



Program Evaluation Report

PROCEDURES REVIEW FOR FGS RECEIVING, PROCESSING, AND
STORAGE FOR NEW GEOLOGICAL CORES AND SAMPLES

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Executive Summary

A. Introduction

The performance evaluation of the Florida Geological Survey Repository now known as the Florida Geologic Sample Collections Facility (Repository) located in Tallahassee at 3900 Commonwealth Boulevard was conducted between August 2019 and December 2019 to assess current operations in the receiving, processing, and storage of new geologic samples. The current staff dedicated to the repository consists of a Professional Geologist Administrator and one full-time career service employee. This staff along with five others support an active drilling schedule as well to obtain geologic samples for ongoing subsurface geologic mapping efforts for the FGS.

Florida Geological Survey (FGS) operates a sample repository consisting of several buildings and one multi-floor storage area totaling 22,600 square feet of space for a collection of over 19,700 geological cores and samples in over 70,000 storage containers that date back to 1887.

B. Methodology

The scope and focus of the program evaluation of the Repository were to identify current operating procedures used in receiving, processing, and storage of new cores and samples at FGS facilities. Appraisal of systems included a review of physical space, existing paper and digital source documents generated within FGS, and employee questionnaire responses. Additionally, a benchmark study of other state repositories was completed to compare approaches that may help to improve operations at the FGS Repository.

C. Observations

In 2018, FGS staff completed a full inventory of the repository. The inventory effort found that 20% of the collection was in a deteriorated condition as well as a large number of geological samples that are unprocessed and out of order and in discontinuous storage areas between the warehouse at 3000 Commonwealth Boulevard and the Repository. The combination of these issues has the potential to jeopardize the future ability of geoscientists to locate samples and effectively extract meaningful, relevant data and information.

The repository operations of receiving, processing, and storage are usually conducted in the same work space. There is also an insufficient contiguous storage space for samples and cores. The Repository's geological sample storage needs are expected to exceed available space in next ten years.

Based on informal discussions and written responses to employee questionnaires distributed during the evaluation, employees are unaware of written sample receiving, processing, and storage policies. There appears to be a lack of awareness that some written policies and workflows should exist for new sample and core receiving, processing, and storage. Therefore the FGS has a need for written, formal standard desktop procedures outlining steps or tasks in the receiving, accessioning, and storage of new samples and cores.

There are insufficient personnel resources for the timely processing of new samples and cores in addition to an inefficient use of GEODES for retrieval and tracking. There appears to be no performance indicators and monitoring systems for tracking and recording receiving, accessioning, and storing activities.

D. Recommendations

Table of Recommendations	
1	Establish a formal, written set of Desktop or Standard Operating Repository Procedures for receiving, accessioning, processing, and storing of geologic cores and samples.
2	Implement a periodic schedule to update formal written procedures describing effective and efficient receiving, processing, and storage of geologic samples.
3	Ensure that repository staff review and understand written standard operating procedures for receiving, processing, and storing geologic cores and samples to ensure consistency in the safety and security of geologic samples.
4	Develop performance indicators for receiving, processing, and storing of geologic samples. Use a suite of performance measures that adequately address the issues of reliability, safety and security of geologic samples. Some examples of performance measures include sample misfiles and time-driven receiving, processing deliveries, and storage.
5	Incorporate monitoring strategies that regularly track repository activities that ensure consistency in the areas of timeliness, security, reliability, and access.
6	General access to the repository should be restricted to the curator and repository staff. Receiving, accessioning, processing, storing, retrieving, and returning to storage of geologic samples should be limited to the FGS professional geologist administrator with curator, designated FGS repository staff, or others under the direct supervision of the curator responsibilities or repository staff.
7	Employ an FGS Repository checkout/return procedure for geologic cores and samples. Geologic cores and samples should be accessed only by the FGS curator or repository staff using standard library science protocols.
8	Dedicate specific work areas for receiving, processing, and storing activities to avoid confusion of functions. The receiving, processing and storage areas should be separate and distinct to avoid errors in handling, contamination, and loss of samples.
9	Label all "grid" storage locations on each storage shelf to minimize mistakes in locating and returning samples and cores. Following this, implement a bar code system that includes metadata on the location of samples and cores as well as their metadata for tracking and control to ensure the reliability of safe and secure handling of geologic samples.
10	In the event of large deliveries of new cores and samples, deploy a "task force" of FGS staff augmenting existing repository staff to effectively complete within a reasonable timeline using best management practices for all steps in receiving, processing, and storing samples.
11.	Develop a full-time position that will serve as a curator and the Repository manager of the geologic collection.

Table of Contents

Executive Summary	1
Table of Contents	3
Introduction	4
Scope and Methodology	5
Benchmark Findings.....	6
Efficiency and Effectiveness Findings	7
Recommendations	8
Wrap Up	9
APPENDIX A.....	11
Standard Operating Procedure – Repository Receiving	
Standard Operating Procedure – Repository Accessioning and Processing	
Standard Operating Procedure – Repository Storage	
APPENDIX B.....	12
Chain of Custody Form	
APPENDIX C.....	13
Underground Injection Control (UIC)Program Sample Form	
APPENDIX D.....	14
GEODES	
APPENDIX E.....	15
Pre-Processing Duplicate Check Process	

Introduction

The performance evaluation of the Florida Geological Survey Repository (Repository) located at Tallahassee at 3900 Commonwealth Boulevard was conducted between September 2019 and December 2019 to review operations at that time in the receiving, processing, and storage of new geologic samples such as continuous core, core segments, cuttings, core chips, split-spoon samples, and vibracore samples. The purpose of the evaluation was to identify practices as well as to explore improvements to those practices resulting in a more effective and efficient collection, accessibility, and protection of geologic samples.

The Florida Geological Survey (FGS) operates a sample repository collection that dates to 1887 and consists of over 19700 sets of geological samples contained in over 70,000 storage containers. The collection includes items such as cores and cuttings samples from oil and gas operations, water wells, deep injection wells, and shallow monitoring wells, as well as exploratory boreholes from past geologic investigations.

The Repository's current configuration consists of several buildings and one multi-floor storage area totaling 22,600 square feet of storage containing a mix of fixed and mobile shelving. Several of the storage areas have weight limitations imposed by the type of shelving, and the original engineering limits of the building reduce available storage capacity.

During Fiscal Year 2017-18, FGS staff completed a full inventory of the Repository. As part of the inventory project, shelving was identified, and shelf and row "maps" were developed to provide a unique coordinate system that assigned location space for specific cores and samples. Also, the inventory provided an accurate assessment of the condition of the collection. While most of the collection is in fair condition, the inventory effort found that approximately 20% are in deteriorated condition. Additionally, in the 1970s, Humble Oil and Refining Company delivered 2200 boxes of geologic samples that were never re-boxed and archived inconsistently and stored out of order to the collection. There are thousands of samples from the last 20 years that remain unprocessed, which are being currently inventoried as well as a back log of samples from St. Johns River Water Management District and some of the UIC samples that went unprocessed over the years. Some of these boxes can be found at the green shed, the drill operations shed, R4 and Loading Bay of the Annex Warehouse, and the warehouse at 3000 Commonwealth Avenue location.

The current staff dedicated to the repository consists of a Professional Geologist Administrator and one full-time career service employee. This staff along with five others support an active drilling schedule as well to obtain geologic samples for ongoing subsurface geologic mapping efforts for the FGS.

Scope and Methodology

The scope and focus of the program evaluation of the FGS Repository were to identify operating procedures used in receiving, processing, and storage of new cores and samples at FGS facilities.

