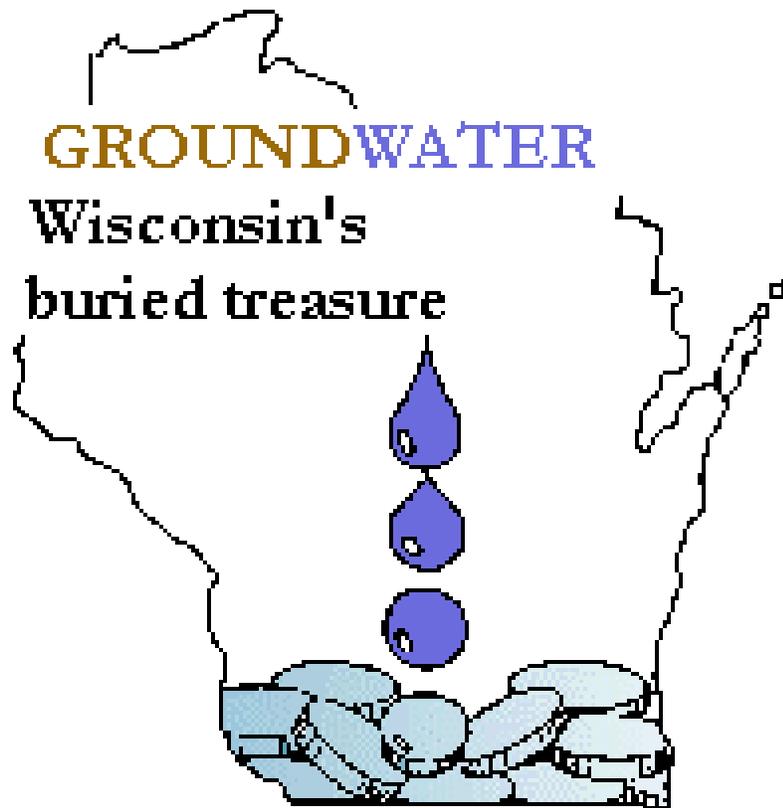


Recommended Minimum Elements For Groundwater Databases





State of Wisconsin \ GROUNDWATER COORDINATING COUNCIL

Scott McCallum, Governor

101 South Webster Street
Box 7921
Madison, Wisconsin 53707
FAX 608-267-7650
TDD 608-267-6897

June, 2002

To: The Citizens of Wisconsin
The Honorable Governor Scott McCallum
Senate Agriculture and Environmental Resources Committee
Assembly Environment Committee
Assembly Natural Resources Committee
Secretary Gene E. Kussart - Department of Transportation
Secretary Philip Edw. Albert - Department of Commerce
Secretary James E. Harsdorf - Department of Agriculture, Trade and Consumer
Protection
Secretary Phyllis Dubé - Department of Health and Family Services
Secretary Darrell Bazzell - Department of Natural Resources
President Katharine Lyall - University of Wisconsin System
State Geologist James Robertson - Geological and Natural History Survey

Susan L. Sylvester,
Council Chair
DNR

Carol Cutshall
DOT

James Robertson
WGNHS

Nicholas Neher
DATCP

Henry Anderson
DHFS

Cathy Cliff
COMMERCE

Frances Garb
UWS

John Metcalf
GOVERNOR'S REP.

The sharing and exchange of information is absolutely critical to the management of our groundwater resources. Vast amounts of groundwater data are generated each year in Wisconsin. Information exchange can often be difficult as a result of incompatible database formats. This document provides a listing of recommended minimum elements for groundwater databases. The use of these data elements will enable the user to share data with others more easily.

Other database standardization efforts have often focused on a broader range of database elements. This one is focused on what is seen as a minimum core. Our intent is not to limit data collection to a minimum amount of information. Our goal is to promote the standardization around a minimum core set of data elements, in an effort to promote data sharing and exchange.

We hope you, your staff, and the public will find this document a useful reference in protecting Wisconsin's valuable groundwater resource.

Sincerely,

Susan L. Sylvester, Chair
Groundwater Coordinating Council

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Introduction

This document is intended to provide a listing of "minimum data elements" that should be collected when collecting well and groundwater sample related information. The data elements listed below have been determined to be a minimum amount of necessary information to make well and sample collection useful to others in the future. All information available at the site, well, or sampling opportunity should be collected when available, with some consideration of time and costs involved in collecting additional data. Our intent is to provide a listing of data elements covering the minimum information that must be collected; not to provide an all-inclusive listing of what we would like to see collected. Use this information in developing a core set of elements for any sampling program or computerized database. For more information on these minimum data elements, contact Randell Clark at (608) 267-7895 or e-mail to clarkr@dnr.state.wi.us.

Two appendices have been included to provide the reader more information about other data standardization efforts undertaken in the past by the Environmental Protection Agency (EPA) and the United States Geological Survey (USGS). Appendix A provides a summary of EPA's 1992 work on minimum data requirements for wells and samples titled "Definitions For The Minimum Set Of Data Elements For Ground Water Quality." EPA publication # EPA 813/B-92-002. A very limited number of copies are available by calling the EPA's National Service Center for Environmental Publications at 800-490-9198.

Appendix B provides a summary of the 2001 data requirement developed for collection for chemical and biological contaminants titled "Data Elements for Reporting Water Quality Results of Chemical and Microbiological Analytes." Both documents have much more extensive requirements for data collection. Both documents should be reviewed and considered when developing a sampling program or database, for they represent input from a broad range of individuals and groups and a consensus agreement.

For the latest version of appendix B, please visit USGS's web site at:

<http://wi.water.usgs.gov/pmethods/elements/elements.html>.

Questions can be directed to Charlie Peters, *Chief Supervisory Hydrologist*, [capeters@usgs.gov] (608) 821-3810, at the USGS in Middleton, Wisconsin.

