

Quality Assessment Report for Water Quality Monitoring

January – March 2012



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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 January 1, 2012, through March 31, 2012:

- 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 2011a) provides the minimum requirements followed in field sample collection. The *Chemistry Laboratory Quality Manual* (SFWMD 2011b) 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 January 1, 2012, through March 31, 2012.

This report includes an analysis of the District laboratory's performance on the split samples (EVPA) 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 56 missing data for this reporting period due to lack of flow, dry conditions, shallow water depth, or insufficient water level.

Table 1. Missing data for January 1, 2012, to March 31, 2012.

Project	Collection Date	Station	Comments
PIN	4-Jan-12	S12B	No flow, no sample collected
PIN	4-Jan-12	S355A	No flow, no sample collected
PIN	4-Jan-12	S355B	No flow, no sample collected
PIE	10-Jan-12	BERMB3	Site dry, no sample collected
PIN	11-Jan-12	S12B	No flow, no sample collected
PIN	11-Jan-12	S12C	No flow, no sample collected
PIN	18-Jan-12	S12B	No flow, no sample collected
PIN	18-Jan-12	S12C	No flow, no sample collected
PIN	18-Jan-12	S355A	No flow, no sample collected
PIN	18-Jan-12	S355B	No flow, no sample collected
PIE	23-Jan-12	BERMB3	Site dry, no sample collected
PIN	24-Jan-12	S12B	No flow, no sample collected
PIN	24-Jan-12	S12C	No flow, no sample collected
PIN	24-Jan-12	S355A	No flow, no sample collected
PIN	24-Jan-12	S355B	No flow, no sample collected
PIN	31-Jan-12	S12B	No flow, no sample collected
PIN	31-Jan-12	S12C	No flow, no sample collected
PIN	31-Jan-12	S355A	No flow, no sample collected
PIN	31-Jan-12	S355B	No flow, no sample collected
PIE	6-Feb-12	BERMB3	Site dry, no sample collected
PIN	7-Feb-12	S12B	No flow, no sample collected
PIN	7-Feb-12	S12C	No flow, no sample collected
EVPA	8-Feb-12	LOX3	Total depth less than 0.10 m, no sample collected
PIN	14-Feb-12	S12B	No flow, no sample collected
PIN	14-Feb-12	S12C	No flow, no sample collected
PIN	14-Feb-12	S355A	No flow, no sample collected
PIN	14-Feb-12	S355B	No flow, no sample collected
PIE	21-Feb-12	BERMB3	Total depth less than 0.10 m, no sample collected
PIN	22-Feb-12	S12B	No flow, no sample collected

Project	Collection Date	Station	Comments
PIN	22-Feb-12	S12C	No flow, no sample collected
PIN	22-Feb-12	S355A	No flow, no sample collected
PIN	22-Feb-12	S355B	No flow, no sample collected
PIN	28-Feb-12	S12B	No flow, no sample collected
PIN	28-Feb-12	S12C	No flow, no sample collected
PIN	28-Feb-12	S355A	No flow, no sample collected
PIN	28-Feb-12	S355B	No flow, no sample collected
PIE	5-Mar-12	BERMB3	Site dry, no sample collected
EVPA	6-Mar-12	LOX3	Total depth less than 0.10 m, no sample collected
EVPA	6-Mar-12	LOX5	Total depth less than 0.10 m, no sample collected
EVPA	6-Mar-12	LOX9	Total depth less than 0.10 m, no sample collected
EVPA	6-Mar-12	LOX10	Total depth less than 0.10 m, no sample collected
PIN	6-Mar-12	S12B	No flow, no sample collected
PIN	6-Mar-12	S12C	No flow, no sample collected
PIN	13-Mar-12	S12B	No flow, no sample collected
PIN	13-Mar-12	S12C	No flow, no sample collected
PIN	13-Mar-12	S355A	No flow, no sample collected
PIN	13-Mar-12	S355B	No flow, no sample collected
PIE	19-Mar-12	BERMB3	Site dry, no sample collected
PIN	20-Mar-12	S12B	No flow, no sample collected
PIN	20-Mar-12	S12C	No flow, no sample collected
PIN	20-Mar-12	S355A	No flow, no sample collected
PIN	20-Mar-12	S355B	No flow, no sample collected
PIN	27-Mar-12	S12B	No flow, no sample collected
PIN	27-Mar-12	S12C	No flow, no sample collected
PIN	27-Mar-12	S355A	No flow, no sample collected
PIN	27-Mar-12	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 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	% < 0.002 mg/L	% ≥ 0.002 mg/L
EB	EVPA	1	0	100	0
	PIE	1	0	100	0
FCEB	EVPA	5	0	100	0
	PIE	14	0	100	0
	PIN	14	0	100	0
FB	PIN	13	0	100	0
	PIE	13	0	100	0
Total		61	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 method detection limit (MDL).
- When sample concentrations are less than 10 times the blank values that were equal or greater than the MDL, the qualifier "J" 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
PIE	3*	9-Jan-12	S178	6.8	0.022	The precision criterion was met.
PIN	3*	10-Jan-12	TAMB105	3.9	0.015	The precision criterion was met.
PIN	3*	12-Jan-12	US41-25	16.4	0.013	The precision criterion was met.
EVPA	3*	14-Feb-12	U3	0.0	0.004	The precision criterion was met.
PIE	3*	23-Feb-12	S200	10.2	0.006	The 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 ≤ 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.