The evaluation examined **physical areas** of the Repository totalling over 22,600 square feet, available for receiving, processing, and storage of new cores and samples. Physical areas included the Annex and adjoining warehouse, green shed, drill shed and the warehouse located at the 3000 Commonwealth Boulevard facility.

Digital documents were reviewed that described operating procedures. These documents included the FGS Handbook of October 2000, revised in 2011, which included flowcharts on sample receiving, evaluation and processing, the FGS Data Management Strategic Plan of 2018, and the Draft FGS Data Governance Plan of February 2018. Additionally, the UIC Program Sample and Chain of Custody forms were reviewed and included in flowcharts with the standard operating procedures developed for this project and appended to this report.

A questionnaire was developed and distributed to Repository staff for written responses describing their awareness and understanding as well as the use of existing processes to receive, process, and store new cores and samples. The review of questionnaire responses explored the level of knowledge of repository operations by the staff.

The program evaluation also included a **benchmark study** to compare FGS repository operations with other similar sample repository operations around the country. The purpose of the benchmark study was to consider different perspectives in developing effectiveness and efficiency recommendations for FGS repository operations. The repositories contacted were the USGS Core Research Center in Denver as well as state repositories in Alabama, Alaska, California, Illinois, Indiana, Kansas, Kentucky, Louisiana, New Mexico, Nebraska, Oklahoma, and Texas.

A review of physical areas and floor plans of the Repository areas, documentation describing operating procedures, questionnaires of repository staff, and related study materials provided by other state repositories and the USGS CRC formed the basis of the program evaluation and recommendations.

Benchmark Findings

The purpose of the Benchmark Study was to determine and compare what operational procedures are being used to receive, process, accession, and store new geological cores and samples among state repositories, which may be useful for the Florida Geological Survey Repository.

The USGS Core Research Center (CRC) in Denver, as well as state repositories in Alabama, California, Illinois, Indiana, Kansas, Kentucky, Louisiana, New Mexico, Nebraska, and Oklahoma, responded to the request for information on operational procedures used to receive, process and store new geologic cores and samples. The aggregate responses were organized into five categories of procedures: Receiving, receiving facilities, processing protocols, data or information recording, and sample storing.

While the USGS CRC in Denver, Alabama, Kansas, Illinois, Nebraska, Kentucky, and Indiana addressed some of the aspects of receiving, processing, and storage with written procedures, not all areas were addressed at an equal level of detail. Additionally, several state repositories have no formal written procedures. Their procedures appear to be based on institutional knowledge and informal understandings.

For **receiving** procedures, benchmark responses listed steps in the physical receiving of samples and the recording of information about the samples as they are accepted. Procedures included assessing the samples' value for archiving. The definition of what is archivable varied; however, some commonly required elements emerged: the physical integrity and sufficient relevant site location information about the sample. Whether a sample was archivable or not influenced the decision to add the sample to the collection. One state repository uses an evaluation committee to decide on adding the sample to the collection using established written principles and policies, which included whether samples were redundant (from locations already in the collection), storage space availability, and cost to accession. Some respondents recorded information using direct entry to an electronic database, while others initially log information on forms followed later with data entry of that information.

Benchmark responses provided limited steps specific to **receiving facilities**. One respondent differentiated storage areas based on sample size and where the samples are in the process: storage bays for palletized samples and shelves for archiving. Another distinguished between secure and unsecured samples for storage. One described their physical facility as a large warehouse with attached office space and public viewing area, as well as the ability to accept large deliveries straight into the accessioning and processing areas of the facility.

While the responses were not extensive in this area, they did highlight some processing protocols that addressed items such as archivability, use of bar codes, labeling, confidentiality, storage organization, timely sample preparation and determination of redundancy. Interestingly, one state repository generates their descriptions then condenses the core to 10% of its original length. Common theme here was timely application of protocols to make sample retention and accessioning decisions.

Recording procedures that described data entry of samples were outlined in the responses. These included detailed descriptions of data fields, use of paper data cards or forms for later data entry, assignment of accession ID number, use of bar-coding labels and their attachment to sample containers, as well as direct data entry to the collection database. The narratives from respondents pointed to the primacy of site location of the sample; if the site location data are not available, the sample must be disposed of to ensure room for samples that are complete and archivable.

Benchmark responses summarized **Storing procedures** in the use of pallets for primary storage and later moving samples to archival containers. Other responses stated that sample containers are shelved promptly updating storage locations in their respective databases as may be needed. One facility pointed out that confidential and public samples are appropriately labeled and stored to ensure confidentiality. Still, other facilities set up temporary storage space until the information sheet on the sample has been completed and added to the permanent collection.

In summary, the benchmark findings represent approaches that have commonality in addressing receiving, processing, accessioning, and storing samples. The consistent thread among the responses is the relationship between the physical receiving of the samples and the recording of delivery information as well as how the data was initially captured, which varied among the repositories. Another consistent response from repositories was the determination of sample archivability: the difference being that some repositories had a standard to compare actual with desired attributes, and others used a committee to review sample attributes against policies for sample retention.

Efficiency and Effectiveness Findings

The results from the evaluation of the FGS Repository between September and December 2019 are listed below. The following discussion of findings is in the format of bulleted items for easier identification of concerns. Suggested remedies for these concerns are then addressed in the next section entitled “Recommendations.”

- The receiving, processing, and storage functions and areas occupy and overlap the same space at the warehouse.
- There is insufficient contiguous storage space for samples and cores. There is existing non-contiguous storage of cores and samples where storage needs will soon exceed available space. Anticipated HVAC improvements are slated for the core drying room; the current storage environment involving climate control and structural integrity for the second floor is constrained by weight limits .
- The Repository inventory of 2018 found that 20% of the collection was in poor and deteriorated condition. They also found that there are 2200 boxes of Humble Oil and Refinery Company samples received in the early 1970s that were not reboxed and archived unprocessed, and out of order in the collection. Additionally, thousands of sample bags from the St. Johns River Water Management District (SJRWMD) and the cuttings samples related to the State’s Underground Injection Control Program) are located in various areas of the Repository such as the green shed, drill ops shed, R4 and Loading Bay of the annex warehouse, and 3000

- Commonwealth Boulevard warehouse. These conditions potentially jeopardize the ability of geoscientists to effectively extract meaningful, relevant information.
- While “maps” in each storage room for each row are prominently displayed, individual grid storage sections are not labeled for quick and reliable identification of sample and core locations.
 - Employees appear to be unaware of written sample receiving, processing, and storage policies.
 - There is a lack of easy access to clear written policies governing repository operations with regards to new sample receiving, acquisitioning, accessioning, processing, and storage.
 - While documents were created in 2018, explaining and showing workflows, there is a lack of clear written desktop or standard operating procedures governing new sample receiving, acquisitioning, accessioning, processing, and storage.
 - There are insufficient personnel resources dedicated to continuous sample receiving, initial processing, and storage.
 - There appears to be a lack of timely processing of new samples as well as samples stored in degrading conditions. There remain a large number of samples that are unprocessed or in need of rebagging or reboxing.
 - The current retrieval and tracking system is inefficient and unreliable.
 - Performance indicators do not exist for tracking and recording the effectiveness or efficiency of the receiving, processing, and storing of new geologic samples or cores.
 - Monitoring systems do not appear to be in place for tracking and recording receiving, processing, and storing of new geologic samples or cores.

