



Quality Plan for the Florida Geological Survey

Florida Department of Environmental Protection

December 2017

Signature Page

The undersigned have read and understood this Quality Plan, are charged with managing and improving the quality system and are responsible for ensuring that all staff properly execute the procedures discussed in the plan.



[Director] 12/20/17
Date



[Administrator] 12/20/2017
Date



[Quality Assurance Officer] 12-20-17
Date

Introduction

The DEP Quality Assurance (QA) program involves the implementation of a management system (planning, review, training, and assessment) to ensure that data collection, generation, interpretation, reporting, evaluation and archiving is of sufficient quality to support Department decisions. The effectiveness of our QA program is dependent upon the actions of all DEP staff, from “front line” employees to management, meaning QA is a function distributed throughout our organization. One aspect of our program is to ensure that Department QA activities are carried out according to commitments made to the Environmental Protection Agency as enumerated in the DEP Quality Management Plan (QMP) (Draft Revision June 2016).

The DEP Secretary is committed to implementation of the quality assurance requirements in the QMP and as authorized at 403.0623 F.S. and Chapter 62-160 F.A.C. (the DEP QA Rule). It is the Secretary's intent to carry out these obligations and requirements as detailed in the Department's QA Directive (Draft Revision November 2016).

To execute the components of the DEP QA Directive, our unit has developed a quality system. This document describes the steps we take to ensure the scientific and legal defensibility of environmental data we generate or use. It details the process of planning, training, execution, assessment and corrective action we undertake to ensure that environmental data meets our established quality criteria.

Basic Elements of Our Quality Plan

Our Quality Plan explains both the process and criteria by which the quality system is managed. The plan is utilized as an instrument of internal communication to inform our staff of current and future quality assurance activities. It discusses how specific QA duties are assigned to responsible staff. We will revise our Quality Plan as needed, and pledge to ensure the consistent application of procedures and criteria for the generation or use of our environmental data. The Quality Plan will also be used as a training document for new staff and as a reference for experienced personnel. The plan and its revisions also serve as an archival record of our formal quality system.

The elements of our plan are consistent with the Department's Quality Management Plan, Quality Assurance Directive and Quality Assurance Rule (62-160 F.A.C.). In addition, we ensure that our plan for all sampling activities, including field-meter testing, is consistent with DEP SOP FA 3300. Our plan addresses all activities associated with sampling, field testing, lab analysis and data review of any type, including those activities associated with database construction and management. Our plan also discusses how decisions about data use are made based on data quality assessments.

Where appropriate, we cite existing internal and external documents, including training manuals, guidance documents, SOPs, Rules, tables, etc.

We expect all staff to understand and follow the procedures and criteria as discussed in this plan, and to carry out their assigned responsibilities for effective utilization of our quality system.

Policy Statement

It is the Florida Geological Survey's policy to:

- Use scientifically valid and legally defensible data for our decisions affecting protection of the environment.
- Have and implement the Quality System described in this document.
- Adaptively manage our Quality System to be consistent with provisions of the DEP Quality Assurance Management Plan.
- Ensure that everyone is properly trained to execute their assigned functions
- Implement procedures to evaluate the quality of the data we use and to implement corrective actions when data do not meet our Data Quality Objectives.
- Periodically audit the performance and record-keeping practices of data generators we have responsibility for
- Implement quality assurance procedures for the management of our data repositories
- Perform a yearly systematic assessment of our quality assurance activities, including any corrective actions, with the findings submitted to the AEQAS (Aquatic Ecology and Quality Assurance Section) Standards and Assessment Section.

Ethics

All employees of the DEP Florida Geological Survey are held to high professional ethical standards in the performance of their duties. All employees are required to take an annual ethics training class attesting to their commitment to honesty and integrity in performance of their duties. Improper, unethical or illegal actions will be dealt with per the published Administrative Directives of the Florida Department of Environmental Protection.

Organization and Responsibilities

Our unit resides within the Regulatory Programs, FDEP Florida Geological Survey. The function of our unit is to collect, interpret, and provide objective quality geologic information about Florida.

