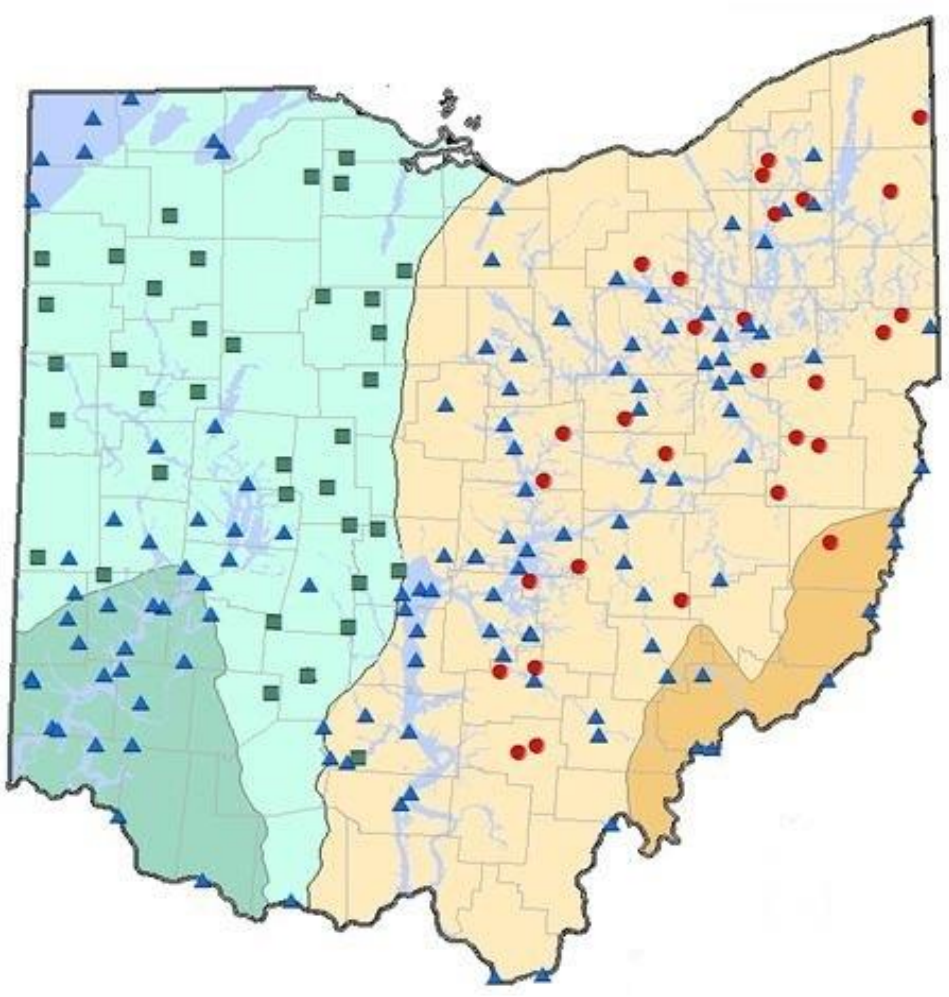
Ambient Ground Water Quality Monitoring Program



Division of Drinking and Ground Waters
March 3, 2015

INTRODUCTION

This program description provides information on Ohio's Ambient Ground Water Quality Monitoring Program to help people understand and use the data. The information includes descriptions of the activities utilized to plan, collect, process, analyze, and manage the water quality monitoring data. In addition, the objectives for collecting raw water quality data and a brief history of the development of the Ambient Ground Water Quality Monitoring Program are included. The numbers included in parentheses in some section headings refer to sections in the *Ambient Ground Water Quality Monitoring Program, Operating Procedures Document* (OPD), which provides the details needed to manage the program on a day-to-day basis.

Section 1 – Ambient Ground Water Quality Monitoring Program

Mission and Objectives (1.2)

Ohio EPA - Division of Drinking and Ground Waters (DDAGW) maintains the Ambient Ground Water Monitoring Program (AGWQMP) as a critical element of the broader effort to characterize general water quality conditions in Ohio, which is referred to as the Ground Water Quality Characterization Program. The primary objective of the AGWQMP is to provide state-wide ground water quality data (raw, untreated water) to characterize the source water quality across the state. The water quality data will enhance water resource planning and to help prioritize protection activities. The AGWMP places a priority on collecting data representative of aquifers used as source water by public water systems. Water samples collected by the public water systems for compliance purposes are primarily collected from distribution samples (post treatment); consequently, the AGWMP raw water monitoring data are valuable resource data distinct from the compliance data. This effort helps support DDAGW's mission to protect human health and the environment by characterizing and protecting ground water quality and ensuring that Ohio's public water systems provide adequate supplies of safe drinking water. In addition to the AGWQMP, the Ground Water Quality Characterization Program includes special studies that address specific water quality issues that are referred to in several sections in this program description.

Program History (1.3)

The program to sample raw (untreated) water was originally established in 1973 to measure seasonal and annual water quality changes in the State's major aquifers. In 1973, the system included about 45 wells with semiannual sampling. Figure 1, a plot of the number of inorganic samples collected each year, illustrates the sampling history of the AGWMP based on the samples collected as of March 2014. Scattered raw water data for 1-2 samples a year is available back to the 1940s, but these data were collected by other programs prior to the establishment of the AGWQMP. After 1973, the number of samples collected declined to almost nothing in the mid 1980's. In 1986, the

AGWMP sampling program was re-energized and the network was expanded to around 100 active wells.

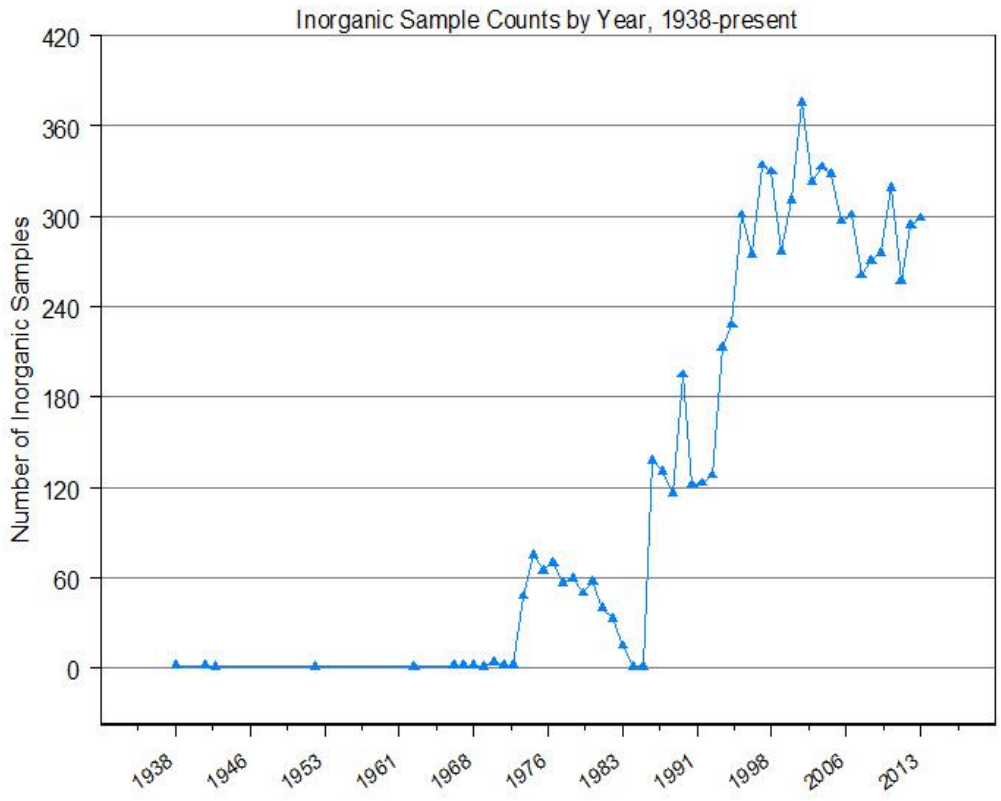


Figure 1. Inorganic Samples Collected by Year

The next expansion of the AGWMP started in 1994 with the addition of wells to improve the geographic distribution and to provide better representation of the primary aquifers. Sampling increased steadily from 1994 to 1995, with a parallel increase in the number of organic samples collected. Of the total active wells (around 200), roughly 92 percent are public water systems and roughly 8 percent are industrial or commercial enterprises or residential wells. Of the active wells, 60% are in unconsolidated aquifers, 23% are in limestone aquifers, and 17% are in sandstone aquifers.

Activities Summary (1.4)

Data collection activities occur at the District Offices and database design, data compilation, and water quality data analysis are completed primarily in Central Office (CO), with input from the district offices.

Raw water samples are collected by district staff and delivered or shipped to Ohio EPA - Division of Environmental Services (DES) laboratory where the samples are analyzed for a standard suite of parameters. Raw water samples are collected and analyzed for a suite of inorganic parameters every six months (active standard (AS) and active organic (AO) status), eighteen months (AR18 cycle status) or 36 months (AR36 cycle status). Samples are analyzed for volatile organic compounds once every eighteen months for AS and AR18 status wells and every 36 months for AR36 status wells. Organics are samples every 6 months at AO status wells, where the district has identified the well for frequent sampling due to concerns about contamination close to the wellfield. In the past, semi-volatile organic and pesticide compounds have been included, but are not currently samples due to limited detection. Sampling occurs during Fall (August to November) and Spring (February to May) sampling rounds.

After the data analysis is completed, CO staff reviews and approves the electronic data. At the end of each round, the End-Of -Round is completed as a:

- summary of the sampling activities and results;
- tool to identify anomalous sample results; and
- quality assurance (QA/QC) report.

After all results are approved, a sample projection report is run to identify the sample sites for the next sampling round. The sample projection reports are sent to the District AGWQMP coordinators and they start the planning for the next sample rounds. A teleconference is scheduled before the start of the next sampling round to discuss issues from the last round and sampling issues for the next round as well as current issues for the AGWQMP.

Roles and Responsibilities (1.4)

The AGWMP is coordinated through the DDAGW's Central Office in Columbus, with sample collection completed by the five OEPA District Offices:

• Central District Office (CDO), Columbus;
• Northeast District Office (NEDO), Twinsburg;
• Northwest District Office (NWDO), Bowling Green;
• Southeast District Office (SEDO), Logan; and
• Southwest District Office (SWDO), Dayton.

The Water Quality Characterization and Protection Section in the Central Office is responsible for administering the Ambient Monitoring Program. This includes the development/refinement of the overall Network design, coordination with the districts, data entry, database management, preliminary data interpretation, generating the End-of-Round Report, and utilizing the AGWMP data to characterize the water quality of Ohio. The Central Office also handles most requests for water quality data or maps based on AGWMP data.

The primary responsibility of the district offices is to collect the AGWMP samples from the network wells, to collect QA/QC samples, and to identify new sites for AGWQMP sampling. In addition to sample collection, the district staff's knowledge about the AGWMP sites and their experience with water quality issues are important components of accurate water quality data analysis and documentation.

Alignment with National Ground Water Monitoring Network (1.5)

The National Ground Water Monitoring Network (NGWMN) was conceived by the Federal Advisory Committee on Water Information (ACWI; http://acwi.gov/) as a framework to consolidate and disseminate ground-water information. The ACWI directed its Subcommittee on Ground Water (SOGW) to develop this framework to support the planning, management, and development of ground water resources to meet current and future needs. The central goal of NGWMN is to provide a structure for a nationally consistent network of selected wells from existing Federal, multi-state, State, Tribal, and local ground water monitoring networks. The focus of the network design is on water levels and water quality in the principal and major aquifers of the United States.

A second aim of NGWMN is the development of a Web-based data portal that dynamically links data bases with end users looking for ground water data. The portal (http://cida.usgs.gov/ngwmn/) serves the data through a map interface.

Ohio EPA hopes to expose the AGWQMP network and its ground water quality data to the greatest number of users possible. This includes eventual inclusion of the AGWQMP into the NGWMN. The ultimate goal of this process is to provide access to AGWQMP data through the NGWMN Data Portal. To accomplish this goal, DDAGW is in the process of documenting that AGWQMP practices and standards are consistent with those of the NGWMN framework to the full extent possible. The *AGWQMP OPD* will provide the bulk of this documentation.

Section 2 – Ambient Monitoring Network

This section describes the distribution of AGWMP wells and provides the rationale for the selection of new wells. Well selection is of course influenced by practical issues, but new well selection must consider the broader issues of characterizing water quality for public water systems to meet the goals of the AGWMP. The options for well status, which dictates sampling frequency, are also described. The criteria for each well status are discussed and the rational for developing new status categories are outlined.

