOUS
73	MODERATE SNOW IN FLAKES, INTERMITTENT
74	MODERATE SNOW IN FLAKES, CONTINUOUS
75	HEAVY SNOW IN FLAKES, INTERMITTENT
76	HEAVY SNOW IN FLAKES, CONTINUOUS
77	SNOW AND FOG
78	GRANULAR SNOW (FROZEN DRIZZLE)
79	ICE CRYSTALS
80	SHOWER(S)

	00041--WEATHER
81	SLIGHT OR MODERATE RAIN SHOWER(S)
82	HEAVY RAIN SHOWER(S)
83	SLIGHT OR MODERATE SNOW SHOWER(S)
84	HEAVY SNOW SHOWER(S)
85	SLIGHT OR MODERATE RAIN AND SNOW SHOWER(S)
86	HEAVY RAIN AND SNOW SHOWER(S)
87	GRANULAR SNOW SHOWER(S)
88	SLIGHT OR MODERATE HAIL OR RAIN AND HAIL SHOWER(S)
89	HEAVY HAIL OR RAIN AND HAIL SHOWER(S)
90	THUNDERSTORM
93	SLIGHT THUNDERSTORM WITH RAIN OR SNOW
94	SLIGHT THUNDERSTORM WITH HAIL
95	MODERATE THUNDERSTORM WITH RAIN OR SNOW
96	MODERATE THUNDERSTORM WITH HAIL
97	HEAVY THUNDERSTORM WITH RAIN OR SNOW
99	HEAVY THUNDERSTORM WITH HAIL
	00115--SAMPLE TREATMENT
1	RAW
2	TREATED
3	WASTEWATER
4	DRINKING WATER
	01300--OIL-GREASE (SEVERITY)
0	NONE
1	MILD
2	MODERATE
3	SERIOUS
4	EXTREME
	01305--DETERGENT SUDS (SEVERITY)
0	NONE
1	MILD
2	MODERATE

	01305--DETERGENT SUDS (SEVERITY)
3	SERIOUS
4	EXTREME
	01310--GAS BUBBLES (SEVERITY)
0	NONE
1	MILD
2	MODERATE
3	SERIOUS
4	EXTREME
	01315--SLUDGE: FLOATING (SEVERITY)
0	NONE
1	MILD
2	MODERATE
3	SERIOUS
4	EXTREME
	01320--GARBAGE, FLOATING (SEVERITY)
0	NONE
1	MILD
2	MODERATE
3	SERIOUS
4	EXTREME
	01325--ALGAE, FLOATING MATS (SEVERITY)
0	NONE
1	MILD
2	MODERATE
3	SERIOUS
4	EXTREME
	01330--ODOR, ATMOSPHERIC (SEVERITY)
0	NONE
1	MILD
2	MODERATE
3	SERIOUS

	01330--ODOR, ATMOSPHERIC (SEVERITY)
4	EXTREME
	01340--FISH, DEAD (SEVERITY)
0	NONE
1	MILD
2	MODERATE
3	SERIOUS
4	EXTREME
	01345--DEBRIS, FLOATING (SEVERITY)
0	NONE
1	MILD
2	MODERATE
3	SERIOUS
4	EXTREME
	01350--TURBIDITY (SEVERITY)
0	NONE
1	MILD
2	MODERATE
3	SERIOUS
4	EXTREME
	01351--STREAMFLOW (SEVERITY)
1	DRY
2	LOW
3	NORMAL
4	FLOOD
5	ABOVE NORMAL
	01355--ICE COVER, FLOATING OR SOLID (SEVERITY)
0	NONE
1	MILD
2	MODERATE
3	SERIOUS
4	EXTREME

	04117--TETHER LINE USED FOR COLLECTING SAMPLE (YES=1)
1	YES
0.00	NO
	31678--STREPTOCOCI, FECAL, TUBE CONFIGURATION
1	FIVE 10-ML TUBES
2	FIVE 10-ML, FIVE 1-ML AND FIVE 0.1-ML TUBES
3	FIVE 10-ML, ONE 1-ML AND ONE 0.1-ML TUBES
4	ONE 50-ML AND FIVE 10-ML TUBES
5	ONE 50-ML, FIVE 10-ML AND FIVE 1-ML TUBES
6	FIVE 50-ML, FIVE 10-ML AND FIVE 1-ML TUBES
7	THREE 10-ML, THREE 1-ML AND THREE 0.1-ML TUBES
8	FIVE 100-ML, FIVE 10-ML AND FIVE 1-ML TUBES
	49986--DEGREE OF DECOMPOSITION, SOIL
1	FIBRIX
2	HEMIC
3	SAPRIC
	50276--FILTER TYPE
10	GELMAN CAPSULE, 0.45UM
20	MEMBRANE, 0.45UM, 142MM
30	MEMBRANE, O,45UM, 47MM
40	MEMBRANE, 0.22UM, 47MM
50	MEMBRANE, 0.1UM, 47MM
60	MEMBRANE, 0.1UM, 142MM
70	MEMBRANE, SYRINGE-TYPE, 0.45UM
80	MEMBRANE, SYRINGE-TYPE, 0.22UM
90	SILVER MEMBRANE, 0.45UM, 47MM
100	GLASS FIBER, 0.7UM, 142MM
110	GLASS FIBER, BAKED, 0.7UM, 142MM
120	GLASS FIBER, 0.7UM, 47MM
130	GLASS FIBER, BAKED, 0.7UM, 47MM
200	OTHER

	50280--PURPOSE, SITE VISIT, CODE
1001	FIXED FREQUENCY, SURFACE-WATER
1002	STORM HYDROGRAPH, SURFACE-WATER
1003	EXTREME HIGH FLOW, SURFACE-WATER
1004	EXTREME LOW FLOW, SURFACE-WATER
1005	DIURNAL, SURFACE-WATER
1006	SYNOPTIC, SURFACE-WATER
1098	SURFACE-WATER QUALITY CONTROL
1099	OTHER, SURFACE-WATER
2001	PRIMARY, GROUND-WATER
2002	SUPPLEMENTAL, GROUND-WATER
2003	TEMPORAL CHARACTERIZATION, GROUND-WATER
2004	RESAMPLE, GROUND-WATER
2098	GROUND-WATER QUALITY CONTROL
2099	OTHER, GROUND-WATER
3001	OCCURRENCE SURVEY, BED SEDIMENT OR TISSUE
3002	SPATIAL DISTRIBUTION SURVEY, BED SEDIMENT OR TISSUE
3003	SYNOPTIC STUDY, BED SEDIMENT OR TISSUE
3098	BED-SEDIMENT OR TISSUE QUALITY CONTROL
3099	OTHER, BED SEDIMENT OR TISSUE
4001	RECONSTRUCTIVE TRENDS FROM SEDIMENT CORE
5051	SAMPLE COLLECTED DURING SITE INSTALLATION, ANY MEDIA
5052	EVENT-BASED (RUNOFF OR RECHARGE CONDITIONS), ANY MEDIA
5053	FIXED FREQUENCY (NON EVENT-BASED), ANY MEDIA
5099	OTHER PURPOSE, ANY MEDIA
	62955--SAMPLE MATRIX, CODE
70	SOIL
80	BOREHOLE CORE
90	BOREHOLE CUTTINGS
	71995--WATER USE, PRIMARY
111	CASH GRAINS
131	FIELD CROPS - EXCEPT CASH GRAINS

	71995--WATER USE, PRIMARY
131	FIELD CROPS - EXCEPT CASH GRAINS
161	VEGETABLES AND MELONS
171	FRUITS AND TREE NUTS
181	HORTICULTURAL SPECIALTIES
191	GENERAL FARM CROPS
211	LIVESTOCK
251	POULTRY AND EGGS
271	ANIMAL SPECIALTIES
291	GENERAL FARMS - PRIMARILY LIVESTOCK
711	AGRICULTURAL SERVICES - SOIL PREP, CROP PLANTINGS, ETC.
741	VETERINARY SERVICES
761	ANIMAL SERVICES, FARM LABOR AND MANAGEMENT
811	FORESTRY
912	FISH AND WILDLIFE FARMING
1011	METAL MINING
1111	ANTHRACITE MINING
1211	BITUMINOUS COAL AND LIGNITE MINING
1311	OIL AND GAS EXTRACTION
1411	MINING AND QUARRYING OF NONMETALIC MINERALS, - NONFUEL
1521	BUILDING CONSTRUCTION
1611	CONSTRUCTION - OTHER THAN BUILDING
1711	SPECIAL TRADE (PLUMBING, HEAT, AIR, ELEC., MASONRY, ETC.)
2011	MANUFACTURING - MEAT PRODUCTS
2016	POULTRY AND EGG PLANTS
2021	DAIRY PRODUCTS
2032	CANNED & PRESERVED FRUITS AND VEGETABLES
2041	GRAIN MILL PRODUCTS
2051	BAKERY PRODUCTS
2061	SUGAR AND CONFECTIONERY PRODUCTS
2074	FATS AND OILS
2084	BEVERAGES - ALCOHOLIC & SOFT DRINKS, SYRUPS & EXTRACTS

	71995--WATER USE, PRIMARY
2091	MISCELLANEOUS FOOD PREPARATIONS
2111	TOBACCO MANUFACTURERS
2211	TEXTILE MILL PRODUCTS
2311	APPAREL - PRODUCTS FROM FABRICS
2411	LUMBER & WOOD PRODUCTS EXCEPT FURNITURE
2511	FURNITURE AND FIXTURES
2611	PAPER AND ALLIED PRODUCTS
2711	PRINTING, PUBLISHING, & ALLIED INDUSTRIES
2821	CHEMICALS AND ALLIED PRODUCTS
2911	PETROLEUM REFINING AND RELATED PRODUCTS
3011	RUBBER AND MISCELLANEOUS PLASTIC PRODUCTS
3111	LEATHER AND LEATHER PRODUCTS
3211	STONE, CLAY, GLASS, AND CONCRETE PRODUCTS
3281	CUT STONE AND STONE PRODUCTS
3291	ABRASIVE, ASBESTOS, & MISCELLANEOUS NONMETALIC PRODUCTS
3312	BLAST FURNACES, STEEL WORKS, & ROLLING & FINISHING MILLS
3411	METAL PRODUCTS & TRANS. EQUIPMENT (NO MACHINERY)
3511	MACHINERY, EXCEPT ELECTRICAL
3612	ELECTRICAL & ELECTRONIC MACHINERY, EQUIPMENT & SUPPLIES
3711	TRANSPORTATION EQUIPMENT REPAIRING AND PARTS
3811	MEASURING, ANALYZING, & CONTROLLING INSTRUMENTS
3911	MISCELLANEOUS MANUFACTURING INDUSTRIES
4011	TRANSPORTATION - TRAINS, TAXICABS, AIRCRAFT
4212	MOTOR FREIGHT TRANSPORTATION AND WAREHOUSING
4311	U.S. POSTAL SERVICE
4411	WATER TRANSPORTATION
4423	WATER RECREATION ON BAYS, LAKES, RIVERS, & CANALS
4511	TRANSPORTATION BY AIR
4612	PIPELINES - EXCEPT NATURAL GAS
4811	COMMUNICATIONS
4922	GAS PRODUCTION AND DISTRIBUTION; ELEC. AND GAS SERVICE

	71995--WATER USE, PRIMARY
4941	WATER SUPPLY
4952	SEWERAGE SYSTEMS
4961	PUBLIC STEAM SUPPLY
4971	IRRIGATION SYSTEMS
5012	WHOLESALE TRADE - DURABLE GOODS
5111	WHOLESALE TRADE - NONDURABLE GOODS
5211	BUILDING MATERIALS, HARDWARE, GARDEN SUPPLY
5311	GENERAL MERCHANDISE STORES
5411	FOOD STORES
5511	AUTO. DEALERS AND GASOLINE SERVICE STATIONS
5611	APPAREL AND ACCESSORY STORES
5712	FURNITURE, HOME FURNISHING, AND EQUIPMENT STORES
5812	EATING AND DRINKING PLACES
5912	MISCELLANEOUS RETAIL - DRUG, LIQUOR, BOOK, CAMERA, ETC.
6011	BANKING
6112	CREDIT AGENCIES
6212	SECURITY AND COMMODITY BROKERS, DEALERS, AND SERVICES
6311	INSURANCE
6512	REAL ESTATE
6711	HOLDING AND OTHER INVESTMENT OFFICES
7011	HOTELS, MOTELS, TOURIST COURTS
7021	ROOMING AND BOARDING HOUSES
7032	CAMPS, TRANSIENT TRAILER PARKS, & CAMP SITES
7041	ORGANIZATION HOTELS AND MEMBERSHIP LODGING HOUSES
7211	LAUNDRY, CLEANING, AND GARMENT SERVICES
7221	SHOPS - PHOTO, BEAUTY, BARBER, SHOE, FUNERAL SERVICES
7311	ADVERTISING SERVICES
7321	CONSUMER CREDIT AND COLLECTION
7331	MAILING, REPRODUCTION, COMMERCIAL ART & PHOTOGRAPHY
7341	SERVICE TO DWELLINGS AND OTHER BUILDINGS
7351	NEWS SYNDICATES

	71995--WATER USE, PRIMARY
7361	EMPLOYMENT SERVICES
7372	COMPUTER AND DATA PROCESSING
7391	MISCELLANEOUS BUSINESS SERVICES
7512	AUTOMOTIVE AND TRUCK RENTAL LEASING WITHOUT DRIVER
7523	AUTOMOBILE PARKING
7531	AUTOMOTIVE REPAIR SHOPS
7542	CAR WASHES
7549	AUTOMOTIVE SERVICES - EXCEPT REPAIR
7622	MISCELLANEOUS REPAIR SERVICES
7813	MOTION PICTURE-T.V. SERVICES, THEATERS, EXCEPT DRIVE-INS
7911	RECREATION SERVICES, EXCEPT THEATERS AND PUBLIC GOLF
7992	PUBLIC GOLF COURSES
7993	COIN OPERATED AMUSEMENT DEVICES
7996	AMUSEMENT PARKS, SPORTS AND RECREATION CLUBS, ETC.
8011	HEALTH SERVICES (OFFICES)
8051	NURSING AND PERSONAL CARE FACILITIES
8062	HOSPITALS
8071	MEDICAL AND DENTAL LABORATORIES
8081	OUTPATIENT CARE FACILITIES
8091	HEALTH & ALLIES SERVICES, NOT ELSEWHERE CLASSIFIED
8111	LEGAL SERVICES
8211	EDUCATIONAL SERVICES, LIBRARIES AND INFORMATION CENTERS
8231	SOCIAL SERVICES & REHABILITATION CENTERS
8411	MUSEUMS, ART GALLERIES, ZOOLOGICAL & BOTANICAL GARDENS
8611	MEMBERSHIP ORGANIZATIONS
8811	PRIVATE HOUSES, CONDOS, MUNICIPALITIES, & TRAILER PARKS
8911	MISCELLANEOUS SERVICES (ENG.,ED., R&D, ACCOUNTING, ETC.)
9111	GOV., LEGISLATIVE, JUSTICE, PUBLIC ORDER & SAFETY MISC.
9411	ADMINISTRATION OF HUMAN RESOURCES PROGRAMS
9511	AIR & WATER RESOURCE, & SOLID WASTE MANAGEMENT
9512	NATURAL RESOURCE CONSERVATION BY PUBLIC ADMINISTRATION

	71995--WATER USE, PRIMARY
9531	ADMIN. OF HOUSING & ECONOMIC PROGRAMS & INTERNAT'L AFFAIRS
9999	WATER COMPACTS, AGREEMENTS & LEGISLATIVE ACTIONS
14911	COMMERCIAL ELECTRIC ENERGY ESTABLISHMENTS - FOSSIL
24911	COMMERCIAL ELECTRIC ENERGY ESTABLISHMENTS - GEOTHERMAL
34911	COMMERCIAL ELECTRIC ENERGY ESTABLISHMENTS - HYDROELECTRIC
44911	COMMERCIAL ELECTRIC ENERGY ESTABLISHMENTS - NUCLEAR
	71996--WATER USE, SECONDARY
191	GENERAL FARM CROPS
211	LIVESTOCK
251	POULTRY AND EGGS
271	ANIMAL SPECIALTIES
291	GENERAL FARMS - PRIMARILY LIVESTOCK
711	AGRICULTURAL SERVICES - SOIL PREP, CROP PLANTINGS, ETC.
741	VETERINARY SERVICES
761	ANIMAL SERVICES, FARM LABOR AND MANAGEMENT
811	FORESTRY
912	FISH AND WILDLIFE FARMING
1011	METAL MINING
1111	ANTHRACITE MINING
1211	BITUMINOUS COAL AND LIGNITE MINING
1311	OIL AND GAS EXTRACTION
1411	MINING AND QUARRYING OF NONMETALIC MINERALS, - NONFUEL
1521	BUILDING CONSTRUCTION
1611	CONSTRUCTION - OTHER THAN BUILDING
1711	SPECIAL TRADE (PLUMBING, HEAT, AIR, ELEC., MASONRY, ETC.)
2011	MANUFACTURING - MEAT PRODUCTS
2016	POULTRY AND EGG PLANTS
2021	DAIRY PRODUCTS
2032	CANNED & PRESERVED FRUITS AND VEGETABLES
2041	GRAIN MILL PRODUCTS
2051	BAKERY PRODUCTS

	71996--WATER USE, SECONDARY
2061	SUGAR AND CONFECTIONERY PRODUCTS
2074	FATS AND OILS
2084	BEVERAGES - ALCOHOLIC & SOFT DRINKS, SYRUPS & EXTRACTS
2091	MISCELLANEOUS FOOD PREPARATIONS
2111	TOBACCO MANUFACTURERS
2211	TEXTILE MILL PRODUCTS
2311	APPAREL - PRODUCTS FROM FABRICS
2411	LUMBER & WOOD PRODUCTS EXCEPT FURNITURE
2511	FURNITURE AND FIXTURES
2611	PAPER AND ALLIED PRODUCTS
2711	PRINTING, PUBLISHING, & ALLIED INDUSTRIES
2821	CHEMICALS AND ALLIED PRODUCTS
2911	PETROLEUM REFINING AND RELATED PRODUCTS
3011	RUBBER AND MISCELLANEOUS PLASTIC PRODUCTS
3111	LEATHER AND LEATHER PRODUCTS
3211	STONE, CLAY, GLASS, AND CONCRETE PRODUCTS
3281	CUT STONE AND STONE PRODUCTS
3291	ABRASIVE, ASBESTOS, & MISCELLANEOUS NONMETALIC PRODUCTS
3312	BLAST FURNACES, STEEL WORKS, & ROLLING & FINISHING MILLS
3411	METAL PRODUCTS & TRANS. EQUIPMENT (NO MACHINERY)
3511	MACHINERY, EXCEPT ELECTRICAL
3612	ELECTRICAL & ELECTRONIC MACHINERY, EQUIPMENT & SUPPLIES
3711	TRANSPORTATION EQUIPMENT REPAIRING AND PARTS
3811	MEASURING, ANALYZING, & CONTROLLING INSTRUMENTS
3911	MISCELLANEOUS MANUFACTURING INDUSTRIES
4011	TRANSPORTATION - TRAINS, TAXICABS, AIRCRAFT
4212	MOTOR FREIGHT TRANSPORTATION AND WAREHOUSING
4311	U.S. POSTAL SERVICE
4411	WATER TRANSPORTATION
4423	WATER RECREATION ON BAYS, LAKES, RIVERS, & CANALS
4511	TRANSPORTATION BY AIR

	71996--WATER USE, SECONDARY
4612	PIPELINES - EXCEPT NATURAL GAS
4811	COMMUNICATIONS
4922	GAS PRODUCTION AND DISTRIBUTION; ELEC. AND GAS SERVICE
4941	WATER SUPPLY
4952	SEWERAGE SYSTEMS
4961	PUBLIC STEAM SUPPLY
4971	IRRIGATION SYSTEMS
5012	WHOLESALE TRADE - DURABLE GOODS
5111	WHOLESALE TRADE - NONDURABLE GOODS
5211	BUILDING MATERIALS, HARDWARE, GARDEN SUPPLY
5311	GENERAL MERCHANDISE STORES
5411	FOOD STORES
5511	AUTO. DEALERS AND GASOLINE SERVICE STATIONS
5611	APPAREL AND ACCESSORY STORES
5712	FURNITURE, HOME FURNISHING, AND EQUIPMENT STORES
5812	EATING AND DRINKING PLACES
5912	MISCELLANEOUS RETAIL - DRUG, LIQUOR, BOOK, CAMERA, ETC.
6011	BANKING
6112	CREDIT AGENCIES
6212	SECURITY AND COMMODITY BROKERS, DEALERS, AND SERVICES
6311	INSURANCE
6512	REAL ESTATE
6711	HOLDING AND OTHER INVESTMENT OFFICES
7011	HOTELS, MOTELS, TOURIST COURTS
7021	ROOMING AND BOARDING HOUSES
7032	CAMPS, TRANSIENT TRAILER PARKS, & CAMP SITES
7041	ORGANIZATION HOTELS AND MEMBERSHIP LODGING HOUSES
7211	LAUNDRY, CLEANING, AND GARMENT SERVICES
7221	SHOPS - PHOTO, BEAUTY, BARBER, SHOE, FUNERAL SERVICES
7311	ADVERTISING SERVICES
7321	CONSUMER CREDIT AND COLLECTION

	71996--WATER USE, SECONDARY
7331	MAILING, REPRODUCTION, COMMERCIAL ART & PHOTOGRAPHY
7341	SERVICE TO DWELLINGS AND OTHER BUILDINGS
7351	NEWS SYNDICATES
7361	EMPLOYMENT SERVICES
7372	COMPUTER AND DATA PROCESSING
7391	MISCELLANEOUS BUSINESS SERVICES
7512	AUTOMOTIVE AND TRUCK RENTAL LEASING WITHOUT DRIVER
7523	AUTOMOBILE PARKING
7531	AUTOMOTIVE REPAIR SHOPS
7542	CAR WASHES
7549	AUTOMOTIVE SERVICES - EXCEPT REPAIR
7622	MISCELLANEOUS REPAIR SERVICES
7813	MOTION PICTURE-T.V. SERVICES, THEATERS, EXCEPT DRIVE-INS
7911	RECREATION SERVICES, EXCEPT THEATERS AND PUBLIC GOLF
7992	PUBLIC GOLF COURSES
7993	COIN OPERATED AMUSEMENT DEVICES
7996	AMUSEMENT PARKS, SPORTS AND RECREATION CLUBS, ETC.
8011	HEALTH SERVICES (OFFICES)
8051	NURSING AND PERSONAL CARE FACILITIES
8062	HOSPITALS
8071	MEDICAL AND DENTAL LABORATORIES
8081	OUTPATIENT CARE FACILITIES
8091	HEALTH & ALLIES SERVICES, NOT ELSEWHERE CLASSIFIED
8111	LEGAL SERVICES
8211	EDUCATIONAL SERVICES, LIBRARIES AND INFORMATION CENTERS
8231	SOCIAL SERVICES & REHABILITATION CENTERS
8411	MUSEUMS, ART GALLERIES, ZOOLOGICAL & BOTANICAL GARDENS
8611	MEMBERSHIP ORGANIZATIONS
8811	PRIVATE HOUSES, CONDOS, MUNICIPALITIES, & TRAILER PARKS
8911	MISCELLANEOUS SERVICES (ENG.,ED., R&D, ACCOUNTING, ETC.)
9111	GOV., LEGISLATIVE, JUSTICE, PUBLIC ORDER & SAFETY MISC.

	71996--WATER USE, SECONDARY
9411	ADMINISTRATION OF HUMAN RESOURCES PROGRAMS
9511	AIR & WATER RESOURCE, & SOLID WASTE MANAGEMENT
9512	NATURAL RESOURCE CONSERVATION BY PUBLIC ADMINISTRATION
9531	ADMIN. OF HOUSING & ECONOMIC PROGRAMS & INTERNAT'L AFFAIRS
9999	WATER COMPACTS, AGREEMENTS & LEGISLATIVE ACTIONS
14911	COMMERCIAL ELECTRIC ENERGY ESTABLISHMENTS - FOSSIL
24911	COMMERCIAL ELECTRIC ENERGY ESTABLISHMENTS - GEOTHERMAL
34911	COMMERCIAL ELECTRIC ENERGY ESTABLISHMENTS - HYDROELECTRIC
44911	COMMERCIAL ELECTRIC ENERGY ESTABLISHMENTS - NUCLEAR
	71997--WATER USE, TERTIARY
111	CASH GRAINS
131	FIELD CROPS - EXCEPT CASH GRAINS
161	VEGETABLES AND MELONS
171	FRUITS AND TREE NUTS
181	HORTICULTURAL SPECIALTIES
191	GENERAL FARM CROPS
211	LIVESTOCK
251	POULTRY AND EGGS
271	ANIMAL SPECIALTIES
291	GENERAL FARMS - PRIMARILY LIVESTOCK
711	AGRICULTURAL SERVICES - SOIL PREP, CROP PLANTINGS, ETC.
741	VETERINARY SERVICES
761	ANIMAL SERVICES, FARM LABOR AND MANAGEMENT
811	FORESTRY
912	FISH AND WILDLIFE FARMING
1011	METAL MINING
1111	ANTHRACITE MINING
1211	BITUMINOUS COAL AND LIGNITE MINING
1311	OIL AND GAS EXTRACTION
1411	MINING AND QUARRYING OF NONMETALIC MINERALS, - NONFUEL
1521	BUILDING CONSTRUCTION

	71997--WATER USE, TERTIARY
1611	CONSTRUCTION - OTHER THAN BUILDING
1711	SPECIAL TRADE (PLUMBING, HEAT, AIR, ELEC., MASONRY, ETC.)
2011	MANUFACTURING - MEAT PRODUCTS
2016	POULTRY AND EGG PLANTS
2021	DAIRY PRODUCTS
2032	CANNED & PRESERVED FRUITS AND VEGETABLES
2041	GRAIN MILL PRODUCTS
2051	BAKERY PRODUCTS
2061	SUGAR AND CONFECTIONERY PRODUCTS
2074	FATS AND OILS
2084	BEVERAGES - ALCOHOLIC & SOFT DRINKS, SYRUPS & EXTRACTS
2091	MISCELLANEOUS FOOD PREPARATIONS
2111	TOBACCO MANUFACTURERS
2211	TEXTILE MILL PRODUCTS
2311	APPAREL - PRODUCTS FROM FABRICS
2411	LUMBER & WOOD PRODUCTS EXCEPT FURNITURE
2511	FURNITURE AND FIXTURES
2611	PAPER AND ALLIED PRODUCTS
2711	PRINTING, PUBLISHING, & ALLIED INDUSTRIES
2821	CHEMICALS AND ALLIED PRODUCTS
2911	PETROLEUM REFINING AND RELATED PRODUCTS
3011	RUBBER AND MISCELLANEOUS PLASTIC PRODUCTS
3111	LEATHER AND LEATHER PRODUCTS
3211	STONE, CLAY, GLASS, AND CONCRETE PRODUCTS
3281	CUT STONE AND STONE PRODUCTS
3291	ABRASIVE, ASBESTOS, & MISCELLANEOUS NONMETALIC PRODUCTS
3312	BLAST FURNACES, STEEL WORKS, & ROLLING & FINISHING MILLS
3411	METAL PRODUCTS & TRANS. EQUIPMENT (NO MACHINERY)
3511	MACHINERY, EXCEPT ELECTRICAL
3612	ELECTRICAL & ELECTRONIC MACHINERY, EQUIPMENT & SUPPLIES
3711	TRANSPORTATION EQUIPMENT REPAIRING AND PARTS

	71997--WATER USE, TERTIARY
3811	MEASURING, ANALYZING, & CONTROLLING INSTRUMENTS
3911	MISCELLANEOUS MANUFACTURING INDUSTRIES
4011	TRANSPORTATION - TRAINS, TAXICABS, AIRCRAFT
4212	MOTOR FREIGHT TRANSPORTATION AND WAREHOUSING
4311	U.S. POSTAL SERVICE
4411	WATER TRANSPORTATION
4423	WATER RECREATION ON BAYS, LAKES, RIVERS, & CANALS
4511	TRANSPORTATION BY AIR
4612	PIPELINES - EXCEPT NATURAL GAS
4811	COMMUNICATIONS
4922	GAS PRODUCTION AND DISTRIBUTION; ELEC. AND GAS SERVICE
4941	WATER SUPPLY
4952	SEWERAGE SYSTEMS
4961	PUBLIC STEAM SUPPLY
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5012	WHOLESALE TRADE - DURABLE GOODS
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5211	BUILDING MATERIALS, HARDWARE, GARDEN SUPPLY
5311	GENERAL MERCHANDISE STORES
5411	FOOD STORES
5511	AUTO. DEALERS AND GASOLINE SERVICE STATIONS
5611	APPAREL AND ACCESSORY STORES
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5812	EATING AND DRINKING PLACES
5912	MISCELLANEOUS RETAIL - DRUG, LIQUOR, BOOK, CAMERA, ETC.
6011	BANKING
6112	CREDIT AGENCIES
6212	SECURITY AND COMMODITY BROKERS, DEALERS, AND SERVICES
6311	INSURANCE
6512	REAL ESTATE
6711	HOLDING AND OTHER INVESTMENT OFFICES

	71997--WATER USE, TERTIARY
7011	HOTELS, MOTELS, TOURIST COURTS
7021	ROOMING AND BOARDING HOUSES
7032	CAMPS, TRANSIENT TRAILER PARKS, & CAMP SITES
7041	ORGANIZATION HOTELS AND MEMBERSHIP LODGING HOUSES
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7391	MISCELLANEOUS BUSINESS SERVICES
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8062	HOSPITALS
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8081	OUTPATIENT CARE FACILITIES
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	71997--WATER USE, TERTIARY
8111	LEGAL SERVICES
8211	EDUCATIONAL SERVICES, LIBRARIES AND INFORMATION CENTERS
8231	SOCIAL SERVICES & REHABILITATION CENTERS
8411	MUSEUMS, ART GALLERIES, ZOOLOGICAL & BOTANICAL GARDENS
8611	MEMBERSHIP ORGANIZATIONS
8811	PRIVATE HOUSES, CONDOS, MUNICIPALITIES, & TRAILER PARKS
8911	MISCELLANEOUS SERVICES (ENG.,ED., R&D, ACCOUNTING, ETC.)
9111	GOV., LEGISLATIVE, JUSTICE, PUBLIC ORDER & SAFETY MISC.
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9511	AIR & WATER RESOURCE, & SOLID WASTE MANAGEMENT
9512	NATURAL RESOURCE CONSERVATION BY PUBLIC ADMINISTRATION
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9999	WATER COMPACTS, AGREEMENTS & LEGISLATIVE ACTIONS
14911	COMMERCIAL ELECTRIC ENERGY ESTABLISHMENTS - FOSSIL
24911	COMMERCIAL ELECTRIC ENERGY ESTABLISHMENTS - GEOTHERMAL
34911	COMMERCIAL ELECTRIC ENERGY ESTABLISHMENTS - HYDROELECTRIC
44911	COMMERCIAL ELECTRIC ENERGY ESTABLISHMENTS - NUCLEAR
	71998--WATER USE, QUATERNARY
111	CASH GRAINS
131	FIELD CROPS - EXCEPT CASH GRAINS
161	VEGETABLES AND MELONS
171	FRUITS AND TREE NUTS
181	HORTICULTURAL SPECIALTIES
191	GENERAL FARM CROPS
211	LIVESTOCK
251	POULTRY AND EGGS
271	ANIMAL SPECIALTIES
291	GENERAL FARMS - PRIMARILY LIVESTOCK
711	AGRICULTURAL SERVICES - SOIL PREP, CROP PLANTINGS, ETC.
741	VETERINARY SERVICES
761	ANIMAL SERVICES, FARM LABOR AND MANAGEMENT

	71998--WATER USE, QUATERNARY
811	FORESTRY
912	FISH AND WILDLIFE FARMING
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1111	ANTHRACITE MINING
1211	BITUMINOUS COAL AND LIGNITE MINING
1311	OIL AND GAS EXTRACTION
1411	MINING AND QUARRYING OF NONMETALIC MINERALS, - NONFUEL
1521	BUILDING CONSTRUCTION
1611	CONSTRUCTION - OTHER THAN BUILDING
1711	SPECIAL TRADE (PLUMBING, HEAT, AIR, ELEC., MASONRY, ETC.)
2011	MANUFACTURING - MEAT PRODUCTS
2016	POULTRY AND EGG PLANTS
2021	DAIRY PRODUCTS
2032	CANNED & PRESERVED FRUITS AND VEGETABLES
2041	GRAIN MILL PRODUCTS
2051	BAKERY PRODUCTS
2061	SUGAR AND CONFECTIONERY PRODUCTS
2074	FATS AND OILS
2084	BEVERAGES - ALCOHOLIC & SOFT DRINKS, SYRUPS & EXTRACTS
2091	MISCELLANEOUS FOOD PREPARATIONS
2111	TOBACCO MANUFACTURERS
2211	TEXTILE MILL PRODUCTS
2311	APPAREL - PRODUCTS FROM FABRICS
2411	LUMBER & WOOD PRODUCTS EXCEPT FURNITURE
2511	FURNITURE AND FIXTURES
2611	PAPER AND ALLIED PRODUCTS
2711	PRINTING, PUBLISHING, & ALLIED INDUSTRIES
2821	CHEMICALS AND ALLIED PRODUCTS
2911	PETROLEUM REFINING AND RELATED PRODUCTS
3011	RUBBER AND MISCELLANEOUS PLASTIC PRODUCTS
3111	LEATHER AND LEATHER PRODUCTS

	71998--WATER USE, QUATERNARY
3211	STONE, CLAY, GLASS, AND CONCRETE PRODUCTS
3281	CUT STONE AND STONE PRODUCTS
3291	ABRASIVE, ASBESTOS, & MISCELLANEOUS NONMETALIC PROD.
3312	BLAST FURNACES, STEEL WORKS, & ROLLING & FINISHING MILLS
3411	METAL PRODUCTS & TRANS. EQUIPMENT (NO MACHINERY)
3511	MACHINERY, EXCEPT ELECTRICAL
3612	ELECTRICAL & ELECTRONIC MACHINERY, EQUIPMENT & SUPP.
3711	TRANSPORTATION EQUIPMENT REPAIRING AND PARTS
3811	MEASURING, ANALYZING, & CONTROLLING INSTRUMENTS
3911	MISCELLANEOUS MANUFACTURING INDUSTRIES
4011	TRANSPORTATION - TRAINS, TAXICABS, AIRCRAFT
4212	MOTOR FREIGHT TRANSPORTATION AND WAREHOUSING
4311	U.S. POSTAL SERVICE
4411	WATER TRANSPORTATION
4423	WATER RECREATION ON BAYS, LAKES, RIVERS, & CANALS
4511	TRANSPORTATION BY AIR
4612	PIPELINES - EXCEPT NATURAL GAS
4811	COMMUNICATIONS
4922	GAS PRODUCTION AND DISTRIBUTION; ELEC. AND GAS SERVICE
4941	WATER SUPPLY
4952	SEWERAGE SYSTEMS
4961	PUBLIC STEAM SUPPLY
4971	IRRIGATION SYSTEMS
5012	WHOLESALE TRADE - DURABLE GOODS
5111	WHOLESALE TRADE - NONDURABLE GOODS
5211	BUILDING MATERIALS, HARDWARE, GARDEN SUPPLY
5311	GENERAL MERCHANDISE STORES
5411	FOOD STORES
5511	AUTO. DEALERS AND GASOLINE SERVICE STATIONS
5611	APPAREL AND ACCESSORY STORES
5712	FURNITURE, HOME FURNISHING, AND EQUIPMENT STORES