The FGS is the premier state government institution specializing in geoscience research and assessments to provide objective quality data and interpretations. Environmental, conservation, and public-welfare issues are addressed through applied field and laboratory investigations supported by our geologic sample and research libraries as well as collaborative efforts within DEP and with other regulatory or policy-making entities. The FGS is dedicated to facilitating a culture of responsible environmental stewardship. This

is achieved by proactively sharing knowledge through accessible geoscience data, active participation on advisory committees, research and assessment publications, websites, public and technical presentations and educational activities.

There are five sections each section has a section head and will be referred to as “Program Manager” in this document.

- The Administration Section provides administrative support for the FGS programs.
- The Applied Geoscience Services Section uses geological research, assessments, data and maps to generate, analyze, interpret, model, and disseminate geologic, hydrogeologic, and geochemical data and information in support of environmental protection and water-resource management initiatives and issues.
- The Geological Investigations Section interprets and revises the geology and geomorphology of the state by collecting and compiling new and legacy geologic data, and provides these interpretations through various maps, data layers and publications in support of our core statutory mission.
- The Geoscience Information and Data Management Section compiles, organizes, improves accuracy, and facilitates access to FGS geologic and hydrogeologic information using databases and Geographic Information Systems; maintains a library of FGS and other geoscience publications and conducts literature searches in support of agency endeavors.
- The Geological Sample Acquisition and Management Section acquires geological samples and geophysical logs through the FGS Drilling Operations and from other government sources and industry, conducts offshore geoscience data acquisition, maintains the FGS Sample Repository and assists visitors and researchers in its use. Acquisition and curation of geological subsurface samples and data is essential to increase knowledge of the geology and hydrogeology of Florida for improved economy and job creation.

Responsibilities for existing staff are as follows:

Our Quality Assurance Officer (QAO) coordinates and participates in the quality evaluation of program data, and provides oversight to ensure that our staff perform their QA functions. The QA Officer may delegate some responsibilities to properly trained and qualified staff, when appropriate. The QAO or the Program Managers conduct systems audits of internal and external data generators (lab and field) and conduct sampling performance audits. The Program Managers ensure that corrective actions are implemented for data non-conformance incidents as determined by evaluation of the data against our program’s Data Quality Objectives. Additionally, the QAO assists Program Managers in the development of the Quality System and other logistical aspects of its implementation, such as coordinating associated training needs.

Our QAO documents all program QA activities, assisting with training, audits and corrective actions as needed and providing this information to the DEP Standards and Assessment Section on a periodic basis. Program Managers are responsible for alerting the QAO to the QA/QC activities in their sections requiring the QAO's assistance.

Our program staff carry out the following duties involving data collection, data usability evaluation, data interpretation based on project needs, data QA and storage. The generation of DEP work products is completed in a manner that ensures scientific defensibility and adherence to DEP rules and policies. Data collected and acquired by the Florida Geological survey is highly variable and project dependent and as such requires a QA Plan which is adaptable and capable of changing to meet the needs of the specific project. This plan will give an overview of QA needs for our program and specific standards and procedures followed can be found at this link:

\\Fdep1\fgs\Resources\Scientific Standards and Procedures\QA_QC\QA_QC\QA Plan

Updates to the folders will be made as needed, guided by project needs.

Staff evaluate program data using program Data Quality Objectives (DQOs) and Data Quality Indicators (DQIs) and implement corrective actions as directed by the Quality Assurance Officer and Program Manager. This list is variable and highly dependent on project needs. The Program Manager and Project Manager are responsible for assuring their project meets the DQOs and DQIs and generates quality data through implementation of a quality plan specific to the project. A list of our DQOs and DQIs is found in Table 1.

