

Quality Assessment Report for Water Quality Monitoring

July – September 2011



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Technical Oversight Committee
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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, 2011, through September 30, 2011:

- Everglades National Park Inflows North (PIN): S12A, S12B, S12C, S12D, S333, S355A, S355B, and S356-334
- Everglades National Park Inflow East (PIE): S332DX, S18C, DS2, 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 2010a) provides the minimum requirements followed in field sample collection. The *Chemistry Laboratory Quality Manual* (SFWMD 2010b) 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 B contains all total phosphorus results for samples of interest to the Everglades Technical Oversight Committee (TOC), collected from July 1, 2011, through September 30, 2011.

This report includes an analysis of the District laboratory's performance on the split (EVPA) and inter-laboratory studies with the Florida Department of Environmental Protection (FDEP) for a one-year period. The report also includes the results of the National Water Research Institute Environment Canada Ecosystem Inter-laboratory Proficiency Testing Program.

FIELD SAMPLING QUALITY ASSESSMENT

PROCEDURE UPDATES

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

MISSING DATA

Table 1 lists the missing data for this reporting period. Seventy five data points were missing (not collected) due to lack of flow, shallow water depth or insufficient water level.

Table 1. Missing data for July 1 to September 30, 2011.

Project	Collection Date	Station	Comments
EVPA	6-Jul-11	LOX6	Site dry, no samples collected.
EVPA	6-Jul-11	LOX11	Site dry, no samples collected.
PIN	6-Jul-11	S12B	No flow, no sample collected.
PIN	6-Jul-11	S12C	No flow, no sample collected.
PIN	6-Jul-11	S12D	No flow, no sample collected.
PIN	6-Jul-11	S355A	No flow, no sample collected.
PIN	6-Jul-11	S355B	No flow, no sample collected.
EVPA	7-Jul-11	LOX13	Total depth less than 0.10 m, no sample collected
EVPA	7-Jul-11	LOX14	Total depth less than 0.10 m, no sample collected
EVPA	7-Jul-11	LOX16	Total depth less than 0.10 m, no sample collected
PIE	12-Jul-11	BERMB3	Site dry, no samples collected.
PIN	13-Jul-11	S12B	No flow, no sample collected.
PIN	13-Jul-11	S12C	No flow, no sample collected.
PIN	13-Jul-11	S12D	No flow, no sample collected.
PIN	19-Jul-11	S12B	No flow, no sample collected.
PIN	19-Jul-11	S12C	No flow, no sample collected.
PIN	19-Jul-11	S12D	No flow, no sample collected.
PIN	19-Jul-11	S355A	No flow, no sample collected.
PIN	19-Jul-11	S355B	No flow, no sample collected.
PIE	25-Jul-11	BERMB3	Site dry, no samples collected.
PIN	26-Jul-11	S12B	No flow, no sample collected.
PIN	26-Jul-11	S12C	No flow, no sample collected.
PIN	26-Jul-11	S12D	No flow, no sample collected.
PIN	26-Jul-11	S355A	No flow, no sample collected.
PIN	26-Jul-11	S355B	No flow, no sample collected.
EVPA	2-Aug-11	LOX3	Site dry, no samples collected.
EVPA	2-Aug-11	LOV4	Site dry, no samples collected.
EVPA	2-Aug-11	LOX5	Site dry, no samples collected.
EVPA	2-Aug-11	LOX9	Site dry, no samples collected.
EVPA	2-Aug-11	LOX10	Site dry, no samples collected.
PIN	2-Aug-11	S12B	No flow, no sample collected.
PIN	2-Aug-11	S12C	No flow, no sample collected.
PIN	2-Aug-11	S12D	No flow, no sample collected.
EVPA	3-Aug-11	LOX13	Site dry, no samples collected.

Project	Collection Date	Station	Comments
PIE	8-Aug-11	BERMB3	Site dry, no samples collected.
PIN	9-Aug-11	S12B	No flow, no sample collected.
PIN	9-Aug-11	S12C	No flow, no sample collected.
PIN	9-Aug-11	S12C	No flow, no sample collected.
PIN	9-Aug-11	S12D	No flow, no sample collected.
PIN	9-Aug-11	S355A	No flow, no sample collected.
PIN	9-Aug-11	S355B	No flow, no sample collected.
PIN	16-Aug-11	S12B	No flow, no sample collected.
PIN	16-Aug-11	S12C	No flow, no sample collected.
PIN	16-Aug-11	S12D	No flow, no sample collected.
PIN	16-Aug-11	S355A	No flow, no sample collected.
PIN	16-Aug-11	S355B	No flow, no sample collected.
PIE	22-Aug-11	BERMB3	Site dry, no samples collected.
PIN	23-Aug-11	S12B	No flow, no sample collected.
PIN	23-Aug-11	S12C	No flow, no sample collected.
PIN	23-Aug-11	S12D	No flow, no sample collected.
PIN	23-Aug-11	S355A	No flow, no sample collected.
PIN	23-Aug-11	S355B	No flow, no sample collected.
PIN	30-Aug-11	S12B	No flow, no sample collected.
PIN	30-Aug-11	S12C	No flow, no sample collected.
PIN	30-Aug-11	S355A	No flow, no sample collected.
PIN	30-Aug-11	S355B	No flow, no sample collected.
PIE	6-Sep-11	BERMB3	Site dry, no samples collected.
EVPA	7-Sep-11	LOX3	Total depth less than 0.10 m, no sample collected
EVPA	7-Sep-11	LOX5	Total depth less than 0.10 m, no sample collected
PIN	7-Sep-11	S12B	No flow, no sample collected.
PIN	7-Sep-11	S12C	No flow, no sample collected.
EVPA	8-Sep-11	LOX13	Total depth less than 0.10 m, no sample collected
PIN	13-Sep-11	S12B	No flow, no sample collected.
PIN	13-Sep-11	S12C	No flow, no sample collected.
PIN	13-Sep-11	S355A	No flow, no sample collected.
PIN	13-Sep-11	S355B	No flow, no sample collected.
PIE	19-Sep-11	BERMB3	Site dry, no samples collected.
PIN	20-Sep-11	S12B	No flow, no sample collected.
PIN	20-Sep-11	S12C	No flow, no sample collected.
PIN	20-Sep-11	S355A	No flow, no sample collected.
PIN	20-Sep-11	S355B	No flow, no sample collected.
PIN	27-Sep-11	S12B	No flow, no sample collected.
PIN	27-Sep-11	S12C	No flow, no sample collected.
PIN	27-Sep-11	S355A	No flow, no sample collected.
PIN	27-Sep-11	S355B	No flow, no sample collected.

