FINAL AUDIT REPORT

South Florida Water Management District

OGC 16-0267

Field and Laboratory Records Audit

July 21 – July 23 2015

Division of Environmental Assessment and Restoration
Florida Department of Environmental Protection
May 5, 2016

Introduction

This laboratory and field records audit of the South Florida Water Management District (SFWMD) was conducted by the Florida Department of Environmental Protection (DEP or department) Aquatic Ecology and Quality Assurance Section. The audit was conducted in accordance with Rules 62-160.650 and 62-160.670, Florida Administrative Code (F.A.C.), to include the evaluation of specific data quality objectives identified for data used to assess impairment of state surface waters according to Chapter 62-303, F.A.C..

The laboratory records audit is used to verify that an organization is correctly implementing approved analytical methods, including acceptable calibration and quality control, and maintaining adequate laboratory documentation. The field records audit is used to verify that a sampling organization is correctly implementing the Department Standard Operating Procedures (SOPs) for Field Activities, and covers required field documentation and quality assurance.

This audit report lists the procedural and documentary deficiencies, as determined by the department auditors.

Description of Audit

DEP auditors Michael Blizzard, Nia Wellendorf, Jennifer Claypool, and Meghann Niesen conducted this on-site audit from July 21, 2015, to July 23, 2015, at the SFWMD facility on Belvedere Road in West Palm Beach, Florida. The auditors met with SFWMD field and lab staff at the beginning and at the conclusion of the on-site audit. During these meetings, the purpose and strategy for conducting the audit was explained, and a brief summary of preliminary findings was provided to SFWMD staff present at the conclusion of the on-site audit. An outline of the expected schedule for delivery of preliminary and final audit reports was also discussed.

For the audit, department staff selected a group of samples collected and analyzed by the SFWMD from 2009 to 2014 for the following analytes: Alkalinity, Color, Chlorophyll *a* (Chl a), Nitrate + Nitrite (NOx), Total Kjeldahl Nitrogen (TKN), Total Phosphorous (TP) and Total Nitrogen (TN) (Table 1). A subset of samples was selected for additional review of field documentation (noted by an asterisk in Table 1). The audit consisted of an extensive review of the records associated with the chosen samples. Some of the documentation reviewed included field sheets, laboratory check in logs, analytical runs, laboratory reports, and Quality Assurance (QA) and Quality Control (QC) documentation. Most of these records were in electronic format and accessed through the SFWMD laboratory information management system (LIMS).

The DEP SOPs (DEP-SOP-001/01, March 31, 2008), the 2003 National Environmental Laboratory Accreditation Conference (NELAC) standards, and the relevant methods provided the criteria for the audit and all findings.

Preliminary Audit Report and Implementation of Corrective Actions

A preliminary audit report was sent to Richard Walker, Laboratory Manager for the SFWMD, and John Moorman, Field Quality Assurance Officer for the SFWMD, on October 29, 2015. The report included a findings table with spaces for the audited party to respond with further information and/or corrective actions. Mr. Walker replied with proposed corrective actions on December 14, 2015, and Mr. John Moorman provided clarification for selected responses on April 20, 2016 (Tables 2 and 3). The auditors have reviewed the corrective actions and deem them acceptable. Corrective actions were implemented according to the statements in Tables 2 and 3, and approved by the department as of May 2, 2016.

Usability Statement

Based on the results of this laboratory records audit, the Aquatic Ecology and Quality Assurance Section has determined that data produced by the SFWMD Laboratory from 2009 to 2014 for the following analytes may be used by the Department for both planning and verified listing purposes when assessing the impairment status of waters according to Chapter 62-303, F.A.C.: Alkalinity, Color, Chlorophyll *a* (Chl a), Nitrate + Nitrite (NOx), Total Kjeldahl Nitrogen (TKN), Total Phosphorous (TP) and Total Nitrogen (TN). Additionally, auditors found that SFWMD field sample collection is conducted in adherence with DEP SOPs.

This audit evaluated the indicated data for the use(s) described in this report. The usability of the audited data for other purposes or the usability of data for other analytes or other date ranges must be determined separately according to applicable requirements in rule 62-160.670, F.A.C.