FIELD AUDIT

There were no audits related to TOC water quality stations conducted during the first quarter of 2012.

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 January 1, 2011, through March 31, 2012. 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 1a shows the recoveries for a laboratory control sample (LCS1) at a TP concentration of 0.300 milligrams per liter (mg/L) varied from 97 to 103 percent, and had a mean central line value of 99.9 percent based on 457 results. The acceptable control limit is 90-110 percent.

Figure 2a shows the recoveries for a laboratory control sample (LCS3) at a TP concentration of 0.020 mg/L varied from 90 to 110 percent, and had a mean central line value of 99.1 percent based on 86 results. The acceptable control limit is 90-110 percent.

Figure 3a shows the recoveries for a continuing calibration verification sample (CCV) at a TP concentration of 0.200 mg/L varied from 97 to 103 percent, and had a mean central line value of 100.2 percent based on 371 results. The acceptable control limit is 95-105 percent.

Figure 4a shows the recoveries for the method detection limit (MDL) sample (LCS5) at a TP concentration 0.004 mg/L varied from 0.003 to 0.005 mg/L based on 86 results. **Figures 4a** and **4c** show the recoveries for the 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 a deficiency was noted but the samples could not be reanalyzed because they had exceeded the required holding times, then the sample is qualified accordingly.

Recoveries for the QC samples, except the practical quantitation limit (PQL) check, 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. The mean recovery for the organic check, a solution prepared from phytic acid and used to prepare matrix spikes, was 100.4 percent.