FIELD QUALITY CONTROL

Field QC measures consist of field generated equipment blanks (EB), field-cleaned equipment blanks (FCEB), field blanks (FB), split samples (SS), 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 but two PIN project's replicates that were not associated with the stations of this report. **Table 4** summarizes the qualified field blanks. TP data were qualified with "J9" code for two EBs for S18C and two FCEBs for S332B because analytes were detected in the field blanks. **Table 5** shows all TP data associated with this EB and qualified with a "J9" code.

Table 2. Field and equipment TP blank results.

Type of Blank	Project	Number of Blanks Collected	Number of Blanks Analyte (were) detected	% < 0.002 mg/L	% ≥ 0.002 mg/L
EB	PIN	0	NA	NA	NA
	EVPA	5	0	100	0
	PIE	6	2	67	33
FCEB	EVPA	4	0	100	0
	PIE	20	2	90	10
	PIN	12	0	100	0
FB	EVPA	3	0	100	0
	PIN	13	0	100	0
	PIE	13	0	100	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 MDL.
- When sample concentrations are less than 10 times the blank values that were equal or greater than the MDL, the qualifier "J9" is assigned to the associated sample(s).
- mg/L – milligram per liter

Table 3. Precision summary for TP field replicates.

Project Code	Number of Samples (Replicates)	Date Collected	Station	% RSD	Average Value (mg/L)	Comments
PIN	3	11-Jul-11	TAMBR10*	28.7	0.117	A precision criterion was not met.
PIN	3	14-Jul-11	US41-25*	47.9	0.068	A precision criterion was not met.
PIE	3	11-Jul-11	S177*	17.3	0.007	A precision criterion was met.
EVPA	3	12-Jul-11	CA315*	0.0	0.014	A precision criterion was met.
EVPA	3	3-Aug-11	LOX14	0.0	0.014	A precision criterion was met.
EVPA	3	8-Sep-11	LOX12	5.4	0.011	A precision criterion was met.

Notes:

- *Samples not associated with the stations of interest
- Only replicates from sampling events containing samples collected at stations listed in the Introduction are included in this analysis. The QC replicates may have been collected during the sampling event on the day adjacent to the collection date for the compliance samples.
- The SFWMD's chemistry laboratory conducted all TP analyses.
- Field precision must be $\leq 20\%$. The laboratory applied this criterion only if sample values were greater than the practical quantitation limit (PQL).
- Qualifiers applied to samples (replicates) that a precision criterion was not met.

Table 4. Field blanks qualified with "J9" code

Type of Blank	Project	Station	Date Collected	Value (mg/L)	Comments
EB	PIE	S18C	11-Jul-11	0.002	EB \geq MDL
EB	PIE	S18C	8-Aug-11	0.002	EB \geq MDL
FCEB	PIE	S332B	6-Sep-11	0.002	FCEB \geq MDL
FCEB	PIE	S332B	19-Sep-11	0.007	FCEB \geq MDL

Table 5. List of qualified TP data

Project Code	Date Collected	Station	Flag	Result (mg/L)	Comments
PIE	11-Jul-11	S18C	J9	0.007	Sample associated with EB \geq MDL and ≤ 10 times of EB (see Table 4).
PIE	8-Aug-11	S18C	J9	0.004	Sample associated with EB \geq MDL and ≤ 10 times of EB (see Table 4).
PIE	8-Aug-11	S332DX	J9	0.007	Sample associated with EB \geq MDL and ≤ 10 times of EB (see Table 4).

Notes:

- The value of 10 times the blank value equal to or greater than the sample value qualified with data code "J9" (FDEP QA Rule Chapter 62-160.700, F.A.C.)

FIELD AUDIT

During this quarter, one audit was conducted on the sample collection of the PIE project collected by Miami-Dade DERM personnel.

Two corrective actions were issued as a result of (1) improper processing protocol and (2) improper protocol for field cleaned equipment blank and equipment rinsing. The corrective actions from this audit are complete. After a review of the key deficiencies and the results for the blanks collected during this sampling trip, it was determined the deficiencies observed during the audit did not negatively affect the quality of the sample data.

LABORATORY ANALYSIS QUALITY ASSESSMENT

PROCEDURE UPDATES

The TP analytical procedure 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 6** show the TP recoveries from various types and levels of QC samples at the SFWMD laboratory from July 1, 2011 through September 30, 2011. Control charts provide a graphical means to demonstrate statistical control, monitoring 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 1a shows the recoveries for laboratory control sample (LCS1) at TP concentration 0.300 milligrams per liter (mg/L) varied from 96 to 103 percent, and mean central line value of 99.9 percent based on 682 results. The acceptable control limit is 90-110 percent.

Figure 2a shows the recoveries for laboratory control sample (LCS3) at TP concentration 0.020 mg/L varied from 90 to 110 percent, and mean central line value of 98.8 percent based on 116 results. The acceptable control limit is 90-110 percent.