Table 1. List of audited samples for the audit of the SFWMD conducted by the FDEP Aquatic Ecology and Quality Assurance Section, July 21-23, 2015. Full review of field documentation was conducted for sample IDs marked with an asterisk.

Field ID	P-number	Collection Date	Analyte	Field ID	P-number	Collection Date	Analyte
ISTK6	P41044-7	1/14/2009	Alkalinity	2274010	P42762-17	1/22/2009	NOX
BCWQA18	P39160-7	6/22/2009	Alkalinity	CR-04.8T	P42512-3	3/16/2009	NOX
A03	P41600-6	9/21/2009	Alkalinity	BCWQA5	P39165-5	6/30/2009	NOX
BCWQA20	P39150-7	11/18/2009	Alkalinity	S12A	P44996-5	9/15/2009	NOX
LOX10	P45537-6	3/1/2010	Alkalinity	G327A	P50610-6	11/15/2010	NOX
GORDYRD	P47383-8	5/3/2010	Alkalinity	BCWQA18	P48876-7	7/25/2011	NOX
G349A	P47678-18	10/20/2010	Alkalinity	G374B	P53617-3	9/26/2011	NOX
S372B*	P52414-9	4/19/2011	Alkalinity	ISTK1	P54382-1	3/26/2012	NOX
NE1	P54352-4	7/19/2012	Alkalinity	KREA 97*	P56875-7	10/1/2012	NOX
S65D	P56885-5	8/22/2012	Alkalinity	D03	P56757-7	12/3/2012	NOX
D03*	P56756-6	10/22/2012	Alkalinity	BC9	P62332-4	5/23/2013	NOX
S352	P60525-5	4/3/2013	Alkalinity	ENR012	P66679-5	9/16/2013	NOX
S65A	P60758-12	5/22/2013	Alkalinity	HEND@951	P70043-4	4/21/2014	NOX
ISTK1	P64722-2	9/23/2013	Alkalinity	SLT-19	P72789-7	10/8/2014	NOX
G379E*	P70197-11	3/3/2014	Alkalinity	FS1	P72837-8	10/9/2014	NOX
LZ2*	P43166-2	7/7/2009	Chl a	LOX8*	P45541-5	11/3/2009	TKN
SLT-19	P46490-7	11/12/2009	Chl a	G349A*	P45372-16	11/4/2009	TKN
CES09	P48229-11	7/28/2010	Chl a	BCWQA4	P39151-8	11/17/2009	TKN
LZ42	P48441-3	10/21/2010	Chl a	G337A	P47767-7	6/16/2010	TKN
S308C	P50434-4	12/13/2010	Chl a	CES09*	P48229-11	7/28/2010	TKN
A03	P48737-2	3/2/2011	Chl a	BCWQA20	P45036-7	8/5/2010	TKN
BC2	P49206-3	3/24/2011	Chl a	SLT-38	P50364-7	4/14/2011	TKN
C03	P53041-4	10/18/2011	Chl a	S18C*	P51827-25	5/23/2011	TKN
FEBOUT	P49455-6	2/6/2012	Chl a	CA315	P52874-6	7/12/2011	TKN
KISSR0.0	P55618-1	8/14/2012	Chl a	S84	P55052-2	8/8/2012	TKN
NB2*	P60367-1	2/5/2013	Chl a	TCNS 207	P58865-22	11/27/2012	TKN
KREA 97	P65179-7	6/10/2013	Chl a	HEND@951*	P60376-4	1/16/2013	TKN
ISTK3W	P66292-3	11/4/2013	Chl a	S65A	P60758-12	5/22/2013	TKN
S10C	P42431-9	3/12/2009	Color	BC9	P68656-4	2/19/2014	TKN