	71998--WATER USE, QUATERNARY
5812	EATING AND DRINKING PLACES
5912	MISCELLANEOUS RETAIL - DRUG, LIQUOR, BOOK, CAMERA, ETC.
6011	BANKING
6112	CREDIT AGENCIES
6212	SECURITY AND COMMODITY BROKERS, DEALERS, AND SERVICES
6311	INSURANCE
6512	REAL ESTATE
6711	HOLDING AND OTHER INVESTMENT OFFICES
7011	HOTELS, MOTELS, TOURIST COURTS
7021	ROOMING AND BOARDING HOUSES
7032	CAMPS, TRANSIENT TRAILER PARKS, & CAMP SITES
7041	ORGANIZATION HOTELS AND MEMBERSHIP LODGING HOUSES
7211	LAUNDRY, CLEANING, AND GARMENT SERVICES
7221	SHOPS - PHOTO, BEAUTY, BARBER, SHOE, FUNERAL SERVICES
7311	ADVERTISING SERVICES
7321	CONSUMER CREDIT AND COLLECTION
7331	MAILING, REPRODUCTION, COMMERCIAL ART & PHOTOGRAPHY
7341	SERVICE TO DWELLINGS AND OTHER BUILDINGS
7351	NEWS SYNDICATES
7361	EMPLOYMENT SERVICES
7372	COMPUTER AND DATA PROCESSING
7391	MISCELLANEOUS BUSINESS SERVICES
7512	AUTOMOTIVE AND TRUCK RENTAL LEASING WITHOUT DRIVER
7523	AUTOMOBILE PARKING
7531	AUTOMOTIVE REPAIR SHOPS
7542	CAR WASHES
7549	AUTOMOTIVE SERVICES - EXCEPT REPAIR
7622	MISCELLANEOUS REPAIR SERVICES
7813	MOTION PICTURE-T.V. SERVICES, THEATERS, EXCEPT DRIVE-INS
7911	RECREATION SERVICES, EXCEPT THEATERS AND PUBLIC GOLF
7992	PUBLIC GOLF COURSES

	71998--WATER USE, QUATERNARY
7993	COIN OPERATED AMUSEMENT DEVICES
7996	AMUSEMENT PARKS, SPORTS AND RECREATION CLUBS, ETC.
8011	HEALTH SERVICES (OFFICES)
8051	NURSING AND PERSONAL CARE FACILITIES
8062	HOSPITALS
8071	MEDICAL AND DENTAL LABORATORIES
8081	OUTPATIENT CARE FACILITIES
8091	HEALTH & ALLIES SERVICES, NOT ELSEWHERE CLASSIFIED
8111	LEGAL SERVICES
8211	EDUCATIONAL SERVICES, LIBRARIES AND INFO. CENTERS
8231	SOCIAL SERVICES & REHABILITATION CENTERS
8411	MUSEUMS, ART GALLERIES, ZOOLOGICAL & BOTANICAL GARDENS
8611	MEMBERSHIP ORGANIZATIONS
8811	PRIVATE HOUSES, CONDOS, MUNICIPALITIES, & TRAILER PARKS
8911	MISCELLANEOUS SERVICES (ENG.,ED., R&D, ACCOUNTING, ETC.)
9111	GOV., LEGISLATIVE, JUSTICE, PUBLIC ORDER & SAFETY MISC.
9411	ADMINISTRATION OF HUMAN RESOURCES PROGRAMS
9511	AIR & WATER RESOURCE, & SOLID WASTE MANAGEMENT
9512	NATURAL RESOURCE CONSERVATION BY PUBLIC ADMIN.
9531	ADMIN. OF HOUSING & ECONOMIC PROG. & INTERNAT'L AFFAIRS
9999	WATER COMPACTS, AGREEMENTS & LEGISLATIVE ACTIONS
14911	COMMERCIAL ELEC. ENERGY ESTABLISHMENTS - FOSSIL
24911	COMMERCIAL ELEC. ENERGY ESTABLISHMENTS - GEOTHERMAL
34911	COMMERCIAL ELEC. ENERGY ESTABLISHMENTS – HYDROELEC.
44911	COMMERCIAL ELECTRIC ENERGY ESTABLISHMENTS - NUCLEAR
	71999--SAMPLE PURPOSE
10	ROUTINE
15	NAWQA - NATIONAL WATER-QUALITY ASSESSMENT
20	NASQAN
30	BENCHMARK
35	RASA, REGIONAL AQUIFER SYSTEMS ANALYSIS

	71999--SAMPLE PURPOSE
40	SW NETWORK
50	GW NETWORK
60	LOWFLOW NETWORK
70	HIGHFLOW NETWORK
80	ACID RAIN
80.01	BULK OR UNDEFINED (BU)
80.02	SAMPLE RELATED PROBLEM (NS)
80.03	DRY WET-SIDE SAMPLE (NA)
80.04	COMPLETELY MISSING SAMPLES (UN)
80.05	LONG DURATION SAMPLE (LD)
80.06	SAMPLING PROTOCOL (TIME) (SP)
80.07	SAMPLER MALFUNCTION (S)
90	SNOW SURVEY
100	MT. ST. HELENS
110	SEEPAGE STUDY
120	IRRIGATION EFFECTS
130	RECHARGE
140	INJECTION
150	BANK ERODIBILITY
160	NATIONAL BLANK AND SPIKE PROGRAM
170	QUALITY ASSURANCE
180	CROSS-SECTION VARIATION

	72005--SAMPLE SOURCE
0.01	AIRLINE MEASUREMENT
0.02	ANALOG OR GRAPHIC RECORDER
0.03	CALIBRATED AIRLINE MEASUREMENT
0.04	ESTIMATED
0.05	PRESSURE-GAGE MEASUREMENT
0.06	CALIBRATED PRESSURE-GAGE MEASUREMENT
0.07	INTERPRETED FROM GEOPHYSICAL LOGS
0.08	MANOMETER MEASUREMENT

	72005--SAMPLE SOURCE
0.09	NONRECORDING GAGE
0.10	REPORTED, METHOD NOT KNOWN
0.11	STEEL-TAPE MEASUREMENT
0.12	ELECTRIC-TAPE MEASUREMENT
0.13	CALIBRATED ELECTRIC-TAPE MEASUREMENT
0.14	OTHER
1	WELL HEAD
2	DRILL STEM TEST
3	SEPARATOR
4	BOILER
5	FLOW LINE
6	BATTERY
7	UNDESIGNATED
8	TANK
9	PRODUCTION TEST
10	HEATER TREATER
11	GUN BARREL
12	SWAB
13	PIT
14	MANIFOLD TEST
15	GAS LINE DRIP
16	CASING LEAK
17	WIRE LINE TEST
18	HEADER
19	FILTER
20	TEST TOOL
21	LTX UNIT
22	KNOCKOUT
23	WELL BLEEDER
24	FRACTURE TEST
25	TEST WAGON

	72005--SAMPLE SOURCE
26	PUMP
27	TAP NEAR WELL
28	TAP AWAY FROM WELL
29	BUCKET
30	PRESSURE TANK
31	DISCHARGE PIPE
32	FOERST SAMPLER
33	BAILER
34	DRAIN LINE
35	INJECTION PUMP
36	SPOT SAMPLE IN FLUID COLUMN
37	TANK BATTERY INCLUDING GUN BARREL
38	WINDMILL
39	WATER SIPHON
40	SPECIAL
41	MUNICIPAL AND DOMESTIC WASTE
42	INDUSTRIAL WASTE
43	STORM WATER (PRIOR TO ENTERING NATURAL CHANNELS)
44	PUBLIC WATER SUPPLIES (TREATED WATER)
45	MINE WATER
46	PUBLIC WATER SUPPLIES (UNTREATED WATER)
47	WATER WELL
48	MULTIPLE WATER WELLS
49	OIL WELL
50	MULTI-OIL WELL
51	GAS WELL
52	MULTI-GAS WELL
53	OIL AND GAS WELL
54	MULTI-OIL AND GAS WELL
55	DRILLED AND ABANDONED WELL
56	PLUGGED AND ABANDONED WELL

	72005--SAMPLE SOURCE
57	JUNKED AND ABANDONED WELL
58	TEMPORARILY ABANDONED WELL
59	ABANDONED OIL WELL
60	ABANDONED GAS WELL
61	SALT-WATER SUPPLY WELL
62	SALT-WATER DISPOSAL WELL
63	INJECTION WELL
64	SERVICE WELL
65	WETLAND ECOSYSTEM
66	DREDGE WAKE
67	MAINSTREAM
68	OVERBANK
69	COMPOSITED PUBLIC WATER SUPPLY(UNTREATED WATER)
70	COMPOSITED PUBLIC WATER SUPPLY(TREATED WATER)
72	INTERSTITIAL WATER
74	LYSIMETER
76	OIL OR GAS TEST WELL CONVERTED TO WATER WELL
77	SURFICIAL BANK
78	INTERIOR BANK
79	BEFORE PRESSURE TANK
80	AFTER PRESSURE TANK
100	DOMESTIC SUPPLY-UNTREATED
110	DOMESTIC SUPPLY-TREATED
1001	WET DEPOSITION
1002	DUSTFALL
1003	LANDFILL
1004	CAST OVERBURDEN
1005	STREET SWEEPING
1006	LANDFILL SEEP

	72006--SAMPLING CONDITION
0.01	THE SITE WAS DRY (NO WATER LEVEL IS RECORDED)

	72006--SAMPLING CONDITION
0.02	THE SITE HAD BEEN FLOWING RECENTLY
0.03	THE SITE WAS FLOWING, HEAD COULD NOT BE MEASURED
0.04	A NEARBY SITE THAT TAPS THE AQUIFER WAS FLOWING
0.05	NEARBY SITE TAPPING SAME AQUIFER HAD BEEN FLOWING RECENTLY
0.06	INJECTOR SITE
0.07	INJECTOR SITE MONITOR
0.08	MEASUREMENT DISCONTINUED
0.09	OBSTRUCTION ENCOUNTERED IN WELL ABOVE WATER SURFACE
0.10	THE SITE WAS BEING PUMPED
0.11	THE SITE HAD BEEN PUMPED RECENTLY
0.12	NEARBY SITE TAPPING THE SAME AQUIFER WAS BEING PUMPED
0.13	NEARBY SITE TAPPING THE SAME AQUIFER WAS PUMPED RECENTLY
0.14	FOREIGN SUBSTANCE PRESENT ON THE SURFACE OF THE WATER
0.15	WELL DESTROYED
0.16	WATER LEVEL AFFECTED BY STAGE IN NEARBY SITE
0.17	OTHER CONDITIONS AFFECTING THE MEASURED WATER LEVEL
1	TESTING
2	UNDESIGNATED
3	SWABBING
4	FLOWING
5	REVERSING OUT
6	FLOWING ON GAS LIFT
7	AFTER ACIDIZING
8	PUMPING
9	MILLIPORE FILTER
10	OPEN HOLE
11	FLOWING ON DRILL STEM TEST
12	AFTER DRILL STEM TEST
15	BAILING
16	AFTER PERFORATION
17	TUBING FLOW

	72006--SAMPLING CONDITION
18	PRODUCING
19	CIRCULATING
20	FLOWING ON PRODUCTION TEST
21	FLOWING ON POTENTIAL TEST
22	LIFTING
23	FLOWING TO PIT
24	WATER FLOODING
25	JETTING
26	PRODUCTION AND DEVELOPMENT TEST
27	PRODUCTION BY UNKNOWN METHOD
30	SEEPING
31	NEARBY WELL PUMPING
32	NEARBY WELL TAKING WATER
33	WELL TAKING WATER
	74200--SAMPLE PRESERVATION METHOD
1	FA, Polyethylene bottle, 250 mL, acid rinsed; 0.45-µm filter, pH<2 with HNO_3
3	FAB, Teflon bottle, 250 ml, acid rinsed; 0.45-µm filter, pH<2 with HNO_3
5	FAR, Polyethylene bottle, 1L, acid rinsed; 0.45-µm filter, pH<2 with Ultrex HNO_3
7	FC, Brown polyethylene bottle, container size dependent on laboratory schedule; field rinsed, 0.45-µm filter, chill
9	FU, POLY BOTTLE, FIELD RINSED
11	RA, Polyethylene bottle, acid-rinsed, 250 mL; field rinsed, pH<2 with HNO3
13	RAB, TEFLON BOTTLE, ACID RINSED, 250 ML
15	RAE, Polyethylene bottle, acid-rinsed, 250 mL; field rinsed, pH<2 with HNO3
17	RAH, Polyethylene bottle, acid-rinsed, 250 mL; field rinsed, pH<2 with HNO3
19	RC, BROWN POLY BOTTLE, FIELD RINSED, 250 ML
21	RU, Polyethylene bottle, size dependent on analyses requested; field rinsed.
23	RUR, Polyethylene bottle, polyseal cap, 250 mL, 500 mL, or 1L ; field rinsed
25	LC0023 or RCN, Polyethylene bottle, 250 mL; field rinsed, ph>12 with NaOH, chill
27	LC0076 or COD, Glass bottle, 125 mL, baked at 450 deg C; pH<2 with H2SO4; chill; do not rinse
29	LC0089, Polyethylene bottle, 250 mL; field rinsed, 0.5 g zinc acetate
31	LC0239, POLY BOTTLE, ACID RINSED, 1 L

	74200--SAMPLE PRESERVATION METHOD
33	LC0298, Contact NWQL
35	LC0300, GLASS BOTTLE, FIELD RINSED, 250 ML
39	LC0439, STEEL BARREL
41	LC0440, Glass bottle, narrow-neck, polyethylene seal cap, 1L; field rinsed, unfiltered, add 50mL SrCl2, seal with tape
43	LC0452, Polyethylene bottle, polyethylene seal cap, 125 mL; field rinsed, unfiltered
45	LC0489, Glass or polyethylene bottle, 125 mL; Contact Ty Coplen (703-648-5862)
47	LC0490, Contact NWQL
49	LC0491, Contact NWQL
51	LC0880 or FCN, Polyethylene bottle, 250 mL; 0.45-µm filter, NaOH to pH>12, chill
53	LC0995, Contact NWQL
55	LC0996, GLASS BOTTLE, FIELD RINSED
57	LC0997, Contact NWQL
59	CL, SEPTUM BOTTLE, 40 ML
61	GCC, Amber glass bottle, baked at 450 degrees C, 1 L; do not rinse, chill.
63	GCV, Amber glass septum vial, 40 mL; do not rinse, see section 8 of USGS OFR 97-829.
65	RCB, Polyethylene bottle, 250 mL; field rinsed, chill (Same as 79 - below)
67	LC0052 or PHE, Glass bottle, baked, 500 mL; do not rinse; dechlorinate with 100 mg of ferrous sulfate ph<2 with H2SO4, chill
69	LC0113 or DOC, Amber glass bottle, baked at 450 degrees C, 125 mL; rinse with organic-free water only, use Gelman filter, ph<2 with H2SO4, chill, See OWQ memo 2000.05
71	LC0114 or TOC, Amber glass bottle, baked at 450 degrees C, 125 mL; do not rinse, chill
73	LC0127, Amber oil and grease bottle, baked at 450 degrees C, 1 L; do not rinse, pH<2 with H2SO4, chill
75	LC0305 or SOC, 0.45-µm silver filter in a petri dish; rinse filter with organic-free water prior to collecting sample, record filtered volume on petri dish, chill
77	FU, Polyethylene bottle, container size dependent on laboratory schedule; field rinsed, 0.45-µm filter
79	RCB, Polyethylene bottle, 250 mL; field rinsed, chill (Same as 65 - above)
81	RU, POLY BOTTLE, FIELD RINSED, 500 ML
83	LC0050 or TBY, Polyethylene bottle, 125 mL; field rinsed
85	LC0169 or SUSO, Polyethylene bottle, 500 ML; field rinsed
87	CC, PLASTIC FREEZER CARTON, 1 PT
89	CU, PLASTIC FREEZER CARTON, 1 PT
91	BGC, WIDE MOUTH GLASS BOTTLE, 1 L

	74200--SAMPLE PRESERVATION METHOD
93	CC, PLASTIC FREEZER CARTON, 1 PT
95	PP, Contact NWQL
97	SIZE, UNTREATED
99	BEN, POLY BOTTLE, WIDE MOUTH
101	CHE, GLASS JAR, WIDE MOUTH
103	CHY, GLASS VIAL
105	DIA, CONTACT ATLANTA CENTRAL LABORATORY
107	PER, CONTACT ATLANTA CENTRAL LABORATORY
109	SHY, POLY BOTTLE
111	ST, POLY BOTTLE
113	ZOO, CONTACT ATLANTA CENTRAL LABORATORY
115	LC0055, POLY BOTTLE
117	LC0438, Contact NWQL
119	LC0616, GLASS VIAL
121	LC1049, WIDE MOUTH GLASS BOTTLE, 1 L
123	FAM, Glass bottle, acid rinsed, 250 mL; 0.45-µm filter, 2mL of HCl, See NWQL Memo 2001.01
125	FCU, BROWN POLY BOTTLE, FIELD RINSED, 250 ML
127	RAM, Glass bottle, acid-rinsed, 250 mL; field rinsed, 2mL of 6N ultrapure HCl, See NWQL Memo 2001.01
129	LCO460, POLY BOTTLE, FIELD RINSED, 500 ML
131	LCO881, POLY BOTTLE, FIELD RINSED, 125 ML
133	LC1043, Glass or high-density polyethylene bottle, polyethylene seal cap, 1 L; field rinsed, untreated
135	LC1199, Contact NWQL
137	LC0019, Amber glass bottle, baked at 450 degrees C, 125 mL; do not rinse, chill.
139	LC0306, GLASS BOTTLE, 125 ML
141	LC1038, PLASTIC FREEZER CARTON, 1 PT
143	LC0961, Contact NWQL
145	ALF, Aluminum foil
147	C18, C-18 SPE Cartridge; See field instructions
149	CC, Polypropylene bottle, 500 mL, wide-mouthed; field sieve through 2-mm plastic sieve, chill.
151	CRB, Carbopak-B Cartridge; See field instructions
153	CUR, Polyethylene bottle, 500 mL, wide mouth; no treatment

	74200--SAMPLE PRESERVATION METHOD
155	EAM, Amber glass bottle, 250 mL; ph<2 with HNO3
157	EBC, Amber glass bottle, 1L, Teflon cap liner; dechlorinate, ph<2 with HCl chill
159	ECC, Amber glass bottle, 1L, Teflon cap liner; dechlorinate, chill
161	EDV, Amber glass screw-cap vials, 40 mL, Teflon-lined septa; dechlorinate, chill
163	ELV, Glass screw-cap vials, 60 mL, Teflon-faced silicone septa; pH=3 with monochloroacetic acid, dechlorinate, chill
165	EOV, Amber glass screw-cap vial, 40 mL, Teflon-lined septa; dechlorinate, 2 drops of HCl:H2O supplied by NWQL, chill
167	EPC, High-density poly-vinyl chloride (PVC) bottles, 1L; dechlorinate, pH=2 with H2SO4 if biologically active, chill.
169	ERA, Polyethylene bottle, 500 mL; EPA SDWA, pH<2 with HNO3
171	ERC, Amber polyethylene bottle, 125 mL; EPA SDWA, Raw sample, chill
173	ERU, Polyehtylene bottle, 250 mL; EPA SDWA, Raw sample
175	FCA, Brown polyethylene bottle, 125 mL; 0.45-µm filter, 1mL of 4.5N H2SO4, chill
177	FCC, Brown polyethylene bottle, 125 mL; 0.45-µm filter, chill
179	FUS, Filtered untreated stable isotopes; treatment dependent on services requested.
181	IQE, Invertebrate QMH Elutriate; see NWQL Tech Memo 98-09
183	IQL, Invertebrate QMH Large Rare; see NWQL Tech Memo 98-09
185	IQM, Invertebrate QMH Main Body; see NWQL Tech Memo 98-09
187	IRE, Invertebrate RTH Elutriate; see NWQL Tech Memo 98-09
189	IRL, Invertebrate RTH Large Rare; see NWQL Tech Memo 98-09
191	IRM, Invertebrate RTH Main Body; see NWQL Tech Memo 98-09
193	LC0460, Polyethylene bottle, polyethylene seal cap, 250mL; field rinsed, untreated
195	LC0624, Polyethylene bottle, polyethylene seal cap, 500 mL; field rinsed, untreated
197	LC1565, Glass or high-density polyethylene bottle, polyethylene seal cap, 1L; field rinsed, untreated
199	LC1567, Polyethylene bottle, polyethylene seal cap, 125 mL; field rinsed, untreated
201	LC1574, Glass or high-density polyethylene bottle, polyethylene seal cap, 125 mL; Contact Ty Coplen (703-648-5862)
203	LC1717 or LC1718, Amber glass or high-density polyethylene bottle, narrow neck, polyethylene seal cap, 1L; field rinsed, wrap poly bottle in aluminum foil, chill
205	LC1949, Contact Ty Coplen (703-648-5862)
207	LC1951, Glass or untreated high-density polyethylene bottle, narrow neck, polyethylene seal cap, 1L; field rinse
209	MBAS, Polyethylene bottle, 250 mL; field rinse, chill
211	PIC, Glass fiber filter; fold filter in half, aluminum foil pouch, Whirlpak bag, chill, include sampled volume

	74200--SAMPLE PRESERVATION METHOD
213	RAR, Polyethylene bottle, acid-rinsed, 1L; field rinsed, pH<2 with HNO3
215	RCA, Brown polyethylene bottle, 125 mL; field rinsed, acidify with H2SO4, chill (Discontinued: See OWQ 99.004)
217	RCC, Brown polyethylene bottle, 125 mL; field rinsed, chill (Discontinued: See OWQ 99.004)
219	RURCT, Copper tube, 1L; See NWQL Tech memo 97.04 and 97.04S
221	RURCV, Glass vial, 20mL; 10 mL mineral oil, must be received within 48 hours of collection
223	RUS, Polyethylene bottle, 250 mL, 500 mL, or 1L; field rinsed, Contact Ty Coplen (703-648-5862)
225	SC1379, Amber glass bottle, baked at 450 degrees C, 125 mL; do not rinse, filter through 0.7-µm in-line filter, chill
227	SUR, Petri dish or vial; filter
229	TBI, ziplock-type bag, glass or polyethylene wide-mouth jar
231	TPCN, Glass fiber filter, 25 mm; fold filter in half, aluminum foil pouch, Whirlpak bag, chill, include sampled volume
233	UAS, Supor or glass fiber filter and Amber glass septum vial, 40 mL; chill
235	WCA, Polyethylene bottle, 125 mL; field rinsed, 1mL of 4.5 N H2SO4, chill
237	LC1648, Polyethylene bottle, 250 mL; field rinsed, ph>12 with NaOH, chill

	82309--CONTAMINATION SOURCE, POSSIBLE
1	OIL SPILL
3	GAS SPILL
5	ORGANIC
7	PESTICIDE
9	HERBICIDE
11	INSECTICIDE
13	FEEDLOT RUNOFF
15	SALT WATER
17	INJECTION WELL
19	SEWAGE TREATMENT PLANT
21	LAND SPREADING
23	LANDFILL
25	SLUDGE DUMP
27	WASTE LAGOON
29	URBAN RUNOFF
31	MINE DRAINAGE

	82309--CONTAMINATION SOURCE, POSSIBLE
33	CONSTRUCTION DRAINAGE
35	PULP MILL OUTFALL
37	TEXTILE MILL OUTFALL
39	IRRIGATION RUNOFF
41	FERTILIZER
43	DAIRY OPERATION

	82398--SAMPLING METHOD
10	EQUAL WIDTH INCREMENT (EWI)
20	EQUAL DISCHARGE INCREMENT (EDI)
25	TIMED SAMPLING INTERVAL
30	SINGLE VERTICAL
40	MULTIPLE VERTICALS
50	POINT SAMPLE
55	COMPOSITE – MULTIPLE POINT SAMPLES
60	WEIGHTED BOTTLE
70	GRAB SAMPLE
80	DISCHARGE INTEGRATED, EQUAL TRANSIT RATE (ETR)
90	DISCHARGE INTEGRATED, CENTROID
100	VAN DORN SAMPLER
110	SEWAGE SAMPLER
120	VELOCITY INTEGRATED
200	ZOOPLANKTON-NET
210	BENTHIC INVERTEBRATE-MECHANICAL GRAB
220	BENTHIC INVERTEBRATE-MECHANICAL DREDGE
230	BENTHIC INVERTEBRATE-ARTIFICIAL SUBSTRATE
240	BENTHIC INVERTEBRATE-NATURAL SUBSTRATE
250	BENTHIC INVERTEBRATE-NET
260	PHYTOPLANKTON-NET
270	PHYTOPLANKTON-WATER BOTTLE
280	PERIPHYTON-NATURAL SUBSTRATE
290	PERIPHYTON-ARTIFICIAL SUBSTRATE

	82398--SAMPLING METHOD
900	SUSPENDED SEDIMENT; PUMPING – STREAM SAMPLE USING A PUMPING MECHANISM
910	SUSPENDED SEDIMENT; SINGLE-STAGE, NOZZLE AT FIXED STAGE, PASSIVELY FILLING
920	SUSPENDED SEDIMENT; BOX SINGLE VERTICAL, DEPTH-INT, ATTACHED TO STRUCTURE
930	SUSPENDED SEDIMENT; PARTIAL DEPTH, DEPTH INTEGRATED, PART OF SINGLE VERTICAL
940	SUSPENDED SEDIMENT; PARTIAL WIDTH – DEPTH/WIDTH INTEGRATED, PART OF X-SECTION
1000	BEDLOAD, SINGLE EQUAL WIDTH INCREMENT (SEWI)
1010	BEDLOAD, MULTIPLE EQUAL WIDTH INCREMENT (MEWI)
1020	BEDLOAD, UNEQUAL WIDTH INCREMENT (UWI)
4010	THIEF SAMPLE
4020	OPEN-TOP BAILER
4025	DOUBLE-VALVE BAILER
4030	SUCTION PUMP
4031	SUCTION LIFT CENTRIFUGAL PUMP
4032	SUCTION LIFT JET PUMP
4033	SUCTION LIFT PERISTALTIC PUMP
4040	SUBMERSIBLE PUMP
4041	SUBMERSIBLE BLADDER PUMP
4042	SUBMERSIBLE GAS RECIPROCATING PUMP
4043	SUBMERSIBLE GAS LIFT PUMP
4044	SUBMERSIBLE JET PUMP
4045	SUBMERSIBLE MULTIPLE IMPELLER (TURBINE) PUMP
4046	SUBMERSIBLE HELICAL ROTOR PUMP
4047	SUBMERSIBLE GEAR PUMP
4048	SUBMERSIBLE GAS-DISPLACEMENT PUMP
4050	SQUEEZE PUMP
4060	GAS RECIPROCATING PUMP
4070	GAS LIFT
4080	PERISTALTIC PUMP
4090	JET PUMP
4100	FLOWING WELL
4110	RESIN TRAP COLLECTOR

	82398--SAMPLING METHOD
5010	SEDIMENT CORE
8010	OTHER
8020	SYRINGE SAMPLE
8030	GRAB SAMPLE AT WATER-SUPPLY TAP
	82923--ATMOSPHERIC DEPOSITION TYPE, WET
1	SNOW
2	HAIL
3	MIXTURE (RAIN, SNOW, AND OR HAIL)
4	RAIN
9.99	UNKNOWN
	83205--ATMOSPHERIC DEPOSITION TYPE, BULK
1	SNOW
2	HAIL
3	MIXTURE (RAIN, SNOW, AND OR HAIL)
4	RAIN
9.99	UNKNOWN
	84060--TOPOGRAPHY, PHYSIOGRAPHIC SETTING
10	ALLUVIAL FAN
20	PLAYA
30	STREAM CHANNEL
40	LOCAL DEPRESSION
50	DUNES
60	FLAT SURFACE
70	FLOOD PLAIN
80	HILLTOP
90	SINKHOLE
100	LAKE, SWAMP, OR MARSH
110	MANGROVE SWAMP
120	OFFSHORE (ESTUARY)
130	PEDIMENT
140	HILLSIDE (SLOPE)
150	TERRACE, ALLUVIAL OR MARINE

	84060--TOPOGRAPHY, PHYSIOGRAPHIC SETTING
160	UNDULATING
170	VALLEY FLAT
180	UPLAND DRAW
	84143--WELL PURGING CONDITION
100	WELL PURGED TO STABLE PH
110	WELL PURGED TO STABLE TEMPERATURE
120	WELL PURGED TO STABLE SPECIFIC CONDUCTANCE
130	WELL PURGED TO STABLE PH AND TEMPERATURE
140	WELL PURGED TO STABLE PH AND SPECIFIC CONDUCTANCE
150	WELL PURGED TO STABLE TEMPERATURE AND SPECIFIC CONDUCTANCE
160	WELL PURGED TO STABLE PH, TEMP. AND SPECIFIC CONDUCTANCE
170	WELL PURGED, AT LEAST THREE WELL VOLUMES
500	WELL NOT PURGED, WATER IN CASING LESS THAN 6 HOURS
510	WELL NOT PURGED, WATER IN CASING 6-12 HOURS
520	WELL NOT PURGED, WATER IN CASING 12-24 HOURS
530	WELL NOT PURGED, WATER IN CASING MORE THAN 24 HOURS
	84144--WELL SELECTION CRITERIA
100	SITE SELECTED BECAUSE IT IS NEAR/WITHIN LOCAL PROBLEM AREA
200	SITE SELECTED WITHOUT REGARD TO LOCAL PROBLEM AREA
	84145--PROJECT COMPONENT
100	REGIONAL SAMPLING
200	TARGETED SAMPLING (AGRICULTURAL AREA)
300	TARGETED SAMPLING (URBAN OR SUBURBAN AREA)
400	TARGETED SAMPLING (NATURALLY OCCURRING SUBSTANCES)
500	TARGETED SAMPLING (LOCAL-SCALE NETWORK)
600	TARGETED SAMPLING (OTHER)
700	GEOCHEMICAL INVESTIGATION
	84146--LAND USE, PREDOMINANT, WITHIN 100 FT OF WELL
110	RESIDENTIAL
120	COMMERCIAL AND SERVICES
130	INDUSTRIAL

	84146--LAND USE, PREDOMINANT, WITHIN 100 FT OF WELL
170	OTHER URBAN OR BUILT-UP LAND
211	NONIRRIGATED CROPLAND
212	IRRIGATED CROPLAND
213	PASTURE
220	ORCHARDS, GROVES, VINEYARDS, NURSERIES
230	CONFINED FEEDING OPERATIONS
240	OTHER AGRICULTURAL LAND
300	RANGELAND
400	FORESTLAND
500	WATER
600	WETLAND
700	BARREN LAND
	84147--LAND USE, PREDOMINANT, WITHIN 0.25 MILE OF WELL
110	RESIDENTIAL
120	COMMERCIAL AND SERVICES
130	INDUSTRIAL
170	OTHER URBAN OR BUILT-UP LAND
211	NONIRRIGATED CROPLAND
212	IRRIGATED CROPLAND
213	PASTURE
220	ORCHARDS, GROVES, VINEYARDS, NURSERIES
230	CONFINED FEEDING OPERATIONS
240	OTHER AGRICULTURAL LAND
300	RANGELAND
400	FORESTLAND
500	WATER
600	WETLAND
700	BARREN LAND
	84148--LAND USE, PREDOMINANT FRACTION, WITHIN 0.25 MILE OF WELL
25	LESS THAN 25 PERCENT
50	FROM 26 PERCENT TO 50 PERCENT

	84148--LAND USE, PREDOMINANT FRACTION, WITHIN 0.25 MILE OF WELL
75	FROM 51 PERCENT TO 75 PERCENT
100	FROM 76 PERCENT TO 100 PERCENT
	84149--LAND-USE CHANGES W/I LAST 10 YRS, WITHIN 0.25 MILE OF WELL
100	YES
200	PROBABLY
300	PROBABLY NOT
400	NO
	84164--SAMPLER TYPE
100	VAN DORN SAMPLER
110	SEWAGE SAMPLE
120	VELOCITY INTEGRATED SAMPLE
125	KEMMERER BOTTLE
200	ZOOPLANKTON NET
210	BENTHIC INVERTEBRATE-MECHANICAL, GRAB
220	BENTHIC INVERTEBRATE-MECHANCIAL, DREDGE
230	BENTHIC INVERTEBRATE-ARTIFICIAL SUBSTRATE
240	BENTHIC INVERTEBRATE-NATURAL SUBSTRATE
250	BENTHIC INVERTEBRATE-NET
260	PHYTOPLANKTON NET
270	PHYTOPLANKTON-WATER BOTTLE
280	PERIPHYTON-NATURAL SUBSTRATE
290	PERIPHYTON-ARTIFICIAL SUBSTRATE
1000	BEDLOAD-HELLEY-SMITH, 3 X 3, AREA RATIO 3.22
1010	BEDLOAD-HELLEY-SMITH, 6 X 6, AREA RATIO 3.22
1020	BEDLOAD-HELLEY-SMITH, 3 X 3, AREA RATIO 1.40
1030	BEDLOAD-HELLEY-SMITH, 6 X 6, AREA RATIO 1.40
1040	BEDLOAD-HELLEY-SMITH, 6 X 12, AREA RATIO 1.40
1050	BEDLOAD-TOUTLE RIVER TYPE 2, 6 X 12, AREA RATIO 1.40
1060	BEDLOAD-BL-84, 3 X 3, AREA RATION, 1.40
1070	BEDLOAD-TOUTLE RIVER TYPE 1, 6 X 6, AREA RATIO 3.22
1080	BEDLOAD-HUBBLE #5, 6 X 12, AREA RATIO, 1.40

	84164--SAMPLER TYPE
1090	FIASP, 3 X 3, AREA RATIO 1.40
1100	3X3 INCH H-S, 1/4-IN THICK NOZZLE, 50-100 LBS, CABLE SUSP
1110	3X3 INCH H-S, 1/4-IN THICK NOZZLE, 100-200 LBS, CABLE SUSP
1120	3X3 INCH H-S, 1/4-INCH THICK NOZZLE, WADING
1130	3X3 INCH H-S, SHEET METAL NOZZLE, WADING
1140	3X3 INCH FIASP, 1/4-IN THICK NOZZLE, 50-100LBS, CABLE SUSP
1150	3X3 INCH FIASP, 1/4-INCH THICK NOZZLE, WADING
1160	3X3 INCH FIASP, SHEET METAL NOZZLE, WADING
1170	6X6 IN H-S, 1/4-IN THICK NOZZLE, 150-200 LBS, CABLE SUSP
3001	SAMPLER, US DH-48
3002	SAMPLER, US DH-59
3003	SAMPLER, US DH-75P
3004	SAMPLER, US DH-75Q
3005	SAMPLER, US DH-76
3006	SAMPLER, US D-43
3007	SAMPLER, US D-49
3008	SAMPLER, US D-49AL
3009	SAMPLER, US D-74
3010	SAMPLER, US D-74AL
3011	SAMPLER, US D-77
3012	SAMPLER, US P-46
3013	SAMPLER, US P-50
3014	SAMPLER, US P-61-A1
3015	SAMPLER, US P-63
3016	SAMPLER, US P-72
3017	SAMPLER, US U-59
3018	SAMPLER, US U-73
3019	SAMPLER, US PS-69
3020	SAMPLER, US PS-69TM
3021	SAMPLER, US CS-77
3022	SAMPLER, US PS-82