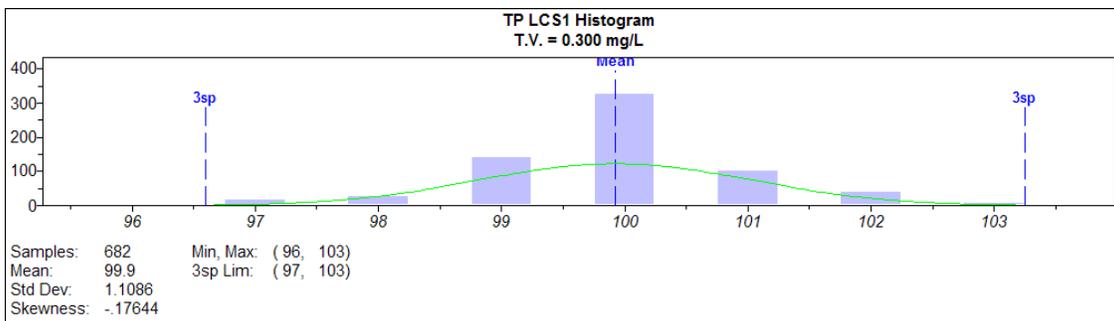
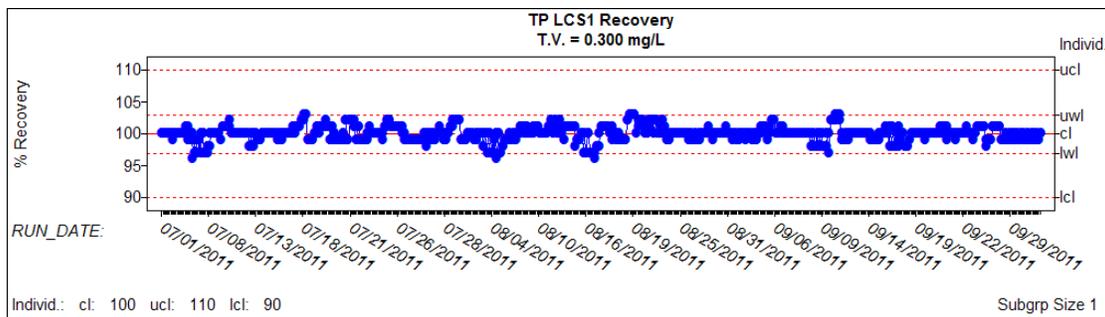
Figure 3a shows the recoveries for continuing calibration verification sample (CCV) at TP concentration 0.200 mg/L varied from 97 to 104 percent, and mean central line value of 100.2 percent based on 566 results. The acceptable control limit is 95-105 percent.

Figure 4a shows the recoveries for the MDL sample (LCS5) at TP concentration 0.004 mg/L varied from 0.003 to 0.005 mg/L based on 94 results. **Figures 4a and 4c** show the recoveries for practical quantitation limit varied from 75 to 125 percent and are within ± 30 percent of the true value, which is acceptable.

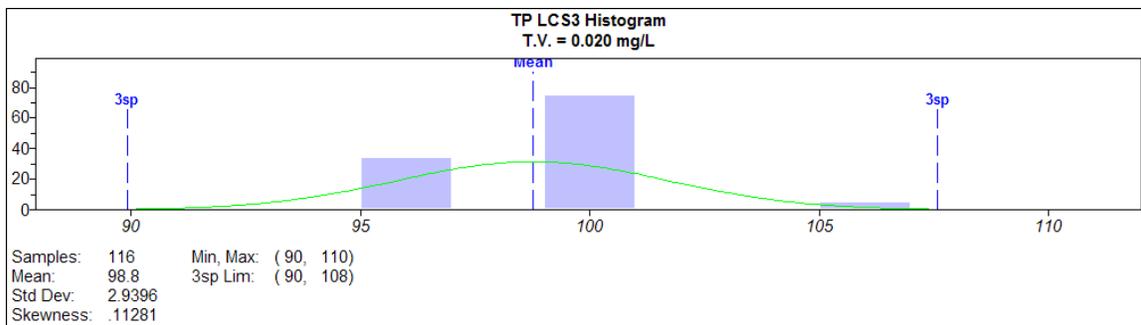
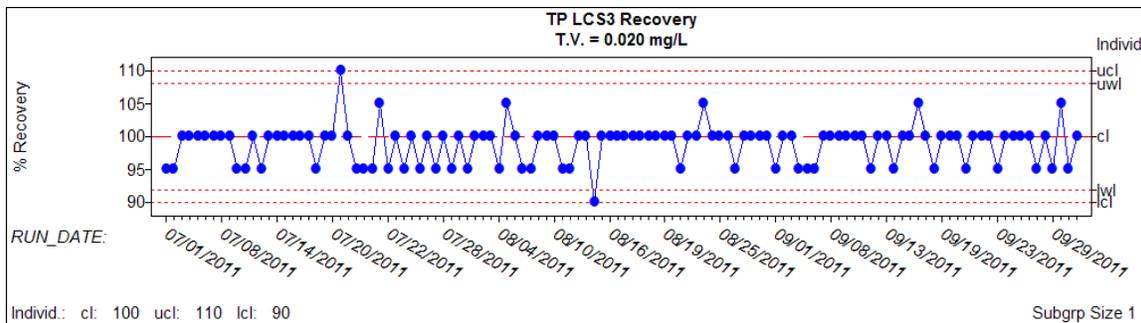
Figures 5 and 6 present the precision and matrix spike recoveries for TP analyses during the reporting period. If QC recoveries are outside the set limits, then the SFWMD's laboratory usually rejects the analytical batch. If any deficiencies are noted, the samples have exceeded the required holding times, and the laboratory cannot reanalyze the data, then the sample is qualified accordingly.

Recoveries for the QC samples are within ± 10 percent of the true value, which is acceptable. 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. An organic check is a solution prepared from phytic acid, which is a stable form of organic phosphate used to prepare matrix spikes, the mean recovery for which was 99.6 percent.

