AN INDEXING AND CLASSIFICATION SYSTEM FOR EARTH-SCIENCE DATA BASES

By James C. Schornick, Janet B. Pruitt, Helen E. Stranathan, and Albert C. Duncan

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ABSTRACT

An indexing and classification system for water and other earth-science data is defined for use in the U.S. Geological Survey's National Water Information System (NWIS), and other similar systems such as the U.S. Environmental Protection Agency (EPA) Water Quality Control Information System (STORET). All five-digit EPA parameter identification codes, which are used in both of these systems, have been classified into a three-level hierarchical system of categories called groupings. The first level in the hierarchy is called the Sample Medium level and includes 42 groupings that classify a parameter code according to the environmental matrix or phase from which the sample is collected. The second level in the hierarchy is called the General Physical/Chemical level and consists of 12 groupings that classify the codes according to whether they represent site characteristics, sample properties, major inorganic constituents, minor inorganic constituents, nutrients, radiochemicals, stable isotopes, industrial organic substances, agricultural organic substances, natural organic substances, biological taxa or biological properties. With minor exceptions, parameter codes assigned to a particular General Physical/Chemical Grouping can also be assigned to any one of the Sample Medium Groupings. The third level in the hierarchy is called the Specific Physical/Chemical level and consists of 436 more specific physical and chemical groupings. A parameter code assigned to a particular Specific Physical/Chemical Grouping is assigned to an appropriate General Physical/Chemical Grouping and Sample Medium Grouping, based on the information supplied in the parameter code description. Each parameter code has been assigned a three-part seven-digit integer indexing code that incorporates the three-level hierarchy.

INTRODUCTION

The U.S. Geological Survey, Water Resources Division, is redesigning its mainframe-based data-processing systems to run on its national network of minicomputers and microcomputers that were installed in all headquarters and field offices. The new system, called the National Water Information System (NWIS), will replace the currently segregated National Water Data Storage and Retrieval System (WATSTORE), National Water Data Exchange (NAWDEX), and the National Water-Use Information Program (NWUIP) with an integrated system of data bases and user-friendly interactive software managed by a state-of-the-art data-base-management system. The hydrologic functionality of the NWIS will reflect an extensive internal reevaluation program to define the water data-processing needs of the Survey.

A principal component of the NWIS is the Site Index Subsystem, which serves to identify the location of sites where hydrologic data are collected and to index the types and sampling frequency of the data collected at those sites. This report describes a data indexing system to supplement the site indexing capability of the system. The indexing and classification system defined in this report is suitable for all similar data bases

that identify stored constituents with a numerical parameter identification system (parameter codes), including the U.S. Environmental Protection Agency's Water Quality Control Information System (STORET) and data bases of agencies that participate in the Survey's NAWDEX Program.

Objective of the Indexing and Classification System

The objective of the Indexing and Classification System is to provide a means of indexing and classifying hydrologic and other earth science data that are identified in the Survey's and other Federal and state agency data bases by means of parameter identification codes similar to the parameter code system developed and used by the U.S. Environmental Protection Agency (EPA) Water Quality Control Information System (STORET).

Scope of the Indexing and Classification System

The scope of the Indexing and Classification System is to develop a data indexing scheme based on the implied structure and environmental information contained therein, of the STORET parameter code. The indexing will be accomplished by assigning to each parameter code an index code representing a hierarchical system of environmental, chemical, and physical categories.

Hydrologic data maintained by the Survey and other agencies are generally available to the public in either published or electronic form. Although the data may be available, the volume of data and the number of stations available in the various data bases is quite large and can impose a considerable burden on an individual in his/her attempts to specify and obtain the specific data needed. To meet this need, the Survey operates and maintains the NAWDEX Program for facilitating the exchange of water data between government and private agencies and for promoting the standardization of water data handling procedures. Prior to the NWIS, the NAWDEX program maintained the Master Water Data Index (MWDI) to aid requestors in obtaining the required data. This system provided a comprehensive indexing of the stations operated by the various agencies as well as a generalized system of data indexing. The old WATSTORE system did index its list of stations in its Header File, but WATSTORE did not have any capability to index the data. In addition, internally, Survey personnel did not use the NAWDEX system to any extent, and thus did not take advantage of its data indexing capability. The functional specifications for the NWIS called for a more comprehensive data indexing capability useful not only for NAWDEX, but for the NWIS as well.

THE INDEXING AND CLASSIFICATION SYSTEM

EPA parameter codes are used in the NWIS for storing the results of laboratory or field analyses on samples of water, sediment, biota, atmospheric deposition, and other types of environmental samples. Each parameter code and its associated description or definition identifies the constituent in question, some reference to the medium from which the sample was collected, the size of the filter used, the particle size, the reporting form of the constituent, for example, as $CaCO_3$, and the units of measurement. A given constituent may be represented by any number of parameter codes, but each code is distinct from the other codes for that same constituent by changes in the sampling medium, the phase of the sampling medium, the filter size, the reporting form, or the reporting units. If any component of the parameter code changes, a new parameter code is defined.

Related groups of parameter codes in the EPA parameter code system were originally intended to be assigned in sequential blocks of codes, but there have been so many exceptions to this rule that the parameter code system can not be considered as self-indexing. In addition, the code itself is not structured in any way. Although the parameter code number itself can not be used for indexing purposes, the actual or implied components of the parameter code description can form the basis of an indexing scheme.

The Sample Medium Component

Earth science agencies collect samples from a wide variety of environments: streams, lakes, sediment, ground water, atmospheric deposition, snow, waste effluents, soil, rocks, street debris, air, biological organisms, and so forth. These and other potential sampling sources represent unique subsystems of the environment from which data are required for the investigation of the various controlling processes that can be detrimentally affected by the activities of man. The sampling matrix usually is included in some form in the EPA parameter code description, and it commonly forms the basis of a data request. For this reason, the sampling matrix or a particular phase of a given matrix is defined as a principal component of the Index Classification System.

Forty-two matrix or matrix phase categories, called Sample Medium Groupings, are defined for the index. These groupings are presented in figure 1 and are defined in table 2 at the end of this report. The Sample Medium groupings include: site characteristics, sample properties, water, sediment, biota, atmospheric deposition, ice, fog, clouds, dew, air, gases, particulate matter, vapors, soil, rock, street debris, wastes, drilling fluids, and milk.

The water category includes six subcategories: filtered, unfiltered; interstitial; intragravel; brine; and water/bottom material mixture (elutriate samples). The filtered and unfiltered categories are for samples of water collected from the predominate water sources--streams, lakes, estuaries, oceans, and the saturated ground water zone. These distinctions are not usually made at the parameter code level, but rather at the sampling site descriptor level--for example, the Survey's NWIS Site Index File. Separate categories for filtered and unfiltered water are defined for indexing purposes because of the prevalence of both types in the parameter code list. Data requests, especially for surface-water stream samples commonly are based on distinctions between filtered and unfiltered samples.

Most of the parameter codes in the Water, Filtered category are for "dissolved" samples, which by definition means that the sample is passed through a 0.45-micrometer membrane filter. Parameter codes for "dissolved" samples do not usually specify the filter size in the parameter code description; however, samples filtered through other filter types and sizes must have the filter size specified in the parameter code description.

Filtered and unfiltered indexing categories are not defined for the other water categories even though parameter codes assigned to these categories can also specify filtered or unfiltered in the parameter code description. The number of codes in these categories is relatively small and most of the codes are for unfiltered samples.

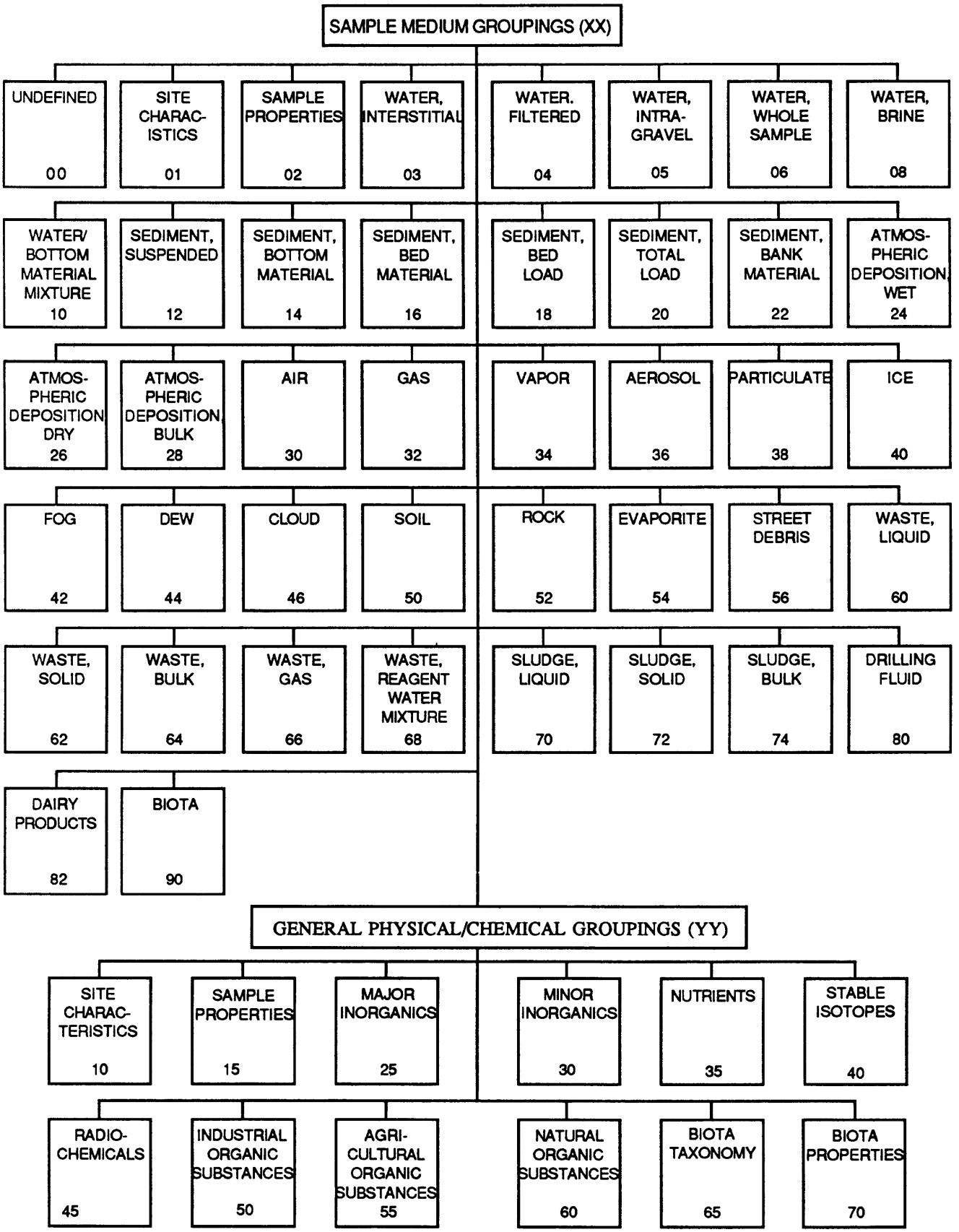

Figure 1. Diagram of Sample Medium Groupings and General Physical/Chemical Groupings in the Indexing and Classification System

Sediment is the solid material that originates mostly from the disintegration of rocks and is transported by, suspended in, or deposited from water; it includes chemical and biochemical precipitates and decomposed organic material, such as humus. The sediment category includes six submatrices: suspended, bottom material, bed material, bedload, total load, and bank material.

Atmospheric deposition includes all forms of solid and liquid materials that strike the earth from the atmosphere. Wet, dry, and bulk submatrices are defined. Bulk atmospheric deposition is a mixture of wet and dry deposition sampled without discrimination.