Field ID	P-number	Collection Date	Analyte	Field ID	P-number	Collection Date	Analyte
S352	P44686-6	7/8/2009	Color	L61E	P69468-8	4/7/2014	TKN
S4	P45515-16	10/14/2009	Color	CA215	P41095-6	2/3/2009	TP
BNSHINGLE	P46233-5	3/8/2010	Color	S391	P43487-5	3/17/2009	TP
GORDYRD	P48427-7	7/12/2010	Color	BCWQA17*	P45027-5	10/14/2009	TP
CA35	P48790-7	10/12/2010	Color	S12A	P46920-6	1/20/2010	TP
C17S44	P51165-4	4/11/2011	Color	S9A	P46887-3	2/2/2010	TP
NE1	P54348-4	3/14/2012	Color	CA315	P45180-6	2/8/2010	TP
P34	P54353-6	8/23/2012	Color	TAMTOM	P49241-3	2/8/2011	TP
LOX12	P59958-8	4/3/2013	Color	ROTC2	P53190-6	8/11/2011	TP
S65D	P61856-5	6/19/2013	Color	S177	P56000-25	5/29/2012	TP
ISTK6*	P61160-5	7/8/2013	Color	S372B	P58029-8	10/2/2012	TP
COCPALM*	P68669-2	1/9/2014	Color	G343L	P66124-12	7/10/2013	TP
ECOCORIV	P70051-5	4/7/2014	Color	S650	P67112-3	9/10/2013	TP
CA34	P75973-10	11/18/2014	Color	CA38	P67970-7	2/18/2014	TP
ECOCORIV	P71325-5	7/2/2014	TN	G379E	P70472-11	3/31/2014	TP
FEBOUT	P71713-3	7/21/2014	TN	BNSHINGLE	P72638-4	6/16/2014	TP
G372	P71679-16	10/20/2014	TN				

Table 2. Audit Findings, corrective actions, and auditor comments for the lab records audit of the SFWMD conducted by the FDEP Aquatic Ecology and Quality Assurance Section (AEQAS), July 21-23, 2015.

Finding #	Analyte	Finding	Sample(s) Affected (lab ID)	Required or Recommended Corrective Action	Laboratory Response	Implementation Date	AEQAS Response
1	ALK	The normality value for the sulfuric acid titrant used in the calculations for sample results did not match the normality value calculated for the stock titrant solution.	P45537-6, P56885-5, P64722-2	Required: Please clarify the information found in the records.	The normality is the same. The number of significant figures available from the sample level detail are greater than as recorded for the standardization titration, which would affect the calculation.	N/A	Acceptable
2	ALL	The current check-in sheet has a prompt for indicating preservation upon receipt for the entire sample bottle set only.	ALL	Required: Each sample should be checked for chemical preservation prior to or during analysis. Please indicate where this information is recorded.	All samples are checked for proper preservation according to the log in SOP (SFWMD-LAB-5090) and all exceptions generate additional documentation as described in the SOP.	N/A	NELAC Quality Systems Section 5.5.8.3.1(a) and (b) (2003) and NELAC Quality Systems Sections 5.8.7.1 and 5.8.7.2 (2009) require positive indication of preservation for each sample.

Finding #	Analyte	Finding	Sample(s) Affected (lab ID)	Required or Recommended Corrective Action	Laboratory Response	Implementation Date	AEQAS Response
3	Alkalinity, Chl a, Color, TN, NOX, TKN	These samples do not have the appropriate prompts filled out for thermal preservation on the lab check-in form (the current Pre-login Summary Report). Some are blank, some are marked as received on ice with no temperature, and some are illegible. All samples must have a temperature recorded.	Alkalinity: (P54352-4, P56885-5, P70197-11), Chl a: (P49455-6, P55618-1, P60367-1), Color: (P54348-4, P54353-6), Total Nitrogen: (P71679-16), NOX: (P54382-1, P56875-7, P66679-5, P72837-8), TKN: (P55052-2)	Required: Ensure that the lab check-in logs are filled out completely, correctly, and legibly every time.	The Pre-login Summary Report (PSR) has evolved to address some of these issues over the time period covered by the audit. The actual sample delivery procedures are documented in the Log in SOP and Sample Acceptance Criteria. Corrective Actions: (1).Staff will be reminded of the requirement for completion and legibility; and (2). A completeness check will be added to the PSR review steps as a second check on completeness of the documentation.	3/1/2016	Acceptable

Finding #	Analyte	Finding	Sample(s) Affected (lab ID)	Required or Recommended Corrective Action	Laboratory Response	Implementation Date	AEQAS Response
4	Alkalinity, Chl a, Color	The lab check in form does not have a prompt for date; receipt date is only recorded by time stamp. In a few cases the scan was not clear enough for the time stamp to be read, causing this information to be lost. Auditors were unable to determine if this was a scan quality issue or if the time stamps were not legible on the original.	Alkalinity: (P47282-8), Chlorophyll: (P48441-3, P50434-4), Color: (P48790-7, P54348-4, P54353-6),	Required: Please ensure that receipt date and time are clear in lab check in records.	See response to finding #3 (1).Staff will be reminded of the requirement for completion and legibility; (2). The electronic data entry program (HFDM) version of the PSR will be revised to include lines for login staff to document the date and time of sample receipt;	3/1/2016	Acceptable