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

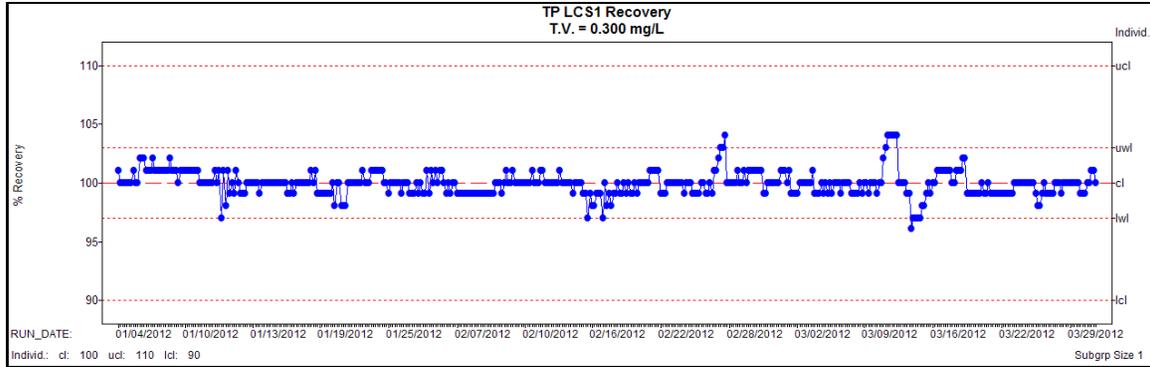


Figure 1a TP QC (Laboratory Control Sample, 0.300 mg/L) sample recoveries

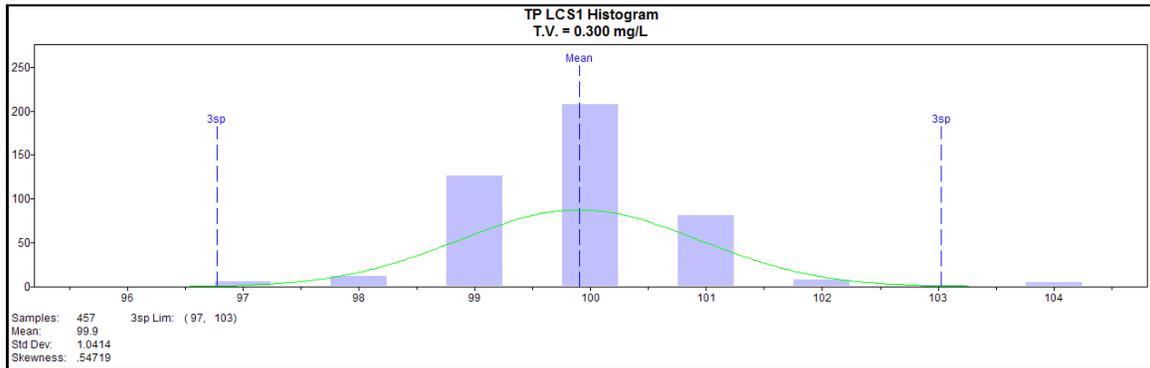


Figure 1b TP QC (Laboratory Control Sample, 0.300 mg/L) sample histogram

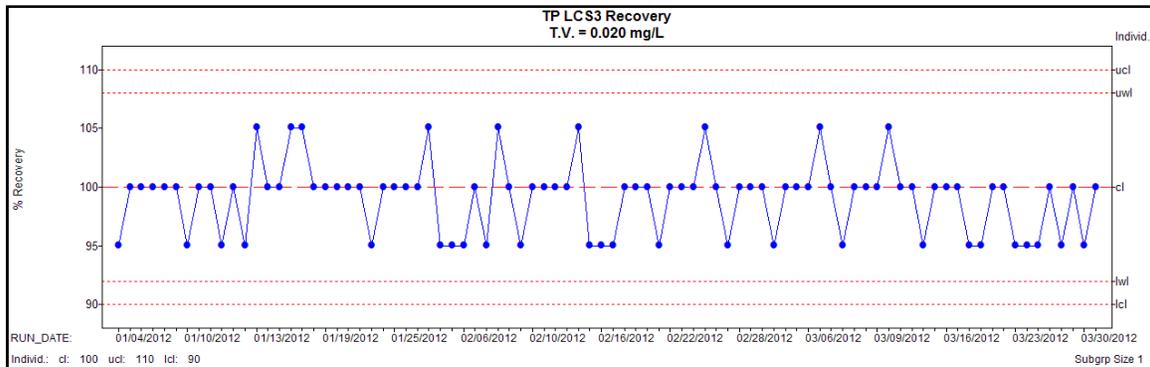


Figure 2a. TP QC (Laboratory Control Sample, 0.020 mg/L) sample recoveries.

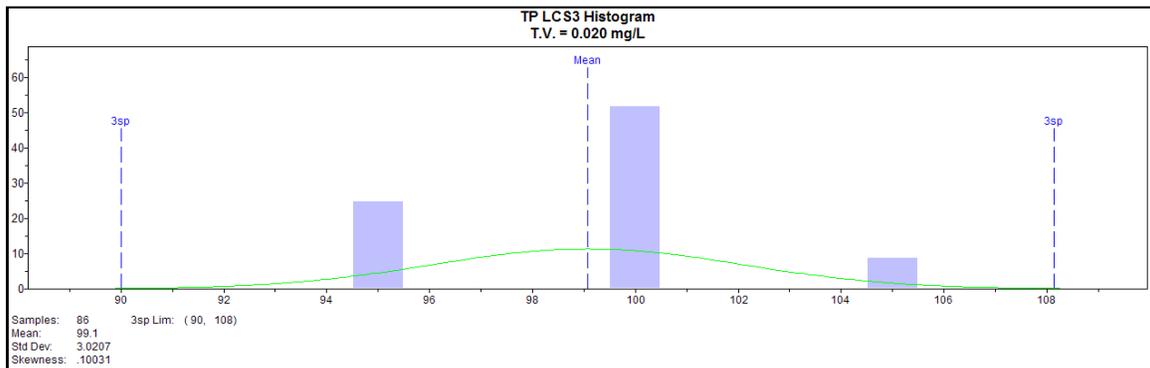


Figure 2b. TP QC (Laboratory Control Sample, 0.020 mg/L) sample histogram.

