Quality Assessment Report for Water Quality Monitoring

July - September 2015

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INTRODUCTION

This report is an assessment of the South Florida Water Management District (SFWMD) laboratory analysis and field sampling for total phosphorus (TP) monitoring, primarily for the following projects and their associated stations from July 1, 2015, through September 30, 2015:

- Everglades National Park Inflows North (PIN): S12A, S12B, S12C, S12D, S333, S355A, S355B, and S356-334
- Everglades National Park Inflow East (PIE): S332DX, S18C, DS4, and BERMB3
- Everglades Protection Area (EVPA): LOX3 through LOX16

Because field quality control (QC) samples are collected for sampling events that include multiple project samples for the stations of interest, the report may also cover information on stations or projects other than those in the above list.

The SFWMD's *Field Sampling Quality Manual* (SFWMD 2015b) provides the minimum requirements followed in field sample collection. The *Chemistry Laboratory Quality Manual* (SFWMD 2015a) provides the minimum requirements followed in preparing and analyzing laboratory samples, as well as data verification and validation. The Field Sampling Quality Assessment and Laboratory Analysis Quality Assessment sections in this report provide the field and laboratory QC results during this quarter. The SFWMD's Laboratory Information Management System (LIMS) provided the data used in this report. These data are available in the SFWMD's DBHYDRO database. Appendix A contains all TP results for samples of interest to the Everglades Technical Oversight Committee (TOC), collected from July 1, 2015, through September 30, 2015.

The report also includes the results of the National Proficiency Testing Program, which is designed to evaluate the laboratory's performance through analysis of unknown samples provided by an external source. Proficiency testing is one of the essential elements of the National Environmental Laboratory Accreditation Conference (NELAC) Institute requirements for certification.

FIELD SAMPLING QUALITY ASSESSMENT

PROCEDURE UPDATES

This period had no major procedural updates related to TP sample collection.

SAMPLES NOT COLLECTED

Table 1 lists the 59 samples that were not collected for this reporting period. Samples were not collected due to lack of flow, site dry, shallow water depth, or insufficient water level.

Table 1. List of samples not collected from July 1, 2015, to September 30, 2015.

Project Code	Collection Date	Station	Comments
PIN	6-July-15	S12B	No flow
PIN	6-July-15	S12C	No flow
PIN	6-July-15	S12D	No flow
EVPA	6-July-15	LOX3	Station visit was suspended
EVPA	6-July-15	LOX4	Station visit was suspended
EVPA	6-July-15	LOX5	Station visit was suspended
EVPA	6-July-15	LOX7	Station visit was suspended
EVPA	6-July-15	LOX9	Station visit was suspended
EVPA	6-July-15	LOX10	Station visit was suspended
EVPA	7-July-15	LOX8	Total depth less than 0.10 meter
PIE	7-July-15	BERMB3	No flow
EVPA	8-July-15	LOX6	Total depth less than 0.10 meter
EVPA	8-July-15	LOX11	Total depth less than 0.10 meter
EVPA	8-July-15	LOX13	Total depth less than 0.10 meter
EVPA	8-July-15	LOX15	Total depth less than 0.10 meter
EVPA	8-July-15	LOX16	Total depth less than 0.10 meter
PIN	13-July-15	S12B	No flow
PIN	13-July-15	S12C	No flow
PIN	13-July-15	S12D	No flow
PIN	27-July-15	S12B	No flow
PIN	27-July-15	S12C	No flow
PIN	27-July-15	S12D	No flow
PIN	3-August-15	S12B	No flow
PIN	3-August-15	S12C	No flow
PIN	3-August-15	S12D	No flow
EVPA	4-August-15	LOX3	Site dry
EVPA	4-August-15	LOX5	Total depth less than 0.10 meter
EVPA	4-August-15	LOX9	Total depth less than 0.10 meter
EVPA	4-August-15	LOX10	Total depth less than 0.10 meter
PIE	4-August-15	BERMB3	Site dry
EVPA	5-August-15	LOX6	Total depth less than 0.10 meter
EVPA	5-August-15	LOX13	Puddled area, water was not contiguous
PIN	10-August-15	S12B	No flow
PIN	10-August-15	S12C	No flow
PIN	10-August-15	S12D	No flow
PIN	17-August-15	S12B	No flow
PIN	17-August-15	S12C	No flow
PIN	17-August-15	S12D	No flow
PIN	24-August-15	S12B	No flow
PIN	24-August-15	S12C	No flow

Table 1. Continued.

Project Code	Collection Date	Station	Comments
PIN	24-August-15	S12D	No flow
PIN	31-August-15	S12B	No flow
PIN	31-August-15	S12C	No flow
PIN	31-August-15	S12D	No flow
PIN	8-September-15	S12B	No flow
PIN	8-September-15	S12C	No flow
PIN	8-September-15	S12D	No flow
PIN	14-September-15	S12B	No flow
PIN	14-September-15	S12C	No flow
PIN	14-September-15	S12D	No flow
PIE	15-September-15	BERMB3	Total depth less than 0.10 meter
PIN	21-September-15	S12B	No flow
PIN	21-September-15	S12C	No flow
PIN	21-September-15	S12D	No flow
PIN	28-September-15	S12B	No flow
PIN	28-September-15	S12C	No flow
PIN	28-September-15	S12D	No flow
PIN	29-September-15	S355A	No flow
PIN	29-September-15	S355B	No flow

The July sampling trip for the northern zone of the Arthur R. Marshall Loxahatchee National Wildlife Refuge (Refuge; LOX3 through LOX5, LOX7, LOX9, and LOX10), which was scheduled on July 6, 2015, was suspended because of low water level, following the guidance for suspending marsh sampling (SFWMD 2010, 2011). Sampling trip for the zone was not required if average stage of the Refuge (1-7, 1-8C, and 1-9) is less than 15.30 feet NGVD 29. The average stage on that day was 15.13 feet NGVD 29.