	84164--SAMPLER TYPE
3023	SAMPLER, US BMH-53
3024	SAMPLER, US BMH-53TM
3025	SAMPLER, US BM-54
3026	SAMPLER, US BM-54TM
3027	SAMPLER, US BMH-60
3028	SAMPLER, US BMH-60TM
3029	SAMPLER, US RBM-80
3030	US DH-48 TM
3031	US DH-48 TM W/ TEFLON GASKET AND NOZZLE
3032	US DH-59 TM
3033	US DH-59 TM W/ TEFLON GASKET AND NOZZLE
3034	US DH-76 TM
3035	US DH-76 TM W/ TEFLON GASKET AND NOZZLE
3036	US D-74 TM
3037	US D-74 AL-TM
3038	US D-74 AL-TM W/ TEFLON GASKET AND NOZZLE
3039	US D-77 TM
3040	US D-77 TM MODIFIED TEFLON BAG SAMPLER
3041	US P-61 AL-TM
3042	US P-61
3043	US P-61 TM
3044	US DH-81
3045	US DH-81 WITH TEFLON CAP AND NOZZLE
3046	SAMPLER, D-77 TM, W/REYNOLDS OVEN COLLAPSIBLE BAG
3047	SAMPLER, FRAME-TYPE, PLASTIC BOTTLE W/REYNOLDS OVEN BAG
3048	SAMPLER, FRAME-TYPE, TEFLON BOTTLE
3049	SAMPLER, FRAME-TYPE, PLASTIC BOTTLE
3050	SAMPLER, FRAME-TYPE, PLASTIC BOTTLE W/TEFLON COLLAPS. BAG
3051	US DH-95 TEFLON BOTTLE
3052	US DH-95 PLASTIC BOTTLE
3053	US D-95 TEFLON BOTTLE

	84164--SAMPLER TYPE
3054	US D-95 PLASTIC BOTTLE
3055	US D-96 BAG SAMPLER
3056	US D-96-A1 BAG SAMPLER
3060	WEIGHTED-BOTTLE SAMPLER
3061	US WBH-96 WEIGHTED-BOTTLE SAMPLER
3070	GRAB SAMPLE
3080	VOC HAND SAMPLER
4010	THIEF SAMPLER
4020	OPEN-TOP BAILER
4025	DOUBLE-VALVE BAILER
4030	SUCTION PUMP
4035	SUBMESIBLE CENTRIFUGAL PUMP
4040	SUBMERSIBLE POSITIVE-PRESSURE PUMP
4041	SUBMERSIBLE HELICAL ROTOR PUMP
4045	SUBMERSIBLE GEAR PUMP
4050	BLADDER PUMP
4055	INERTIAL PUMP
4060	GAS RECIPROCATING PUMP
4070	GAS LIFT
4075	SUBMERSIBLE PISTON PUMP
4080	PERISTALTIC PUMP
4090	JET PUMP
4095	LINE-SHAFT TURBINE PUMP
4100	FLOWING WELL
4110	RESIN TRAP COLLECTOR
4115	SAMPLER, POINT, AUTOMATIC
5010	BOX CORE, LONG
5020	BOX CORE, SHORT
5030	GRAVITY CORE
5040	PISTON CORE
5050	PUSH CORE

	84164--SAMPLER TYPE
8000	NONE
8010	OTHER
	99100--BLANK, TYPE OF SOLUTION
10	DISTILLED/DEIONIZED WATER
20	STANDARD REFERENCE WATER SAMPLE
30	MATCHED MATRIX
40	ORGANIC-FREE WATER
50	VOC FREE WATER
60	STERILE SALINE BUFFERED WATER
70	STERILE BUFFERED WATER PO4/MgC12
200	OTHER
	99101--BLANK, SOURCE OF SOLUTION
10	NATIONAL WATER QUALITY LAB (USGS)
20	U.S. ENVIRONMENTAL PROTECTION AGENCY
30	STANDATD REFERENCE WATER SAMPLE (USGS)
35	MIX OF STANDARD REFERENCE WATER SAMPLE
40	NIST (FORMERLY NBS)
50	CANADIAN INLAND WATERS
55	USGS MERCURY RESEARCH LAB (WISCONSIN DISTRICT)
60	DISTRICT LAB
61	SUBDISTRICT #1 LAB
62	SUBDISTRICT #2 LAB
63	SUBDISTRICT #3 LAB
64	SUBDISTRICT #4 LAB
70	NATURAL SAMPLE
71	FIELD OFFICE #1 LAB
72	FIELD OFFICE #2 LAB
73	FIELD OFFICE #3 LAB
74	FIELD OFFICE #4 LAB
80	OCALA LAB (USGS)
99.99	UNKNOWN

	99101--BLANK, SOURCE OF SOLUTION
100	CHEMICAL SUPPLIER
110	BURDICK AND JACKSON
120	J.T. BAKER
200	OTHER

	99102--BLANK, TYPE OF SAMPLE
1	SOURCE SOLUTION
10	SHELF (HOLD)
20	REFRIGERATOR
30	TRIP
40	SAMPLER
50	SPLITTER
60	FILTER
70	PRESERVATION
80	EQUIPMENT
90	AMBIENT
100	FIELD
150	LAB BLANK
200	OTHER

	99103--REFERENCE MATERIAL, SOURCE
10	NATIONAL WATER QUALITY LAB (USGS)
20	U.S. ENVIRONMENTAL PROTECTION AGENCY
30	STANDARD REFERENCE WATER SAMPLE (USGS)
40	NIST (FORMERLY NBS)
50	CANADIAN INLAND WATERS
60	DISTRICT LAB
70	NATURAL SAMPLE
80	OCALA LAB (USGS)
99.99	UNKNOWN
100	CHEMICAL SUPPLIER
200	OTHER

	99105--REPLICATE TYPE
10	CONCURRENT
20	SEQUENTIAL
30	SPLIT
40	SPLIT-CONCURRENT
50	SPLIT-SEQUENTIAL
200	OTHER
	99106--SPIKE, TYPE
10	FIELD
20	LABORATORY
30	SURROGATE
40	INTERNAL STANDARDS
200	OTHER
	99107--SPIKE, SOURCE
10	NATIONAL WATER QUALITY LAB (USGS)
20	U.S. ENVIRONMENTAL PROTECTION AGENCY
30	STANDARD REFERENCE WATER SAMPLE (USGS)
35	MIX OF STANDARD REFERENCE WATER SAMPLE
40	NIST (FORMERLY NBS)
50	CANADIAN INLAND WATERS
60	DISTRICT LAB
70	NATURAL SAMPLE
80	OCALA LAB (USGS)
99.99	UNKNOWN
100	CHEMICAL SUPPLIER
110	SUPELCO
120	PROTOCOL ANALYTICAL SUPPLIES, INC.
200	OTHER
	99111--QUALITY ASSURANCE DATA TYPE ASSOCIATED WITH SAMPLE
1	NO ASSOCIATED QA DATA
10	BLANK
20	BLIND SAMPLE

	99111--QUALITY ASSURANCE DATA TYPE ASSOCIATED WITH SAMPLE
30	REPLICATE SAMPLE
40	SPIKE SAMPLE
100	MORE THAN ONE TYPE OF QA SAMPLE
110	CROSS-SECTION INFORMATION STORED
200	OTHER
	99112--PURPOSE, TOPICAL QUALITY-CONTROL DATA, CODE
1	ROUTINE QC (NON-TOPICAL)
10	TOPICAL QC FOR HIGH BIAS (CONTAMINATION)
20	TOPICAL QC FOR LOW BIAS (RECOVERY)
100	TOPICAL QC FOR VARIABILITY DUE TO FIELD EQUIPMENT
110	TOPICAL QC FOR VARIABILITY DUE TO FIELD COLLECTION PROC.
120	TOPICAL QC FOR VARIABILITY DUE TO FIELD PERSONNEL
130	TOPICAL QC FOR VARIABILITY DUE TO FIELD PROCESSING PROC.
140	TOPICAL QC FOR VARIABILITY DUE TO SHIP. & HANDLING PROC.
200	TOPICAL QC FOR VARIABILITY DUE TO LABORATORY
900	OTHER TOPICAL QC PURPOSE
	99329--COLIPHAGE, SOMATIC, E. COLI C-HOST, 2-STEP ENRICHMENT
1	PRESENT
2	ABSENT
	99335--COLIPHAGE, F-SPECIFIC, E. COLI FAMP-HOST, 2-STEP ENRICHMENT
1	PRESENT
2	ABSENT
	99595--TOTAL COLIFORM, COLILERT PA METHOD
1	PRESENT
2	ABSENT
	99596--E. COLI, COLILERT PA METHOD, WATER
1	PRESENT
2	ABSENT
	99766--ENTEROVIRUS, WATER, REVERSE-TRANSCRIPTASE POLYMERASE CHAIN REACTION, 1MDS FILTER
1	PRESENT

	99766--ENTEROVIRUS, WATER, REVERSE-TRANSCRIPTASE POLYMERASE CHAIN REACTION, 1MDS FILTER
2	ABSENT
	99767--REOVIRUS, WATER, REVERSE-TRANSCRIPTASE POLYMERASE CHAIN REACTION, 1MDS FILTER
1	PRESENT
2	ABSENT
	99768--ROTAVIRUS, WATER, REVERSE-TRANSCRIPTASE POLYMERASE CHAIN REACTION, 1MDS FILTER
1	PRESENT
2	ABSENT
	99769--HEPATITIS-A VIRUS, WATER, REVERSE-TRANSCRIPTASE POLYMERASE CHAIN REACTION, MEMBRANE DISK FILTER
1	PRESENT
2	ABSENT
	99770--NORWALK VIRUS, WATER, REVERSE-TRANSCRIPTASE POLYMERASE CHAIN REACTION, 1MDS FILTER
1	PRESENT
2	ABSENT
	99771--CALICIVIRUS, WATER, REVERSE-TRANSCRIPTASE POLYMERASE CHAIN REACTION, 1MDS FILTER
1	PRESENT
2	ABSENT

4.3 Appendix C: Output Examples

Section	Description
3.3.1.1	Site listing from site retrieval to locate records
3.3.1.2	Record number listing from retrieval to locate records
3.3.2	Output from inventory of samples
3.3.3	Listing of samples and results (3 formats)
3.3.4	Listing of sample and cation-anion balance
3.3.5	Chemical validation listing
3.4.3.2	Publication tables (by-sample format; 4 table types)
3.4.4	Publication tables (by-result format; 3 table types)
3.4.5	Flat file (by-sample, fixed column format)
3.4.6	Flat file (by-result, fixed-column format)
3.4.7	P-Stat output (three files)
3.6.1	Listing of site information
3.6.3	Listing of parameter code dictionary
3.6.6	Listing of check of state/county information
3.6.7	Listing of short name output for parameter code dictionary
3.6.9	Listing of output from the parameter-method reference table
3.7.6	DQI remapping report
3.8	WATLIST file
3.8	Rejected files in tab-delimited format from batch processing

Site Listing from Site Retrieval to Locate Records

"[Explanation of columns: agency code (1-5), station number (6-20), station name (21-70), latitude (71-77), longitude (78-85), state code (86-87), county code (88-90), altitude (91-98), hydrologic unit code (99-114), basin code (115-116) station type code (117-123), drainage area (124-131), aquifer code (132-139), project number (140-151), primary water use code (152), sorting code for internal program use (153), current database (154-155)]

```
USGS 06130000       FLATWILLOW CREEK NEAR MOSBY, MT.              465540 107560030069        10040203      SW 1855.00     301
USGS 06130500       MUSSELSHELL RIVER AT MOSBY, MT.               465941 107531830069  2493.910040205      SW 7846.00     301
USGS 06130600       CAT CREEK NEAR CAT CREEK, MT.                 470300 108010030069 2650.0010040205      SW   36.50     301
USGS 06130610       BAIR COULEE NEAR MOSBY MT                     470315 107364330033 2980.0010040205      SW    1.79     301
USGS 06130620       BLOOD CREEK TRIB NEAR VALENTINE MT            472010 108273330027 2950.0010040205      SW    1.97     301
USGS 06130680       BIG DRY CREEK AT JORDAN, MT.                  471856 106543330033        10040105      SW  521.00     301
USGS 06130700       SAND CREEK NEAR JORDAN, MT.                   471500 106510030033 2586.2810040105      SW  317.00     301
USGS 06130800       SECOND CREEK TRIBUTARY NEAR JORDAN, MT.       471200 106480030033 2750.0010040105      SW    0.52     301
USGS 06130850       SECOND CREEK TRIBUTARY NO. 2 NEAR JORDAN, MT. 471200 106490030033 2750.0010040105      SW    2.08     301
USGS 06130900       SECOND CREEK TRIBUTARY NO 3 NEAR JORDAN, MT.  471300 106500030033 2780.0010040105      SW    0.72     301
USGS 06130915       RUSSIAN COULEE NEAR JORDAN MT                 471958 106423930033 2530.0010040105      SW    3.45     301
USGS 06130925       THOMPSON CREEK TRIB NEAR COHAGEN MT           465705 106273830033 2750.0010040106      SW    1.23     301
USGS 06130935       CROW ROCK CREEK NEAR COHAGEN MT               470345 106141130033        10040106      SW  213.00     301
USGS 06130940       SPRING CREEK TRIB NEAR VAN NORMAN MT          471458 106182130033 2440.0010040106      SW    1.39     301
USGS 06130950       LITTLE DRY CREEK NEAR VAN NORMAN, MT.         472022 106214730033 2340.0010040106      SW 1224.00     301
```

Record Number Listing from Retrieval to Locate Records

```
      9640017001   06130000          19640311    19640322         9
      9640017101   06130000          19640323    19640331         9
      9640017201   06130000          19640401    19640407         9
      9640017301   06130000          19640408    19640417         9
      9640017401   06130000          19640418    19640427         9
      9640017501   06130000          19640428    19640502         9
      9640017601   06130000          19640503    19640509         9
      9640017701   06130000          196405061130                 9
      9640017801   06130000          19640510    19640521         9
      9640017901   06130000          19640522    19640531         9
      9640018001   06130000          19640601    19640611         9
      9640018101   06130000          19640612    19640621         9
      9640018201   06130000          196406191000                 9
      9640018301   06130000          19640622    19640630         9
      9640018401   06130000          196406301330                 9
```

Output from Inventory of Samples:

[Explanation of codes: M, Medium code; Analysis codes are listed in the following order - analysis status, analysis source, hydrologic condition, sample type, and hydrologic event codes; STAT. – District processing status code; NO OF PARMS, number of parameters in the record; CH, chemical; NU, nutrient; ME, metals; BI, biological; PE, pesticides; RA, radiochemical; SE, sediment; BE, bed material]

1 DATA IN WATER-QUALITY FILE
SAT, JUN 30 2001

RECORD NUMBER	STATION NUMBER		BEGIN DATE	BEGIN TIME	END DATE	END TIME	M	ANALYSIS CODES	STAT.	PROJECT	LAST UPDATE	NO OF PARMS	TYPES OF ANALYSES CH	NU	ME	BI	PE	RA	SE	BE	AGENCY	LAB-ID
96400170	06130000		03-11-64		03-22-64		9	7AA99	TRANS		860202	24									USGS	
96400171	06130000	CST	03-23-64		03-31-64		9	7AA99	TRANS		860202	23									USGS	
96400172	06130000		04-01-64		04-07-64		9	7AA99	TRANS		860202	24									USGS	
96400173	06130000	CST	04-08-64		04-17-64		9	7AA99	TRANS		860202	24									USGS	
96400174	06130000		04-18-64		04-27-64		9	7AA99	TRANS		860202	24									USGS	
96400175	06130000		04-28-64		05-02-64		9	7AA99	TRANS		860202	24									USGS	
96400176	06130000		05-03-64		05-09-64		9	7AA99	TRANS		860202	24									USGS	
96400177	06130000		05-06-64	1130	- -		9	7AA99	TRANS		860202	9									USGS	
96400178	06130000		05-10-64		05-21-64		9	7AA99	TRANS		860202	24									USGS	
96400179	06130000		05-22-64		05-31-64		9	7AA99	TRANS		860202	24									USGS	
96400180	06130000	CDT	06-01-64		06-11-64		9	7AA99	TRANS		860202	24									USGS	
96400181	06130000	CDT	06-12-64		06-21-64		9	7AA99	TRANS		860202	24									USGS	
96400182	06130000		06-19-64	1000	- -		9	7AA99	TRANS		860202	13									USGS	

Listing of samples and results (3 formats):

[Explanation of codes: PARM, parameter code, RPT LEV, report level; R, remarks code; M, method code; Q, quality assurance code; PR and P, precision code; DQI, data quality inventory code; Q1, Q2, and Q3, value qualifier codes; NVQ, null value qualifier codes; RP-LVCD, report level code, ANAL_SET_NO, analysis set number; ANL_DATE, analysis date; ANAL_PREP_NO, analysis preparatory set number; PRP_DATE, analysis preparatory date; MOD_DATE, last date record was modified; MOD_BY, user that modified the record last]

1) Format used for long form, 132 characters and for output to a file:

```
Record Number: 96400170
Agency: USGS   Station Number 06130000
Station Name: FLATWILLOW CREEK NEAR MOSBY, MT.
Start Date: 19640311  Start Time: 1200  CST
  End Date: 19640322    End Time:
Medium Code: 9

Sample type: 9  Analysis Status: 7  Analysis Source: A
Hydrologic Condition: A  Hydrologic Event: 9
Project Code:            Lab Number:          Geologic Unit:
Organism ID (ITIS):           Body Part ID:
Analysis Types:                          Number Parameters: 024
Modified: 19860202  By: nwis
District Processing Status: T -- TRANSFERRED

Sample Field Comment--

Sample Lab Comment--

 PARM  --VALUE--  -RPT LEV-  R M Q  PR  DQI  Q1 Q2 Q3  NVQ  RP-LVCD  ANAL_SET_NO  ANL_DATE  ANAL_PREP_NO  PRP_DATE  MOD_DATE  MOD_BY

00060        1.9        --       A  2    A                                                                    20010614  nwis
00080          4        --       A  1    A                                                                    20010614  nwis
00095       4190        --       A  3    A                                                                    20010614  nwis
00400        7.4        --       A  2    A                                                                    20010614  nwis
00440        233        --       A  2    A                                                                    20010614  nwis
00445         .0        --       A  1    A                                                                    20010614  nwis
00900       1370        --       A  2    A                                                                    20010614  nwis
00902       1180        --       A  2    A                                                                    20010614  nwis
00915        245        --       A  2    A   c                                                                20010614  nwis
00925        184        --       A  2    A                                                                    20010614  nwis
00930        590        --       A  2    A                                                                    20010614  nwis
00931        6.9        --       A  2    A                                                                    20010614  nwis
00935        6.2        --       A  2    A                                                                    20010614  nwis
00940         40    1.0           A  2    A                   MRL                                              20010614  nwis
00945         --        --       A  2    A             b                                                      20010614  nwis
```

2) Format used for short form, 2-columns:

```
Record Number: 96400170

 Station Name: FLATWILLOW CREEK NEAR MOSBY, MT.

 Agency Code: USGS   Site Number: 06130000
 Begin Date: 19640311  Begin Time: 1200  CST
   End Date: 19640322    End Time:
 Medium Code: 9

 Sample type: 9  Analysis Status: 7  Analysis Source: A
 Hydrologic Condition: A  Hydrologic Event: 9
 Project Code:            Lab Number:          Geologic Unit:
 Organism ID (ITIS):           Body Part ID:
 Analysis Types:                           Number Parameters: 024
```

```
Modified: 19860202  By: nwis
 District Processing Status: T -- TRANSFERRED

 Sample Field Comment--

 Sample Lab Comment--

 PARAMETER  VALUE   R  Q  M  P    PARAMETER  VALUE   R  Q  M  P

   00060      1.9     A     2      00080        4     A     1
   00095     4190     A     3      00400      7.4     A     2
   00440      233     A     2      00445       .0     A     1
   00900     1370     A     2      00902     1180     A     2
   00915      245     A     2      00925      184     A     2
   00930      590     A     2      00931      6.9     A     2
   00935      6.2     A     2      00940       40     A     2
   00945     2260     A     2      00950       .5     A     1
   00955      5.1     A     2      01020      410     A     2
   70300     3450     A     3      70302     17.7     A     3
   70303     4.69     A     2      71851       .0     A     1
   71870      .48     A     2      71885       .0     A     1
```

3) Format used for long form folded into 80 characters:

```
Record Number: 96400170

 Station Name: FLATWILLOW CREEK NEAR MOSBY, MT.

 Agency Code: USGS   Site Number: 06130000
 Begin Date: 19640311  Begin Time: 1200  CST
   End Date: 19640322    End Time:
 Medium Code: 9

 Sample type: 9  Analysis Status: 7  Analysis Source: A
 Hydrologic Condition: A  Hydrologic Event: 9
 Project Code:            Lab Number:          Geologic Unit:
 Organism ID (ITIS):           Body Part ID:
 Analysis Types:                          Number Parameters: 024
 Modified: 19860202  By: nwis
 District Processing Status: T -- TRANSFERRED

 Sample Field Comment--
 Sample Lab Comment--
Press <CR> to continue:

 PARM  --VALUE--  -RPT LEV-  RMK  METH  QA  PR  DQI  Q1 Q2 Q3  NVQ  RP-LVCD
       ANAL_SET_NO  ANAL_DATE  ANAL_PREP_NO  PREP_DATE  MOD_DATE  MODIFIED_BY

 00060       1.9        --               A   2   A
                                                     20010614   nwis
 00080         4        --               A   1   A
                                                     20010614   nwis
 00095      4190        --               A   3   A
                                                     20010614   nwis
 00400       7.4        --               A   2   A
                                                     20010614   nwis
 00440       233        --               A   2   A
                                                     20010614   nwis
 00445        .0        --               A   1   A
                                                     20010614   nwis
 00900      1370        --               A   2   A
                                                     20010614   nwis
 00902      1180        --               A   2   A
                                                     20010614   nwis
 00915       245        --               A   2   A
                                                     20010614   nwis
 00925       184        --               A   2   A
                                                     20010614   nwis
```

Listing of Sample and Cation-Anion Balance

1 WATER QUALITY ANALYSIS - SAT, JUN 30 2001

RECORD NUMBER ------- 96400170
STATION NUMBER ------ 06130000
STATION NAME -------- FLATWILLOW CREEK NEAR MOSBY, MT.
DATE OF COLLECTION -- 03-11-1964 03-22-1964

PARAMETERS INCLUDED IN THIS RECORD ARE--

NO.	CODE.	REMARK	VALUE.....	DESCRIPTION.....
1	00060		1.9	DISCHARGE, CUBIC FEET PER SECOND
2	00080		4	COLOR (PLATINUM-COBALT)
3	00095		4190	SPECIFIC CONDUCTANCE (MICROSIEMENS/CM AT 25 DEG. C)
4	00400		7.4	PH, WATER, WHOLE, FIELD, STANDARD UNITS
5	00440		230	ACID NEUTRALIZING CAPACITY (ANC), WATER, UNFILTERED, BICARBONATE, FIXED ENDPOINT
6	00445		0	ACID NEUTRALIZING CAPACITY (ANC), WATER, UNFILTERED, CARBONATE, FIXED ENDPOINT T
7	00900		1400	HARDNESS TOTAL (MG/L AS CA03)
8	00902		1200	NONCARBONATE HARDNESS WATER WHOLE TOTAL, FIELD, (MG/L AS CA CO3)
9	00915		245	CALCIUM DISSOLVED (MG/L AS CA)
10	00925		184	MAGNESIUM DISSOLVED (MG/L AS MG)
11	00930		590	SODIUM DISSOLVED (MG/L AS NA)
12	00931		7	SODIUM ADSORPTION RATIO
13	00935		6.20	POTASSIUM DISSOLVED (MG/L AS K)
14	00940		40.0	CHLORIDE DISSOLVED (MG/L AS CL)
15	00945		2260	SULFATE DISSOLVED (MG/L AS SO4)
16	00950		.5	FLUORIDE DISSOLVED (MG/L AS F)
17	00955		5.1	SILICA DISSOLVED (MG/L AS SIO2)
18	01020		410	BORON DISSOLVED (UG/L AS B)
19	70300		3450	SOLIDS, RESIDUE ON EVAPORATION AT 180 DEG C, DISSOLVED (MG/L)
20	70302		17.7	SOLIDS, DISSOLVED (TONS PER DAY)
21	70303		4.69	SOLIDS, DISSOLVED (TONS PER ACRE-FOOT)
22	71851		.000	NITROGEN, NITRATE, DISSOLVED (MG/L AS NO3)
23	71870		.48	BROMIDE, DISSOLVED (MG/L AS BR)
24	71885		0	IRON (UG/L AS FE)

1 WATER QUALITY ANALYSIS - SAT, JUN 30 2001

```
     RECORD NUMBER -------  96400170
     STATION NUMBER ------  06130000
     STATION NAME --------  FLATWILLOW CREEK NEAR MOSBY, MT.
     DATE OF COLLECTION --  03-11-1964         03-22-1964


      CATIONS                (MG/L)     (MEQ/L)        ANIONS                (MG/L)     (MEQ/L)

  CALCIUM,   DISS. MG/L         245      12.226   CHLORIDE,  DISS. MG/L        40.0       1.129
  MAGNESIUM, DISS. MG/L         184      15.142   SULFATE,   DISS. MG/L        2260      47.054
  SODIUM,    DISS. MG/L         590      25.665   FLUORIDE,  DISS. MG/L          .5       0.027
  POTASSIUM, DISS. MG/L        6.20       0.159   BICARB., WHL,FET, FLD         230       3.819
                                                  CARB., WHL, FET, FLD            0       0.001
                                                  NITRATE, DISS. AS NO3        .000       0.001
                              _____________                                  _____________
                            TOTAL         53.191                           TOTAL         52.027
                                          PERCENT DIFFERENCE =   1.11
```

Chemical validation listing:

[Explanation of codes: R, remarks code; Q, quality assurance code; M, method code; P, precision code]

```
1                    QW RECORD VALIDATION PROGRAM

                           SAT, JUN 30 2001

1


     RECORD NUMBER: 96400170   STATION NUMBER: 06130000          COLLECTED: 03-11-1964 AT:     03-22-1964 AT:
      STATION NAME: FLATWILLOW CREEK NEAR MOSBY, MT.                          COUNTY: 069      LAB-ID:
            MEDIUM:9   STATUS: 7      SOURCE: A    HYD. CONDITION: A   SAMPLE TYPE: 9    HYD. EVENT: 9   24 PARAMETERS


 CATION/CONDUCTANCE RATIO OUTSIDE LIMITS .92 TO 1.24

 ANION/CONDUCTANCE RATIO OUTSIDE LIMITS .92 TO 1.24

 SUM OF CONSTITUENTS/SPECIFIC CONDUCTANCE RATIO OUTSIDE LIMITS .55 TO .81

 RESIDUE AT 180 C/SPECIFIC CONDUCTANCE RATIO  OUTSIDE LIMITS .55 TO .81
```

	CODE	PARAMETER NAME	UNITS	VALUE	R	Q	M	P
	00060	DISCHARGE	CFS	1.9		A		2
	00080	COLOR	PLATINUM-COBALT	4		A		1
	00095	SPECIFIC CONDUCTANCE	US/CM @ 25C	4190		A		3
	00400	PH, WH, FIELD	(STANDARD UNITS)	7.4		A		2
	00440	ANC HCO3 FET FIELD	(MG/L AS HCO3)	230		A		2
	00445	ANC CARB FET FIELD	(MG/L AS CO3)	0		A		1
	00900	HARDNESS TOTAL	(MG/L AS CAO3)	1400		A		2
	00902	NONCARBONATE HARD. F	(MG/L AS CACO3)	1200		A		2
	00915	CALCIUM DISSOLVED	(MG/L AS CA)	245		A		2
	00925	MAGNESIUM DISSOLVED	(MG/L AS MG)	184		A		2
	00930	SODIUM DISSOLVED	(MG/L AS NA)	590		A		2
	00931	SODIUM ADSORPTION R.	(RATIO)	7		A		2
COMPUTED	00932	SODIUM, PERCENT	PERCENT	49				
	00935	POTASSIUM DISSOLVED	(MG/L AS K)	6.20		A		2
	00940	CHLORIDE DISSOLVED	(MG/L AS CL)	40.0		A		2
	00945	SULFATE DISSOLVED	(MG/L AS SO4)	2260		A		2
	00950	FLUORIDE DISSOLVED	(MG/L AS F)	.5		A		1
	00955	SILICA DISSOLVED	(MG/L AS SIO2)	5.1		A		2
	01020	BORON DISSOLVED	(UG/L AS B)	410		A		2
	70300	RESIDUE DIS 180C	MG/L	3450		A		3
COMPUTED	70301	DISSOLVED SOLIDS SUM	MG/L	3450				
	70302	DISSOLVED SOLIDS	TONS/DAY	17.7		A		3
	70303	RESIDUE DIS TON/ACFT	T/AC-FT	4.69		A		2
	71851	NITR. NO3 AS NO3 DIS	MG/L AS NO3	.000		A		1
	71870	BROMIDE DISSOLVED	MG/L AS BR	.48		A		2
	71885	IRON	UG/L AS FE	0		A		1

1

RECORD NUMBER: 96400170

STATION ID: USGS 06130000

STATION NAME: FLATWILLOW CREEK NEAR MOSBY, MT.

COLLECTION DATE: 03-11-1964 03-22-1964

CATIONS		(MG/L)	(MEQ/L)	ANIONS		(MG/L)	(MEQ/L)
CALCIUM,	DISS. MG/L	245	12.226	CHLORIDE,	DISS. MG/L	40.0	1.129
MAGNESIUM,	DISS. MG/L	184	15.142	SULFATE,	DISS. MG/L	2260	47.054
SODIUM,	DISS. MG/L	590	25.665	FLUORIDE,	DISS. MG/L	.5	0.027
POTASSIUM,	DISS. MG/L	6.20	0.159	BICARB., WHL,FET, FLD		230	3.819
				CARB., WHL, FET, FLD		0	0.001
				NITRATE, DISS. AS NO3		.000	0.001
		TOTAL	53.191			TOTAL	52.027

PERCENT DIFFERENCE = 1.11

Publication tables (by-sample format; 4 table types)

Table type 1 (Single-station):

DISTRICT CODE 30 UNITED STATES DEPARTMENT OF INTERIOR - GEOLOGICAL SURVEY PROCESS DATE 6-30-01
06130000 -- FLATWILLOW CREEK NEAR MOSBY, MT.