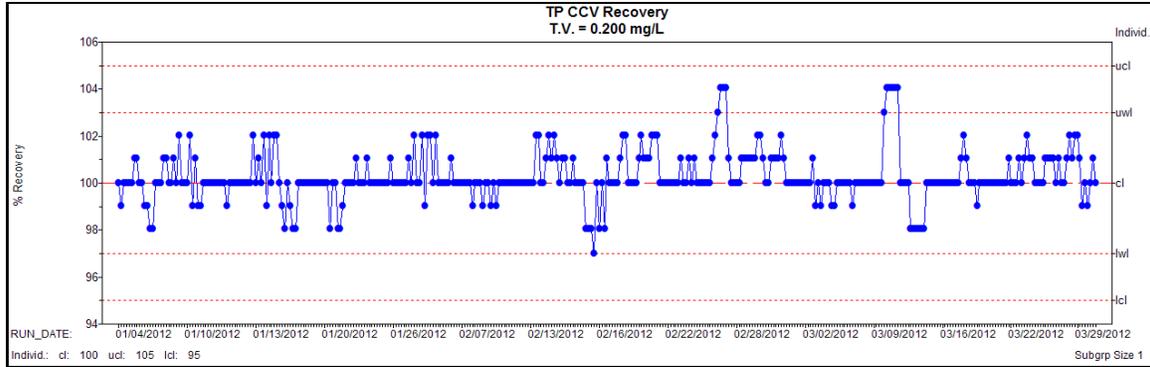


Figure 3a. TP QC (Continuing Calibration Verification Sample, 0.200 mg/L) sample recoveries.

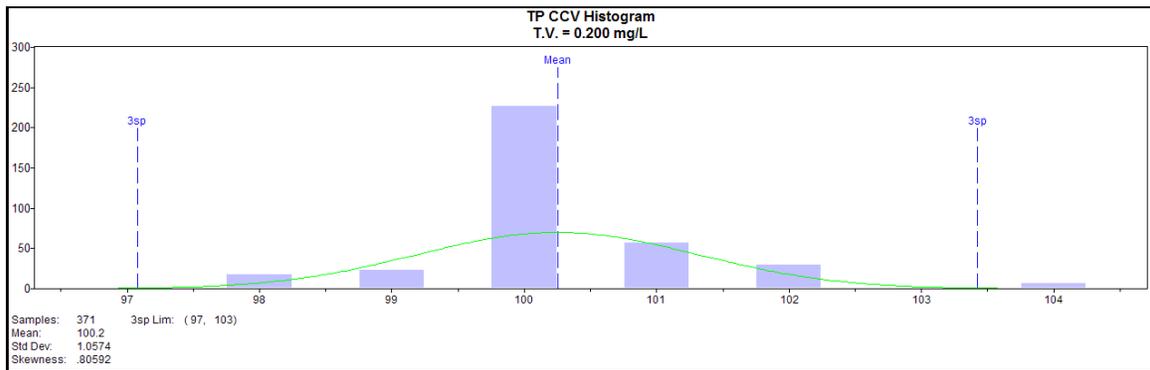


Figure 3b. TP QC (Continuing Calibration Verification Sample, 0.200 mg/L) sample histogram.