Finding #	Analyte	Finding	Sample(s) Affected (lab ID)	Required or Recommended Corrective Action	Laboratory Response	Implementation Date	AEQAS Response
5	ALL	The field sheet has a prompt for processing time but it is not clear if this is for thermal or chemical preservation. Auditors are unable to confirm if samples were immediately placed in ice.	ALL	Recommended: Add a prompt to the field sheet indicating samples were immediately placed in ice. Edit the form to clarify what the prompt "Processing time" means.	The following language will be added to the FSQM and, if possible, to the Prelogin Summary Report in the "Hand Transport" portion: "Samples preserved according to Holding Time and Preservation table in the FSQM within 15 minutes of collection unless otherwise noted.". The "processing time" is entered on marsh field record sheets only. This refers to the time when processing is complete, including filtration and acidification. The samples are placed on ice immediately in accordance with the FSQM and Marsh SOP (SFWMD-FIELD-SOP-004) requirements.	5/31/16	Acceptable
6	NOx	A corrected field form was submitted with numerous cross outs. The legibility is poor, and the sheet is hard to interpret.	P48876-7	Required: Ensure that field sampling personnel are instructed not to obliterate errors.	Staff will be reminded of the requirement for completion and legibility	1/1/2016	Acceptable

Finding #	Analyte	Finding	Sample(s) Affected (lab ID)	Required or Recommended Corrective Action	Laboratory Response	Implementation Date	AEQAS Response
7	CHLA	Auditors were unable to determine if method blanks were extracted and analyzed with some samples. The quality manual states that method blanks are run with each analytical batch. While method SM 10200 does not require them, EPA 447.0 does. QC practices should be consistent with the quality manual and method 447.0. The lab director indicated that only equipment blanks were used prior to 2012.	?	Required: Please clarify the current procedure for running method blanks on both the visible and HPLC methods and how they are associated with the sample batches.	All samples are now analyzed by EPA447.0 The method now includes three blank types: LRB (Laboratory Reagent Blank which includes the sample filtration step), MB (Method Blank, solvent extracted blank filter) and CCB (90% acetone solution to establish the instrument zero point). The LRB was implemented in 2012.	N/A	Acceptable

Finding #	Analyte	Finding	Sample(s) Affected (lab ID)	Required or Recommended Corrective Action	Laboratory Response	Implementation Date	AEQAS Response
8	CHLA	Sample has a comment that states, "warning: time exceeded +/- 1 hour" but there are no qualifiers. Is this time to preservation?	P48441-3	Required: Please explain this comment and include any corrective action reports.	The time warning refers to the information being entered into the electronic data entry program (HFDM) at a time greater than one hour from the actual time. This was due to the computer having crashed in the field at the first station. The field event was documented on paper and later entered into HFDM. This was recorded in the trip comments for the event and the original paper document was submitted with the HFDM print out. Since this issue was not a failure of the quality system and they recorded the information adequately in the field, no corrective action was issued.	N/A	Acceptable

Finding #	Analyte	Finding	Sample(s) Affected (lab ID)	Required or Recommended Corrective Action	Laboratory Response	Implementation Date	AEQAS Response
9	CHLA	The sample that was used as a duplicate had a result of 17.36 on the analytical run but a lower value was reported on the QC summary. The value of 17.36 did not match up with the duplicate value of 39.52. The reported RPD was 2.5%, whereas the auditors calculated RPD as 78%.	P48441-3	Required: Explain what samples were used to calculate recovery. Ensure the appropriate calculations are being used to determine precision.	The associated sample duplicate in the batch was from sample 24563004 (CHLA2 calculated value of 40.94; reportable value 41) and the LIMS ID for the duplicate was 257760 (CHLA2 calculated value of 39.52; reportable value 40). The reported RPD of 2.5% is correct. The value of 17.36 is the actual reported CHLA2 result for sample 23268010. There was no duplicate analysis of this sample.	N/A	Acceptable, Auditor's error.
10	CHLA	The work order number was incorrect on the filtration/extraction log sheet.	P49206-3	Required: Ensure that critical information is transferred correctly between records.	The filtration extraction log sheet was annotated to make this correction and staff were reminded of this requirement.	11/12/2015	Acceptable
11	CHLA	Exact time of extraction was not recorded. Instead, a range of time for the entire batch was recorded.	P60367-1, P65179-7	Required: Record the exact time for sample extraction so the holding time calculations can be made accurately.	The laboratory contends that recording the range of extraction times provides adequate information for evaluation of the holding time under these conditions.	N/A	Acceptable