Recommendations

Eleven recommendations were developed based on the review and observation of operational procedures and activities of the FGS Repository in the handling of new geologic cores/samples. The benchmark study of other state repositories of geologic samples also suggested ideas that were incorporated into some of the recommendations below. While resource and time constraints may not allow immediate implementation, the suggestions below can serve as a roadmap for goal setting in future planning and action.

The recommendations of this report are:

1. Establish a formal, written set of Desktop or Standard Operating Repository Procedures for receiving, accessioning, processing, and storing of geologic cores and samples;
2. Implement a periodic schedule to update formal written procedures describing effective and efficient receiving, processing, and storage of geologic samples;
3. Ensure that repository staff review and understand written standard operating procedures for receiving, processing, and storing geologic cores and samples to ensure consistency in the safety and security of geologic samples;
4. Develop performance indicators for receiving, processing, and storing of geologic samples. Use a suite of performance measures that adequately address the issues of safety and security of geologic samples. Some examples of performance measures include misfiles and time-driven receiving, processing deliveries and storage;

5. Incorporate monitoring strategies that regularly track repository activities that ensure consistency in the areas of timeliness, security, reliability, and access;
6. General access to the repository should be restricted to the curator and repository staff. Receiving, accessioning, processing, storing, retrieving, and returning to storage of geologic samples should be limited to the FGS professional geologist administrator with curator responsibilities, designated FGS repository staff or others under the direct supervision of the curator or repository staff;
7. Employ an FGS Repository checkout/return procedure for geologic cores and samples. Geologic cores and samples should be accessed only by the FGS curator or repository staff using standard library science protocols;
8. Dedicate specific work areas for receiving, processing, and storing activities to avoid confusion of functions. The receiving, processing and storage areas should be separate and distinct to avoid errors in handling, contamination, and loss of samples;
9. Label all “grid” storage locations on each storage shelf to minimize mistakes in locating and returning samples and cores. Following this, implement a bar code system that includes metadata on the location of samples and cores as well as their metadata for tracking and control to ensure the reliability of safe and secure handling of geologic samples;
10. In the event of large deliveries of new cores and samples, deploy a "task force" of FGS staff augmenting existing repository staff to effectively complete within a reasonable timeline all steps in receiving, processing, and storing samples; and,
11. Develop a full-time position that will serve as a curator and the Repository manager of the geologic collection.

Wrap Up

The purpose of the FGS Repository evaluation between September and December 2019 was to identify practices being used during this period as well as to explore improvements to those practices resulting in a more effective and efficient collection, accessibility, and protection of geologic samples. Two years ago, a significant effort in the face of resource and time limitations was successful in developing a unique location identifier system as well as using this system to record the existing library of samples and cores in the repository at that time.

As the evaluation progressed following the evaluation plan outlined in the “Scope and Methodology” section of this report, obtaining benchmark responses from several of the state repositories as well as timely employee questionnaire responses constituted the most significant obstacles to timely processing and compilation.

As discussed in the “The Benchmark Findings” section, the responses highlighted the lack of written procedures by a number of the repositories. However, those that did respond provided some commonality in their responses, such as sample retention standards, bar code tracking systems, and data entry procedures. The benchmark responses, together with the discoveries highlighted in the findings section of this report, led to the eleven recommendations listed in the Executive Summary.

The review effort also brought forward some issues that were outside the scope of the evaluation that should be considered as potential followups. These include monitoring of accurate data

entry and verification along with timely processing and storage of samples. Periodic inspection of the repository for misplaced or out of place samples that are not properly shelved and quarterly and random inventory checks to ensure the inventory is accurate. There also appears to be a need to standardize sample and sample information submittals to the repository and communicating this to our current sources to be effective. Implementation of recommendations from this report should be considered for monitoring as well as reviewing procedures for processing and storage of grab samples.

Finally, based on reviewing previous FGS documents, flowcharts, and findings, a series of suggested standard operating procedures were developed addressing receiving, accessioning, and storing of new samples and cores. These proposed procedures and forms are in the Appendices of this report.

The Appendices that follow are:

[Appendix A: Repository Standard Operating Procedures](#)

[Appendix B: Chain of Custody Form](#)

[Appendix C: UIC Sample Form](#)

[Appendix D: GEODES](#)

[Appendix E: Preprocessing Checklist Guide](#)

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APPENDIX A

Standard Operating Procedures for FGS Repository Receiving, Accessioning, Processing, and Storage

Receiving: SOP R-001

Accessioning: SOP R-002

Storage: SOP R-003

[Back to list of Appendices](#)

[Return to Table of Contents](#)

 Florida Geological Survey	FGS Repository	SOP #	R-001
		Revision #	
		Implementation Date	2/11/2020
Page #	1 of 5	Last Reviewed/Update Date	
SOP Owner	Geological Sample Acquisition & Management	Approval	

Standard Operating Procedure – Repository Receiving

1. Purpose

Ensure consistency in the process of receiving new samples by the Florida Geological Survey Repository.

2. Scope

Receiving and documentation process used for new samples delivered to the Florida Geological Survey Repository.

3. Responsibilities

Professional Geologist Administrator with curator and repository management responsibilities, two repository staff members physically receive and record geological samples received.

4. Procedure

- Repository staff receives notification that samples are to be delivered; staff refers the notifier to the **Chain of Custody** form to complete.
- For samples that are delivered with **Chain of Custody** or **UIC Sample** form or for which key information (site location with latitude/longitude information, elevations, driller name, borehole or well name) is subsequently obtained from the source, examine the delivery contents and documents for completeness of all items and complete delivery information in **GEODES**. Determine the condition of the samples delivered to see if they meet accessioning standards. Skip steps 3-8 and go to **step 9** if all information is complete and condition of the samples meet accessioning standards.
- For samples that are delivered **without** the **Chain of Custody** form, examine the delivery contents and documents for completeness of all items, enter and record delivery information into **GEODES**. Proceed to the next step.

 Florida Geological Survey	FGS Repository	SOP #	R-001
		Revision #	
		Implementation Date	2/11/2020
Page #	2 of 5	Last Reviewed/Update Date	
SOP Owner	Geological Sample Acquisition & Management	Approval	

4. Examine documents, if available, to determine if key information such as site location, elevations, and driller are listed.
5. If key information such as site location, elevations, driller and borehole name is **not** available, reject delivery for accessioning and contact the **source** along with FGS district geologist to obtain key information.
6. If the **source** is not known, after all discovery efforts have been exhausted go to the next step.
7. If key information is still not available after exhausting all discovery efforts, continue to reject delivery for accessioning and physically **discard the samples**.
8. If samples are **discarded**, note the discard and reason for the action in the delivery record in **GEODES**. No further action necessary.
9. Check sample box or container labeling information for consistency with documents accompanying the samples.
10. Annotate missing boxes or containers and add to **GEODES** when well information is entered.
11. Assure the well name and all depths are appropriately labelled on the boxes or containers. This includes both main box and the lid if they are separate.
12. If archivable, fix or replace boxes or containers as needed; place samples in archive boxes promptly and ensure that samples are immediately set out to dry.
13. Ensure that boxes/containers are in sequential order.
14. Decide if cores/samples are to be photographed.
15. Check pallet for possible restacking of materials. Restack the pallet if needed.
16. Enter all sample and box information for new samples that are determined to be archivable.
17. Proceed to new sample **Accessioning / Processing** steps in [SOP R-002](#).