In the late 1980s and early 1990s, the Department of Natural Resources (DNR) worked extensively with internal and external agency staff to design their groundwater database system. DNR staff realized that in practice there was a need to design the database input mechanism around an absolute minimum of input requirements. Old historical data and newer projects had to meet a baseline of minimum data element requirements before being allowed in the new system, but too many requirements would exclude all previous work. At the same time EPA was also working on their list of minimum groundwater quality elements to provide a baseline of acceptable and useful data. The EPA's elements were addressed in the DNR's final database design, but some of these elements were too costly or required too much work collecting to be expected in every project.

As a result of DNR's work on minimum database elements in the early 1990s and more recently work by the Groundwater Coordinating Council's Monitoring and Data Management Subcommittee, the GCC is endorsing the DNR's minimum data requirements. The DNR has perhaps the largest consolidated collection of well and associated sample results in the state of Wisconsin. Promoting data sharing and exchange is the ultimate goal of these data standards.

DNR's MINIMUM DATA REQUIREMENTS:

The following is a listing of minimum data elements required for submission of groundwater data to the Wisconsin Department of Natural Resources. In cases where contractors are submitting data in accordance with the provisions of a contract, more precise locational information and other available data may be expected. The listing describes those data elements that must be provided for the data to be acceptable in computerized format, or must be supplied if data is being sent in ASCII text format. The DNR field name is included as a suggestion to promote statewide consistency.

The remainder of this document is organized into four sections covering well and locational, name and address, sample collection and sample results data. The well inventory elements cover mandatory information about the well and its location. Mandatory contact elements cover the information necessary to associate a person with the well, provide that person's relationship to the well and give a complete mailing address. Sample collection elements cover the minimum information necessary to identify the collected sample. Mandatory sample results elements provide the minimum fields necessary to provide a complete sample result.

Mandatory Well Inventory Elements

Wisconsin Unique Well Number

The Wisconsin Unique well number has been assigned to all drinking water supply wells on the well construction form, required to be filled out by the well driller, since 1988. It has been required on all monitoring wells since October, 1999. The Wisconsin unique well number also provides a unique database key for each well record. The format consists of a six (6) character

field. The first two characters are alphabetic and the next three are numeric, with the final character reserved for future use. (e.g. AB123) DNR field name: WI_UNIQUE_WELL_NO

Well Use Description or Use Code

This describes the type or use for the well (e.g. whether it's a public or private well.) The first character (M, O, N, and T), except for monitoring wells, indicates categories of Public Water Systems as defined under the Safe Drinking Water Act and state regulations. DNR uses a two (2) character field indicating the type of use for the well being inventoried. DNR field name: WELL_USE_CODE

- MC - Municipal community
- OC - Other Than Municipal Community (OTM)
- NN - Nontransient Noncommunity
- TN - Transient Noncommunity
- PR - Private Water Supply
- PX - Private Non-potable
- PZ - Piezometer
- MW - Monitoring Well (not a Water Supply Well)

County Name or County Code

The name or county code representing where the well is located. Wisconsin county code numbers range from 1 - 72 representing the 72 counties in Wisconsin. The 99 option is provided should data not fall within Wisconsin proper. DNR uses a two (2) digit numeric field. DNR field name: DNR_CNTY_CODE

- | | | | |
|-------------------|------------------|----------------|------------------|
| 1 - Adams | 19 - Florence | 37 - Marathon | 55 - Rusk |
| 2 - Ashland | 20 - Fond Du Lac | 38 - Marinette | 56 - St. Croix |
| 3 - Barron | 21 - Forest | 39 - Marquette | 57 - Sauk |
| 4 - Bayfield | 22 - Grant | 40 - Menominee | 58 - Sawyer |
| 5 - Brown | 23 - Green | 41 - Milwaukee | 59 - Shawano |
| 6 - Buffalo | 24 - Green Lake | 42 - Monroe | 60 - Sheboygan |
| 7 - Burnett | 25 - Iowa | 43 - Oconto | 61 - Taylor |
| 8 - Calumet | 26 - Iron | 44 - Oneida | 62 - Trempealeau |
| 9 - Chippewa | 27 - Jackson | 45 - Outagamie | 63 - Vernon |
| 10 - Clark | 28 - Jefferson | 46 - Ozaukee | 64 - Vilas |
| 11 - Columbia | 29 - Juneau | 47 - Pepin | 65 - Walworth |
| 12 - Crawford | 30 - Kenosha | 48 - Pierce | 66 - Washburn |
| 13 - Dane | 31 - Kewaunee | 49 - Polk | 67 - Washington |
| 14 - Dodge | 32 - La Crosse | 50 - Portage | 68 - Waukesha |
| 15 - Door | 33 - Lafayette | 51 - Price | 69 - Waupaca |
| 16 - Douglas | 34 - Langlade | 52 - Racine | 70 - Waushara |
| 17 - Dunn | 35 - Lincoln | 53 - Richland | 71 - Winnebago |
| 18 - Eau Claire | 36 - Manitowoc | 54 - Rock | 72 - Wood |
| Out of State - 99 | | | |

DNR will not accept any data that does not provide a public land survey (PLS) coordinate of Township, Range, Range Dir, and Section or a Latitude/Longitude coordinate of Latitude Degrees and Minutes and Longitude Degrees and Minutes. DNR staff, contractors and cooperators are required to provide more precise locational data than indicated below.