FIELD QUALITY CONTROL

Field QC measures consist of field generated equipment blanks (EB), field-cleaned equipment blanks (FCEB), field blanks (FB), and replicate samples (RS). **Table 2** summarizes EB, FCEB, and FB results for projects of interest to the TOC, as referenced in the table's footnotes. **Table 3** summarizes the field precision results and shows that the field sampling precision was acceptable for all three project replicates.

Table 2. Field and equipment TP blank results.

Type of Blank	Project	Number of Blanks Collected	Number of Blanks with Analyte Detected
EB	EVPA	1	0
	PIE	1	0
	PIN	1	0
FCEB	EVPA	5	0
	PIE	23	0
	PIN	19	0
FB	EVPA	0	0
	PIE	6	0
	PIN	12	0
Total		**68**	**0**

Notes:

- All blanks were from sampling events containing grab and auto-sampler samples collected during the sampling event on the day of collection or day adjacent to the collection date for the compliance samples.
- FCEB, EB, and FB acceptance criteria: they must be less than the method detection limit (MDL), which is 0.002 milligrams per liter.
- When sample concentrations are less than 10 times the blank values that were equal or greater than the MDL, the qualifier "G" is assigned to the associated sample(s).

Table 3. Precision summary for TP field replicates.

Project Code	Number of Samples (Replicates)	Date Collected	Station	% RSD	Average Value (mg/L)	Comments
PIE	3	3-August-15	S331-173*	0.0	0.009	The precision criterion was met.
PIN	3	3-August-15	S333	4.0	0.014	The precision criterion was met.
EVPA	3	19-August-15	CA27*	10.2	0.006	The precision criterion was met.
EVPA	3	1-September-15	LOX8	9.1	0.011	The precision criterion was met.

Notes:

- The SFWMD Chemistry Laboratory conducted all TP analyses.
- Field precision must be ≤ 20 percent. The laboratory applied this criterion only if sample values were greater than the practical quantitation limit (PQL).
- % RSD – percent relative standard deviation
- mg/L – milligrams per liter
- *The replicate samples were collected at the stations different than stations of interest, which are listed in the Introduction section.

FIELD AUDIT

SFWMD did not conduct any field audits on TOC-related projects during the third quarter of 2015.

LABORATORY ANALYSIS QUALITY ASSESSMENT

PROCEDURE UPDATES

The TP analytical procedure (Standard Methods 4500 P-F, Automated Ascorbic Acid Reduction Method) did not change during this reporting period.

LABORATORY QUALITY CONTROL

Routine laboratory QC samples include QC checks, matrix spikes, and precision checks. **Figures 1** through **7** show the TP recoveries from various types and levels of QC samples at the SFWMD laboratory from July 1, 2015, through September 30, 2015. Control charts provide a graphical means to demonstrate statistical control, monitor a measurement process, diagnose measurement problems, and document measurement uncertainty. They also are used to monitor and document critical aspects of samples and sampling operation.

Figure 1 shows the recoveries for a laboratory control sample (LCS1) at a TP concentration of 0.300 milligrams per liter (mg/L). Performance limits varied from 96 to 103 percent, and had a mean central line value of 99.6 percent based on 691 results. The acceptable control limit is 90 to 110 percent.

Figure 2 shows the recoveries for a laboratory control sample (LCS3) at a TP concentration of 0.020 mg/L. Performance limits varied from 90 to 108 percent, and had a mean central line value of 99.3 percent based on 108 results. The acceptable control limit is 90 to 110 percent.

Figure 3 shows the recoveries for a continuing calibration verification sample (CCV) at a TP concentration of 0.200 mg/L. Performance limits varied from 97 to 102 percent, and had a mean central line value of 99.6 percent based on 583 results. The acceptable control limit is 90 to 110 percent.

Figure 4 shows the recoveries for the method detection limit (MDL) check sample (LCS5) at a TP concentration 0.004 mg/L. The acceptable range is 0.002 to 0.006 mg/L.

Figure 5 shows the recoveries for the practical quantitation limit (PQL) varied from 75 to 150 percent. The acceptable control limit is 55 to 145 percent.

Figures 6 and **7** present the precision and matrix spike recoveries for TP analyses during the reporting period. If QC recoveries are outside the set limits, then the SFWMD's laboratory usually rejects the analytical batch and reanalyzes.

The acceptable recoveries for the QC samples, except the PQL check, are within ±10 percent of the true value. The daily MDL check with a true value of 0.004 mg/L indicates that the laboratory has consistently achieved the established MDL of 0.002 mg/L. The mean recovery for the organic check, a solution prepared from phytic acid and used to prepare matrix spikes, was 100.6 percent based on 424 results.

Figures 1 through **7** show also the distribution of QC samples (histograms) in the roughly symmetrical bell shape form with most values clustered around the central line.