 Florida Geological Survey	FGS Repository	SOP #	R-001
		Revision #	
		Implementation Date	2/11/2020
Page #	3 of 5	Last Reviewed/Update Date	
SOP Owner	Geological Sample Acquisition & Management	Approval	

5. References

Chain of Custody Form

FGS Employee Handbook (2001)

Flowchart Diagrams SOP R-001

GEODES

NGGDPP 2017 Final Report

UIC Sample Form

FGS Sample Submission Form

(Go to next page for SOP-R001 Definitions.)

 Florida Geological Survey	FGS Repository	SOP #	R-001
		Revision #	
		Implementation Date	2/11/2020
Page #	4 of 5	Last Reviewed/Update Date	
SOP Owner	Geological Sample Acquisition & Management	Approval	

6. Definitions

Archivable – A geological core or sample as well as its physical condition and integrity that can provide unambiguous, uncorrupted geoscience information at a later date.

Boxes or containers – An object that can hold, store, or transport samples. This includes 5-gallon buckets, wooden crates, plastic bins, coolers, steel drums, etc.

Chain of Custody form – Form to record essential data for later input to GEODES about sample type, sample delivery, sample attributes such as driller name, borehole or well name, site lat/long coordinates, and elevations, and date received by FGS along with documentation accompanying the sample delivery. Form should resemble, in order and content, the data entry screens for GEODES.

GEODES – Database of locations and geologic descriptions for samples stored at the FGS Repository.

Key information – essential data such as (but not limited to) site lat/long coordinates, elevations, driller name, borehole or well name, well permit number (if any), drill completion date needed to record sample geospatial relationships.

Repository – FGS's library of geologic samples held in storage for later retrieval to conduct geoscience research.

Sample types – Materials such as cuttings, continuous cores, and hand collections from geologic sites that can provide geoscience information.

UIC Sample Form - Form provided by FGS to Florida Department of Environmental Protection Underground Injection Control Program and included in permits issued for monitoring and injection wells in Florida. Info about samples to be provided to FGS per permit condition is recorded on the form and sent to FGS when contractors coordinate to ship samples.

W-Series number – Recording and tracking system for geologic samples that are cores or cuttings.

(Last page for SOP-R001)

[Return to list of SOPs](#)

 Florida Geological Survey	Geological Sample Acquisition & Management Repository	SOP #	R-002
		Revision #	
		Implementation Date	1/23/2020
Page #	1 of 4	Last Reviewed/Update Date	
SOP Owner		Approval	

Standard Operating Procedure – Repository Accessioning and Processing

1. Purpose

Ensure consistency in the process of accessioning and initial processing of new samples by the Florida Geological Survey Repository.

2. Scope

Outline of the steps in accessioning and initial processing steps for new samples at the Florida Geological Survey.

3. Responsibilities

Professional Geologist Administrator with curator and repository management responsibilities, two repository staff members physically receive and record geological samples received.

4. Procedure

1. Review the **Chain of Custody** form and other documents for completeness of key information such as site location, elevations, driller, and borehole name about the new core or cuttings sample.
2. Using the **PreProcessing Checklist Guide** compare location data as well as well name and well designation provided with the sample with existing FGS W-Series numbers in **GEODES**.
3. If location data and key information is the same, update existing inventory information in the **GEODES** database.
4. Label the received samples with the appropriate W-Series number listed in the **GEODES** database. Then go to **Step 7**.
5. If location data is not the same, accession the sample with a unique W- Series number generated by the GEODES database.
6. Label the new sample with the new W- Series number.

 Florida Geological Survey	Geological Sample Acquisition & Management Repository	SOP #	R-002
		Revision #	
		Implementation Date	1/23/2020
Page #	2 of 4	Last Reviewed/Update Date	
SOP Owner		Approval	

7. Notify FGS Director and district geologist of new sample accession.
8. Fix or replace containers as may be needed, label and place in sequential order.
9. Prepare the sample for drying and boxing in preparation for storage. Split cuttings samples into two fractions and label: "Washed" and "Unwashed".
10. When samples are dry, determine sample weight and set up for storage.
11. Go to **FGS SOP R-003** for steps in storing the new sample.

(Go to next page for SOP-R002 References.)

 Florida Geological Survey	Geological Sample Acquisition & Management Repository	SOP #	R-002
		Revision #	
		Implementation Date	1/23/2020
Page #	3 of 4	Last Reviewed/Update Date	
SOP Owner		Approval	

5. *References*

Chain of Custody Form

FGS Employee Handbook (2001)

Flowchart Diagram [SOP R-002](#)

GEODES

NGGDPP 2017 Final Report

[PreProcessing Checklist Guide](#)

UIC Sample Form

FGS Sample Submission Form

GEODES User Guide

(Go to next page for SOP-R002 Definitions.)

 Florida Geological Survey	Geological Sample Acquisition & Management Repository	SOP #	R-002
		Revision #	
		Implementation Date	1/23/2020
Page #	4 of 4	Last Reviewed/Update Date	
SOP Owner		Approval	

6. **Definitions**

Archivable – A geological core or sample as well as its physical condition and integrity that can provide unambiguous, uncorrupted geoscience information at a later date.

Boxes or containers – An object that can hold, store, or transport samples.

Chain of Custody form – Form to record essential data for later input to GEODES about sample type, sample delivery, sample attributes such as driller name, borehole or well name, site lat/long coordinates, and elevations, and date received by FGS along with documentation accompanying the sample delivery. Form should resemble, in order and content, the data entry screens for GEODES.

GEODES – Database of locations and geologic descriptions for samples stored at the FGS Repository.

Key information – essential data such as (but not limited to) site lat/long coordinates, elevations, driller name, borehole or well name, well permit number (if any), drill completion date needed to record sample geospatial relationships.

PreProcessing Checklist Guide – document that outlines the steps to determine if recently received geologic samples are a unique location and site or it already exists, and they are additional materials to be logged into **GEODES**.

Repository – FGS's library of geologic samples held in storage for later retrieval to conduct geoscience research.

Sample types – Materials such as cuttings, continuous cores, and hand collections from geologic sites that can provide geoscience information.

W-Series number – Recording and tracking system for geologic samples that are recovered from a borehole.

(Last page for SOP R-002)

[Return to list of SOPs](#)

 Florida Geological Survey	Geological Sample Acquisition & Mgmt. Repository	SOP #	R-003
		Revision #	
		Implementation Date	1/23/2020
Page #	1 of 3	Last Reviewed/Update Date	
SOP Owner		Approval	

Standard Operating Procedure – Repository Storage

1. Purpose

Ensure consistency in the process in the storing of new cores and samples by the Florida Geological Survey Repository.

2. Scope

Outlines the steps used for the storage and documentation of new cores and samples at the Florida Geological Survey.

3. Responsibilities

Professional Geologist Administrator with curator and repository management responsibilities, two repository staff members physically receive and record geological samples received

4. Procedure

1. Determine the repository shelf location for new samples based on sample weight and available storage space. DO NOT EXCEED SHELF WEIGHT RATINGS.
2. Label repository shelf storage location, if not already done.
3. Enter repository storage location data for each box of new samples into **GEODES**.
4. Confirm that new sample storage box label data is the same as the storage location data in **GEODES**.
5. Place storage boxes on shelves set aside for the new samples.
6. Independently verify within five days that location data in **GEODES** is the same as the repository physical location.
7. If location data in **GEODES** does not agree with actual physical location in the Repository, correct the discrepancy.
8. The new sample is now ready for later access and retrieval.

(Go to next page for SOP-R003 References.)