Finding #	Analyte	Finding	Sample(s) Affected (lab ID)	Required or Recommended Corrective Action	Laboratory Response	Implementation Date	AEQAS Response
12	Color	Only six standards are used for the curve, and the current method requires nine; however, the curve covers the full range of samples.	ALL	Recommended: Specify which version of Standard Methods is being followed, or state the reasons for using alternatives to the current published method and provide any supporting evidence.	The laboratory is certified for SM 2120C (22nd Ed). The application and variances from the method are noted in the SOP. The method is validated every six months with PT studies and with a blind ISO43 Performance Evaluation study using natural surface water samples. Additional documentation is available.	N/A	Acceptable
13	Color	The limit for undiluted samples in the method is 100; however, the curve run by the lab goes up to 400, and two samples are above 100.	P46233-5, P61856-5	Recommended: State the reasons for using alternatives to the published method and provide any supporting evidence.	See response for Finding #12	N/A	Acceptable
14	Color	Duplicate precision appears to be calculated incorrectly. The results used by the auditors were 17.51 and 17.25, which gave a RPD of 5.7.	P54353-6	Required: Please correct the calculation or explain the error.	The laboratory RPD is calculated using the significant figures available from the reportable results. The raw data may offer additional significant figures that can result in different RPD calculations. The laboratory convention is to use reportable results for these calculations.	N/A	Acceptable

Finding #	Analyte	Finding	Sample(s) Affected (lab ID)	Required or Recommended Corrective Action	Laboratory Response	Implementation Date	AEQAS Response
15	NOx	Batch worklist is barely legible. It appears to be a bad scan.	P53617-3	Required: Ensure that permanent copies of records are legible. Recommended: If not already in place, institute a QC practice for scanned records.	In 2013 the laboratory implemented a requirement for analysts to check all scanned information to assure the quality of the scan. All staff were again reminded of this requirement.	11/20/2015	Acceptable
16	TKN	The result reported to DEP does not match the result in lab records. It appears the dissolved result was switched with this result.	P45541-5	Required: Determine if the error originated in the lab. If so, correct this sample in the records.	The result for TKN (1.46) for this sample matches in LIMS, DBHYDRO and STORET	N/A	Acceptable, Auditor's error.

Finding #	Analyte	Finding	Sample(s) Affected (lab ID)	Required or Recommended Corrective Action	Laboratory Response	Implementation Date	AEQAS Response
17	TKN	The MS and MSD pairs were re-run, and one sample from each run was chosen to calculate recovery and precision. It appeared that these two samples were selectively used.	P52874-6	Recommended: Explain the procedure for choosing which samples to use when calculating precision in cases where QC samples have been run more than once.	These samples were not used in the laboratory to evaluate precision. Re-pour of the over-range spike was consistent with the procedure. However, selective use of the results by the analyst was not appropriate. The spike concentration was not in the correct range for the sample and may have not been correctly added to the sample. The laboratory has addressed spiking ranges and procedures since this time, but will use this finding to re-address spiking ranges, preparation procedures and follow-up actions from failing spikes.	1/1/2016	Acceptable
18	TN	The digestion log was missing. Auditors could not find information for expiration dates and standards.	P71325-5, P71679-16	Required: Ensure the original digestion record is kept for the required time and appropriately linked to all required information.	Digested parameters include a separate LIMS digestion batch which links the digested QC samples and digestion logs. All information is available in TN prep batch 17721.	N/A	Acceptable