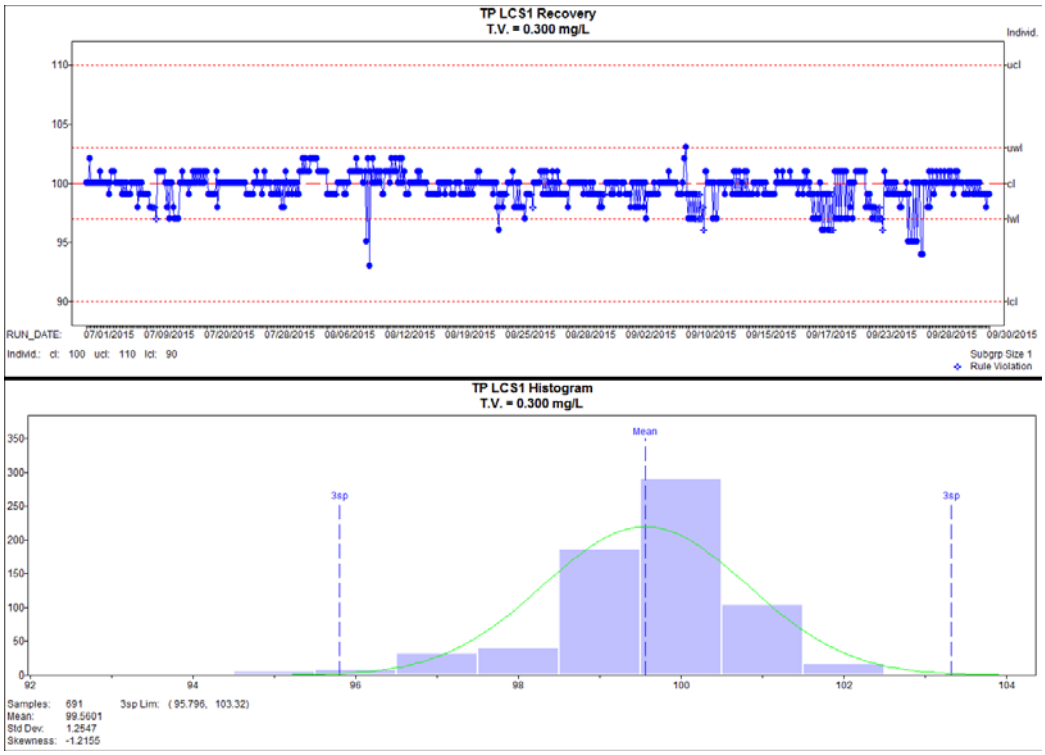

Figure 1. TP QC (Laboratory Control Sample 1, 0.300 mg/L) sample recoveries and histogram.

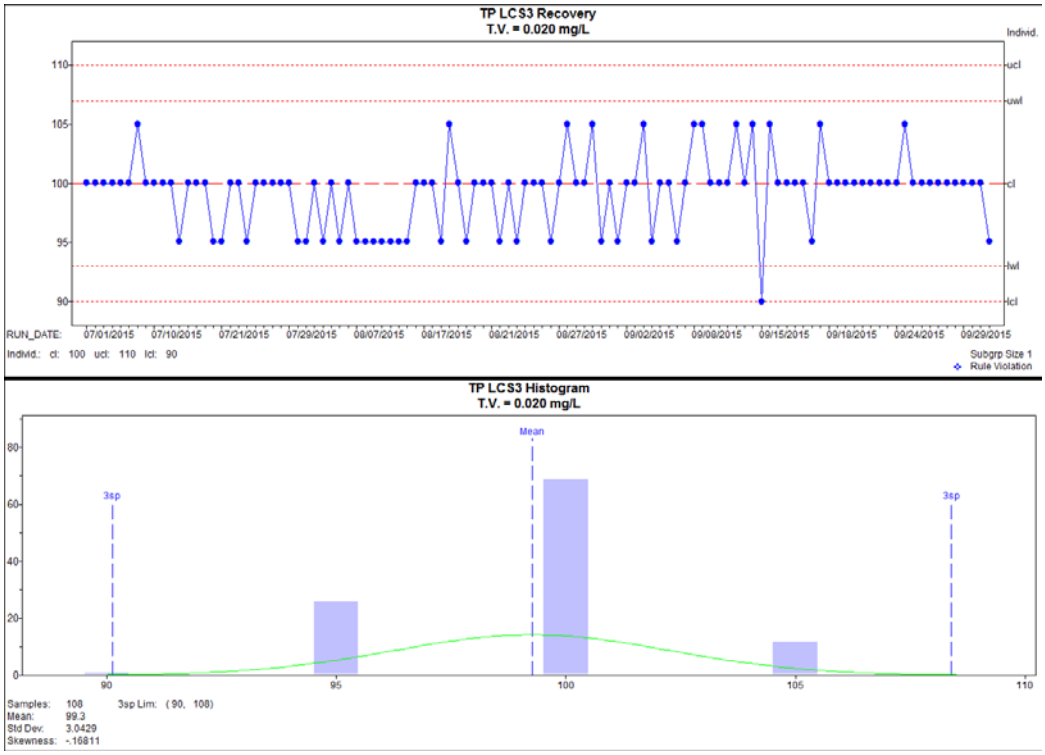

Figure 2. TP QC (Laboratory Control Sample 3, 0.020 mg/L) sample recoveries and histogram.