Table 1. DQO's and DQI's

Florida Geological Survey	
DEP SOP's are used for field documentation, and field testing	
DEP SOP's are used for general water sampling, groundwater sampling and surface water sampling	
DEP SOP's are used for drinking water sampling	
DEP SOP's are used for field parameter sampling, pH, ORP, Temp., DO, specific conductance, etc.	
DEP SOP's are used for soil and sediment sampling	
DEP SOP's are used for clean sampling for trace metals	
DEP SOP's are used for flowmeters and continuous monitoring	
DEP SOP's are used for maintaining and checking and cleaning equipment	
FGS SOP's are followed for data entry and data QA/QC into various databases	
FGS, Ozark Underground Laboratory, and DEP SOP's are followed for dye trace sampling	
ASTM Standards and FGS SOP's are followed for sample preparation, splitting, homogenizing, crushing etc.	
ASTM Standards and instrument manuals are followed for Geophysical logging	
ASTM Standards and instrument manuals are followed for Ground penetrating radar (GPR)	

Program staff along with the Program Manager performs the following per the DEP procedures and SOP's:

- Review proposed work for conformance with quality criteria
 - o Utilizing DEP SOP's, ASTM standards, instrument manuals, and FGS developed SOP's
- Review and evaluate
 - o Sampling methods
 - o Calibration records
 - o Procedures followed
 - o Sample preservation
 - o Sample holding times
 - o QA/QC performed on internal and external data
 - FGS generated data
 - See DataMngmtPlanUPDATE-2016
 - \\Fldep1\fgs\Resources\Scientific Standards and Procedures\QA_QC\QA_QC\SOP's
 - Data from other sources (i.e. USGS, Storet, WMD's, WMIS, etc.)
- Interpret data or determine usability
 - o As it pertains to specific projects utilizing standards and SOP's
 - o \\Fldep1\fgs\Resources\Scientific Standards and Procedures\QA_QC\QA_QC\SOP's
 - Equipment cleaning, calibration, and verification
 - Continuous flow meters
 - Field and equipment blanks, duplicates, and splits
 - Detection limits, qualifiers, and practical quantification limit (PQL)
 - Use of reference materials and blind matrix spikes
- Documentation and Check calculations
- \\Fldep1\fgs\Resources\Scientific Standards and Procedures\QA_QC\QA_QC\Audits and forms
 - o Purge volumes when sampling wells
 - o Conversions, units, etc. (especially when using multiple data sources)
 - o Custody sheets
 - o Equipment maintenance and calibrations
- Review documents for errors and completeness

Program Managers and staff provide feedback to the program QAO for improving the program quality system.

- The Director acts as liaison with other units, data providers, data consumers or other external parties concerning QA matters.
- Program Managers answer public or external technical inquiries about data interpretation, approved procedures, suspected QA problems, site-specific issues, etc. Program Managers work with the QAO for resolution.

Our unit's management (Director and Program Managers) ensure that this quality system is fully operational within our program, designates our Quality Assurance Officer, and provides general oversight. These managers also evaluate the above Data Quality Objectives and Data Quality Indicators to ensure they meet our program's needs, and periodically evaluate the effectiveness of staff's data quality activities, including reviewing audit results. These managers evaluate and implement corrective action policies and procedures when data do not meet program Data Quality Objectives. Our managers discuss audit results with the QA Officer, review the annual Quality Assurance Report to the Secretary, and discuss findings with the Director.

An organizational chart is presented in Figure 1.

Training

All personnel are properly trained to perform their duties. Project Managers set up and train staff or request staff training for compliance with policies and procedures of our unit that are pertinent to their specific projects. Project Managers coordinate this training with the Program Manager and the QAO.

The QA directive and additional Quality Assurance Resources can be found here: [Quality Assurance Resources | Florida Department of Environmental Protection](#)

AEQAS provides some online training which can be used to satisfy certain training and audit requirements. [The Water Quality Standards Program \(WQSP\) | Depnet](#)

These opportunities include:

- *Apprenticeship Program* [Water Quality Sampling Training - Home](#) - for new hires with field sampling as part of their job duties
- *DEAR SOP test* [DEP SOP Sampling Tests for DEAR Employees | Depnet](#)
 - o General knowledge module
 - o Surface water sampling module
 - o Groundwater sampling module
 - o Wastewater sampling module
 - o Sediment sampling module
- *Training presentations and videos*
 - o [Training Presentations | Florida Department of Environmental Protection](#)