AGWQMP Network (2.1)

Distribution of Wells

Figure 2 illustrates distribution of active Ambient monitoring wells as of March 2014. Of

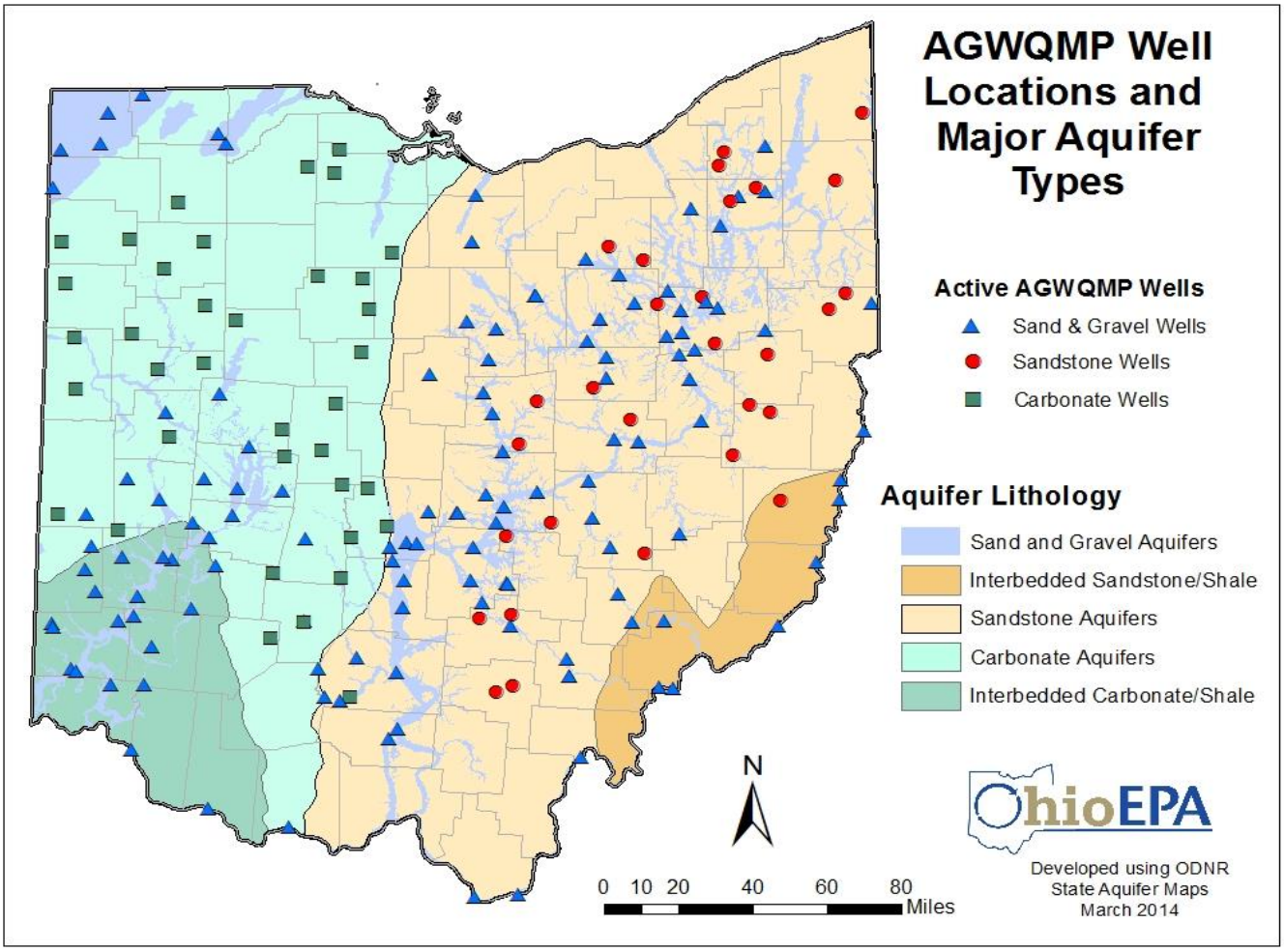


Figure 2. AGWMP Well Locations by Aquifer Type

the active wells, currently 60 % of the wells are in the unconsolidated sand and gravel aquifers, 23% are in limestone aquifers, and 17% are in sandstone aquifers. The subset of active AGWMP wells is dynamic and consequently the interactive map of the Ambient Ground Water Monitoring network on the web is updated periodically. A complete listing of AGWQMP wells is included in Appendix A.

StationID (Well ID) and Naming Protocol

Each well has a unique StationID for correct data association in the Gound Water Quality Characterization Pprogram (GWQCP) database. Once a well (station) is accepted by the AGWMP Planning Group into the Ambient Monitoring Network, a StationID is assigned. When the well is entered into the GWQCP database, the program assigns it a StationID, using the following protocol:

39ADA00001 where:

39 = Federal State Code (e.g., 39 is Ohio);
ADA = County Code, generally the first three letters in the county name;
00001 = System-specific well code, given chronologically by entry within the state (00001 being the first well entered).

Selection Criteria for New Wells

DDAGW has tried to select wells for inclusion in the AGWMP on the basis of the well's production aquifer and geographic location. The goal is to sample wells that are representative of the major aquifers that are used by Ohio public water systems. About 92% of the active AGWMP wells are public water systems to ensure that the program evaluates the source water for public water systems

The following are considered in the decision to add an AGWMP well:

- The well should improve the state-wide geographic and/or hydrogeologic setting distribution;
- The well must be representative of a significant subset of Ohio ground water;
- The well must provide data on ground water that is potentially a source of drinking water;
- Someone has to act as a proponent for the addition the well and present the rationale for the well's addition;
- Staff time and program costs for sampling the well are considered; and
- Considerations, such as access to facilities, proper well construction, safety of the sampling points, and facility willingness to allow sampling by OEPA staff, are evaluated.

Status Codes

Status codes provide important information regarding the:

1) standing of a site or well (active/inactive) and
2) sampling category of a well.

There are three status codes; the first two status codes (Site Status and Well Status) are indicators of whether the site and well are currently active or inactive. The third status code (Sampling Status) provides information about sample scheduling for that particular well as described below.

Site Status - The code elements for Site Status are Active or Inactive.

Well Status - The code elements for Site Status are Active or Inactive.

Sampling Status
Several sampling status categories are identified for AGWMP wells. The main purpose for these categories is to identify the sampling frequency for inorganics and organics at a well. The sample status categories are listed below:

- AS - Active Standard;
- AO - Active Organic
- AR18 - Cycle;
- AR36 - Cycle;
- SB - Stand-By; and
- NO - No Sampling;

Descriptions of each status are provided in Table 1 below.

Table 1: Well Sampling Status Codes

STATUS	COUNT*	DESCRIPTION
AS Active Standard	212	**Active Standard** wells are sampled for inorganics semi-annually and for organics every 18 months. All AGWQMP wells start as Active Standard wells.
AO Active Organic	23	**Active Organic** wells are sampled every 6 months for inorganics and organics because they either: 1) display detects of organic compounds, and/or are 2) considered threatened by an organic plume, and are being monitored.
AR18** Active Rotational	146	**Active Rotational 18** wells are wells that have been determined to be stable from a geochemical viewpoint (no steep trends in a time vs. concentration plot). The stable geochemistry allows sampling for inorganics to be moved to an 18 months frequency. (See additional comments below)

AR36* ** Active Rotational	0	**Active Rotational 36** wells are wells that have been determined to be stable from a geochemical viewpoint (no steep trends in a time vs. concentration plot). The stable geochemistry allows sampling for inorganics to be moved to a 36 months frequency. (See additional comments below)
SB Stand-By	114	**Stand-By** wells are wells that are similar (based on the production aquifer) to the active well at the site. A stand-by well is not sampled unless the current AS or AR well is temporarily unavailable for sampling.
NO No Sampling	224	**No Sampling** wells are not currently sampled, the well is inactive or abandoned.

** AR18 status instituted in 1996;
*** AR36 status instituted in 2015.

Criteria for Inactive Well Status

If an AGWMP well can no longer be sampled due to changes in the well usage or safety issues, or a better well for AGWMP sampling is identified, sampling of an AGWMP well is discontinued, and the well status is changed to INACTIVE and the sampling status is changed to No Sampling. An Inactive well is still part of the AGWMP, since the data collected from the well is valuable for characterizing the ground water. In most cases, the sampling is discontinued as a result of a change in the well usage, such as changing a production well to an observation well, abandoning the well, or drilling a new well replacement.

AGWQMP Samples (2.2)

Ambient Monitoring Samples

AGWQMP samples are raw water samples (pre-treatment) and thus, are distinct from public water system compliance samples, generally collected at the entry point to the distribution system (post-treatment). This section describes the samples collected for the AGWQMP, including the sampling frequencies, rationale for different sampling frequencies, the inorganic and organic parameters analyzed, and the QA/QC samples collected.

Sample Frequency

Wells are sampled for inorganic parameters on a six (6) month, eighteen (18) month, or 36 month frequency depending on the well status. Organic samples are generally collected every 18 months or 36 months. Table 2 provides the inorganic sample frequency for each sample status. In the mid-1990's, well sample status categories were developed in the process of expanding the number of wells in the AGWQMP. The development of a rotational status (AR) was included in this expansion as a means of reducing the inorganic analytical cost for the expanded system by sampling wells with

stable geochemistry less frequently. In 1996 the AR18 Cycle status was initiated and in 2015 the AR36 Cycle status is being phased in by identifying a subset of wells with stable geochemistry and extending their sample frequency to add additional wells. A well must be an AR18 cycle status well for a significant number of sampling rounds before being designated a AR36 Cycle status well.

Table 2: Sampling Frequency	
Sampling Status	**Sampling Frequency**
AS - active standard	Inorganic every 6 months; organics every 18 months
AO - active organic	Inorganics and organics every 6 months
AR18 Cycle - active rotational	Inorganics and organics every 18 months
AR36 Cycle - active rotational	Inorganics and organics every 36 months
SB - standby	Sampled if active well is not available
NO – no sampling	No longer sampled

Sample Rounds

Samples are collected during spring and fall sampling rounds. The sampling period is currently defined as follows:

Spring Round sampling - occurs between February 15 and May 15;
Fall Round sampling - occurs between August 15 and November 15.

Parameters

Samples are sent to the DES laboratory for analysis using standard analytical methods for inorganic and organic parameters. All AGWMP samples are analyzed for the same suites of parameters so the results are easily compared to help characterize the water quality according to aquifer type. Lists of inorganic and organic parameters analyzed are provided in the following Tables. The reader is referred to the *DES Manual of Laboratory Procedures and Field Practices* (2010) for specific information on the analytical methods.

Inorganic Samples

Inorganic samples are currently analyzed for total of 36 parameters, including five field parameters and 31 lab parameters. The analytical methods and detection limits for the 31 laboratory parameters completed by DES are listed in Table 3.

Table 3: AGWMP INORGANIC PARAMETERS

Parameters	Reporting Limits	Analytical Method
Major Constituents	**mg/L**	
Alkalinity, Total	5	SM2320B
Calcium (Ca)	2	ICP METALS – 200.7
Chloride (Cl)	5	SM 4500 Cl-E
Hardness	10	ICP METALS – 200.7
Magnesium (Mg)	1	ICP METALS – 200.7
Potassium (K)	2	ICP METALS – 200.7
Sodium (Na)	5	ICP METALS – 200.7
Sulfate (SO_4)	5	ASTM D516092
Total Dissolved Solids (TDS)	10	SM 2540D
Trace Constituents	**µg/L**	
Aluminum (Al)	200	ICP METALS – 200.7
Arsenic (As)	2	ICPMS LL METALS – 200.8
Barium (Ba)	15	ICP METALS – 200.7
Bromide (Br)	20	USEPA 300.1
Cadmium (Cd)	0.2	ICPMS LL METALS – 200.8
Chromium (Cr)	30	ICPMS LL METALS – 200.8
Copper (Co)	10	ICPMS LL METALS – 200.8
Fluoride (F)	0.10 mg/L	SM 4500-F C
Iron (Fe)	50	ICP METALS – 200.7
Lead (Pb)	2	ICPMS LL METALS – 200.8
Manganese (Mn)	10	ICP METALS – 200.7
Nickel (Ni)	40	ICPMS LL METALS – 200.8
Selenium (Se)	2	ICPMS LL METALS – 200.8
Strontium (Sr)	30	ICP METALS – 200.7
Tritium (^3H)	0.8 T.U.	Electrolytic Enrichment
Zinc (Zn)	10	ICP METALS – 200.7
Nutrients	**mg/L**	
Ammonia (NH_3)	0.05	SM 4500 – NH3 B&E
Chemical Oxygen Demand (COD)	10	410.4

Table 3: AGWMP INORGANIC PARAMETERS		
Nitrate/Nitrite (as N)	0.10	SM 4500 – NO3 H
Phosphorus (P)	0.05	USEPA 365.4
Total Kjeldahl Nitrogen (as N)	0.2	USEPA 351.2
Total Organic Carbon (TOC)	2	SM 5310B
Field Analysis	**Relative Accuracy**	
pH	± 0.02 S.U.	Myron Ultrameter II
Specific Conductance (µmhos/cm)	± 0.5 %	Myron Ultrameter II
Temperature	± 0.1 °C	Myron Ultrameter II
Oxidation-Reduction Potential	± 10 mV	Myron Ultrameter II
Total Dissolved Solids	± 0.4 mg/L	Myron Ultrameter II

Organic Samples

Organic samples are currently collected every 18 months or 36 months, unless the districts have identified specific reasons for a six-month interval, for example, the presence of a plume close to the wellfield.

Volatile Organic Samples

Volatile organic samples are analyzed using U.S. EPA Method 524.2. Table 4 lists the 60 parameters included in Method 524.2. MTBE was added to the parameter list for inclusion in the Fall 2000 sampling round as a result of its mobility and stability in ground water.