The wastes category consists of five submatrices: liquid, solid, bulk, gas, and waste/reagent water mixture. Sludge is a particular type of waste material and it also includes liquid, solid, and bulk submatrices.

Forty of the 42 Sample Medium Groupings identify specific matrices or matrix phases that constitute potential sample sources. Two of the other three groupings are for parameter codes that represent data elements that (1) describe the site or conditions around the site where a sample is collected (Site Characteristics), and (2) quantify or describe the physical or chemical properties of either the gross sample or a specific component of the sample (Sample Properties). The final category is for those parameter codes that for some reason either do not fit into one of the other categories or could not be indexed because of an incomplete parameter code description (Undefined).

The Site Characteristics Grouping and the Sample Properties Grouping are unique in that categories exist at both the Sample Medium level and at the next level in the indexing hierarchy--the General Physical/Chemical level. Functionally, the Site Characteristics category is more related to the Sample Medium level than the General Physical/Chemical level, whereas the Sample Properties category is functionally more related to the physical, chemical, and biological categories of the General Physical/Chemical level. In either case, there are parameter codes that, because of the information supplied (or not supplied) in the parameter code description, will be classified in the appropriate Site Characteristics Grouping or the Sample Properties Grouping at either or both the Sample Medium level or the General Physical/Chemical level. The rules governing these assignments are discussed below.

The special conventions that have been adopted for classifying codes in the Site Characteristics and Sample Properties groupings depend largely on the information supplied in the parameter code description. A parameter code that properly fits into either the Site Characteristics or the Sample Properties Grouping but specifically identifies one of the actual sample matrix categories in the parameter code description is classified in that sample matrix category at the Sample Medium level, but is then assigned to either the Site Characteristics or Sample Properties Grouping at the General Physical/Chemical level, as appropriate. Other codes that fall into either of these Groupings, but either do not relate specifically to the sampling process or the parameter code description does not specifically identify a sampling matrix or phase, are assigned to either the Site Characteristics or the Sample Properties Grouping at both the Sample Medium and the General Physical/Chemical levels.

Other parameter codes, which do not specify a specific Sample Medium and are also not appropriate for either the Site Characteristics or Sample

Properties groupings, are classified in the Undefined grouping at the Sample Medium level and the appropriate grouping at the General Physical/Chemical level. Any code that would be classified in the Undefined grouping at both the Sample Medium and General Physical/Chemical levels is not indexed. In fact, the Indexing Classification System does not include an Undefined grouping at the General Physical/Chemical level.

The General Physical/Chemical Component

The second level in the Indexing Classification System is the General Physical/Chemical level and consists of 12 categories. The General Physical/Chemical categories classify a parameter code according to whether it represents a site characteristic, a sample property, a general chemical category, a biological taxa, or a biological property. The General Physical/Chemical groupings are presented in figure 1 and are defined in table 3 at the end of this report. The General Physical/Chemical groupings are: Site Characteristics, Sample Properties, Minor Inorganic Constituents, Major Inorganic Constituents, Nutrients (nitrogen and phosphorus species), Stable Isotopes, Radiochemicals, Industrial Organic Substances, Agricultural Organic Substances, Natural Organic Substances, Biota Taxa, and Biota Properties.

Each General Physical/Chemical grouping can be associated with any of the Sample Medium groupings with the following exceptions: (1) no code classified in the Undefined grouping at the Sample Medium level can be classified in the Site Characteristics, Sample Properties, Biota Taxonomic, or Biota Properties groupings at the General Physical/Chemical level; (2) codes classified in the Site Characteristics or Sample Properties groupings at the Sample Medium level are classified only in their respective groupings at the General Physical/Chemical level; and (3) codes classified in the Biota, Taxonomic or Biota, Properties groupings at the General Physical/Chemical level can only be associated with the Biota Grouping at the Sample Medium level. Codes assigned to the Biota Sample Medium Grouping can be associated with any of the chemical categories as well as the Biota Taxa and Biota Properties Groupings at the General Physical/Chemical level.

The Specific Physical/Chemical Component

Data requests are often very specialized. The data indexing capability in the old NAWDEX MWDI and even the General Physical/Chemical categories proposed here for the NWIS Indexing Classification System are both too broad to adequately address this need. Therefore, a third level in the indexing hierarchy is defined. Specific Physical/Chemical Groupings are more specific subcategories of the General Physical/Chemical Groupings. For example, calcium would be a Specific Physical/Chemical category under the Major Inorganic General Physical/Chemical Grouping and alkalinity is a specific category under the Sample Properties General Physical/Chemical Grouping.

In general, a given Specific Physical/Chemical grouping is associated with only one General Physical/Chemical Grouping; however, there are many instances where a given Specific Physical/Chemical chemical category will have parameter codes that can be classified in any of several General Physical/Chemical Groupings, depending on the specifics of the parameter code description. For example, the Nitrogen Specific Physical/Chemical Grouping would include many parameter codes representing the nitrogen based nutrient species and would therefore be assigned to the Nutrients General

Physical/Chemical Grouping. However, there are also parameter codes in the Nitrogen category, for example Nitrogen-13 or other isotopic variations, which would be classified in the Stable Isotopes General Physical/Chemical Grouping. Many constituents with codes in the Minor Inorganic Constituents General Physical/Chemical Grouping would also have parameter codes classified in the Stable Isotopes and/or the Radiochemicals General Physical/Chemical Groupings.

There are 436 Specific Physical/Chemical Groupings defined for the Index. One category is for "Other", which is for those parameter codes that do not fit into any of the Specific Physical/Chemical groupings. Individual codes in the "Other" category are distinguished from each other by their classification in the appropriate Sample Medium and General Physical/Chemical Groupings.

Most of the Specific Physical/Chemical categories are self-explanatory and need not be discussed outside their simple listing in tables 10 through 21 at the end of this report. However, many categories classified in the Site Characteristics and Sample Characteristics General Physical/Chemical Groupings and all the categories in the three Organic Substances and the Biota, Properties Groupings require additional explanation of the criteria used to classify a code in a particular grouping. These explanations are given in tables 4 through 9 at the end of this report. The decision to assign a parameter code to a particular Specific Physical/Chemical grouping is, in some instances, judgmental, because the parameter code description may imply two or more appropriate Specific Physical/Chemical groupings. Indeed, more than one General Physical/Chemical category might even be implied. The policy adopted for the Indexing Classification System is to select the category that best reflects the primary purpose of the code.

Organic Substances

Organic substances have been divided into three General Physical/Chemical Groupings: Industrial (XX-50-ZZZ), Agricultural (XX-55-ZZZ), and Natural (XX-60-ZZZ). Some organic substances could be placed in two groupings or in all three groupings, but the indexing scheme requires that each substance be placed in just one grouping. The authors have attempted to classify such codes in the one most applicable grouping. For example, nicotine, which is an alkaloid occurring naturally in tobacco, is classified here as a naturally occurring organic substance (XX60190), but it is also used agriculturally as an insecticide. Camphor, a naturally occurring ketone found in the camphor tree is classified as a natural substance (XX60280), but it also used agriculturally as an insect repellent, and industrially as a plasticizer and as a preservative. Pentachlorophenol is used agriculturally as a preharvest defoliant and molluscicide and is also used industrially as a wood preservative. Its primary use, however, is agricultural and has been been classified as such (XX-55-230). Therefore, some Specific Physical/Chemical groupings may appear in more than one General Physical/Chemical grouping, and individual parameter codes classified in a given Specific Physical/Chemical Grouping in a General Physical/Chemical grouping are so classified according to the primary use of the substance. Each General Physical/Chemical Grouping defined below is followed by a description of each of the Specific Physical/Chemical Groupings. Examples are given for substances chosen for each grouping. The most applicable grouping for each substance was chosen based on the

primary use of the substance, its environmental significance, and (or) its method of isolation (natural or synthetic).

Biological Taxa

The classification of biological organisms may be accomplished in any number of ways. Indeed, many classification systems have been proposed, none of which is particularly dominant over the others. The purpose of a classification system is to organize the diversity of life forms in a way that provides a best estimate of nature's own organization of life.

The most common systems used today are phylogenetic classifications which attempt to reflect the best estimate of the evolutionary history of organisms (Wiley, 1981). These systems estimate changes in life forms over the 3 billion years or so that life has existed on earth. Very few lineages from fossil organisms to living ones have actually been traced, yet the truest classification is the one that best reflects the evidence for relationships by common ancestry.

The Linnean hierarchy, after Carolus Linneaus (1701-1778), is a scheme that tags sets and subsets of taxa with a rank that reflects relative complexity levels to other levels (Wiley, 1982). Linneaus based his system on visible structures of living organisms. Later, extinct organisms were added. In the 19th century, with new paleontology discoveries and Darwin's evolution theories, classification schemes became more phylogenetic (family trees). The 20th century has added the tools of biochemistry, embryology, and sophisticated microscopy to aid the development of taxonomic schemes. Taxonomy is always in a state of flux, as new discoveries and new species are recorded almost daily. Linneaus divided the world into two kingdoms: plant and animal. Taxonomists have been trying different schemes to optimize the kingdoms to more accurately represent the lower groups of organisms. Robert Whittaker (1959) of Cornell University developed the Five Kingdom system in the 1950's. This system has been adopted by most major biology textbook companies, which are usually the slowest medium to reflect changes. Jahn (1979) advocates a six kingdom system which creates a place for the viruses and mycoplasmas.

The scheme adopted to implement the Indexing and Classification System in the NWIS Site Index System is the Whittaker five kingdom system as modified by Margulis and Schwartz (1982). The five kingdoms used in this system are as follows:

1. Monera -- Procaryotic cells (Bacteria and Bluegreen Algae)
2. Protista -- Eucaryotic cells (Algae, Protozoa, Aquatic Fungi and Slime Molds)
3. Fungi -- Mushrooms, Molds, and Lichens
4. Plantae -- Plants (Mosses, Ferns, Cone-bearing, Flowering)
5. Animalia -- Animals (With and without backbones)

Most taxonomic schemes can be used and followed by using these guidelines.

1. All organisms are assigned a two-part name, Latin in form. The first part (Genus) is always capitalized; the second part (species) is not. Both are italicized--for example, *Homo sapiens*.

2 Groups of all sizes from species (smallest) on up are often called taxa (taxon-singular). These groups (taxa) or categories are systematically arranged based on characteristics common to the group. Usually, each of these taxa are assigned suffixes that identify the levels of classification as shown in table 1.

Different phylogeneticists may classify organisms differently and still be correct. It all depends on the criteria used to base the system. Many types of classification schemes are included in the present WATSTORE and STORET data bases. For this reason, the Indexing Classification System code assignments are generally on the phylum level. If the phyla was complex and the data entries warranted more divisions, they were added. Decisions were made based on the number of parameter codes that could be assigned to the subdivisions. The intent here is to make the data available and useful, not to rewrite the taxonomy schemes.

The five kingdom system was used in the Indexing Classification System for the following reasons:

1. Adoption by major textbook publishers will cause major shifts in taxonomy in this direction.

2. It is simple enough for lay personnel to understand and use.

3. It follows sound biological, ecological, and phylogenetic principles to satisfy most professionals.

4. The scheme chosen will, hopefully, be useful in retrieving data and also prevent a researcher from missing valuable data.

5. There is general agreement among botanists and zoologists on the classification of higher plants and animals. A large frontier of research still exists in the microbial world. There has been no opportunity to erect a complete classification system to satisfy bacteriologists, phycologists, protozoologists, and others. Margulis and Schwartz (1982) have introduced phyla levels for the Kingdom, Monera.

6. If additional categories within the five kingdom system are required at some future time, the Index and Classification System can be easily expanded to include them without affecting the existing configuration.

The Indexing and Classification Code

A seven-digit indexing code is defined that permits incorporation of the 3-level hierarchical structure of the Indexing Classification System outlined above. Additional categories can be added to any of the three hierarchical levels without affecting the overall structure; however, some codes may have to be reclassified if a newly added category is more appropriate for a given code than the category in which it was originally classified.