Public Land Survey Township

The public land survey township number where the well is located. Townships are in 53 bands running east and west across Wisconsin. Townships in Wisconsin are always measured North of the base line. DNR uses a two (2) digit numeric field. DNR field name: PLSS_TWN_ID

Public Land Survey Range

The public land survey range location of the well. Ranges run north and south of the Principal Meridian, numbered to 20 West in Polk and Burnett Counties and 30 East on the eastern half of Washington Island in Lake Michigan. DNR uses a two (2) digit number field. DNR field name: PLSS_RNG_ID

Public Land Survey Range Direction

Direction indicator for east or west of the Principal Meridian in Wisconsin. The Principal Meridian vertical line starts at the border of Grant and Lafayette counties at the Illinois border and extends north going through the Outer Apostle Islands in Lake Superior. DNR uses a one (1) character field with valid entries being E or W. DNR field name: PLSS_RNG_DIR_CODE

Public Land Survey Section

The public land survey section. Each section represents approximately 1 square mile. Valid numbers range from 1 - 36. DNR uses a two (2) digit numeric number for the section location of the well. Sections are roughly one mile square. Thirty six sections make up one township. DNR field name: PLSS_SCTN_ID

OR

Latitude Degrees

Latitude degrees for the well location. Latitude lines are east-west circular divisions of the earth's surface, measured from the Equator North or South. Wisconsin lies between 42 degrees and 47 degrees North Latitude of the Equator. DNR uses a two (2) digit numeric number. DNR field name: LL_LAT_DEG_AMT

Latitude Minutes

Latitude minutes for the well location. Latitude minutes are 60 equal subdivisions of degrees. The range of values is from 0 to 59. DNR uses a two (2) digit numeric number. DNR field name: LL_LAT_MIN_AMT

Longitude Degrees

Longitude degrees for the well location. Longitude lines are north-south circular divisions of the earth’s surface, measured East or West of the Prime Meridian through Greenwich, England. Wisconsin lies between 86 and 93 degrees West of the Prime Meridian. DNR uses a two (2) digit numeric number. DNR field name: LL_LONG_DEG_AMT

Longitude Minutes

Longitude minutes for the well location. Longitude minutes are 60 equal subdivisions of degrees. The range of values is from 0 to 59. DNR uses a two (2) digit numeric number. DNR field name: LL_LONG_MIN_AMT

Mandatory Contact Elements

Wisconsin Unique Well Number

The format consists of a six (6) character field. The first two characters are alphabetic and the next three are numeric, with the final character reserved for future use. (e.g. AB123) DNR field name: WI_UNIQUE_WELL_NO

Contact Relationship or Type Code

Indicates the relationship to the well information collected by a code identifying the type of relationship the contact name has to the well. DNR uses a two (2) character digit. DNR field name: CONTACT_TYPE_CODE

- | | | | |
|---------------|-----------------|-------------------|-----------------|
| 01 – Owner | 02 - Operator | 03 - Occupant | 04 - Consultant |
| 05 – Manager | 06 - Contractor | 07 - Well Driller | 08 - Business |
| 09 – Facility | 10 - Sampler | 99 - Other | |

Contact Last Name

Last name for the contact to the well or sample. DNR uses twenty (20) characters. DNR field name: CONTACT_LAST_NAME

Contact Street Address or PO Box

Street address or post office box number for the contact. DNR uses thirty (30) characters. DNR field name: CONTACT_STREET_ADDRESS

Contact City Name

City or municipality name for the contact. DNR uses twenty (20) characters. DNR field name: CONTACT_CITY_NAME

Contact State Name or Code

State name or state code for the contact. DNR uses two (2) characters for the state code. DNR field name: CONTACT_STATE_CODE

Mandatory Sample Collection Elements

Wisconsin Unique Well Number

The format consists of a six (6) character field. The first two characters are alphabetic and the next three are numeric, with the final character reserved for future use. (e.g. AB123) DNR field name: WI_UNIQUE_WELL_NO

Sample ID Number

The identification number assigned by the lab to a sample for unique identification. DNR uses a nine (9) character field. DNR field name: SAMPLE_ID

Sample Collection Date

Date on which the well sample was collected using the format - month/day/year (mm/dd/yyyy). DNR field name: SAMPLE_DATE

Laboratory Name or ID Number

The name of the laboratory or an ID number assigned by the DNR Lab Certification Program to laboratories that are certified for various test method and/or parameter analysis. DNR uses nine (9) characters for the lab ID. DNR field name: LAB_ID

Mandatory Sample Result Elements

Wisconsin Unique Well Number

The format consists of a six (6) character field. The first two characters are alphabetic and the next three are numeric, with the final character reserved for future use. (e.g. AB123) DNR field name: WI_UNIQUE_WELL_NO

Sample ID Number

The identification number assigned by the lab to a sample for unique identification. DNR uses a nine (9) character field. DNR field name: SAMPLE_ID

Sample Collection Date

Date on which the well sample was collected using the format - month/day/year (mm/dd/yyyy). DNR field name: SAMPLE_DATE

Sample Parameter Analysis

A code which uniquely identifies which compound or element was tested in the analysis. DNR uses the Chemical Abstracts Service (CAS) number. CAS Registry Numbers (often referred to as CAS RNs or CAS Numbers) are unique identifiers for chemical substances. A registry number itself has no inherent chemical significance but provides an unambiguous way to identify a chemical substance or molecular structure when there are many possible systematic, generic, proprietary, or trivial names.

DNR uses a twelve (12) character field for CAS number codes that can contain up to 9 digits, divided by hyphens into 3 parts. DNR field name: CAS_NO.

The CAS numbers can be found using the Chemical Abstract Service's Registry Handbook or on the Chemfinder website at <http://chemfinder.cambridgesoft.com/>.

Result Amount or Value

The numeric result of the sample if the sample was tested for a substance regardless of whether or not the substance was detected or quantified. DNR does not report a value if the result is zero or a non-detect. The field is left blank. DNR field name: RESULT_AMT

Result Units

The field represents units of measurement for the sample result (e.g. mg/l, ug/l, and ppb). This field is also mandatory for non-detects. The units are necessary for the reporting of limits of detection and quantification or reporting limit. DNR uses a ten (10) character field. DNR field name: RESULT_UNITS_TEXT

Note: If the sample result is 0.00 or a non-detect, the Limit of Detection (LOD) and Limit of Quantitation (LOQ) fields **OR** Reporting Limit field is mandatory. One of the two combination of fields is mandatory only if the result is zero, otherwise reporting these fields is optional for a normal result.

If the sample result is reported between the LOD and LOQ, then values must be reported for both the LOD and LOQ.