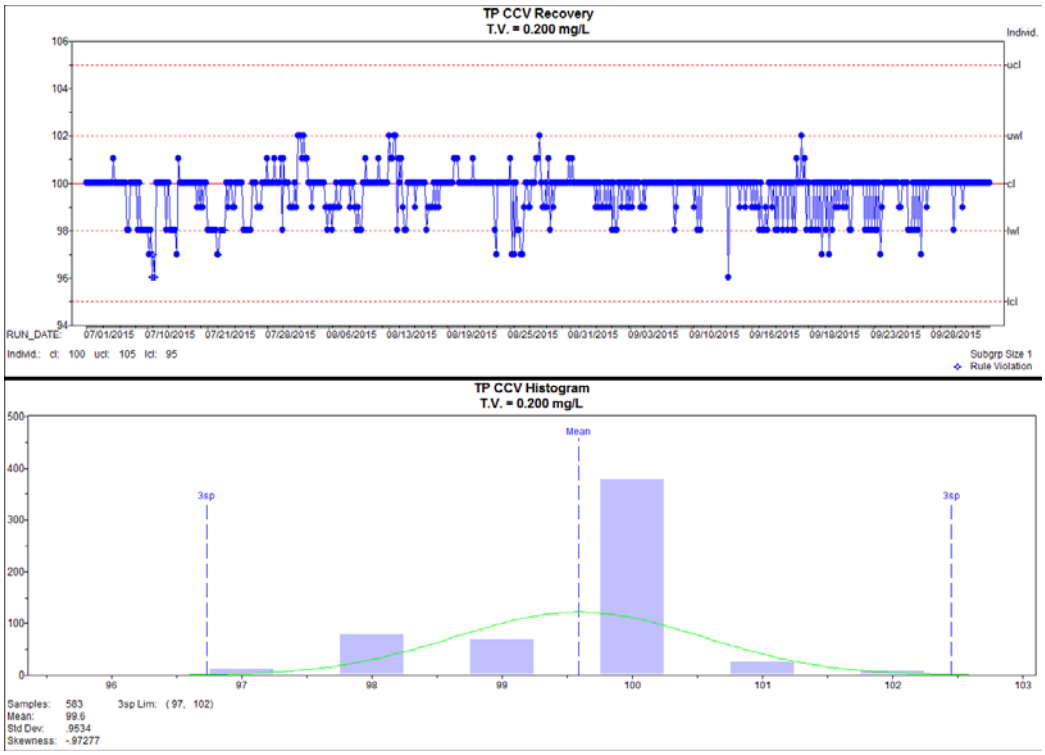

Figure 3. TP QC (Continuing Calibration Verification Sample, 0.200 mg/L) sample recoveries and histogram.

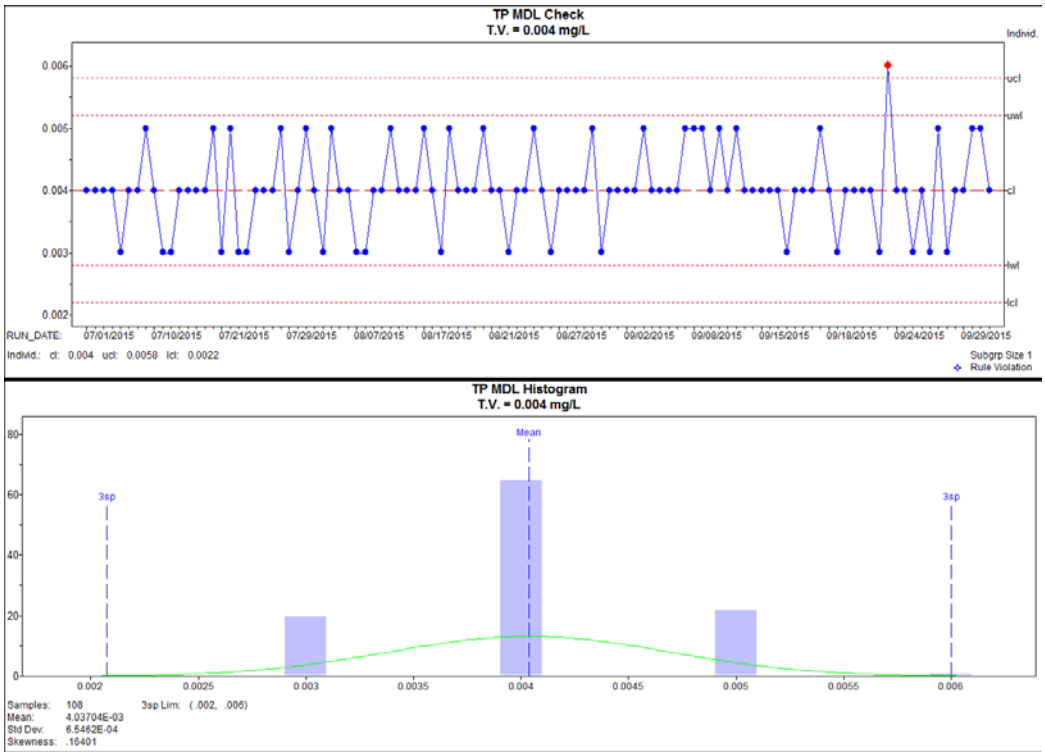

Figure 4. TP QC5 (Method Detection Limit Check, 0.004 mg/L) sample recoveries and histogram.

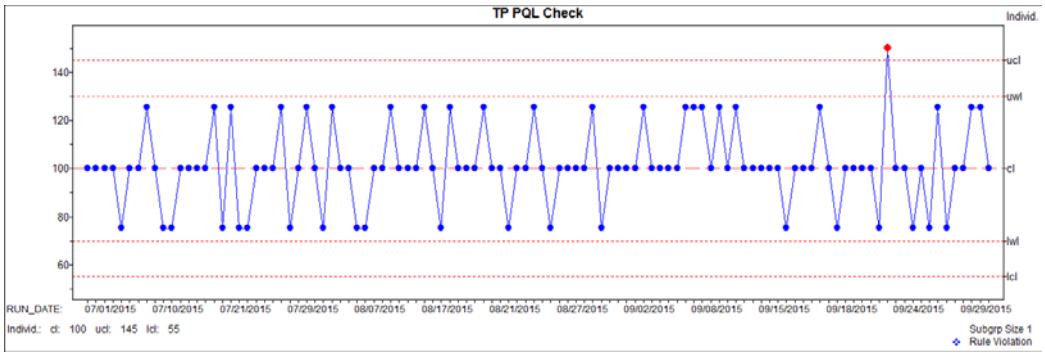

Figure 5. TP PQL (Practical Quantitation Limit) recovery.