Florida Geological Survey

 Florida Geological Survey	Geological Sample Acquisition & Mgmt. Repository	SOP #	R-003
		Revision #	
		Implementation Date	1/23/2020
Page #	2 of 3	Last Reviewed/Update Date	
SOP Owner		Approval	

5. *References* ---

Chain of Custody Form

FGS Employee Handbook (2001)

Flowchart Diagram SOP R-003

GEODES

NGGDPP 2017 Final Report

UIC Sample Form

GEODES User Guide

(Go to next page for SOP-R003 Definitions.)

 Florida Geological Survey	Geological Sample Acquisition & Mgmt. Repository	SOP #	R-003
		Revision #	
		Implementation Date	1/23/2020
Page #	3 of 3	Last Reviewed/Update Date	
SOP Owner		Approval	

6. ***Definitions***

GEODES – Database of locations and geologic descriptions for samples stored at the FGS Repository.

Repository – Library of geologic samples held in storage for later retrieval for geoscience research.

Sample Types – Materials such as cuttings, continuous cores, hand collections from geologic sites that can provide geoscience information.

Storage boxes or containers – An object that can hold, store, or transport samples.

UIC Sample Form – Form provided by FGS to Florida Department of Environmental Protection Underground Injection Control Program and included in permits issued for monitoring and injection wells in Florida. Info about samples to be provided to FGS per permit condition is recorded on the form and sent to FGS when contractors coordinate to ship samples.

(Last page for SOP-R003.)

[Return to list of SOPs](#)

APPENDIX B

Chain of Custody Form

Is on the following page

FLORIDA GEOLOGICAL SURVEY

3915 Commonwealth Blvd

Office Ph: 850-617-0300

Warehouse Ph: 850-245-3131

SAMPLES CHAIN-OF-CUSTODY DOCUMENT (to be completed by sender)

Agency Contact _____ Phone _____

Agent completing form: _____ Phone: _____ Email: _____

Sample Ship Date: _____ Total Number of Samples Sent: _____

Type of container(s) used: _____ (boxes, bags, buckets, jars, etc.)

Well Name: _____ Permit Number: _____

Drill Completion Date: _____ Driller: _____

Company: _____ Company Headquarters _____

Project Geologist: _____ Consulting Company: _____

Borehole/Well Type: Monitor, Geologic Exploration, Oil and Gas, Underground injection well

Type of Documentation provided with samples:(circle all that apply):

Well Construction Permit, Completion Report, Photographs, Engineer Report, Hydrogeologic data,

Lithologs, Geophysical Logs, Packer Test Samples, Other (List if Other _____)

Total Depth: _____ From Depth: _____ To Depth: _____

Stick Up Height (ft.) _____ Reference: _____

Static Water Level (Head) (ft.) _____ Reference: _____ Yield (GPH) _____

Well Coordinates ____° ____' ____" N / ____° ____' ____" W Datum _____ County: _____

How coordinates were determined: _____

Elevation _____ Datum _____

How elevation was determined: _____

Recovery/Sample Type	Depth From (Ft.)	Depth To (Ft.)	Number of Samples	Containers Samples Sent In	Comments
Continuous Core					
Cuttings					
SPT Sample					
Core Chips					
Rotasonic Core					
Vibracore					
Secondary Samples					
Core Segments					
Representative Samples					
Other					

[Return to list of appendices](#)

APPENDIX C

FDEP Underground Injection Control (UIC) Program Sample Form

Is on the following page

FDEP Underground Injection Control Program Sample Form

(Cores/Cuttings/Formation Water)

Contact: David Paul, P.G.
 Geological Sample Acquisition & Management Section
 Florida Geological Survey
 Florida Department of Environmental Protection
 3915 Commonwealth Blvd
 Tallahassee, FL 32399
 Office: (850) 245-3131
 Fax: (850) 245-3136
David.Paul@dep.state.fl.us

Well Name:	
Well Type (circle one)	Class I Class V Exploratory Monitoring
Date Collected:	Date sent to FGS:
Sample type (circle one) Core Cuttings Formation Water	
Preservative used — if formation water sample — (circle one) Nitric n/a Other (describe)	
Datum and elevation:	Sample Interval:
Elevation method (circle one) Survey USGS Quadrangle Other (describe)	
Sample Interval Drilling Method (circle one) Reverse Air Mud Rotary Sonic/Acoustic Other (describe)	
Well Coordinates ° ' " N / ° ' " W	
Method (circle one) AGPS (hand held) DGPS (GPS survey) Map Derived	
FDEP Permit Number:	
Facility Name:	
Permittee (owner):	
Facility Address:	
Drilling Company:	Lead Driller:
Project Geologist:	Consulting Company:

[Return to list of appendices](#)

APPENDIX D

GEODES

***GEO**logic **D**ata **E**nterprise **S**ystem (**GEODES**) is the Florida Geological Survey database that contains geoscience information about borehole and hand specimen collections. **GEODES** includes location information, sample availability and lithologic descriptions.*

[Return to Table of Contents](#)

[Return to list of appendices](#)

APPENDIX E

Preprocessing Check Guide

Is on the following page

Pre-Processing Duplicate Check Process

The following steps should be completed to verify that a W number does not exist for given borehole. After this “duplicate check” is completed, a new W number may be assigned to the samples.

1. Search by Well Name in the database (<https://geodes.kyrasolutions.com/>) to verify that a designation hasn't already been assigned.
 - a. Check the Inventory Wells for an existing W number.
 - b. Check the Additional Wells for an existing wgi number.
2. If the samples are from a newly drilled well (within the last 12 months) or sufficient location information was acquired with the samples, use GIS to verify that the location given by the driller is correct. Verify that the county is right and that the coordinates correspond to any additional location information (e.g. property owner). If limited information exists, you may use the Additional Resources, but the driller may need to be contacted directly.
3. If the samples are from an older borehole and limited information was received with the samples, identify the location (Lat/Long and TRS) based on the following GIS layers (compare TD of samples to the TD of the well records) and other records (see Additional Resources).

Agency	Layer(s)	Fields
NWFWMD	NWFWMD\NWFWMD.gdb (NWF-Well_Inv_Jul2017)	NWF_ID; WELL_NAME
SJRWMD	SJRWMD\GDB\WellNetworks20150506.gdb (GWPLIB_Groundwater_Wells)	STN_NM
SRWMD	SRWMD_Well_Data\SRWMD_MWI_wells_ALL_NAD83.shp	SITEID
SWFWMD	SWFWMD_Wells\RD_GROUNDWATER_SITES.shp	SITE_ID; SITE_NAME
SFWMD	SFWMD\SFWMD_WaterUseFacilities.shp; SFWMD\MonitoringStations.shp	<i>multiple</i>
UIC	UIC\UIC_CLASS1_SP.shp; UIC\UIC\UIC_CLASS5_ASR_SP.shp; UIC\UIC_TEST_SITES_PT_SP.shp	FACILITY_I; FACILITY_N; WELL_NUMBE

(see R:\GIS_Data\Wells)

4. Search by GIS to check that there is not a current conflict. A borehole may not have been found in the database if the name was misspelled or listed under a different agency identifier.
5. Identify additional information about the borehole through Agency records (see Additional Resources).
6. Attach the pertinent info to the samples for entry into the database during sample processing. This should include any Water Management IDs or UIC Facility IDs.