Table 4: Volatile Organic List		
Methods: 524.2		
Benzene	1,2-Dichlorobenzene	Methyl-tert-butyl ether
Bromobenzene	1,3-Dichlorobenzene	Naphthalene
Bromochloromethane	1,4-Dichlorobenzene	N-Propylbenzene
Bromodichloromethane	Dichlorodifluoromethane	Styrene(Ethenylbenzene)
Bromoform	1,1-Dichloroethane	1,1,1,2-Tetrachloroethane
Bromomethane	1,2-Dichloroethane	1,1,2,2-Tetrachloroethane
N-Butylbenzene	1,1-Dichloroethene	Tetrachloroethene
Sec-Butylbenzene	Cis-1,2-Dichloroethene	Toluene
Tert-Butylbenzene	Trans-1,2-Dichloroethene	1,2,3-Trichlorobenzene

Carbon Tetrachloride	1,2-Dichloropropane	1,2,4-Trichlorobenzene
Chlorobenzene	1,3-Dichloropropane	1,1,1-Trichloroethane
Chloroethane	2,2-Dichloropropane	1,1,2-Trichloroethane
Chloroform	1,1-Dichloropropene	Trichloroethene
Chloromethane	Cis-1,3-Dichloropropene	Trichlorofluoromethane
2-Chlorotoluene	Trans-1,3-Dichloropropene	1,2,3-Trichloropropane
4-Chlorotoluene	Ethylbenzene	1,2,4-Trimethylbenzene
Dibromochloromethane	Hexachlorobutadiene	1,3,5-Trimethylbenzene
1,2-Dibromo-3-Chloropropane	Isopropylbenzene	Vinyl Chloride
1,2-Dibromoethane	4-Isopropyltoluene	O-Xylene
Dibromomethane	Methylene Chloride	M-Xylene &/or P-Xylene

Semi-Volatile Organic Samples

Semi-Volatile Organic Samples are analyzed using U.S. EPA Method 625 (base, neutral, & acid extractable, BNA). Table 5 lists the 53 parameters included in Method 625.

Table 5: Base Neutral & Acid Extractable Organic List		
Method: 625		
Acenaphthalene	Chrysene	Hexachlorocyclopentadiene
Acenaphthene	Di-N-butyl phthalate	Hexachloroethane
Anthracene	Di-N-octyl phthalate	Indeno (1,2,3-CD) pyrene
Benzo (A) anthracene	Dibenzo (a,h) anthracene	Isophorone
Benzo (A)pyrene	1,2-Dichlorobenzene	2-Methyl-4,6-Dinitrophenol
Benzo (B) fluoranthene	1,3-Dichlorobenzene	Naphthalene
Benzo (G,H,I) perylene	1,4-Dichlorobenzene	Nitrobenzene
Benzo (K) fluoranthere	2,4-Dichlorophenol	2-Nitrophenol
Benzylbutyl phthalate	Diethyl phthalate	4-Nitrophenol
Bis(2-Chloroethoxy) Methane	Dimethylphthalate	N-Nitrosodiphenyl Amine
Bis(2-Chloroethyl) ether	2,4-Dimethylphenol	N-Nitroso-n-propylamine
Bis(2-Chloroisopropyl) ether	2,4-Dinitrophenol	Pentachlorophenol
Bis(2-Ethylhexyl) phthalate	2,4-Dinitrotoluene	Phenanthrene
4-Bromophenyl-phenyl ether	2,6-Dinitrotoluene	Phenol
4-Chloro-3-Methyl Phenol	Fluoranthene	Pyrene
2-Chloronaphthalene	Fluorene	1,2,4-Trichlorobenzene
2-Chlorophenol	Hexachlorobenzene	2,4,6-Trichlorophenol
4-Chlorophenyl-phenyl ether	Hexachlorobutadiene	

Pesticide Organic Samples

Pesticide organic samples are analyzed using U.S. EPA Method 525.2 (herbicides). The parameters include common herbicides listed below in Table 6. The earliest

pesticide analyses (1996) had only six parameters analyzed as opposed to the 1998 samples with 11 parameters.

Table 6: Pesticide List		
Methods: 525.2		
Alachlor	bis(2-Ethylhexyl)phthalate	Metribuzin
Atrazine	Butachlor	Propachlor
Benzo[a]pyrene	Cyanizine	Simazine
bis(2-Ethylhexyl)adipate	Metolachlor	

QA/QC Samples

OA/QC samples, including field blanks, duplicates, blind duplicates, matrix spike duplicates, and trip blanks, are collected to assess the potential impact of a contaminant on field sampling procedures and confirm the precision of analytical procedures. These samples allow both the laboratory chemist and data analyst to be confident that proper procedures were followed for field sampling and analytical processes. Recent budget restrictions have led to reduction in QA/QC samples targets to minimum requirements established in 2003.

Currently, each district collects one duplicate sample for inorganics per round. One matrix spike duplicate is collected by each district each round and trip blanks are transported with VOC samples.

Sample Projection Program

The sample projection program is used to identify the samples to be collected in the next sampling round. The program queries the database to select the most recent sample at each active well and then projects the next sample to be collected at that well based on the well Sampling Status (6, 18 or 36 months) and identifies the sample round for the next inorganic and organic sample by the spring or fall round and year. This program utilizes the most current sampling information for projecting the next samples and includes the correct station ID and well number to help assure that the correct sites are sampled and properly documented on the sample submission forms.

Documentation (2.3)

Sample Documentation Forms

AGWQMP samples are submitted with sample submission forms (SSF) generated electronically. Site and well information are pulled from the GWQCP database and parameters are selected from template options to minimize errors. Templates can be modified for special conditions. A chain-of-custody form is completed by the sampler and travels with the samples, with appropriate sign-offs as samples are transferred from samplers to transporters and finally, to the DES Lab.

Operations Procedures Document

The AGWQMP Operation Procedure Document provides a complete description of the procedures utilized to operate Ohio's AGWQMP. This document includes the details necessary to run the AGWQMP on a day-to-day basis. The OPD is intended to be used by Ohio EPA DDAGW staff to manage the AGWQMP in a consistent manner over multiple sampling rounds. As procedures evolve, the OPD is revised to reflect the changes. The *AGWQMP OPD* is available for review if the reader is interested in additional information on any of the sections included in this program description. The structure of the *AGWQMP OPD* is similar to this program description and the numbers in parentheses are chapter sections in the *AGWQMP OPD*.

Section 3 - DIVISION OF ENVIRONMENTAL SERVICES LABORATORY ANALYTICAL PROCEDURES

Analytical Procedures

The Division of Environmental Services has completed almost all of the AGWQMP analytical results. All AGWMP samples are analyzed for the same suite of parameters so the results are easily compared to help characterize the water quality according to aquifer type. The consistent analytical capacity and high quality results provided by the DES Lab are a valuable element of the AGWQMP. The reader is referred to the *DES Manual of Laboratory Procedures and Field Practices* (2010) for specific information on the analytical methods. In some cases, AGWMP has contracted outside labs for analysis of analytes not performed by DES (for example, tritium), but very nearly 100% of samples generated for the AGWQMP are analyzed by DES.

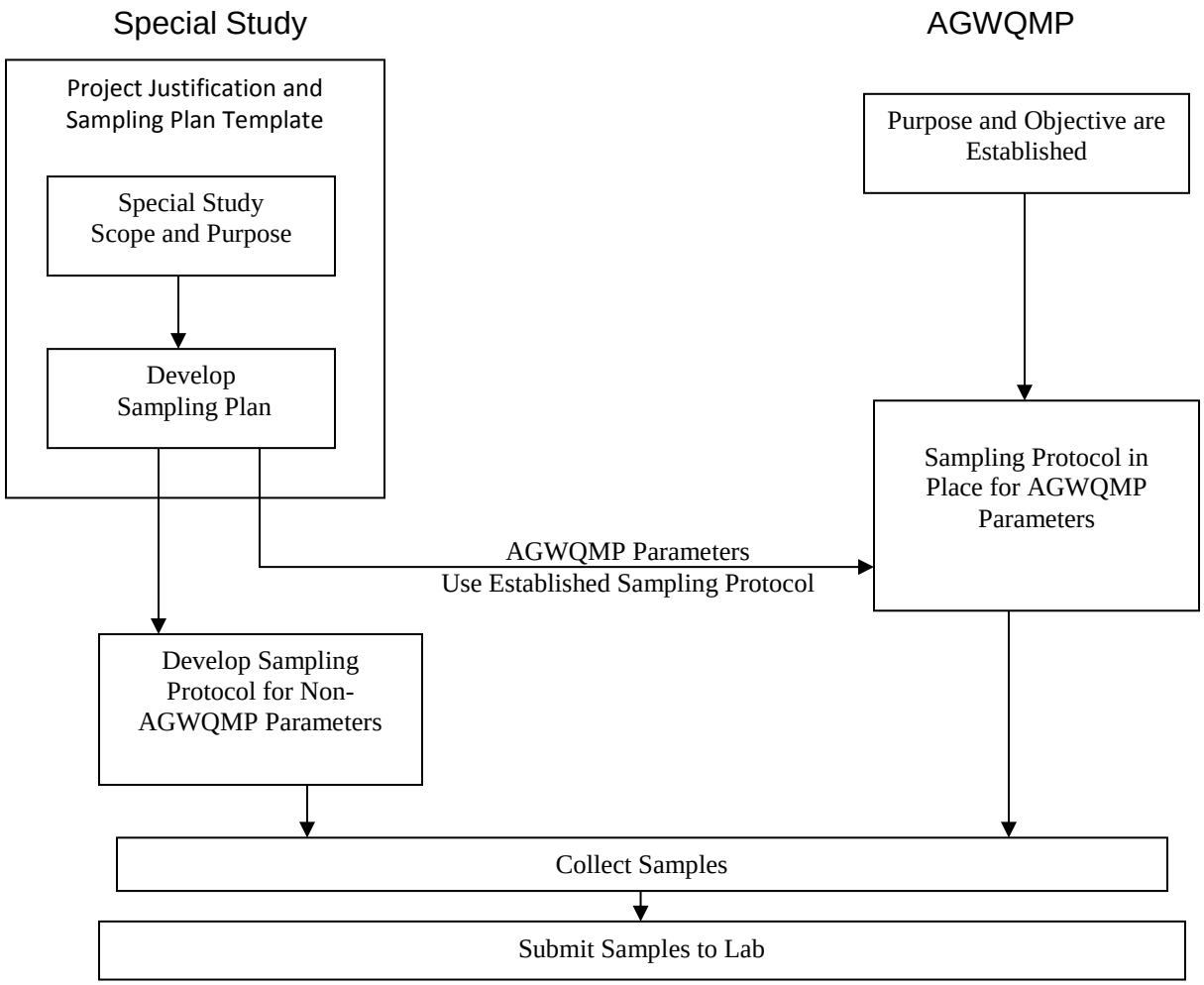
Section 4 - SAMPLE COLLECTION AND FIELD ANALYSIS

This section addresses preparing for sampling, collecting raw water samples, measuring field parameters, transporting samples to the DES laboratory for analysis, and entering required documentation into the GWQCP database. Following appropriate and consistent procedures for these activities is the first step to assuring the high quality data desired for the AGWMP.

Sampling Objectives (4.1)

The objective of sampling and field analysis is to collect raw ground water samples and field data in a systematic manner to ensure that sample results are representative. The flow chart in Figure 3 outlines procedures for developing approved sample plans and sampling protocols for special studies and the AGWQMP.

Figure 3. Sample Collection Flow Chart



For the Division of Drinking and Ground Waters, sampling is completed for the AGWQMP or for special studies. The objectives, sampling plan, and sampling protocol are established for the AGWQMP as outlined in this document and presented in detail in the *AGWQMP OPD*. A procedure has been approved for developing project justifications and sample plans for special studies. In general, special studies will utilize the AGWQMP sample protocols for the special studies parameters that overlap with AGWQMP sampling. If a special study includes parameters that are not analyzed in the AGWQMP, protocols for collecting samples for these parameters need to be developed and outlined in the sample plan. AGWQMP samples are collected from raw water sample taps on pumped wells and specials studies may sample wells or borings without dedicated pumps. The special studies sample plan needs to identify the sampling methods used for the study and to outline the systematic steps to follow during sampling. The goal is to collect ground water samples that are characteristic of local aquifers.

AGWQMP Sampling Protocol (4.3)

AGWQMP sampling occurs during spring and fall sampling rounds. District offices collect the samples and central office oversees the data import and approval into GWQCP. The following sections summarize the sampling procedures and capture the main elements and QA/QC related issues to provide the reader with confidence in the quality of these data. The details of each of these elements, however, are included in the *AGWQMP Samplers Guide* in the *AGWQMP OPD*.

Preparation/Support for Sampling Round - Ambient Coordinator

Each AGWMP sampling round requires the district ambient coordinator to complete certain tasks prior to sampling:

1. Set up the district sampling routes and identify the QA/QC samples;
2. Confirm that field meter/meters are available and operating properly;
3. Check that necessary supplies are on hand for the sampling round.

Preparation for Sampling - Sampler

The sampler needs to complete several tasks prior to the sampling run:

1. Check directions to sample locations and call the sample sites to confirm the availability of the well for sampling; Set up approximate sampling time;
2. Schedule sample delivery with the DES lab;
3. Make sure that the field meter is working properly;
4. Print sample submission forms and sample labels;
5. Reread the *Ambient Samplers Guide* to review the sampling procedures and confirm that the necessary equipment and supplies are available.

Sample Collection Protocol (4.4)

The sample collection protocol for the AGWMP listed below focuses on sample procedures for active public water supply wells. The *Technical Guidance Manual for Hydrogeologic Investigations and Ground Water Monitoring* is the primary resource for developing sample procedures for special studies when needed.