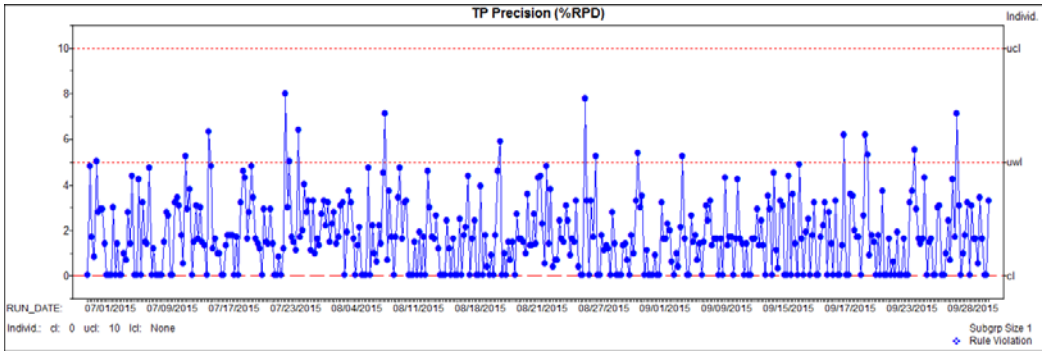

Figure 6. TP precision (%) relative percent different.

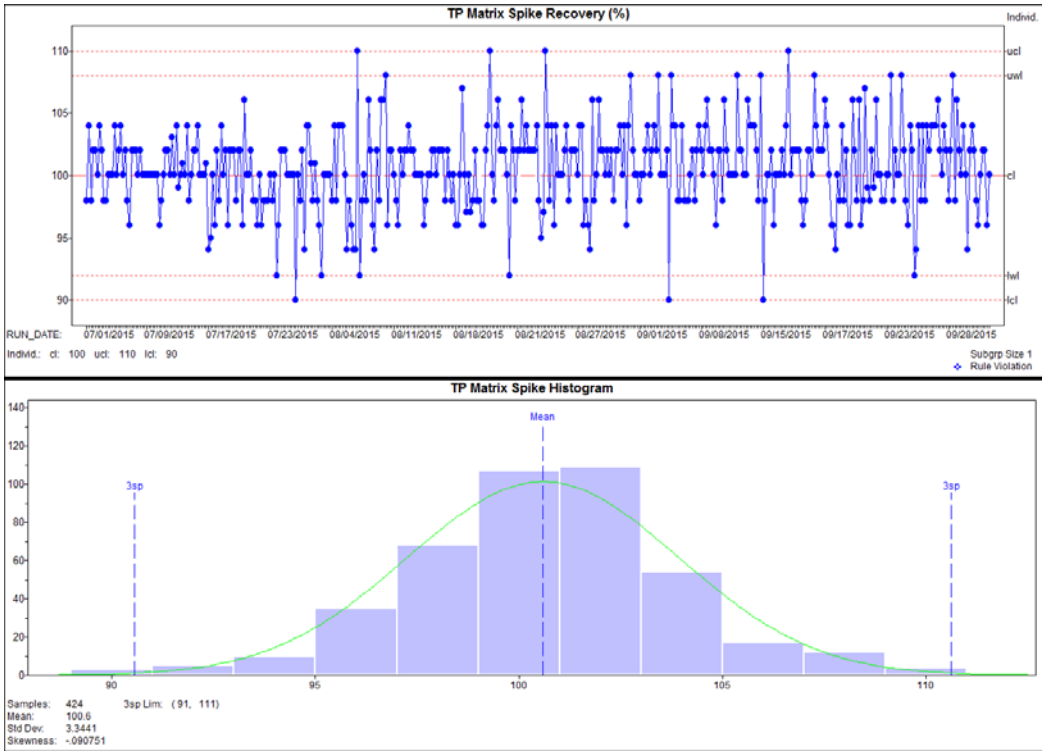

Figure 7. TP spike recovery (%) and histogram

Notes for Figures 1 through 7:

- T.V. – true value
- ucl – upper control limit
- uwl – upper warning limit
- cl – central line
- lwl – lower warning limit
- lcl – lower control limit
- Min, Max – range (minimum and maximum) of acceptable limits
- Std Dev – standard deviation
- Samples – number of analyzed QC samples
- 3sp Lim – calculated limits for subgroup based on 3 sigma factor
- y-axis label for histogram indicates number of data points

METHOD DETECTION LIMIT AND PRACTICAL QUANTITATION LIMIT

MDL checks are routinely analyzed with each analytical run. From July 1, 2015, to September 30, 2015, 108 results for MDL checks were reported for TP measurements. The calculated MDL from these results was determined to be 0.0015 mg/L, using the procedure described in the Code of Federal Regulations (CFR), 40 CFR 136, Appendix B. These results validated the current laboratory MDL value of 0.002 mg/L.

The performance of PQL QC sample is presented in **Figure 5**. The average recovery for PQL was 100.9 percent. The average relative standard deviation (RPD) for the third quarter was 16.2 percent, slightly above acceptable criterion of 15 percent. The annual 2015 (January–December) PQL verification indicated the average RPD value of 14.1 percent. These annual results validated the current laboratory PQL value of 0.004 mg/L.

The reported values between the MDL (0.002 mg/L) and less than PQL (0.004 mg/L) are assigned the "I" qualifier, indicating that the results are at concentrations that cannot be accurately quantified.

ESTIMATION OF ANALYTICAL MEASUREMENT UNCERTAINTY

The definition of uncertainty (of measurement) can be found in the *International Vocabulary of Basic and General Standard Terms in Metrology*: "A parameter associated with the result of a measurement that characterizes the dispersion of the values that could reasonably be attributed to the measurand" (JCGM 1993).

The uncertainty has a probabilistic basis and reflects incomplete knowledge of the quantity. All measurements are subject to uncertainty and a measured value is only complete if it is accompanied by a statement of the associated uncertainty.