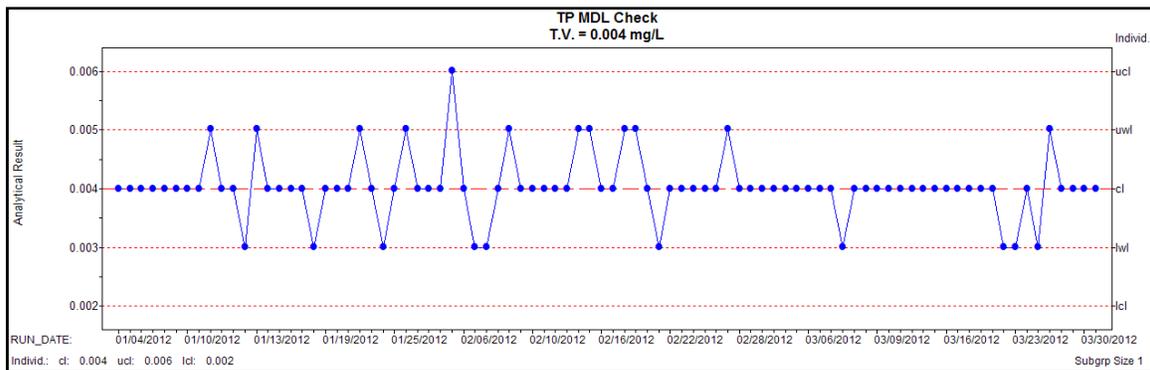


Figure 4a. TP QC5 (Method Detection Limit Check, 0.004 mg/L) sample recoveries.

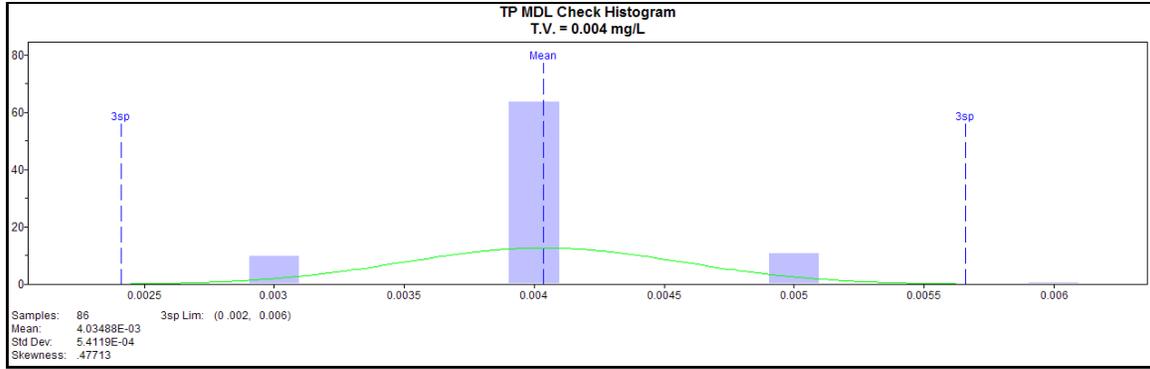


Figure 4b. TP QC5 (Method Detection Limit Check, 0.004 mg/L) sample histogram.

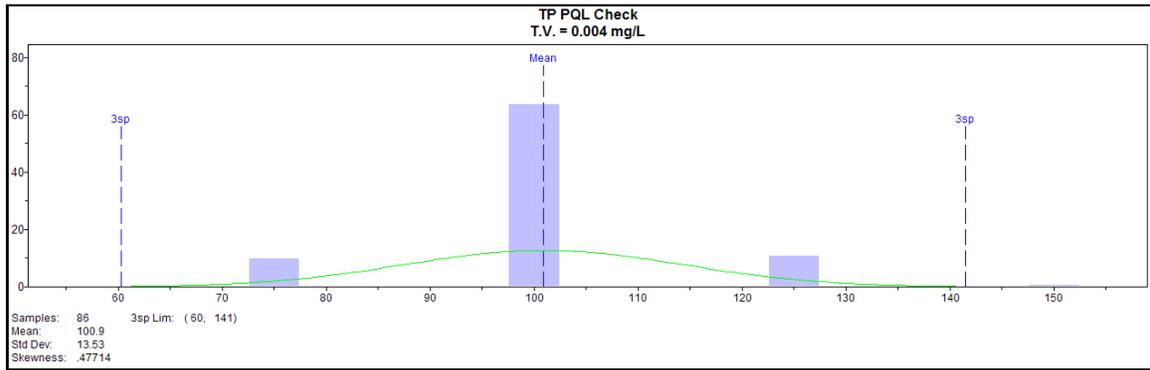


Figure 4c. TP PQL (Practical Quantitation Limit) check.