Limit of Detection

The lowest concentration level that can be determined to be significantly different from a blank. DNR uses an eight (8) character field. DNR field name: LIMIT_OF_DETECTION

Limit of Quantitation

The level above which quantitative results may be obtained with a specified degree of confidence. DNR uses an eight (8) character field. DNR field name: LIMIT_OF_QUANTITATION.

OR

Reporting Limit

The level above which quantitative results may be obtained; based on subjective review by the laboratory (analyst or management) of the analytical test method performance. DNR uses an eight (8) character field. DNR field name: REPORTING_LIMIT

Appendix A

EPA Minimum Data Set For Groundwater Quality

DEFINITIONS: Definitions for the data elements in the minimum set of data elements (MSDE) were developed by a work group of Federal and State representatives. The Office of Ground Water and Drinking Water, Ground Water Protection Division (GWPD) coordinated this effort. Section 7 contains the citation of the final report and information on where it can be obtained. The document contains the elements' definitions, discussion on element use, examples of data formats, and implementation information. The definitions for the 21 data elements are:

1. Data Sources. The names of the organizations to which questions regarding the following data should be directed: (1) latitude and longitude coordinates, (2) altitude coordinate, (3) well log information, (4) sample collection and (5) laboratory sample analyses.
2. Latitude. A coordinate representation that indicates a location on the surface of the earth using the earth's equator as the latitudinal origin, reported in degrees, minutes, seconds, and fractions of a second in decimal format (if fractions of a second are available). A "+" (plus) symbol represents latitudes north of the equator. A "-" (minus) symbol represents latitudes south of the equator.
3. Longitude. A coordinate representation that indicates a location on the surface of the earth using the prime meridian (Greenwich, England) as the longitudinal origin, reported in degrees, minutes, seconds, and fractions of a second in decimal format (if fractions of a second are available). A "+" (plus) symbol represents longitudes east of the prime meridian. A "-" (minus) symbol represents longitudes west of the prime meridian.
4. Method Used To Determine Latitude and Longitude. The procedure used to determine the latitude and longitude coordinates (Technology of Method Used), the standard used for three dimensional and horizontal positioning (Reference Datum), and the date on which the coordinates were determined (Latitude/Longitude Date).
5. Description of Entity. A textual description of the entity to which the latitude and longitude coordinate refers.
6. Accuracy of Latitude and Longitude Measurement. The quantitative measurement of the amount of deviation from true value present in a measurement (estimate of error). It describes the correctness of a measurement.
7. Altitude. The vertical distance from the National Reference Datum for Altitude to the land surface or other measuring point in feet or meters. If the measuring point is above the National Reference Datum for Altitude a "+" (plus) sign shall precede the reported altitude value. If the measuring point is below the National Reference Datum for Altitude a "-" (minus) sign shall precede the reported altitude value.

8. Method Used to Determine Altitude. The method used to determine the altitude value (Altitude Method), the National Reference Datum, on which the altitude measurement is based (National Reference Datum for Altitude), and the date the measurement was taken (Altitude Date).
9. State FIPS Code. A Federal Information Processing Standard (FIPS) alphabetic or numeric code to indicate the location of the state (or its equivalent such as territory or province) in which the well is located.
10. County FIPS Code. A Federal Information Processing Standard (FIPS) numeric code to indicate the location of the county (or county equivalent) in which a well is located.
11. Well Identifier. A unique well identifier assigned by the responsible organization.
12. Well Use. The principal current use of the well or, if the well is not currently in use, the original or principal purpose for its construction.
13. Type of Log. The type of record-keeping log(s) available for a well.
14. Depth of Well at Completion. The depth of the completed well below the land surface or other measuring point, in feet or meters.
15. Screened/Open Interval. The depth below the measuring point to the top and bottom of the open section in a well reported as an interval in feet or meters. The open section may be a well screen, perforated casing or open hole.
16. Sample Identifier. A unique number for each water quality sample collected at a well (Sample Control Number) which references the date (Sample Date), the depth at which each sample is taken reported in feet or meters (Sample Depth) and the time the sample is taken (Sample Time).
17. Depth To Water. The vertical distance between the measuring point and the water surface level at a well, corrected to land surface, where the measuring point is not the land surface. This distance should be reported in feet or meters (Measurement Depth), along with the date and time the measurement was taken (Measurement Date/Time).
18. Constituent or Parameter Measured. Measurement of a physical, chemical, or biological component. The physical, chemical, or biological component is referred to as a constituent or parameter.
19. Concentration/Value. The analytical results value, the units of measure used (Analytical Concentration/Value), and the analytical method applied (Analytical Method) to samples collected.

20. Analytical Results Qualifier. Qualifying information that will assist in the interpretation of the concentration/value, such as whether the value is below the detectable limit or if the constituents (or parameters) of interest are present but cannot be quantified.

21. Quality Assurance Indicator. The quality assurance of the field protocol plan and laboratory quality assurance/quality control (QA/QC) procedures.

Appendix B

Data Elements for Reporting Water Quality Results of Chemical and Microbiological Analytes

This version of the file, Final WQDE 2001/06/22, **last revised 2001/10/24**, shows the changes recommended and accepted by the National Water Quality Monitoring Council on June 06, 2001, based on its WQDE modification policy