The Indexing Classification Code consists of three parts. The first two digits represent the Sample Medium Grouping and is designated by (XX) in the tables at the end of this report. The next two digits represent the General Physical/Chemical Grouping (YY) and the last three digits represent the Specific Physical/Chemical Grouping (ZZZ). The Indexing Code

Table 1.-- Common suffixs used in phylogenetic classification systems

Taxonomic Level	Endings**	Examples (man)	Examples (garlic)
KINGDOM	-A	Animalia	Plantae
PHYLUM (DIVISION)+	-A	Chorda	Angio-spermophyta
SUBPHYLUM*	-A	Vertebrata	
CLASS	-IA (EAE)	Mammilia	Monocotyledoneae
SUBCLASS	-IA		Eutheria
ORDER	-IDA (ALES)	Primates	Liliales
SUBORDER	-INA		
FAMILY	-IDAE (ACEAE)	Hominidae	Liliaceae
GENUS		Homo	Allium
SPECIES		sapiens	sativum

+-- Botanists use the term DIVISION instead of PHYLUM

*-- Any level may be expanded by the addition of the prefixes -sub and -super.

**-- Suffixs in ( ) are more commonly used by botanists.

structure can handle 100 Sample Medium groupings, 100 General Physical/Chemical groupings, and 1,000 Specific Physical/Chemical Groupings. Even though a given Specific Physical/Chemical Grouping can be represented in more than one General Physical/Chemical Grouping, it retains the same 3-digit Specific Physical/Chemical Grouping code. The distinction between the constituents, assuming the samples come from the same matrix, is, therefore, at the General Physical/Chemical level.

For programming purposes, the Sample Medium grouping is represented by a full 7-digit number, that is the two digits specifying the Sample Medium followed by five zeros. Similarly, the General Physical/Chemical grouping is based on a 5-digit number, that is the two digits specifying the General Physical/Chemical grouping followed by three zeros. Finally, the Specific Physical/Chemical grouping consists of 3 digits. These numbers are combined to derive the complete 7-digit index code.

Example: 0600000 + 40000 + 210 = 0640210
(Unfiltered water sample, stable isotopes, hydrogen)

DATA BASE AVAILABILITY

A data base containing the EPA STORET codes, the parameter code descriptions, the Survey's NWIS Site Index Indexing Classification System codes, and other ancillary information about the parameter code system has been created. Retrievals from this data base are available through the Office of Water Quality at the following address.

U.S. Geological Survey
Water Resources Division
Office of Water Quality
Mail Stop 412
12202 Sunrise Valley Drive
Reston, Virginia 22092
Phone 703-648-6862

SUMMARY

A system of indexing and classifying U.S. EPA STORET parameter codes used in the U.S. Geological Survey and other governmental agency data bases has been defined. The codes have been assigned a 7-digit code representing a 3-level hierarchical system of categories called groupings. The first level in the hierarchy is called the Sample Medium level and includes 42 groupings that classify a parameter code according to the environmental matrix or phase from which the sample is collected. The second level in the hierarchy classifies a code in one of 12 general physical or chemical groupings. These groupings include site characteristics, sample properties, major inorganic constituents, minor inorganic constituents, nutrients, radiochemicals, stable isotopes, industrial organic substances, agricultural organic substances, natural organic substances, biological taxa or biological properties. With minor exceptions, parameter codes assigned to a particular General Physical/Chemical Grouping can be assigned to any one of the Sample Medium Groupings. The third level in the hierarchy is called the Specific Physical/Chemical level and consists of 436 more specific physical or chemical groupings. A parameter code assigned to a particular Specific Physical/Chemical Grouping is assigned to an appropriate General Physical/Chemical Grouping and Sample Medium Grouping, depending on the information supplied in the parameter code description.

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Table 2.-- Codes and descriptions for Sample Medium Groupings.

[Code: XX, Sample Medium Grouping; YY, General Physical/Chemical Grouping; ZZZ, Specific Physical/Chemical Grouping]

Code XX-YY-ZZZ	Sample Medium Grouping	Description
00	UNDEFINED	The parameter code description does not provide any indication of a sampling matrix, which corresponds to any of the other Sample Medium categories
01	SITE CHARACTERISTICS	Data elements that represent some physical aspect or property of the site or surrounding area where a sample is collected. Examples: drainage area, elevation, streamflow, humidity, runoff, treatment plant data, stream width or depth, lake volume, cross-section data, site dimensions, location, well data, and various classification codes, such as weather, water-quality index, severity, sample analyzing agency. Parameter codes characterized as site characteristics are always classified in the Site Characteristics Grouping at the General Physical/Chemical level, but they may or may not be classified in the Site Characteristics Grouping at the Sample Medium level. If a parameter code that normally belongs in this category specifically indicates one of the other sampling matrices in the parameter code description, then the code is classified in that Sample Medium Grouping; otherwise it is classified in the Site Characteristics Grouping at the Sample Medium level.
02	SAMPLE PROPERTIES	Data elements that describe or otherwise value a physical or chemical property of the sample, such as acidity, alkalinity, pH, organic carbon, oxygen demand, particle size, dissolved solids, and sample volume. Parameter codes characterized as sample properties are always classified in the Sample Properties Grouping at the General Physical/Chemical level, but they may or may not be classified in the Sample Properties Grouping at the Sample Medium level. If the parameter code description specifically indicates one of the other sampling matrices, the code is classified in that Sample Medium Grouping; otherwise it classified in the Sample Properties Grouping at the Sample Medium level.

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Table 2.-- Codes and descriptions for Sample Medium Groupings--Continued

[Code: XX, Sample Medium Grouping; YY, General Physical/Chemical Grouping; ZZZ, Specific Physical/Chemical Grouping]

Code XX-YY-ZZZ	Sample Medium Grouping	Description
03	WATER, INTERSTITIAL	Subsurface water obtained from the pores of host rock or soil.
04	WATER, FILTERED	Water from streams, lakes, estuaries, oceans, and saturated and unsaturated ground-water that has passed through a filter prior to analysis. If the filter is a 0.45 micrometer membrane filter, then the sample is by definition, DISSOLVED. The parameter code description should indicate the filter size if the filter used is other than 0.45 micrometers. If the filter material is other than membrane, then the filter material should also be indicated..This category includes filtered samples taken from the unsaturated zone with lysimiters.
05	WATER, INTRAGRAVEL	The water in the interstices of gravel that forms that portion of the streambed utilized by fish as a spawing or incubation habitat, usually 0 to 1 foot below the bed surface.
06	WATER, WHOLE SAMPLE	Water from streams, lakes, estuaries, oceans, and saturated and unsaturated ground-water that has not been passed through a filter prior to analysis. This category includes unfiltered samples taken from the unsaturated zone with lysimiters . An analysis of such samples, which include both dissolved and suspended components, may reflect either a TOTAL analysis (95 percent or more of the constituent present in the sample) or a RECOVERABLE analysis (less than 95 percent of the constituent in the sample).
08	WATER, BRINE	Samples of naturally occurring water, mainly in subsurface pools, in which the dissolved solids concentration is greater than sea water (3 to 20 percent). This category includes the brine recovered from drilling operations.and any of the following natural waters meeting the concentration requirements: connate, metamorphic, magmatic, juvenile, meteoric.

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Table 2.-- Codes and descriptions for Sample Medium Groupings--Continued

[Code: XX, Sample Medium Grouping; YY, General Physical/Chemical Grouping; ZZZ, Specific Physical/Chemical Grouping]

Code XX-YY-ZZZ	Sample Medium Grouping	Description
10	WATER/ BOTTOM MATERIAL MIXTURE (ELUTRIATE)	The U.S. Environmental Protection Agency defines an elutriate sample as the supernatant resulting from the vigorous 30 minute shaking of 1 part bottom material with 4 parts of native water (water-column composite) followed by 1 hour settling time, centrifugation and filtration through a 0.45 micrometer membrane filter.
12	SEDIMENT, SUSPENDED	The sediment that at any given time is maintained in suspension by the upward components of turbulent currents or that exists in suspension as a colloid.
14	SEDIMENT, BOTTOM MATERIAL	The unconsolidated material composing the bottom of a reservoir, lake, estuary, or ocean. Bottom material may include previously suspended material, bedload, or residual material.
16	SEDIMENT, BED MATERIAL	The unconsolidated sediment mixture that makes up the active bed of an alluvial channel.
18	SEDIMENT, BED LOAD	Material moving on or near the streambed by rolling, sliding, and skipping (saltation).
20	SEDIMENT, TOTAL LOAD	Total sediment is bed load plus suspended load that is transported. For a sample to be considered to be total load, it must have been (1) collected from the entire depth of flow, or (2) be collected in a section where the stream turbulence is so large as to place all material being transported into suspension.
22	SEDIMENT, BANK MATERIAL	The unconsolidated sediment mixture that formerly made up the active bed of an alluvial channel, but is now exposed above the water line.

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Table 2.-- Codes and descriptions for Sample Medium Groupings--Continued

[Code: XX, Sample Medium Grouping; YY, General Physical/Chemical Grouping; ZZZ, Specific Physical/Chemical Grouping]

Code XX-YY-ZZZ	Sample Medium Grouping	Description
24	ATMOSPHERIC DEPOSITION, WET	Water that strikes the earth in liquid form or frozen form. as rain, hail, sleet, snow. Wet deposition samples usually contain a variable amount suspended material. Parameter codes representing the suspended component of wet atmospheric deposition are, by definition, classified in this grouping, not atmospheric deposition, dry.
26	ATMOSPHERIC DEPOSITION, DRY	Substances that strikes the earth in non-liquid form between wet deposition events. Dry deposition includes particulates, gases, and aerosols and is distinguished from the suspended components in wet deposition.
28	ATMOSPHERIC DEPOSITION, BULK	A mixture of wet and dry atmospheric deposition sampled without discrimination.
30	AIR	The mixture (or solution) of naturally occurring gases, generally above the surface of the earth, the composition of which varies with altitude and other conditions at the collection point.
32	GAS	Samples of individual gases such as carbon dioxide, helium, methane, oxygen, etc.
34	VAPOR	An air dispersion of molecules of a substance that is liquid or solid in its normal state, i.e. at standard temperature and pressure. Examples are water, mercury and benzene vapors.
36	AEROSOL	A suspension of liquid or solid particles, often of colloidal size, in a gas. Fog and smoke are common examples of natural aerosols. Note: fog, as a specific example of aerosol is designated as a separate Sample Medium category.
38	PARTICULATE	Samples of the solid particles suspended in the atmosphere. The samples are collected in situ as opposed to collection after deposition
40	ICE	Frozen water.