The uncertainty has been estimated using the nested hierarchical methodology by Ingersoll (2001) in combination with a mathematical model found in the Eurachem/CITAC (2000) guide on uncertainty. This QC-based nested approach uses the statistical QC data attributed to laboratory measurement activities and does not include uncertainty attributed to field sampling activities. The estimated uncertainty is calculated using the following equation:

$$\mathbf{u(x)} = \sqrt{s_o^2 + (s_1^2 x^2)}$$

where:

u(x) is the combined standard uncertainty in the result x.

s_0 is a constant contribution to the overall uncertainty derived from the procedure to determine the MDL.

$\mathbf{s_1}$ is a proportionality constant derived from nested hierarchical methodology by Ingersoll.

Figure 8 is presented to clarify the concept of uncertainty of a measurement process relative to the MDL and PQL.

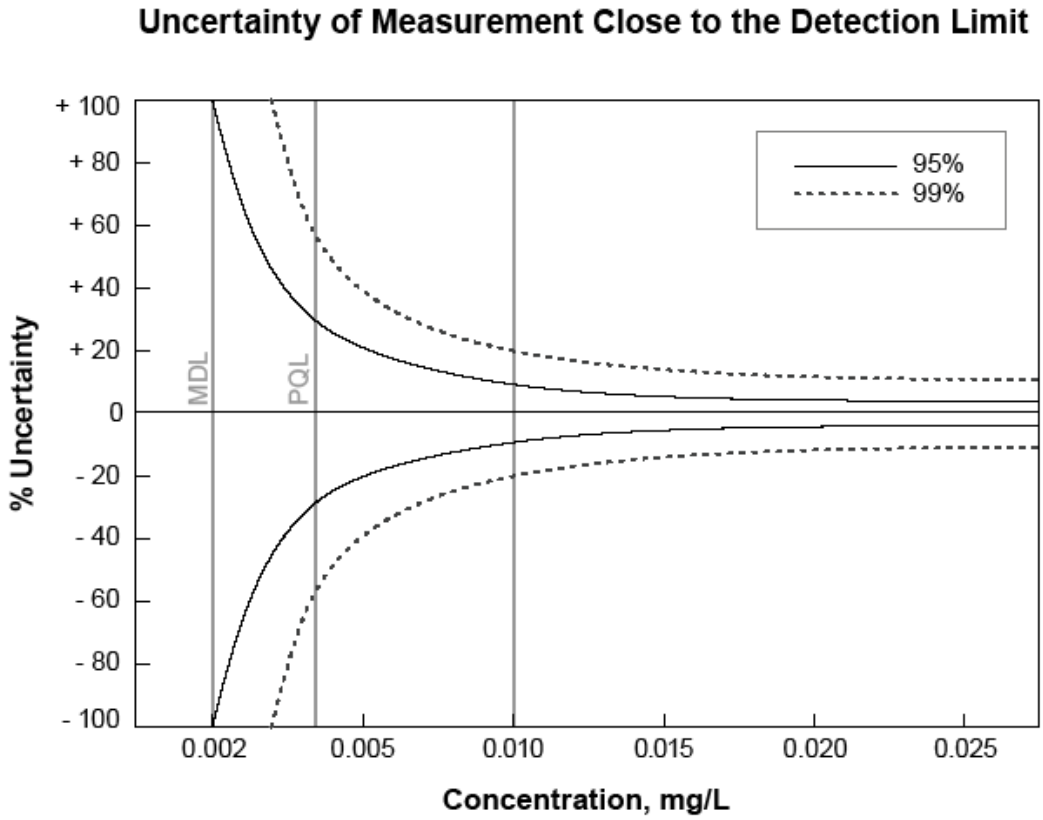

Figure 8. Uncertainty of TP measurement close to the detection limit.

INTER-LABORATORY QUALITY CONTROL ASSESSMENT

NATIONAL PROFICIENCY TESTING PROGRAM

As a requirement for laboratory continued certification, the SFWMD's laboratory performs proficiency testing on environmental samples twice per year. The result for the SFWMD's laboratory from the most recent proficiency testing study (September–October 2015) are shown in **Table 7**.

Table 7. Proficiency testing WP-248 study TP.

Assigned Value	5.83 mg/L
Study Mean	5.96 mg/L
Reported Value	5.95mg/L
Z-Score	-0.0209
Acceptance Limits	4.84 – 6.76 mg/L
Performance Evaluation	Acceptable

Notes:

- Assigned Value – This value is the calculated true value of the standard based upon the actual composition of the standard.
- Reported Value – The test result reported to the study provider for a specific analyte.
- Acceptable – Reported value falls within the acceptance limits.
- Acceptance Limits – this limit is calculated upon the United States Environmental Protection Agency (USEPA) National Standards for Water Proficiency Testing Criteria Document. For the Water Pollution Program, USEPA acceptance limits are defined as ± 3 USEPA standard deviation from the USEPA mean.

REFERENCES

Eurachem/CITAC. 2000. *Quantifying Uncertainty in Analytical Measurement, Second Edition.* ISBN 0-948926-15-5, Eurachem/CITAC, Guide CG4.

Ingersoll, W.S. 2001. *Environmental Analytical Measurement Uncertainty Estimation. Nested Hierarchical Approach*. Defense Technical Information Center Number ADA396946, Fort Belvoir, VA.

JCGM. 1993. *International Vocabulary of Basic and General Standard Terms in Metrology*. Joint Committee on Guides for Metrology, Geneva, Switzerland (ISBN 92-67-10175-1).

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SFWMD. 2011. *Monitoring Issues, An Update for the TOC*, Presentation to TOC at the September 14, 2011, Quarterly Meeting, Pete Rawlik, South Florida Water Management District, West Palm Beach, FL.