1.0 Contact	
1.1 Sources of Data (Alternate Names: Data Owner, Data Source, Sampling Entity, Laboratory Name and Address)	This element identifies the primary sources or providers of data to the system, whether within or outside the agency, including: name, address, telephone number including area code and e-mail address of the agency to direct questions about the sample analytical results.
1.1.1 Organization Formal Name	The legal, formal name of an organization that is the primary source of data.
1.1.2 Mailing Address	The exact address where a mail piece is intended to be delivered, including urban-style street address, rural route, and PO Box.
1.1.3 Mailing Address City Name	The name of the city, town, or village where the mail is delivered.
1.1.4 Mailing Address State Name	The name of the state where mail is delivered.
1.1.5 Mailing Address ZIP Code/ International Postal Code	The combination of the 5-digit Zone Improvement Plan (ZIP) code and the four-digit extension code (if available) that represents the geographic segment that is a subunit of the ZIP code, assigned by the U.S. Postal Service to a geographic location to facilitate mail delivery; or the postal zone specific to the country, other than the U.S., where the mail is delivered.
1.1.6 Telephone Number	The telephone number including area code of the person who is the point of contact for an establishment.
1.1.7 Electronic Mail Address Text	The text that describes an electronic mail address of a person located at an establishment.
1.2 Sampling Entity/Person	Name, address, telephone number including area code and e-mail address of the organization or person to direct questions about the sample collection.
1.2.1 Sampling Entity/Person Formal Name	The legal, formal name of an organization that is the sampling entity.
1.2.2 Mailing Address	The exact address where a mail piece is intended to be delivered, including urban-style street address, rural route, and PO Box.
1.2.3 Mailing Address City Name	The name of the city, town, or village where the mail is delivered.
1.2.4 Mailing Address State Name	The name of the state where mail is delivered.

1.2.5 Mailing Address ZIP Code/ International Postal Code	The combination of the 5-digit Zone Improvement Plan (ZIP) code and the four-digit extension code (if available) that represents the geographic segment that is a subunit of the ZIP code, assigned by the U.S. Postal Service to a geographic location to facilitate mail delivery; or the postal zone specific to the country, other than the U.S., where the mail is delivered.
1.2.6 Telephone Number	The telephone number including area code of the person who is the point of contact for an establishment.
1.2.7 Electronic Mail Address Text	The text that describes an electronic mail address of a person located at an establishment.
1.3 Laboratory/Field (Alternate Names: Laboratory Name and Address)	Name, address, telephone number including area code and e-mail address of the organization to direct questions about the laboratory analysis. Field denotes measurements conducted in the field.
1.3.1 Laboratory Formal Name	The formal title of the laboratory facility.
1.3.2 Mailing Address	The exact address where a mail piece is intended to be delivered, including urban-style street address, rural route, and PO Box.
1.3.3 Mailing Address City Name	The name of the city, town, or village where the mail is delivered.
1.3.4 Mailing Address State Name	The name of the state where mail is delivered.
1.3.5 Mailing Address ZIP Code/ International Postal Code	The combination of the 5-digit Zone Improvement Plan (ZIP) code and the four-digit extension code (if available) that represents the geographic segment that is a subunit of the ZIP code, assigned by the U.S. Postal Service to a geographic location to facilitate mail delivery; or the postal zone specific to the country, other than the U.S., where the mail is delivered.
1.3.6 Telephone Number	The telephone number including area code of the person who is the point of contact for an establishment.
1.3.7 Electronic Mail Address Text	The text that describes an electronic mail address of a person located at an establishment.

2.0 Results	
2.1 Result Value	Reportable numerical measure of the result for the chemical or microbiological analyte, or other characteristic, being analyzed.
2.1.1 Result Value Unit of Measure Name	The name of the determinate quantity for a standard of measurement used for measuring dimension, capacity, or amount of something (e.g., µg/L, pCi/L, CFU/mL, etc.).

<p>2.2 Analyte Name</p> <p>(Alternate Names: Analyte, Analyte Name, Constituent, Contaminant, Parameter, Chemical, Taxon, Metric, Index)</p>	<p>The name assigned to a substance or feature that describes it in terms of its molecular composition, taxonomic nomenclature or other characteristic.</p> <p>This field is optional if the analyte is adequately described in one of the following subelements.</p>
<p>2.2.1 Chemical Identifier/Number</p> <p>(Chemicals only)</p> <p>(Alternate Names: EPA Preferred Number, Constituent Identification Number; Contaminant; Chemical)</p>	<p>Chemical Identifier/Number is the unique number assigned to all chemical substances in the Chemical Abstract Service's (CAS) Registry or, in the EPA Chemical Registry System, to chemical groupings for which CAS Registry Numbers do not exist and cannot be assigned.</p>
<p>2.2.2 Biological Identification Number</p> <p>(Alternate Names: ITIS Taxonomic Serial Number, ICTVGB Taxon Identifier, EPA Biological Registry System Number)</p>	<p>The unique identification number assigned by either the Integrated Taxonomic Information System, (ITIS) the International Committee on Taxonomy of Viruses, or the EPA Biological Registry System .</p>
<p>2.2.2.1 Biological Systematic Context Name</p> <p>(Alternate Names: Biological Context Name, Biological Group Context Name)</p>	<p>The name of the classification system used to assign a systematic name to a biological entity.</p>

<p>3.0 Reason for Sampling</p>	
<p>3.1 Reason for Sample Collection</p> <p><i>See also 6.1 Sample Type</i></p>	<p>A text field to include such reasons as:</p> <ul style="list-style-type: none"> (a) Reconnaissance/Occurrence Survey (b) Trend analysis (c) Permit Compliance (d) Pollution Event (e) Storm Event (f) Research (g) Regulatory benchmark (h) Bioaccumulation (i) Deposition (j) Other entries as applicable

<p>4.0 Date/Time</p>	
<p>4.1 Sample Collection Start Date</p> <p>(Alternate Names: Date; Sample Collection Date; Sampling Date; Year, Month and Day)</p>	<p>The calendar date when collection of the analyte was started, reported as 4-digit year, 2-digit month, and 2-digit day in YYYYMMDD format.</p>
<p>4.2 Sample Collection Start Time Measure</p> <p>(Alternate Names: Time; Sample Collection Time; Collected; Collected End; Hour and Minute; Hour, Minute and Second)</p>	<p>The measure of clock time and time zone when collection of the analyte was begun, reported as a 24-hour day with 2-digit hour, 2-digit minute, and 2-digit second.</p>
<p>4.3 Sample Collection End Date</p> <p>(Alternate Names: Date; Sample Collection Date; Sampling Date; Year, Month and Day)</p>	<p>The calendar date when collection of the analyte was finished, reported as 4-digit year, 2-digit month, and 2-digit day in YYYYMMDD format.</p>
<p>4.4 Sample Collection End Time Measure</p> <p>(Alternate Names: Sample Collection Time; Collected; Collected End; Hour and Minute; Hour, Minute and Second)</p>	<p>The measure of clock time and time zone when collection of the analyte was finished, reported as a 24-hour day with 2-digit hour, 2-digit minute, and 2-digit second.</p>