Additional Resources

OCULUS (Primarily for UIC)

<https://depdms.dep.state.fl.us/Oculus/servlet/login>

- Login in using “PUBLIC OCULUS LOGIN”
- Select a Catalog (i.e. “Underground Injection Control”)
- Select the Profile (Construction_Operation Mgmt and/or Permitting_Authorization)
- Fill in the Facility ID (if unknown, click on the ellipses to search)
- Click the Search button

Search

Catalog

- SCO - Siting Coordination Office
- Solid Waste
- State Revolving Fund
- Storage Tanks
- Underground Injection Control**
- Waste Cleanup
- Wastewater

Search By

Profile

Profile

- Cleanup_Remediation
- Construction_Operation Mgmt
- Discovery_Compliance
- Enforcement_Legal
- Fiscal
- Permitting_Authorization**
- Sampling

Sort By Document Date

Creator

Created MM-DD-YYYY

Type Any

Folder Name

To MM-DD-YYYY

Search **Clear**

County = COLLIER

District = SD

Facility-Site ID = 91762 SOUTH COLLIER COUNTY WTP

Document Date From MM-DD-YYYY To MM-DD-YYYY

Received Date From MM-DD-YYYY To MM-DD-YYYY

Document Type =

Contractor ID =

Facility Type *

- Using the Document Date, Document Type, and Document Subject, find the appropriate records. The most useful are “PERMT-FINAL” and “WELL COMPLETION REPORT”

ID	Document Date	Received Date	Document Type	Inspection Type	Permit Type	Facility Type	Application Number	Permit Number	Document Subject
10-31-2003	11-03-2003		REQUEST FOR ADDITIONAL INFORMAT		CONSTRUCTION	CLASS I			RESPONSE TO RFI DATED 10-8-03
10-08-2003	10-08-2003		REQUEST FOR ADDITIONAL INFORMAT		CONSTRUCTION	CLASS I			RFI DATED 10-8-03
10-06-2003	10-06-2003		INCOMING CORRESPONDENCE			CLASS I			PRESSURE TEST
09-02-2003	09-03-2003		ENGINEERING REPORTS		CONSTRUCTION	CLASS I			WELL COMPLETION REPORT
08-28-2003	08-28-2003		PERMIT - FINAL		CONSTRUCTION	CLASS I			MINOR MOD SENT OUT
06-02-2003	06-05-2003		DRILLING REPORTS			CLASS I			WATER QUALITY DATA
03-18-2003	03-19-2003		DRILLING REPORTS			CLASS I			WEEKLY REPORT NO. 10
02-26-2003	02-26-2003		INCOMING CORRESPONDENCE		CONSTRUCTION	CLASS I			EMAIL
02-25-2003	02-25-2003		INCOMING CORRESPONDENCE		CONSTRUCTION	CLASS I			EMAIL
02-24-2003	02-25-2003		DRILLING REPORTS			CLASS I			WEEKLY SUMMARY REPORT # 60

- Open the documents and look for information about locations, drill dates, depths of drilling and casing, and any well construction diagrams or site maps.

ePermitting Sites

The following are the well permit sites for each of the Water Management Districts

NFWWMD: <https://permitting.sjrwmd.com/nwepermitting/jsp/SearchWellCmple.do?theAction=init>

SJRWMD: <https://permitting.sjrwmd.com/epermitting/jsp/Search.do?theAction=PermitNumSearch>

SFWMD: <https://my.sfwmd.gov/ePermitting/PopulateLOVs.do?flag=1>

SRWMD: <https://permitting.sjrwmd.com/srepermitting/jsp/SearchWellCmple.do?theAction=init>

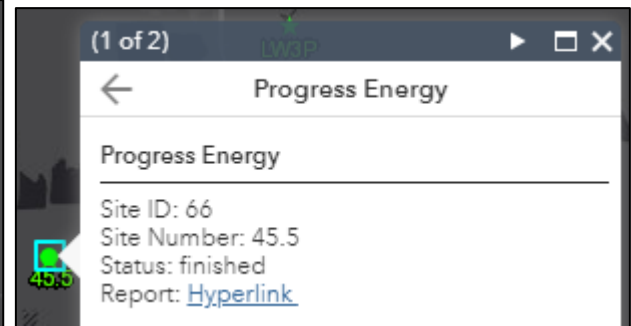
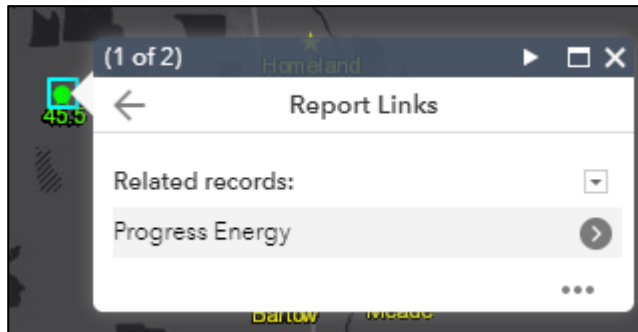
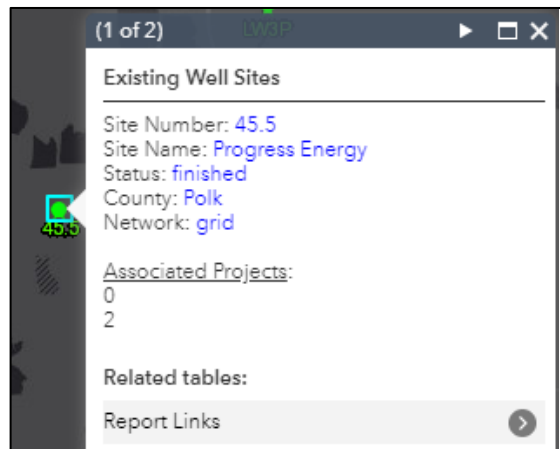
SWFWMD:

http://www18.swfwmd.state.fl.us/search/search/wcpsimple.aspx?_ga=2.195658799.2029816200.1591741503-2053730084.1567691868

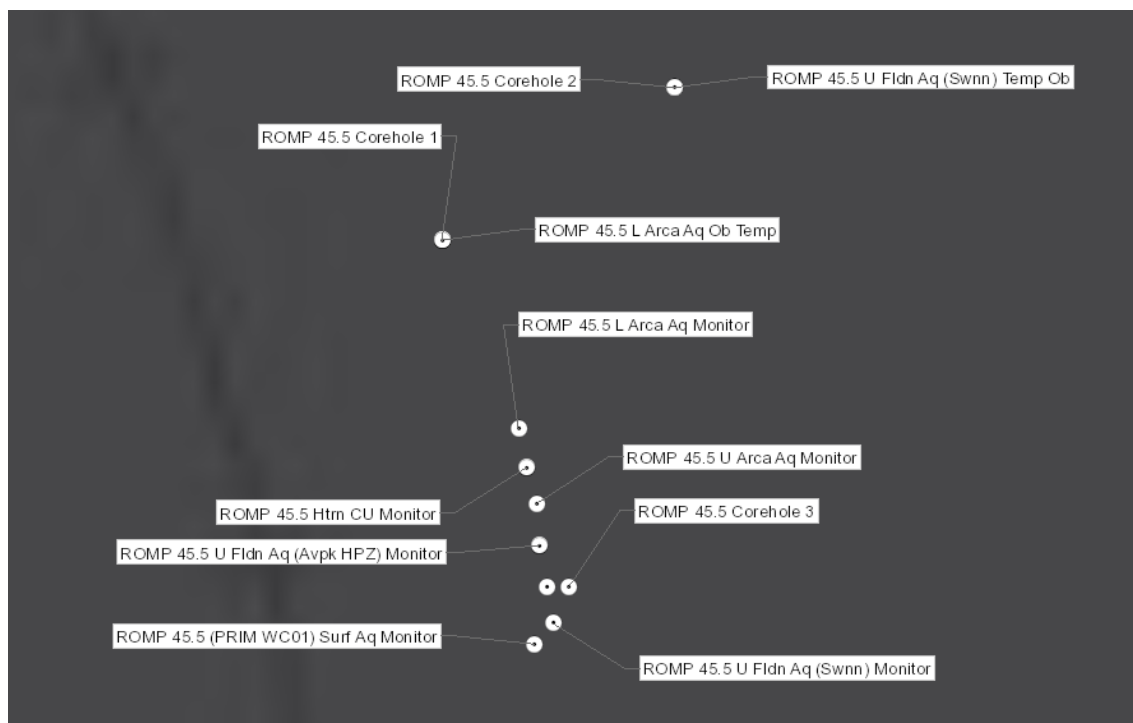
SWFWMD ROMP Viewer (Regional Observation and Monitoring Program)