SFWMD. 2015a. *Chemistry Laboratory Quality Manual*. SFWMD-LAB-QM-2015-01, South Florida Water Management District, West Palm Beach, FL.

SFWMD. 2015b. *Field Sampling Quality Manual*. SFWMD-FIELD-QM-001-08, South Florida Water Management District, West Palm Beach, FL.

GLOSSARY

Accuracy: The degree of agreement between an observed value and an accepted reference value. Accuracy includes a combination of random error (precision) and systematic error (bias) components that are due to sampling and analytical operations.

Equipment Blank (EB): Field QC sample prepared using sampling equipment that has been brought to the site or processing area precleaned and is collected before the equipment has been used. The results of these blanks are used to monitor the on-site sampling environment, sampling equipment decontamination, sample container cleaning, the suitability of sample preservatives and analyte-free water, sample transport and storage conditions, and laboratory process.

Field Blank (FB): FBs are collected by pouring analyte-free water directly into the sample container, preserved, and kept open for the same approximate time and interval as required for collection and/or processing of the routine sample. The results of this blank are used to monitor the on-site sampling environment, sample container cleaning, the suitability of sample preservatives and analyte-free water, sample transport and storage conditions, and laboratory process.

Field Cleaned Equipment Blank (FCEB): Field QC sample prepared using sampling equipment that has been cleaned in the field or at the processing area. The results of this blank are used to monitor the on-site sampling environment, sampling equipment field decontamination, sample container cleaning, the suitability of sample preservatives and analyte-free water, sample transport and storage conditions, and laboratory process.

Measurand: Particular quantity subject to measurement.

Method Detection Limit (MDL): The smallest concentration of an analyte of interest that can be measured and reported with 99 percent confidence that the concentration is greater than zero. The MDLs are determined from the analysis of a sample in a given matrix, using accepted sampling and analytical preparation procedures, containing the analyte at a specified level. The MDL is determined by the protocol defined in the Code of Federal Regulations (CFR) section 40 CFR, Part 136, Appendix B, as established by the United States Environmental Protection Agency.

Practical Quantitation Limit (PQL): The smallest concentration of an analyte of interest that can be quantitatively reported with a specific degree of confidence. The PQL is verified for each matrix, technology and analyte. The validity of the PQL is verified by analysis of quality control sample containing the analyte of concern.

Precision: The agreement or closeness between two or more results and is an indication that the measurement system is operating consistently and is a quantifiable indication of variations introduced by the analytical systems over a given time and field sampling period.

Relative Percent Difference (RPD): A measure of precision, used when comparing two values. It is calculated as %RPD = [Value1-Value2]/Mean*100.

Relative Standard Deviation (RSD): A measurement of precision, used when comparing more than two results. It is calculated as %RSD = [Standard Deviation/Mean]*100.

Replicate Sample (RS): A RS is collected by repeating (simultaneously or in rapid succession) the entire sample acquisition technique that was used to obtain the routine sample. A single RS set (e.g., one sample and two RS) is collected per quarter, per project, at the same station, for the longest parameter list. RS data are compared to routine sample data to evaluate sampling precision.

Split Sample (SS): A second sample collected from the same sample obtained from the same sampling device. Results for SS are compared with routine sample results; agreement between these two results is mostly an indication of laboratory precision.

Uncertainty: The range of values within which the true value is estimated to lie. It is a best estimate of possible inaccuracy due to both random and systematic error.

Z-Score: A measure of the deviation of the result (Xi) from the assigned value (X) for that determinant (calculated as $z = (Xi–X)/\sigma$, where σ is a standard deviation) (Eurachem/CITAC 2000).

APPENDIX A

TP results for projects and their associated stations specified in the Introduction from July 1, 2015, to September 30, 2015. Among 102 reported results, two were qualified with a code ”I”.

Project	Date Collected	Station	Total Phosphorus Result (mg/L)	Uncertainty (mg/L)	Qualifier Code
PIN	7/6/2015	S12A	0.030	+/- 0.003	
PIE	7/6/2015	S332DX	0.009	+/- 0.002	
PIN	7/6/2015	S333	0.015	+/- 0.002	
PIN	7/6/2015	S356-334	0.017	+/- 0.002	
PIN	7/7/2015	S355A	0.065	+/- 0.005	
PIN	7/7/2015	S355B	0.161	+/- 0.011	
PIE	7/7/2015	S18C	0.004	+/- 0.002	
EVPA	7/8/2015	LOX12	0.019	+/- 0.002	
EVPA	7/8/2015	LOX14	0.017	+/- 0.002	
PIN	7/13/2015	S12A	0.036	+/- 0.003	
PIN	7/13/2015	S333	0.015	+/- 0.002	
PIN	7/13/2015	S356-334	0.013	+/- 0.002	
PIE	7/13/2015	S332DX	0.009	+/- 0.002	
PIE	7/14/2015	S18C	0.006	+/- 0.002	
PIN	7/20/2015	S12A	0.045	+/- 0.004	
PIE	7/20/2015	S332DX	0.010	+/- 0.002	
PIN	7/20/2015	S333	0.018	+/- 0.002	
PIN	7/20/2015	S356-334	0.012	+/- 0.002	
PIE	7/21/2015	S18C	0.005	+/- 0.002	
PIN	7/21/2015	S355A	0.062	+/- 0.005	
PIN	7/21/2015	S355B	0.192	+/- 0.013	
PIN	7/27/2015	S12A	0.036	+/- 0.003	
PIN	7/27/2015	S333	0.015	+/- 0.002	
PIN	7/27/2015	S356-334	0.011	+/- 0.002	
PIE	7/27/2015	S332DX	0.007	+/- 0.002	
PIE	7/28/2015	S18C	0.003	+/- 0.002	I
PIN	8/3/2015	S12A	0.031	+/- 0.003	
PIN	8/3/2015	S333	0.015	+/- 0.002	
PIN	8/3/2015	S356-334	0.010	+/- 0.002	
PIE	8/3/2015	S332DX	0.006	+/- 0.002	
EVPA	8/4/2015	LOX4	0.018	+/- 0.002	
EVPA	8/4/2015	LOX7	0.009	+/- 0.002	
EVPA	8/4/2015	LOX8	0.014	+/- 0.002	
PIN	8/4/2015	S355A	0.061	+/- 0.005	
PIN	8/4/2015	S355B	0.213	+/- 0.015	
PIE	8/4/2015	S18C	0.004	+/- 0.002	