5.0 Location	
5.1 Water Body/Aquifer Name (Alternate Name: Receiving Water Name)	Name of the lake, stream, river, estuary, aquifer, reach name in the National Hydrography Dataset or other water feature related to the physical site.
5.2 Sample Station Identifier (Alternate Names: Sampling Station/Facility Identification Number; Site Number, Well Identifier)	The name or number that uniquely identifies the sample station.
5.3 Sampling Station Type Name (Alternate Names: Facility Type; Site Type)	<p>The descriptive name for a type of sampling station. The valid sampling facility choices are:</p> <ul style="list-style-type: none"> (a) Ambient <ul style="list-style-type: none"> (i) River/Stream (ii) Canal <ul style="list-style-type: none"> Drainage Irrigation Transport (iii) Lake (iv) Wetland <ul style="list-style-type: none"> Estuarine, emergent Estuarine, forested Estuarine, scrub-shrub Lacustrine, emergent Palustrine, emergent Palustrine, forested Palustrine, moss-lichen Palustrine, shrub-scrub Riverine, emergent Constructed (v) Reservoir (v) Riverine Impoundment (vi) Estuary (vii) Tidal Fresh (viii) Tidal Brackish (ix) Ocean (x) Great Lake (xi) Well (xii) Subsurface unsaturated/vadose zone (xiii) Spring (b) Water Supply/Source Influent <ul style="list-style-type: none"> (i) Raw/untreated water (drinking/com/ind) (ii) Finished/treated water for drinking <ul style="list-style-type: none"> (A) From treatment system (B) Entry Point to the distribution system after treatment (C) Within the distribution system (D) End of the distribution system with longest residence time (E) Point in distribution system with lowest disinfection residual (F) Household/drinking water tap (iii) Unknown (comment field) (c) Within treatment process (comment field) (d) Wastewater/Effluent <ul style="list-style-type: none"> (i) End of pipe (ii) Within mixing zone (iii) Downstream from mixing zone (iv) Upstream from mixing zone (e) Storm Sewer (f) Combined Sewer (g) Land Runoff

<p>5.3 Sampling Station Type Name (continued) (Alternate Names: Facility Type; Site Type)</p>	<p>(h) Mine/Mine Drainage (i) Landfill (j) Waste Pit (k) Other entries as applicable</p>
<p>5.4 Latitude Measure (Alternate Names: Latitude; Latitude of Sampling Station)</p>	<p>The measure of the angular distance on a meridian north or south of the equator in degrees, and decimal degrees.</p>
<p>5.5 Longitude Measure (Alternate Names: Longitude; Longitude of Sampling Station)</p>	<p>The measure of the angular distance on a meridian east or west of the prime meridian in degrees, and decimal degrees.</p>
<p>5.6 Latitude/Longitude Accuracy</p>	
<p>5.6.1 Horizontal Accuracy Measure</p>	<p>The measure of the accuracy (in meters) of the latitude and longitude coordinates.</p>
<p>5.6.2 Source Map Scale Number</p>	<p>The number that represents the proportional distance on the ground for one unit of measure on the map or photo.</p>
<p>5.6.3 Coordinate Data Source Name</p>	<p>The name of the party responsible for providing the latitude and longitude coordinates.</p>
<p>5.7 Latitude/Longitude Method</p>	
<p>5.7.1 Horizontal Collection Method</p>	<p>The method used to determine the latitude and longitude coordinates for a point on the earth.</p>
<p>5.7.2 Horizontal Reference Datum</p>	<p>The code that represents the reference datum used in determining latitude and longitude coordinates. Can include the NAD27 North American Datum of 1927, the NAD83 North American Datum of 1983, the World Geodetic System of 1984, or other entries as applicable</p>
<p>5.7.3 Reference Point (Alternate Names: Sample Point Identifier)</p>	<p>The place for which geographic coordinates were established. Entries may include:</p> <ul style="list-style-type: none"> - Facility/Station Building Entrance or Street Address - Facility Center/Centroid - Boundary Point - Intake Point - Treatment/Storage Point - Release Point - Monitoring Point - Other entries as applicable
<p>5.8 Altitude of the Sampling Station</p>	
<p>5.8.1 Vertical Measure (Alternate Name: Elevation, Altitude)</p>	<p>The measure of elevation above or the depth below a reference datum.</p>
<p>5.8.1.1 Vertical Collection Method</p>	<p>The method used to establish the elevation or depth of the sampling site</p>
<p>5.8.1.2 Vertical Reference Datum</p>	<p>The reference datum used to determine the vertical measure</p>
<p>5.8.1.3 Vertical Measure Unit of Measure</p>	<p>The unit for expressing the vertical measure</p>