On the day of sampling: Load up the sampling equipment and review that all needed gear and supplies are included, including ice and coolers. Drive to the first sampling locality. Upon arriving in the vicinity of the well to be sampled:

1. Meet with local contact and gain access to the well.

2. Confirm that the PWS well has been running for a minimum of 20 minutes.

3. Calibrate pH meter before collecting the first sample.

4. Set out sampling equipment and fill out Field Data Log.

5. Clean off the sample tap and remove any screens. Open tap for five to ten minutes to remove any debris.

6. If containers were not pre-labeled, attach labels to containers.

7. If necessary, purge the well (hand pump).

8. Collect field parameter data - temperature, pH, specific conductance, TDS and ORP and record results on the Field Data Log.

9. Sample collection –
   - Adjust sample tap to steady, laminar, low-flow stream for sample collection. Allow some flush time after tap adjustment to flush out any debris loosened with valve adjustment.
   - Confirm that field parameters are stable.
   - Wear latex gloves for sampling.
   - Collect VOC sample first - 2 40 mL septum vial (with preservative added) with no bubbles.
   - Collect Inorganic Sample – 3 quart cubitainers:
     - One 1 liter/quart cubitainer preserved with 5 mL nitric acid (NHO_3);
     - One 1 liter/quart cubitainer preserved with 2 mL sulfuric acid (H_2SO_4);
     - One 1 liter/quart cubitainer non-preserved.
     - Leave a little headspace in the cubitaners.

10. Collect Special Samples - additional samples may be collected, such as SVOC or pesticide samples.

11. Preserve samples with labeled preservative, if not pre-preserved.

12. Check that samples are properly labeled and store samples on ice.

13. Clean and stow equipment, check area for trash.

14. Review field notes for inclusion of unusual sampling conditions or events, confirm that field data and sample times were recorded.

15. Upon returning to the office or on the following day, enter the field data and field notes including any unusual circumstances for the samples collected.

Field QA/QC Samples (4.5)

The district coordinator identifies any QA/QC samples that need to be collected on the sample run list. QA/QC samples are collected at a rate of approximately 5 percent. The QA/QC samples collected are listed below:

Field Blanks - If a field blank is included in the sample run, a carboy with nanopure™ needs to be transported to the field. The field blank is collected in the field at the site where a raw ground water sample is collected and with the same containers and preservatives, but using nanopure™ to fill the field blank sample containers. No sampling equipment is reused for collecting AGWQMP sample; consequently, there is little need for equipment/field blanks.

Duplicates - A duplicate sample is a second identical sample (two complete sets of sample bottles and separate Sample Submission Forms). Duplicate samples need to be labeled Dup A and Dup B on the sample bottles and on the Sample Submission Form.

Trip Blanks (VOC only) - For collection of organic samples, a trip blank should be included in each cooler delivered to the OEPA laboratory that contains organic samples. Only one trip blank per sampling run is needed if all the VOC samples for that days sampling run are included in the same cooler. DES generates the trip blanks and provides them to the districts.

Matrix Spike Duplicate (VOC only) - MSD samples require a duplicate VOC sample (two separate 40 mL vials for a total of four (4) 40 mL vials) and should be labeled as any organic sample is with the addition of MSD on the two vials. The sample and MSD sample are both submitted with one Sample Submission Form with the QA/QC MSD oval checked.

Sample Submission (4.6)

Most samples for the AGWQMP are submitted using CyberIntern, an automated program, to generate the sample submission form (SSF) and labels for sample bottles. This program pulls names and stationIDs from the GWQCP database which avoids transcription errors. CyberIntern prints a unique barcode for each sample on the SSF and the container labels to associate results and location.

Sample Submission Form

Proper documentation on the Sample Submission form is critical to associating the results to the well sampled. Since the AGWQMP sampling is completed at a six-month frequency, it is easy to forget the correct information to include on the sample submission form. The use of CyberIntern is helpful because the critical information on the SSF is pulled directly from the GWQCP database.

Chain of Custody Form

The Chain of Custody form (COC) must be filled out completely for the samples delivered or sent to the Lab. All the samples collected on the same day, by the same samplers in the same sampling run (but different locations) can be included on the same COC Form. Fill out the Collected by, Ohio EPA District, Division, Date of Grab Sample, and Location(s) sections of the COC. Indicate the number of QA/QC samples, the Sample Types, Condition of Container of Transfer, indicate the Number of Samples, and sign and date the form at the time of transfer.

Sample Delivery to DES Laboratory

After sampling is completed at a well, the samples should be packed in a cooler on ice. The coolers need to be delivered or sent to the DES laboratory by the sampler or by courier for delivery the next morning. At the lab, samples are set out on the counter by location/station for logging the samples in by DES staff.

Training - Ambient Samplers Guide (4.7)

The AGWMP district coordinators requested that an *AGWQMP Samplers Guide* be generated to help promote uniform sampling procedures. The previous portions of Sections 4 (4.1-4.6) provide a summary of the procedures. The *AGWQMP Samplers Guide* provides detailed, step-by-step procedures to be followed and is available in the *AGWQMP OPD*. The *AGWQMP Samplers Guide* is particularly helpful to new samplers and can be used as a document to help train ambient samplers. New samplers will accompany an experienced sampler on several AGWQMP sampling runs prior to sampling on their own. Because AGWQMP sampling is completed on a 6 month interval, it is difficult to remember all of the sampling steps. Thus, samplers can use the *AGWQMP Samplers Guide* to review the AGWQMP sampling procedures.

Field Equipment (4.8)

Field parameters provide important data to support laboratory analysis. Care must be taken to assure that the equipment necessary to complete field sampling is available and that the equipment is properly maintained, calibrated, and stored in a clean, dry, and locked area, which is designated for AGWMP equipment.

When collecting field data, make sure the storage solution residue is completely rinsed out of the sample cups before recording field data.

Section 5 - AGWQMP Data Management

Data management for the AGWQMP was upgraded in 2013 from the unsupported STORET system (utilized from 2002 to 2013) to a new, web-based application named GWQCP (**G**round **W**ater **Q**uality **C**haracterization **P**rogram). This database management system was built using major elements of the Division of Surface Water's EA3 application, with customization for specific needs of the AGWQMP and special studies for DDAGW. It utilizes an ORACLE data table back-end, alongside a web-based user interface built mainly on the Java language. The scope of this new application was purposely kept broad to allow a range of ground water data to be imported, including AGWQMP data. The description here focuses primarily on the general processes for importing, reviewing, and approving AGWQMP data for inclusion in GWQCP. This broad description is intended to provide the reader with the framework of the GWQCP database, processes utilized for data import, approval, and retrieval, and for the care with which these processes are completed. Chapter 5 of the *AGWQCP OPD* provides the detail to manage these processes on a day-to-day basis. Detailed information about the GWQCP database is provided in the *GWQCP User Guide*.

GWQCP Structure (5.1)

The structure of the GWQCP consists of four main elements: Projects, Sites, Chemistry, and Administration. Each has search capacities to locate individual projects, sites or samples. Samples are collected in association with a project. The projects tab includes structured descriptions including: Purpose, Area, Design, Work Plan, and QA Plan. Detailed project description documents can be attached to individual projects.

Sites are the facilities that own the wells. The site tab includes metadata on the site including; name, site type, location, travel directions, etc. Wells are associated with sites, with sites to wells as a one-to-many relationship. Within the database, wells are selected by selecting the site first, and then selecting the well of interest. Chemistry or results are associated with wells, so samples are associated with the well it was collected from. The administration tab is used to add new samplers and manage the rights that individual using the database have. Projects, sites and wells all have status

codes to help identify the currently active sites. In addition, wells have a sampling status, which is used to determine when an active site is sampled. The GWQCP database is described in detail in the *GWQCP Users Guide*. The *2014 AGWQMP OPD* provides additional information on GWQCP to help manage the day-by-day operation of the AGWQMP or other active special studies.

CyberIntern

CyberIntern is a separate web-based application that DDAGW staff use to generate labels and sample submission forms with instructions to run the samples for the parameters included in the AGWQMP templates. CyberIntern pulls data from GWQCP so the sites and wells are identified accurately to avoid transcription errors. CyberIntern is also used to capture the field data and field comments, which are linked to the DES sample results in the data import process.

GWQCP Permissions

Most users of GWQCP have only-read only rights. Samplers have rights to edit and approve their samples. Administrators have rights to all functions of GWQCP database, including adding new projects, sites, and wells. Importing and approving data is normally completed by staff with administrator permissions. Sample analytical results are owned by DES and thus, cannot be edited. In the approval and editing process, results for individual parameters can be excluded. Field data is owned by DDAGW and can be edited. Once a sample is approved, no editing is allowed. Errors that are identified can be corrected, but only by requesting a database administrator (DBA) to make corrections/edits.

Data Transfer to US EPA WQX Portal

The GWQCP database application includes data transfer through an XML data transfer process to US EPA Storet warehouse through the Water Quality Exchange network (WQX). The WQX is a data-sharing framework that defines a standard set of required data elements. GWQCP was built with these data transfer requirements in mind, so that the XML data flow to the WQX node is seamless. The data transfer from GWQCP to STORET/WQX is performed on a semi-annual basis by DDAGW-Information Management staff.

General Data Flow (5.2)

After deciding what sites/wells will be sampled, CyberIntern is used to generate sample labels and sample submission forms. CyberIntern provides a unique external ID with a bar code that is used to identify the sample. When the sample is collected, field parameters are taken and recorded along with any appropriate field comments. The samples are delivered to the DES lab, where the barcode is read to provide electronic information associated with the sample, such as location, well number, sample date, etc. Only the sample time needs to be entered. The lab proceeds to complete the analysis. The sampler returns to the office and opens CyberIntern, locates the record

created when the sample submission form and label were generated, and then enters the field data and any field comments associated with the sample. This information is associated with the unique external ID that is included on the label and sample submission form.

Once the sample analysis is completed by the DES lab and meets its QA/QC procedures, the results are posted in the DES view. A data manager uses sequel server to query the view for external IDs that match AGWQMP samples generated in CyberIntern. The DES results and sample time are matched with location and sample date stored in CyberIntern and the entire record is sent to the GWQCP staging table for import. On a weekly basis, CO staff receive a report that lists the GWQCP samples sent to the GWQCP staging tables and which are available to be imported into GWQCP. CO staff imports these samples in groups. Minor adjustments may have to be made to the sample metadata to import the sample. After import, all samples are approved on an individual sample basis. If the review process identifies inconsistencies or problems with sample documentation (e.g. well and stationID don't match - indicating the results are not associated with the proper well), communication with the sampler or district coordinators address these issues before a sample is approved.

End-Of-Round Report (5.3)

The End-of-Round Report (EOR Report), completed at the end of a sample cycle, summarizes the previous round and records major events or issues that occurred during the previous sampling round. The focus is QA/QC and data validation of the recent data to assure data quality. Report sections include:

- Comments/Issues on Past Round;
- Comments/Issues for Next Round;
- Sample Summary;
- Inorganic Sample Summary;
    - Evaluates charge balance errors, MCL comparisons, outlier analysis; and duplicate analyses for the recent data;
- Organic Sample Summary - evaluates the VOC detections;
- QA/QC Sample Summary;
- Analytical Budget summary; and
- Updates and future Directions for AGWQMP.

This report is a tool for documenting and summarizing all major AMN activities and completing appropriate QA/QC activities, and so provides consistency in AMN tasks from round to round. This report is an evolving document, with the goal of presenting only the most useful information for samplers, coordinators, and managers.

GWQCP Data Access and Reports (5.4)

Although sample data can be viewed in GWQCP, the database is not set up for reviewing sample results. Consequently, InfoMaker reports were generated to select

and extract data from GWQCP with several options for printing individual sample data sheets or for saving groups of samples in spreadsheets for data analysis. Two categories of reports are available within the GWQCP system: dynamic and static. Dynamic reports are those that DDAGW staff can generate on demand. This ensures that staff has access to reports that reflect the latest data loaded into GWQCP. Static reports are those that are already generated and viewable online, or printable in hardcopy, typically in .pdf format. Since these reports have already been run, they are necessarily out of date to some degree. Web-based static reports are the only ones the public can currently access, however the public can access all the AGWQMP data on the Web at: http://www.epa.ohio.gov/ddagw/gwqcp.aspx On the Ground Water Quality Characterization Program web page, go to the Access Data tab and follow the instruction for downloading raw data.