Finding #	Analyte	Finding	Sample(s) Affected (lab ID)	Required or Recommended Corrective Action	Laboratory Response	Implementation Date	AEQAS Response
19	TN	The digestion form in the SOP does not appear to have linkage to standard lot numbers and expiration dates.	ALL	Required: If linkage exists, please explain how. If there is not linkage, add a prompt to the log sheet.	The LIMS generated prep batch is populated with the links to the standards. LIMS checks the standards logs during the batch build process and assures that standards are current when the batch is created.	N/A	Acceptable
20	TP	The result does not match between the EDD file sent and STORET. The newer result is from a 10-9-12 analytical run, and was reported in STORET as 0.037. The older result, 0.045, was run on 10-3-12 and was reported on the EDD file. It appears the whole run from 10-3 was repeated but it was not clear why.	P58029-8	Recommended: Please provide an explanation for the re-run samples along with an explanation of how that would be noted in the sample run. According to the lab Quality Manual the first result should have been reported. Please explain why the second result was reported and why it is different in the EDD.	The result for TPO4 (0.045) for this sample matches in LIMS, DBHYDRO and STORET. The result in STORET of 0.037 is for TDPO4.	N/A	Acceptable, Auditor's error.

Table 3. Audit Findings, corrective actions, and auditor comments for the field records audit of the SFWMD conducted by the FDEP Aquatic Ecology and Quality Assurance Section (AEQAS), July 21-23, 2015. Audit criteria were from the DEP SOPs (DEP-SOP-001/01, March 31, 2008).

Finding number	SOP reference	Audit Finding	Recommended or Required Corrective Actions	SFWMD Response	Implementation Date	AEQAS Response
1	FD 5000 3	The sample transmittal record for each site lists the analytes to be tested among all bottles collected at that site; however, the information about which analyses will be conducted from each bottle is only found on the bottles themselves and in the SFWMD Field Quality Manual (FQM).	Recommended: Include a reference to FQM Table 5.0.B on sample transmittal form. Reference to the FQM on field records, in lieu of including all information on the field records, is allowed per FD 1100 2.2.	The information located in FSQM Table 5.0.B is also in the analogous table in the laboratory QM (Table 7-1). Both tables link the use of the colored label (and color code on each label) to identify how the sample aliquot was processed. The required analyses are defined in the LIMS template and associated with the work order and Pre-login numbers. Since the analysis information is associated at the time of "pre-login" in LIMS, this information is not necessary for sample receipt. Because the current analysis information is known by the laboratory prior to receipt we do not think it is helpful to identify the table on the Prelogin Summary Report.	N/A	Acceptable

Finding number	SOP reference	Audit Finding	Recommended or Required Corrective Actions	SFWMD Response	Implementation Date	AEQAS Response
2	FD 5000 section 2.14	The sampling equipment is listed on the field data record, but the record does not specifically indicate which equipment is used to collect which samples or analytes. The FQM does not specify which equipment is used for each project, stations, or analytes. Table 5.0.B only specifies which bottles contain samples collected with filters. Section 7 of the FQM states that all equipment listed is used for all stations unless comments indicate otherwise. However, there were very few equipment-related comments in the field records. Numerous samples use a grab bucket and a Niskin, a grab bucket and a tray, or all three, with no comments. For cases in which multiple equipment was used, it is not clear if that equipment was used for all samples.	Required: Please clarify how bucket and Niskin are used together, and ensure that comments are added if any sites deviate from full equipment list.	When identified, the bucket is used to process the sample collected by the Van Dorn (a.k.a. Niskin) or autosampler but is not used to collect the sample. The Surface Water Quality Sampling Equipment table (3.2.A) in the FSQM specifies the bucket is used for "Collection". This will be changed in the Next Revision of the FSQM to specify "Sample Processing". This part of the corrective action will be completed by 2/1/16. The laboratory and WQM will develop codes to identify the sample collection and processing equipment used for each sample. The appropriate code will be recorded in the field by the sample collector.	3/1/16	Acceptable. Please clearly define "sample processing" in the FSQM.