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Table 2.-- Codes and descriptions for Sample Medium Groupings--Continued

[Code: XX, Sample Medium Grouping; YY, Gcneral Physical/Chemical Grouping; ZZZ, Specific Physical/Chemical Grouping]

Code XX-YY-ZZZ	Sample Medium Grouping	Description
42	FOG	A suspension of liquid droplets in air; a specific example of an aerosol. The size of the droplets ranges from colloidal to macroscopic.
44	DEW/FROST	Moisture condensed from the atmosphere, especially at night, and deposited in the form of small drops or ice crystals..
46	CLOUD	A visible collection of particles of water or ice suspended in the air, at an elevation above the earth's surface.
50	SOIL	Surficial unconsolidated material consisting of disintegrated rock and humus that is not currently associated with deposition by moving water, i.e., distinct from sediment.
52	ROCK	Mineral matter of various composition, consolidated or unconsolidated, assembled in masses or considerable quantities in nature by the action of water, temperature and pressure.
54	EVAPORITE	Any sedimentary rock, such as gypsum or rock salt, formed by precipitation from evaporating. water.
56	STREET DEBRIS	The unconsolidated material that collects on city streets, but does not include human trash.
60	WASTE, LIQUID	Liquid waste products from industrial, municipal, or agricultural processes. A liquid waste sample may have been separated from a bulk waste sample.
62	WASTE, SOLID	Solid waste products from industrial, municipal, or agricultural processes. A solid waste sample may have been separated from a bulk waste sample.
64	WASTE, BULK	A mixture of solid and liquid waste sampled together without discrimination.
66	WASTE, GAS	Industrial waste gases

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Table 2.-- Codes and descriptions for Sample Medium Groupings--Continued

[Code: XX, Sample Medium Grouping; YY, General Physical/Chemical Grouping; ZZZ, Specific Physical/Chemical Grouping]

Code XX-YY-ZZZ	Sample Medium Grouping	Description
68	WASTE/REAGENT WATER MIXTURE	Waste dried to a standard weight and mixed with a fixed volume of reagent grade water before analysis.
70	SLUDGE, LIQUID	The liquid fraction of sludge.
72	SLUDGE, SOLID	The dewatered (often dried) mud, slush, or mire from industrial or municipal sewage processes. Sometimes called filter cake.
74	SLUDGE, BULK	A mixture of liquid and solid sludge sampled without discrimination.
80	DRILLING FLUID	A suspension of barytes and bentonite or attapulgite clay in either water or oil circulated through oil-well drilling pipes to act as a coolant and lubricant and to also keep the hole free from bore cuttings. Lignosulfonates are used as thinners in water-based drilling fluids, while additives such as blown asphalt and metallic soaps of tall oil and rosin acids are used as thickeners for oil-based fluids.
82	DAIRY PRODUCTS	Includes milk, cheese, butter. and so forth.
90	BIOTA	Includes all parameter codes dealing with the analysis, count, identification, or description of the physical or chemical properties of living matter.

Table 3.-- Codes and descriptions for General Physical/Chemical Groupings.

[Code: XX, Sample Medium Grouping; YY, General Physical/Chemical Grouping; ZZZ, Specific Physical/Chemical Grouping]

Code XX-YY-ZZZ	General Physical/Chemical Grouping	Description
10	SITE CHARACTERISTICS	See Sample Medium Groupings in Table 1.
15	SAMPLE PROPERTIES	See Sample Medium Groupings in Table 1.
25	MAJOR INORGANICS	Constituents commonly referred to as "Common or Major". These include sodium, potassium, calcium, magnesium, chlorine, sulfur, fluorine, silicon, and so forth. Included in the category are parameter codes for general acids, bases, salts, and minerals.
30	MINOR INORGANICS	Generally, those inorganic constituents that occur in nature in minute quantities relative to the major inorganic species. This grouping includes all inorganic species that do not fit into Major Inorganics, Nutrients, Stable Isotopes, and Radiochemicals Groupings.
35	NUTRIENTS	The nitrogen and phosphorus species including: Kjeldahl nitrogen, organic nitrogen, ammonia, nitrite, nitrate, phosphorus, ortho phosphate, hydrolyzable phosphorus, and organic phosphorus.
40	STABLE ISOTOPES	Those constituents are identified in the data base primarily on the basis of their non-radioactive isotopic properties.
45	RADIOCHEMICALS	Those constituents are identified in the data base primarily on the basis of their radiochemical properties.

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Table 3.-- Codes and descriptions for General Physical/Chemical Groupings-- Continued

[Code: XX, Sample Medium Grouping; YY, General Physical/Chemical Grouping; ZZZ, Specific Physical/Chemical Grouping]

Code XX-YY-ZZZ	General Physical/Chemical Grouping	Description
50	ORGANIC SUBSTANCES, INDUSTRIAL	Industrial organic substances are defined here as those which are (1) prepared synthetically to duplicate a natural substance, for example, urea, (2) prepared from a natural substance, for example, ethyl alcohol, or (3) prepared synthetically as a unique material not found in nature, for example, PCB. More detailed examples are given in Table 6.
55	ORGANIC SUBSTANCES, AGRICULTURAL	Agricultural organic substances are those which are manufactured for primary use as pesticides, plant growth regulators, defoliants, and desiccants. Pesticides may be used as: insecticides, herbicides, fungicides, acaracides, molluscicides, fumigants, repellants, nematicides, rodenticides, avicides, piscicides, and algicides. Some naturally occurring compounds are extracted from their natural source and formulated for use as pesticides. Examples: pyrethrum, an extract from chrysanthemums; nicotine sulfate, formulated from the alkaloid nicotene; rotenone, an oxygen heterocycle found in the roots of two types of legumes.

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Table 3.-- Codes and descriptions for General Physical/Chemical Groupings-- Continued

[Code: XX, Sample Medium Grouping; YY, General Physical/Chemical Grouping; ZZZ, Specific Physical/Chemical Grouping]

Code XX-YY-ZZZ	General Physical/Chemical Grouping	Description
60	ORGANIC SUBSTANCES, NATURAL	Natural organic substances are defined as those organic substances or mixtures which occur in nature. Many of these substances, however, are used or synthesized industrially and agriculturally, and so, they are classified as such if their primary pathway to the environment is likely to occur through industrial or agricultural applications, for example, phenol, acetic acid, rotenone, and pyrethrins. In many cases the environmental significance of a compound is unknown. Substances are classified as natural if their natural occurrence is environmentally significant, their industrial usage and/or synthesis is unknown or less significant than the natural occurrence, or the substance is commonly thought of as natural. Examples: caffeine (3,7,-dihydro, 3 7-trimethyl-1H-purine-2,6-dione); fatty acids; hormones; terpenes;, vitamins.
65	BIOTA, TAXONOMY	Parameter codes for counts of specific biological taxa.
70	BIOTA, PROPERTIES	Data elements that describe some physical, chemical, or biological property of an organism. Examples: primary productivity; toxicity test; and chemosynthetic activity.

Table 4.-- Codes and descriptions for selected Site Characteristics, Specific Physical/Chemical Groupings.

[Code: XX, Sample Medium Grouping; 10, General Physical/Chemical Grouping; ZZZ, Specific Physical/Chemical Grouping]

Index Code XX-10-ZZZ	Specific Physical/Chemical Grouping	Description
000	OTHER:	Site related data elements that do not fit into any of the other Site Characteristics, Specific Physical/Chemical Groupings.
001	ADMINISTRATIVE:	Data elements that describe site ownership, grants, product or sample enumeration, production, general administrative information, and so forth.
004	ATMOSPHERIC DEPOSITION:	Data elements that quantify or qualify the amount of precipitation as opposed to measurements of the chemical composition of precipitation.
007 THROUGH 018	CODES:	Any data element whose value is obtained from a list of fixed values such as severity codes, water-quality index codes, methodology codes, weather codes, analyzing agency codes, and so forth.
026	DEBRIS:	Street sweepings, trash, floatsum and other materials that are distinguished from suspended sediment, treatment plant solids, and so forth.
037	FLOW, OTHER:	Codes pertaining to the flow of water and other liquids not directly related to streamflow, such as cooling plant flow, treatment plant flow, and so forth.

Table 5.-- Codes and descriptions for selected Sample Properties, Specific Physical/Chemical Groupings.

[Code: XX, Sample Medium Grouping; 15, General Physical/Chemical Grouping; ZZZ, Specific Physical/Chemical Grouping]

Index Code XX-15-ZZZ	Specific Physical/Chemical Grouping	Description
000	OTHER:	Sample Properties data elements that do not fit into any of the other Sample Properties, Specific Physical/Chemical Groupings.
146	CARBON, INORGANIC:	Gross measurement of the carbon content of the matrix of inorganic compounds (carbonates, bicarbonates, and carbon dioxide).
148	CARBON, ORGANIC:	Gross measurement of the carbon content of the matrix of several types of organic substances, such as: (1) soluble, non-volatile organic compounds (sugars), (2) soluble, volatile organic substances, (mercaptans), (3) insoluble, partially volatile carbon (oils), (4) insoluble particulate carbonaceous materials (cellulose fibers), and (5) soluble or insoluble carbonaceous materials absorbed or entrapped on insoluble suspended matter, (oily matter adsorbed on silt).
150	CARBON, TOTAL (INORGANIC + ORGANIC):	Gross measurement of the carbon content of the matrix of inorganic and organic substances.
176	DENSITY, SPECIFIC GRAVITY:	Density is the concentration of matter, expressed as mass per unit volume. Specific gravity is the ratio of the mass of a body to the mass of an equal volume of water at 4 Degrees Celsius (or other specified temperature) expressed with no units.
296	ORGANIC MATTER, EXTRACTABLE:	Gross measurement of organic matter extractable from the matrix with a solvent.
298	ORGANIC MATTER, EXTRACTABLE CARBON ABSORBABLE:	Gross measurement of mixtures of organic substances followed by adsorption from the matrix onto activated carbon followed by desorption with chloroform (Carbon-Chloroform Extract - CCE) or alcohol (Carbon-Alcohol Extract - CAE).

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Table 5.-- Codes and descriptions for selected Sample Properties, Specific Physical/Chemical Groupings--Continued

[Code: XX, Sample Medium Grouping; 15, General Physical/Chemical Grouping; ZZZ, Specific Physical/Chemical Grouping]

Index Code XX-15-ZZZ	Specific Physical/Chemical Grouping	Description
300	ORGANIC MATTER, EXTRACTABLE, OIL AND GREASE:	Gross gravimetric measurement of solvent (fluorocarbon) extractable organic substances, which may include non-volatile hydrocarbons, fatty acids, soap, fats, waxes, vegetable and mineral oils, and so forth.
314	OXYGEN DEMAND, BIOCHEMICAL:	The determination of the relative oxygen requirement of waters, as a function of the number and types of biological organisms present and the amount of organic matter which provides their food supply; refers usually, but not limited to, immediate oxygen demand (5-day BOD).
316	OXYGEN DEMAND, BIOCHEMICAL, CARBONACEOUS:	Determination of the relative oxygen requirement of water as a function of the oxidizable carbonaceous compounds present.
318	OXYGEN DEMAND, BIOCHEMICAL, NITROGENOUS:	Determination of the relative oxygen requirement of water as a function of the nitrogenous compounds present.
322	OXYGEN DEMAND, CHEMICAL:	Determination of the oxygen equivalent of the portion of organic matter in a sample that can be oxidized by a strong chemical oxidant.
380	SALINITY:	Salinity is the electro chemical measurement of conductance using an instrument standardized against seawater of known salinity, expressed as microsiemens/cm; also calculated from specific gravity measurements expressed as parts per thousand or milligrams per milliliter (mg/mL).
426	SPECIFIC, CONDUCTANCE:	Electrochemical measurement of the ability of water to conduct electric current at a given temperature, expressed numerically as microsiemens per centimeter ($\propto$S/cm) at 25 degrees Celsius.

Table 6.-- Codes and descriptions for selected Industrial Organic Substances, Specific Physical/Chemical Groupings.

[Code: XX, Sample Medium Grouping; 50, General Physical/Chemical Grouping; ZZZ, Specific Physical/Chemical Grouping]

Index Code XX-50-ZZZ	Specific Physical/Chemical Grouping	Description
000	OTHER:	Industrial organic data elements which do not fit into one of the other Industrial Organic Substances, Specific Physical/Chemical Groupings.
502	ACIDS AND ACID DERIVATIVES:	Organic acids; most are carboxylic acids and are characterized by a carboxyl group or dicarboxyl group; may include sulfonic acids and acid derivatives, such as anhydrides. Examples: acetic acid and acetic anhydride.
512	ACIDS AND ACID DERVATIVES, HALOGENATED:	Organic acids substituted with one or more halogen atoms and may include derivatives, such as, acid chlorides. Examples: chlorobenzoic acid, dichloroacetic acid, acetyl chloride.
522	ALCOHOLS:	Organic compounds containing one or more hydroxy groups attached to an open-chain or cyclic alkyl group; includes 1,2-diols or glycols, and polyalcohols. Examples: ethyl alcohol, ethylene, glycol, glycerol.
526	ALDEHYDES AND ALDEHYDE DERIVATIVES:	Organic compounds characterized by a carbonyl group. The name aldehyde is derived from alcohol dehydrogenation. Examples: formaldehyde, acrolein, propenal.
532	AMIDES AND AMIDE DERIVATIVES:	Functional derivatives of carboxylic acids in which the hydroxyl group has been replaced with the amide group; includes derivatives, such as, anilides. Examples: ureas, sulfonamides, phosphoramides.
536	AMINES AND AMINE DERIVATIVES:	Organic bases derived from ammonia in which one or more of the hydrogen atoms are replaced with alkyl groups; includes derivatives, such as, anilines and toluidines. Examples: methylamine, benzidine, dimethylaniline.