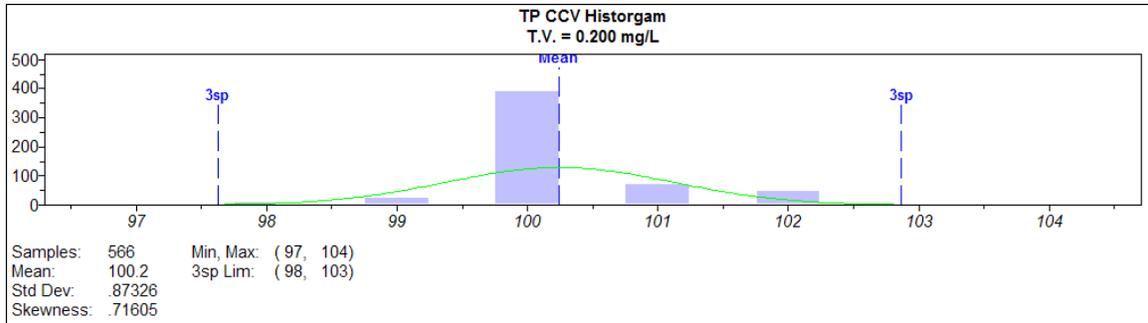
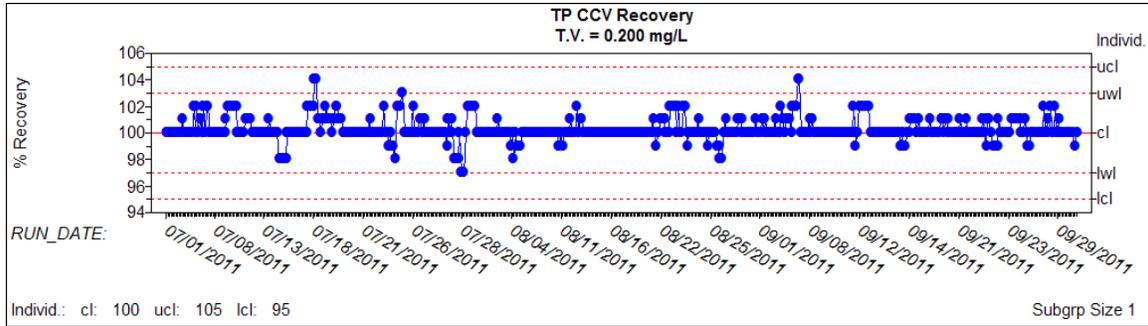
Figures 1b through 6b show the distributed of quality control samples in the roughly symmetrical bell-shape form with most values clustered around the central line.



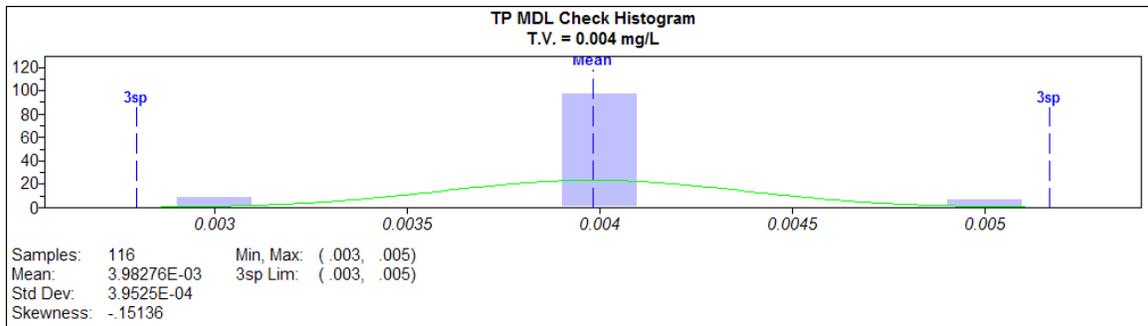
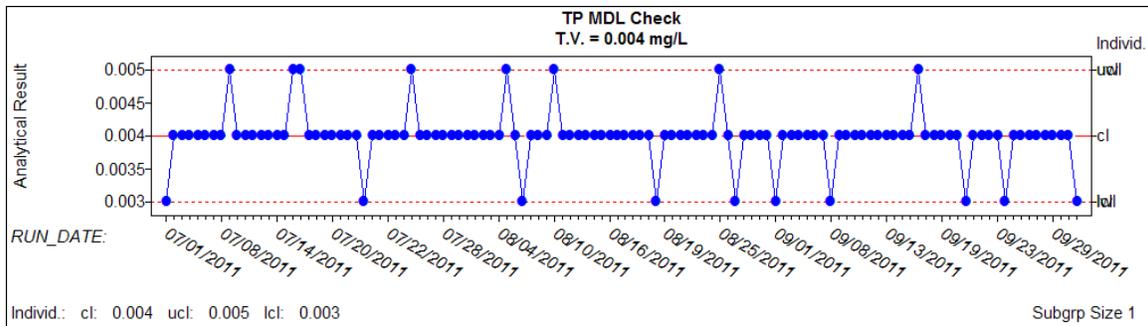
Figures 1a and 1b. TP QC (Laboratory Control Sample, 0.300 mg/L) sample recoveries and histogram.



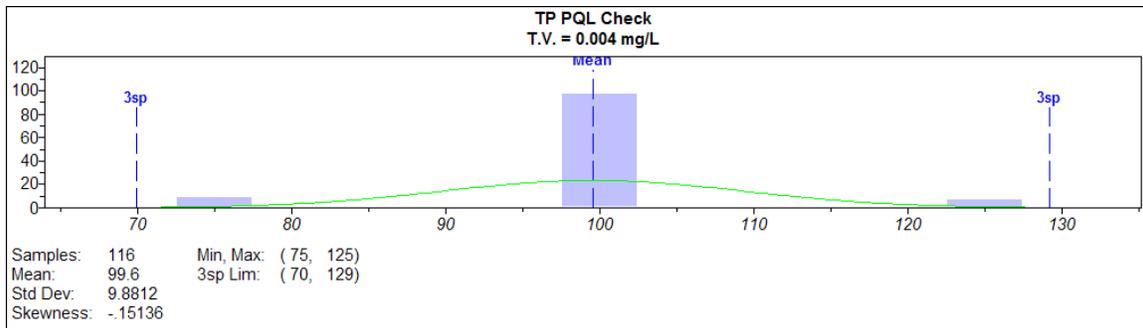
Figures 2a and 2b. TP QC (Laboratory Control Sample, 0.020 mg/L) sample recoveries and histogram.