WATER-QUALITY DATA

DATE	STATION NUMBER	DATE	CALCIUM DIS-SOLVED (MG/L AS CA) (00915)	CHLO-RIDE, DIS-SOLVED (MG/L AS CL) (00940)	FLUO-RIDE, DIS-SOLVED (MG/L AS F) (00950)
MAR 1964					

```
   11-22      06130000         19640311    245     40.0       .5
 MAR
   23-31      06130000         19640323    240     42.0       .4
1


 DISTRICT CODE 30  UNITED STATES DEPARTMENT OF INTERIOR - GEOLOGICAL SURVEY  PROCESS DATE  6-30-01
                     06130500 -- MUSSELSHELL RIVER AT MOSBY, MT.


                                WATER-QUALITY DATA

                                                                                CHLO-    FLUO-
                                                                    CALCIUM     RIDE,    RIDE,
                                                          TEMPER-    DIS-       DIS-      DIS-
  DATE        STATION  NUMBER    DATE      TIME          ATURE     SOLVED     SOLVED    SOLVED
                                                          WATER     (MG/L      (MG/L     (MG/L
                                                         (DEG C)    AS CA)     AS CL)    AS F)
                                                         (00010)   (00915)    (00940)   (00950)

 OCT 1974
   22...      06130500         19741022    1230      --        --        --        --
   22...      06130500         19741022    1230    10.0       120      23.0       .3
```

Table type 2 (Miscellaneous station):

```
         UNITED STATES DEPARTMENT OF INTERIOR - GEOLOGICAL SURVEY  PROCESS DATE  6-30-01
                      MISCELLANEOUS STATION ANALYSES


                                                                CHLO-    FLUO-
                                                     CALCIUM    RIDE,    RIDE,
                                           TEMPER-    DIS-      DIS-      DIS-
    DATE     STATION  NUMBER    DATE       ATURE     SOLVED    SOLVED    SOLVED
                                           WATER     (MG/L     (MG/L     (MG/L
                                          (DEG C)    AS CA)    AS CL)    AS F)
                                          (00010)   (00915)   (00940)   (00950)

 06130000  FLATWILLOW CREEK NEAR MOSBY, MT.  (LAT 46 55 40N LONG 107 56 00W)

 MAR 1964
   11...    06130000         19640311     --      245     40.0       .5
   23...    06130000         19640323     --      240     42.0       .4

 06130500  MUSSELSHELL RIVER AT MOSBY, MT.  (LAT 46 59 41N LONG 107 53 18W)
```

```
OCT 1974
  22...    06130500         19741022     --       --       --       --
  22...    06130500         19741022   10.0      120     23.0       .3
```

Table type 3 (Multiple station):

```
        UNITED STATES DEPARTMENT OF INTERIOR - GEOLOGICAL SURVEY  PROCESS DATE  6-30-01
                     MISCELLANEOUS STATION ANALYSES


                                                                  CHLO-    FLUO-
                                                       CALCIUM    RIDE,    RIDE,
                                          TEMPER-       DIS-      DIS-     DIS-
  STATION  NUMBER    DATE      TIME       ATURE       SOLVED    SOLVED   SOLVED
                                          WATER       (MG/L     (MG/L    (MG/L
                                          (DEG C)     AS CA)    AS CL)   AS F)
                                          (00010)    (00915)   (00940)  (00950)

     06130000      03-11-64      --         --        245      40.0       .5
                   03-23-64      --         --        240      42.0       .4
     06130500      10-22-74    1230         --         --        --       --
                   10-22-74    1230       10.0        120      23.0       .3
```

Table type 4 (Biological):

```
DISTRICT CODE 30  UNITED STATES DEPARTMENT OF INTERIOR - GEOLOGICAL SURVEY  PROCESS DATE  6-30-01
 460645112491201 -- 04N10W10DADA01


 WATER-QUALITY DATA

                        DATE                                  MAR 29, 78   JUL 30, 74                    SET:    1
                        TIME                                     1230         1330                       PAGE:   1

                        TOTAL CELLS/ML                            120         6200

                                                              CELLS PER-   CELLS PER-
                                                               /ML  CENT    /ML  CENT

                        CHLOROPHYTA) (GREEN ALGAE
                        .CHLOROPHYCEAE
                        ..CHLOROCOCCALES
                        ...OOCYSTACEAE
                        ....ANKISTRODESMUS                        --          110  2
```

```
....TETRAEDRON                                  --           28 <1
CHRYSOPHYTA) (YELLOW-GREEN ALGAE
.BACILLARIOPHYCEAE
..CENTRALES
...COSCINODISCACEAE
....CYCLOTELLA                                  --          390  6
....MELOSIRA                                    --          340  5
..PENNALES
...ACHNANTHACEAE
....COCCONEIS                                   --           84  1
....RHOICOSPHENIA                               --           28 <1
...CYMBELLACEAE
....CYMBELLA                                    --          220  4
...DIATOMACEAE
....DIATOMA                                     --          450  7
...FRAGILARIACEAE
....HANNAEA                                     14 12        --
....SYNEDRA                                     81 68       220  4
...NAVICULACEAE
....NAVICULA                                    27 23       560  9
CYANOPHYTA) (BLUE-GREEN ALGAE
.CYANOPHYCEAE
..OSCILLATORIALES
...OSCILLATORIACEAE
....LYNGBYA                                     --         3800 61
```

Publication tables (by-result format; 3 table types)

Table type 1 (Single station):

```
DISTRICT CODE 30  UNITED STATES DEPARTMENT OF INTERIOR - GEOLOGICAL SURVEY  PROCESS DATE  6-30-01
       06130000 -- FLATWILLOW CREEK NEAR MOSBY, MT.


                    WATER-QUALITY DATA



                                        PARAM-
                                         ETER
  DATE        STATION  NUMBER    DATE     CODE    VALUE
```

```
 MAR 1964
   11-22      06130000         19640311   00915      245
 MAR
   11-22      06130000         19640311   00940     40.0
 MAR
   11-22      06130000         19640311   00950       .5
 MAR
   23-31      06130000         19640323   00915      240
 MAR
   23-31      06130000         19640323   00940     42.0
 MAR
   23-31      06130000         19640323   00950       .4
1

DISTRICT CODE 30  UNITED STATES DEPARTMENT OF INTERIOR - GEOLOGICAL SURVEY  PROCESS DATE  6-30-01
            06130500 -- MUSSELSHELL RIVER AT MOSBY, MT.


                        WATER-QUALITY DATA



                                                    PARAM-
                                                     ETER
  DATE        STATION  NUMBER    DATE      TIME     CODE    VALUE


 OCT 1974
   22...      06130500         19741022    1230    00915      120
   22...      06130500         19741022    1230    00940     23.0
   22...      06130500         19741022    1230    00950       .3
```

Table type 2 (Miscellaneous station):

```
    UNITED STATES DEPARTMENT OF INTERIOR - GEOLOGICAL SURVEY  PROCESS DATE  6-30-01
                MISCELLANEOUS STATION ANALYSES



                                                  PARAM-
                                                   ETER
    DATE    STATION  NUMBER    DATE      TIME     CODE    VALUE
```

```
06130000  FLATWILLOW CREEK NEAR MOSBY, MT.  (LAT 46 55 40N LONG 107 56 00W)

MAR 1964
  11...    06130000         19640311      --    00915      245
  11...    06130000         19640311      --    00940     40.0
  11...    06130000         19640311      --    00950       .5
  23...    06130000         19640323      --    00915      240
  23...    06130000         19640323      --    00940     42.0
  23...    06130000         19640323      --    00950       .4

06130500  MUSSELSHELL RIVER AT MOSBY, MT.  (LAT 46 59 41N LONG 107 53 18W)

OCT 1974
  22...    06130500         19741022    1230    00010     10.0
  22...    06130500         19741022    1230    00915      120
  22...    06130500         19741022    1230    00940     23.0
  22...    06130500         19741022    1230    00950       .3
```

Table type 3 (Multiple station):

```
  UNITED STATES DEPARTMENT OF INTERIOR - GEOLOGICAL SURVEY  PROCESS DATE  6-30-01
           MISCELLANEOUS STATION ANALYSES



                                        PARAM-
                                         ETER
  STATION  NUMBER    DATE      TIME      CODE    VALUE


     06130000      03-11-64      --    00915      245
                   03-11-64      --    00940     40.0
                   03-11-64      --    00950       .5
                   03-23-64      --    00915      240
                   03-23-64      --    00940     42.0

                   03-23-64      --    00950       .4
     06130500      10-22-74    1230    00010     10.0
                   10-22-74    1230    00915      120
                   10-22-74    1230    00940     23.0
                   10-22-74    1230    00950       .3
```

Flat file (by-sample, fixed column format)

```
  06130000           19640311        --  -999999   -999999       245      40.0        .5
  06130000           19640323        --  -999999   -999999       240      42.0        .4
  06130500           19741022      1230  -999999   -999999   -999999   -999999   -999999
  06130500           19741022      1230  -999999      10.0       120      23.0        .3
```

Flat file (by-result, fixed-column format)

```
  06130000           19640311        --     00915   -999999     245
  06130000           19640311        --     00940   -999999    40.0
  06130000           19640311        --     00950   -999999      .5
  06130000           19640323        --     00915   -999999     240
  06130000           19640323        --     00940   -999999    42.0
  06130000           19640323        --     00950   -999999      .4
  06130500           19741022      1230     00010   -999999    10.0
  06130500           19741022      1230     00915   -999999     120
  06130500           19741022      1230     00940   -999999    23.0
  06130500           19741022      1230     00950   -999999      .3
```

P-Stat output (three files)

[Note: The *.stats file is produced when values with remark codes are included in the data set]

Data file:

```
06130000         19640311    -   19640322    -
      --        --        245      40.0        .5
06130000         19640323    -   19640331    -
      --        --        240      42.0        .4
06130000         19640401    -   19640407    -
      --        --        238      34.0        .6
06130000         19640408    -   19640417    -
      --        --        204      24.0        .6
06130000         19640418    -   19640427    -
      --        --        209      28.0        .6
06130000         19640428    -   19640502    -
      --        --        219      29.0        .6
06130000         19640503    -   19640509    -
      --        --       72.0       4.5        .5
06130000         19640506  1130      -       -
```

```
      --       11.7       --        --        --
06130000         19640510    -   19640521    -
      --        --        132       6.7        .5
06130000         19640522    -   19640531    -
      --        --        122       7.9        .5
06130000         19640601    -   19640611    -
      --        --        121       7.0        .3
06130000         19640612    -   19640621    -
      --        --        100       5.8        .4
06130000         19640619  1000      -        -
      --        --        --        --        --
06130000         19640622    -   19640630    -
      --        --        110       6.8        .4
06130000         19640630  1330      -        -
      --       15.6       --        --        --
06130000         19640701    -   19640710    -
      --        --        131       5.6        .5
06130000         19640711    -   19640722    -
      --        --        149       9.5        .4
06130000         19640723    -   19640731    -
      --        --        173      14.0        .5
06130000         19640801    -   19640819    -
      --        --        219      17.0        .6
06130000         19640820    -   19640831    -
      --        --        149       8.4        .5
```

Command file (*.cmnd):

```
BUILD pstat_output.P, FILE pstat_output;
VARS  STATION.NUMBER:C DATE:C TIME:C END.DATE:C END.TIME:C
 P00025 P00010 P00915 P00940 P00950
 $
```

Statistics file (*.stats):

```
          LIST OF PARAMETERS WITH REMARK CODES

     PARAMETER 00915        VALUE     COUNT

                        <     245       1
```

Listing of site information:

```
1   SHOWSITE -  ACCESSING SITEFILE FOR DATABASE 01         RETRIEVAL DATE:  Sat, 30 Jun 2001 @ 17:42:13        Page 0001


                    STATION NAME:  Flatwillow Creek near Mosby MT                    STATION NUMBER:  06130000
                         COUNTRY:  US                                 STATE: 30          COUNTY:  069
                   LAT. / LONG. :   465540    / 1075600     LAT/LONG METHOD: M          DISTRICT:  30
                LAT/LONG ACCURACY:  U                       LAT/LONG DATUM: NAD27    ALTITUDE DATUM:
                   RECORD CREATED:  19850531              GAGE/SURFACE DATUM:          UPDATED:  19930120000000
                    SITE USE CODE:  INACTIVE                 HYDROLOGIC UNIT: 10040203      BASIN CODE:
                LAND NET LOCATION:                           ALTITUDE METHOD:          ALTITUDE ACCURACY:
              NAME OF LOCATION MAP:                                 MAP SCALE: 1:         SOURCE AGENCY:  USGS
                    SITE WEB FLAG:  Y                        TIME ZONE CODE: MST  DAYLIGHT SAVINGS TIME:  Y
    DATE SITE ESTAB. OR INVENT.:                                    REMARKS:

                   PROJECT NUMBER:                          CONTRIB. DRAIN AREA:            DRAINAGE AREA:   1855.00
0     TYPE OF SITE                      TYPE OF DATA COLLECTED AT SITE: STATUS          INSTRUMENTATION AT SITE: STATUS
+     ____________                      ______________________________________          ______________________________
            STREAM
```

Listing of parameter code dictionary:

PARAMETER CODE LIST

CODE	SHORT NAME	ORDER	LONG NAME
00001	CROSS-SECTION (FEET)	5559	CROSS-SECTION LOCATION FEET FROM RIGHT B
00002	CROSS-SECTION (%)	5560	CROSS-SECTION LOCATION PERCENT FROM RIGH
00003	SAMPLING DEPTH (FT.)	234	SAMPLING DEPTH (FEET)
00004	STREAM WIDTH (FEET)	276	STREAM WIDTH (FEET)
00005	CROSS-SECTION (%)	5561	CROSS-SECTION LOCATION VERTICAL (PERCENT
00008	SAMPLE ACCT. NUMBER	5641	SAMPLE ACCOUNTING NUMBER
00009	CROSS-SECTION (FT.)	5558	CROSS-SECTION LOCATION FEET FROM LEFT BA
00010	WATER TEMPERATURE	375	TEMPERATURE, WATER (DEG. C)
00011	WATER TEMPERATURE	374	WATER TEMPERATURE, (DEGREES) FARENHEIT

CODE	SHORT NAME	ORDER	LONG NAME
00012	EVAP TEMP (48" PAN)	114	EVAPORATION TEMPERATURE 48" PAN (DEGREES
00013	EVAP TEMP (24" PAN)	113	EVAPORATION TEMPERATURE 24" PAN (DEGREES
00014	WET BULB TEMP. DEG.	323	WET BULB TEMPERATURE (DEGREES) CELSIUS
00020	AIR TEMPERATURE	370	TEMPERATURE, AIR, DEGREES CELSIUS
00021	AIR TEMPERATURE	371	TEMPERATURE, AIR, DEGREES FAHRENHEIT
00022	LENGTH OF EXPOSURE	5611	LENGTH OF EXPOSURE (DAYS)
00023	SAMPLE WEIGHT (LBS)	5683	SAMPLE WEIGHT (POUNDS)
00024	SAMPLE LENGTH (IN)	228	SAMPLE LENGTH (INCHES)
00025	AIR PRESSURE	331	BAROMETRIC PRESSURE (MM OF HG)
00027	COLLECTING AGENCY	2	AGENCY COLLECTING SAMPLE (CODE NUMBER)
00028	ANALYZING AGENCY	1	AGENCY ANALYZING SAMPLE (CODE NUMBER)
00029	PROJECT NUMBER	5626	PROJECT NUMBER
00030	SOLAR RADIATION	248	SOLAR RADIATION, INCIDENTAL, INTENSITY (
00031	LIGHT INCIDENT (%)	140	LIGHT INCIDENT AT REMAINING DEPTH (PERCE
00032	CLOUD COVER (%)	55	CLOUD COVER (PERCENT)
00034	LIGHT DEPTH 1%	134	LIGHT DEPTH TO 1% OF SURFACE LIGHT (FEET
00035	WIND SPEED	329	WIND SPEED (MPH)
00036	WIND DIRECTION	324	WIND DIRECTION IN DEGREES FROM TRUE NORT
00041	WEATHER DESCRIPTION	5800	WEATHER (WMO CODE NUMBER)
00042	ALTITUDE ABOVE MSL	31	ALTITUDE ABOVE MEAN SEA LEVEL (TEST)
00045	PRECIPITATION	191	PRECIPITATION, TOTAL, INCHES
00046	PRECIPITATION TOTAL	188	PRECIPITATION TOTAL (INCHES/WEEK)
00047	TOT PARTIAL PRESSURE	196	PRESSURE, TOTAL PARTIAL OF DISSOLVED GAS
00048	PART. PRESS SATUR	197	PRESSURE, TOTAL PARTIAL, DISSOLVED GASSE
00049	SURFACE AREA (SQ MI)	287	SURFACE AREA (SQUARE MILES)
00050	EVAPORATION	115	EVAPORATION TOTAL (INCHES/DAY)
00051	SURFACE AREA (SQ FT)	286	SURFACE AREA (SQUARE FEET)

Listing of check of state/county information:

```
1
  STATE NAME: ALABAMA                    MIN LAT:  301425
  STATE ABBR: AL                         MAX LAT:  350045   MIN ALT: 00000
  STATE CODE: 01                        MIN LONG:  0845402  MAX ALT: 02407
  LAST UPDAT:                           MAX LONG:  0882824
```

```
1
  STATE NAME: ALASKA                          MIN LAT:  490749
  STATE ABBR: AK                              MAX LAT:  705242   MIN ALT: 00000
  STATE CODE: 02                             MIN LONG:  1292641  MAX ALT: 20320
  LAST UPDAT:                                MAX LONG: -1733359

1
  STATE NAME: ARIZONA                         MIN LAT:  312000
  STATE ABBR: AZ                              MAX LAT:  370014   MIN ALT: 00000
  STATE CODE: 04                             MIN LONG:  1090229  MAX ALT: 12633
  LAST UPDAT:                                MAX LONG:  1144849

1
  STATE NAME: ARKANSAS                        MIN LAT:  330011
  STATE ABBR: AR                              MAX LAT:  363036   MIN ALT: 00055
  STATE CODE: 05                             MIN LONG:  0893859  MAX ALT: 02753
  LAST UPDAT:                                MAX LONG:  0943724

1
  STATE NAME: CALIFORNIA                      MIN LAT:  323235
  STATE ABBR: CA                              MAX LAT:  420122   MIN ALT:  -282
  STATE CODE: 06                             MIN LONG:  1140751  MAX ALT: 14494
  LAST UPDAT:                                MAX LONG:  1242255

1
  STATE NAME: COLORADO                        MIN LAT:  365901
  STATE ABBR: CO                              MAX LAT:  410059   MIN ALT: 03350
  STATE CODE: 08                             MIN LONG:  1020244  MAX ALT: 14433
  LAST UPDAT:                                MAX LONG:  1090344

1
  STATE NAME: CONNECTICUT                     MIN LAT:  405850
  STATE ABBR: CT                              MAX LAT:  420302   MIN ALT: 00000
  STATE CODE: 09                             MIN LONG:  0714702  MAX ALT: 02380
  LAST UPDAT:                                MAX LONG:  0734312
```

Listing of short name output for parameter code dictionary:

PARAMETER CODE LIST
NAME. THE FULL NAME INCLUDES THE PARAMETER CODE,THE SHORT NAME

CODE	SHORT NAME	ORDER	LONG NAME	UNITS	MEQ F	ROUNDING
00001	CROSS-SECTION (FEET)	5559	CROSS-SECTION LOCATION FEET FROM RIGHT B	(FEET)	00000	0223333332
00002	CROSS-SECTION (%)	5560	CROSS-SECTION LOCATION PERCENT FROM RIGH	(PERCENT)	00000	0223333332
00003	SAMPLING DEPTH (FT.)	234	SAMPLING DEPTH (FEET)	FEET	00000	0223333332
00004	STREAM WIDTH (FEET)	276	STREAM WIDTH (FEET)	(FEET)	00000	0223333332
00005	CROSS-SECTION (%)	5561	CROSS-SECTION LOCATION VERTICAL (PERCENT	(PERCENT)	00000	0223333332
00008	SAMPLE ACCT. NUMBER	5641	SAMPLE ACCOUNTING NUMBER	(NUMBER)	00000	0001234560
00009	CROSS-SECTION (FT.)	5558	CROSS-SECTION LOCATION FEET FROM LEFT BA	(FEET)	00000	0223333332
00010	WATER TEMPERATURE	375	TEMPERATURE, WATER (DEG. C)	(DEGREES C)	00000	0012333331
00011	WATER TEMPERATURE	374	WATER TEMPERATURE, (DEGREES) FARENHEIT	(DEGREES F)		0012333331
00012	EVAP TEMP (48" PAN)	114	EVAPORATION TEMPERATURE 48" PAN (DEGREES	(DEGREES)	00000	0012333331
00013	EVAP TEMP (24" PAN)	113	EVAPORATION TEMPERATURE 24" PAN (DEGREES	(DEGREES)	00000	0012333331
00014	WET BULB TEMP. DEG.	323	WET BULB TEMPERATURE (DEGREES) CELSIUS	(DEGREES)	00000	0012333331
00020	AIR TEMPERATURE	370	TEMPERATURE, AIR, DEGREES CELSIUS	DEGREES C	00000	0012333331
00021	AIR TEMPERATURE	371	TEMPERATURE, AIR, DEGREES FAHRENHEIT	DEGREES F		0012333331
00022	LENGTH OF EXPOSURE	5611	LENGTH OF EXPOSURE (DAYS)	(DAYS)	00000	0001234560
00023	SAMPLE WEIGHT (LBS)	5683	SAMPLE WEIGHT (POUNDS)	(POUNDS)	00000	0222333332
00024	SAMPLE LENGTH (IN)	228	SAMPLE LENGTH (INCHES)	(INCHES)	00000	0222333332
00025	AIR PRESSURE	331	BAROMETRIC PRESSURE (MM OF HG)	(MM OF HG)	00000	0001233330
00027	COLLECTING AGENCY	2	AGENCY COLLECTING SAMPLE (CODE NUMBER)	(CODE NUMBER)	00000	0001234560

Listing of output from the parameter-method reference table:

```
00025     BAROMETRIC PRESSURE (MM OF HG)               (MM OF HG) 0001233330
00025  A  BAROMETRIC PRESSURE (MM OF HG)               (MM OF HG) 0001233330
00400  A  PH, WATER, WHOLE, FIELD, STANDARD UNITS      (STANDARD  0012333331
00500     SOLIDS, RESIDUE ON TOTAL EVAPORATION AT 105 D (MG/L)     0001233330
00500  A  SOLIDS, RESIDUE ON TOTAL EVAPORATION AT 105 D (MG/L)     0001233330
00505     RESIDUE, TOTAL LOSS ON IGNITION, VOLATILE (MG (MG/L)     0001233330
00505  A  RESIDUE, TOTAL LOSS ON IGNITION, VOLATILE (MG (MG/L)     0001233330
00510     RESIDUE, TOTAL FIXED (MG/L)                  (MG/L)     0001233440
00515     RESIDUE, TOTAL FILTERABLE, DRIED AT 105 DEGRE (MG/L)     0001233440
00515  A  RESIDUE, TOTAL FILTERABLE, DRIED AT 105 DEGRE (MG/L)     0001233440
00515  B  RESIDUE, TOTAL FILTERABLE, DRIED AT 105 DEGRE (MG/L)     0001233330
00520     RESIDUE, VOLATILE FILTRABLE (MG/L)           (MG/L)     0001233330
00520  A  RESIDUE, VOLATILE FILTRABLE (MG/L)           (MG/L)     0001233330
00525     RESIDUE, FIXED FILTERABLE (MG/L)             (MG/L)     0001233440
00525  A  RESIDUE, FIXED FILTERABLE (MG/L)             (MG/L)     0001233440
00530     RESIDUE, TOTAL NON FILTERABLE (MG/L)         (MG/L)     0001233440
00530  0  RESIDUE, TOTAL NON FILTERABLE (MG/L)         (MG/L)     0001233330
00530  A  RESIDUE, TOTAL NON FILTERABLE (MG/L)         (MG/L)     0001233440
00530  B  RESIDUE, TOTAL NON FILTERABLE (MG/L)         (MG/L)     0001233330
00535     RESIDUE, VOLATILE NONFILTRABLE (MG/L)        (MG/L)     0001233330
00535  A  RESIDUE, VOLATILE NONFILTRABLE (MG/L)        (MG/L)     0001233330
00540     RESIDUE, FIXED NON FILTERABLE (MG/L)         (MG/L)     0001233330
00540  A  RESIDUE, FIXED NON FILTERABLE (MG/L)         (MG/L)     0001233330
00545     RESIDUE, SETTLEABLE (MG/L)                   (MG/L)     0001233330
```

DQI remapping report:

[Explanation of codes: RECORD-NO, record number; PARM, parameter code; DQI, data quality indicator code]

```
1qwdqiflag -- DQI codes changed to: R          08-22-2001 19:22

 SITE NUMBER            RECORD-NO  PARM  METHOD   VALUE  DQI

 USGS  06037000         99002449   00010            2.5   A
 USGS  06037000         99002449   00020             -5   A
 USGS  06037000         99002449   00027           1028   A
 USGS  06037000         99002449   00028           1028   A
 USGS  06037000         99002449   00061             80   A
 USGS  06037000         99002449   00095            465   A
 USGS  06037000         99002450   00010           11.0   A
 USGS  06037000         99002450   00020            7.5   A
 USGS  06037000         99002450   00027           1028   A
 USGS  06037000         99002450   00028           1028   A
 USGS  06037000         99002450   00061             76   A
 USGS  06037000         99002450   00095            487   A
 USGS  06037000         99002451   00010            7.5   A
 USGS  06037000         99002451   00020             .5   A
 USGS  06037000         99002451   00027           1028   A
```

WATLIST file:

[Explanation of codes: C, Calculated result; N, New result; PCODE, parameter code; MET, method code ; RPLV, report level; RLCOD, report level code; REM, remark code; QUAL CODES, value qualifier codes; NLQ, null value qualifier codes; DQI, data quality indicator code; QA, quality assurance code; PRC, precision code; PRP-DATE, analysis preparatory date; ANL-DATE, analysis date; CDT, Central Daylight Time; the time datum for the sample, which will only appear if the time-datum reliability code is stored as ‘K’ for the sample]

```
1===== Project: 460800100  Site: USGS  06130000        Database: 01 ========================================================================

0NWIS QW Batch Enter  --  Process Date: 07-01-2001 15:46  --  Transaction Number:     2

 **** NEW RECORD created
```

```
Record Number: 97601997   SINT: 322              CDT Begin Date: 07-01-1976 12:00  End Date:                   Medium: 9
Site ID: USGS 06130000         Station Name: FLATWILLOW CREEK NEAR MOSBY, MT.                      State: 30    County: 069
Lab ID Number: 0640024    Project: 460800100    Geologic Unit:             Data Types:
Sample Status: 7    Sample Source: 9    Hydrologic Condition: 9    Sample Type: 9    Hydrologic Event: 9
Organism (ITIS):          Body-part id:        Processing Status: R    Number Parameters:   9
Sample Field Comment--
Sample Lab Comment--

         M                                                              R  QUAL   N  D     P
         E                                                              E  CODES  L  Q  Q  R
* PCODE  T  RPLV  RLCOD  --PARAMETER NAME--   -----UNITS-----  --VALUE--  M  1 2 3  Q  I  A  C  PRP-DATE ANL-DATE

C 00900      --          HARDNESS TOTAL       (MG/L AS CAO3)         100
N 00915  A  1.00  LRL    CALCIUM DISSOLVED    (MG/L AS CA)            26     p         S  H  3  19760707 19760708
N 00925  A   .10  MRL    MAGNESIUM DISSOLVED  (MG/L AS MG)           8.9     q         R  H  2  19760707 19760708
N 00930  B   .10  MRL    SODIUM DISSOLVED     (MG/L AS NA)          15.5     r         Q  H  3  19760707 19760708
C 00931      --          SODIUM ADSORPTION R. (RATIO)                .7
C 00932      --          SODIUM, PERCENT      PERCENT                24
N 00935  A   .20  MRL    POTASSIUM DISSOLVED  (MG/L AS K)            4.7     s         I  H  2  19760707 19760708
N 00945  C   .10  MRL    SULFATE DISSOLVED    (MG/L AS SO4)           --     t      c  P  H  3  19760707 19760708
N 00951  C   .10  LT-MDL FLUORIDE TOTAL       (MG/L AS F)             .2     u         O  H  3  19760707 19760708
N 00955  C  1.00  MRL    SILICA DISSOLVED     (MG/L AS SIO2)         32.4     v         X  H  3  19760707 19760708
N 01065  C  1.00  MRL    NICKEL DISSOLVED     (UG/L AS NI)              1  <  w x y     A  H  2  19760707 19760708
Result Lab Comment--
Would you happen to have any Grey Poupon?
N 39787      --          TRITHION BTM         UG/KG                   .8              P  9  3  19760707 19760708

****  NEW RECORD CREATED -- RECORD NUMBER = 97601997

****  ERROR REPORT AND MESSAGES for Transaction Number    2  ****


             RECORD NUMBER:  97601997
                STATION ID:  USGS 06130000
              STATION NAME:  FLATWILLOW CREEK NEAR MOSBY, MT.
           COLLECTION DATE:  07-01-1976  1200     -  -


          PARTIAL BALANCE

            CATIONS                (MG/L)     (MEQ/L)        ANIONS                (MG/L)     (MEQ/L)

        CALCIUM,   DISS. MG/L        26.0       1.298
        MAGNESIUM, DISS. MG/L        8.90       0.733
        SODIUM,    DISS. MG/L        15.5       0.675
        POTASSIUM, DISS. MG/L        4.70       0.121
                                  __________                            __________
```

```
                                TOTAL         2.825                            TOTAL          0.001
                                              PERCENT DIFFERENCE = 100.00
1===== Project: 460800100  Site: USGS  463722111590201  Database: 01 ==========================================================================

0NWIS QW Batch Enter  --  Process Date: 07-01-2001 15:46  --  Transaction Number:     1

 **** NEW RECORD created

 Record Number: 97601996   SINT: 315              CDT Begin Date: 07-01-1976 12:00  End Date:                    Medium: 6
 Site ID: USGS 463722111590201  Station Name: 10N03W16DBAD01                                          State: 30    County: 049
 Lab ID Number: 0640017    Project: 460800100    Geologic Unit: 100CNZC     Data Types:
 Sample Status: A    Sample Source: A    Hydrologic Condition: 9    Sample Type: A    Hydrologic Event: 9
 Organism (ITIS):          Body-part id:        Processing Status: R    Number Parameters:   5
 Sample Field Comment--
 Sample Lab Comment--

          M                                                              R  QUAL   N  D     P
          E                                                              E  CODES  L  Q  Q  R
 * PCODE  T  RPLV  RLCOD  --PARAMETER NAME--   -----UNITS-----  --VALUE--  M  1 2 3  Q  I  A  C  PRP-DATE ANL-DATE

 N 00620  A   .10  MRL    NITROGEN NITRATE T.  MG/L AS N             3.5  S  a         A  H  2  19760707 19760708
 Result Field Comment--
 I will not eat them on a boat. I will not eat them with a go
 at.
 Result Lab Comment--
 I do not like them Sam I am. I do not like green eggs and ha
 m.
 N 00680  A   .10  MDL    CARBON ORGANIC TOT.  (MG/L AS C)             12     d         R  3  3  19760707 19760708
 C 00900      --          HARDNESS TOTAL       (MG/L AS CAO3)         150
 N 00915  A   --          CALCIUM DISSOLVED    (MG/L AS CA)          35.3     f         Q  6  3  19760707 19760708
 N 00925  A   --          MAGNESIUM DISSOLVED  (MG/L AS MG)          15.8     b         S  1  3  19760707 19760708
 N 01046  A  1.00  INT    IRON DISSOLVED       (UG/L AS FE)           7.3  V  i         I  8  2  19760707 19760708

 ****  NEW RECORD CREATED -- RECORD NUMBER = 97601996
 Sample Status: A    Sample Source: A    Hydrologic Condition: 9    Sample Type: A    Hydrologic Event: 9
 Organism (ITIS):          Body-part id:        Processing Status: R    Number Parameters:   5
 Sample Field Comment--
 Sample Lab Comment--

          M                                                              R  QUAL   N  D     P
          E                                                              E  CODES  L  Q  Q  R
 * PCODE  T  RPLV  RLCOD  --PARAMETER NAME--   -----UNITS-----  --VALUE--  M  1 2 3  Q  I  A  C  PRP-DATE ANL-DATE

 N 00620  A   .10  MRL    NITROGEN NITRATE T.  MG/L AS N             3.5  S  a         A  H  2  19760707 19760708
 Result Field Comment--
 I will not eat them on a boat. I will not eat them with a go
 at.
```

```
Result Lab Comment--
I do not like them Sam I am. I do not like green eggs and ha
m.
N 00680  A   .10  MDL    CARBON ORGANIC TOT.  (MG/L AS C)             12     d         R  3  3  19760707 19760708
C 00900      --          HARDNESS TOTAL       (MG/L AS CAO3)        150
N 00915  A   --          CALCIUM DISSOLVED    (MG/L AS CA)         35.3     f         Q  6  3  19760707 19760708
N 00925  A   --          MAGNESIUM DISSOLVED  (MG/L AS MG)         15.8     b         S  1  3  19760707 19760708
N 01046  A  1.00  INT    IRON DISSOLVED       (UG/L AS FE)          7.3  V  i         I  8  2  19760707 19760708

****  NEW RECORD CREATED -- RECORD NUMBER = 97601996

****  ERROR REPORT AND MESSAGES for Transaction Number    1  ****
RINT: 315 PCODE: 00915 rpt_lev_va and rpt_lev_cd must both have values or both be blanks; resetting to blanks
RINT: 315 PCODE: 00925 rpt_lev_va and rpt_lev_cd must both have values or both be blanks; resetting to blanks

            RECORD NUMBER:  97601996
               STATION ID:  USGS 463722111590201
             STATION NAME:  10N03W16DBAD01
           COLLECTION DATE:  07-01-1976  1200     -  -



          PARTIAL BALANCE

            CATIONS                (MG/L)     (MEQ/L)        ANIONS                (MG/L)     (MEQ/L)

        CALCIUM,   DISS. MG/L        35.3       1.762
        MAGNESIUM, DISS. MG/L        15.8       1.301
                                   _____________                                  _____________
                                TOTAL          3.062                          TOTAL          0.001
                                               PERCENT DIFFERENCE = 100.00
```

Rejected files from tab-delimited batch processing:

[The lines in the rejected files that begin with a '#' are errors found during batch processing. The error message is included before the record creating the problem. See *Section 3.8* for more information.]

Rejected.sample file:

```
0200104002      30      USGS    472312106074500 20001220120000          6       463000300               9               9
0200104003      30      USGS    472346106100200 20010101130000  20010104140000     7       463000444      7     7    7     7
#0200104004     Invalid value: 06132200 for field: site_no
0200104004      30      USGS    06132200        20010202000100          C
```

Rejected.result file:

```
#0200104002     00010   Protected by DQI code: R
0200104002      00010   7.33                                                    R                               Multimeter acting funny
#0200104002     00025   Protected by DQI code: R
0200104002      00025   733                                                     R
0200104002      00095   73.3                                                                                    Multimeter acting funny
0200104003      00613   1                                                       S
#0200104003     00631   Protected by DQI code: X
0200104003      00631   1                                                       X
#0200104004    IRON   Invalid parameter
0200104004      IRON   1                       B
```

4.4 Appendix D: Calculated Parameters

Calculated parameters are determined by using algorithms within QWDATA. Option 6 in the Support Files menu can be used to view the algorithms for these parameters. The table below contains additional information about the calculated parameters.