Finding number	SOP reference	Audit Finding	Recommended or Required Corrective Actions	SFWMD Response	Implementation Date	AEQAS Response
3	FD 5000 section 2.14	Sample P45541-5 from LOX8 was collected using intermediate Nalgene bottles; however, that bottle is not included in the list of equipment.	Required: Documentation must reflect that the equipment list includes the Nalgene bottle, and that bottle must be part of the blank process.	The Nalgene bottles are certified as clean by the laboratory prior to being made available to the field personnel. Field personnel were reminded that the intermediate collection bottles must be listed in the field notes when used to collect samples and field QC blanks.	11/25/2015	Acceptable
4	FS 1001 2.2, Tables FS 1000-1 through 1000-3	Auditor was not able to confirm that the sampling equipment construction and materials were appropriate for the analytes collected. Field records do not specify which equipment was used for which samples or analytes. Table 3.2.A of the FQM lists equipment types and materials, with some information about analyte restrictions.	Recommended: Include citation for the FQM on the field sheet.	The WQM and Laboratory will develop a sign off on the Prelogin Summary Report that identifies the field quality system used to collect the samples. This will include a reference to the WQM FSQM.	3/1/16	Acceptable

Finding number	SOP reference	Audit Finding	Recommended or Required Corrective Actions	SFWMD Response	Implementation Date	AEQAS Response
5	FS 1001 4.1, Table FS 1000-4	Auditor was not able to confirm that the container construction and materials were appropriate for the analytes collected. The field records do not contain container material information nor specify which containers were used to collect which analytes. Table 5.0B in FQM lists bottles by color, and indicates analytes, preservation, holding time, and material. Material stated as "plastic." Table 3.2A says sample bottles are either plastic HDPE or Nalgene. Table 3.2C more specifically states which types of plastics are used for which analyte groups	Recommended: Include citation for the FQM on the field sheet. Information is in FQM, but not in field records or kit packing form (SFWMD doesn't have these) for any particular sampling event.	The WQM and Laboratory will develop a sign off on the Prelogin Summary Report that identifies the field quality system used to collect the samples. This will include a reference to the WQM FSQM.	3/1/16	Acceptable

Finding number	SOP reference	Audit Finding	Recommended or Required Corrective Actions	SFWMD Response	Implementation Date	AEQAS Response
6	FS 1200 2	For samples P43166-2, P45027-5, P45229-11, and P54352-4, the associated equipment blank was not preserved with the same amount of acid as the samples. For sample P51827-25, only a single value was provided for the amount of preservative, so it was unclear if the same was added to the blanks and samples.	Required: Preserve field blanks with the same amount of acid as the maximum amount used in samples. Section 5.2.2 of the FQM includes this requirement, and this error was not detected after 2012.	The Protocol to acidify field QC blanks with the same amount of acid as the samples was implemented in 2012. Prior to that the protocol was to acidify with a lesser amount of acid so the low pH would not interfere with the analysis. Language was added to the FDEP SOP to allow for this. In 2012, WQM QA performed a study to confirm the amount of acid that would over acidify the samples should be greater than the amount of acid used to preserve the sample. It was determined the amount used for most samples should not lower the pH of the blank too much. Additionally, since the pH of every sample is checked in the field, the risk of submitting a blank that had a pH less than 1.3 SU was very low.	N/A	Acceptable
7	FS 1006 2	Samples P45541-5 from LOX8 and P54352-4 from NE1 were not acid-preserved or filtered within 15 minutes.	SFWMD is currently seeking approval to delay preservation, especially for certain Everglades projects, and approval is pending.	N/A	N/A	N/A