Appendix A
AGWQMP Wells Listed Alphabetically By Site Name

Name	County	Well ID	Well Number	Well Depth	Major Lithology	Geologic Seting	Well Status	Sampling Status
Acoe-Mariemont	Hamilton	39HAM00036	4	40	UNC	Buried_Valley	Inactive	NoSampling
Ada WTP	Hardin	39HRD00408	5	150	LS	LS_Bedrock	Active	ActiveRotational
Ada WTP	Hardin	39HRD08921	7	155	LS	LS_Bedrock	Active	Standby
Adams County Water Co.	Adams	39ADA00217	1	0	UNC	Buried_Valley	Active	Standby
Adams County Water Co.	Adams	39ADA00070	4	66	UNC	Buried_Valley	Active	ActiveStandard
Adamsville Elem School	Muskingum	39MUS05492	BF	180	SS	SS_Bedrock	Inactive	NoSampling
Amanda Wellfield	Fairfield	39FAI00277	1	80	SS	SS_Bedrock	Inactive	NoSampling
American Can Wellfield	Knox	39KNO00259	7	96	UNC	Buried_Valley	Inactive	NoSampling
Andover WTP	Ashtabula	39ATB00401	7	73	SS	SS_Bedrock	Active	ActiveRotational
Anna Wellfield	Shelby	39SHE00421	4	123.5	UNC	Buried_Valley	Active	ActiveRotational
Anna Wellfield	Shelby	39SHE08924	5	103.5	UNC	Buried_Valley	Active	Standby
Ansonia Village	Darke	39DAR00054	1	84.5	UNC	Alluvial	Inactive	NoSampling
Arcanum Water & Light	Darke	39DAR00035	2	29	UNC	Moraine_LS_Bedrock	Inactive	NoSampling
Arcanum Water & Light	Darke	39DAR08899	4	42	UNC		Active	ActiveStandard
Arcanum Water & Light	Darke	39DAR00381	5	83	LS	LS_Bedrock	Inactive	NoSampling
Armco Steel Corp 2	Fayette	39FAY00020	1	215	UNC	Moraine_LS_Bedrock	Inactive	NoSampling
Ashland Chemical	Franklin	39FRA00066	1	155	LS	LS_Bedrock	Active	ActiveRotational
Ashland WTP	Ashland	39ASH00135	1	91	UNC	Buried_Valley	Inactive	NoSampling
Ashland WTP	Ashland	39ASH00183	4	325	UNC	Buried_Valley	Active	ActiveRotational
Ashland WTP	Ashland	39ASH00136	5	97	UNC	Buried_Valley	Active	ActiveRotational
Ashley Wellfield	Delaware	39DEL00269	1	28	UNC	Alluvial	Inactive	NoSampling
Ashville Wellfield	Pickaway	39PIC00232	1	65	UNC	Buried_Valley	Inactive	NoSampling
Ashville Wellfield	Pickaway	39PIC08888	3	74	UNC	Buried_Valley	Active	ActiveStandard
ASM International	Geauga	39GEA08750	1	150	SS		Active	Standby
ASM International	Geauga	39GEA00198	2	138	SS		Active	ActiveStandard
Athens City Of	Athens	39ATH00024	2A	52	UNC	Buried_Valley	Active	ActiveStandard

Athens City Of	Athens	39ATH08927	3A	57	UNC	Buried_Valley	Active	ActiveStandard
Bainbridge Wellfield	Ross	39ROS08782	3	87	UNC	Alluvial	Active	Standby
Bainbridge Wellfield	Ross	39ROS00425	4	77	UNC	Alluvial	Active	ActiveStandard
Baltimore Wellfield	Fairfield	39FAI00278	1	175	UNC	Buried_Valley	Active	ActiveRotational
Baltimore Wellfield	Fairfield	39FAI07258	2	169	UNC	Buried_Valley	Active	Standby
Battelle Darby Metro Park	Franklin	39FRA00225	3	55	LS	LS_Bedrock	Active	ActiveRotational
Beaverdam Village Of	Allen	39ALL08919	3	435	LS	LS_Bedrock	Active	ActiveStandard
Bellville Village Of	Richland	39RIC08896	4	92	UNC	Buried_Valley	Active	ActiveStandard
Bellville Village Of	Richland	39RIC08898	5	92	UNC	Buried_Valley	Active	Standby
Belmont County Sanitary District	Belmont	39BEL00114	1	73	UNC	Buried_Valley	Active	ActiveStandard
Belmont County Sanitary District	Belmont	39BEL00151	3	75	UNC	Buried_Valley	Active	Standby
Belmont Wellfield	Belmont	39BEL08925	6	45	SS	SS_Bedrock	Active	ActiveStandard
Belpre Wellfield	Washington	39WAS00067	1	61	UNC	Buried_Valley	Active	ActiveStandard
Beverly Wellfield	Washington	39WAS00068	4	63.7	UNC	Buried_Valley	Inactive	NoSampling
Beverly Wellfield	Washington	39WAS08884	5	51	UNC	Buried_Valley	Active	ActiveOrganic
Big Island Wildlife Area	Marion	39MAR00008	2	235	LS	LS_Bedrock	Inactive	NoSampling
Bloomville Waterworks	Seneca	39SEN00123	2	165	LS	LS_Bedrock	Active	ActiveRotational
Bluffton South WTP	Allen	39ALL08882	1	340	LS	LS_Bedrock	Inactive	NoSampling
Bluffton South WTP	Allen	39ALL00130	3	100	LS	LS_Bedrock	Abandoned	NoSampling
Bolivar Wellfield	Tuscarawas	39TUS08918	2	100	UNC	Buried_Valley	Active	Standby
Bolivar Wellfield	Tuscarawas	39TUS00168	4	100	UNC	Buried_Valley	Active	ActiveStandard
Bowerston Wellfield	Harrison	39HRS02770	1	140	SS	SS_Bedrock	Active	ActiveStandard
Bremen Wellfield	Fairfield	39FAI08906	1	0	UNC	Buried_Valley	Active	Standby
Bremen Wellfield	Fairfield	39FAI00220	2	60	UNC	Buried_Valley	Active	ActiveOrganic
Bremen Wellfield	Fairfield	39FAI08913	5	67	UNC	Buried_Valley	Active	ActiveOrganic
Brewster Wellfield	Stark	39STA00172	4	105	UNC	Buried_Valley	Active	ActiveRotational
Brighton Mosteller Plant	Hamilton	39HAM00057	2	70	UNC	Buried_Valley	Inactive	NoSampling
Brown County RWA	Brown	39BRO00419	5	65	UNC	Buried_Valley	Active	ActiveRotational
Brown County RWA	Brown	39BRO07020	6	86	UNC	Buried_Valley	Active	Standby
Bryan Waterworks	Williams	39WIL00100	4	147	UNC	Lacustrine	Active	ActiveRotational
Bryan Waterworks	Williams	39WIL00237	5	0	UNC	Lacustrine	Active	Standby

Byesville Wellfield	Guernsey	39GUE00091	1	0	SS	SS_Bedrock	Inactive	NoSampling
Byesville Wellfield	Guernsey	39GUE08923	2	0	SS	SS_Bedrock	Inactive	NoSampling
Camden Wellfield	Preble	39PRE00050	2	41	UNC	Alluvial	Inactive	NoSampling
Camden Wellfield	Preble	39PRE00377	3	45	UNC	Alluvial	Inactive	NoSampling
Canal Fulton	Stark	39STA00213	4	169	UNC	Buried_Valley	Active	Standby
Canal Fulton	Stark	39STA00173	6	172	UNC	Buried_Valley	Active	ActiveRotational
Canton Northeast WTP	Stark	39STA00162	17	196	UNC	Buried_Valley	Active	ActiveRotational
Canton Northwest WTP	Stark	39STA08904	4	120	UNC	Buried_Valley	Active	ActiveStandard
Canton Northwest WTP	Stark	39STA00163	5	132	UNC	Buried_Valley	Abandoned	NoSampling
Canton Northwest WTP	Stark	39STA08895	7	132	UNC	Buried_Valley	Active	Standby
Canton Sugarcreek Wellfield	Tuscarawas	39TUS06279	10	250	UNC	Buried_Valley	Active	Standby
Canton Sugarcreek Wellfield	Tuscarawas	39TUS00243	8	250	UNC	Buried_Valley	Inactive	NoSampling
Canton Sugarcreek Wellfield	Tuscarawas	39TUS00174	9	250.75	UNC	Buried_Valley	Active	ActiveRotational
Capt. Anthony Meldahlm	Clermont	39CLE00063	1	105	UNC	Buried_Valley	Inactive	NoSampling
Carey Wellfield	Wyandot	39WYA00131	2	130	LS	LS_Bedrock	Active	Standby
Carey Wellfield	Wyandot	39WYA00205	3	130	LS	LS_Bedrock	Active	ActiveStandard
Carroll Wellfield	Fairfield	39FAI00274	1	74	UNC	Buried_Valley	Inactive	NoSampling
Carrollton Wellfield	Carroll	39CAR00169	1	135	SS	SS_Bedrock	Active	Standby
Carrollton Wellfield	Carroll	39CAR08903	2	125	SS	SS_Bedrock	Active	ActiveStandard
Carter Jones Lumber	Greene	39GRE00044	1	145	UNC	Buried_Valley	Inactive	NoSampling
Castalia (OTC)	Erie	39ERI05449	MB4	150	LS	LS_Bedrock	Inactive	NoSampling
Catalpa Grove MHP	Montgomery	39MOT00034	1	40	UNC	Buried_Valley	Inactive	NoSampling
Centrex Corp.	Hancock	39HAN00132	1&2	310	LS	LS_Bedrock	Inactive	NoSampling
Champion Paper Mill	Butler	39BUT00040	4	168	UNC	Buried_Valley	Inactive	NoSampling
Chauncey Wellfield	Athens	39ATH00078	1	50	UNC	Buried_Valley	Inactive	NoSampling
Chauncey Wellfield	Athens	39ATH00147	2	57	UNC	Buried_Valley	Active	ActiveRotational
Chillicothe Wellfield	Ross	39ROS08738	18	0	UNC	Buried_Valley	Abandoned	NoSampling
Chillicothe Wellfield	Ross	39ROS00095	19	89	UNC	Buried_Valley	Active	ActiveRotational
Chippewa Lake	Medina	39MED00439	1	220	SS	SS_Bedrock	Active	ActiveStandard
Circleville Wellfield	Pickaway	39PIC04954	3	126	UNC	Buried_Valley	Active	Standby
Circleville Wellfield	Pickaway	39PIC00193	4	125	UNC	Buried_Valley	Active	ActiveRotational
Clarington Water Dept	Monroe	39MRE00369	1	70	UNC	Buried_Valley	Active	Standby
Clarington Water Dept	Monroe	39MRE00025	B	70	UNC	Buried_Valley	Active	ActiveRotational

Cleves Wellfield	Hamilton	39HAM00257	3	64	UNC	Buried_Valley	Inactive	NoSampling
Coldwater Waterworks	Mercer	39MER00207	1	245	LS	LS_Bedrock	Active	Standby
Coldwater Waterworks	Mercer	39MER00096	5	241	LS	LS_Bedrock	Active	ActiveRotational
Collingwood Water Supply Corp	Lucas	39LUC00138	1	522	LS	LS_Bedrock	Inactive	NoSampling
Columbia Gas LNG	Seneca	39SEN00022	3	123	LS	LS_Bedrock	Inactive	NoSampling
Columbiana PWS	Columbiana	39COL08914	4	265	SS	SS_Bedrock	Active	ActiveStandard
Columbiana PWS	Columbiana	39COL08915	8	0	SS	SS_Bedrock	Inactive	NoSampling
Columbus South Wellfield	Franklin	39FRA00402	101	71	UNC	Buried_Valley	Active	ActiveStandard
Columbus South Wellfield	Franklin	39FRA00403	103	102	UNC	Buried_Valley	Active	Standby
Convoy Waterworks	Van Wert	39VAN00154	4	267	LS	LS_Bedrock	Active	ActiveRotational
Cortland Wellfield	Trumbull	39TRU00438	5	318	SS	SS_Bedrock	Active	ActiveRotational
Coshocton Wellfield	Coshocton	39COS00086	6	82	UNC	Buried_Valley	Active	ActiveRotational
Covington Wellfield	Miami	39MIA00055	6	144	UNC	Alluvial	Active	ActiveRotational
Covington Wellfield	Miami	39MIA07115	9	0	UNC	Alluvial	Active	Standby
Craig Beach Wellfield	Mahoning	39MAH00442	5	160	SS	SS_Bedrock	Inactive	NoSampling
Crestline Wellfield	Richland	39RIC00145	2	195	UNC	Buried_Valley	Inactive	NoSampling
Crestline Wellfield	Richland	39RIC00204	3	206	UNC	Buried_Valley	Active	ActiveRotational
CSOE-Conesville Station	Coshocton	39COS00016	2	92	UNC	Buried_Valley	Inactive	NoSampling
Cygnet Wellfield	Wood	39WOO00133	1	209	LS	LS_Bedrock	Abandoned	NoSampling
Cygnet Wellfield	Wood	39WOO00206	3	188	LS	LS_Bedrock	Inactive	NoSampling
Danville Wellfield	Knox	39KNO00229	1	235	SS	SS_Bedrock	Inactive	NoSampling
Danville Wellfield	Knox	39KNO07257	3	250	SS	SS_Bedrock	Inactive	NoSampling
Danville Wellfield	Knox	39KNO08910	5	345	SS	SS_Bedrock	Active	ActiveOrganic
Darbyville Wellfield	Pickaway	39PIC00275	1	26	UNC	Buried_Valley	Inactive	NoSampling
Dayton Miami Wellfield	Montgomery	39MOT00251	10R	150	UNC	Buried_Valley	Active	ActiveStandard
Dayton Miami Wellfield	Montgomery	39MOT00105	15R	165	UNC	Buried_Valley	Inactive	NoSampling
Dayton Miami Wellfield	Montgomery	39MOT08900	9R	153	UNC	Buried_Valley	Active	Standby
Dayton Ottawa Wellfield	Montgomery	39MOT00037	2	115	UNC	Buried_Valley	Inactive	NoSampling
Dayton Ottawa Wellfield	Montgomery	39MOT00104	3	135	UNC	Buried_Valley	Active	Standby
Dayton Ottawa Wellfield	Montgomery	39MOT00141	4R	115	UNC	Buried_Valley	Active	ActiveRotational
Deed's Dairy	Fairfield	39FAI00262	114	25	UNC	Buried_Valley	Inactive	NoSampling
Deercreek School Wellfield	Madison	39MAD00261	1	47	UNC	Complex	Inactive	NoSampling
Dover Wellfield	Tuscarawas	39TUS08740	0	100	UNC	Buried_Valley	Active	Standby