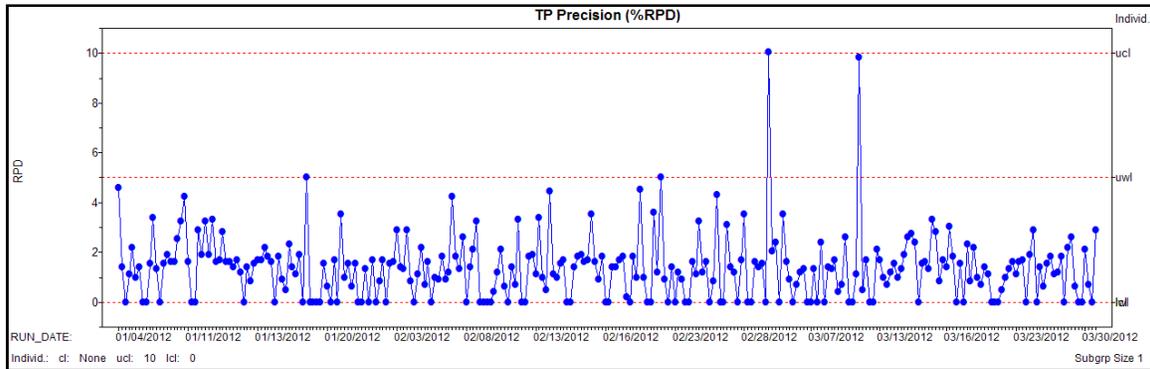


Figure 5a TP precision (%) relative percent different.

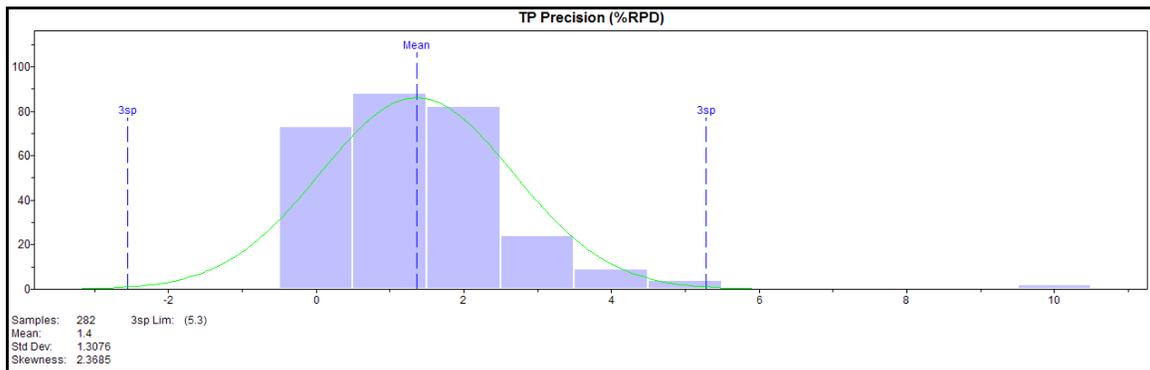


Figure 5b. TP precision (%) relative percent different histogram.