<http://swfwmd.maps.arcgis.com/apps/webappviewer/index.html?id=5cfe38abbae84d1fadfd0953c3126bc>

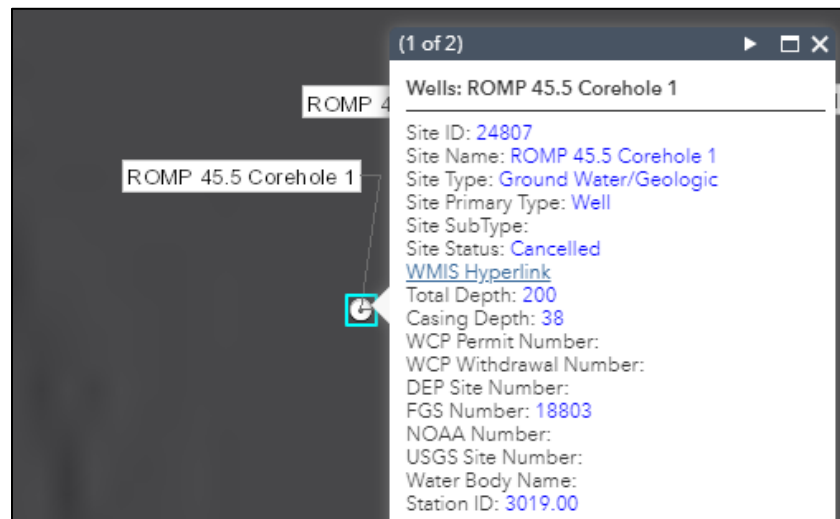
- Zoom in to see the site numbers.
- Clicking on the site will allow you to get to the project report hyperlink.



- Zooming in further will allow you to see the individual boreholes and monitor wells at the site.



- Clicking on the individual points will identify additional information. Note: there may be more than one record at a given point.



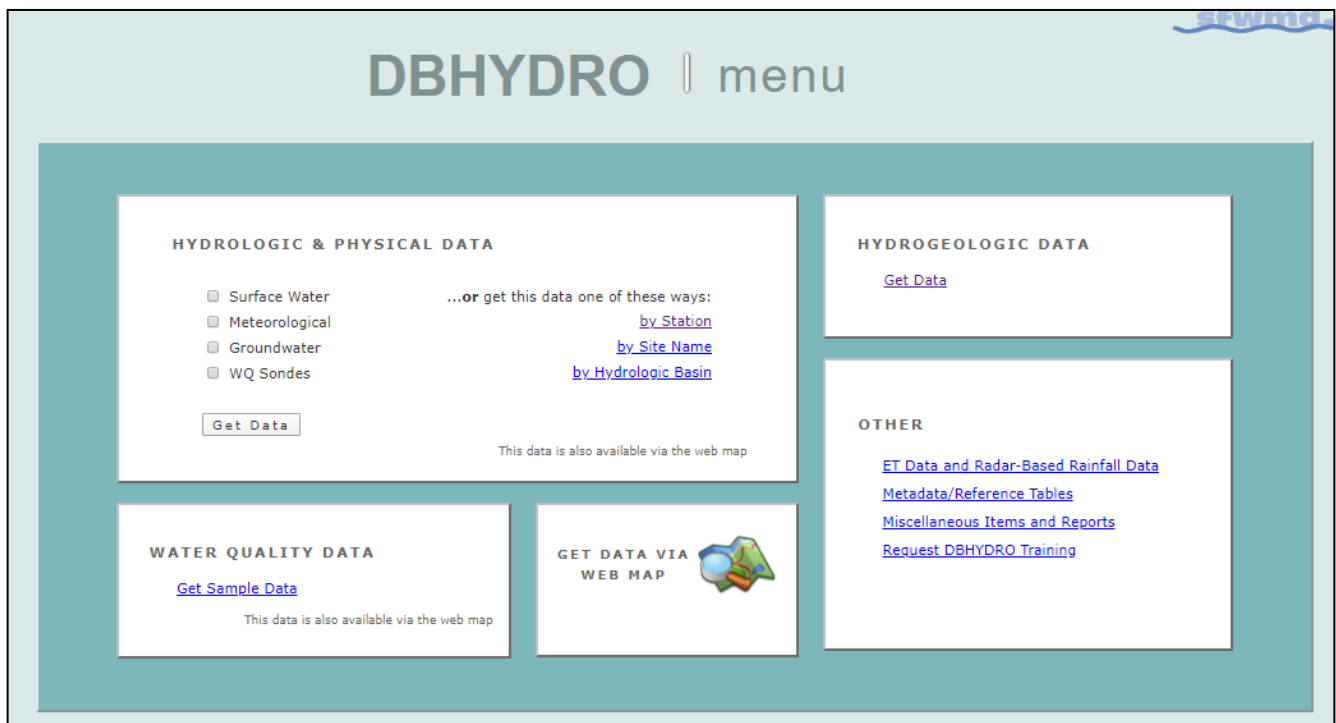
DBHYDRO (SFWMD)

<https://www.sfwmd.gov/science-data/dbhydro>

Browser Menu: http://my.sfwmd.gov/dbhydro/sql/show_dbkey_info.main_menu

User Guide: <https://www.sfwmd.gov/sites/default/files/documents/dbhydrobrowseruserdocumentation.pdf>

This database can be useful to find wells, primarily in the South Florida WMD region. Note that wells can be listed in multiple ways including the FGS W Number as a Site Name or Station ID. Also note that any information from those records came from our historical data and are not as accurate as our current database.



Once in the Browser Menu, go under Hydrologic Data (on the upper right), and click on “Get Data.” This will bring you to the main search menu.

HYDROGEOLOGIC DATA

SELECT SEARCH PARAMETERS

(click on the parameter text for help)

Station	☐	Station Description	☐
County	☐	X-Y Coordinates	☐
Latitude/Longitude	☐	Township	☐
Range	☐	Section	☐
DCVP Station Id	☐	Total Depth	☐
Screen Depth	☐	Aquifer	☐
Data Type	☐	Borehole Purpose	☐
Formation	☐		

The most useful searches are by Station, Station Description, or Township, Range, and Section. Note that a site name might be found in either Station or Station Description, or neither. Select the options you would like and click "Submit." Enter the Criteria you want and then click "Submit" and then "Submit" on the next screen.

QUERY CRITERIA

Township:

Range:

Section:

Separate multiple values in Text field by '/'.
 The '%' character may be used as a **wildcard**.