Dover Wellfield	Tuscarawas	39TUS00004	7	105	UNC	Buried_Valley	Active	ActiveStandard
Dover Wellfield	Tuscarawas	39TUS00367	8	102.5	UNC	Buried_Valley	Inactive	NoSampling
Dresden Wellfield	Muskingum	39MUS00077	1	85	UNC	Buried_Valley	Active	ActiveOrganic
Dresden Wellfield	Muskingum	39MUS00031	2	80	UNC	Buried_Valley	Active	Standby
East Palestine Wellfield	Columbiana	39COL00443	Rhodes	75	UNC	Outwash_Kame	Active	ActiveRotational
East Sparta Wellfield	Stark	39STA00448	1	270	SS	SS_Bedrock	Active	ActiveStandard
East Sparta Wellfield	Stark	39STA08765	2	0	SS	SS_Bedrock	Active	Standby
Eaton Black Plant	Preble	39PRE00416	1	62	UNC	Alluvial	Active	ActiveRotational
Eaton Black Plant	Preble	39PRE04432	3	70	UNC	Alluvial	Active	Standby
Edgerton Waterworks	Williams	39WIL00450	3	85	UNC	Complex	Active	ActiveRotational
EGP Inc.	Hocking	39HOC00081	1	375	SS	SS_Bedrock	Active	ActiveRotational
Elmore Waterworks	Ottawa	39OTT03679	1	381	LS	LS_Bedrock	Inactive	NoSampling
Elmore Waterworks	Ottawa	39OTT00139	3	402	LS	LS_Bedrock	Active	ActiveStandard
Enon Wellfield	Clark	39CLA00287	1	50	UNC	Buried_Valley	Active	Standby
Enon Wellfield	Clark	39CLA00090	2	78	UNC	Buried_Valley	Active	ActiveOrganic
Erie Islands Plaza (OTC)	Sandusky	39SAN00406	WEST	0	LS	LS_Bedrock	Inactive	NoSampling
Etna School Wellfield	Licking	39LIC00194	1	250	SS	SS_Bedrock	Inactive	NoSampling
Fairfield Wellfield	Butler	39BUT08646	6	164	UNC		Inactive	NoSampling
Fayette Waterworks	Fulton	39FUL00101	1	47	UNC	Complex	Abandoned	NoSampling
Fayette Waterworks	Fulton	39FUL08920	4	187	UNC	Complex	Active	ActiveStandard
Fisher Cheese Wellfield	Van Wert	39VAN00097	1	387	LS	LS_Bedrock	Inactive	NoSampling
Fort Hill Dupont Plant	Hamilton	39HAM00058	50	85	UNC	Buried_Valley	Inactive	NoSampling
Fort Loramie Wellfield	Shelby	39SHE00423	2	0	LS	LS_Bedrock	Inactive	NoSampling
Fort Loramie Wellfield	Shelby	39SHE03654	4	302	LS	LS_Bedrock	Inactive	NoSampling
Frankfort Wellfield	Ross	39ROS00426	3	53	UNC	Buried_Valley	Active	ActiveRotational
Franklin Wellfield	Warren	39WAR00156	6	90	UNC	Buried_Valley	Active	Standby
Franklin Wellfield	Warren	39WAR00102	7	112	UNC	Buried_Valley	Active	ActiveStandard
Fredericktown Wellfield	Knox	39KNO00230	1	122	UNC	Buried_Valley	Active	Standby
Fredericktown Wellfield	Knox	39KNO00279	2	133	UNC	Buried_Valley	Active	ActiveRotational
Freeport Wellfield	Harrison	39HRS00428	5	110	SS	SS_Bedrock	Active	ActiveRotational
Galena Wellfield	Delaware	39DEL00188	1	31	LS		Inactive	NoSampling
Gallia Co RWA	Gallia	39GAL02560	4	66	UNC	Buried_Valley	Inactive	NoSampling
Gallia Co. Airport	Gallia	39GAL00030	1	60	UNC	Buried_Valley	Inactive	NoSampling

Garrettsville Wellfield	Portage	39POR00157	20	178	UNC	Buried_Valley	Active	ActiveRotational
Garth's Auction Barn	Delaware	39DEL00199	1	45	LS	LS_Bedrock	Inactive	NoSampling
General Industries Inc	Union	39UNI00202	1	200	LS	LS_Bedrock	Inactive	NoSampling
Gibsonburg Waterworks	Sandusky	39SAN00152	2	300	LS	LS_Bedrock	Abandoned	NoSampling
Gibsonburg Waterworks	Sandusky	39SAN00239	4	301	LS	LS_Bedrock	Active	ActiveOrganic
Gnadenhutten Waterworks	Tuscarawas	39TUS00087	1	116	UNC	Buried_Valley	Active	ActiveStandard
Gomer Elementary School	Allen	39ALL00407	School	280	LS	LS_Bedrock	Inactive	NoSampling
Granville Wellfield	Licking	39LIC00246	2	92	UNC	Buried_Valley	Active	ActiveOrganic
Granville Wellfield	Licking	39LIC07296	4	92	UNC	Buried_Valley	Active	Standby
Gratis Wellfield	Preble	39PRE00415	1	26	UNC	Buried_Valley	Active	ActiveStandard
Gratis Wellfield	Preble	39PRE04394	2	24	UNC	Alluvial	Active	Standby
Green Springs Wellfield	Seneca	39SEN00437	1	108	LS	LS_Bedrock	Inactive	NoSampling
Green Springs Wellfield	Seneca	39SEN00124	1-7	0	LS	LS_Bedrock	Inactive	NoSampling
Green Springs Wellfield	Seneca	39SEN00386	3	109	LS	LS_Bedrock	Inactive	NoSampling
Greene Co SWR Wellfield	Greene	39GRE00372	SWR1	49	UNC	Buried_Valley	Active	ActiveStandard
Greene Co SWR Wellfield	Greene	39GRE00398	SWR2	49.5	UNC	Buried_Valley	Active	Standby
Greenfield City Of	Highland	39ROS08922	8	0	UNC	Alluvial	Active	ActiveStandard
Groveport Wellfield	Franklin	39FRA00233	2	96	UNC	Buried_Valley	Abandoned	NoSampling
Groveport Wellfield	Franklin	39FRA08892	3	106	UNC	Buried_Valley	Active	ActiveStandard
Groveport Wellfield	Franklin	39FRA08893	4	110	UNC	Buried_Valley	Active	Standby
Hamilton South Wellfield	Butler	39BUT07116	6	0	UNC	Buried_Valley	Active	Standby
Hamilton South Wellfield	Butler	39BUT00375	FW3	169	UNC	Buried_Valley	Active	ActiveStandard
Happy Days Visitor Center	Summit	39SUM02561	OLD	300	SS	SS_Bedrock	Abandoned	NoSampling
Heath Wellfield	Licking	39LIC00017	4	195	UNC	Buried_Valley	Inactive	NoSampling
Heath Wellfield	Licking	39LIC00185	5	230	UNC	Buried_Valley	Active	ActiveStandard
Hebron Wellfield	Licking	39LIC00221	1	155	UNC	Buried_Valley	Active	ActiveRotational
Hebron Wellfield	Licking	39LIC07299	4	155	UNC	Buried_Valley	Active	Standby
Hicksville Waterworks	Defiance	39DEF00103	2	188	LS	LS_Bedrock	Inactive	NoSampling
Hicksville Waterworks	Defiance	39DEF00197	3	178	UNC	End_Moraine	Active	ActiveRotational
Hicksville Waterworks	Defiance	39DEF00120	6	150	UNC	End_Moraine	Active	Standby
Hide-A-Way Hills Lodge	Hocking	39HOC00001	1	215	SS	SS_Bedrock	Inactive	NoSampling
Highland County Water Company	Highland	39HIG00418	4	62	UNC	Alluvial	Active	ActiveStandard

Highland County Water Company	Highland	39HIG06929	5	94	UNC	Alluvial	Active	Standby
Hiram Wellfield	Portage	39POR00165	1	150	SS	SS_Bedrock	Active	ActiveRotational
Hocking Valley Concrete	Hocking	39HOC00010	2	25	UNC	Buried_Valley	Inactive	NoSampling
Holgate Waterworks	Henry	39HEN00121	2	310	LS	LS_Bedrock	Active	ActiveRotational
Home City Ice	Hamilton	39HAM00059	1	103	UNC	Buried_Valley	Inactive	NoSampling
Hopewell Elementary School	Licking	39LIC08737	1	305	SS	SS_Bedrock	Abandoned	NoSampling
Hopewell Elementary School	Licking	39LIC00264	OLD	0	SS	SS_Bedrock	Inactive	NoSampling
Hudson Water Plant	Summit	39SUM00178	1	141	UNC	Buried_Valley	Active	ActiveRotational
Ironton Iron	Lawrence	39LAW03213	6	75	UNC	Buried_Valley	Inactive	NoSampling
Ironton Iron	Lawrence	39LAW02775	7	84	UNC	Buried_Valley	Inactive	NoSampling
Jefferson Water & Sewer District	Franklin	39FRA00234	1	74	UNC	Buried_Valley	Active	ActiveOrganic
Jefferson Water & Sewer District	Franklin	39FRA07113	2	73	UNC	Buried_Valley	Active	Standby
Johnstown Wellfield	Licking	39LIC00222	4	300	UNC	Complex	Inactive	NoSampling
Kalida Wellfield	Putnam	39PUT00430	1	400	LS	LS_Bedrock	Active	ActiveRotational
Kent Wellfield	Portage	39POR08645	10	131.7	UNC	Buried_Valley	Active	Standby
Kent Wellfield	Portage	39POR00187	11	120	UNC	Buried_Valley	Active	ActiveRotational
Kenton Plant (Rockwell Int.)	Hardin	39HRD00127	2	300	LS	LS_Bedrock	Inactive	NoSampling
Killbuck Wellfield	Holmes	39HOL00179	1	200	SS		Active	ActiveRotational
Killbuck Wellfield	Holmes	39HOL00241	2	0	SS		Active	Standby
Kimbolton Wellfield	Guernsey	39GUE00092	7	100	SS	SS_Bedrock	Inactive	NoSampling
Kraft General	Trumbull	39TRU08753	11	115	SS	SS_Bedrock	Inactive	NoSampling
Kraft General	Trumbull	39TRU00161	9	115	SS	SS_Bedrock	Inactive	NoSampling
Kunkle Maintenance Bldg (OTC)	Williams	39WIL00431	MB1	173	UNC	End_Moraine	Active	ActiveRotational
La Rue Waterworks	Marion	39MAR00128	1	136	LS	LS_Bedrock	Inactive	NoSampling
La Rue Waterworks	Marion	39MAR08916	2	200	LS	LS_Bedrock	Inactive	NoSampling
Lake Katherine Nature Preserve	Jackson	39JAC05497	Office	155	SS	SS_Bedrock	Inactive	NoSampling
Lake Loramie State Park	Shelby	39SHE00106	1	105.5	LS	LS_Bedrock	Inactive	NoSampling
Lancaster Wellfield	Fairfield	39FAI00195	28	104	UNC	Buried_Valley	Active	ActiveRotational
Lebanon Correctional Inst	Warren	39WAR00376	2	0	UNC	Buried_Valley	Inactive	NoSampling
Lebanon Correctional Inst	Warren	39WAR00110	3	129	UNC	Buried_Valley	Inactive	NoSampling

Lebanon Correctional Inst	Warren	39WAR06045	4	0	UNC	Buried_Valley	Inactive	NoSampling
Lebanon Wellfield Plant 1	Warren	39WAR00211	4	117	UNC	Alluvial	Inactive	NoSampling
Lebanon Wellfield Plant 1	Warren	39WAR00046	5	65	UNC	Alluvial	Inactive	NoSampling
Lebanon Wellfield Plant 1	Warren	39WAR00397	6A	87	UNC	Alluvial	Active	Standby
Leipsic Waterworks	Putnam	39PUT00134	3	510	LS	LS_Bedrock	Active	ActiveRotational
Leto's Ridge	Hocking	39HOC08901	1	345	SS	SS_Bedrock	Active	ActiveStandard
Lewisburg Wellfield	Preble	39PRE00411	1	60	UNC	Alluvial	Active	ActiveRotational
Lewisburg Wellfield	Preble	39PRE04419	2	60	UNC	Alluvial	Active	Standby
Lisbon Wellfield	Columbiana	39COL00396	5	100	SS	SS_Bedrock	Active	ActiveStandard
Lisbon Wellfield	Columbiana	39COL08908	6	108	SS	SS_Bedrock	Active	Standby
Little Hocking Water Association	Washington	39WAS00069	2	57	UNC	Buried_Valley	Active	ActiveStandard
Lockland WTP	Hamilton	39HAM08769	5	200	UNC	Buried_Valley	Active	Standby
Lockland WTP	Hamilton	39HAM00380	6	201	UNC	Buried_Valley	Active	ActiveRotational
Lockland WTP	Hamilton	39HAM00122	8	199	UNC	Buried_Valley	Inactive	NoSampling
Lodi Water Department	Medina	39MED00159	5	91	UNC	Buried_Valley	Active	ActiveRotational
Logan Wellfield	Hocking	39HOC00399	B	63	UNC	Buried_Valley	Active	Standby
Logan Wellfield	Hocking	39HOC08909	C	0	UNC	Buried_Valley	Active	ActiveStandard
Logan Wellfield	Hocking	39HOC00082	G	65	UNC	Buried_Valley	Inactive	NoSampling
London Wellfield	Madison	39MAD07301	7	172	UNC	Complex	Active	ActiveRotational
London Wellfield	Madison	39MAD00196	8	165	UNC	Complex	Active	Standby
Loveland Wellfield	Hamilton	39HAM00064	2	70	UNC	Buried_Valley	Active	Standby
Loveland Wellfield	Hamilton	39HAM00089	5	81	UNC	Buried_Valley	Active	ActiveStandard
Malta Wellfield	Morgan	39MRG00451	4	54	UNC	Buried_Valley	Active	ActiveStandard
Mansfield Plumbing Products	Ashland	39ASH00149	1	84	UNC	Buried_Valley	Inactive	NoSampling
Mansfield STP	Richland	39RIC00027	1	120	UNC	Buried_Valley	Active	ActiveOrganic
Mansfield STP	Richland	39RIC05554	2	120.67	UNC	Buried_Valley	Active	Standby
Mantua Wellfield	Portage	39POR08656	1	100	UNC	Buried_Valley	Active	ActiveStandard
Mantua Wellfield	Portage	39POR00166	3	125	SS	SS_Bedrock	Inactive	NoSampling
Marietta Wellfield	Washington	39WAS02347	3	56	UNC	Buried_Valley	Inactive	NoSampling
Marietta Wellfield	Washington	39WAS00014	6	55	UNC	Buried_Valley	Inactive	NoSampling
Martins Ferry Wellfield	Belmont	39BEL08881	13	69	UNC	Buried_Valley	Active	ActiveStandard
Martins Ferry Wellfield	Belmont	39BEL00452	9	0	UNC	Buried_Valley	Abandoned	NoSampling