Our training procedures:

- Training for specific QA functions
 - o Project Managers with knowledge and approval of Program Managers should report the number and names of individuals to be trained to QAO along with:
 - o What specific training is required
 - o Training will be reported as it pertains to specific projects including but not limited to:

- Pre-approval and documentation for alternative field procedures, if needed
- Record retention and documentation including custody sheets, and sampling forms per SOP's
- Equipment use, calibration, verification, and cleaning
- Parameters and acceptance criteria
- Sampling procedures (dependent on sample type – use of appropriate SOP)
- Sample preservation, storage and holding times
- Data storage and QA/QC
- Audits
- Review of staff training, procedures, and materials:
 - o Specific training materials for routine functions and designated QA activities (found in DEP SOP's) are available for staff review
 - o Program Managers should report number of individuals trained and method of training to QAO and whether training reviews are needed.
 - Training as it pertains to specific projects, are any changes needed
 - Specifically, what training or audits were completed.
 - Are there deficiencies which require corrective action
- Review of ethics policy
 - o Yearly DEP combo refresher course completed by all staff
- Refresher trainings or delivery of updated information
 - o Schedule with QAO as needed
 - o Through AEQAS when available
 - o TREEO environmental training
 - o DEAR SOP tests
 - o FGS developed SOP tests – specific to project
 - o Timeframe
 - When audits show deficiencies
 - When new projects begin
 - When new employees begin
 - When new methods or procedures are implemented
- Evaluation of effectiveness of training for each staff member
 - o Audits
 - o DEAR SOP tests
 - o FGS SOP tests – FGS may create SOP tests like the DEAR SOP test for specific projects to meet QA/QC requirements

Sampling Design and Procedures

Successful implementation of our program relies on valid data, which begins with proper sampling. Program Managers are responsible for the Project Managers implementing a project specific sampling design including QA/QC criteria. QAO will assist as needed. Therefore, each section performs the following activities in accordance with the QA Plan:

- Project Managers design sampling plans based on specific project needs with approval from the Program Manager and then the QAO
 - o Utilizing DEP and FGS established SOP's and ASTM standards
 - o [\\Fdep1\fgs\Resources\Scientific Standards and Procedures\QA_QC\QA_QC\SOP's](#)
- Project Managers are responsible for Program Manager's approval of their sampling plans for the specific project before the project begins
 - o This includes all training needs, audits and QA/QC controls
- QAO reviews these procedures and methods for compliance with the QA plan and works with the Program Manager to ensure compliance.
- AEQAS handles requests for use of alternative, new or modified sampling procedures or lab methods
- Project Manager oversees sampling, field-testing and associated support operations including documentation that all training for their project is completed
- Program Manager is responsible for the Project Manager following the QA Plan and maintains sufficient documentation to verify following the QA plan
- Program Manager is responsible for the assurance of quality data and data entry into the FGS databases utilizing set procedures
- Program Manager is responsible for corrective action when non-compliance is noted.
- QAO will work with Program Managers to correct non-compliance issues.
- While working with the Program Managers and Project Managers the QAO will coordinate training, data reviews, sampling activities, and audits, as well as other QA tasks for timely completion.

Data Review

Our program understands the need to evaluate the quality and usefulness of environmental data prior to making decisions. We conduct a review of procedures to determine the usability of data including but not limited to field documentation, actual sampling, equipment cleaning; checks, calibrations, and verifications of equipment operation; and use of sample blanks, duplicates and equipment blanks. These procedures are based on our established Data Quality Objectives and Data Quality Indicators, and incorporate the concepts and criteria found in DEP's "Process for Assessing Data Usability", DEP-EA-001/07.

An example table of data acceptability criteria is available upon request.