Output Parameters Selection

Selected Parameters :

Section: 27

Township: 48

Range: 26

Output Format :

☒ Location Details
☐ Well Construction Details
☐ Hydrogeologic Data Summary

Output To :

☒ Screen
☐ File

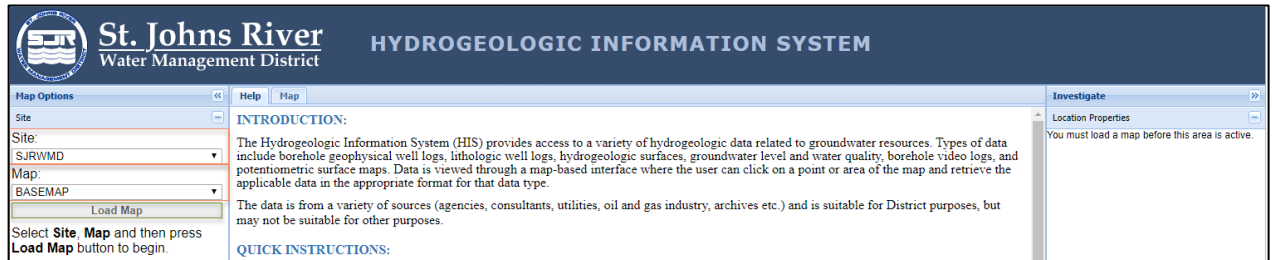
Any matching results will then be displayed. Clicking on the Station link will bring you to additional information. In the Multimedia field, a like may appear if there are any logs, photos, or documents available.

Select	Station	Alias Match	Description	Latitude	Longitude	X-Coord (feet)	Y-Coord (feet)	County	Total Depth (feet)	Screen	Map	Multimedia
☐	C-303		30ft W & 15ft S of Collier Blv(CR 951) & CR 846 intractn, 9mi NE of Naples PO	261622.31	814122.292	430214.315	705468.135	Collier	300	Screen	MAP	NO Multimedia
☐	C-997		C - 997	261532.3	814117.295	430642.251	700416.275	Collier	22	Screen	MAP	NO Multimedia
☐	CO-454		Gee & Jenson:	261614	814124	430054	704630	Collier	280	No Screen	MAP	NO Multimedia

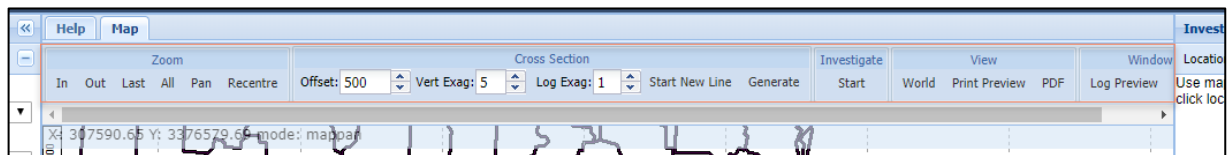
SJRWMD Data Explorer

<http://webapub.sjrwmd.com/webdataexplorer/>

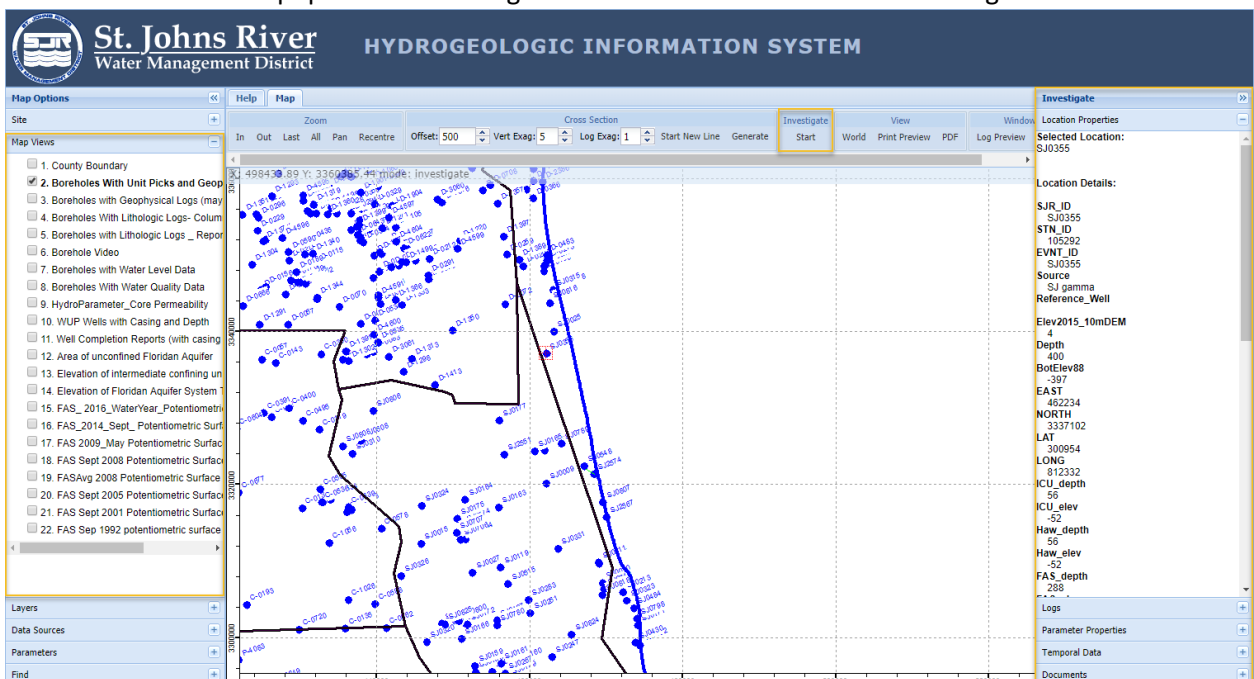
- Load the appropriate Basemap under the Site and Map options (*highlighted in orange*). Select the desired data sets and click the “Load Map” button (*highlighted in green*). For basic well information provided from the district such as geophysical logs, location information, completion reports, litho- or stratigraphic picks, you will use the default settings. (Site: SJRWMD; Map: BASEMAP)



- In order to zoom in or out on the map screen you may use the command strip or the scroll on your mouse (*highlighted in orange*). This is also where you will find the tools to “Pan” the map screen and “Recentre” the map.



- To explore the various maps, you will need to identify a combination of “Map Views” and “Data Sources” in the table of contents, on the left side of the page.
- Once the desired map is selected and loaded, you should see the available data populate. Due to increased density in certain areas, the well designations are sometimes difficult to read, zooming in to the target area can be helpful. Once clicking “Investigate”, you can then select a specific site and the information should be populated on the right side of the screen under the “Investigate” Panel.



- After selecting the desired data source(s), you may click “**Find**” on the left side of the screen. Using the find function will allow you to search the selected Data Sources for specific well and station information. To access this data, follow the following steps.
 1. Begin by clicking the “Refresh/Clear” button. By doing this, a “data source” has populated the drop-down field.
 2. Change the data source by using the drop-down. You must search each “data source” separately.
 3. Use the “Select Field” drop-down to specify whether searching for Well Name or Station ID.
 4. Access the “Enter Criteria” drop-down. A broad search typically returns more results, therefore setting “Example Criteria” to “Like ‘*Keyword*’” will typically generate everything associated with the well or station you are searching.
 5. Finally, you must fill out the “Actual Criteria” textbox. This is a specific format.
*(e.g. to search for records associated with L-1062 or OR1130, you will enter into the textbox: Like ‘*L-1062*’ or Like ‘*OR1130*’ then select Find Data/Filter View)*

If information is available for that record, a labeled selection will be populated below the “Find Data/Filter View” button. Select this in order to generate record information in the investigate tab on the right side of the screen.

[Return to Table of Contents](#)

[Return to list of Appendices](#)