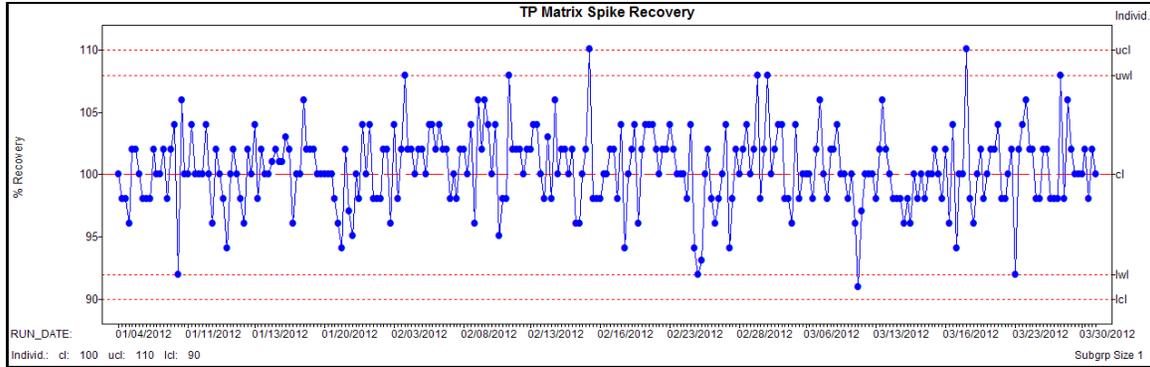
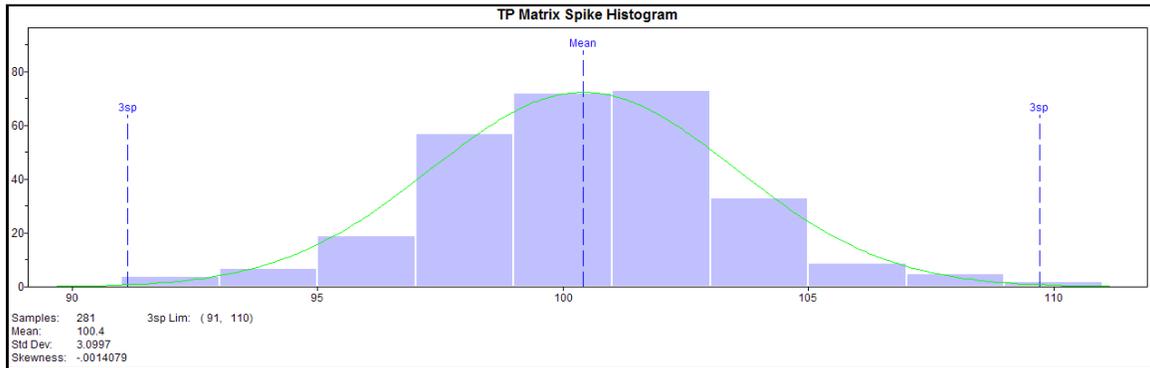


Figure 6a. TP spike recovery (%) data.



Figures 6b. TP spike recovery (%) 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 (January–March 2012) was determined to be 4.9 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 PQL of a measurement process.

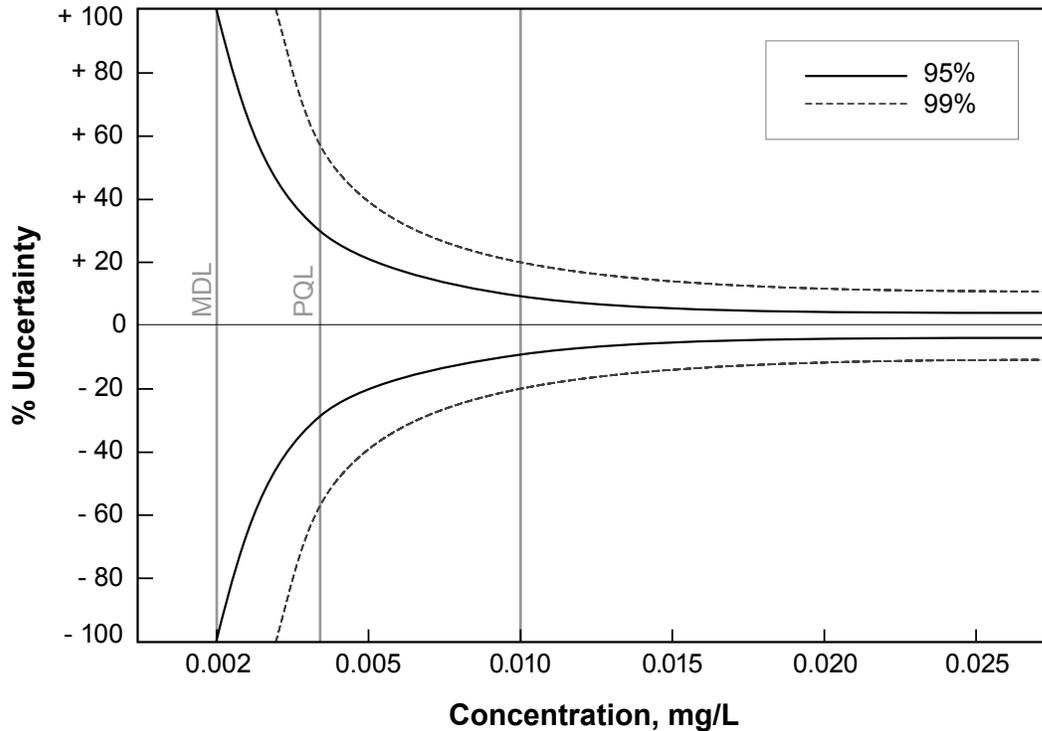


Figure 7. Uncertainty of TP measurement close to the detection limit.