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Table 6.-- Codes and descriptions for selected Industrial Organic Substances, Specific Physical/Chemical Groupings--Continued

[Code: XX, Sample Medium Grouping; 50, General Physical/Chemical Grouping; ZZZ, Specific Physical/Chemical Grouping]

Index Code XX-50-ZZZ	Specific Physical/Chemical Grouping	Description
552	DETERGENTS:	Any synthetic substance (chemical structures vary) which reduces the surface tension of water, mainly linear alkyl sulfonates or alkyl benzene sulfonates soluble in oil and water.
554	DIOXINS, FURANS, AND DERIVATIVES:	Two related oxygen heterocycles; dioxins are characterized by a six membered ring with two oxygen atoms; furans are characterized by a five membered ring with one oxygen atom. Examples: dibenzofuran; 3-methyl tetrahydropyran.
556	DIOXINS, FURANS, AND DERIVATIVES, HALOGENATED:	Halogen-substituted dioxins and furans and derivatives; considered to be toxic by-products in the manufacture of phenoxyacid herbicides. Examples: chlorinated dibenzofurans; 2,3,7,8 Tetrachlorodibenzo[b,e][1,4] dioxin (TCDD); isomers of TCDD.
560	ESTERS:	Derivatives of organic acids in which the hydrogen of the carboxyl group has been replaced by an alkyl group: Examples: aluminum stearate, propyl acetate, ethyl iso-butyrate.
562	ESTERS, PHTHALATE:	Derivatives of phthalic anhydride in which a carbon and oxygen atom are replaced with an alkyl group; widely used as plasticizers. Examples: dibutyl phthalate, bis(2-ethylhexyl) phthalate, dimethyl phthalate.
566	ETHERS:	Compounds characterized by two alkyl, two aryl, or one alkyl and one aryl group, separated by an oxygen atom; include epoxides which are ethers configured as a three-membered ring. Examples: diethyl ether, methoxy ethyl benzene, ethylene oxide 1,4-dioxane.
568	ETHERS, HALOGENATED:	Halogenated-substituted ethers. Examples: bis(chloromethyl) ether; 4-bromophenyl phenyl ether.

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Table 6.-- Codes and descriptions for selected Industrial Organic Substances, Specific Physical/Chemical Groupings--Continued

[Code: XX, Sample Medium Grouping; 50, General Physical/Chemical Grouping; ZZZ, Specific Physical/Chemical Grouping]

Index Code XX-50-ZZZ	Specific Physical/Chemical Grouping	Description
572	HALOGENS (BR, CL, F, I), ORGANIC:	Halogenated organic compounds measured as a group (gross measurement). Examples: TOX - total organic halogens; POX - purgeable organic halogens; NPOX - non-purgeable organic halogens.
576	HETEROCYCLES, NITROGEN:	Ring compounds containing one or more nitrogen atoms as a part of the ring. Examples: pyridines, pyrolles; quinolines; carbazole; thiazoles; [NOTE: heterocycles containing a nitrogen atom and an oxygen atom, for example, oxazole, or a sulfur atom, for example, thiazoles, are indexed as nitrogen heterocycles].
578	HETEROCYCLES, OXYGEN:	Ring compounds containing one or more oxygen atoms as part of the ring. Examples: pyrones, thioxane. [NOTE: heterocycles containing an oxygen atom and a sulfur atom, for example,thioxane) are indexed as oxygen heterocycles].
580	HETEROCYCLES SULFUR:	Ring compounds containing one or more sulfur atoms as a part of the ring. Examples: thiophenes; sulfones.
588	HYDROCARBONS:	Unsubstituted organic compounds consisting exclusively of carbon and hydrogen atoms derived from petroleum, coal tar and vegetable sources. Examples: styrene; isooctane; cyclopentane.
590	HYDROCARBONS, HALOGENATED:	Hydrocarbons in which one or more hydrogen atoms is replaced with ahalogen atom. Examples: hexachlorocyclopentadiene; pentachlorobenzene.
592	HYDROCARBONS, HALOGENATED, VOLATILE (PURGEABLE):	Halo-substituted hydrocarbons having a boiling point below 200 degrees Celsius Examples: 1,2-dichlorobenzene; carbon tetrachloride; trichloroethylene.

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Table 6.-- Codes and descriptions for selected Industrial Organic Substances, Specific Physical/Chemical Groupings--Continued

[Code: XX, Sample Medium Grouping; 50, General Physical/Chemical Grouping; ZZZ, Specific Physical/Chemical Grouping]

Index Code XX-50-ZZZ	Specific Physical/Chemical Grouping	Description
594	HYDROCARBONS, POLYCHLORINATED BIPHENYLS (PCBS) AND ISOMERS:	Chlorinated biphenyls are a specific group of halogenated hydrocarbons characterized by a biphenyl ring, substituted only with chlorine atoms. PCBs are made up of a mixture of chlorobiphenyl isomers and biphenyl. Certain PCB preparations, known as industrial Aroclors, are characterized in name by a four digit number which usually represents the type of molecule and weight percent of chlorine, for example, Aroclor 1254, 12 = chlorinated biphenyl, 54 = weight percent of chlorine Note: Aroclor 5442 is a chlorinated terphenyl, Aroclors 2565 and 4465 are blends of chlorinated biphenyls and chlorinated terphenyls. Examples: 2-chlorobiphenyl [2,2',3,4'-tetrachlorobiphenyl] Aroclor 1242. Usage: dielectric fluids, industrial fluids.
596	HYDROCARBONS, POLYCHLORINATED NAPHTHALENES (PCNs) AND ISOMERS:	Chlorinated naphthalenes are a specific group of halogenated hydrocarbons, characterized by the fused-ring naphthalene molecule substituted only with chlorine atoms. Examples: total 2-chloronaphthalene, halowaxes. Usage: solvent, moisture-proofing.
598	HYDROCARBONS, POLYNUCLEAR AROMATIC:	Fused-ring aromatic hydrocarbons and their derivatives. Examples: naphthalene; anthracene; [1,4-naphthoquinone]; 1,2-benzanthracene].
600	HYDROCARBONS, TRIHALO-METHANES:	Methane based compounds substituted with three halogen atoms. Commonly refers to four halo-substituted methanes occurring as a result of the chlorination process during water treatment: Examples: chloroform; bromoform; dichlorobromomethane; dibromochloromethane.
602	HYDROCARBON, VOLATILE (PURGEABLE):	Unsubstituted hydrocarbons generally having a boiling point below 200 Degrees Celsius Examples: benzene; toluene; ethylbenzene.

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Table 6.-- Codes and descriptions for selected Industrial Organic Substances, Specific Physical/Chemical Groupings--Continued

[Code: XX, Sample Medium Grouping; 50, General Physical/Chemical Grouping; ZZZ, Specific Physical/Chemical Grouping]

Index Code XX-50-ZZZ	Specific Physical/Chemical Grouping	Description
606	KETONES:	Liquid organic compounds derived from secondary alcohols in which the carbonyl group is attached to two alkyl groups. Examples: methyl ethyl ketone (MEK); methyl isobutyl ketone (MIBK); acetone. Usage: solvents in plastics, paint, and textile industries.
614	NITRILES AND RELATED COMPOUNDS:	Completely nitrogenized form of carboxylic acid with a triple bond between the carbon atom of the carboxyl group and a nitrogen atom The nitrogen replaces the (=O) and the (-OH) of the carboxyl group. Examples: acetonitrile; acrylonitrile; thiocyanates; acetonecyanhydrin. Usage: solvents, raw material of polymers and polymerized products.
616	NITROGEN COMPOUNDS:	Industrially synthesized nitrogen-containing organic compounds. Examples: diphenylhydrazine.
630	PHENOLS AND PHENOL DERIVATIVES:	Class of aromatic compounds in which one or more hydroxy groups are directly attached to a benzene ring. Examples: phenol; hydroquinones; aminophenols; butylphenol.
632	PHENOLS AND PHENOL DERIVATIVES, HALOGENATED:	Halogen-substituted phenols and phenol derivatives. Examples: chlorophenols, bromophenols, trichloroguiacol.
634	PHENOLS AND PHENOL DERIVATIVES, METHYL-:	Methyl-substituted phenols. Examples: cresols; xylenols.
638	PHENOLS AND PHENOL DERIVATIVES, NITRO-:	Nitro-substituted phenols. Examples: nitrophenols; nitrosophenols.

(Continued on Next Page)

Table 6.-- Codes and descriptions for selected Industrial Organic Substances, Specific Physical/Chemical Groupings--Continued

[Code: XX, Sample Medium Grouping; 50, General Physical/Chemical Grouping; ZZZ, Specific Physical/Chemical Grouping]

Index Code XX-50-ZZZ	Specific Physical/Chemical Grouping	Description
642	PHOSPHORUS COMPOUNDS:	Industrially synthesized phosphorus compounds not categorized in other Physical/Chemical groups. Examples: phosphine oxides; phosphonium salts; phosphoranes.
646	PHOSPHORUS COMPOUNDS, PHOSPHATE DERIVATIVES:	Organophosphates and derivatives. Examples: trichloroethyl phosphate; tributyl phosphate; phosphonates; phosphinates.
668	SOLVENT EXTRACTABLES:	Compounds extractable with an organic solvent.
670	SOLVENT EXTRACTABLES, ACID:	Compounds extractable with an organic solvent from an acidified matrix. Example: phenols.
672	SOLVENT EXTRACTABLES, BASE/NEUTRAL:	Compounds extractable with an organic solvent, from a basic or neutral matrix. Examples: polynuclear aromatics; halogenated non-volatile hydrocarbons; phthalates.
678	SULFUR COMPOUNDS:	Industrially synthesized sulfur compounds not categorized in other Physical/Chemical groups. Examples: dimethyl sulfoxide (DMSO); carbon disulfide; 1,4 dithiane; sulfonyl bis benzene.
680	SULFUR COMPOUNDS, THIOCYANATES:	Compounds in which a hydrogen atom of a hydrocarbon is replaced by the thiocyano (SCN) group. Examples: Ethyl isothiocyanate; n-butyl isothiocyante.
682	SULFUR COMPOUNDS, THIOLS:	Group of organic compounds resembling alcohols, with sulfur replacing the oxygen of the hydroxyl group; also known as mercaptans. Examples: methyl mercaptan; dodecanthiol.

Table 7.-- Codes and descriptions for selected Agricultural Organic Substances, Specific Physical/Chemical Groupings.