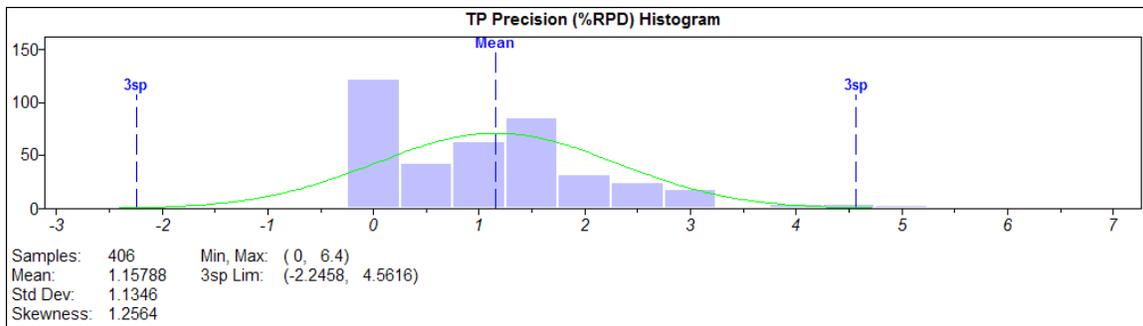
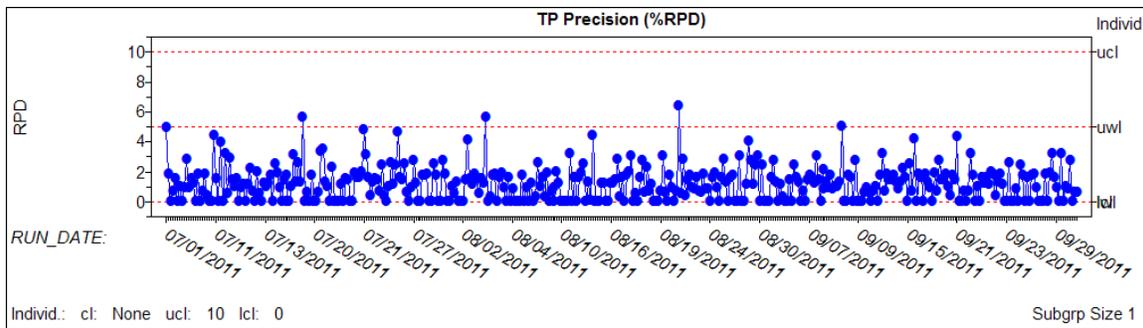
Figures 3a and 3b. TP QC (Continuing Calibration Verification Sample, 0.200 mg/L) sample recoveries and histogram.



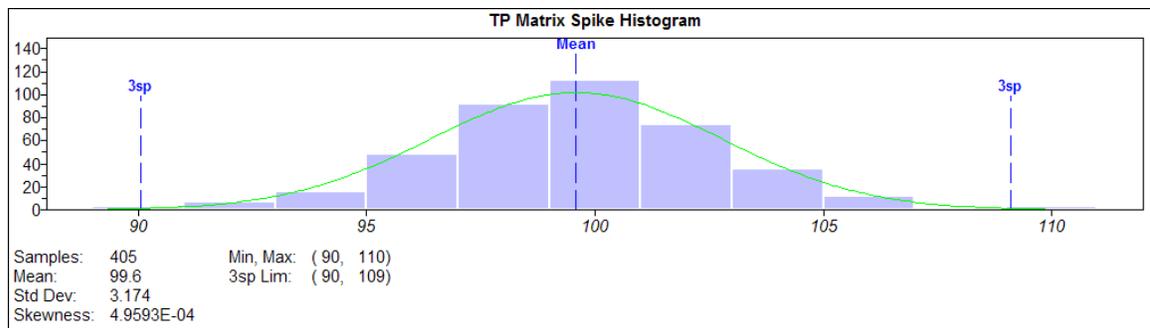
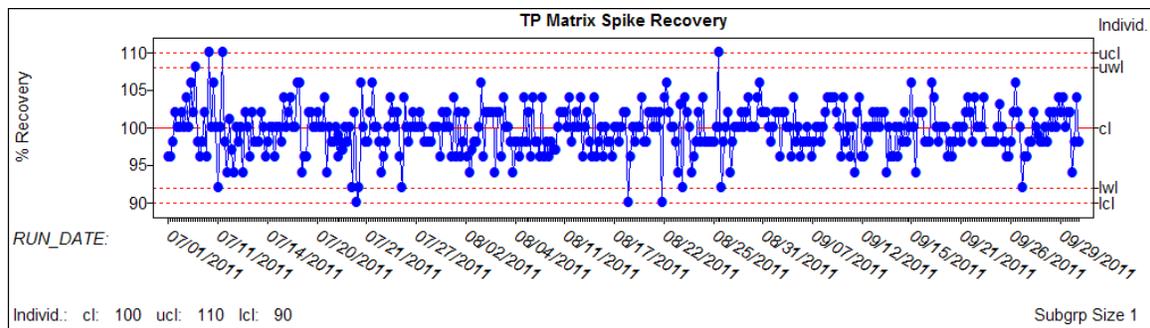
Figures 4a and 4b. TP QC5 (Method Detection Limit Check, 0.004 mg/L) sample recoveries and histogram.



Figures 4c. TP PQL (Practical Quantitation Limit) Check



Figures 5a and 5b. TP precision (%) relative percent different and histogram.



Figures 6a and 6b. TP spike recovery (%) data and histogram

Notes for Figures 1 through 6:

- 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 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

ESTIMATION OF ANALYTICAL MEASUREMENT UNCERTAINTY

The estimated analytical uncertainty for total phosphorus conducted by the SFWMD laboratory for the last quarter (July–September 2011) was determined to be 4.4 percent (with a 95 percent confidence level). This result applies to the analytical process and does not include uncertainty attributed to field sampling activities (e.g., sample collection and sample location effects). **Figure 7** is presented to clarify the concept of MDL and practical quantitation limit (PQL) of a measurement process.