[NA, Not applicable]

Calculated parameter	Parameters preferred for calculation	Additional parameters			Result from special cases for parameters used in calculation		
		Parameters used in calculation, if available	Missing parameters	Replacement parameters used in calculation, if available	Missing values	Remark codes	Negative result
00301--Dissolved oxygen, water, unfiltered, percent of saturation	**00300**--Dissolved oxygen **00025**--Barometric pressure **00010**--Water temperature **00095**--Specific cond at 25C	---	---	---	missing	missing	NA
00405--Carbon dioxide, water, unfiltered, milligrams per liter	**99440**--Bicarbonate,wu,icr,f **00400**-- pH **99430**--Carbonate, water, unfiltered, incremental titration, field, milligrams per liter as calcium carbonate	---	[1] ---	[1] ---	[2] ---	[3] ---	NA
00435--Acidity, water, unfiltered, milligrams per liter as calcium carbonate	**71825**--Acidity, heated, wu	---	---	---	missing	missing	NA
00540--Residue, fixed nonfilterable, milligrams per liter	**00530**--Residue, total **00535**--Residue, volatile	---	---	---	missing	missing	0
00600--Total nitrogen, wu	**00625**-Ammonia plus organic nitrogen, water, unfiltered, milligrams per liter as nitrogen **00630**-Nitrite plus nitrate, water, unfiltered, milligrams per liter as nitrogen	---	**00630**	**00631**--Nitrite plus nitrate, dissolved	missing	missing	NA
00602--Total nitrogen, wf	**00623**-Ammonia plus organic nitrogen, water, filtered, milligrams per liter as nitrogen **00631**--Nitrite plus nitrate, water, filtered, milligrams per liter as nitrogen	---	---	---	missing	missing	NA

Calculated parameter	Parameters preferred for calculation	Parameters used in calculation, if available	Missing parameters	Replacement parameters used in calculation, if available	Missing values	Remark codes	Negative result
00605--Organic nitrogen, water, unfiltered, milligrams per liter	**00625**--Ammonia plus organic nitrogen, water, unfiltered, milligrams per liter as nitrogen **00610**--Ammonia, water, unfiltered, milligrams per liter as nitrogen	---	**00610**	**00608**--Ammonia, water, filtered, milligrams per liter as nitrogen	missing	missing	missing
00607--Organic nitrogen, water, filtered, milligrams per liter	**00623**--Ammonia plus organic nitrogen, water, filtered, milligrams per liter as nitrogen **00608**--Ammonia, water, filtered, milligrams per liter as nitrogen	---	---	---	missing	missing	missing
00618--Nitrate, water, filtered, milligrams per liter as nitrogen	**00631**--Nitrite plus nitrate, water, filtered, milligrams per liter as nitrogen **00613**--Nitrite, water, filtered, milligrams per liter as nitrogen	---	---	---	missing	missing	missing
00620--Nitrate, water, unfiltered, milligrams per liter as nitrogen	**00630**--Nitrite plus nitrate, water, unfiltered, milligrams per liter as nitrogen **00615**--Nitrite, water, unfiltered, milligrams per liter as nitrogen	---	---	---	missing	missing	missing
00621--Nitrate, bed sediment, total, dry weight, milligrams per kilogram as nitrogen	**00633**--Nitrite plus nitrate, bed sediment, total, dry weight, milligrams per kilogram as nitrogen **00616**--Nitrite, bed sediment, total, dry weight, milligrams per kilogram as nitrogen	---	---	---	missing	missing	missing
00650--Phosphate, water, unfiltered, milligrams per liter	**70507**--Orthophosphate, water, unfiltered, milligrams per liter as phosphorus	---	---	---	missing	missing	Negative results not likely
00660--Orthophosphate, water, filtered, milligrams per liter	**00671**--Orthophosphate, water, filtered, milligrams per liter as phosphorus	---	---	---	missing	missing	Negative results not likely
00669--Hydrolyzable phosphorus, water, unfiltered, milligrams per liter	**00678**--Hydrolyzable phosphorus plus orthophosphate, water, unfiltered, milligrams per liter as phosphorus **70507**--Orthophosphate, water, unfiltered, milligrams per liter as phosphorus	---	---	---	missing	missing	If result is negative, the final result is 0

Calculated parameter	Parameters preferred for calculation	Parameters used in calculation, if available	Missing parameters	Replacement parameters used in calculation, if available	Missing values	Remark codes	Negative result
00670--Organic phosphorus, water, unfiltered, milligrams per liter	**00665**--Phosphorus, water, unfiltered, milligrams per liter **00678**--Hydrolyzable phosphorus plus orthophosphate, water, unfiltered, milligrams per liter as phosphorus	---	**00678**	**70507**--Orthophosphate, water, unfiltered, milligrams per liter as phosphorus **00669**--Hydrolyzable phosphorus, water, unfiltered, milligrams per liter	missing	missing	missing
00672--Hydrolyzable phosphorus, water, filtered, milligrams per liter	**00677**--Hydrolyzable phosphorus plus orthophosphate, water, filtered, milligrams per liter as phosphorus **00671**--Orthophosphate, water, filtered, milligrams per liter as phosphorus	---	---	---	missing	missing	missing
00673--Organic phosphorus, water, filtered, milligrams per liter	**00666**--Phosphorus, water, filtered, milligrams per liter **00677**--Hydrolyzable phosphorus plus orthophosphate, water, filtered, milligrams per liter as phosphorus	---	**00677**	**00672**--Hydrolyzable phosphorus, water, filtered, milligrams per liter **00671**--Orthophosphate, water, filtered, milligrams per liter as phosphorus	missing	missing	missing
00687--Organic carbon, bed sediment, total, dry weight, grams per kilogram	**00693**--Carbon (inorganic plus organic), bed sediment, total, dry weight, grams per kilogram **00686**--Inorganic carbon, bed sediment, total, dry weight, grams per kilogram	---	---	---	missing	missing	missing
00690--Carbon (inorganic plus organic), water, unfiltered, milligrams per liter	**00685**--Inorganic carbon, water, unfiltered, milligrams per liter **00680**--Organic carbon, water, unfiltered, milligrams per liter	---	---		missing	missing	NA
00900--Hardness, water, unfiltered, milligrams per liter as calcium carbonate	**00915**--Calcium, water, filtered, milligrams per liter **00925**-- Magnesium, water, filtered, milligrams per liter	**01005**-- Barium, water, filtered, micrograms per liter **01080**-- Strontium, water, filtered, micrograms per liter	---	---	If **00915** or **00925** are missing, the result is missing	If **00915** or **00925** have a remarked result, the result is missing	Negative result not likely

Calculated parameter	Parameters preferred for calculation	Parameters used in calculation, if available	Missing parameters	Replacement parameters used in calculation, if available	Missing values	Remark codes	Negative result
00902-- Noncarbonate hardness, water, unfiltered, field, milligrams per liter as calcium carbonate	**00916**-- Calcium, water, unfiltered, recoverable, milligrams per liter **00927**-- Magnesium, water, unfiltered, recoverable, milligrams per liter **00450**-- Bicarbonate, water, unfiltered, incremental titration, field, milligrams per liter	[4] ---	[4] ---	[4] ---	[5] ---	[6] ---	NA
00903--Noncarbonate hardness, water, unfiltered, lab, milligrams per liter as calcium carbonate	**00916**-Calcium, water, unfiltered, recoverable, milligrams per liter **00927**-Magnesium, water, unfiltered, recoverable, milligrams per liter **00449**-Bicarbonate, water, unfiltered, incremental titration, laboratory, milligrams per liter	[7] ---	[7] ---	[7] ---	[8] ---	[9] ---	NA
00904-Noncarbonate hardness, water, filtered, field, milligrams per liter as calcium carbonate	**00915**-Calcium, water, filtered, milligrams per liter **00925**-Magnesium, water, filtered, milligrams per liter **00453**-Bicarbonate, water, filtered, incremental titration, field, milligrams per liter	[10] ---	[10] ---	[10] ---	[11] ---	[12] ---	NA
00905-Noncarbonate hardness, water, filtered, lab, milligrams per liter as calcium carbonate	**00915**-Calcium, water, filtered, milligrams per liter **00925**-Magnesium, water, filtered, milligrams per liter **29806**-Bicarbonate, water, filtered, incremental titration, laboratory, milligrams per liter	[13] ---	[13] ---	[13] ---	[14] ---	[15] ---	NA
00931-Sodium adsorption ratio, water, number	**00930**-Sodium, water, filtered, milligrams per liter **00915**-Calcium, water, filtered, milligrams per liter **00925**-Magnesium, water, filtered, milligrams per liter	---	---	---	missing	missing	NA

Calculated parameter	Parameters preferred for calculation	Parameters used in calculation, if available	Missing parameters	Replacement parameters used in calculation, if available	Missing values	Remark codes	Negative result
00932-Sodium, water, percent in equivalents of major cations	**00930**-Sodium, water, filtered, milligrams per liter **00915**-Calcium, water, filtered, milligrams per liter **00925**-Magnesium, water, filtered, milligrams per liter **00935**-Potassium, water, filtered, milligrams per liter	---	---	---	missing	missing	NA
30207-Gage height, above datum, meters	**00065**-Gage height, feet	---	---	---	missing	missing	NA
30208-Discharge, cubic meters per second	**00060**-Discharge, cubic feet per second	---	---	---	missing	missing	NA
30209-Discharge, instantaneous, cubic meters per second	**00061**-Discharge, instantaneous, cubic feet per second	---	---	---	missing	missing	NA
30210-Depth to water level, below land surface datum (LSD), meters	**72019**-Depth to water level, feet below land surface	---	---	---	missing	missing	NA
30211-Elevation above NGVD 1929, meters	**72020**-Elevation above NGVD 1929, feet	---	---	---	missing	missing	NA
49954-Biomass, periphyton, ash free dry mass, grams per square meter	**00573**-Biomass, periphyton, dry weight, grams per square meter **00572**-Biomass, periphyton, ash weight, grams per square meter	---	---	---	missing	missing	missing
70301-Residue, water, filtered, sum of constituents, milligrams per liter	**00453**-Bicarbonate, water, filtered, incremental titration, field, milligrams per liter **00915**-Calcium, water, filtered, milligrams per liter **00925**-Magnesium, water, filtered, milligrams per liter **00930**-Sodium, water, filtered, milligrams per liter **00940**-Chloride, water, filtered, milligrams per liter **00945**-Sulfate, water, filtered, milligrams per liter **00935**-Potassium, water, filtered, milligrams per liter	[16] ---	[16] ---	[16] ---	[17] ---	[17] ---	NA

Calculated parameter	Parameters preferred for calculation	Parameters used in calculation, if available	Missing parameters	Replacement parameters used in calculation, if available	Missing values	Remark codes	Negative result
70302-Residue, water, filtered, tons per day	**70300**-Residue on evaporation, dried at 180 degrees Celsius, water, filtered, milligrams per liter **00061**--Discharge, instantaneous, cubic feet per second	---	**70300** **00061**	**70301**-Residue, water, filtered, sum of constituents, milligrams per liter **00060**-Discharge, cubic feet per second	If **70300** and **70301** or **00061** and **00060** are missing, the result is missing	If **70300** and **70301** or **00061** and **00060** have remark codes, the result is missing	NA
70303-Residue, water, filtered, tons per acre-foot	**70300**-Residue on evaporation, dried at 180 degrees Celsius, water, filtered, milligrams per liter	---	**70300**	**70301** (see above)-Residue, water, filtered, sum of constituents, milligrams per liter	If **70300** and **70301** are missing, the result is missing	If **70300** and **70301** have remark values, the result is missing	NA
70949-Biomass-chlorophyll ratio, plankton	**81354**- Biomass, plankton, dry weight, milligrams per liter **81353**- Biomass, plankton, ash weight, milligrams per liter **70953**- Chlorophyll a, phytoplankton, chromatographic-fluorometric method, micrograms per liter	---	---	---	missing	missing	missing
70950- Biomass/chlorophyll ratio, periphyton, number	**00573**- Biomass, periphyton, dry weight, grams per square meter **00572**- Biomass, periphyton, ash weight, grams per square meter **70957**- Chlorophyll a, periphyton, chromatographic-fluorometric method, milligrams per square meter	---	---	---	missing	missing	missing
71845- Ammonia, water, unfiltered, milligrams per liter as NH4	**00610**--- Ammonia, water, unfiltered, milligrams per liter as nitrogen	---	---	---	missing	missing	NA
71846- Ammonia, water, filtered, milligrams per liter as NH4	**00608**-- Ammonia, water, filtered, milligrams per liter as nitrogen		---	---	missing	missing	NA
71851- Nitrate, water, filtered, milligrams per liter	**00631**-- Nitrite plus nitrate, water, filtered, milligrams per liter as nitrogen **00613**-- Nitrite, water, filtered, milligrams per liter as nitrogen		---	---	missing	missing	0

Calculated parameter	Parameters preferred for calculation	Parameters used in calculation, if available	Missing parameters	Replacement parameters used in calculation, if available	Missing values	Remark codes	Negative result
71856-Nitrite, water, filtered, milligrams per liter	**00613**--Nitrite, water, filtered, milligrams per liter as nitrogen		---	---	missing	missing	NA
71887-Total nitrogen, water, unfiltered, milligrams per liter as nitrate	**00625**---Ammonia plus organic nitrogen, water, unfiltered, milligrams per liter as nitrogen **00630**--Nitrite plus nitrate, water, unfiltered, milligrams per liter as nitrogen	---	---	---	missing	missing	NA
80155-Suspended sediment load, tons per day	**80154**-Suspended sediment concentration, milligrams per liter **00061**-Discharge, instantaneous, cubic feet per second	---	**00061**	**00060**-Discharge, cubic feet per second	missing	missing	NA
80156-Total sediment load, tons per day	**80180**-Total sediment concentration, milligrams per liter **00061**-Discharge, instantaneous, cubic feet per second	---	**00061**	**00060**-Discharge, cubic feet per second	missing	missing	NA
90851-- Trihalomethanes, water, unfiltered, calculated, micrograms per liter	**32106**--Trichloromethane, water, unfiltered, recoverable, micrograms per liter **32105**--Dibromochloromethane, water, unfiltered, recoverable, micrograms per liter **32101**--Bromodichloromethane, water, unfiltered, recoverable, micrograms per liter **32104**--Tribromomethane, water, unfiltered, recoverable, micrograms per liter	---	---	---	If **32106**, **32105**, **32101**, and **32104** are missing the result is 0	If any parameter has a remark code, it is not used	NA
90852--DDT plus degradates, bed sediment smaller than 2 millimeters, wet seived (native water), recoverable, calculated, dry weight, micrograms per kilogram	**49325**--o,p'-DDD, bed sediment smaller than 2 millimeters, wet sieved (native water), field, recoverable, dry weight, micrograms per kilogram **49326**--p,p'-DDD, bed sediment smaller than 2 millimeters, wet sieved (native water), field, recoverable, dry weight, micrograms per kilogram	---	---	---	If **49325**, **49326**, **49327**, **49329**, **49330**, and 49328 are missing, the result is 0	If any parameter has a remark code, it is not used	NA

Calculated parameter	Parameters preferred for calculation	Parameters used in calculation, if available	Missing parameters	Replacement parameters used in calculation, if available	Missing values	Remark codes	Negative result
90852 --continued --DDT plus degradates, bed sediment smaller than 2 millimeters, wet seived (native water), recoverable, calculated, dry weight, micrograms per kilogram	**49327**--o,p'-DDE, bed sediment smaller than 2 millimeters, wet sieved (native water), field, recoverable, dry weight, micrograms per kilogram **49329**--o,p'-DDT, sediment, bed material wet sieved, field, < 2mm, recoverable **49330**--p,p'-DDT, sediment, bed material wet sieved, field, < 2mm, recoverable **49328**--p,p'-DDE, sediment, bed material wet sieved, field, < 2mm, recoverable	---	---	---	If **49325**, **49326**, **49327**, **49329**, **49330**, and **49328** are missing, the result is 0	If any parameter has a remark code, it is not used	NA
90853-- Chlordane plus degradates, bed sediment, recoverable, calculated, dry weight, micrograms per kilogram	**49320**--cis-Chlordane, bed sediment smaller than 2 millimeters, wet sieved (native water), field, recoverable, dry weight, micrograms per kilogram **49321**--trans-Chlordane, bed sediment smaller than 2 millimeters, wet sieved (native water), field, recoverable, dry weight, micrograms per kilogram **49316**--cis-Nonachlor, bed sediment smaller than 2 millimeters, wet sieved (native water), field, recoverable, dry weight, micrograms per kilogram **49317**--trans-Nonachlor, bed sediment smaller than 2 millimeters, wet sieved (native water), field, recoverable, dry weight, micrograms per kilogram **49318**-Oxychlordane, bed sediment smaller than 2 millimeters, wet sieved (native water), field, recoverable, dry weight, micrograms per kilogram	---	---	---	If **49320**, **49321**, **49316**, **49317**, and **49318** are missing, the result is 0	If any parameter has a remark code, it is not used	NA

Calculated parameter	Parameters preferred for calculation	Parameters used in calculation, if available	Missing parameters	Replacement parameters used in calculation, if available	Missing values	Remark codes	Negative result
90854-- DDT plus degradates, biota, whole organism, wet weight, calculated, dry weight, micrograms per kilogram	**49374**--o,p'-DDD, biota, whole organism, recoverable, wet weight, micrograms per kilogram **49375**--p,p'-DDD, biota, whole organism, recoverable, wet weight, micrograms per kilogram **49373**-o,p'-DDE, biota, whole organism, recoverable, wet weight, micrograms per kilogram **49377**--o,p'-DDT, biota, whole organism, recoverable, wet weight, micrograms per kilogram **49376**--p,p'-DDT, biota, whole organism, recoverable, wet weight, micrograms per kilogram **49372**--p,p'-DDE, biota, whole organism, recoverable, wet weight, micrograms per kilogram	---	---	---	If **49374**, **49375**, **49373**, **49377**, **49376**, and **49372** are missing, the result is 0	If any parameter has a remark code, it is not used	NA
90855-- Chlordane plus degradates, biota, whole organism, calculated, wet weight, micrograms per kilogram	**49380**--cis-Chlordane, biota, whole organism, recoverable, wet weight, micrograms per kilogram **49379**--trans-Chlordane, biota, whole organism, recoverable, wet weight, micrograms per kilogram **49359**--cis-Nonachlor, biota, whole organism, recoverable, wet weight, micrograms per kilogram **49358**--trans-Nonachlor, biota, whole organism, recoverable, wet weight, micrograms per kilogram **49357**--Oxychlordane, biota, whole organism, recoverable, wet weight, micrograms per kilogram	---	---	---	If **49380**, **49379**, **49359**, **49358**, and **49357** are missing, the result is 0	If any parameter has a remark code, it is not used	NA
99019--Water level, depth below land surface, meters	**72019--**Depth to water level, feet below land surface		These were deleted from use as of 8/25/00.				
99020--Elevation above NGVD 1929, meters	**72020--**Elevation above NGVD 1929, feet						
99060--Discharge, cubic meters per second	**00060**-Discharge, cubic feet per second						

Calculated parameter	Parameters preferred for calculation	Parameters used in calculation, if available	These were deleted from use as of 8/25/00.
99061-Discharge, instantaneous, cubic meters per second	**00061**-Discharge, instantaneous, cubic feet per second		
99065-Gage height, above datum, meters	**00065**-Gage height, feet		

Footnote #1--

If 99440 is missing then 00440-Acid neutralizing capacity (ANC), unfiltered, fixed endpoint titration, field, as HCO_3
or 90440-Bicarbonate, incremental titration, laboratory as HCO_3
or 95440-Bicarbonate, titration to pH 4.5, laboratory as HCO_3 will be used, if available.
If 99430 is missing then 00410-Acid neutralizing capacity (ANC), unfiltered, fixed endpoint titration, field, as $CaCO_3$
or 00430-Acid neutralizing capacity (ANC), unfiltered, carbonate as $CaCO_3$
or 90430-Acid neutralizing capacity (ANC), unfiltered, incremental titration, laboratory, as $CaCO_3$
or 90410-Acid neutralizing capacity (ANC), unfiltered, titration to pH 4.5, laboratory, as $CaCO_3$
or 95430-Acid neutralizing capacity (ANC), unfiltered, fixed endpoint titration, laboratory, as $CaCO_3$ will be used if available.

Footnote #2--

If 99440 and 00440 and 90440 and 95440 are missing then the result is missing.
If 00400 is missing, the result is missing.
If 99430 and 00410 and 00430 and 90430 and 95430 are missing, then the result is calculated.

Footnote #3--

If 99440 and 00440 and 90440 and 95440 have remark codes, the result is calculated.
If 00440 has a remark code, the result is missing.
If 99430 and 00410 and 00430 and 90430 and 95430 have remark codes, then the result is calculated.

Footnote #4--

If 00916 is missing then 00918-Calcium, total can be used
If 00927 is missing then 00921-Magnesium, total can be used
If 00450 is missing then 00440-Acid neutralizing capacity (ANC), unfiltered, fixed endpoint titration, field, as HCO_3 or 99440-Bicarbonate, incremental titration, field will be used, if available
If 00447-Acid neutralizing capacity (ANC), unfiltered, incremental titration, field, as CO_3 -is present then it is added to 00450 or 00440 or or 99440
If 00447 is missing then 00445-Acid neutralizing capacity (ANC), unfiltered, fixed endpoint titration, field, as CO_3 or 99445-Carbonate, incremental titration, field as CO_3 will be used, if available
If 00450, 00440, and 99440 are missing then 00419-Acid neutralizing capacity (ANC), unfiltered, incremental titration, field, as $CaCO_3$
or 00410-Acid neutralizing capacity (ANC), unfiltered, fixed endpoint titration, field, as $CaCO_3$
or 29813-Acid neutralizing capacity (ANC), unfiltered, gran titration, field, as $CaCO_3$
or 99430-Acid neutralizing capacity (ANC), unfiltered, incremental titration, field, as $CaCO_3$

Footnote #4--(Continued)

or 0043l-Acid neutralizing capacity (ANC), unfiltered, as $CaCO_3$ will be used, if available.
01082-Strontium, total or 01084-Strontium, total recoverable-will be used, if available.
01007-Barium, total or 01009-Barium, total recoverable-will be used if available.

Footnote #5--

If 00916 and 00918; or 00927 and 00921; or 00450 and 00440 and 99440 and 00419 and 00410 and 29813 and 99430 and 00431 are missing then the result is missing.

Footnote #6--

If 00916 or 00918; or 00927 or 00921; or 00450 or 00440 or 99440 or 00419 or 00410 or 29813 or 99430 or 00431 are used and have a remark code then the result is missing.

Footnote #7--

If 00916 is missing then 00918-Calcium, total will be used, if available.
If 00927 is missing then 00921-Magnesium, total will be used, if available.
If 00449 is missing then 00451-Acid neutralizing capacity (ANC), unfiltered, fixed endpoint titration, laboratory as HCO_3 or 90440-Bicarbonate, incremental titration, laboratory as HCO_3 or 95440-Bicarbonate, titration to pH 4.5, laboratory as HCO_3 will be used, if available.
If 00446-Acid neutralizing capacity (ANC), unfiltered, incremental titration, laboratory, as CO_3 -is present then it is added to 00449, 00451, 90440, or 95440.
If 00446 is missing 00448-Acid neutralizing capacity (ANC), unfiltered, fixed endpoint titration, laboratory as CO_3 or 90445-Carbonate, incremental titration, laboratory as CO_3 or 95445-Carbonate, titration to pH 8.3, laboratory as CO_3 will be used, if available.
If 00449 and 00451 and 90440 and 95440 are missing then 00416-Acid neutralizing capacity (ANC), unfiltered, incremental titration, laboratory, as $CaCO_3$
or 00417-Acid neutralizing capacity (ANC), unfiltered, fixed endpoint titration, laboratory, as $CaCO_3$
or 00413-Acid neutralizing capacity (ANC), unfiltered, gran titration, laboratory, as $CaCO_3$
or 00418-Alkalinity, filtered, fixed endpoint titration, field, as $CaCO_3$
or 0042l-Alkalinity, unfiltered, fixed endpoint titration, laboratory as $CaCO_3$
or 90410-Acid neutralizing capacity (ANC), unfiltered, titration to pH 4.5, laboratory, as $CaCO_3$
or 90430-Acid neutralizing capacity (ANC), unfiltered, incremental titration, laboratory, as $CaCO_3$
or 95410-Acid neutralizing capacity (ANC), unfiltered, titration to pH 4.5, laboratory, as $CaCO_3$
or 95430-Acid neutralizing capacity (ANC), unfiltered, fixed endpoint titration, laboratory, as $CaCO_3$
will be used, if available.
01082-Strontium, total or 01084-Strontium, total recoverable-will be used, if available.
01007-Barium, total or 01009-Barium, total recoverable-will be used, if available.

Footnote #8

If 00916 and 00918; or 00927 and 00921; or 00449 and 00451 and 90440 and 95440 and 00416 and 00417 and 00413 and 00418 and 00421and 90410 and 90430 and 95410 and 95430 are missing then the result is missing

Footnote #9

If 00916 or 00918; or 00927 or 00921; or 00449 or 00451 or 90440 or 95440 or 00416 or 00417 or 00413 or 00418 or 00421or 90410 or 90430 or 95410 or 95430 are used and have a remark code then the result is missing.

Footnote #10

If 00453 is missing 29804-Bicarbonate, dissolved, fixed endpoint titration, field as HCO3 will be used, if available.
If 00452-Carbonate, dissolved, incremental titration, field, as CO_3 -is present then it is added to 00453 or 29804.
If 00452 is missing 29807-Carbonate, dissolved, fixed endpoint titration, field, as CO_3 will be used, if available.
If 00453 and 29804 are missing then 39086-Alkalinity, dissolved, incremental titration, field as $CaCO_3$
or 39036-Alkalinity, dissolved, fixed endpoint, field as $CaCO_3$
or 29802-Alkalinity, dissolved, gran titration, field as $CaCO_3$ will be used, if available.
01080-Strontium, dissolved will be used, if available.
01005-Barium, dissolved will be used, if available.

Footnote #11

If 00915; or 00925; or 00453 and 29804 and 39086 and 39036 and 29802 are missing then the result is missing.

Footnote #12

If 00915; or 00925; or 00453 or 29804 or 39086 or 39036 or 29802 are used and have a remark code then the result is missing.

Footnote #13

If 29806 is missing 29805-Bicarbonate, dissolved, fixed endpoint titration, laboratory as HCO_3 will be used, if available.
If 29809-Carbonate, dissolved, incremental titration, laboratory, as CO_3 *-is present then it is added to 29806 or 29805.*
If 29809 is missing 29808-Carbonate, dissolved, fixed endpoint titration, laboratory as CO_3 will be used, if available.
If 29806 and 29805 are missing 39087-Alkalinity, dissolved, incremental titration, laboratory as $CaCO_3$
or 29801-Alkalinity, dissolved, fixed endpoint titration, laboratory as $CaCO_3$
or 29803-Alkalinity, dissolved, gran titration, laboratory as $CaCO_3$ will be used, if available.
If 01005-Barium, dissolved will be used, if available.
If 01080--Strontium, dissolved will be used, if available.

Footnote #14

If 00915; or 00925; or 29806 and 29805 and 39087 and 29801 and 29803 are missing then the result is missing.

Footnote #15

If 00915; or 00925; or 29806 or 29805 or 39087 or 29801 or 29803 are used and have a remark code then the result is missing.

Footnote #16

If 00453 is missing 99440-Bicarbonate, incremental titration, field
or 00450--Acid neutralizing capacity (ANC), unfiltered, incremental titration, field, as HCO_3
or 29804-Bicarbonate, dissolved, fixed endpoint titration, field as HCO3
or 00440-Acid neutralizing capacity (ANC), unfiltered, fixed endpoint titration, field, as HCO_3
or 29806-Bicarbonte, dissolved, oncremental titration, laboratory as HCO_3
or 00449-Acid neutralizing capacity (ANC), unfiltered, incremental titration, laboratory as HCO_3
or 90440-Bicarbonate, incremental titration, laboratory as HCO_3
or 29805-Bicarbonate, dissolved, fixed endpoint titration, laboratory as HCO_3
or 00451-Acid neutralizing capacity (ANC), unfiltered, fixed endpoint titration, laboratory as HCO_3
or 95440-Bicarbonate, titration to pH 4.5, laboratory as HCO_3 will be used, if available

Footnote #16 (Continued)

If 00452-Carbonate, dissolved, incremental titration, field, as CO_3 is present then it is added to 00453, 00450, 29804, 00440, 29806, 00449, 90440, 29805, 00451, or 95440.

If 00452 is missing 99445-Carbonate, incremental titration, field as CO_3
or 00447-Acid neutralizing capacity (ANC), unfiltered, incremental titration, field, as CO_3
or 29807-Carbonate, dissolved, fixed endpoint titration, field, as CO_3
or 00445-Acid neutralizing capacity (ANC), unfiltered, fixed endpoint titration, field, as CO_3
or 29809-Carbonate, dissolved, incremental titration, laboratory, as CO_3
or 00446-Acid neutralizing capacity (ANC), unfiltered, incremental titration, laboratory, as CO_3
or 90445-Carbonate, incremental titration, laboratory as CO_3
or 29808-Carbonate, dissolved, fixed endpoint titration, laboratory as CO_3
or 00448-Acid neutralizing capacity (ANC), unfiltered, fixed endpoint titration, laboratory as CO_3
or 95445-Carbonate, titration to pH 8.3, laboratory as CO_3 *will be used, if available*

If 00453 and 99440 and 00450 and 29804 and 00440 and 29806 and 00449 and 90440 and 29805 and 00451 and 95440 are missing then 39086-Alkalinity, dissolved, incremental titration, field as $CaCO_3$
or 00419-Acid neutralizing capacity (ANC), unfiltered, incremental titration, field, as $CaCO_3$
or 99430-Acid neutralizing capacity (ANC), unfiltered, incremental titration, field, as $CaCO_3$
or 39036-Alkalinity, dissolved, fixed endpoint, field as $CaCO_3$
or 00410-Acid neutralizing capacity (ANC), unfiltered, fixed endpoint titration, field, as $CaCO_3$
or 00418-Alkalinity, filtered, fixed endpoint titration, field, as $CaCO_3$
or 29802-Alkalinity, dissolved, gran titration, field as $CaCO_3$
or 29813-Acid neutralizing capacity (ANC), unfiltered, gran titration, field, as $CaCO_3$
or 39087-Alkalinity, dissolved, incremental titration, laboratory as $CaCO_3$
or 00416-Acid neutralizing capacity (ANC), unfiltered, incremental titration, laboratory, as $CaCO_3$
or 95410-Acid neutralizing capacity (ANC), unfiltered, titration to pH 4.5, laboratory, as $CaCO_3$
or 90430-Acid neutralizing capacity (ANC), unfiltered, incremental titration, laboratory, as $CaCO_3$
or 00421-Alkalinity, unfiltered, fixed endpoint titration, laboratory as $CaCO_3$
or 29801-Alkalinity, dissolved, fixed endpoint titration, laboratory as $CaCO_3$
or 90410-Acid neutralizing capacity (ANC), unfiltered, titration to pH 4.5, laboratory, as $CaCO_3$
or 00417-Acid neutralizing capacity (ANC), unfiltered, fixed endpoint titration, laboratory, as $CaCO_3$
or 95430-Acid neutralizing capacity (ANC), unfiltered, fixed endpoint titration, laboratory, as $CaCO_3$
or 29803-Alkalinity, dissolved, gran titration, laboratory as $CaCO_3$
or 00413-Acid neutralizing capacity (ANC), unfiltered, gran titration, laboratory, as $CaCO_3$
or 00425-Acid neutralizing capacity (ANC), unfiltered, bicarbonate as $CaCO_3$
or 00430-Acid neutralizing capacity (ANC), unfiltered, carbonate as $CaCO_3$
or 00431-Acid neutralizing capacity (ANC), unfiltered, as $CaCO_3$
will be used, if available.

If any of the following are present they will be used:
00955-Silica, dissolved
00631-Nitrate plus nitrite, dissolved or

Footnote #16 (Continued)

If 00631 is missing 00618-Nitrate, dissolved plus 00613--Nitrite, dissolved will be used, if available.
00608-Ammonia, dissolved
71870-Bromide, dissolved
00746-Sulfide, dissolved
00723-Cyanide, dissolved
71830-Hydroxide dissolved
71865-Iodide, dissolved

Footnote #16 (Continued)

00950-Fluoride, dissolved
00671-Orthophosphate, dissolved
01000-Arsenic, dissolved
01005-Barium, dissolved
01010-Beryllium, dissolved
01020-Boron, dissolved
01025-Cadmium, dissolved
01030-Chromium, dissolved
01035-Cobalt, dissolved
01040-Copper, dissolved
01046-Iron, dissolved
01049-Lead, dissolved
01056-Manganese, dissolved
01060-Molybdenum, dissolved
01065-Nickel, dissolved
01075-Silver, dissolved
01080-Strontium, dissolved
01085-Vanadium, dissolved
01090-Zinc, dissolved
01100-Tin, dissolved
01106-Aluminum, dissolved
01120-Gallium, dissolved
01125-Germanium, dissolved
01130-Lithium, dissolved
01135-Rubidium, dissolved
01145-Selenium, dissolved
01150-Titanium, dissolved
01160-Zirconium, dissolved
71890-Mercury, dissolved

Footnote #17

If 00453, 99440, 00450, 29804, 00440, 29806, 00449, 90440, 29805, 00451, 95440, 39086, 00419, 99430, 39036, 00410, 00418, 29802, 29813, 39087, 00416, 95410, 90430, 00421, 29801, 90410, 00417, 95430, 29803, 00413, 00425, 00430, and 00431 or 00915 or 00925 or 00930 or 00940 or 00945 or 00935 are missing or have a remark code, the result is missing

4.5 Appendix E: USEPA Drinking-Water Alert Limits

Parameter Code	Parameter Name	Alert limit (concentration in mg/L)
01002 01000 00997	Arsenic	0.10
01009 01007 01005	Barium	2
01113 01027 01025	Cadmium	0.005
01118 01034 01033 01032 01030	Chromium	0.1
01119 01042 01040	Copper	1.3
00951 00950	Flouride	2
01114 01051 01049	Lead	0.015
71901 71900 71890	Mercury	0.002
01147 01145	Selenium	0.05
01079 01077 01075	Silver	0.1
01094 01092 01090	Zinc	5
99889 00631 00630	Nitrogen, nitrite+nitrate	10

Parameter Code	Parameter Name	Alert limit (concentration in mg/L)
00620 00618	Nitrogen, nitrate	10
34236 34235 34030	Benzene	0.005
34298 34297 32102	Carbon tetrachloride	0.005
39733 39732 39730	2,4-D	0.07
34573 34572	1,4-Dichlorobenzene (p-Dichlorobenzene)	0.075
34568 34567	1,3-Dichlorobenzene (m-Dichlorobenzene)	0.075
34533 34532 32103	1,2-Dichloroethane	0.005
34503 34502 34501	1,1-Dichloroethylene	0.007
39392 39391	Endrin	0.0002
39342 39341 39340	Lindane	0.0002
82351 82350 39480	Methoxychlor	0.04
39763 39762 39760	Silvex	0.05
34508 34506 34507	1,1,1-Trichloroethane	0.2
39180	Trichloroethylene	0.005
90851 82080	Trihalomethane	0.08

Parameter Code	Parameter Name	Alert limit (concentration in mg/L)
39402 39401 39400	Toxaphene	0.003
39175 34494 34493	Vinyl Chloride	0.002

4.6 Appendix F: Format for Batch Input of Data

Two batch formats for input of data into the water-quality file can be used in any release after NWIS 4.1. The original format uses 1 and * card images and the new format uses two tab-delimited files. The new format includes one file that contains sample-level information including a sample integer **(SINT)** that is used only to link file records between the two files. The second file contains the results and all of the result-level attributes. In the case of null values, the tabs must be provided **(i.e., <TAB><TAB>)**. For all fields except value qualifiers and null value qualifiers, entries will be changed to uppercase during the batch entry process. Both formats are described and examples are included in this appendix as a reference for those users who will be entering data by batch.

Sample-level information batch file format

Column order	Column name	Description	NWIS format	Mandatory field?	Null value behavior	Field can be overwritten during batch?
1	Sample Integer	Integer used only to link sample and result information between the two batch files	Not stored in NWIS	--	--	--
2	User Code	---	Not stored in NWIS	--	--	--
3	Agency_cd	Agency code	Char(5)	Y	Set to default (USGS)	N
4	Site_no	Station identification number	Char(15)	Y	Not allowed	N
5	Sample_start_dt	Sample start date	Date yyyymmddhhmmss	Y	Not allowed	N
6	Sample_end_dt	Sample end date	Date yyyymmddhhmmss	N	Set to blank	N
7	Medium_cd	Medium code	Char(1)	Y	Not allowed	N
8	Lab_id	Lab identification number	Char(7)	N	---	N
9	Project_cd	Project code	Char(9)	N	---	N
10	Aqfr_cd	Aquifer code	Char(8)	N	---	N
11	Samp_type_cd	Sample type	Char(1)	Y	Set to default (9)	N
12	Anl_stat_cd	Analysis status	Char(1)	Y	Set to default (H)	N

Column order	Column name	Description	NWIS format	Mandatory field?	Null value behavior	Field can be overwritten during batch?
13	Anl_src_cd	Analysis source	Char(1)	Y	Set to default (9)	N
14	Hyd_cond_cd	Hydrologic condition	Char(1)	Y	Set to default (9); if medium code = 6 or S, set to X	N
15	Hyd_event_cd	Hydrologic event	Char(1)	Y	Set to default (9); if medium code = 6 or S, set to X	N
16	Tissue_id	Tissue sample identifier	Char(8)	N	---	N
17	Body_part_cd	Body part code	Char(3)	N	---	N
18	Lab_smp_com	Lab sample comment	Varchar (300)	N	---	Y
19	Field_smp_com	Field sample comment	Varchar (300)	N	---	N
20	sample_tz_cd	Sample time datum	char(6)	N	Populated with sitefile setting	Y; but UTC stored time is not recomputed
21	tm_datum_rlblty_cd	Time-datum reliability code	char(1)	N	Set to default ‘K’	Y

Result-level information batch file format

Column order	Column name	Description	NWIS format	Mandatory field?	Null value behavior	Field can be overwritten during batch?
1	Sample Integer	Integer used only to link sample and result information between the two batch files	Not stored in NWIS	Y	---	---
2	Parameter_cd	Parameter code	Char (5)	Y	---	---
3	Result_va	Result value	Float	N	'#' can be used to set a result to null as long as a null remark or null qualifier is present	Y
4	Remark_cd	Remark code	Char (1)	N	---	Y
5	QA_cd	Quality-assurance code	Char (1)	N	Set to default (A)	N
6	QW_method_cd	Method code	Char (1)	N	---	Y
7	Result_rd	Rounding code	Char (1)	N	---	Y
8	Val_qual_cd	Value qualifiers	Char (12)	N	---	Y
9	Rpt_lev_va	Report level	Float	N	---	Y
10	Rpt_lev_cd	Report level type	Varchar (6)	N	---	Y
11	dqi_cd	Data quality indicator	Char (1)	Y	Set to default (S)	N
12	Null_val_qual_cd	Null-value qualifier	Char (1)	N	---	Y
13	Prep_set_no	Preparation set number	Char (12)	N	---	Y
14	Anl_set_no	Analytical set number	Char (12)	N	---	Y
15	Anl_dt	Analysis date	Date	N	---	Y
16	Prep_dt	Preparation date	Date	N	---	Y
17	Lab_result_com	Laboratory result comment	Varchar (300)	N	---	Y
18	Field_result_com	Field result comment	Varchar (300)	N	---	N
19	Lab_std_dev	Laboratory standard deviation	Float	N	---	Y

1 and * card batch file format

Column	Description	Mandatory Field?	Field can be overwritten during batch?
1-card format			
1	Card type (1)	Y	---
2-16	Station number	Y	N
17	Medium code	Y	N
18-19	Begin year, last two digits	Y	N
20-21	Begin month, use leading zeros	Y	N
22-23	Begin day, use leading zeros	Y	N
24-27	Begin time (2400-hours system, use leading zeros)	Y	N
28-29	End month, use leading zeros	N	N
30-31	End day, use leading zeros	N	N
32-35	End time (2400-hours system, use leading zeros)	N	N
36-43	Geologic unit code	N	N
44	Analysis status code	N	Y
45	Analysis source code	N	Y
46	Hydrologic condition code	N	Y
47	Sample type code	N	Y
48	Hydrologic event code	N	Y
49-51	Blank	N	---
52-53	May be left blank. If so, the program will assume 19 if the year coded in column 18-19 is 50 or more and will assume 20 if the year is 49 or less	N	N
54-61	Blank	N	---
62-63	Data category (all values default to QW)	N	---
64-68	Agency Code (null will default to USGS)	Y	N
69-75	Laboratory ID	N	---
76	District processing status	N	Y
77-80	Blank	N	---

*-card format			
1	Card type (*)	N	---
2-76	Free-field format for parameter description The format of the parameter description is: Pnnnnn = value (R:Q:M:P) where: nnnnn = a valid 5-digit parameter code value = the measurement for or analytical determination of the constituent identified by the parameter code. R = remark code qualifying the parameter value. Codes are listed in *Appendix A*. Q = Quality assurance code for the parameter values. Codes are listed in *Appendix A*. M = Method code identifying the NWQL method used to determine the parameter value. Codes are listed in *Appendix A*. P = a rounding code used when printing the parameter value with the "user"-rounding option	N	 N Y Y Y Y

Due to the tab-delimited format for the batch-file pair (qwsample and qwresult), the files can be difficult to review on the screen without the use of the batch editor program. To view an example of the batch-file pair see the rejected.* files displayed in *Appendix C*. The examples below are a batch-file pair that have been reformatted for this document.