Documentation

Since accurate documentation is an important factor for determining the success of QA activities, our unit records the following record-keeping procedures for the indicated activities to ensure appropriate documentation:

- Equipment
 - o Maintenance
 - o Cleaning
 - o Calibration and verification
 - o Reagents and supplies
- Sampling
 - o Field sheets
 - o Location
 - o Sample collection
 - o Sample preservation and holding times
 - o Custody sheets
- Field-testing
 - o Well purging, if applicable
 - o calibration and verification records
 - o field blanks
- Data review
 - o Detection limits
 - o Reporting units
 - o Calculations, PQL's
 - o Qualifiers
- Calculation checks
 - o Purge volumes
 - o Unit conversions
 - o Latitude and longitude
- Data archiving
 - o Reports (including drafts)
 - o Database
 - Well verification
 - Description and picks
 - Publications and research
 - Geophysical logs
 - o Files
 - Including all above documentation
- Checks of database entries
 - o Maintain original data files, images and text even after entry into database
 - o Scanning data
 - o Importing data using optical character recognition

- o In some instances, the software runs a series of QA checks as data is imported
 - o Maintain integrity of database with front and back ends. Users of data cannot change data
- Document control and maintenance
 - o Do not keep older versions of the same data in the same folder. Move older versions to another folder if they need to be retained
 - o Use and keep custody sheets/field notes
 - o Update data and database on a regular basis
- Record generation, retention, and storage procedures
 - o Timeframes for data retention.
 - Digital and paper
 - Long term storage options

Contract Management

Our program ensures that the DEP contracts that we administer are properly managed to assure appropriate data quality. As such, the following QA/QC activities are conducted as related to the contract:

- Activation Laboratories Inc. Ancaster Ontario, Canada
 - o Analytical services
 - o Accreditation
 - Standards Council of Canada (SCC)
 - requires on-site assessment of the laboratory by auditors knowledgeable in the field
 - International Organization for Standardization /International Electrotechnical Commission (ISO/IEC) 17025
 - (ISO/IEC 17025 includes ISO 9001 and ISO 9002 specifications) with CAN-P-1578 (Forensics), CAN-P-1579 (Mineral Analysis) and CAN-P-1585 (Environmental) for specific registered tests by the SCC.
 - Accreditation program includes ongoing audits which verify the QA system and all applicable registered test methods.
 - Accredited by Health Canada
 - o Formal training of staff for specific instruments and method
 - o Test methods and method validation
 - o Equipment
 - Maintain schedule for calibration and maintenance
 - o Traceability
 - Maintain records of calibration and performance parameters
 - o Sample preparation
 - Monitors and documents the reliability of our sampling from the sample preparation process. This ensures that sub-samples taken (e.g. from a crushed rock split) are reliable and representative of the original sample submitted

- o Use of standard reference materials
- o Water quality analysis
 - Blank and water standards are run at the beginning and end of each group of 32 samples
 - Every tenth sample is run in duplicate
 - If instrument suppression occurs, they are re-run at appropriate dilutions
- o Bulk rock analysis
 - Sample preparation
 - Sample crushed and split
 - Cleaner sand used between each sample
 - Quality of crushing and pulverizing is checked
 - One Blank is run per work order
 - One standard is run for every 11 samples
 - Certified reference materials are used for quality control

Audits and Corrective Actions

Audits provide objective feedback concerning the effectiveness of our program's quality system, and may identify areas in need of improvement. Therefore, our unit performs the following activities as discussed below:

- May utilize DEAR resources if applicable [The Water Quality Standards Program \(WQSP\) | Depnet](#) this includes:
 - o DEAR Apprenticeship program
 - o Dear SOP tests
 - o Training presentations and videos
- Conducts audits as needed (project dependent) and compiles audit reports
 - o Safety audits and project audits (projects vary from year to year)
- Program Managers and QAO handles complaints and other reports received from data users and the public concerning data quality and will work together to resolve
- Reports exceptions to established procedures and criteria
 - o To Program Manager and AEQAS
- Program Manager revises and implements corrective actions for problems with procedures, data reviews, etc. with input from QAO

Report Compilation

To provide the Secretary with information regarding DEP's ongoing QA efforts, our unit describes and compiles the results of all appropriate QA activities, and relays it to the Standards and Assessment Section for an annual report.