Martinsburg Wellfield	Knox	39KNO00392	3	300	SS	SS_Bedrock	Active	ActiveStandard
Martinsburg Wellfield	Knox	39KNO00393	4	310	SS	SS_Bedrock	Active	Standby
Marysville Wellfield	Union	39UNI00192	3	200	LS	LS_Bedrock	Active	ActiveStandard
Massillon Steel Castings	Stark	39STA00012	1	137	UNC	Buried_Valley	Inactive	NoSampling
Massillon Wellfield	Stark	39STA00175	7	165	UNC	Buried_Valley	Active	ActiveStandard
Maumee State Forest HQ	Fulton	39FUL08890	1	25	UNC		Active	ActiveStandard
Mcarthur Wellfield	Vinton	39VIN00073	8	255	SS	SS_Bedrock	Active	ActiveRotational
Mcconnelsville Wellfield	Morgan	39MRG06044	2	0	UNC	Buried_Valley	Inactive	NoSampling
Mcconnelsville Wellfield	Morgan	39MRG00079	3	45	UNC	Buried_Valley	Inactive	NoSampling
Mcconnelsville Wellfield	Morgan	39MRG03708	4	48	UNC	Buried_Valley	Inactive	NoSampling
McDonald's Restaurant	Fayette	39FAY00267	1	102	LS	LS_Bedrock	Inactive	NoSampling
Mead Paper	Ross	39ROS00007	14	108	UNC	Buried_Valley	Inactive	NoSampling
Mechanicsburg Wellfield	Champaign	39CHA08746	1	98.5	UNC	Buried_Valley	Active	ActiveStandard
Mechanicsburg Wellfield	Champaign	39CHA00410	4	73	UNC	Buried_Valley	Inactive	NoSampling
Miami Whitewater Forest	Hamilton	39HAM00056	1	82	UNC	Buried_Valley	Inactive	NoSampling
Miamisburg WTP	Montgomery	39MOT00038	8	150	UNC	Buried_Valley	Active	ActiveStandard
Miamisburg WTP	Montgomery	39MOT00378	9	123	UNC	Buried_Valley	Active	Standby
Middlefield Wellfield	Geauga	39GEA00444	1	104	UNC	Buried_Valley	Active	ActiveStandard
Middlefield Wellfield	Geauga	39GEA06130	2	84	UNC	Buried_Valley	Active	Standby
Middleport Wellfield STU 2	Meigs	39MEI02142	4	68	UNC	Buried_Valley	Active	ActiveStandard
Middletown Paperboard	Butler	39BUT00117	1	140	UNC	Buried_Valley	Inactive	NoSampling
Middletown Wellfield	Butler	39BUT08633	12	49	UNC	Buried_Valley	Inactive	NoSampling
Middletown Wellfield	Butler	39BUT00155	17	147	UNC	Buried_Valley	Active	ActiveStandard
Middletown Wellfield	Butler	39BUT00244	18	146	UNC	Buried_Valley	Inactive	NoSampling
Middletown Wellfield	Butler	39BUT06046	3	0	UNC	Buried_Valley	Inactive	NoSampling
Middletown Wellfield	Butler	39BUT00252	6	178	UNC	Buried_Valley	Inactive	NoSampling
Milan Waterworks	Erie	39ERI00125	1	161	UNC	Buried_Valley	Inactive	NoSampling
Milan Waterworks	Erie	39ERI00260	5	152	UNC	Buried_Valley	Active	ActiveRotational
Miller Brewing Company	Butler	39BUT00119	2	202	UNC	Buried_Valley	Inactive	NoSampling
Miller Brewing Company	Butler	39BUT00065	3	218	UNC	Buried_Valley	Inactive	NoSampling
Millersburg Wellfield	Holmes	39HOL00180	2	90	UNC	Buried_Valley	Active	Standby
Millersburg Wellfield	Holmes	39HOL00242	3	93	UNC	Buried_Valley	Active	ActiveStandard
Mineral City Wellfield	Tuscarawas	39TUS00170	1	324	SS	SS_Bedrock	Inactive	NoSampling

Minerva Wellfield	Stark	39STA00171	3	76	UNC	Buried_Valley	Active	Standby
Minerva Wellfield	Stark	39STA00212	4	85	UNC	Buried_Valley	Active	ActiveOrganic
Mingo Junction Wellfield	Jefferson	39JEF00005	1	71	UNC	Buried_Valley	Active	ActiveOrganic
Montgomery County/Miami Shores	Montgomery	39MOT00061	14	160	UNC	Buried_Valley	Inactive	NoSampling
Montgomery County/Miami Shores	Montgomery	39MOT00148	15	0	UNC	Buried_Valley	Inactive	NoSampling
Montgomery County/Miami Shores	Montgomery	39MOT00113	19	225	UNC	Buried_Valley	Inactive	NoSampling
Morning View Care Center	Delaware	39DEL00405	2	140	SS	SS_Bedrock	Inactive	NoSampling
Mt. Gilead Wellfield	Morrow	39MRW03697	2	107	UNC	Complex	Active	Standby
Mt. Gilead Wellfield	Morrow	39MRW00189	4	126	UNC	Complex	Active	ActiveRotational
Mt. Sterling Wellfield	Madison	39MAD00276	1	285	LS	LS_Bedrock	Active	Standby
Mt. Sterling Wellfield	Madison	39MAD07303	3	285	LS	LS_Bedrock	Active	ActiveRotational
Mt. Vernon Wellfield	Knox	39KNO00395	7	98	UNC	Buried_Valley	Active	Standby
Mt. Vernon Wellfield	Knox	39KNO00190	8	97.6	UNC	Buried_Valley	Active	ActiveRotational
Myers Residence	Franklin	39FRA00236	1	50	SS	SS_Bedrock	Inactive	NoSampling
National Cash Register	Montgomery	39MOT00118	1	205	UNC	Buried_Valley	Inactive	NoSampling
Navarre Wellfield	Stark	39STA00254	1	92	UNC	Buried_Valley	Active	ActiveStandard
Navarre Wellfield	Stark	39STA00176	3	0	UNC	Buried_Valley	Inactive	NoSampling
Nevada Waterworks	Wyandot	39WYA00129	3	104	LS	LS_Bedrock	Active	ActiveRotational
New Carlisle Wellfield	Clark	39CLA00048	1	113	UNC	Buried_Valley	Active	ActiveRotational
New Madison Wellfield	Darke	39DAR00424	1	166	LS	LS_Bedrock	Active	ActiveRotational
New Matamoras Wellfield	Washington	39WAS08905	2	53	UNC	Buried_Valley	Active	ActiveRotational
New Matamoras Wellfield	Washington	39WAS00115	3	125	UNC	Buried_Valley	Active	Standby
New Richmond Wellfield	Clermont	39CLE00146	3	86	UNC	Buried_Valley	Inactive	NoSampling
Nona France Park	Lucas	39LUC00023	1	133	LS	LS_Bedrock	Inactive	NoSampling
North Canton WTP	Stark	39STA00164	4	397	SS	SS_Bedrock	Active	ActiveOrganic
North Fairfield Waterworks	Huron	39HUR00248	1	37	UNC	End_Moraine	Active	ActiveStandard
North Fairfield Waterworks	Huron	39HUR00126	2	45	UNC	End_Moraine	Inactive	NoSampling
North Lewisburg Wellfield	Champaign	39CHA07117	1	135	LS	LS_Bedrock	Active	Standby
North Lewisburg Wellfield	Champaign	39CHA00412	2	143	LS	LS_Bedrock	Active	ActiveRotational
Norwood Wellfield	Hamilton	39HAM00053	1	200	UNC	Buried_Valley	Inactive	NoSampling
Oakwood Wellfield	Paulding	39PAU00238	1	206	LS	LS_Bedrock	Active	ActiveRotational

Oakwood Wellfield	Paulding	39PAU06025	2	230	LS	LS_Bedrock	Active	Standby
Oakwood Wellfield	Paulding	39PAU00032	3	480	LS	LS_Bedrock	Inactive	NoSampling
Obetz Wellfield	Franklin	39FRA07114	N1	125	UNC	Buried_Valley	Active	Standby
Obetz Wellfield	Franklin	39FRA00235	S1	125	UNC	Buried_Valley	Active	ActiveRotational
Ohio Power-Muskingum River	Washington	39WAS00015	1	63	UNC	Buried_Valley	Inactive	NoSampling
Orrville Wellfield	Wayne	39WAY00440	75	113	UNC	Buried_Valley	Active	ActiveRotational
Orrville Wellfield	Wayne	39WAY00441	84	185	SS	SS_Bedrock	Active	ActiveRotational
Oxford Wellfield	Butler	39BUT00051	1	55	UNC	Buried_Valley	Active	ActiveStandard
Oxford Wellfield	Butler	39BUT08911	2	0	UNC	Buried_Valley	Active	ActiveStandard
Oxford Wellfield	Butler	39BUT00382	3	49.5	UNC	Buried_Valley	Active	Standby
Paint Valley School	Ross	39ROS00371	1	104	LS	LS_Bedrock	Active	ActiveRotational
Parklake Apartments	Clark	39CLA00112	1	0	UNC	Buried_Valley	Inactive	NoSampling
Pataskala Wellfield STU 1	Licking	39LIC07304	5	108	UNC	Buried_Valley	Active	Standby
Pataskala Wellfield STU 1	Licking	39LIC00006	6	103	UNC	Buried_Valley	Active	ActiveOrganic
Pataskala Wellfield STU 1	Licking	39LIC08917	8	87	UNC	Buried_Valley	Active	ActiveOrganic
Payne Wellfield	Paulding	39PAU00432	1	325	LS	LS_Bedrock	Active	ActiveRotational
Payne Wellfield	Paulding	39PAU03678	2	289	LS	LS_Bedrock	Inactive	NoSampling
Pemberville Wellfield WTP 1	Wood	39WOO00435	7	250	LS	LS_Bedrock	Active	ActiveStandard
Phillipsburg Village PWS	Montgomery	39MOT08926	2	137	LS	LS_Bedrock	Active	ActiveStandard
Philo Wellfield	Muskingum	39MUS08902	1	61	UNC		Active	ActiveRotational
Philo Wellfield	Muskingum	39MUS03685	2	40	UNC	Buried_Valley	Inactive	NoSampling
Philo Wellfield	Muskingum	39MUS03684	3	51	UNC	Buried_Valley	Inactive	NoSampling
Philo Wellfield	Muskingum	39MUS02771	6	51	UNC	Buried_Valley	Inactive	NoSampling
Picway Power Plant	Pickaway	39PIC00249	1	94.75	UNC	Buried_Valley	Active	ActiveRotational
Pierce Union Batavia Wellfield	Clermont	39CLE00420	16	91	UNC	Buried_Valley	Active	ActiveRotational
Pierce Union Batavia Wellfield	Clermont	39CLE06047	18	92	UNC	Buried_Valley	Active	Standby
Pierce Union Batavia Wellfield	Clermont	39CLE06640	6	0	UNC	Buried_Valley	Inactive	NoSampling
Piketon Wellfield	Pike	39PIK00071	1	72	UNC	Buried_Valley	Active	ActiveRotational
Piketon Wellfield	Pike	39PIK00209	3	69	UNC	Buried_Valley	Inactive	NoSampling
Plain City Wellfield	Madison	39MAD00387	1	377	LS	LS_Bedrock	Active	Standby
Plain City Wellfield	Madison	39MAD00226	2	387	LS	LS_Bedrock	Active	ActiveRotational
Pleasant City Wellfield	Guernsey	39GUE00093	2	50	UNC	Buried_Valley	Active	ActiveRotational
Proctorville Wellfield	Lawrence	39LAW02787	EAST	56	UNC	Buried_Valley	Active	Standby