Uncertainty of Measurement Close to the Detection Limit

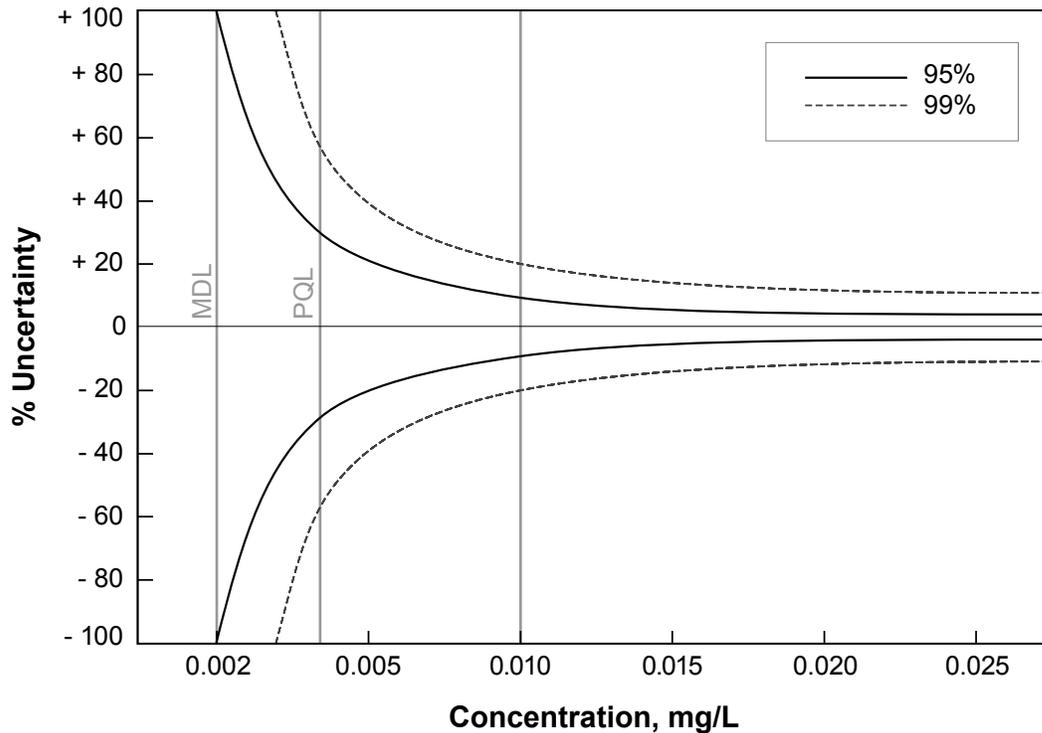


Figure 7. Uncertainty of TP measurement close to the detection limit.

METHOD DETECTION LIMIT AND PRACTICAL QUANTITATION LIMIT

MDL checks are routinely analyzed with each analytical run. From July 1 to September 30, 2011, 116 results for MDL checks were reported for TP measurements. The calculated MDL from these results was determined to be 0.001 milligram per liter (mg/L), using the procedure described in 40 CFR 136 Appendix B and the calculated PQL for this period was 0.004 mg/L. At this concentration, the relative uncertainty in the measured value is estimated to be ± 30 percent at the 95 percent confidence level (Taylor 1987).

Previously, the PQL was calculated as four times the MDL (0.008 mg/L). As of July 1, 2011, the procedure for the practical quantitation limit (PQL) establishment was changed. PQL is now determined by analysis of quality control sample (LCS5) with acceptable level of uncertainty (± 30 percent at 95 percent probability level). PQL was determined to be 0.004 mg/L by the new procedure. The performance of this QC sample is presented in **Figures 4a** and **4c**. The reported values between the MDL (established at 0.002 mg/L) and PQL (0.004 mg/L) are assigned the “I” qualifier, indicating that the results are at concentrations that cannot be accurately quantified.

INTER-LABORATORY QUALITY CONTROL ASSESSMENT

SPLIT STUDIES WITH FDEP LABORATORY

To continuously assess comparability of results, the SFWMD routinely sends split samples to other laboratories. The statistical evaluation contains the EVPA Quarterly Splits conducted between the FDEP and the SFWMD's laboratory from September 2010 to September 2011 (see **Appendix A**) provided the data used in this analysis. **Figure 8** presents regression analysis of all data, and **Table 6** presents summary statistics for the data pairs.

ALL DATA

Figure 8 shows that the intercept is not statistically different from zero and the slope is not statistically different from one for all TP data from both laboratories. The r^2 (R-square) value is 0.8526. The intercept of the regression is not statistically different from zero since the 95 percent confidence interval for the intercept contains zero. The slope of the regression is not different from one statistically since the 95 percent confidence interval for slope contains one.

Table 6 shows that the mean difference is marginally statistically significant, while the median difference is not statistically significant. The paired t-test and signed-rank test yield p-values of 0.030 and 0.063 respectively.

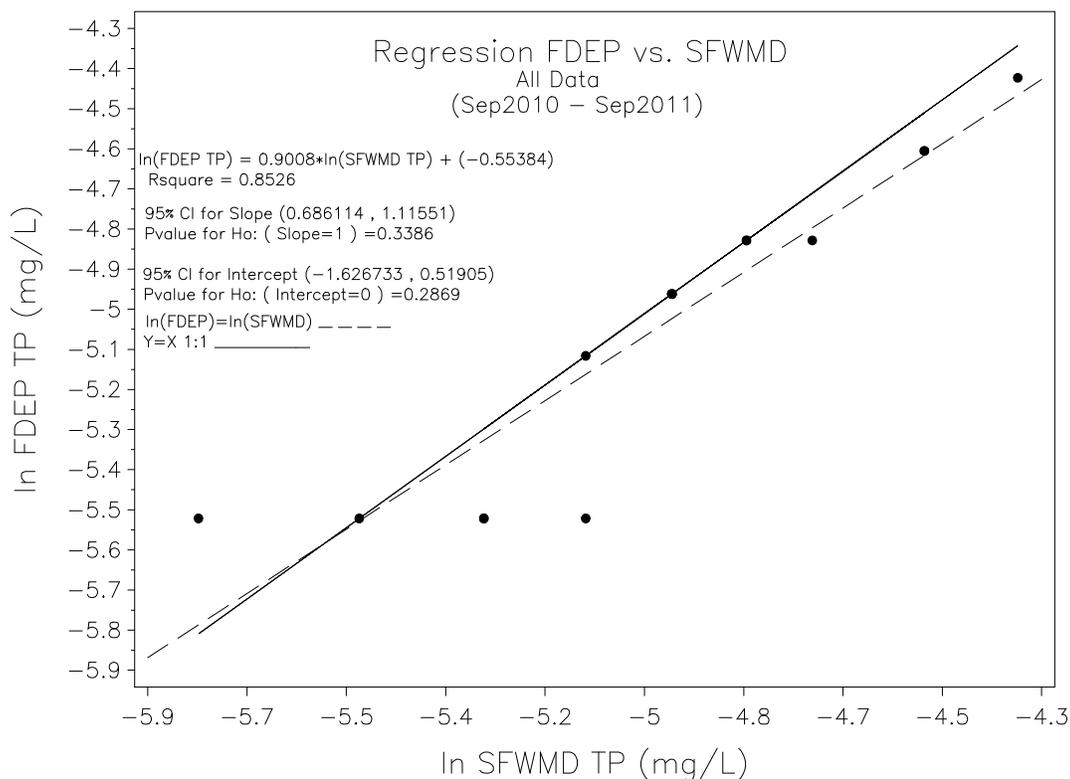


Figure 8. Regression analysis for all TP data.