Sample-level batch file format example

Sample integer	User code	Agency code	Site number	Sample start date	Sample end date	Med. code	Lab ID	Project code	Aquifer code	Sample Type code	Analysis stat code	Analysis source code	Hydrologic condition code	Hydro-logic event code	Tissue ID	Body part code	Lab sample comment	Field sample comment	Time Datum	Time-datum reliability
0200101376	30	USGS	462448104303901	20010521	end date/time	6	0640017	460800100	211FHHC	9	H	9	X	X			Lab comments	Field comments	CST	E
0200100945	30	USGS	06334630	200106041200	end date/time	9	0640024	460800100		9	H	9	9	9					CDT	K
0200100946	30	USGS	06334630	200106041200	end date/time	C	0640024	460800100		9	H	9	9	9	80904	018			*Blank	*Blank

Result-level information batch file format example

Sample integer	Parameter code	Result value	Remark code	QA code	QW method code	Rounding code	Value qualifiers	Report level	Report level code	DQI code	Null value qualifier code	Preparation set number	Analytical set number	Analysis date	Preparation date	Laboratory result comment	Field result comment	Lab Standard Deviation
0200101376	00940	18		H	J	2		0.08	mrl	S		200114801	AKTO01150A	20010530	20010528	Lab result comment	Field result comment	0.1
0200101376	00945	170		H	G	2		0.11	mrl	S		200114801	AKTO01150A	20010530	20010528			0.2
0200101376	01020	400		H	F	2		13	mrl	S		200114801	AKTO01150A	20010530	20010528			0.1
0200100945	00631	0.020		H	G	3		0.005	mrl	S		200115903	1200101162A	20010611	20010608			
0200100945	00666	0.06	<	H	D	2	s	0.06	mrl	S		200115903	1200101162A	20010611	20010608			0.2
0200100945	00677	0.03		H	B	2		0.01	mrl	S		200115903	1200101162A	20010611	20010608			0.2
0200100946	49258	#		H	A	2		0.10	mrl	S	r	200115903	GCMS162A	20010611	20010608			
0200100946	39350	0.1	<	H	B	2	xiz	0.10	mrl	S		200115903	GCMS162A	20010611	20010608			0.1
0200100946	39371	0.08		H	A	2		0.01	mrl	S		200115903	GCMS162A	20010611	20010608			

1 and * card batch file format example

```
1 06178500      99607151410              H9979   19         USGS
*P00010=25.5   ( :A: :3),P00020=28.    ( :A: :3),P00025=664.   ( :A: :3),
*P00027=1028.  ( :I: :5),P00028=80020. ( :H: :5),P00061=2.1    ( :A: :2),
*P00076=.3     ( :H:A:2),P00080=30.    ( :H:A:2),P00095=1500.  ( :I: :3),
*P00300=9.4    ( :A: :2),P00400=8.4    ( :I: :3),P00403=8.3    ( :H:A:2),
*P00608=.13    ( :H:F:3),P00613=.02    ( :H:F:3),P00625=.6     ( :H:D:2),
*P00631=.09    ( :H:E:3),P00665=.02    ( :H:D:3),P00671=.02    ( :H:H:3),
*P00680=8.4    ( :H:A:2),P00915=42.    ( :H:D:2),P00925=50.    ( :H:C:2),
*P00930=210.   ( :H:C:2),P00935=7.7    ( :H:B:2),P00940=6.3    ( :H:J:2)
1 06178500      R9607151430              H9979   19         USGS
*P00010=25.5   ( :A: :3),P00020=28.    ( :A: :3),P00025=664.   ( :A: :3),
*P00027=1028.  ( :I: :5),P00028=80020. ( :H: :5),P00061=2.1    ( :A: :2),
*P00076=.6     ( :H:A:2),P00080=15.    ( :H:A:2),P00095=1500.  ( :I: :3),
*P00300=9.4    ( :A: :2),P00400=8.4    ( :I: :3),P00403=8.3    ( :H:A:2),
*P00608=.11    ( :H:F:3),P00613=.01    ( :H:F:3),P00625=.5     ( :H:D:2),
*P00631=.05    (1:H:E:3),P00665=.01    (1:H:D:3),P00671=.01    ( :H:H:3),
*P00680=8.7    ( :H:A:2),P00915=43.    ( :H:D:2),P00925=50.    ( :H:C:2),
*P00930=210.   ( :H:C:2),P00935=7.7    ( :H:B:2),P00940=6.3    ( :H:J:2),
*P99111=30.    ( :I: :3),P99870=201.   ( :H:B:2)
```

Return to Appendix F

4.7 Appendix G: Format for Input Files

Section	Description
3.2.1	Format required for field forms
3.3.1.1	Station identification numbers for retrieval
3.3.3, 3.4.3.1	Record number file for retrieval
3.3.3	Station identification number, sample date, sample time, and sample medium code for retrieval
3.4.3.3	Parameter code file
3.4.3.4	Censoring of zero values
3.4.3.4	Recensoring of stored values
3.6.9	Parameter codes for parameter-method table retrieval

Format Required for Field Forms

[Lines that begin with a '#' are comment lines that can be inserted at the beginning of the field form. The first line with a '#' will be the name of the field form shown when field forms are listed to the screen. These comment lines are optional.]

Column	Description
1-5	Parameter code
6	Method code (optional – must be capitalized)
7	Not used
8-32	Parameter names or descriptions
36	'Y' indicates that parameter is mandatory

List of Station Identification Numbers for Retrieval

Column	Description
1-5	Agency code
6-20	Station number

Record Number File Format for Retrievals:

Column	Description
1-8	Record number
9-10	Database number (if multiple databases are being used)

List of Station Identification Number, Sample Date, Sample Time, and Sample Medium Code

Column	Description
1-5	Agency code
6-7	[not used]
8-22	Station number
23-46	Sample date
23-26	Begin year (YYYY)
27-28	Begin month (MM)
29-30	Begin day (DD)
31-34	Begin time (2400 hour system)
35-38	End year (YYYY)
39-40	End month (MM)
41-42	End day (DD)
43-46	End time (2400 hour system)
47	Medium code

Parameter Code File

Column	Description
1-5	Parameter code
6	Method code (if needed)
7-80	Parameter name (if needed)

Format of File for Censoring of Zero Values:

Column	Description
1-5	Parameter code
6-14	Recensoring value

Format of File for Recensoring Information:

Column	Description
1-5	Parameter code
6	Method Code (if needed)
7-15	Recensoring value

Parameter Codes for Parameter-Method Table Retrieval:

Column	Description
1-5	Parameter code
7	Method code (optional – must be capitalized)
9	Dash (optional—required if retrieving a range of parameter codes)
11-15	Parameter code (optional—required if retrieving a range of parameter codes)
17	Method code (optional – must be capitalized)

4.8 Appendix H: Parameters that Allow Negative Values

Parameter Code	Parameter Name
00001	Location in cross section, distance from right bank looking upstream, feet
00002	Location in cross section, distance from right bank looking upstream, percent
00009	Location in cross section, distance from left bank looking downstream, feet
00010	Temperature, water, degrees Celsius
00011	Temperature, water, degrees Fahrenheit
00012	Evaporation temperature, 48 inch pan, degrees Celsius
00013	Evaporation temperature, 24 inch pan, degrees Celsius
00014	Wet bulb temperature (degrees) Celsius
00020	Temperature, air, degrees Celsius
00021	Temperature, air, degrees Fahrenheit
00042	Altitude, feet above mean sea level
00055	Stream velocity, feet per second
00056	Flow rate of well, gallons per day
00058	Flow rate of well, gallons per minute
00059	Flow rate, instantaneous, gallons per minute
00060	Discharge, cubic feet per second
00061	Discharge, instantaneous, cubic feet per second
00062	Elevation of reservoir water surface above datum, feet
00065	Gage height, feet
00072	Stream stage (meters)
00090	Oxidation reduction potential (millivolts)
00400	pH, water, unfiltered, field, standard units
00401	Cations minus anions, water, milliequivalents
00409	Acid neutralizing capacity, water, unfiltered, Gran titration, microequivalents per liter
00410	Acid neutralizing capacity, water, unfiltered, fixed endpoint (pH 4.5) titration, field, milligrams per liter as calcium carbonate
00411	Acid neutralizing capacity, water, unfiltered, methyl orange endpoint (pH 3.1-4.4) titration, milligrams per liter as calcium carbonate
00413	Acid neutralizing capacity, water, unfiltered, Gran titration, milligrams per liter as calcium carbonate
00415	Acid neutralizing capacity, water, unfiltered, phenolphthalein endpoint (pH 8.5-9.0) titration, milligrams per liter as calcium carbonate
00416	Acid neutralizing capacity, water, unfiltered, incremental titration, laboratory, milligrams per liter as calcium carbonate
00417	Acid neutralizing capacity, water, unfiltered, fixed endpoint (pH 4.5) titration, laboratory, milligrams per liter as calcium carbonate
00418	Alkalinity, water, filtered, fixed endpoint (pH 4.5) titration, field, milligrams per liter as calcium carbonate
00419	acid neutralizing capacity (anc), water, unfiltered, incremental titration, field, milligrams per liter as caco3

Parameter Code	Parameter Name
00420	Hydroxide, water, unfiltered, milligrams per liter
00421	Alkalinity, water, filtered, fixed endpoint (pH 4.5) titration, laboratory, milligrams per liter calcium carbonate
00425	Bicarbonate, water, unfiltered, milligrams per liter as calcium carbonate
00430	Carbonate, water, unfiltered, milligrams per liter as calcium carbonate
00431	Acid neutralizing capacity, water, unfiltered, milligrams per liter as calcium carbonate
01501	Alpha radioactivity, water, unfiltered, picocuries per liter
01502	Alpha radioactivity counting error, water, unfiltered, picocuries per liter
01503	Alpha radioactivity, water, filtered, picocuries per liter
01504	Alpha radioactivity counting error, water, filtered, picocuries per liter
01505	Alpha radioactivity, suspended sediment, picocuries per liter
01506	Alpha radioactivity counting error, suspended sediment, picocuries per liter
03501	Beta radioactivity, water, unfiltered, picocuries per liter
03502	Beta radioactivity counting error, water, unfiltered, picocuries per liter
03503	Beta radioactivity, water, filtered, picocuries per liter
03504	Beta radioactivity counting error, water, filtered, picocuries per liter
03505	Beta radioactivity, suspended sediment, picocuries per liter
03506	Beta radioactivity counting error, suspended sediment, picocuries per liter
03515	Gross beta radioactivity, water, filtered, Cs-137 curve, picocuries per liter
03519	Gross beta radioactivity, water, unfiltered, Cs-137 curve, picocuries per liter
03521	Carbon-13/Carbon-12 ratio in organic fraction, soil or rock, per mil
03522	Sulfur-34/Sulfur-32 ratio in sulfide, water, filtered, per mil
03523	Sulfur-34/Sulfur-32 ratio in sulfide, bed sediment, per mil
03526	Gross beta radioactivity counting error, water, filtered, Cs-137 curve, picocuries per liter
03527	Gross beta radioactivity counting error, suspended sediment, Cs-137 curve, picocuries per liter
03528	Gross beta radioactivity counting error, water, filtered, Sr-90/Y-90 curve, picocuries per liter
03529	Gross beta radioactivity counting error, suspended sediment, Sr-90/Y-90 curve, picocuries per liter
04113	Uranium-238 2-sigma combined uncertainty, suspended sediment, dry weight, picocuries per gram
04126	Alpha radioactivity, water, filtered, Th-230 curve, picocuries per liter
05504	Gross gamma radioactivity scan counting error, water, filtered, picocuries per liter
05516	Gross gamma radioactivity scan counting error, suspended sediment, picocuries per liter
07000	Tritium, water, unfiltered, picocuries per liter
07001	Tritium counting error, water, unfiltered, picocuries per liter
07005	Tritium, water, filtered, picocuries per liter
07010	Tritium, suspended sediment, picocuries per liter
07011	Tritium counting error, suspended sediment, picocuries per liter
07050	Calcium-45, water, filtered, picocuries per liter
07051	Calcium-45 counting error, water, filtered, picocuries per liter

Parameter Code	Parameter Name
07052	Calcium-45, suspended sediment, picocuries per liter
07053	Calcium-45 counting error, suspended sediment, picocuries per liter
07054	Calcium-45, water, unfiltered, picocuries per liter
07055	Calcium-45 counting error, water, unfiltered, picocuries per liter
07060	Iron-59, water, filtered, picocuries per liter
07061	Iron-59 counting error, water, filtered, picocuries per liter
07062	Iron-59, suspended sediment, picocuries per liter
07063	Iron-59 counting error, suspended sediment, picocuries per liter
07064	Iron-59, water, unfiltered, picocuries per liter
07065	Iron-59 counting error, water, unfiltered, picocuries per liter
07100	Selenium-75, water, filtered, picocuries per liter
07101	Selenium-75 counting error, water, filtered, picocuries per liter
07102	Selenium-75, suspended sediment, picocuries per liter
07103	Selenium-75 counting error, sediment, suspended, picocuries per liter
07104	Selenium-75, water, unfiltered, picocuries per liter
07105	Selenium-75 counting error, water, unfiltered, picocuries per liter
07120	Silver-110, water, filtered, picocuries per liter
07121	Silver-110 counting error, water, filtered, picocuries per liter
07122	Silver-110, suspended sediment, picocuries per liter
07123	Silver-110 counting error, suspended sediment, picocuries per liter
07124	Silver-110, water, unfiltered, picocuries per liter
07125	Silver-110 counting error, water, unfiltered, picocuries per liter
07140	Sulfur-35, water, filtered, picocuries per liter
07141	Sulfur-35 counting error, water, filtered, picocuries per liter
07142	Sulfur-35, suspended sediment, picocuries per liter
07143	Sulfur-35 counting error, suspended sediment, picocuries per liter
07144	Sulfur-35, water, unfiltered, picocuries per liter
07145	Sulfur-35 counting error, water, unfiltered, picocuries per liter
09501	Radium-226, water, unfiltered, picocuries per liter
09503	Radium-226, water, filtered, picocuries per liter
09504	Radium-226 counting error, water, filtered, picocuries per liter
09505	Radium-226, suspended sediment, picocuries per liter
09506	Radium-226 counting error, suspended sediment, picocuries per liter
09510	Alpha-emitting isotopes of radium, water, filtered, planchet count, picocuries per liter
09511	Radium-226, water, filtered, radon method, picocuries per liter
11501	Radium-228, water, unfiltered, picocuries per liter
11502	Radium-228 counting error, water, unfiltered, picocuries per liter
13501	Strontium-90, water, unfiltered, picocuries per liter

Parameter Code	Parameter Name
13502	Strontium-90 counting error, water, unfiltered, picocuries per liter
13503	Strontium-90, water, filtered, picocuries per liter
13504	Strontium-90 counting error, water, filtered, picocuries per liter
13505	Strontium-90, suspended sediment, picocuries per liter
13506	Strontium-90 counting error, suspended sediment, picocuries per liter
13507	Strontium-90 counting error, water, filtered, picocuries per liter
15501	Strontium-89, water, unfiltered, picocuries per liter
15502	Strontium-89 counting error, water, unfiltered, picocuries per liter
15503	Strontium-89 counting error, water, filtered, picocuries per liter
15504	Strontium-89, water, filtered, picocuries per liter
17501	Lead-210, water, unfiltered, picocuries per liter
17502	Lead-210 counting error, water, unfiltered, picocuries per liter
17503	Lead-210, water, filtered, picocuries per liter
17504	Lead-210 counting error, water, filtered, picocuries per liter
17505	Lead-210, suspended sediment, picocuries per liter
17506	Lead-210 counting error, suspended sediment, picocuries per liter
17517	Lead-212, water, unfiltered, picocuries per liter
17518	Lead-212 counting error, water, unfiltered, picocuries per liter
17519	Lead-214, water, unfiltered, picocuries per liter
17520	Lead-214 counting error, water, unfiltered, picocuries per liter
18501	Iodine-129, water, unfiltered, picocuries per liter
18502	Iodine-129 counting error, water, unfiltered, picocuries per liter
19503	Polonium-210, water, filtered, picocuries per liter
19504	Polonium-210 counting error, water, filtered, picocuries per liter
19505	Polonium-210, suspended sediment, picocuries per liter
19506	Polonium-210 counting error, suspended sediment, picocuries per liter
22001	Plutonium-238, water, filtered, picocuries per liter
22002	Plutonium-238 counting error, water, filtered, picocuries per liter
22010	Plutonium-239, water, filtered, picocuries per liter
22011	Plutonium-239 counting error, water, filtered, picocuries per liter
22012	Plutonium-238, water, unfiltered, picocuries per liter
22013	Plutonium-238 counting error, water, unfiltered, picocuries per liter
22014	Plutonium-239, water, unfiltered, picocuries per liter
22015	Plutonium-239 counting error, water, unfiltered, picocuries per liter
22383	Bismuth-214, water, unfiltered, picocuries per liter
22384	Bismuth-214 counting error, water, unfiltered, picocuries per liter
22450	Americium-241, bed sediment, dry weight, picocuries per gram
22501	Thorium-232, water, unfiltered, picocuries per liter

Parameter Code	Parameter Name
22502	Thorium-232 counting error, water, unfiltered, picocuries per liter
22503	Thorium/uranium isotope ratio, water, unfiltered, number
22505	Thorium-228, water, unfiltered, picocuries per liter
22601	Uranium-238, water, unfiltered, picocuries per liter
22602	Uranium-238 counting error, water, unfiltered, picocuries per liter
22603	Uranium-238, water, filtered, picocuries per liter
22604	Uranium-238 counting error, water, filtered, picocuries per liter
22606	Uranium-234, water, unfiltered, picocuries per liter
22607	Uranium-234 counting error, water, unfiltered, picocuries per liter
22610	Uranium-234, water, filtered, picocuries per liter
22611	Uranium-234 counting error, water, filtered, picocuries per liter
22620	Uranium-235, water, filtered, picocuries per liter
22622	Uranium-235, water, unfiltered, picocuries per liter
26501	Thorium-230, water, unfiltered, picocuries per liter
26503	Thorium-230, water, filtered, picocuries per liter
26504	Thorium-230 counting error, water, filtered, picocuries per liter
26505	Thorium-230, suspended sediment, picocuries per liter
26506	Thorium-230 counting error, suspended sediment, picocuries per liter
27801	Niobium-95, water, unfiltered, picocuries per liter
27802	Niobium-95 counting error, water, unfiltered, picocuries per liter
27901	Ruthenium-103, water, unfiltered, picocuries per liter
27902	Ruthenium-103 counting error, water, unfiltered, picocuries per liter
28001	Ruthenium-106, water, unfiltered, picocuries per liter
28002	Ruthenium-106 counting error, water, unfiltered, picocuries per liter
28005	Radiocesium, water, filtered, Cs-137 curve, picocuries per liter
28006	Radiocesium, suspended sediment, Cs-137 curve, picocuries per liter
28007	Radiocesium, water, unfiltered, Cs-137 curve, picocuries per liter
28008	Radioruthenium, water, filtered, Ru-106 curve, picocuries per liter
28009	Radioruthenium, suspended sediment, Ru-106 curve, picocuries per liter
28010	Radioruthenium, water, unfiltered, Ru-106 curve, picocuries per liter
28012	Uranium (natural), water, unfiltered, picocuries per liter
28013	Uranium-234/uranium-238 ratio, water, filtered, number
28301	Iodine-131, water, unfiltered, picocuries per liter
28302	Iodine-131 counting error, water, unfiltered, picocuries per liter
28401	Cesium-137, water, unfiltered, picocuries per liter
28402	Cesium-137 counting error, water, unfiltered, picocuries per liter
28403	Cesium-137, water, filtered, picocuries per liter
28404	Cesium-137, suspended sediment, picocuries per liter

Parameter Code	Parameter Name
28405	Cesium-137 counting error, suspended sediment, picocuries per liter
28406	Cesium-137 counting error, water, filtered, picocuries per liter
28410	Cesium-134, water, filtered, picocuries per liter
28411	Cesium-134 counting error, water, filtered, picocuries per liter
28412	Cesium-134, suspended sediment, picocuries per liter
28413	Cesium-134 counting error, suspended sediment, picocuries per liter
28414	Cesium-134, water, unfiltered, picocuries per liter
28415	Cesium-134 counting error, water, unfiltered, picocuries per liter
28601	Barium-140, water, unfiltered, picocuries per liter
28602	Barium-140 counting error, water, unfiltered, picocuries per liter
28701	Lanthanum-140, water, unfiltered, picocuries per liter
28702	Lanthanum-140 counting error, water, unfiltered, picocuries per liter
28801	Cerium-141, water, unfiltered, picocuries per liter
28802	Cerium-141 counting error, water, unfiltered, picocuries per liter
28901	Cerium-144, water, unfiltered, picocuries per liter
28902	Cerium-144 counting error, water, unfiltered, picocuries per liter
29301	Zinc-65, water, unfiltered, picocuries per liter
29302	Zinc-65 counting error, water, unfiltered, picocuries per liter
29402	Chromium-51 counting error, water, unfiltered, picocuries per liter
29501	Manganese-54, water, unfiltered, picocuries per liter
29502	Manganese-54 counting error, water, unfiltered, picocuries per liter
29601	Cobalt-60, water, unfiltered, picocuries per liter
29602	Cobalt-60 counting error, water, unfiltered, picocuries per liter
29631	Scandium-46, water, filtered, picocuries per liter
29632	Scandium-46 counting error, water, filtered, picocuries per liter
29633	Scandium-46, suspended sediment, picocuries per liter
29634	Scandium-46 counting error, suspended sediment, picocuries per liter
29635	Scandium-46, water, unfiltered, picocuries per liter
29636	Scandium-46 counting error, water, unfiltered, picocuries per liter
29801	Alkalinity, water, filtered, fixed endpoint (pH 4.5) titration, laboratory, milligrams per liter as calcium carbonate
29802	Alkalinity, water, filtered, Gran titration, field, milligrams per liter as calcium carbonate
29803	Alkalinity, water, filtered, Gran titration, laboratory, milligrams per liter as calcium carbonate
29813	Acid neutralizing capacity, water, unfiltered, Gran titration, field, milligrams per liter as calcium carbonate
29857	Actinium-228, water, unfiltered, picocuries per liter
29858	Actinium-228 counting error, water, unfiltered, picocuries per liter
29859	Actinium-228, water, filtered, picocuries per liter
29860	Actinium-228 counting error, water, filtered, picocuries per liter

Parameter Code	Parameter Name
29861	Silver-108, water, unfiltered, picocuries per liter
29862	Silver-108 counting error, water, unfiltered, picocuries per liter
29863	Silver-108, water, filtered, picocuries per liter
29864	Silver-108 counting error, water, filtered, picocuries per liter
29865	Americium-241, water, unfiltered, picocuries per liter
29866	Americium-241 counting error, water, unfiltered, picocuries per liter
29867	Americium-241, water, filtered, picocuries per liter
29868	Americium-241 counting error, water, filtered, picocuries per liter
29869	Barium-140, water, filtered, picocuries per liter
29870	Barium-140 counting error, water, filtered, picocuries per liter
29871	Beryllium-7, water, unfiltered, picocuries per liter
29872	Beryllium-7 counting error, water, unfiltered, picocuries per liter
29873	Beryllium-7, water, filtered, picocuries per liter
29874	Beryllium-7 counting error, water, filtered, picocuries per liter
29875	Bismuth-214, water, filtered, picocuries per liter
29876	Bismuth-214 counting error, water, filtered, picocuries per liter
29877	Cerium-141, water, filtered, picocuries per liter
29878	Cerium-141 counting error, water, filtered, picocuries per liter
29879	Curium-242, water, unfiltered, picocuries per liter
29880	Curium-242 counting error, water, unfiltered, picocuries per liter
29881	Curium-242, water, filtered, picocuries per liter
29882	Curium-242 counting error, water, filtered, picocuries per liter
29883	Curium-244, water, unfiltered, picocuries per liter
29884	Curium-244 counting error, water, unfiltered, picocuries per liter
29885	Curium-244, water, filtered, picocuries per liter
29886	Curium-244 counting error, water, filtered, picocuries per liter
29887	Cobalt-57, water, unfiltered, picocuries per liter
29888	Cobalt-57 counting error, water, unfiltered, picocuries per liter
29889	Cobalt-57, water, filtered, picocuries per liter
29890	Cobalt-57 counting error, water, filtered, picocuries per liter
29891	Cobalt-58, water, unfiltered, picocuries per liter
29892	Cobalt-58 counting error, water, unfiltered, picocuries per liter
29893	Cobalt-58, water, filtered, picocuries per liter
29894	Cobalt-58 counting error, water, filtered, picocuries per liter
29895	Chromium-51, water, filtered, picocuries per liter
29896	Chromium-51 counting error, water, filtered, picocuries per liter
29897	Cesium-144, water, unfiltered, picocuries per liter
29898	Cesium-144 counting error, water, unfiltered, picocuries per liter

Parameter Code	Parameter Name
29899	Cesium-144, water, filtered, picocuries per liter
29900	Cesium-144 counting error, water, filtered, picocuries per liter
29901	Europium-155, water, unfiltered, picocuries per liter
29902	Europium-155 counting error, water, unfiltered, picocuries per liter
29903	Europium-155, water, filtered, picocuries per liter
29904	Europium-155 counting error, water, filtered, picocuries per liter
29905	Hafnium-175, water, unfiltered, picocuries per liter
29906	Hafnium-175 counting error, water, unfiltered, picocuries per liter
29907	Hafnium-175, water, filtered, picocuries per liter
29908	Hafnium-175 counting error, water, filtered, picocuries per liter
29909	Hafnium-181, water, unfiltered, picocuries per liter
29910	Hafnium-181 counting error, water, unfiltered, picocuries per liter
29911	Hafnium-181, water, filtered, picocuries per liter
29912	Hafnium-181 counting error, water, filtered, picocuries per liter
29913	Iodine-129, water, filtered, picocuries per liter
29914	Iodine-129 counting error, water, filtered, picocuries per liter
29915	Iodine-131, water, filtered, picocuries per liter
29916	Iodine-131 counting error, water, filtered, picocuries per liter
29917	Iodine-133, water, unfiltered, picocuries per liter
29918	Iodine-133 counting error, water, unfiltered, picocuries per liter
29919	Iodine-133, water, filtered, picocuries per liter
29920	Iodine-133 counting error, water, filtered, picocuries per liter
29921	Lanthanum-140, water, filtered, picocuries per liter
29922	Lanthanum-140 counting error, water, filtered, picocuries per liter
29923	Molybdenum-95, water, unfiltered, picocuries per liter
29924	Molybdenum-95 counting error, water, unfiltered, picocuries per liter
29925	Molybdenum-95, water, filtered, picocuries per liter
29926	Molybdenum-95 counting error, water, filtered, picocuries per liter
29927	Molybdenum-99, water, unfiltered, picocuries per liter
29928	Molybdenum-99 counting error, water, unfiltered, picocuries per liter
29929	Molybdenum-99, water, filtered, picocuries per liter
29930	Molybdenum-99 counting error, water, filtered, picocuries per liter
29931	Sodium-24, water, unfiltered, picocuries per liter
29932	Sodium-24 counting error, water, unfiltered, picocuries per liter
29933	Sodium-24, water, filtered, picocuries per liter
29934	Sodium-24 counting error, water, filtered, picocuries per liter
29935	Niobium-95, water, filtered, picocuries per liter
29936	Niobium-95 counting error, water, filtered, picocuries per liter

Parameter Code	Parameter Name
29937	Neodymium-147, water, unfiltered, picocuries per liter
29938	Neodymium-147 counting error, water, unfiltered, picocuries per liter
29939	Neodymium-147, water, filtered, picocuries per liter
29940	Neodymium-147 counting error, water, filtered, picocuries per liter
29941	Neptunium-239, water, unfiltered, picocuries per liter
29942	Neptunium-239 counting error, water, unfiltered, picocuries per liter
29943	Neptunium-239, water, filtered, picocuries per liter
29944	Neptunium-239 counting error, water, filtered, picocuries per liter
29945	Lead-212, water, filtered, picocuries per liter
29946	Lead-212 counting error, water, filtered, picocuries per liter
29947	Lead-214, water, filtered, picocuries per liter
29948	Lead-214 counting error, water, filtered, picocuries per liter
29953	Ruthenium-103, water, filtered, picocuries per liter
29954	Ruthenium-103 counting error, water, filtered, picocuries per liter
29955	Antimony-124, water, unfiltered, picocuries per liter
29956	Antimony-124 counting error, water, unfiltered, picocuries per liter
29957	Antimony-124, water, filtered, picocuries per liter
29958	Antimony-124 counting error, water, filtered, picocuries per liter
29959	Antimony-125, water, unfiltered, picocuries per liter
29960	Antimony-125 counting error, water, unfiltered, picocuries per liter
29961	Antimony-125, water, filtered, picocuries per liter
29962	Antimony-125 counting error, water, filtered, picocuries per liter
29963	Strontium-91, water, unfiltered, picocuries per liter
29964	Strontium-91 counting error, water, unfiltered, picocuries per liter
29965	Strontium-91, water, filtered, picocuries per liter
29966	Strontium-91 counting error, water, filtered, picocuries per liter
29967	Technetium-99 (metastable), water, unfiltered, picocuries per liter
29968	Technetium-99 (metastable) counting error, water, unfiltered, picocuries per liter
29969	Technetium-99 (metastable), water, filtered, picocuries per liter
29970	Technetium-99 (metastable) counting error, water, filtered, picocuries per liter
29971	Tellurium-128, water, unfiltered, picocuries per liter
29972	Tellurium-128 counting error, water, unfiltered, picocuries per liter
29973	Tellurium-128, water, filtered, picocuries per liter
29974	Tellurium-128 counting error, water, filtered, picocuries per liter
29975	Tellurium-132, water, unfiltered, picocuries per liter
29976	Tellurium-132 counting error, water, unfiltered, picocuries per liter
29977	Tellurium-132, water, filtered, picocuries per liter
29978	Tellurium-132 counting error, water, filtered, picocuries per liter

Parameter Code	Parameter Name
29979	Thallium-208, water, unfiltered, picocuries per liter
29980	Thallium-208 counting error, water, unfiltered, picocuries per liter
29981	Thallium-208, water, filtered, picocuries per liter
29982	Thallium-208 counting error, water, filtered, picocuries per liter
29983	Xenon-135, water, unfiltered, picocuries per liter
29984	Xenon-135 counting error, water, unfiltered, picocuries per liter
29985	Xenon-135, water, filtered, picocuries per liter
29986	Xenon-135 counting error, water, filtered, picocuries per liter
29987	Yttrium-91 (metastable), water, unfiltered, picocuries per liter
29988	Yttrium-91 (metastable) counting error, water, unfiltered, picocuries per liter
29989	Yttrium-91 (metastable), water, filtered, picocuries per liter
29990	Yttrium-91 (metastable) counting error, water, filtered, picocuries per liter
29991	Zirconium-95, water, filtered, picocuries per liter
29992	Zirconium-95 counting error, water, filtered, picocuries per liter
30320	Uranium, bed sediment, dry weight, micrograms per gram
39036	Alkalinity, water, filtered, fixed endpoint (pH 4.5) titration, field, milligrams per liter as calcium carbonate
39086	Alkalinity, water, filtered, incremental titration, field, milligrams per liter as calcium carbonate
39087	Alkalinity, water, filtered, incremental titration, laboratory, milligrams per liter as calcium carbonate
46005	Acid neutralizing capacity, water, unfiltered, bromthymol blue endpoint (pH 6.0-7.6) titration, milliequivalents per liter
46516	Solar radiation, net, calories per square centimeter per minute
49414	2,3,5,6-Tetramethylphenol, bed sediment smaller than 2 millimeters, wet sieved (native water), field, recoverable, dry weight, micrograms per kilogram
49470	Gross alpha radioactivity, water, unfiltered, Pu-239 curve, picocuries per liter
49472	Bismuth-212, water, unfiltered, picocuries per liter
49475	Plutonium-239 plus plutonium-240, water, unfiltered, picocuries per liter
49476	Europium-152, water, unfiltered, picocuries per liter
49478	Plutonium-239 plus plutonium-240, water, filtered, picocuries per liter
49480	Nickel-63, water, unfiltered, picocuries per liter
49482	Chlorine-36, water, unfiltered, picocuries per liter
49902	Sulfur-34/Sulfur-32 ratio in sulfide, water, filtered, per mil
49926	Carbon-13/Carbon-12 ratio in carbon dioxide, per mil
49927	Carbon-13/Carbon-12 ratio, rock, per mil
49928	Sulfur-34/Sulfur-32 ratio in sulfate, rock, per mil
49929	Sulfur-34/Sulfur-32 ratio in sulfide, rock, per mil
49930	Sulfur-34/Sulfur-32 ratio in disulfide, rock, per mil
49931	Sulfur-34/Sulfur-32 ratio in monosulfide, rock, per mil
49932	Sulfur-34/Sulfur-32 ratio in sulfate, water, filtered, per mil