[Code: XX, Sample Medium Grouping; 55, General Physical/Chemical Grouping; ZZZ, Specific Physical/Chemical Grouping]

Index Code XX-55-ZZZ	Specific Physical/Chemical Grouping	Description
000	OTHER:	Agricultural organic substances which do not fit into one of the other Agricultural Organic Substances, Specific Physical/Chemical Groupings.
502	ACIDS AND ACID DERIVATIVES: (see XX-50-502)	Examples: propionic acid and salts of propionic acid; endothall.
512	ACIDS AND ACID DERIVATIVES, HALOGENATED: (see XX-50-512)	Examples: TCA (trichloroacetic acid).
518	ACIDS AND ACID DERIVATIVES, PHENOXY AND HALO-PHENOXY:	Phenoxy-substituted aliphatic acids often containing one or more halogen atoms used as herbicides, plant-growth regulators, or defolliants; may be formulated as a sodium salt (acifluorfen or Blazer) or as an ester (Diclofop-Methyl or Hoelon). Examples: 2,4-D; 2,4,5-T; Silvex; MCPA; Dicamba DCPA; DNOC.
532	AMIDES AND AMIDE DERIVATIVES: (see XX-50-532)	Examples: Propachlor; Alachlor; Metachlor.
536	AMINES AND AMINE DERIVATIVES: (see XX-50-536)	Includes aniline, toluidine. Examples: Trifluralin (Treflan); Roundup.
540	CARBAMATES AND RELATED COMPOUNDS:	Derivatives of carbamic acid used as herbicides, insecticides, and fungicides. Examples: Propham (isopropyl carbanilate); Carbaryl or Sevin; Carbofuran.

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Note: The use of trade/brand names in this report is for identification purposes only and does not constitute endorsement by the U. S. Geological Survey.

Table 7.-- Codes and descriptions for selected Agricultural Organic Specific Physical/Chemical Groupings--Continued

[Code: XX, Sample Medium Grouping; 55, General Physical/Chemical Grouping; ZZZ, Specific Physical/Chemical Grouping]

Index Code IXX-55-ZZZ	Specific Physical/Chemical Grouping	Description
542	CARBAMATES, THIO- AND RELATED COMPOUNDS:	Carbamates containing sulfur, used primarily as herbicides, soil insecticides, nematicides, and molluscicides. Examples: Aldicarb (Temik); Methiocarb (Mesurol); Metham; CDEC.
556	DIOXINS, FURANS, AND DERIVATIVES, HALOGENATED:	Halogen-substituted dioxins and furans and derivatives; considered to be toxic by-products in the manufacture of phenoxyacid herbicides. Examples: chlorinated dibenzofurans; 2,3,7,8 Tetrachlorodibenzo[b,e][1,4] dioxin (TCDD); isomers of TCDD.
568	ETHERS, HALOGENATED: (See XX-50-568)	
576	HETEROCYCLES, NITROGEN: (see XX-50-576)	Examples: bentazon (Basagran); triademefon (Bayleton), a triazole; Picloram; thiazole (etridiazole or Dwell); see also Triazines (XX-55-688) and Uracils (XX-55-690).
578	HETEROCYCLES OXYGEN: (see XX-50-578)	Example: Rotenone.
588	HYDROCARBONS: (see XX-50-588)	
590	HYDROCARBONS, HALOGENATED:	Pesticides containing carbon, hydrogen, and one or more halides. Substituted organohalides may also contain nitrogen (e.g., DCNA), oxygen (e.g., keto-Endrin or Dicofol), or sulfur (e.g., Endosulfan and Ovex). Examples: DDT; Chlordane; Toxaphene; Mirex.
616	NITROGEN COMPOUNDS: (see XX-50-616)	Examples: thiocyanates [Lethane 384 or 2-(2-butoxyethoxy) ethyl thiocyanate; Thanite or isobornyl thiocyanoacetate.

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Table 7.-- Codes and descriptions for selected Agricultural Organic Substances, Specific Physical/Chemical Groupings--Continued

[Code: XX, Sample Medium Grouping; 55, General Physical/Chemical Grouping; ZZZ, Specific Physical/Chemical Grouping]

Index Code XX-55-ZZZ	Specific Physical/Chemical Grouping	Description
626	ORGANOMETALS:	Usually fungicides in which there is an interaction between carbon and a metal. For example: mercury and tin. Some tin compounds are also used as acaricides and algicides Examples: PMA (phenylmercury acetate); triphenyltin chloride; Vendex (fenbutatin oxide); Plictran (cyhexatin).
632	PHENOLS & PHENOL DERIVATIVES, HALOGENATED: (see XX-50-632)	Examples: PCP (pentachlorophenol); tetrachlorophenol; sodium pentachlorophenate.
638	PHENOLS & PHENOL DERIVATIVES, NITRO-: (see XX-50-638)	Examples: DNOC; Dinoseb; Nitrofen.
642	PHOSPHORUS COMPOUNDS:	Generally known as organo-phosphates, the term refers to all insecticides containing: phosphorus. Examples: Crufomate (phosphoroamidate); Dicrotophos; Paraoxon.
644	PHOSPHORUS COMPOUNDS, HALOGENATED:	Halogen-substituted organo-phosphorus insecticides. Examples: Trichlorfon; Dursban (chloropyriphos); Dichlorvos (DDVP).
648	PHOSPHORUS, COMPOUNDS THIO- DERIVATIVES:	Examples: Parathion; Counter (Terbufos); Abate; Ronnel.
662	PYRETHRINS:	Botanical insecticides extracted from Crysanthemum flowers and commercially formulated as powerful contact insecticides. Examples: Allethrin; Permethrin.
666	QUINONES AND RELATED COMPOUNDS:	Cyclic diketones usually used as fungicides. Examples: Chloranil; Cichlone.

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Table 7.-- Codes and descriptions for selected Agricultural Organic Substances, Specific Physical/Chemical Groupings--Continued

[Code: XX, Sample Medium Grouping; 55, General Physical/Chemical Grouping; ZZZ, Specific Physical/Chemical Grouping]

Index Code XX-55-ZZZ	Specific Physical/Chemical Grouping	Description
678	SULFUR , COMPOUNDS: (see also XX-55-622)	Organosulfur pesticides usually contain chlorine and are often considered organohalides. Example: Omite (Propargite).
688	TRIAZINES & RELATED COMPOUNDS:	Nitrogen heterocycles with a symmetrical structure and a variety of attached radicals used as fungicides and herbicides. Examples: Atrizine; Prometryne; Simazine.
690	URACILS, SUBSTITUTED:	Nitrogen heterocyclic herbicides characterized by the uracil nucleus. Examples: Lenacil; Bromacil; Terbacil.
692	UREAS, SUBSTITUTED:	Urea based compounds having various carbon chains and rings in place of the hydrogen atoms. Examples: Monuron; Diuron; Fenuron-TCA; or Dozer.

Table 8.-- Codes and descriptions for selected Natural Organic Substances, Specific Physical/Chemical Groupings.

[Code: XX, Sample Medium Grouping; 60, General Physical/Chemical Grouping; ZZZ, Specific Physical/Chemical Grouping]

Index Code XX-60-ZZZ	Specific Physical/Chemical Grouping	Description
000	OTHER:	Natural organic data elements which do not fit into one of the other Natural Organic Substances, Specific Physical/Chemical Groupings.
502	ACIDS AND ACID DERIVATIVES: see XX-50-502	
504	ACIDS AND ACID DERIVATIVES, AMINO:	Carboxylic acids used as building blocks for proteins. Examples: glycine; serine; valine.
506	ACIDS AND ACID DERIVATIVES, CYCLIC:	Organic acids characterized by one or more ring, compounds. Examples: cyclopropanoic acid; cyclobutanoic acid; hexahydrobenzoic acid; camphoric acid.
508	ACIDS AND ACID DERIVATIVES, DIBASIC, TRIBASIC AND HYDROXY:	Carboxylic acids characterized by 2, 3 or more, displaceable hydrogen atoms. Examples: oxalic acid; citric acid; tartaric acid.
510	ACIDS AND ACID DERIVATIVES, FATTY:	Carboxylic acids derived from or contained in animal or vegetable fat or oil. Examples: linoleic acid (octadecadienoic); lauric acid (dodecanoic); stearic acid (octadecanoic).
514	ACIDS AND ACID DERIVATIVES, KETO-:	A compound containing both the ketone and organic acid radicals. Examples: pyruvic acid; acetoacetic acid; levulinic acid.
516	ACIDS AND ACID DERIVATIVES, NUCLEIC:	Complex phosphorus-containing acids of high molecular weight occurring in plant and animal cells, usually chemically bound to proteins to form nucleoproteins. Examples: DNA (deoxyribonucleic acid); RNA (ribonucleic acid).

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Table 8.-- Codes and descriptions for selected Natural Organic Substances, Specific Physical/Chemical Groupings--Continued

[Code: XX, Sample Medium Grouping; 60, General Physical/Chemical Grouping; ZZZ, Specific Physical/Chemical Grouping]

Index Code XX-60-ZZZ	Specific Physical/Chemical Grouping	Description
522	ALCOHOLS: see XX-50-522	Hydroxyl containing organic compounds occurring naturally in plants. Examples: lauryl alcohol; terpineol; borneol.
526	ALDEHYDES AND ALDEHYDE DERIVATIVES: (see XX-50-526)	Examples: syringaldehyde; acetals.
530	ALKALOIDES:	Basic nitrogenous organic compounds of vegetable origin usually derived from nitrogen ring compounds. Examples: atropine; morphine; nicotine; quinine; codeine.
546	CARBOHYDRATES:	Compounds made up of carbon, hydrogen and oxygen, containing the saccharose group; most abundant class of organic compounds, making up 3/4 of the dry weight of all vegetable matter. Examples: starch; sucrose.
550	CELLULOSE AND CELLULOSE DERIVATIVES:	Natural high molecular weight carbohydrate polymer (polysaccharide) consisting of anhydroglucose units joined by oxygen linkage to form long molecular chains that are essentially linear; most abundant organic material in the world; important industrial derivatives are: nitrocellulose; rayon; cellophane. Examples: cellulose; cotton.
560	ESTERS: (see XX-50-560 & 562)	Primarily methyl esters of fatty acids. Examples: methyl laurate; methyl myristate
566	ETHERS: (see XX-50-566 & 568)	Examples: cineole or eucalyptol eugenol; isoeugenol; safrole.

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Table 8.-- Codes and descriptions for selected Natural Organic Substances, Specific Physical/Chemical Groupings--Continued

[Code: XX, Sample Medium Grouping; 60, General Physical/Chemical Grouping; ZZZ, Specific Physical/Chemical Grouping]

Index Code XX-60-ZZZ	Specific Physical/Chemical Grouping	Description
576	HETEROCYCLES, NITROGEN: (see XX-50-576)	Examples: purines; pyridines; indoles.
578	HETEROCYCLES, OXYGEN: See XX-50-578.	
584	HUMIC SUBSTANCES:	Brown, polymeric constituents of humus (organic component of soils containing humic and fulvic acids and humin); not well defined compounds; mixtures of polymers containing aromatic and heterocyclic structures, carboxyl groups and nitrogen.
588	HYDROCARBONS: (see XX-50-588)	Examples: methane; butane
606	KETONES: (see XX-50-606)	Examples: camphor; acetovanillone; jasmone.
610	LIPIDS:	Inclusive term for fats and fat-derived material.
618	NUCLEOSIDES:	Compounds obtained during partial decomposition (hydrolysis) of nucleic acids and containing a purine or pyrimidine base linked to D-ribose (ribosides) or D-deoxyribose (deoxyribosides). Examples: inosine; methylinosine; guanosine.
620	NUCLEOTIDES:	Fundamental unit of nucleic acids; phosphoric acid esters of nucleosides. Examples: riboflavin phosphate; nicotinamide adenine dinucleotide (NAD), coenzyme Aadenosine-triphosphate (ATP).
652	PIGMENTS:	Any substance that imparts color to another substance or mixture; organosoluble substances obtained from animal and vegetable matter. Examples: flavone; melanin; litmus; rhodopsin.