Proctorville Wellfield	Lawrence	39LAW02788	WEST	53	UNC	Buried_Valley	Active	ActiveRotational
Revere HS (Bath School)	Summit	39SUM00449	1	82	SS	SS_Bedrock	Inactive	NoSampling
Richmond Wellfield	Jefferson	39JEF00427	WEST	175	SS	SS_Bedrock	Inactive	NoSampling
Richwood Wellfield	Union	39UNI00227	4	165	LS	LS_Bedrock	Active	ActiveRotational
Richwood Wellfield	Union	39UNI00388	5	165	LS	LS_Bedrock	Active	Standby
Ridgedale HS	Marion	39MAR00436	School	200	LS	LS_Bedrock	Active	ActiveRotational
Rittman Wellfield	Wayne	39WAY00219	6	126	UNC	Buried_Valley	Active	ActiveStandard
Rittman Wellfield	Wayne	39WAY00158	7	124	UNC	Buried_Valley	Inactive	NoSampling
Riverdale HS	Hancock	39HAN00383	1	165	LS	LS_Bedrock	Inactive	NoSampling
Rock Well	Montgomery	39MOT00033	5	40	LS	LS_Bedrock	Active	NoSampling
Rockbridge Post Office	Hocking	39HOC00083	1	68	UNC	Buried_Valley	Inactive	NoSampling
Rockford Wellfield	Mercer	39MER00434	1	308	LS	LS_Bedrock	Active	ActiveRotational
Rotosolutions (Compak/Datacard)	Holmes	39HOL00026	1	130	UNC	Buried_Valley	Active	Standby
Rotosolutions (Compak/Datacard)	Holmes	39HOL00177	MAIN	90	UNC	Buried_Valley	Active	ActiveOrganic
Russells Point Wellfield	Logan	39LOG02861	2	95	UNC	Buried_Valley	Inactive	NoSampling
Russells Point Wellfield	Logan	39LOG00422	3	85	UNC	Buried_Valley	Active	ActiveRotational
Russells Point Wellfield	Logan	39LOG08770	4	0	UNC	Buried_Valley	Active	Standby
Sabina Wellfield	Clinton	39CLI00417	10	110	LS	LS_Bedrock	Active	ActiveRotational
Sabina Wellfield	Clinton	39CLI07118	12	110	LS	LS_Bedrock	Active	Standby
Sandy Valley High School	Tuscarawas	39TUS08355	1	315	SS	SS_Bedrock	Inactive	NoSampling
Scio Wellfield	Harrison	39HRS02772	1-2	90	SS	SS_Bedrock	Active	ActiveStandard
Scioto County RWA	Scioto	39SCI00270	6	59	UNC	Buried_Valley	Inactive	NoSampling
Scioto County RWA	Scioto	39SCI00072	8	63	UNC	Buried_Valley	Inactive	NoSampling
Secor Metro Park	Lucas	39LUC00384	Walnut Grove	90	LS	LS_Bedrock	Inactive	NoSampling
Shalersville Wellfield	Portage	39POR00167	1	201	SS	SS_Bedrock	Active	ActiveStandard
Shawnee Golf Course	Scioto	39SCI00021	1	51	UNC	Buried_Valley	Inactive	NoSampling
Shreve Wellfield	Wayne	39WAY00445	11	85	UNC	Buried_Valley	Active	ActiveRotational
Sidney Wellfield	Shelby	39SHE04659	5	231	LS	LS_Bedrock	Active	Standby
Sidney Wellfield	Shelby	39SHE00094	6	200	LS	LS_Bedrock	Active	ActiveRotational
Simonds-Heller Tools	Tuscarawas	39TUS00013	6	90	UNC	Buried_Valley	Inactive	NoSampling
Sims Fertilizer	Morrow	39MRW00240	1	60	SS	SS_Bedrock	Inactive	NoSampling

Sims Fertilizer	Morrow	39MRW00271	2	75	SS	SS_Bedrock	Inactive	NoSampling
South Point Wellfield	Lawrence	39LAW00074	2	85	UNC	Buried_Valley	Active	ActiveRotational
South Solon Wellfield	Madison	39MAD00228	1	225	LS	LS_Bedrock	Active	ActiveRotational
South Solon Wellfield	Madison	39MAD07305	2A	220	LS	LS_Bedrock	Active	Standby
Spencerville Wellfield	Allen	39ALL00184	1	250	LS	LS_Bedrock	Active	ActiveRotational
Spencerville Wellfield	Allen	39ALL00153	3	225	LS	LS_Bedrock	Active	Standby
Spring Valley Wellfield STU 2	Greene	39GRE00049	2	53	UNC	Buried_Valley	Inactive	NoSampling
Springfield WTP	Clark	39CLA00075	5	96	UNC	Buried_Valley	Active	ActiveStandard
Springfield WTP	Clark	39CLA00186	7	107	UNC	Buried_Valley	Active	Standby
St Paris Wellfield STU 1	Champaign	39CHA00409	1	210	UNC	Complex	Active	ActiveStandard
St Paris Wellfield STU 1	Champaign	39CHA07119	2	0	UNC	Complex	Active	Standby
Stockport Wellfield	Morgan	39MRG02773	2	76	UNC	Buried_Valley	Active	ActiveRotational
Stone Container Corp	Richland	39RIC00137	1	200	SS	SS_Bedrock	Inactive	NoSampling
Stone Country Water Co	Knox	39KNO00191	1	180	SS	SS_Bedrock	Inactive	NoSampling
Strawser & Allen Partnership	Franklin	39FRA00404	1	85	LS	LS_Bedrock	Active	ActiveStandard
Sugar Grove Wellfield	Fairfield	39FAI00247	4	57	UNC	Buried_Valley	Active	ActiveStandard
Sugar Grove Wellfield	Fairfield	39FAI07111	5	58	UNC	Buried_Valley	Active	Standby
SWR Water District South Plant	Hamilton	39HAM00041	1	82	UNC	Buried_Valley	Active	ActiveRotational
Sycamore Water Department	Wyandot	39WYA02559	9	175	LS	LS_Bedrock	Active	ActiveRotational
Sypris	Hardin	39HRD00084	3	400	LS	LS_Bedrock	Inactive	NoSampling
Syracuse Wellfield	Meigs	39MEI00080	3	90	UNC		Inactive	NoSampling
Tanglewood Lake Water Company	Geauga	39GEA00446	9	159	SS	SS_Bedrock	Active	ActiveStandard
Taylorsville Reserve	Montgomery	39MOT00047	1	67	UNC	Buried_Valley	Inactive	NoSampling
Taylorsville Reserve	Montgomery	39MOT08912	2	0	UNC		Inactive	NoSampling
The Wilds	Muskingum	39MUS08774	1	122	SS	SS_Bedrock	Active	ActiveStandard
Thornville Wellfield	Perry	39PER02769	1-2	120	SS	SS_Bedrock	Active	ActiveStandard
Timkin Roller Bearing Co.	Wayne	39WAY00019	N-S	101	UNC		Inactive	NoSampling
Towne-Sander Co.	Coshocton	39COS00018	1	76	UNC	Buried_Valley	Inactive	NoSampling
Transporation Research Center (TRC)	Logan	39LOG00042	2	240	LS	LS_Bedrock	Active	ActiveRotational
Troy Wellfield	Miami	39MIA00210	14	124	UNC	Buried_Valley	Active	ActiveRotational
Troy Wellfield	Miami	39MIA00108	17	122	UNC	Buried_Valley	Active	Standby

Troy Wellfield	Miami	39MIA03216	2	125	UNC	Buried_Valley	Inactive	NoSampling
Union City Wellfield	Darke	39DAR07120	1	0	UNC	End_Moraine	Inactive	NoSampling
Union City Wellfield	Darke	39DAR00414	2	80	UNC	End_Moraine	Inactive	NoSampling
Union City Wellfield	Darke	39DAR04081	3	80	LS	LS_Bedrock	Inactive	NoSampling
Union City Wellfield	Darke	39DAR00413	5	268	LS	LS_Bedrock	Inactive	NoSampling
Urbana Wellfield-Old Troy Pike	Champaign	39CHA00109	8	63	UNC	Buried_Valley	Active	ActiveStandard
Urbana Wellfield-Old Troy Pike	Champaign	39CHA00052	9	62	UNC	Buried_Valley	Active	Standby
USDA Field Station	Coshocton	39COS08783	1	0	SS	SS_Bedrock	Active	Standby
USDA Field Station	Coshocton	39COS00373	2	222	SS	SS_Bedrock	Active	ActiveRotational
Utica Wellfield	Licking	39LIC00223	4	350	SS	SS_Bedrock	Inactive	NoSampling
Utica Wellfield	Licking	39LIC00390	5	144	UNC	Buried_Valley	Active	ActiveRotational
Utica Wellfield	Licking	39LIC00391	6	302	UNC	Buried_Valley	Active	Standby
Valley MHP	Licking	39LIC00224	1	206	UNC	Buried_Valley	Active	ActiveRotational
Valley MHP	Licking	39LIC07112	2	208	UNC	Buried_Valley	Active	Standby
Wadsworth Wellfield	Medina	39MED08381	10A	0	SS	SS_Bedrock	Inactive	NoSampling
Wadsworth Wellfield	Medina	39MED00029	7	227	SS	SS_Bedrock	Inactive	NoSampling
Wadsworth Wellfield	Medina	39MED00160	9	270	SS	SS_Bedrock	Active	ActiveRotational
Wapakoneta Waterworks	Auglaize	39AUG00098	1	268	LS	LS_Bedrock	Active	ActiveRotational
Wapakoneta Waterworks	Auglaize	39AUG08907	2	266	LS	LS_Bedrock	Active	Standby
Washington CH Wellfield	Fayette	39FAY00214	11	47	UNC	Alluvial	Active	ActiveStandard
Washington CH Wellfield	Fayette	39FAY00374	8	200	LS	LS_Bedrock	Active	ActiveStandard
Washington CH Wellfield	Fayette	39FAY00400	9	190	LS	LS_Bedrock	Active	Standby
Waverly Wellfield	Pike	39PIK00215	1	70	UNC	Buried_Valley	Active	Standby
Waverly Wellfield	Pike	39PIK00144	3	66	UNC	Buried_Valley	Active	ActiveRotational
Waverly Wellfield	Pike	39PIK00366	4	70	UNC	Buried_Valley	Inactive	NoSampling
Waynesfield Wellfield	Auglaize	39AUG00433	2	245	LS	LS_Bedrock	Active	ActiveRotational
West Lafayette Wellfield	Coshocton	39COS00088	1	120	UNC	Buried_Valley	Inactive	NoSampling
West Lafayette Wellfield	Coshocton	39COS00203	2	120	UNC	Buried_Valley	Active	ActiveOrganic
West Lafayette Wellfield	Coshocton	39COS05479	3	152	UNC	Buried_Valley	Active	Standby
West Liberty Wellfield	Logan	39LOG00060	1	70	UNC	Buried_Valley	Active	ActiveRotational
West Liberty Wellfield	Logan	39LOG05673	2	69	UNC	Buried_Valley	Active	Standby
White Pines Golf Course	Fulton	39FUL08891	1	210	SS	SS_Bedrock	Active	ActiveStandard
Whitehouse Waterworks	Lucas	39LUC00140	5	170	LS	LS_Bedrock	Inactive	NoSampling

Williamsport Wellfield	Pickaway	39PIC04967	2	60	UNC	Buried_Valley	Inactive	NoSampling
Willow Island Lock & Dam	Washington	39WAS00255	1	0	UNC	Buried_Valley	Inactive	NoSampling
Wolf Creek Spring	Montgomery	39MOT00062	SP1	0	UNC	Complex	Active	ActiveRotational
Wooster Wellfield	Wayne	39WAY00256	S2	120	UNC	Buried_Valley	Active	ActiveRotational
Wright State University	Greene	39GRE00045	1	109	UNC	Buried_Valley	Inactive	NoSampling
Wright State University	Greene	39GRE00143	2	116	UNC	Buried_Valley	Inactive	NoSampling
Xenia-Ford Road WWTP	Greene	39GRE00111	1	67	UNC	Buried_Valley	Inactive	NoSampling
Yellow Springs Wellfield	Greene	39GRE00039	1	82	UNC	Buried_Valley	Active	Standby
Yellow Springs Wellfield	Greene	39GRE00150	2	81.6	UNC	Buried_Valley	Active	ActiveStandard
Youngstown AFB	Trumbull	39TRU00003	2-5	500	SS		Inactive	NoSampling
Youngstown AFB	Trumbull	39TRU00362	3	416	SS		Inactive	NoSampling
Zaleski Wellfield	Vinton	39VIN00218	3	310	SS	SS_Bedrock	Inactive	NoSampling
Zaleski Wellfield	Vinton	39VIN00181	5	317	SS	SS_Bedrock	Active	Standby
Zaleski Wellfield	Vinton	39VIN00250	6	375	SS	SS_Bedrock	Active	ActiveRotational
Zanesfield R&G Club	Logan	39LOG00043	1	140	UNC	Buried_Valley	Inactive	NoSampling
Zanesville Wellfield	Muskingum	39MUS03689	2	59	UNC	Buried_Valley	Active	Standby
Zanesville Wellfield	Muskingum	39MUS03690	3	69	UNC	Buried_Valley	Inactive	NoSampling
Zanesville Wellfield	Muskingum	39MUS03219	6	67.5	UNC	Buried_Valley	Inactive	NoSampling
Zanesville Wellfield	Muskingum	39MUS06034	9	56	UNC	Buried_Valley	Active	ActiveStandard