Parameter Code	Parameter Name
49939	Plutonium-238 2-sigma combined uncertainty, water, filtered, picocuries per liter
49940	Plutonium-239 plus plutonium-240, water, filtered, picocuries per liter
49941	Plutonium-239 plus plutonium-240 2-sigma combined uncertainty, water, filtered, picocuries per liter
49942	Americium-241 2-sigma combined uncertainty, water, filtered, picocuries per liter
49947	Gross alpha radioactivity 2-sigma combined uncertainty, suspended sediment, natural uranium curve, dry weight, micrograms per gram
49971	Gamma radioactivity scan 2-sigma combined uncertainty, suspended sediment, dry weight, picocuries per gram
49972	Radium-226, bed sediment, dry weight, picocuries per gram
49973	Radium-226 2-sigma combined uncertainty, bed sediment, dry weight, picocuries per gram
49974	Plutonium-238, suspended sediment, dry weight, picocuries per gram
49975	Plutonium-238 2-sigma combined uncertainty, suspended sediment, dry weight, picocuries per gram
49976	Plutonium-239 plus plutonium-240, suspended sediment, dry weight, picocuries per gram
49977	Plutonium-239 plus plutonium-240 2-sigma combined uncertainty, suspended sediment, dry weight, picocuries per gram
49978	Cesium-137, bed sediment, dry weight, picocuries per gram
49979	Cesium-137 2-sigma combined uncertainty, bed sediment, dry weight, picocuries per gram
49980	Americium-241, suspended sediment, dry weight, picocuries per gram
49981	Americium-241 2-sigma combined uncertainty, suspended sediment, dry weight, picocuries per gram
49991	Methyl acrylate, water, unfiltered, recoverable, micrograms per liter
50002	Bromoethene, water, unfiltered, recoverable, micrograms per liter
50004	Tert-Butyl ethyl ether, water, unfiltered, recoverable, micrograms per liter
50005	Methyl tert-pentyl ether, water, unfiltered, recoverable, micrograms per liter
50047	Flow, maximum during 24 hour period, million gallons per day
50048	Flow, minimum during 24 hour period, million gallons per day
50050	Flow, in conduit or through a treatment plant, million gallons per day
50051	Flow rate, instantaneous, million gallons per day
50052	Flow total during composite period, thousands of gallons
50420	Plutonium-239 plus plutonium-240, bed sediment, dry weight, picocuries per gram
50423	Plutonium-238, bed sediment, dry weight, picocuries per gram
50833	Radium-224, water, filtered, picocuries per liter
50835	Radium-224, water, unfiltered, picocuries per liter
61036	Delta helium-3, water, unfiltered, ingrowth method, percent
61053	Uranium, bed sediment smaller than 2 millimeters, total digestion, dry weight, micrograms per gram
61738	Thorium-228, water, filtered, picocuries per liter
72000	Elevation of land surface datum above NGVD 1929, feet
72012	Temperature, specific gravity measurement, degrees Celsius
72014	Temperature, resistivity measurement, degrees Celsius
72019	Depth to water level, feet below land surface

Parameter Code	Parameter Name
72020	Elevation above NGVD 1929, feet
72040	Drawdown observed, feet
72103	Sample location, relative to right bank, looking downstream, feet
72104	Sample location, distance downstream, feet
72105	Sample location, distance upstream, feet
72106	Elevation of sample, feet
74082	Streamflow, daily, acre-feet
75031	Zirconium, niobium-95, counting error, water, unfiltered, picocuries per liter
75032	Zirconium, niobium-95, water, unfiltered, picocuries per liter
75037	Potassium-40 counting error, water, unfiltered, picocuries per liter
75038	Potassium-40, water, unfiltered, picocuries per liter
75940	Uranium-238, suspended sediment, dry weight, picocuries per gram
75941	Uranium-234 2-sigma combined uncertainty, suspended sediment, dry weight, picocuries per gram
75942	Uranium-234, suspended sediment, dry weight, picocuries per gram
75947	Uranium-235 2-sigma combined uncertainty, suspended sediment, dry weight, picocuries per gram
75975	Uranium-235, suspended sediment, dry weight, picocuries per gram
75976	Thorium-232, water, filtered, picocuries per liter
75985	Tritium 2-sigma combined uncertainty, water, unfiltered, picocuries per liter
75987	Alpha radioactivity 2-sigma combined uncertainty, water, filtered, Th-230 curve, picocuries per liter
75988	Beta radioactivity 2-sigma combined uncertainty, water, filtered, Sr-90/Y-90 curve, picocuries per liter
75989	Beta radioactivity 2-sigma combined uncertainty, water, filtered, Cs-137 curve, picocuries per liter
75991	Uranium-238 2-sigma combined uncertainty, water, filtered, picocuries per liter
75992	Uranium-234 2-sigma combined uncertainty, water, filtered, picocuries per liter
75994	Uranium-235 2-sigma combined uncertainty, water, filtered, picocuries per liter
75995	Lead-210 2-sigma combined uncertainty, water, filtered, picocuries per liter
75997	Thorium-230 2-sigma combined uncertainty, water, filtered, picocuries per liter
75998	Polonium-210 2-sigma combined uncertainty, water, filtered, picocuries per liter
75999	Thorium-232 2-sigma combined uncertainty, water, filtered, picocuries per liter
76000	Radium-228 2-sigma combined uncertainty, water, filtered, picocuries per liter
76001	Radium-226 2-sigma combined uncertainty, water, filtered, picocuries per liter
76002	Radon-222 2-sigma combined uncertainty, water, unfiltered, picocuries per liter
76003	Strontium-90 2-sigma combined uncertainty, water, filtered, picocuries per liter
76004	Alpha radioactivity 2-sigma combined uncertainty, suspended sediment, Th-230 curve, picocuries per liter
76005	Beta radioactivity 2-sigma combined uncertainty, suspended sediment, Cs-137 curve, picocuries per liter
80015	Uranium, water, filtered, extraction fluorometric method, picocuries per liter
80029	Gross alpha radioactivity, water, unfiltered, natural uranium curve, micrograms per liter
80060	Gross beta radioactivity, suspended sediment, Sr-90/Y-90 curve, picocuries per liter

Parameter Code	Parameter Name
81027	Temperature, soil, degrees Celsius
81029	Temperature, snow, degrees Celsius
81366	Radium-228, water, filtered, picocuries per liter
81380	Discharge velocity, meters per second
81903	Depth to bottom at sample location, feet
81904	Velocity at point in stream, feet per second
81907	Well recovery, feet
81908	Recovery fraction ratio
81917	Temperature at bottom of hole, degrees Fahrenheit
82068	Potassium-40, water, filtered, picocuries per liter
82069	Potassium-40 counting error, water, filtered, picocuries per liter
82070	Potassium-40, suspended sediment, picocuries per liter
82071	Potassium-40 counting error, suspended sediment, picocuries per liter
82072	Dial reading, number
82081	Carbon-13/Carbon-12 ratio, water, unfiltered, per mil
82082	Deuterium/Protium ratio, water, unfiltered, per mil
82083	Lithium-7/Lithium-6 ratio, water, unfiltered, per mil
82084	Nitrogen-15/Nitrogen-14 ratio, water, unfiltered, per mil
82085	Oxygen-18/Oxygen-16 ratio, water, unfiltered, per mil
82086	Sulfur-34/Sulfur-32 ratio, water, unfiltered, per mil
82087	Uranium-238/Uranium-234 ratio, water, unfiltered, per mil
82302	Radon-222 counting error, water, unfiltered, picocuries per liter
82303	Radon-222, water, unfiltered, picocuries per liter
82304	Radon-222 counting error, water, dissolved, picocuries per liter
82305	Radon-222, water, dissolved, picocuries per liter
82306	Cobalt-60 counting error, water, filtered, picocuries per liter
82307	Cobalt-60, water, filtered, picocuries per liter
82336	Sulfur-34/Sulfur-32 ratio, bed sediment, per mil
82337	Oxygen-18/Oxygen-16 ratio, bed sediment, per mil
82338	Nitrogen-15/Nitrogen-14 ratio, bed sediment, per mil
82339	Carbon-13/Carbon-12 ratio, bed sediment, per mil
82341	Nitrogen-15/Nitrogen-14 ratio in organic fraction, soil or rock, per mil
82362	Radon-222, water, dissolved, picocuries per liter
82688	Nitrogen-15/Nitrogen-14 ratio in nitrate fraction, soil, per mil
82689	Nitrogen-15/Nitrogen-14 ratio in ammonia fraction, soil, per mil
82690	Nitrogen-15/Nitrogen-14 ratio in nitrate fraction, water, filtered, per mil
82691	Nitrogen-15/Nitrogen-14 ratio in ammonia fraction, water, filtered, per mil
82904	Acid neutralizing capacity, wet atmospheric deposition, unfiltered, field, mil. per liter as calcium carb.

Parameter Code	Parameter Name
82905	Acid neutralizing capacity, wet atmospheric deposition, unfiltered, field, microequivalents per liter
82906	Acid neutralizing capacity, wet atmospheric deposition, unfiltered, laboratory, milligrams per liter as calcium carbonate
82907	Acid neutralizing capacity, wet atmospheric deposition, unfiltered, laboratory, microequivalents per liter
83186	Acid neutralizing capacity, bulk atmospheric deposition, unfiltered, field, milligrams per liter as calcium carbonate
83187	Acid neutralizing capacity, bulk atmospheric deposition, unfiltered, field, microequivalents per liter
83188	Acid neutralizing capacity, bulk atmospheric deposition, unfiltered, laboratory, milligrams per liter as calcium carbonate
83189	Acid neutralizing capacity, bulk atmospheric deposition, unfiltered, laboratory, microequivalents per liter
85557	Temperature, low saturation, degrees Celsius
85558	Temperature, high saturation, degrees Celsius
90010	Temperature, area-weighted-average, degrees Celsius
90410	Acid neutralizing capacity, water, unfiltered, fixed endpoint (pH 4.5) titration, laboratory, milligrams per liter as calcium carbonate
90430	Carbonate, water, unfiltered, incremental titration, laboratory, milligrams per liter as calcium carbonate
95100	Conversion factor, number
95410	Acid neutralizing capacity, water, unfiltered, fixed endpoint (pH 4.5) titration, laboratory, milligrams per liter as calcium carbonate
95430	Carbonate, water, unfiltered, fixed endpoint (pH 8.3) titration, laboratory, milligrams per liter as calcium carbonate
99020	Elevation above NGVD 1929, meters
99060	Discharge, cubic meters per second
99061	Discharge, instantaneous, cubic meters per second
99065	Gage height, above datum, meters
99225	Datum offset, elevation of station's Aquatrak leveling point in reference to established datum, meters
99226	Sensor offset, Aquatrak sensor, meters
99227	Primary water level, Aquatrak, distance from measuring point to water surface, meters
99229	Temperature #1, Aquatrak, air temperature of the upper sounding well, degrees Celsius
99230	Temperature #2, Aquatrak, air temperature of the bottom sounding well, degrees Celsius
99326	Radium-228 sample-specific minimum detectable concentration, water, filtered, picocuries per liter
99430	Carbonate, water, unfiltered, incremental titration, field, milligrams per liter as calcium carbonate
99900	District special 99900
99901	District special 99901
99902	District special 99902
99903	District special 99903
99904	District special 99904
99905	District special 99905
99906	District special 99906
99907	District special 99907

Parameter Code	Parameter Name
99908	District special 99908
99909	District special 99909

4.9 Appendix I: Parameters that can be Recensored if Stored Value is Zero

Parameter Code	Parameter Name
00410	Acid neutralizing capacity, water, unfiltered, fixed endpoint (pH 4.5) titration, field, milligrams per liter as calcium carbonate
00608	Ammonia, water, filtered, milligrams per liter as nitrogen
00610	Ammonia, water, unfiltered, milligrams per liter as nitrogen
00613	Nitrite, water, filtered, milligrams per liter as nitrogen
00615	Nitrite, water, unfiltered, milligrams per liter as nitrogen
00623	Ammonia plus organic nitrogen, water, filtered, milligrams per liter as nitrogen
00624	Ammonia plus organic nitrogen, suspended sediment, total, milligrams per liter as nitrogen
00625	Ammonia plus organic nitrogen, water, unfiltered, milligrams per liter as nitrogen
00630	Nitrite plus nitrate, water, unfiltered, milligrams per liter as nitrogen
00631	Nitrite plus nitrate, water, filtered, milligrams per liter as nitrogen
00665	Phosphorus, water, unfiltered, milligrams per liter
00666	Phosphorus, water, filtered, milligrams per liter
00671	Orthophosphate, water, filtered, milligrams per liter as phosphorus
00915	Calcium, water, filtered, milligrams per liter
00925	Magnesium, water, filtered, milligrams per liter
00930	Sodium, water, filtered, milligrams per liter
00935	Potassium, water, filtered, milligrams per liter
00940	Chloride, water, filtered, milligrams per liter
00945	Sulfate, water, filtered, milligrams per liter
00950	Fluoride, water, filtered, milligrams per liter
00951	Fluoride, water, unfiltered, milligrams per liter
00955	Silica, water, filtered, milligrams per liter
01000	Arsenic, water, filtered, micrograms per liter
01001	Arsenic, suspended sediment, total, micrograms per liter
01002	Arsenic, water, unfiltered, micrograms per liter
01005	Barium, water, filtered, micrograms per liter
01007	Barium, water, unfiltered, recoverable, micrograms per liter
01010	Beryllium, water, filtered, micrograms per liter
01012	Beryllium, water, unfiltered, recoverable, micrograms per liter
01020	Boron, water, filtered, micrograms per liter
01022	Boron, water, unfiltered, recoverable, micrograms per liter

Parameter Code	Parameter Name
01030	Chromium, water, filtered, micrograms per liter
01034	Chromium, water, unfiltered, recoverable, micrograms per liter
01035	Cobalt, water, filtered, micrograms per liter
01037	Cobalt, water, unfiltered, recoverable, micrograms per liter
01040	Copper, water, filtered, micrograms per liter
01042	Copper, water, unfiltered, recoverable, micrograms per liter
01045	Iron, water, unfiltered, recoverable, micrograms per liter
01046	Iron, water, filtered, micrograms per liter
01049	Lead, water, filtered, micrograms per liter
01051	Lead, water, unfiltered, recoverable, micrograms per liter
01055	Manganese, water, unfiltered, recoverable, micrograms per liter
01056	Manganese, water, filtered, micrograms per liter
01060	Molybdenum, water, filtered, micrograms per liter
01062	Molybdenum, water, unfiltered, recoverable, micrograms per liter
01065	Nickel, water, filtered, micrograms per liter
01067	Nickel, water, unfiltered, recoverable, micrograms per liter
01075	Silver, water, filtered, micrograms per liter
01077	Silver, water, unfiltered, recoverable, micrograms per liter
01080	Strontium, water, filtered, micrograms per liter
01082	Strontium, water, unfiltered, recoverable, micrograms per liter
01090	Zinc, water, filtered, micrograms per liter
01095	Antimony, water, filtered, micrograms per liter
01105	Aluminum, water, unfiltered, recoverable, micrograms per liter
01106	Aluminum, water, filtered, micrograms per liter
01130	Lithium, water, filtered, micrograms per liter
01132	Lithium, water, unfiltered, recoverable, micrograms per liter
01145	Selenium, water, filtered, micrograms per liter
01146	Selenium, suspended sediment, total, micrograms per liter
01147	Selenium, water, unfiltered, micrograms per liter
70507	Orthophosphate, water, unfiltered, milligrams per liter as phosphorus
70958	Chlorophyll b, periphyton, chromatographic-fluorometric method, milligrams per square meter
71825	Acidity, water, unfiltered, heated, milligrams per liter as hydrogen ion
71890	Mercury, water, filtered, micrograms per liter
71895	Mercury, suspended sediment, recoverable, micrograms per liter
71900	Mercury, water, unfiltered, recoverable, micrograms per liter

4.10 Appendix J: Time-Related Codes

Table 1. Time datum codes

Time Datum Code	Time Datum Name	Offset from UTC (hours)
	Commonly Used Time Datums	
ADT	Atlantic Daylight Time	-03:00
AKDT	Alaska Daylight Time	-08:00
AKST	Alaska Standard Time	-09:00
AST	Atlantic Standard Time (Canada)	-04:00
CDT	Central Daylight Time	-05:00
CST	Central Standard Time	-06:00
EDT	Eastern Daylight Time	-04:00
EST	Eastern Standard Time	-05:00
GMT	Greenwich Mean Time	00:00
HDT	Hawaii Daylight Time	-09:00
HST	Hawaii Standard Time	-10:00
MDT	Mountain Daylight Time	-06:00
MST	Mountain Standard Time	-07:00
PDT	Pacific Daylight Time	-07:00
PST	Pacific Standard Time	-08:00
UTC	Universal Coordinated Time	00:00
ZP11	GMT +11 hours	+11:00
ZP-11	GMT -11 hours	-11:00
ZP-2	GMT -2 hours	-02:00
ZP-3	GMT -3 hours	-03:00
ZP4	GMT +4 hours	+04:00
ZP5	GMT +5 hours	+05:00
ZP6	GMT +6 hours	+06:00
	Other Time Datums Available	
ACSST	Central Australia Summer Time	+10:30
ACST	Central Australia Standard Time	+09:30
AESST	Australia Eastern Summer Time	+11:00
AEST	Australia Eastern Standard Time	+10:00
AWSST	Australia Western Summer Time	+09:00
AWST	Australia Western Standard Time	+08:00
BST	British Summer Time	+01:00
BT	Baghdad Time	+03:00
CADT	Central Australia Daylight Time	+10:30
CAST	Central Australia Standard Time	+09:30
CCT	China Coastal Time	+08:00

Table 1. Time datum codes (continued)

Time Datum Code	Time Datum Name	Offset from UTC (hours)
	Other Time Datums Available	
CET	Central European Time	+01:00
CETDST	Central European Daylight Time	+02:00
DNT	Dansk Normal Tid	+01:00
DST	Dansk Standard Time (?)	+01:00
EASST	East Australian Summer Time	+11:00
EAST	East Australian Standard Time	+10:00
EET	Eastern Europe, USSR Zone 1	+02:00
EETDST	Eastern Europe Daylight Time	+03:00
FST	French Summer Time	+01:00
FWT	French Winter Time	+02:00
GST	Guam Standard Time, USSR Zone 9	+10:00
IDLE	International Date Line, East	+12:00
IDLW	International Date Line, West	-12:00
IST	Israel Standard Time	+02:00
IT	Iran Time	+03:30
JST	Japan Standard Time,USSR Zone 8	+09:00
JT	Java Time	+07:30
KST	Korea Standard Time	+09:00
LIGT	Melbourne, Australia	+10:00
MEST	Middle Europe Summer Time	+02:00
MET	Middle Europe Time	+01:00
METDST	Middle Europe Daylight Time	+02:00
MEWT	Middle Europe Winter Time	+01:00
MEZ	Middle Europe Zone	+01:00
MT	Moluccas Time	+08:30
NDT	Newfoundland Daylight Time	-02:30
NDT	Newfoundland Daylight Time	-02:30
NFT	Newfoundland Standard Time	-03:30
NOR	Norway Standard Time	+01:00
NST	Newfoundland Standard Time	-03:30
NZDT	New Zealand Daylight Time	+13:00
NZDT	New Zealand Daylight Time	+13:00
NZST	New Zealand Standard Time	+12:00
NZT	New Zealand Time	+12:00
SADT	South Australian Daylight Time	+10:30
SAT	South Australian Standard Time	+09:30
SET	Seychelles Time	+01:00
SST	Swedish Summer Time	+02:00

Table 1. Time datum codes (continued)

Time Datum Code	Time Datum Name	Offset from UTC (hours)
	Other Time Datums Available	
SWT	Swedish Winter Time	+01:00
WADT	West Australian Daylight Time	+08:00
WAST	West Australian Standard Time	+07:00
WAT	West Africa Time	-01:00
WDT	West Australian Daylight Time	+09:00
WET	Western Europe	00:00
WETDST	Western Europe Daylight Time	+01:00
WST	West Australian Standard Time	+08:00

Table 2. Time datum reliability codes

Time-datum reliability code	Description
E	Estimated (assumed) time datum. This code would be an option during interactive or batch sample input. **If this code is used the associated time datum will not appear for the sample on several output reports unless the time datum is requested specifically*
K	Known time datum. This code would be the default during either interactive or batch sample login.
T	Time datum assumed during data transfer. This should only be set during data transfer **If this code is used the associated time datum will not appear for the sample on several output reports unless the time datum is requested specifically*

5.1 Tip Sheet: How do I move around on the screens?

- ❖ You can use the <Enter> key to move through the fields one by one on any QWDATA screen. You must include an entry for fields that are mandatory (highlighted).
- ❖ In addition to the <Enter> key, special keystroke combinations are available to save time during data entry.

Cursor controls

Keystroke	Resulting Action
^D	**(Ctrl-D) Skip to next block**
#	**Delete (clear) entry in field** **[NOTE: used as null value indicator in data entry screens]**
/	**Move back one field**
/x	**Continue at item number x**
/+x	**Move forward (x) items, default x is 1**
/-x	**Move back (x) items, default x is 1**
/@	**Continue at item with string @ in label**
/p	**Back up to previous page (screen)**
/n	**Advance to next page (screen)**
/d	**Delete current parameter**
/a	**Insert new parameter**
/c	**Cancel editing of current record – no changes are saved**
/q	**Skip remaining items – changes are saved**

- ❖ Type a ?/ to show the list above on the screen.
- ❖ All of these control options are not available on each screen within QWDATA. Available cursor controls are shown on the bottom of the screens within the program.

5.2 Tip Sheet: How do I login my sample and enter field data?

> ***Note*** **:** The sampling site must exist in the NWIS Site File before samples can be logged in or water-quality data can be entered. The program for adding a new site to the NWIS database is described in *Section 3.7.2--Add new site or modify site information*. Access to this program may be restricted to more experienced database users.

- Choose option 1 from the main QWDATA menu.
- Items required to login a sample are highlighted on the screen and include: agency code, station number, begin date, time datum, time datum reliability code, medium code, sample type, analysis status, hydrologic condition, hydrologic event, and analysis source. The items are sometimes referred to as the sample header information and are described in *section 3.1*.
- If you are entering a tissue sample with a medium code of C, D, X or Y, the organism and body part codes become mandatory fields.
- You can search the valid codes for most of the items on this screen by typing "?" in the first column after the item.
- After the sample header information has been entered, a record number is generated. You may want to keep track of this record number on your field sheet or another location for future reference.
- You are required to answer the query:

  Do you want to add parameters 00027 and ***00028 (Y/N)?***

  If you choose to enter these codes, a fixed value is required; acceptable fixed-value codes are listed in *Appendix B*.

  The default value, 1028 representing the ***U.S.GEOLOGICAL SURVEY***, is initially entered for 00027 and 00028; however, there is an opportunity to change the default values later, when entering or editing field data.
- You are then asked: ***Do you want to enter any data for this record (Y/N)?***
- If you respond with a ***"Y"***, the following query appears:

  Are you entering lab (L) or field (F) data? (L or F, <CR>=F)?

  - If ***F*** is chosen, the program described in *section 3.2.1* is initiated and you are asked: ***Enter field form #, ?# for detail of form #, ? for list of forms available.***
  - If ***L*** is chosen, the program described in *section 3.2.2* is initiated and you are asked: ***Enter field form #, ?# for detail of form #, ? for list of forms available.***
- The ***"#"*** in the prompt refers to the field form number contained in the file name: ***field.parmsnn***, stored in the directory ***/usr/opt/nwis/data/auxdata/qw_field_forms/***, where "***nn***" represents the 2-digit form number (e.g. field.parms01).

- Information about adding and designing a field form is available in *section 2.9* and *Tip sheet 5.3*.

- If you choose to enter field data (short form) and enter a field form number, you can enter the data value, rounding precision, data-value remark, data quality indicator (DQI), null-value qualifier, value qualifiers, and result field comments for each of the parameters in the field form, which are described in *section 3.2.1*.
- If you choose to enter laboratory data (long form) and enter a field form number, in addition to the fields listed above, you can also enter information about the reporting level used, the preparatory set number and date; the analytical set number and date; and result field and result laboratory comments for each of the parameters in the field form, which are described in *section 3.2.2.*
- Cursor control characters and options shown at the bottom of the field-data entry screen are described in *section 2.2.2* and *Tip Sheet 5.1*, and can be displayed on the screen by typing "***?/***".
- Additional parameters may be added during data entry without adding them to the field form by entering ***"/a"*** at any time.
- After the data entry is complete, the user is given an opportunity to make changes or enter a carriage return to continue.
- The record is stored you must answer the query: ***Login another sample (Y/N)?*** An ***"N"*** ends the program and a ***"Y"*** allows the user to login another sample.
- If a ***"Y"*** is entered, you must answer the query: ***Edit the same header (Y/N)?*** The ability to edit the previous sample information allows for the rapid login of samples that contain similar information contained in the previous sample.

5.3 Tip Sheet: How do I design a field form.....and why would I want to?

- Field forms allow the user to design a data input file containing the parameters that are routinely entered for a particular project, field trip, a District water-quality field sheet, or data from a non-USGS laboratory.
- Creation of new field forms should be completed if the available field forms do not contain one that can be used for the needed purpose. This requires that the available field forms be reviewed prior to creating a new one.
- A field form is a file containing a list of parameter codes, method codes, parameter names or descriptions, and identification that a parameter is mandatory. Field forms are used in the Enter Field Results, program *(section 3.2.1)*, the Enter Laboratory Results program *(section 3.2.2)* and in the Login Sample program *(section 3.1)*.
- Any editor that produces an ASCII output file can be used to create or edit a field form file.
- Any numeric parameter can be entered into a field form. Alpha parameters (such as GUNIT for geologic unit code) cannot be used in the field form.
- Up to 100 parameters can be included in a field form.
- Attach to the directory: ***/usr/opt/nwis/data/auxdata/qw_field_forms***
- **List the directory to see what field form numbers already exist before selecting a new 2-digit form number to create.**
- Initiate the editor from this directory and enter the data in the format shown below. Save the file as ***field.parmsnn*** where 'nn' is the new 2-digit number.
- The first line of the field form should be used to document the purpose of the field form by placing a "**#**" in the first column. Additional lines can be used for comments as long as a "**#**" is in the first column of the line. The format and an example of a field form are shown below.
- Use caution when creating descriptions for parameters to ensure that they are clear and match the definition in the PCD for that parameter. For example, if the parameter is defined as 'dissolved' in the PCD, then the description in the field form should contain 'dissolved' in the parameter description.
- Be sure that the final line of the field form contains a carriage return at the end. If this is not included, the last parameter will not be included to enter data.

Format of the field form

Line 1	**Begins with a "#" in column 1 and is used to describe the purpose of the field form, name of the person who designed the form, and date created. (This line is not required but is strongly recommended because the line is displayed if a list of field forms is requested.)**
Columns 1-5	**Parameter code [5 digits, use leading zeros].**
Column 6	**Method code [optional].**
Column 7	**Not used.**
Columns 8-32	**Parameter names or descriptions [could match District water-quality field sheet]**
Column 36	**Y indicates parameter is mandatory.**

Example of field form

```
#NAWQA SW field form for Biological project was created
#  by John Smith on 12-25-1999
#2345678901234567890123456789012345678901234567890 Column numbers
00061  Streamflow
00065  Gage height
00010  Temp water
00020  Temp air
00400  pH
00095  Specific Conductance
00300  Dissolved Oxygen
00025  Barometric pressure
00452B CO3 Carbonate M=B
00453B HCO3 Bicarbonate M=B
39086B Alkalinity Inc. Titration
31625  Fecal Coliform
31673  Fecal strep
84164  SAMPLER TYPE                Y
71999  PURPOSE                     Y
99105  REPLICATE
99111  QA DATA TYPE                Y
```

5.4 Tip Sheet: How do I view my data in the database?

- Choose Option 3 – 'List Samples and Results' from the Data Review menu. See *section 3.3.3* for more details about this option.
- Identify the records you want to view by record numbers or by using station number, date, optionally time and medium code. This information can be entered from the screen or from a file. See *section 3.3.1* for information about selecting sites and(or) samples.
- Choose to display the data to the screen or output to a file. Choose 'T' for output to the screen or 'F' for output to a file.
- If you choose to output to a file the output will be the long form and 132 characters wide. You will need to enter a file name to store the output.
- If you choose to display the output to the screen you can choose from the following three options:

  1 -- short form, 2-columns
  2 -- long form, folded into 80 characters
  3 -- long form, 132 characters

  If you have a small viewing area on your screen you will want to choose option 1 or 2. If you want to display the most complete set of information, you will want to choose option 2 or 3.

- Output from the three options:

  Short form, 2-columns

```
Record Number: 96400170

 Station Name: FLATWILLOW CREEK NEAR MOSBY, MT.

 Agency Code: USGS   Site Number: 06130000
 Begin Date: 19640311  Begin Time:
   End Date: 19640322    End Time:
 Medium Code: 9

 Sample type: 9  Analysis Status: 7  Analysis Source: A
 Hydrologic Condition: A  Hydrologic Event: 9
 Project Code:            Lab Number:          Geologic Unit:
 Organism ID (ITIS):           Body Part ID:
 Analysis Types:                          Number Parameters: 024
 Modified: 19860202  By: nwis
 District Processing Status: T -- TRANSFERRED

 Sample Field Comment--

 Sample Lab Comment--

 PARAMETER  VALUE  R  Q  M  P    PARAMETER  VALUE  R  Q  M  P

   00060      1.9     A     2      00080        4     A     1
   00095     4190     A     3      00400      7.4     A     2
   00440      233     A     2      00445       .0     A     1
   00900     1370     A     2      00902     1180     A     2
   00915      245     A     2      00925      184     A     2
   00930      590     A     2      00931      6.9     A     2
```

Long form, folded into 80-characters

```
Record Number: 96400170

 Station Name: FLATWILLOW CREEK NEAR MOSBY, MT.

 Agency Code: USGS   Site Number: 06130000
 Begin Date: 19640311  Begin Time:
   End Date: 19640322    End Time:
 Medium Code: 9

 Sample type: 9  Analysis Status: 7  Analysis Source: A
 Hydrologic Condition: A  Hydrologic Event: 9
 Project Code:            Lab Number:          Geologic Unit:
 Organism ID (ITIS):           Body Part ID:
 Analysis Types:                          Number Parameters: 024
 Modified: 19860202  By: nwis
 District Processing Status: T -- TRANSFERRED

 Sample Field Comment--
 Sample Lab Comment--
Press <CR> to continue:

 PARM  --VALUE--  -RPT LEV-  RMK  METH  QA  PR  DQI  Q1 Q2 Q3  NVQ  RP-LVCD
       ANAL_SET_NO  ANAL_DATE  ANAL_PREP_NO  PREP_DATE  MOD_DATE  MODIFIED_BY

 00060       1.9        --               A   2   A
                                                          20010614   nwis
 00080         4        --               A   1   A
                                                          20010614   nwis
 00095      4190        --               A   3   A
                                                          20010614   nwis
 00400       7.4        --               A   2   A
                                                          20010614   nwis
 00440       233        --               A   2   A
                                                          20010614   nwis
```

Long form, 132 characters

```
 Record Number: 96400170
Agency: USGS   Station Number 06130000
Station Name: FLATWILLOW CREEK NEAR MOSBY, MT.
Start Date: 19640311  Start Time:
  End Date: 19640322    End Time:
Medium Code: 9

Sample type: 9  Analysis Status: 7  Analysis Source: A
Hydrologic Condition: A  Hydrologic Event: 9
Project Code:            Lab Number:          Geologic Unit:
Organism ID (ITIS):           Body Part ID:
Analysis Types:                          Number Parameters: 024
Modified: 19860202  By: nwis
District Processing Status: T -- TRANSFERRED

Sample Field Comment--

Sample Lab Comment--

  PARM  --VALUE--  -RPT LEV-  R M Q  PR  DQI  Q1 Q2 Q3  NVQ  RP-LVCD  ANAL_SET_NO  ANL_DATE  ANAL_PREP_NO  PRP_DATE  MOD_DATE  MOD_BY

00080         4        --        A  1    A                                                                          20010614  nwis
00095      4190        --        A  3    A                                                                          20010614  nwis
00400       7.4        --        A  2    A                                                                          20010614  nwis
00440       233        --        A  2    A                                                                          20010614  nwis
00445        .0        --        A  1    A                                                                          20010614  nwis
00900      1370        --        A  2    A                                                                          20010614  nwis
00902      1180        --        A  2    A                                                                          20010614  nwis
00915       245        --        A  2    A    c                                                                     20010614  nwis
00925       184        --        A  2    A                                                                          20010614  nwis
00935       6.2        --        A  2    A                                                                          20010614  nwis
00940        40    1.0           A  2    A                   MRL                                                    20010614  nwis
00945        --        --        A  2    A              b                                                           20010614  nwis
```

5.5 Tip Sheet: How do I edit data that are already in the database?

This tip sheet describes the basic steps required to edit data that already exist in the database.

- The user must know the record number of the sample that is to be edited or the agency code, site number, begin date, begin time, end date (if there is one), and end time (if there is one) and medium code before proceeding. Note: you must have write access to the database.

- Choose option 2 – *Modify samples or results* from the main QWDATA menu.

- Choose option 3 – *Edit samples or results* from the Modify Samples or Results menu and the following qwedit screen is displayed. Note: before proceeding, confirm that the user is in the correct database.

qwedit – Water Quality Edit Program

Processing in database: 01

Enter record number:

(Q to quit, <CR> to select by agency-site-date-time-medium)

- Enter the sample record number or press the <Enter> key and enter the agency code, site number, date(s), time(s), and medium code. The program will respond and ask you to confirm if this is the desired record.

- If this is not the correct sample record enter an 'n' and the program will reset the input screen to the qwedit screen above. If it is the correct sample record, enter a 'y' and the program will display the following "Edit Options:" screen:

EDIT OPTIONS:

1 – Select another record

2 – Modify the record header

3 – Modify the analytical data

4 – Delete the record

Please enter your choice:

- Choose Edit option 1 to select another record.

- Choose Edit option 2 to add, delete, or change any of the record header information. The sample header information is described in section 3.1. Choose Edit option 3 to add, delete, or change any of the analytical data or attributes associated with a result.

- For both option 2 and 3, the cursor control characters and options are shown at the bottom of the entry screen and are described in section 2.2.2 and in Tip Sheet 5.1, and can be displayed on the screen by typing "?/".

- Note that if the data have been reviewed, the DQI will have to be changed before making changes to an existing analytical result or its attributes.

- Choose Edit Option 4 to delete the entire record. The program will ask for confirmation that this record is to be deleted. To help ensure that no mistakes are made, the response must be "YES" in all capital letters.

Please enter your choice: 4

Are you sure you want to DELETE that record (Must enter YES to delete)?

- The program will confirm if the record has been deleted. If the record was not deleted then the program returns the user to the Edit Options screen. If the record was successfully deleted, then the program returns the user to the initial qwedit screen.

5.6 Tip Sheet: How do I table data in publication-style table format?

This tip sheet describes the basic steps required to make a publication-style table. Publication-style tables include informative titles, column headings, and appropriate spacing for publishing tables of data. Links to sections in the documentation that contain details for certain topics are included. The user should refer to those sections for details that are not presented in this tip sheet.

- You must have a file of record numbers before beginning the tabling program. Create this file if you do not already have it. See *section 3.3.1* or *Tip Sheet 5.12* for more information about retrieving records.
- From the main QWDATA menu, choose option 4 – *Data Output.*
- Choose option 3 – *Water-Quality Table by Sample (Publication Format)* from the Data Output menu. See *section 3.4.3* for more details about this option.
- Enter the file name for the record-number file. Enter the file name for the output file.
- A table definition file is required. You may use an existing definition file or create one now. See *section 3.4.3.2* for more information about table definitions.
- Provide parameter codes to be included in the table. This may be done interactively or by providing a file name for a file containing the parameter codes. See *section 3.4.3.3* for more information about providing parameter codes and *Appendix G* for the format of a parameter code file.
- Choose table output options from the screen 'qwtable -- current selections for options'. See *section 3.4.3.4* for detailed information on table output options. Following is the table options screen with the default options shown by X's:

```
qwtable -- current selections for options

(1) Results Included in Table:       X_Historical, Accepted, or presumed OK
                                     __ User Specified

(2) Parameter Order:                 X_Publication Order   __As Supplied

(3) Rounding of Result Values:       X_PCD   __User   __None

(4) Censoring of Zero Values:        X_None   __User Specified

(5) Recensoring of Values:           X_None   __User Specified

(6) Qualifiers in Output:            __Yes  X_No

(7) Footnotes:                       __None  X_Remarks   __Qualifiers
```

Note: A user with only read access to the database will be able to only table results with data quality indicator (DQI) codes of A – historical, S – presumed satisfactory, R – reviewed and accepted, or Q – reviewed and rejected. A user must have write access to table results for DQI codes of I – methods in review or P,O, or X – proprietary results.