5.9 Altitude of Sampling Station Features	
5.9.1 Water Level (Alternate Names: Depth to Water)	(a) Surface Water: (i) Quantitative measurement of water level: The level of the water surface at the sampling point. (ii) Qualitative measurement of water level: (A) Tidal (1) High (2) Low (B) Stream Stage (1) Flood (over bank) (2) High (3) Medium (4) Low (b) Ground Water: The vertical distance from the land surface to the water surface level in a well
5.9.1.1 Water Level Unit of Measure	The unit for measuring the water level, where applicable.
5.9.2 Bottom Depth Measure (Surface Water)	The measure of the distance from the water surface to the channel or lake bottom.
5.9.3 Depth at Completion Measure (Ground Water)	The measure indicating the total depth of the well upon completion of construction.
5.9.3.1 Bottom Depth/Depth at Completion Unit of Measure	The unit for measuring the distance from the surface to the bottom..
5.9.4 Depth to Top of Well Open Interval (Alternate Name: Depth to Top)	The depth to the top of the open interval. Openings are permeable portions of the well casings or lining. Openings may be protected with screens, fractured rock, or other devices/materials.
5.9.4.1 Depth to Top of Well Open Interval Unit of Measure	The unit for measuring the distance down to the top of the open interval
5.10 Altitude of Sample (Alternate Names: Sample Collection Water Depth)	The numerical measure of the vertical location of sample collection.
5.10.1 Sample Depth/Altitude Units Text (Alternate Names: Sample Collection Water Depth Unit of Measure)	The text that describes the units for sample Depth/Altitude.
5.11 Water Discharge Rate Value (Alternate Names: Flow, yield)	The numerical value of the discharge rate of the water being sampled
5.11.1 Water Discharge Rate Unit of Measure	The text that describes the units for the discharge rate of the water being sampled
6.0 Sample Collection	

<p>6.1 Sample Type (Alternate Names: Quality Control Sample Type)</p>	<p>The type of sample being described. Permitted values include: (1) Field Measurement/Observation (a) Routine Measurement/ Observation (b) Replicate Measurement/Observation (2) Sample (a) Routine Sample (b) Field Blank (c) Field Replicate (d) Depletion Replicate (d) Integrated Time Series (d) Integrate Flow Proportioned (g) Integrate Horizontal Profile (h) Integrated Vertical Profile (i) Composite Without Parents (j) Positive Control (<i>Microbio.</i>) (k) Negative Control (<i>Microbio.</i>) (l) Other entries as applicable (3) Sample Created from Sample (No subtypes recommended) (4) Composite Sample with Parents (No subtypes recommended) (5) Quality Control Sample (a) Trip blank (b) Reagent Blank (c) Equipment Blank (d) Pre-preserved Blank (e) Post-preserved Blank (f) Field Spike (g) Field Blank (h) Reference Sample (i) Measurement Precision Sample (j) Other entries as applicable</p>
<p>6.2 Media Sampled (Alternate Names: Sample Medium Code, Water Source Type, Water Body Type)</p>	<p>The environmental media sampled at a site. The environmental material about which results are reported from either direct observation or collected samples. Includes water, sediment, precipitation and other entries as applicable.</p>
<p>6.3 Sample Temperature</p>	<p>Temperature of the sample when collected</p>
<p>6.3.1 Temperature Unit Measure</p>	<p>Fahrenheit, or Centigrade</p>
<p>6.4 Sample Identification (Alternate Names: Sample Number, Sample Identification Number)</p>	<p>The unique name, number, or code assigned to identify the sample.</p>
<p>6.5 Sample Collection Method</p>	<p>The method used to collect the sample: (a) Surface Water (i) Grab (ii) Pump (iii) Collection filter - positive charge (iv) Collection filter - negative charge (v) Insitu monitor (probe) (vi) Composite (A) Flow weighted (B) Proportional (C) Cross sectional (D) Integrated Depth (vii) Other entries as applicable (b) Ground Water (i) High flow submersible pump (specify water flow rate) (ii) Low flow submersible pump (specify water flow rate) (iii) Bladder pump (iv) Bailer (v) Other entries as applicable (c) Precipitation/Atmospheric (i) Grab (ii) Pump (iii) Collection filter - positive charge (iv) Collection filter - negative charge (v) Continuous (specify water flow rate) (vi) Other entries as applicable</p>
<p>6.6 Sample Preservation / Treatment</p>	

6.6.1 Container Type	Free text: Sample container type
6.6.2 Container Color	Free text: Sample container color
6.6.3 Container size	The container size used in sample collection
6.6.3.1 Container size unit of measure	The unit of measures used in specifying the container size
6.6.4 Sample collection filtering (Alternate Name: Sample Fraction)	Filtered, unfiltered, or the specific fraction
6.6.5 Chemical preservation method	The method used to preserve the sample in the field by the sampling entity. This entry is intended to include preservation techniques that are <u>NOT</u> specified as part of the <i>Analytical Method</i> , element 7.1: (a) Chemical added {1} Acidification {2} Antioxidant {3} Mercuric oxide {4} Other (comment field) (b) None (c) Other entries as applicable
6.6.6 Temperature preservation method	The method used to preserve the sample in the field by the sampling entity. This entry is intended to include preservation techniques that are <u>NOT</u> specified as part of the <i>Analytical Method</i> , element 7.1: Temperature Preservation Method. Suggested entries include: (a) Wet Ice (4 deg C) (b) Dry Ice (-78.5 deg C) (c) Cold Packs (4 deg C) (d) Refrigerated (4 deg C) (e) Frozen (0 deg C) (f) Frozen (-20 deg C) (g) Frozen (-50 deg C) (h) Freeze Dried (i) None (j) Other entries as applicable
6.10 Sample volume	The numerical value of the volume of the sample
6.10.1 Sample volume unit of measure	The unit of measures used in specifying the sample volume
6.11 Sample weight	The numerical value of the sample weight
6.11.1 Sample weight unit of measure	The unit of measures used in specifying the sample weight

7.0 Sample Analysis	
7.1 Extraction/Processing Date	The calendar date when an extract for a sample analysis was taken for sample analysis, reported as 4-digit year, 2-digit month, and 2-digit day.
7.2 Extraction Process Time	The measure of clock time and time zone when the extraction of the sample was completed, reported as a 24-hour day with 2-digit hour, 2-digit minute, and 2-digit second.
7.3 Analysis Date (Alternate Names: Date; Year, Month, and Day)	The calendar date when analysis of the analyte was finished, reported as 4-digit year, 2-digit month, and 2-digit day in YYYYMMDD format.