Table 6. Comparison of SFWMD and FDEP split TP samples.

All Data	Summary Statistics			
	Lab	N	Mean (mg/L)	Median (mg/L)
	FDEP	16	0.007	0.007
	SFWMD	16	0.007	0.007
	Statistical Test of Hypotheses			
	Summary of Paired Differences (mg/L)	Hypothesis	Test	P-value
Mean of Differences	0.000	Mean of Differences = 0	Student's t	0.030
Median of Differences	0.000	Median of Differences = 0	Signed Rank	0.063

Notes:

- Differences calculated as the SFWMD TP minus the FDEP TP. The mean and median differences for all concentration levels are at or below the MDL.
- Data were not used in this comparison study if the FDEP value was below the FDEP's detection limit (0.004 mg/L).

TP ≥ 0.020 mg/L

There were not any data points in this range where the TP was greater than or equal to 0.020 mg/L.

TP < 0.020 mg/L

All results for this analysis fell into the TP less than 0.020 mg/L range. The results for the “All Data” range are comparisons of concentration at this level.

In summary, the differences for all TP levels were below the MDL for both laboratories and the difference was statistically insignificant in both the sign-rank test ($p > 0.05$) for non-normally distributed paired data and linear regression.

National Water Research Institute Environment Canada Ecosystem Inter-laboratory Proficiency Testing Program

The purpose of the program is to identify sources of measurement uncertainties and variation among analytical results, and to provide information on overall data quality and reliability of analytical measurements of inorganic parameters in natural waters. The results for the District's laboratory from the most recent Performance Testing (PT) Study 98 are presented in **Table 7**. The District laboratory was rated on performance of TP as “Ideal” (highest). The evaluation includes systematic bias and precision, a laboratory appraisal, and a summary of Z-scores.

The interpretation of a Z-Score is based on the International Organization of Standardization (ISO), Guide 43. A Z-Score < 2 is classified satisfactory, $2 < \text{Z-score} < 3$ is questionable and Z-Score > 3 is consider unsatisfactory.

Table 7. Performance in PT Study 98 for TP, September 2011.

Sample Number	1	2	3	4	5	6	7	8	9	10
Assigned Value, mg/L	0.024	0.225	0.002	0.423	0.009	0.340	0.045	0.007	0.808	0.110
Reported Results, mg/L	0.024	0.227	< 0.002	0.428	0.009	0.339	0.045	0.007	0.811	0.110
Z-Score	0.0	0.1	NA	0.2	0.0	0.0	0.0	0.0	0.0	0.0

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.

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SFWMD. 2010b. Chemistry Laboratory Quality Manual, SFWMD-LAB-QM-2010-01. South Florida Water Management District, Analytical Services Division, West Palm Beach, FL.

Taylor, J.K. 1987. Quality Assurance of Chemical Measurements. Lewis Publishers, Chelsea, MI.

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): A general term used for analyte-free water that is processed on site through all sampling equipment used in routine sample processing. May be an assessment of effectiveness of laboratory decontamination or on site (field) decontamination (FCEB).

Field Blank (FB): Analyte-free water that is poured directly into the sample container on site during routine collection, preserved, and kept open until sample collection is completed for the routine sample at that site. FB values are indicative of environmental contamination on site.

Field Cleaned Equipment Blank (FCEB): Analyte-free water that is processed on-site, after the first sampling site, through all sampling equipment used in routine sample processing. EB values are indicative of the effectiveness of the decontamination process.

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 section 40 CFR, Part 136, Appendix B, as established by the U.S. 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. Generally, the PQL is 12 times the standard deviation that is derived from the procedure used to determine the MDL, or can be assumed to be four times the MDL.

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 $\%RSD = [Std. Deviation / Mean] * 100$.

Replicate Sample (RS): A second sample collected from the same source as the routine sample, using the same sampling equipment. RS data are compared to routine sample 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.

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

APPENDIX A

Results of TP split studies between the SFWMD and FDEP laboratories,
EVPA Project, September 2010–September 2011.

Sample	Date	SFWMD	FDEP	%RPD/Comments
EVPA	7-Sep-10	0.006 (I)	0.006 (I), (Y)	<PQL
EVPA	7-Sep-10	0.007 (I)	0.007 (I), (Y)	<PQL
EVPA	8-Sep-10	0.005 (I)	0.004 (I), (Y)	<PQL
EVPA	8-Sep-10	0.006 (I)	0.004 (I), (Y)	<PQL
EVPA	6-Dec-10	0.007** (I) (J)	0.007 (I)	<PQL
EVPA	7-Dec-10	0.003 (I)	0.004 (I)	<PQL
EVPA	7-Dec-10	0.004 (I)	0.004 (I)	<PQL
EVPA	7-Dec-10	0.005 (I)	0.004 (I)	<PQL
EVPA	6-Apr-11	0.007 (I)	0.007 (I)	<PQL
EVPA	6-Apr-11	0.011	0.010 (I)	9.5
EVPA	6-Apr-11	0.008	0.008 (I)	<PQL
EVPA	6-Apr-11	0.007 (I)	0.007 (I)	<PQL
EVPA	8-Sep-11	0.011	0.010 (I)	9.5
EVPA	8-Sep-11	0.008	0.008 (I)	<PQL
EVPA	8-Sep-11	0.013	0.012	8.0
EVPA	8-Sep-11	0.009	0.008 (I)	<PQL

Notes:

** Equipment blanks (EB) associated with this result were improperly preserved

Qualifier codes:

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

U: indicates the compound was analyzed for but not detected

Y: sample temperature is outside acceptable range

J: sample associated with EB ≥ MDL

SFWMD: reported MDL = 0.002 mg/L and PQL = 0.004 mg/L

FDEP: reported MDL = 0.004 mg/L and PQL = 0.010 mg/L

APPENDIX B

Total phosphorus results for projects and their associated stations specified in the Introduction from July 1 to September 30, 2011. Ninety-nine results were reported and three results were qualified with “J9” code.