- After the table is retrieved, you can create another table with the by-sample format by entering a 'Y' at the next prompt and the tabling program will begin again. If another table is not required, type CR or N at the prompt.

- The output file contains "Fortran carriage control" characters. Use the Unix command:
  asa <filename | lp –y landscape
  to print the formatted file. Fortran carriage-control characters are numeric codes written in the first column of each line describing how the print out should appear.

5.7 Tip Sheet: How do I make flat files to use data in programs outside of QWDATA?

This tip sheet describes the basic steps required to make a flat file using column-style (by-sample) output. If you would like to make a flat file using row-style (by-result) output, refer to *section 3.4.6*. Flat files do not include titles or column headings, but are simple columns of data. This type of output is typically used for simple data reviews or to enter data into other software. Links to sections in the documentation that contain details for certain topics are included in this tip sheet. The user should refer to those sections for details that are not presented in this tip sheet.

- ❖ You must have a file of record numbers before beginning the tabling program. Create this file if you do not already have it. See *section 3.3.1* or *Tip Sheet 5.12* for more information about retrieving records.
- ❖ Choose option 4 – *Data Output* from the main QWDATA menu.
- ❖ Choose option 5 – *Flat File by Sample* from the Data Output menu.
- ❖ Six options are available to create a flat file using by-sample output:

```
qwtable -- Flat file (by sample)

You have 6 options for flatfile output:
  1 -- Fixed column flat file (qwflatout)
  2 -- Flat file with TAB delimiter (RDB format)
  3 -- Flat file with user-specified delimiter
(Following options include method code in output)
  4 -- Fixed column flat file (qwflatoutm)
  5 -- Flat file with TAB delimiter (RDB format)
  6 -- Flat file with user-specified delimiter

Enter option desired (1-6, <CR>=1):
```

- ✓ Option 1 produces two files: one with the data in fixed columns separated by spaces and the other containing a list of parameter names. This option can be used to import the data to other programs; however, delimited files are better for some programs (see option 3).
- ✓ Option 2 produces a tab-delimited RDB file with header lines at the top of the file containing parameter and format information followed by the data. Only those users wishing to use the RDB capabilities should choose this option.
- ✓ Option 3 produces two files: one with the data delimited by the user-defined delimiter and the other containing a list of parameter names. This option can be used to import the

data to other programs.

- ✓ Options 4-6 are similar to options 1-3, but the output also includes method codes when method codes exist with a result. This option creates an extra space or column for each parameter specified in the parameter list to hold a method code; in some cases this column may be blank because no method code exists.

  * See *section 3.4.5* for more details about these options.*

- ❖ Each option has the following prompts:

  - ✓ Options 1 and 4:

    Enter name of file containing record numbers (Q to quit):
    Enter name of file to hold output –

  - ✓ Options 2 and 5:

    Do you want remarks and values to be delimited (Y/N,<CR>=Y)?
    Enter name of file containing record numbers (Q to quit):
    Enter name of file to hold output –

  - ✓ Options 3 and 6:

    Enter column separator char or TAB for tab char:
    Do you want remarks and values to be delimited (Y/N,<CR>=Y)?
    Enter name of file containing record numbers (Q to quit):
    Enter name of file to hold output –

  - ✓ Options 2, 5, 3, and 6 allow you to separate remarks, such as < or E, into a different column from the values by answering 'Y' to that prompt. For options 3 and 6, any character may be used as a column separator, but the most common are tabs, commas, and slashes.

- ❖ Provide parameter codes to be tabled. This may be done interactively or by providing a file name for a file containing the parameter codes. See *section 3.4.3.3* for more information about providing parameter codes and *Appendix G* for the format of a parameter code file.

- Choose table output options from the screen 'qwtable -- current selections for options'. See *section 3.4.3.4* for detailed information on table output options. Following is the table options screen, X's indicate the default setttings:

```
qwtable -- current selections for options

(1) Results Included in Table:      X_Historical, Accepted, or presumed OK
                                    __ User Specified

(2) Parameter Order:                X_Publication Order  __As Supplied

(3) Rounding of Result Values:      X_PCD  __User  __None

(4) Censoring of Zero Values:       X_None  __User Specified

(5) Recensoring of Values:          X_None  __User Specified

(6) Qualifiers in Output:           __Yes  X_No

(7) Footnotes:                      __None  X_Remarks  __Qualifiers
```

Note: A user with only read access to the database will be able to only retrieve results with data quality indicator (DQI) codes of A – historical, S – presumed satisfactory, R – reviewed and accepted, or Q – reviewed and rejected. A user must have write access to retrieve results for DQI codes of I – methods in review, U – unapproved result or laboratory, or P,O, or X – proprietary results.

- After the file is retrieved, you can create another flat file with the same format by entering a 'Y' at the next prompt and the tabling program will begin again. If another table is not required, type CR or N at the prompt.

5.8 Tip Sheet: How can I find a parameter code number or name?

- Several options for parameter code number or name queries are available on the *Support Files (section 3.6)* menu option of QWDATA.

  Option 2 on the *Support Files* menu gives you the option to retrieve parameter code information by parameter code or parameter name:

```
        Parameter Name and Code Retrieval Routine
        Options for Retrieving Parameter Name or Code:
          1 -- Retrieve/Select a Parameter by Code
          2 -- Retrieve/Select a Parameter by Name
          0 -- Quit
What do you want to do (0-2)?
```

  Choosing option 1 results in the following system prompt:

```
Enter 5-character parameter code
```

  At this point, you may enter a 5-digit parameter code and the parameter name will be shown on the screen.

  Choosing option 2 results in the following system prompt:

```
Enter parameter name:
```

  At this point, you may enter a parameter name, partial name, or string of letters. All parameter names that begin with the character string or contain the character string entered will be displayed to the terminal.

- The same information for parameter code numbers or name queries can be obtained from the unix prompt by use of the **show_parm** script, available at: http://wwwdcascr.wr.usgs.gov/~dkyancey/showparm.html

  The **show_parm** script has the following options:

  show_parm [-l] { parm1} { parm2 }…. { parmN}

  or: show_parm [-l] [-f {parm_file} || -k {keyword}]

  Where:
  -l indicates that the output will include the parameter long name

-f indicates that the list of parameter codes will come from a file, and parm_file is the input file that contains a list of parameter codes, one per line, beginning in column one.

-k {word} = search parameter code by keyword

Additional information including a manual page on this script is available at the URL included above.

5.9 Tip Sheet: How do I load data using batch processing?

- Batch processing is used for loading electronic data files, generally from laboratories, into the database.
- The NWIS software accepts two batch file formats—the "1 and * card" format and the "tab-delimited" format.
- The "1 and * card" format uses a file called qwcards (or qacards for QC data), and the "tab-delimited" format uses files called qwsample and qwresult (or qasample and qaresult for QC data).
- Descriptions of the batch file formats are in *Appendix F*. A document that describes the requirements for external laboratories that may want to produce the batch format is located at *http://wwwok.cr.usgs.gov/nawqa/phoenix/*.
- To begin batch processing, choose option 8 – *Batch Processing* from the main menu. See *section 3.8* for more details about this option.
- If you are loading data from the National Water Quality Laboratory (NWQL), you must first retrieve the data by choosing option 1 – *Retrieve National Water-Quality Laboratory Data* from the batch-processing menu. This will retrieve the available NWQL data to the current directory in the qwcards or qwsample and qwresult batch files needed by the batch-processing program.
- If you are loading data from a source other than NWQL, the program will look for the qwcards or qwsample and qwresult batch files in the directory where the program is initiated.
- The batch process can be run in one of two ways:
  1. The batch process updates sample records that are already in the database (option 2 – *Process Batch File for All Logged In Samples*). The data is matched based on agency code, site id, begin date and time, end date and time, and medium code which are contained in the 1-card (qwcards/qacards) or the sample-level file (qwsample/qasample). The result-level data (* cards in qwcards/qacards or qwresult/qaresult records) are appended to the existing sample.
  2. The batch process enters and updates samples in the database (option 3 – *Process Batch File for All Samples*). The data are checked based on agency code, site id, begin date and time, end date and time, and medium code, which are contained in the 1-card or the sample-level file (qwsample/qasample). If a match is found, the result-level data (* cards in qwcards/qacards or qwresult/qaresult records) are appended to the existing sample. If a match is not found, a new sample is created and the result-level data are processed.
- During batch processing, the batch file(s) (qwcards or qwsample and qwresult) are separated into a file(s) to be processed in the environmental database (qwcards or qwsample and qwresult) and a file(s) to be processed in the QC database (qacards or qasample and qaresult). The separation is based on medium code. Medium codes 0-9 and A-P are used for environmental samples. Medium codes Q-Z are used for quality-control samples. A complete description of the valid medium codes can be found in *Appendix A*.

- If you are dealing only with QC data, you can run the batch files directly into the database using menu options 4 – *Process Batch File for All Logged in QA Samples* or 5 – *Process Batch File for All QA Samples*.
- A record of the actions taken when a batch file is processed is written to files named ***watlist.yymmdd.hhmm*** **and** ***watlist.qa.yymmdd.hhmm*** for option 2 or 4 or ***watlist.qwenter.yymmdd.hhmm*** and ***watlist.qaenter.yymmdd.hhmm*** for option 3 or 5.
- The parameter codes for the parameters listed in the *watlist* are preceded by a one-letter code (N, U, C) to indicate whether the value is new, updated, or computed, respectively. The *watlist* also contains a cation/anion balance and messages from validation checks. The *watlist* should be reviewed for chemical accuracy and preserved as part of the official record for the sample as it is considered original data.
- Data for samples that are not successfully processed with the batch program are output to files for clean up (***badqw.yymmdd.hhmm*** and ***badqa.yymmdd.hhmm*** if using 1 and * card format; and ***rejected.sample.yyyymmdd.hhmmss***, ***rejected.result.yyyymmdd.hhmmss***, ***rejected.sample.qa.yyyymmdd.hhmmss*** and ***rejected.result.qa.yyyymmdd.hhmmss*** if using the tab-delimited format).
- Samples that are not successfully processed have one or more of the following problems:
  (a) invalid formats (columns have been shifted, etc),
  (b) invalid site ID's, dates, times, or medium codes,
  (c) results for samples that do not already exist in the water-quality file (except for menu options 3 and 5), and
  (d) samples that contain results that are overwrite protected with a DQI value.
  All results are rejected for a sample if a rejection error is found for one or more results.
- There is a batch-file editor available through the batch menu, option 7 – *Review/Edit batch files*, for fixing errors in files that are in the tab-delimited format. A text editor can also be used to edit the tab-delimited files, but the user should be extremely careful not to delete or add tabs used to separate the columns of data. Any text editor can be used for fixing data in the "1 and * card" format.
- To help verify the format of tab-delimited files, the program *qwcat* can be used. For more information about this program refer to *section 3.9.*
- After the necessary steps are taken to correct any problems, the corrected samples can be entered by renaming the files to the appropriate batch filename (qwcards or qwsample and qwresult) and initiating one of the batch input programs (options 2 or 3).
- If data are rejected during the batch loading because of DQI protection but you have reviewed the new data and accepted it, you can reload the data from the batch file and override the DQI protection using option 9 – *Reload QW data from batch file, overriding DQI* or option 10 – *Reload QA data from batch file, overriding DQI*.

5.10 Tip Sheet: How do I make large-scale updates to data?

There are several different ways of making large-scale updates to the database, including batch processing, Unix scripts, and Standard Query Language (SQL). Recommendations on which technique to use and when to use that technique are described in this tip sheet.

Batch processing:

Batch processing can be used to change sample-level information or to add, change, or delete results for existing sample records.

- The NWIS software accepts two batch file formats—the "1 and * card" format and the "tab-delimited" format. The "1 and * card" format uses a file called qwcards (or qacards for QC data), and the "tab-delimited" format uses files called qwsample and qwresult (or qasample and qaresult for QC data). Descriptions of the batch file formats are in *Appendix F*. Users are referred to *Tip Sheet 5.9* or *section 3.8* for more details on batch processing.
- To create a batch file which can be used for making updates, option 6 – *Produce batch output* and option 8 – *Produce 1- and *-card output* can be used from the Batch Processing menu. Which output you choose is dependent on what type of changes you want to make.
- To make large-scale updates to any of the sample or result-level attributes, the tab-delimited format should be used. The "1 and * card" format can only be used for making updates to some fields. Please refer to *Appendix F* for batch behavior information.
- Some attributes in the tab-delimited formatted files are protected from batch update so that the NWQL cannot overwrite field-only attributes. Please refer to *Appendix F* for batch behavior information.
- The '1 and *-card' batch file can be edited with any text editor. A remark code of 'X' will delete a result and all of the associated attributes. Parameters can be added using any Unix editor.
- The batch process to use for updating sample records that are already in the database is option 2 – '*Process Batch File for All Logged In Samples*' for environmental samples or option 4 – '*Process Batch File for All Logged In QA Samples*' for QC samples.
- If updates are to be applied to values that have DQI protection, option 9 – *Reload QW data from batch file, overriding DQI* or option 10 – *Reload QA data from batch file, overriding DQI* should be used for environmental samples and QC samples, respectively.
- A record of the updates that were processed is written to files named ***watlist.yymmdd.hhmm*** and ***watlist.qa.yymmdd.hhmm*** for options 2 or 9 and 4 or 10, respectively.
- The parameter codes listed in the *watlist* are preceded by a one-letter code (N, U) to indicate whether the value is new or updated, respectively. Deleted parameters are described in the error messages in the *watlist*.

Unix Scripts:

Unix scripts generally are most useful when making large-scale changes to sample-level information.

- Unix scripts require the responses to database prompts to be exactly what was planned for in the Unix script. If an unexpected database prompt is encountered while a Unix script is processing, the script will provide responses to database prompts that are incorrect and data could potentially be corrupted.
- Unix scripts should only be used by experienced Unix users and in situations where there is no potential for planned database prompts to deviate from actual database prompts.

SQL:

SQL may be used for data retrievals by trained database personnel, but it is not recommended for any data updates. Reasons for this include: (1) date-time information are internally stored in GMT; (2) certain attributes have domain-list enforcement; (3) relational tables are linked with identifiers that could be corrupted and referential integrity broken; and (4) logical rules among inter-related fields (such as rpt_lev_va & rpt_lev_tp). Some *examples of SQL statements* that can be used for the NWIS system are available.

- If a situation arises where you need to change a large data set and batch processing or Unix scripts will not work, please contact the NWIS office for assistance in evaluating whether SQL can be used to change data for your particular data scenario. If SQL is determined to be the only viable approach, NWIS staff would assist in developing an SQL script to update the data.

5.11 Tip Sheet: How do I use null values?

There are two situations where a null value is appropriate. The first situation is a null value that is the result of non-quantitative test, which results in only the presence or absence of a constituent. The second situation is when an attempted measurement is not successfully completed due to logistical problems or unintentional errors, and a null value is stored in the data documenting the measurement attempt and the reason that no numerical result was stored. In general, most null values will be from laboratory analyses; however, null values can also be entered for field values.

There are two ways that a null value can be entered into QWDATA

- **Interactive**
  - Details about how to enter data interactively in QWDATA is available in *Section 3.2.*
  - A null value is entered in the database interactively by entering a # in the value field in either the field form, the laboratory data entry form, or while editing existing data.
  - After the '#' is entered, the user is required to qualify the null value with either a "null value remark" or a "null value qualifier", as described by the screen prompts:

You have specified a NULL result value. You must qualify null values with a null value remark code or a null value qualifier code.

Null Value Remarks:	**Null Value Qualifiers:**
M:Presence verified, not quantified	**b**:Sample broken/spilled in shipment
N:Presumptive evidence of presence	**c:**Sample lost in lab
U:Analyzed for, not detected	**e**:Required equipment not functional
	f:Sample discarded: improper filter
	i:Required sample type not received
	l:Analysis discarded: lab QC failure
	m:Results sent by separate memo
	o:Insufficient amount of water
	p:Sample discarded: improper preservative
	q:Sample discarded: holding time exceeded
	r:Sample ruined in preparation
	u:Unable to determine-matrix interference
	w:Sample discarded: warm when received
	x:Result failed quality assurance review

Do you want to enter a remark code (R) or a qualifier code (Q)?

  - After you choose 'R' or 'Q', then you can choose the remark or qualifier for the null result.
- **Batch**
  - A null value also can be entered in using batch files if the value field of the parameter(s) of interest are blank in the tab-delimited "qwresult" file. A valid code in the null-qualifier field or remark code field must be present. Batch processing is discussed in *Section 3.8.*

5.12 Tip Sheet: How do I retrieve records for use in other QWDATA programs?

Programs used to view data in the QWDATA database (data review, data output and graphics programs) either require or will accept a file of record numbers. Additional information about record numbers can be found in *section 2.1.5*. This tip sheet describes how to create a file of record numbers from a single database. Site or record retrieval from multiple databases can be done using similar steps; the user is prompted for the information for each database specified. *Section 3.4.2* provides details about retrieving data from multiple databases.

- Selecting sites or samples from a single database may be accomplished from two options in the QWDATA main menu: option 3 – *Data Review* or option 4 – *Data Output*. From either of those menus, choose option 1 – *Select Sites or Samples*.

- Three options are available for retrieving water-quality records from specific sites and one option is for retrieving water-quality information for any sites. See *section 3.3.1.1* for detailed information.

```
qwsiterec -- locate record numbers for use by QW application programs
QW database(s): 01

You may locate records for specific sites.

If you wish to locate records for specific sites the options are:
  1 -- You have a file containing site numbers
  2 -- You will enter site numbers at terminal
  3 -- You wish to locate sites based upon selection criteria

If you don't care which sites the option is:
  4 -- Locate QW records without regard to site

Please enter option (1-4,Q to quit):
```

- If sites are retrieved, the option is given to sort the sites after retrieval. The retrieved sites may be sorted on a variety of fields that will be displayed by the program.

- If the retrieved sites will be used in the future, save them to a file.

- Regardless of the option chosen, you will be given the opportunity to refine the water-quality records retrieved using the following menu:

```
Locate QWDATA records

Enter an X to choose an item for limiting retrieval,
Enter a # to remove an item.

(1) DATE:    (2) ANALYSIS-LEVEL CODES: _  (3) PROJECT ID: _
(4) GEOLOGIC UNIT: _  (5) PROCESSING STATUS: _
(6) PARAMETER VALUES AND CODES: _
```

- See *section 3.3.1.2* for detailed information about the menu shown above.
- After the retrieval criteria have been set you will be given the option to include proprietary and (or) local use data. See *section 2.10* for definitions.
- You will be given another opportunity to save sites that contain the requested water-quality information to a file. This group of sites may be a subset of the sites retrieved using option 1 or 2 in the first menu shown above.
- The records retrieved can be sorted on a variety of fields (See *section 3.3.1.2* for more detailed information):

```
qwsiterec -- Total number QWDATA records located: 12227

Do you wish to sort the located QWDATA records (Y/N)? Y

You may sort on any combination of the following fields:

   A -- Agency code              F -- Geologic unit code
   B -- Station number           G -- Processing status
   C -- Dates and times          H -- County code
   D -- Medium code              I -- Station name
   E -- Project ID               J -- Station type

The first field will be the primary sort
the next will be the secondary sort 1, ...
Please enter the sort codes on one line with no embedded spaces




Enter sort code(s):
```

- Provide a file name for the file to hold the water-quality records.
- The resulting file of record numbers can be used in QWDATA programs that accept files of record numbers. Use clear, descriptive filenames if these record numbers will be used again.

5.13 Tip Sheet: How do I enter reports into the problem-reporting system?

If you run across a problem while running QWDATA and you think that it might be considered a 'bug' in the software, please use the problem-reporting system that is available to notify NWIS personnel so they can look for a solution. This same system can be used to request enhancements and ask questions that may arise while using QWDATA.

- If you believe you have identified a 'bug' in the software, please attempt to repeat it two more times. By producing the behavior three times, you insure it is a 'bug' and that you can identify all the steps taken to cause the 'bug' to occur.
- After you have identified the 'bug', the enhancement, or the question make sure that the same issue hasn't already been entered. Point your browser to http://wwwnwis.er.usgs.gov/IT/NWIS4_3/known_problems_nwis.html and look through the list of problems. If you find a similar problem, read the workaround suggested for help. If there is not enough information on that page, click on the problem report number and read the detailed information to see if any solutions are identified.
- If you do not find the same problem in the Known Problems list, point your browser to http://wwwnwis.er.usgs.gov/cgi-bin/gnats_home.pl
- Click on the appropriate category, QWDATA, GWSI, NWISWeb, etc. then use option 5- 'Keyword Search utility' to enter a word that is part of your problem (e.g., record number) and search for problem reports that contain that phrase. Enter your key words in the box under 'Text fields' or 'Multitext fields' and then search for reports that contain those words.
- If you review the list of reports that appear and find one that sounds like your 'bug', click on the problem report number and read the description. If the description is similar to your problem, read to see if any solutions are identified. If you have additional information that is not in the description please add your information by clicking the edit button at the top of the page. Find your name in the Editor list box and click on it. Then add your new information to the Response section.
- If you do not find any existing problem reports that match your 'bug', you will need to enter a new problem report. This is option 1 on the page you were moved to after choosing the appropriate category above. If you chose QWDATA you will be at http://wwwnwis.er.usgs.gov/cgi-bin/wwwgnats2.pl/NWISQW/1/1/
- Indicate the severity. Consider the extent to which your problem is hampering your work. A critical problem is one in which the programs stop working completely or data is incorrectly stored or displayed. A serious problem is one in which your workflow is seriously hampered. A non-critical problem is a question, an enhancement, or a problem that is annoying, but doesn't significantly affect your workflow.
- Indicate the class of the problem: support, software bug, documentation problem, or change request.
    - In the submitter ID and originator ID enter your email ID and(or) the email ID of others that

might want to know about the progress of a solution to your problem. As information is added to the report you will receive emails containing that information.

- For the synopsis, include enough of a description that someone would be able to determine the program that caused the problem or created the question or enhancement. Consider using 10 words or less.
- To determine the category, use the table below that lists the software program that is initiated by each menu option. If none of these categories seem appropriate, use water_quality. (Program names followed by an asterisk are not currently in the list of categories. For the qwtable programs, please use qwtable for qwtable 1-5. For all other program names followed by an asterisk, please use the water_quality category.)

QWDATA main menu option (option number)	Sub-menu option (option number)	Program name
Login Sample (1)	---	qwlogin
Modify Samples or Results (2)	Enter Field Results (1)	qwfield
	Enter Laboratory Results (2)	qwinput
	Edit Sample or Results (3)	qwedit
Data Review (3)	Select Sites or Samples (1)	qwsiterec
	Produce Inventory of Samples (2)	qwloglist
	List Samples and Results (3)	qwlist
	Sample list and/or Cation-Anion Balance (4)	qwbal
	Chemical Validation Checks (5)	qwvalid
Data Output (4)	Select Sites and Samples (1)	qwsiterec
	Select Sites and Samples from Multiple Data Bases (2)	qwmdb_loc
	Water-Quality Table by Sample (Publication Format) (3)	qwtable 1*
	Water-Quality Table by Result (4)	qwtable 2*
	Flat File by Sample (5)	qwtable 3*
	Flat File by Result (6)	qwtable 4*
	Make a P-STAT Data Set (7)	qwtable 5*
Graphs (5)	X,Y Plot (1)	qwplot
	Boxplots (2)	qwboxplot
	Stiff Diagrams (3)	qwstiff
	Piper Diagrams (4)	qwpiper
	Time Series Plots (5)	qwtplot
	Regression plots (6)	qwregress
	Summary statistics table (7)	qwprcntl
	Detection Limits Table (8)	qwdetlims
	Statistics Plots (9)	qwstatplot
Support Files (6)	List site records (1)	qwshowsite
	Check parameter code dictionary (2)	qwckpcd
	List parameter code dictionary (3)	qwpcdlist

QWDATA main menu option (option number)	Sub-menu option (option number)	Program name
	Check geologic unit code file (4)	qwckgeo
	Check Federal Information Processing Standards (FIPS) code (5)	qwckfips
	List state/county data (6)	qwckstcty
	Dump parameter code dictionary (7)	qwpcddump
	Display contents of algorithm file (8)	qwalgcon
Utilities (7)	Change data-base number (1)	mod.user_dbn_def*
	Add new site or modify site (2)	stnup
	Change site ID or delete site (3)	stnchange
	Count water quality records (4)	qwcount
	Set district processing status flag (5)	qwflag
	Set data quality indicator (DQI) code (6)	qwdqiflag*
	Inventory DQI codes (7)	qwckdqi*
	Produce drinking-water alert limit table (8)	qwalert
Batch Processing (8)	Retrieve National Water-Quality Laboratory Data (1)	qwgetlab
	Process batch file for all logged in samples (2)	qw_cardsin
	Process batch file for all samples (3)	qw_enter
	Process batch file for all logged in QA samples (4)	qa_cardsin
	Process batch file for all QA samples (5)	qa_enter
	Produce batch output (6)	qwbatchout*
	Review/Edit batch files (7) Review tab-delimited batch input files (1) Edit tab-delimited batch input files (2)	qwckbatch* qwlistbatch* qweditbatch*
	Produce 1- and *-card output	qwfixed
	Reload QW data from batch file, overriding DQI (9)	qw_cardsinxdqi*
	Reload QA data from batch file, overriding DQI (10)	qa_cardsinxdqi*

- To determine the entries for release and environment, type nwisenv at your unix prompt. Copy the information printed to the screen after Release: into the Release text box. Copy the remaining information printed to the screen into the Environment text box.
- In the description text box, enter a detailed description of your problem. This is your space to provide details to help NWIS personnel understand your problem. Please include results that illustrate the problem or how the problem is hampering your work. NWIS personnel will use this information to determine the severity of the problem as well as possible short-term and long-term solutions.
- In the How to Repeat text box, enter a step-by-step description you used to cause the problem to occur. You should include a list of the menu options used and a description of

the files you used, if applicable.

- As a last step, click on the Send the Report button. You should get a message back that you will receive an email containing the problem report number and some information that you entered.
- When additional information is added to the problem report, you will receive an email containing that information so that you know work is being completed on your problem.
- When the report is moved to the feedback position, NWIS personnel are expecting that you test out the same problem on the newest version of QWDATA to determine if the problem has been fixed.
- If it has been fixed, please close the report. Use option 2 after choosing the appropriate category and enter your problem report number at: http://wwwnwis.er.usgs.gov/cgi-bin/wwwgnats2.pl/NWISQW/1/1/ for the QWDATA category. Use the 'Click here to edit' button, find your name in the list of editors. If the problem has been fixed change the state from feedback to closed. If the problem has not been fixed, change the state to open. Enter a response in the Response text box to describe whether you have tested and closed the report or if you need to re-open explain why. After you have entered your response, click the 'Click here to submit the changes' button.

5.14 Tip Sheet: How do I make linear plots of my data?

This tip sheet describes the basic steps to make X,Y (linear) plots of data using a program available within QWDATA. If you would like to retrieve data from QWDATA and use a graphics program available outside of QWDATA, please refer to *TipSheet 5.7*. Links to sections in the documentation that contain details for certain topics are included. The user should refer to those sections for details that are not presented in this tip sheet.

- All graphics programs within QWDATA are available from option 5 – 'Graphs' in the main QWDATA menu. Details for all the options in this menu are available in *section 3.5* of the documentation. That option will display the following menu:

```
QW DATA PROCESSING ROUTINE   REV NWIS-4.3.2-20030527
YOU ARE USING WATER-QUALITY DATABASE NUMBER 01

      Graphs
 1 -- X,Y Plot
 2 -- Boxplots
 3 -- Stiff Diagrams
 4 -- Piper Diagrams
 5 -- Regression Plots
 6 -- Summary Statistics Table
 7 -- Detection Limits Table

 98 -- Exit menu

 99 -- Exit system
Please enter a number from the above list or a Unix command:
```

- Option 1 from the graphics menu creates an X,Y plot in three stages: ***(1)*** retrieves data from the QWDATA database that are written to an ASCII file, ***(2)*** uses data in the ASCII file to create the plot in a separate graphics (TKG2) window, and **(3)** from the TKG2 window, the plot can be printed or saved to a file.
  - The first query is a check of your Unix DISPLAY environment variable to check that it is set correctly. If you need help with this step, please contact you local system administrator. You are given the opportunity to stop the program at this point.
  - The next query is asking for a file of record numbers to identify what samples will be included in the plot. All graphical programs require an input file of record numbers to operate. The format of this file is one record number per line in columns 1-8 and can be generated through QWDATA (*see section 3.3.1*) or created with an editor. Examples of this input file are shown in *Appendix G*.
  - The next query asks for the name of the ASCII data output file. The program produces an output ASCII file that contains the data used in the plot; the file will be saved to the directory where you started QWDATA.

- The next query will give you the choice of the type of X,Y plot that will be produced. Three options exist for plotting the data: ***(1)*** 1-7 parameters by one parameter, ***(2)*** 1-7 parameters by sample date, and ***(3)*** Multiple stations by sample date for one parameter. All three options will handle data from multiple stations; however, only option ***(3)*** will identify the individual stations on the plot.
- Which type of plot you choose determines the next set of queries, but most queries are related to what parameters you want to include in the plot. Enter the parameter codes that you wish to include on the plot.
- After the program retrieves the data, a short set of summary information for the data retrieved is displayed to the screen for your review.
- The next prompt, List the Data?, allows you to display all the data to the screen. If you choose 'Y' then the data are displayed in a paired format. For example if option 1 was selected and parameter 00010 was chosen for the X-axis and parameters 00025, 00095, and 00915 were chosen for the Y-axis, the following data would be displayed:

```
P 00010  00025  00095  00915
 T plot title in columns 3-42 (optional)
 X Temperature, water
 Y   1 Air pressure           0 POINTS
 H    00010       00025       00010       00025       00010       00025
 Y   2 Specific cond at 25C   2 POINTS
 H    00010       00095       00010       00095       00010       00095
 * 0.1500E+01  0.1600E+03  0.1400E+02  0.1150E+03
 Y   3 Calcium, wf            3 POINTS
 H    00010       00915       00010       00915       00010       00915
 * 0.1500E+01  0.1900E+02  0.1400E+02  0.1500E+02  0.1500E+02  0.1300E+02
 END OF DATA
```

- The next queries allow you to customize the plot title and axes labels.
- Finally, you have the option of connecting the plot points with lines.
- A separate TKG2 window should appear on your screen. From that window you can select the output format by selecting the 'TKG2 Displayer' button to see your output options.

  The output options are printing the plot, saving the plot as a TKG2 or G2 file, or export the plot into a Framemaker Interchange Format (*mif), portable document format (pdf), bitmap (bmp), portable network graphics (png), or postscript (ps) file.

  Any TKG2 or G2 files that are made can be manipulated outside of QWDATA by using TKG2. All files that are produced will be available in your working directory.
- When your output option is completed, you should use the 'Exit' option from the TKG2 Displayer window and then return to the Unix screen. Enter <CR> in that window and you will be returned to the graphics menu.

5.15 Tip Sheet: How do I make boxplots of my data?

This tip sheet describes the basic steps to make boxplots of data using a program available within QWDATA. If you would like to retrieve data from QWDATA and use a graphics program available outside of QWDATA, please refer to *TipSheet 5.7*. Links to sections in the documentation that contain details for certain topics are included. The user should refer to those sections for details that are not presented in this tip sheet.

- All graphics programs within QWDATA are available from option 5 – 'Graphs' in the main QWDATA menu. Details for all the options in this menu are available in *section 3.5* of the documentation. That option will show the following menu:

```
             QW DATA PROCESSING ROUTINE   REV NWIS-4.3.2-20030527
  YOU ARE USING WATER-QUALITY DATABASE NUMBER 01

           Graphs

  1 -- X,Y Plot
  2 -- Boxplots
  3 -- Stiff Diagrams
  4 -- Piper Diagrams
  5 -- Regression Plots
  6 -- Summary Statistics Table
  7 -- Detection Limits Table

 98 -- Exit menu

 99 -- Exit system

Please enter a number from the above list or a Unix command:
```

- Option 2 from the graphics menu creates a boxplot in two stages: ***(1)*** retrieves data from the QWDATA database that are written to an ASCII file and ***(2)*** uses data in the ASCII file to create the plot in a separate graphics (S-Plus) window and write the output to a file.
  - You should check that your Unix DISPLAY environment variable is set correctly. If you need help with this step, please contact you local system administrator.
  - The first query is asking for the name of a file of record numbers to identify what samples will be included in the plot. All graphical programs require an input file of record numbers to operate. The format of this file is one record number per line in columns 1-8 and can be generated through QWDATA (see *section 3.3.1*) or created with an editor. Examples of this input file are shown in *Appendix G*.
  - The next query asks for the name of the ASCII data output file. The ASCII files produced from S-Plus programs will be saved to the directory where you started QWDATA . Any other files that are produced while using this program (for example, pdf or postscript) will be saved in a directory named NWIS_Swork that is created in your home directory.

- The next query will allow you to select the type of boxplot for output from the following three options:

```
-------------------------------------------
Data-retrieval options                 Code
-------------------------------------------
One station with one or more parameters   1
Multiple stations with one parameter      2
Multiple stations treated as one          3
-------------------------------------------
   Enter code for option, <cr> = 3       >
```

- Enter the desired parameter code(s) when prompted.
- After the data are retrieved, a table of summary information appears on the screen for your review:

```
RETRIEVING DATA ... RETRIEVAL COMPLETED

 RETRIEVAL OPTION 2: PARAMETER CODE 00915 FOR  1 STATIONS
 -----------------------------------------
 GROUPS RETRIEVED   1     MIN VALUE    13.000
 GROUPS WITH DATA   1     MAX VALUE    19.000
 -----------------------------------------

 SUMMARY OF VALUES BY GROUP:
 ------------------------------------------------------------------------------
 GROUP          NUM OF                  25TH                  75TH
 IDENTIFIER     VALUES    MINIMUM     PCTILE     MEDIAN     PCTILE    MAXIMUM
 ------------------------------------------------------------------------------
 05016000           3*     13.000     14.000     15.000     17.000     19.000
 ------------------------------------------------------------------------------

 LIST THE DATA?  Ans: y / n, <cr> = n >
```

- If any censored values are found in the retrieved data, the next query will ask the user if these values should be estimated and what method should be used. More information about the two different methods is available in: *Statistical Methods in Water Resources* by D.R. Helsel and R.M. Hirsch.
- The next prompt, 'List the Data?', allows you to display all the data to the screen.
- The next prompt, 'Plot the Data?', asks if you want to plot the retrieved data. If you answer 'y' then you will choose between a schematic and a truncated boxplot for output. Details about each of these plots are available in *section 3.5.2* of the user documentation.
- The next set of queries will allow you to customize the plot title and the axes labels.
- The next query will allow you to choose an S-Plus output option.

  The output options are printing the plot to a separate x-window or a Tektronix window; or save the plot as a pdf, HP Laserjet, encapsulated postscript (EPS), or a postscript file. For specific details on these output options, please refer to *section 3.5*. If option (1) is selected, a separate S-Plus window appears that includes the plot. To exit cleanly from this window, the user should include all responses in the Unix window, not in the S-Plus window.
- The next query will allow you to use a different output option for the same plot.
- If you select 'n' and hit <CR> you will be returned to the main graphics menu.