7.4 Analysis Time	The measure of clock time and time zone when analysis of the analyte was completed, reported as a 24-hour day with 2-digit hour, 2-digit minute, and 2-digit second.
7.5 Analytical Method Number (Alternate Names: Analytical Method, Method References)	The method number of the analytical method used, represented as a reference number: (a) EPA (Specify number) (b) ASTM (Specify number) (c) SM (Specify number) (d) Other methods as applicable
7.6 Sample Size <i>(Microbiologicals only)</i>	The size of the sample used for analysis
7.6.1 Sample Size Unit of Measure <i>(Microbiologicals only)</i>	The unit of measure of the size of the sample, measured in Liters or milliliters.
7.7 Serial Dilution <i>(Microbiologicals only)</i>	The serial dilution is expressed as a numerical factor representing the number of equal volumes of dilute added to the sample and to be applied to the same units as the "Analytical Result Unit of Measure"
7.8 Composite Sample	Composite samples for microorganisms are: (a) Time (i) Flow weighted (ii) Proportional (iii) Cross sectional (iv) Integrated Depth (b) Flow (i) Flow weighted (ii) Proportional (iii) Cross sectional (iv) Integrated Depth (c) Spatial (i) Flow weighted (ii) Proportional (iii) Cross sectional (iv) Integrated Depth (d) Other entries as applicable
7.9 Run Batch (Alternate Names: Sample Batch Identification Number; Batch Number)	A lab-defined identifier for a batch of analyses done on one instrument that make up a sequence of analyses during which the instrument is continuously in control.
7.10 (Spiking) Amount or Dose Added (Alternate Names: Spiking Concentration)	For Chemicals: The amount (weight or volume) or final concentration of an analyte that has been spiked into an aliquot at any time during the analysis process.
	For Microorganisms: The dose of method organisms/cells added to a sample to be analyzed for calculating analytical precision and accuracy where the value reported use the same unit of measure reported for Analytical Results.
7.10.1 Spiking Amount or Dose Added Unit of Measure	The name of the determinate quantity for a standard of measurement used for measuring dimension, capacity, or amount of something (e.g., µg/L, pCi/L, CFU/mL, etc.)
7.11 Analytical Precision (Alternate Names: Precision of Value)	A measure of the agreement among individual measurements of the same property in duplicate laboratory samples (duplicate laboratory spiked samples) under prescribed similar conditions to estimate variability in the measurement method or procedures. Precision is expressed as: (a) Standard Deviation (SD) $SD = \sqrt{\frac{\sum (x_i - \text{avg } x)^2}{n-1}}$ (b) % Relative Standard Deviation (RSD), $\% RSD = (SD / \text{mean concentration}) \times 100$, or (c) Relative Percent Difference (RPD), $RPD = \frac{ X_1 - X_2 }{\{(X_1 + X_2)/2\}} \times 100$

<p>7.12 Analytical Accuracy/Error</p> <p>(Alternate Names: Bias of Value; Analytical Accuracy Measure)</p>	<p>(a) Accuracy is a measure of confidence in a measurement and can be assessed by calculating:</p> <p>(i) % deviation % deviation = [(average x - true value) / true value] x 100; or</p> <p>(ii) % recovery (Rec)</p> <p>% Rec = [(amt. found in Spiked sample - amt. found in sample) / amt. in spiked sample] x 100</p> <p>Accuracy describes how close a result is to the true value measured through the use of spikes, surrogates, standards, or performance evaluation samples.</p> <p>(b) Error</p> <p>(i) Type I error (False positive) - a numerical value indicating the magnitude of Type I error</p> <p>(ii) Type II error (False Negative) - a numerical value indicating the magnitude of Type II error</p>
<p>7.13 Controls</p>	
<p>7.13.1 Positive Control</p> <p>(Microbiologicals only)</p>	<p>Identification of organisms used for determining accuracy: Genus and species</p>
<p>7.13.2 Positive Control Result</p> <p>(Microbiologicals only)</p>	<p>The analytical result of measuring the positive control: Presence or Absence</p>
<p>7.13.3 Negative Control</p> <p>(Microbiologicals only)</p>	<p>Identification of organisms used for determining accuracy: Genus and species</p>
<p>7.13.4 Negative Control Result</p> <p>(Microbiologicals only)</p>	<p>The analytical result of measuring the negative control: Presence or absence</p>
<p>7.14 Detection / Quantitation Level Measure</p> <p>(Alternate Names: Detection Limit; Detection Level)</p>	<p>The measure that describes the quantity of analyte below which the sample analysis equipment will not detect the analyte accurately.</p> <p>If the lowest numerical value that a laboratory can report reliably for a test result based on the laboratory's experience with the method and equipment is different than the Detection Limit Measure and set by Statute or Regulation, then it should be reported as the Regulatory Reporting Level.</p>
<p>7.14.1 Detection / Quantitation Level Unit of Measure Name</p>	<p>The name of the determinate quantity for a standard of measurement used for measuring dimension, capacity, or amount of something (e.g., µg/L, pCi/L, CFU/mL, etc.).</p>
<p>7.15 Detection / Quantitation Level Type</p> <p>(Alternate Names: Detection Limit Type)</p>	<p>The type of detection level used in the analysis of a chemical constituent:</p> <p>(a) Instrument detection level</p> <p>(b) Method detection level</p> <p>(c) Estimated detection level</p> <p>(d) Practical quantitation limit</p> <p>(e) Limit of detection</p> <p>(f) Long term method detection level</p> <p>(g) Regulatory reporting level</p> <p>. Drinking Water Maximum Contaminant Level</p> <p>. Water quality standard or criteria</p> <p>. Alternate concentration level</p> <p>(h) Other entries as applicable</p>

7.16 QA/QC Exception Flags	Flags should allow for: Analyzed past holding time - Dual quantification difference > 40% RPD - Estimated value, quantification doesn't meet SOP criteria - Duplicate injection precision not met. - Spike recovery outside of control limits - Spike out of calibration range
7.16.1 QA/QC Comment Field	Text noting other aspects of the quality assurance and control