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Table 8.-- Codes and descriptions for selected Natural Organic Substances
Specific Physical/Chemical Groupings--Continued

[Code: XX, Sample Medium Grouping; 60, General Physical/Chemical Grouping; ZZZ, Specific Physical/Chemical Grouping]

Index Code XX-60-ZZZ	Specific Physical/Chemical Grouping	Description
654	PIGMENTS, CAROTENOID:	Class of yellow and red pigments, made up of highly unsaturated aliphatic and alicyclic hydrocarbons and their oxidation products. Examples: caroten; xanthophylls; lutein.
656	PIGMENTS, CHLOROPHYLL:	Magnesium-containing green photosynthetic pigments; derivatives of porphyrin (complex tetrapyrroles); found in all higher plants. Examples: chlorophyll; pheophytin.
660	PROTEINS:	Complex high molecular weight polymers made up of carbon, hydrogen, oxygen, nitrogen, and usually sulfur; comprised of chains of amino acids connected by peptide bonds; occur in cells of all living organisms and in biological fluids. Examples: enzymes; collagen; silk; keratins; albumin; casein; hemoglobin; some bacterial toxins; snake venom.
676	STEROIDS:	Group of polycyclic compounds closely related biochemically to terpenes; found in plants and animals; include hormones, sterols, certain glycosides. Examples: cholesterol; cholestene; sitosterol, coprostanol.
686	TERPENES AND TERPENE DERIVATIVES:	Unsaturated hydrocarbons occurring in most essential oils and oleoresins of plants; also called terpenoids, isoprenes, isoprenoids; derivatives include steroids (see XX-60-676) and carotenoids (see XX-60-654) terpene ketones (see XX-60-606). Examples: terpene; pineol; cineol; camphene; santene.
694	VITAMINS:	Complex organic compounds present in natural products or synthetically produced; essential in small quantities in the diet of animals and man. Examples: niacin; p-aminobenzoic acid (PABA); riboflavin; pantothenic acid; thiamine.

Table 9.-- Codes and descriptions for Biota Properties, Specific Physical/Chemical Groupings.

[Code: XX, Sample Medium Grouping; 70, General Physical/Chemical Grouping; ZZZ, Specific Physical/Chemical Grouping]

Index Code XX-70-ZZZ	Specific Physical/Chemical Grouping	Description
910	BIOASSAY TESTS:	Other tests not previously covered, such as heart rate and so forth.
915	BIOMASS:	Dry weight of living matter expressed in terms of a given area or volume of the habitat.
920	BIOSTIMULATORY TESTS:	Measured reactions of an organism to a substance or set of conditions, such as, algae growth potential.
925 THROUGH 940	CALCULATIONS:	Rates, ratios, indexes.
945	CHEMOSYNTHETIC ACTIVITY:	Synthesis of organic matter from carbon dioxide using chemical energy (usually chemolithotrophs - "rock eaters").
950	HISTO-PATHOLOGICAL TESTS:	Determinations of changes in an organism's tissue structure as a result of chemical (toxic substances) or physical (parasitism) activity.
960	PRIMARY PRODUCTIVITY:	Rate of organic matter produced by autotrophs using inorganics as a carbon source and sunlight.
965	SECONDARY PRODUCTIVITY:	Rate of organic matter produced by heterotrophs of a community.
970	TOXICITY TESTS:	Determination of the potency of a toxic substance by measuring biological responses.

Table 10.-- Specific Physical/Chemical Groupings related to the Site Characteristics, General Physical/Chemical Grouping.

[Code: XX, Sample Medium Grouping; 10, General Physical/Chemical Grouping; ZZZ, Specific Physical/Chemical Grouping]

Specific Physical/Chemical Grouping	Index Classification Code XX-10-ZZZ	Specific Physical/Chemical Grouping	Index Classification Code XX-10-ZZZ
Other	000	Location	048
Administrative	001	Plant,Other	055
Application Rate	002	Plant,Power	056
Area	003	Plant,Treatment	057
Atmospheric Deposition	004	Population	060
Codes, Other	007	Radiation	062
Codes, Biologic	008	Runoff	063
Codes, Ground Water	009	Satellite	065
Codes, Land Use	010	Size	066
Codes, Sample Analyzing Agency	012	Slope	067
Codes, Sample Analysis	013	Thickness	070
Codes, Sample Collection Agency	014	Tides	071
Codes, Sample Collection	015	Time	072
Codes, Severity	016	Time of Travel	073
Codes, Water Quality Index	017	Type	074
Codes, Weather	018	Volume	077
Content	020	Waves	079
Cross Section	021	Weather	080
Currents	022	Well Data, Other	081
Date	025	Well Data, Casing	082
Debris	026	Well Data, Depth	083
Depth	027	Well Data, Diameter	084
Direction	028	Well Data, Drawdown	086
Distance	029	Well Data, Flow	087
Elevation	032	Well Data, Hydraulic Conductivity	088
Equipment	033	Well Data, Pressure	089
Evaporation	034	Well Data, Pumping	090
Flow, Other	037	Well Data, Sampling	091
Flow, Stream	038	Well Data, Screen	092
Heat	040	Well Data, Transmissivity	093
Height	041	Well Data, Water Level	094
Horsepower	042	Well Data, Withdrawl	095
Humidity	043	Width	097
Length	047	Wind	098

Table 11.-- Specific Physical/Chemical Groupings related to the Sample Properties, General Physical/Chemical Grouping.

[Code: XX, Sample Medium Grouping; 15, General Physical/Chemical Grouping; ZZZ, Specific Physical/Chemical Grouping]

Specific Physical/Chemical Grouping	Index Classification Code XX-15-ZZZ	Specific Physical/Chemical Grouping	Index Classification Code XX-15-ZZZ
Other	000	Oxygen Demand, Chemical	322
Acidity	102	pH	328
Alkalinity	112	Physical/Chemical Measurements	344
Carbon, Inorganic	146	Pressure	360
Carbon, Organic	148	Salinity	380
Carbon, Total (Inorganic + Organic)	150	Secchi Depth	394
Color	166	Sediment, Particle Size	396
Density/Specific Gravity	176	Sediment, Concentration	398
Eh	180	Sediment, Discharge	400
Electrochemical Measurements	182	Size	416
Filter	188	Sludge	418
Hardness	200	Solids	424
Moisture	260	Specific Conductance	426
Odor	292	Surface Area	431
Organic Matter	294	Temperature	438
Organic Matter, Extractable	296	Toxicity	452
Organic Matter, Ext., Carbon Absorbable	298	Turbidity	458
Organic Matter, Ext., Oil and Grease	300	Viscosity	464
Oxygen Demand, Biochemical	314	Voltage	466
Oxygen Demand, Carbonaceous	316	Volume	468
Oxygen Demand, Nitrogenous	318	Weight	474

Table 12.-- Specific Physical/Chemical Groupings related to the Major Inorganics, General Physical/Chemical Grouping.

[Code: XX, Sample Medium Grouping; 25, General Physical/Chemical Grouping; ZZZ, Specific Physical/Chemical Grouping]

Specific Physical/Chemical Grouping	Index Classification Code
	XX-25-ZZZ
Other	000
Acids	106
Bases	130
Bicarbonate	134
Bromine	140
Calcium	144
Carbon	146
Carbonate	152
Carbon Dioxide	154
Chlorine	160
Cyanide/Cyanate	174
Fluorine	190
Hydroxide	210
Iodine	214
Magnesium	230
Minerals	236
Oxygen	312
Potassium	356
Salts	382
Silicon	412
Sodium	422
Sulfur	430

Table 13.-- Specific Physical/Chemical Groupings related to the Minor Inorganics, General Physical/Chemical Grouping.

[Code: XX, Sample Medium Grouping; 30, General Physical/Chemical Grouping; ZZZ, Specific Physical/Chemical Grouping]

Specific Physical/Chemical Grouping	Index Classification Code XX-30-ZZZ	Specific Physical/Chemical Grouping	Index Classification Code XX-30-ZZZ
Other	000	Lutetium	228
Aluminum	116	Manganese	232
Antimony	120	Mercury	234
Argon	122	Molybdenum	262
Arsenic	124	Neodymium	264
Barium	128	Neon	266
Beryllium	132	Nickel	270
Bismuth	136	Niobium	290
Boron	138	Osmium	310
Cadmium	142	Palladium	326
Cerium	156	Platinum	350
Cesium	158	Praseodymium	358
Chromium	162	Rhenium	372
Cobalt	164	Rhodium	374
Columbium	168	Rubidium	376
Copper	170	Ruthenium	378
Dysprosium	178	Samarium	390
Erbium	184	Scandium	392
Europium	186	Selenium	410
Gadolinium	192	Silver	414
Gallium	194	Tantalum	432
Germanium	196	Tellurium	436
Gold	198	Terbium	440
Hafnium	202	Thallium	442
Helium	204	Thulium	446
Holmium	206	Tin	448
Hydrogen	208	Titanium	450
Indium	212	Tungsten	456
Iridium	216	Vanadium	462
Iron	218	Ytterbium	470
Krypton	220	Yttrium	472
Lanthanum	222	Zenon	476
Lead	224	Zinc	478
Lithium	226	Zirconium	480

Table 14.-- Specific Physical/Chemical Groupings related to the Nutrients, General Physical/Chemical Grouping.

[Code: XX, Sample Medium Grouping; 35, General Physical/Chemical Grouping; ZZZ, Specific Physical/Chemical Grouping]

Specific Physical/Chemical Grouping	Index Classification Code
	XX-35-ZZZ
Other	000
Nitrogen	272
Nitrogen, Ammonia	274
Nitrogen, Kjeldahl (NH4 + Org)	276
Nitrogen, Nitrate	278
Nitrogen, Nitrite	280
Nitrogen, Nitrite + Nitrate	282
Nitrogen, Organic	284
Phosphorus	330
Phosphorus, Hydrolyzable	332
Phosphorus, Organic	334
Phosphorus, Phosphate	336
Phosphorus, Ortho + Hydrolyzable	338
Phosphorus, Total	340

Table 15.-- Specific Physical/Chemical Groupings related to the Stable Isotopes, General Physical/Chemical Grouping.

[Code: XX, Sample Medium Grouping; 40, General Physical/Chemical Grouping; ZZZ, Specific Physical/Chemical Grouping]

Specific Physical/Chemical Grouping	Index Classification Code
	XX-40-ZZZ
Other	000
Carbon	146
Hydrogen	210
Lithium	226
Nitrogen	272
Oxygen	312
Sulfur	430

Table 16.-- Specific Physical/Chemical Groupings related to the Radiochemicals, General Physical/Chemical Grouping.

[Code: XX, Sample Medium Grouping; 45, General Physical/Chemical Grouping; ZZZ, Specific Physical/Chemical Grouping]

Specific Physical/Chemical Grouping	Index Classification Code XX-45-ZZZ	Specific Physical/Chemical Grouping	Index Classification Code XX-45-ZZZ
Other	000	Plutonium	352
Actinium	110	Polonium	354
Aluminum	116	Potassium	356
Americium	118	Praseodymium	358
Astatine	126	Promethium	362
Barium	128	Protactinium	364
Beryllium	132	Radium	368
Bismuth	136	Radon	370
Calcium	144	Rhodium	374
Carbon	146	Ruthenium	378
Cerium	156	Scandium	392
Cesium	158	Selenium	410
Chlorine	160	Silver	414
Chromium	162	Sodium	422
Cobalt	164	Strontium	428
Curium	172	Sulfur	430
Europium	186	Technetium	434
Iodine	214	Thallium	442
Iron	218	Thorium	444
Lanthanum	222	Tritium	452
Lead	224	Uranium	460
Manganese	232	Yttrium	470
Neptunium	268	Zinc	478
Niobium	290	Zirconium	480
Phosphorus	330		

Table 17.-- Specific Physical/Chemical Groupings related to the Industrial Organic Substances, General Physical/Chemical Grouping.