Finding number	SOP reference	Audit Finding	Recommended or Required Corrective Actions	SFWMD Response	Implement ation Date	AEQAS Response
8	FD 5100 1.1-1.3	Preservatives and lot #s indicated in field record, but not specific to particular sample bottles. FQM indicates which bottles are preserved with which preservatives (Table 5.0.B).	Recommended: Include citation for the FQM on the field sheet.	The WQM and Laboratory will develop a sign off on the Prelogin Summary Report that identifies the field quality system used to collect the samples. This will include a reference to the WQM FSQM.	3/1/16	Acceptable
9	FD 5100 1.3	Amount of preservative added is indicated on record, but the unit for the amount is unclear (unit not included in FQM 8.2.5.1 or on field sheet, though more detailed notes were in P54352 EVER project field notes).	Required: Indicate units of acid added for preservation, in the FQM at minimum, and recommended on the field sheet.	The unit of acid added to each sample is the "drop." Since we purchase preservation acids in disposable droppers from the same manufacturer, the aperture in the end of the dropper tip is constant. Will add the words "measured in drops where a drop of acid is equal to approximately 0.03 ml" to FSQM in Section 8.2.5.1 to the bullet that describes the "Acid" portion of the field notes. If possible the term "Lot#" will be added to the space where the lot number is located in the field notes. If possible the term "Drops" will be added to where the acid amount is indicated in the field notes.	5/31/2016	Acceptable
10	FD 5100 1.5	Field filtration is indicated for entire field record, and filter lot # provided, but the record does not indicate which samples or bottles receive filtered water, for which analytes. FQM Table 5.0.B indicates which bottles are filtered.	Recommended: Include citation for the FQM on the field sheet.	The WQM and Laboratory will develop a sign off on the Prelogin Summary Report that identifies the field quality system used to collect the samples. This will include a reference to the WQM FSQM.	3/1/16	Acceptable

Finding number	SOP reference	Audit Finding	Recommended or Required Corrective Actions	SFWMD Response	Implementation Date	AEQAS Response
11		Temperature in field record (23.69) does not match temperature reported in STORET (32.7) for sample P70197-11 collected from G379E on 3/3/14, likely due to a data transcription error.	Required: Check and correct if error in STORET	The result for temperature (23.7) for this sample matches in LIMS, DBHYDRO and STORET. Data pulled from STORET on 11/6/2015 to confirm.	N/A	Acceptable Auditor's error.
12	FD 4100 1	For sample set P54352, IC/ICV/CCV solution set numbers transferred incorrectly from field book. Numbers were recorded on field book, but the lot # transferred to Field Test Report was the HNO3 acid preservative lot number.	Recommended: Correct this Field Test Report.	The ID number transferred was correct but was also used to identify the calibration standard and therefore not unique to the acid. This issue was addressed in an audit performed in 2013.	N/A	Acceptable. Samplers had erroneously used the meter standard set ID rather than acid lot numbers. SFWMD conducted an internal audit of that sampling team in 2013 and identified that error. Corrective actions have been taken.
13	FD 4100 2.3	For sample P45541-5, only one time is provided for all IC and ICV. Individual IC and ICV times are provided for other samples, and it appears that the Field Test Report form was modified through time.	No corrective action needed; forms have been modified.	N/A-No response needed	N/A	N/A

14	FT 1000 2.2.4, FT 1100 2.3.2.3, FT 1500 2.3.1	Initial calibration verification (ICV) is not being conducted or is not labeled as such for pH or DO. FQM Section 8.2.3 indicates that values recorded in pH and DO columns are the values read by the instrument after calibration, but it is not clear if those readings are conducted in "run" or "calibrate" mode. FQM Table 7.2.A does not indicate ICV for pH and DO.	Required: Conduct ICV and clearly label as ICV in the calibration records.	The reading displayed by the instrument after calibration is the same reading from the probe regardless of which mode the display is in. We confirmed this with the manufacture of the YSI instruments. This is the reading entered into the Field Test Report in the DO or pH fields after the calibration is performed. FSQM Table 7.2.A will be modified to specify the reading recorded immediately after calibration is the ICV for DO and the final reading for pH is the ICV. The FDEP SOP references cited do not specify that the instrument display must be in a "read" mode in order to obtain a reading from the instrument. The instrument manuals also do not specify the meter must be returned to a "read" mode to obtain an accurate reading from the instrument. The FSQM will be changed to indicate that the last reading recorded for pH IC is also an ICV. If possible, the FTR will be modified to indicate the DO IC reading is also the ICV reading. Wording will be added to FSQM Table 7.2.a and section 8.2.3 to describe this labeling.	5/31/2016	Acceptable

Finding number	SOP reference	Audit Finding	Recommended or Required Corrective Actions	SFWMD Response	Implementation Date	AEQAS Response
15	FD 4100 3	Calibration verification failed for DO for P54352-4, but a J qualifier was not indicated on the field record. J qualifier and comment were in EDD from the lab. This data point was not in STORET.	Required: J qualifier and comment must be recorded.	The J qualifier and comment were added during validation and are recorded in the District's permanent data base (DBHYDRO).	N/A	Acceptable