Project	Date Collected	Station	Total Phosphorus Result (mg/L)	Uncertainty (mg/L)	Qualifier Code
EVPA	8/5/2015	LOX12	0.012	+/- 0.002	
EVPA	8/5/2015	LOX15	0.008	+/- 0.002	
EVPA	8/5/2015	LOX16	0.011	+/- 0.002	
EVPA	8/5/2015	LOX14	0.015	+/- 0.002	
EVPA	8/5/2015	LOX11	0.015	+/- 0.002	
PIN	8/10/2015	S12A	0.021	+/- 0.002	
PIN	8/10/2015	S333	0.015	+/- 0.002	
PIN	8/10/2015	S356-334	0.013	+/- 0.002	
PIE	8/10/2015	S332DX	0.006	+/- 0.002	
PIE	8/11/2015	S18C	0.004	+/- 0.002	
PIN	8/17/2015	S12A	0.015	+/- 0.002	
PIN	8/17/2015	S333	0.015	+/- 0.002	
PIE	8/17/2015	S332DX	0.006	+/- 0.002	
PIN	8/17/2015	S356-334	0.019	+/- 0.002	
PIN	8/18/2015	S355A	0.034	+/- 0.003	
PIN	8/18/2015	S355B	0.144	+/- 0.010	
PIE	8/18/2015	S18C	0.004	+/- 0.002	
PIN	8/24/2015	S12A	0.017	+/- 0.002	
PIN	8/24/2015	S333	0.015	+/- 0.002	
PIN	8/24/2015	S356-334	0.018	+/- 0.002	
PIE	8/24/2015	S332DX	0.004	+/- 0.002	
PIE	8/25/2015	S18C	0.004	+/- 0.002	
PIN	8/31/2015	S12A	0.018	+/- 0.002	
PIN	8/31/2015	S333	0.012	+/- 0.002	
PIN	8/31/2015	S356-334	0.013	+/- 0.002	
PIE	8/31/2015	S332DX	0.006	+/- 0.002	
EVPA	9/1/2015	LOX4	0.023	+/- 0.002	
EVPA	9/1/2015	LOX7	0.009	+/- 0.002	
EVPA	9/1/2015	LOX8	0.010	+/- 0.002	
EVPA	9/1/2015	LOX9	0.010	+/- 0.002	
EVPA	9/1/2015	LOX10	0.015	+/- 0.002	
EVPA	9/1/2015	LOX5	0.009	+/- 0.002	
PIN	9/1/2015	S355A	0.037	+/- 0.003	
EVPA	9/1/2015	LOX3	0.013	+/- 0.002	
PIN	9/1/2015	S355B	0.116	+/- 0.008	
PIE	9/1/2015	S18C	0.004	+/- 0.002	
EVPA	9/2/2015	LOX12	0.012	+/- 0.002	
EVPA	9/2/2015	LOX15	0.007	+/- 0.002	
EVPA	9/2/2015	LOX16	0.009	+/- 0.002	
EVPA	9/2/2015	LOX14	0.009	+/- 0.002	
EVPA	9/2/2015	LOX13	0.010	+/- 0.002	
EVPA	9/2/2015	LOX11	0.009	+/- 0.002	

Project	Date Collected	Station	Total Phosphorus Result (mg/L)	Uncertainty (mg/L)	Qualifier Code
EVPA	9/2/2015	LOX6	0.016	+/- 0.002	
PIN	9/8/2015	S12A	0.017	+/- 0.002	
PIE	9/8/2015	S332DX	0.005	+/- 0.002	
PIN	9/8/2015	S333	0.013	+/- 0.002	
PIE	9/8/2015	S18C	0.004	+/- 0.002	
PIN	9/8/2015	S356-334	0.014	+/- 0.002	
PIN	9/14/2015	S12A	0.013	+/- 0.002	
PIN	9/14/2015	S333	0.014	+/- 0.002	
PIN	9/14/2015	S356-334	0.008	+/- 0.002	
PIE	9/14/2015	S332DX	0.005	+/- 0.002	
PIN	9/15/2015	S355A	0.038	+/- 0.003	
PIN	9/15/2015	S355B	0.080	+/- 0.006	
PIE	9/15/2015	S18C	0.003	+/- 0.002	I
PIN	9/21/2015	S12A	0.011	+/- 0.002	
PIN	9/21/2015	S333	0.013	+/- 0.002	
PIE	9/21/2015	S332DX	0.005	+/- 0.002	
PIN	9/21/2015	S356-334	0.012	+/- 0.002	
PIE	9/22/2015	S18C	0.004	+/- 0.002	
PIN	9/28/2015	S12A	0.014	+/- 0.002	
PIN	9/28/2015	S333	0.011	+/- 0.002	
PIN	9/28/2015	S356-334	0.007	+/- 0.002	
PIE	9/28/2015	S332DX	0.006	+/- 0.002	
PIE	9/29/2015	BERMB3	0.076	+/- 0.006	
PIE	9/29/2015	S18C	0.004	+/- 0.002	

Qualifier code:

I – indicates the reported value is greater than or equal to the MDL but less than PQL.