Project	Date Collected	Station	TP Result (mg/L)	Qualifier Code
PIE	5-Jul-11	S332DX	0.009	
PIE	5-Jul-11	S18C	0.007	
PIN	6-Jul-11	S12A	0.052	
PIN	6-Jul-11	S333	0.025	
EVPA	6-Jul-11	LOX7	0.012	
PIN	6-Jul-11	S356-334	0.023	
EVPA	6-Jul-11	LOX4	0.030	
EVPA	7-Jul-11	LOX12	0.020	
EVPA	7-Jul-11	LOX15	0.023	
PIE	11-Jul-11	S18C	0.007	J9
PIE	12-Jul-11	S332DX	0.008	
PIN	13-Jul-11	S12A	0.053	
PIN	13-Jul-11	S333	0.020	
PIN	13-Jul-11	S355A	0.025	
PIN	13-Jul-11	S355B	0.058	
PIN	13-Jul-11	S356-334	0.029	
PIE	18-Jul-11	S332DX	0.006	
PIE	18-Jul-11	S18C	0.006	
PIN	19-Jul-11	S12A	0.093	
PIN	19-Jul-11	S333	0.020	
PIN	19-Jul-11	S356-334	0.028	
PIE	25-Jul-11	S332DX	0.005	
PIE	25-Jul-11	S18C	0.005	
PIN	26-Jul-11	S12A	0.047	
PIN	26-Jul-11	S333	0.019	
PIN	26-Jul-11	S356-334	0.021	
PIE	1-Aug-11	S332DX	0.011	
PIE	1-Aug-11	S18C	0.004	
PIN	2-Aug-11	S12A	0.028	
EVPA	2-Aug-11	LOX7	0.013	
EVPA	2-Aug-11	LOX8	0.017	
PIN	2-Aug-11	S333	0.017	
PIN	2-Aug-11	S355A	0.024	

Project	Date Collected	Station	TP Result (mg/L)	Qualifier Code
PIN	2-Aug-11	S355B	0.055	
PIN	2-Aug-11	S356-334	0.019	
EVPA	3-Aug-11	LOX6	0.012	
EVPA	3-Aug-11	LOX11	0.008	
EVPA	3-Aug-11	LOX12	0.011	
EVPA	3-Aug-11	LOX14	0.014	
EVPA	3-Aug-11	LOX15	0.008	
EVPA	3-Aug-11	LOX16	0.012	
PIE	8-Aug-11	S332DX	0.007	J9
PIE	8-Aug-11	S18C	0.004	J9
PIN	9-Aug-11	S12A	0.029	
PIN	9-Aug-11	S333	0.024	
PIN	9-Aug-11	S356-334	0.017	
PIE	15-Aug-11	S332DX	0.007	
PIE	15-Aug-11	S18C	0.004	
PIN	16-Aug-11	S12A	0.021	
PIN	16-Aug-11	S333	0.018	
PIN	16-Aug-11	S356-334	0.013	
PIE	22-Aug-11	S332DX	0.008	
PIE	22-Aug-11	S18C	0.005	
PIN	23-Aug-11	S12A	0.056	
PIN	23-Aug-11	S333	0.025	
PIN	23-Aug-11	S356-334	0.034	
PIE	29-Aug-11	S332DX	0.006	
PIE	29-Aug-11	S18C	0.004	
PIN	30-Aug-11	S12A	0.019	
PIN	30-Aug-11	S12D	0.015	
PIN	30-Aug-11	S333	0.017	
PIN	30-Aug-11	S356-334	0.016	
PIE	6-Sep-11	S332DX	0.007	
PIE	6-Sep-11	S18C	0.004	
EVPA	7-Sep-11	LOX10	0.010	
PIN	7-Sep-11	S12A	0.016	
EVPA	7-Sep-11	LOX4	0.013	
EVPA	7-Sep-11	LOX7	0.006	
EVPA	7-Sep-11	LOX8	0.010	
EVPA	7-Sep-11	LOX9	0.012	
PIN	7-Sep-11	S12D	0.015	

Project	Date Collected	Station	TP Result (mg/L)	Qualifier Code
PIN	7-Sep-11	S333	0.013	
PIN	7-Sep-11	S355A	0.019	
PIN	7-Sep-11	S355B	0.042	
PIN	7-Sep-11	S356-334	0.012	
EVPA	8-Sep-11	LOX6	0.010	
EVPA	8-Sep-11	LOX11	0.008	
EVPA	8-Sep-11	LOX12	0.011	
EVPA	8-Sep-11	LOX14	0.009	
EVPA	8-Sep-11	LOX15	0.008	
EVPA	8-Sep-11	LOX16	0.013	
PIE	12-Sep-11	S332DX	0.007	
PIE	12-Sep-11	S18C	0.005	
PIN	13-Sep-11	S12A	0.028	
PIN	13-Sep-11	S12D	0.015	
PIN	13-Sep-11	S333	0.014	
PIN	13-Sep-11	S356-334	0.020	
PIE	19-Sep-11	S332DX	0.007	
PIE	19-Sep-11	S18C	0.004	
PIN	20-Sep-11	S12A	0.020	
PIN	20-Sep-11	S12D	0.014	
PIN	20-Sep-11	S333	0.013	
PIN	20-Sep-11	S356-334	0.018	
PIE	26-Sep-11	S332DX	0.007	
PIE	26-Sep-11	S18C	0.005	
PIN	27-Sep-11	S12A	0.025	
PIN	27-Sep-11	S12D	0.017	
PIN	27-Sep-11	S333	0.013	
PIN	27-Sep-11	S356-334	0.010	

Notes:

Qualifier codes:

J9: indicates that the analyte was detected in the associated field blank