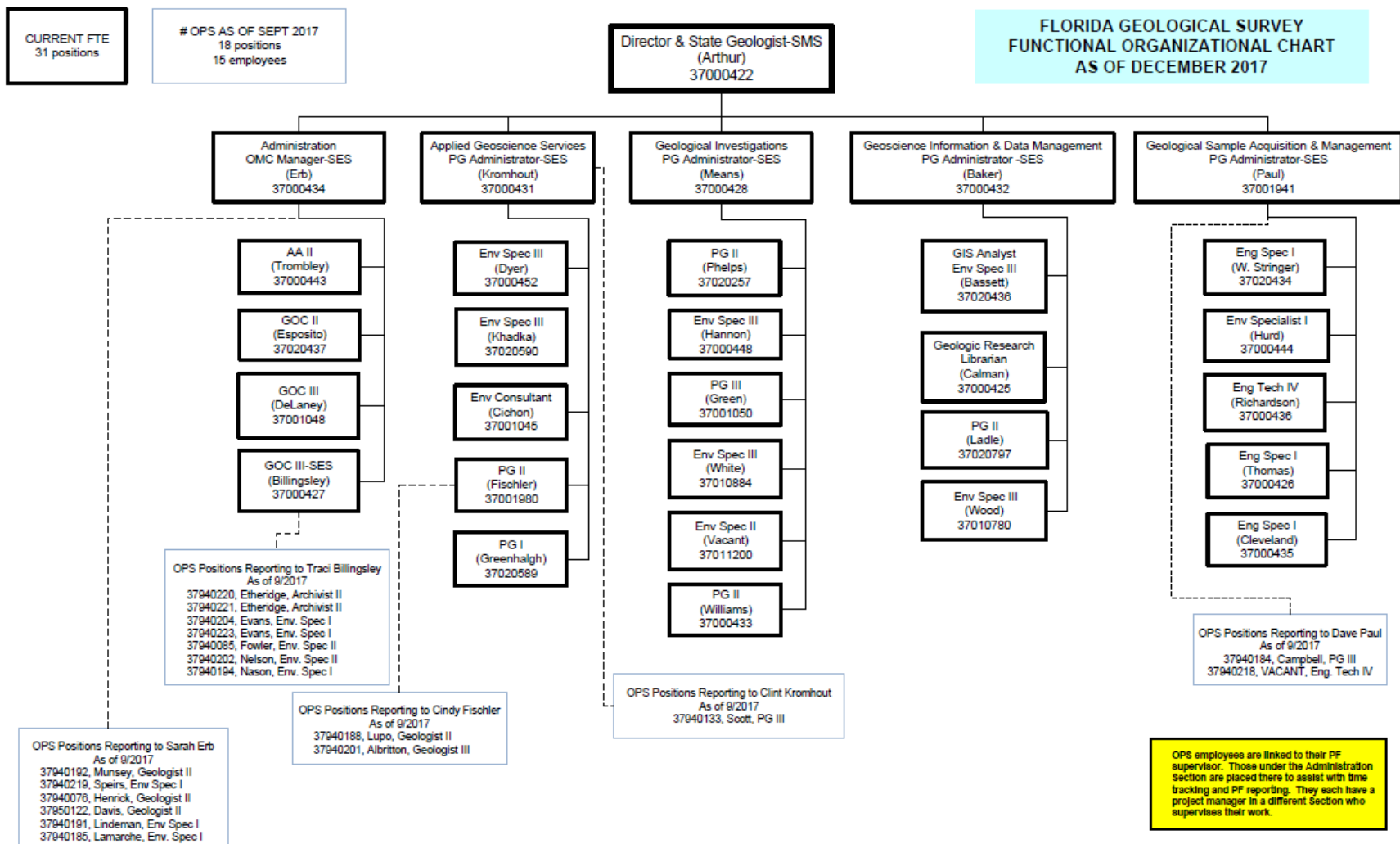


Figure 1. organizational chart.