[Code: XX, Sample Medium Grouping; 50, General Physical/Chemical Grouping; ZZZ, Specific Physical/Chemical Grouping]

Specific Physical/Chemical Grouping	Index Classification Code XX-50-ZZZ
Other	000
Acids and Acid Derivatives	502
Acids and Acid Derivatives, Halogenated	512
Alcohols	522
Aldehydes and Aldehyde Derivatives	526
Amides and Amide Derivatives	532
Amines and Amine Derivatives	536
Detergents	552
Dioxins, Furans and Derivatives	554
Dioxins, Furans and Derivatives, Halogenated	556
Esters, Other	560
Esters, Phthalate	562
Ethers	566
Ethers, Halogenated	568
Halogens (Br, Cl, F, I), Organic	572
Heterocycles, Nitrogen	576
Heterocycles, Oxygen	578
Heterocycles, Sulfur	580
Hydrocarbons	588
Hydrocarbons, Halogenated	590
Hydrocarbons, Halogenated, Volatile (Purgeable)	592
Hydrocarbons, PCB's and Isomers	594
Hydrocarbons, PCN's and Isomers	596
Hydrocarbons, Polynuclear Aromatic	598
Hydrocarbons, Trihalomethanes	600
Hydrocarbons, Volatile (Purgeable)	602
Ketones	606
Nitriles and Related Compounds	614
Nitrogen Compounds	616
Phenols and Phenol Derivatives	630
Phenols and Phenol Derivatives, Halogenated	632
Phenols and Phenol Derivatives, Methyl-	634
Phenols and Phenol Derivatives, Nitro-	638
Phosphorus Compounds	642
Phosphorus Compounds, Phosphate Derivatives	646
Solvent Extractables	668
Solvent Extractables, Acid-	670
Solvent Extractables, Base/Neutral-	672
Sulfur Compounds	678
Sulfur Compounds, Thiocyanates	680
Sulfur Compounds, Thiols (Mercaptans)	682

Table 18.-- Specific Physical/Chemical Groupings related to the Agricultural Organic Substances, General Physical/Chemical Grouping.

[Code: XX, Sample Medium Grouping; 55, General Physical/Chemical Grouping; ZZZ, Specific Physical/Chemical Grouping]

Specific Physical/Chemical Grouping	Index Classification Code XX-55-ZZZ
Other	000
Acids and Acid Derivatives	502
Acids and Acid Derivatives, Halogenated	512
Acids and Acid Derivatives, Phenoxy and Halogenated Phenoxy	518
Amides and Amide Derivatives	532
Amines and Amine Derivatives	536
Carbamates and Related Compounds	540
Carbamates, Thio- and Related Compounds	542
Dioxins, Furans and Derivatives, Halogenated	556
Ethers, Halogenated	568
Heterocycles, Nitrogen	576
Heterocycles, Oxygen	578
Hydrocarbons	588
Hydrocarbons, Halogenated	590
Nitrogen Compounds	616
Organometals	626
Phenols and Phenol Derivatives, Halogenated	632
Phenols and Phenol Derivatives, Nitro-	638
Phosphorus Compounds	642
Phosphorus Compounds, Halogenated	644
Phosphorus Compounds, Thio- Derivatives	648
Pyrethrins	662
Quinones and Related Compounds	666
Sulfur Compounds	678
Triazines and Related Compounds	688
Uracils, Substituted	690
Ureas, Substituted	692

Table 19.-- Specific Physical/Chemical Groupings related to the Natural Organic Substances, General Physical/Chemical Grouping.

[Code: XX, Sample Medium Grouping; 60, General Physical/Chemical Grouping; ZZZ, Specific Physical/Chemical Grouping]

Specific Physical/Chemical Grouping	Index Classification Code
	XX-60-ZZZ
Other	000
Acids and Acid Derivatives	502
Acids and Acid Derivatives, Amino	504
Acids and Acid Derivatives, Cyclic	506
Acids and Derivatives, Dibasic, Tribasic, Hydroxy	508
Acids and Acid Derivatives, Fatty	510
Acids and Acid Derivatives, Keto-	514
Acids and Acid Derivatives, Nucleic	516
Alcohols	522
Aldehydes and Aldehyde Derivatives	526
Alkaloids	530
Carbohydrates	546
Cellulose and Cellulose Derivatives	550
Esters	560
Ethers	566
Heterocycles, Nitrogen	576
Heterocycles, Oxygen	578
Humic Substances	584
Hydrocarbons	588
Ketones	606
Lipids	610
Nucleosides	618
Nucleotides	620
Pigments	652
Pigments, Carotinoid	654
Pigments, Chlorophyll	656
Proteins	660
Steroids	676
Terpenes and Terpene Derivatives	686
Vitamins	694

Table 20.-- Specific Physical/Chemical Groupings related to the Biota Taxonomy, General Physical/Chemical Grouping.

[Code: XX, Sample Medium Grouping; 65, General Physical/Chemical Grouping; ZZZ, Specific Physical/Chemical Grouping]

Specific Physical/Chemical Grouping	Index Classification Code XX-65-ZZZ
OTHER	
Other	000
KINGDOM MONERA	
Other	702
Bacteria	704
Cyanophyta (Bluegreen Algae)	706
KINGDOM PROTISTA	
Algae, Other	710
Bacillariophyta (Diatoms)	712
Navicula Species	713
Nitzschia Species	714
Neidium Species	715
Chloromonadophyta (Chloromonads)	716
Chlorophyta (Greens	717
Chrysophyta (Yellow-Greens)	718
Cryptophyta (Cryptomonads)	719
Euglenophyta (Euglenoids)	720
Phaeophyta (Browns)	721
Pyrrhophyta (Dinoflagellates)	722
Rhodophyta (Reds)	723
Aquatic Fungi	725
Ciliophora	726
Foraminifera	727
Protozoa	728
KINGDOM FUNGI	
Fungi, Other	730
Ascomycota (Sac Fungi, Lichens)	731
Basidiomycota (Mushrooms, Rusts, Smuts)	732
Zygomycota (Molds)	733
KINGDOM PLANTAE	
Fossils	
Bennettitales (Gymnosperms)	735
Coenopteridales (Ferns)	736
Cordaitales (Large Leaved Evergreens)	737
Cycadofilicales (Seed Ferns)	738
Hyeniales (Horsetails)	739
Lepidodendrales (Giant Club Mosses)	740
Pleuromeiales (Club Mosses)	741
Psilophytales (Leafless-Rootless Vascular Plants)	742
Non-Vascular Plants	
Bryophyta (Mosses, Liverworts, Hornworts)	745
Vascular Plants	
Other	750
Lycopodophyta (Club Mosses, Quillworts)	751
Sphenophyta (Horsetails)	752
Filicinophyta (Ferns)	753
Cycadophyta (Cycads, Seed Ferns)	754
Ginkophyta (Ginko)	755
Coniferophyta (Evergreens, Cone-bearing Plants)	756
Gnetophyta (Cone-bearing Desert Plants)	757
Angiospermophyta (Flowering Plants)	758

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Table 20.-- Specific Physical/Chemical Groupings related to the Biota Taxonomy, General Physical/Chemical Grouping--Continued

[Code: XX, Sample Medium Grouping; 65, General Physical/Chemical Grouping; ZZZ, Specific Physical/Chemical Grouping]

Specific Physical/Chemical Grouping	Index Classification Code XX-65-ZZZ
KINGDOM ANIMALIA	
Porifera (Sponges)	760
Cnideria (Coelenterates, Jellyfish, Hydroids, Corals)	762
Ctenophora	764
Platyhelminthes (Flatworms)	766
Nemertea (Rhynchodoela, Proboscis-Ribbon Worms)	768
Rotifera (Wheel Animals)	770
Gastrotrichia	772
Kinochyncha	774
Nemotoda (Round-Thread-Eel Worms)	776
Nematomorpha (Horsehair Worms)	778
Acanthocephala (Hookheaded-Spineyheaded Worms)	780
Ectoprocta (Moss Animals-Bryozoa)	782
Endoprocta	784
Gnathostomulida	786
Mollusca	
Other	788
Amphineura (Chitons)	789
Bivalva (Clams, Mussels, Oysters)	790
Cephalopoda (Squids, Octopi)	791
Gastropoda (Snails, Slugs, Abalones)	792
Scaphopoda (Tooth-Tusk Shells)	793
Annelida (Segmented Worms)	
Other	795
Hirundina (Leeches)	796
Polychaeta (Bristle-Marine Worms)	797
Oligochaeta (Fresh Water/Land Worms)	798
KINGDOM ANIMALIA (Continued)	
Arthropoda	
Other	800
Arachnida (Spiders, Ticks, Mites)	802
Chilopoda (Centipedes)	804
Crustacea	
Other	806
Branchiopoda (Fairy-Tadpole-Clam Shrimps)	807
Copepoda (Copepods, Fish Lice)	808
Malaeostraca (Sowbugs, Scuds, Shrimps, Crayfish)	809
Ostracoda (Seed-Mussel Shrimps)	810
Diplopoda (Millipeds)	812
Insecta	
Other	814
Coleoptera (Beetles)	815
Collembola (Springtails)	816
Diptera (Flies)	817
Ephemoptera (Mayflies)	818
Hemiptera (True Bugs)	819
Hymenoptera (Ants, Wasps, Bees)	820
Lepidoptera (Butterflies, Moths)	821
Megaloptera (Hellgrammites)	822
Neuroptera (Dobson Flies, Lacewings)	823
Odonata (Dragon Flies, Damselflies)	824
Plecoptera (Stoneflies)	825
Trichoptera (Caddisflies)	826
Pycngonida (Sea Spiders)	828
Phoronida	830
Brachiopoda (Lamp Shells)	832

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Table 20.-- Specific Physical/Chemical Groupings related to the Biota Taxonomy, General Physical/Chemical Grouping--Continued

[Code: XX, Sample Medium Grouping; 65, General Physical/Chemical Grouping; ZZZ, Specific Physical/Chemical Grouping]

Specific Physical/Chemical Grouping	Index Classification Code XX-65-ZZZ
KINGDOM ANIMALIA (Continued)	
Sipuncula (Peanut Worms)	834
Echiura (Spoon Worms)	836
Priapulida	838
Onychophora (Velvet Worms)	840
Tardigrada (Water Bears)	842
Pentastimida	844
Pogonophora (Bread Worms)	846
Echinodermata (Starfish, Sea Lilies, Sea Urchins)	848
Chaetognatha (Arrow Worms)	850
Hemichordata (Acron Worms)	852
Chordata	
Other	854
Urochordata (Tunicates, Sea Squirts)	856
Cephalochordata (Lancelets)	858
Vertebrata	
Placodermi (Fossils, Spiney-skinned Sharks)	860
Agnatha (Lampreys, Hagfishes, Slime Eels, Fossil Ostracoderms)	861
Chondrichthyes (Sharks, Rays, Skates, Chimaeras)	862
Osteichthyes (Boney Fishes)	863
Amphibia (Frogs, Salamanders, Toads, Extinct Labyrinthodouts)	864
Reptilia (Lizards, Snakes, Turtles, Extinct Dinosaurs)	865
Aves (Birds)	866
Mammalia (Warm Blooded Animals)	867
Macrophyton	870
Zooplankton	872
Plankton	874
Phytoplankton	876
Periphyton	878
Nannoplankton	880
Benthos	882
Viruses	884
Microinvertebrates	886
Macroinvertebrates	888
Vertebrates	890

Table 21.-- Specific Physical/Chemical Groupings related to the Biota Properties, General Physical/Chemical Grouping.

[Code: XX, Sample Medium Grouping; 70, General Physical/Chemical Grouping; ZZZ Specific Physical/Chemical Grouping]

Specific Physical/Chemical Grouping	Index Classification Code
	XX-70-ZZZ
Other	000
Bioassay	910
Biomass	915
Biostimulatory Tests	920
Calculations, Other	925
Calculations, Index	930
Calculations, Rate	935
Calculations, Ratio	940
Chemosynthetic Activity	945
Histopathological Tests	950
Productivity, Other	955
Productivity, Primary	960
Productivity, Secondary	965
Toxicity Tests	970