METHOD DETECTION LIMIT AND PRACTICAL QUANTITATION LIMIT

MDL checks are routinely analyzed with each analytical run. From January 1, 2011, to March 31, 2012, 86 results for MDL checks were reported for TP measurements. The calculated MDL from these results was determined to be 0.001 mg/L, using the procedure described in 40 CFR 136 Appendix B.

Since July 1, 2011, the PQL with a determined value of 0.004 mg/L has been continuously measured by analysis of a quality control sample (LCS5) with an acceptable level of uncertainty ($\pm 30\%$ at 95% probability level). The performance of PQL QC sample is presented in **Figures 4a**, **4b**, 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. During the period from January to March 2012 no split TP samples were collected. The statistical evaluation contains the EVPA Quarterly Splits conducted between the FDEP and the SFWMD's laboratory from December 2010 to December 2011 (see **Appendix A**) provided the data used in this analysis. This comparison contains the TP qualified data. **Figure 8** presents regression analysis of all data, and **Table 4** 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 0.9229. 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 4 shows that the mean difference and the median difference are not statistically significant. The paired t-test and signed-rank test yield p-values of 0.056 and 0.125, respectively.

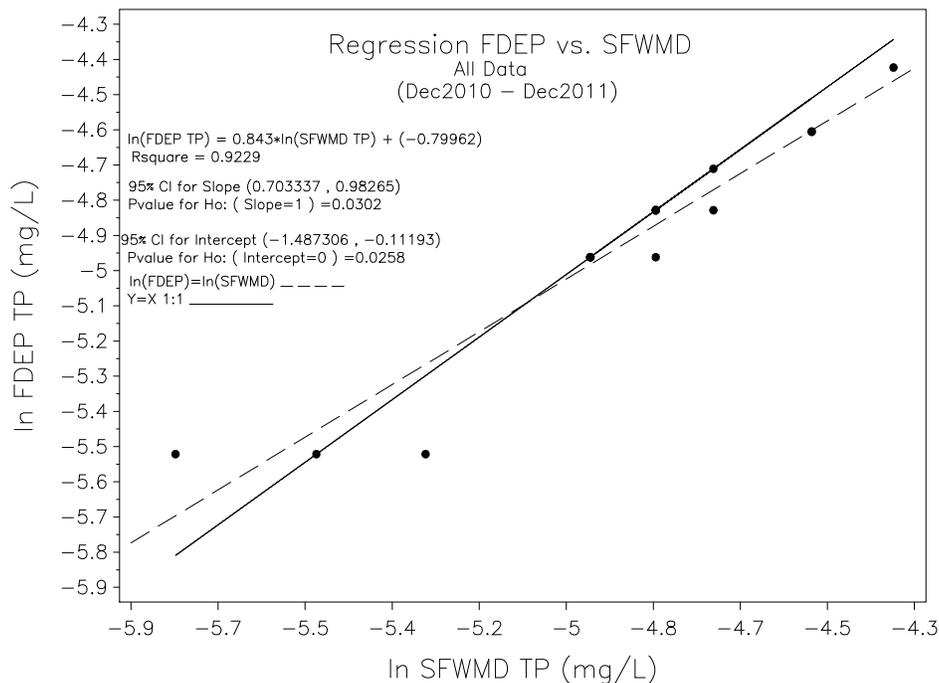


Figure 8. Regression analysis for all TP data.

Table 4. Comparison of SFWMD and FDEP split TP samples.

All Data	Summary Statistics			
	Lab	N	Mean (mg/L)	Median (mg/L)
	FDEP	16	0.008	0.008
	SFWMD	16	0.008	0.008
	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
Median of Differences	0.000	Median of Differences = 0	Signed Rank	0.125

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 concentrations at this level.

In summary, the differences for all TP data were below the MDL for both laboratories and the difference was statistically insignificant in both; the sign-rank test ($p > 0.05$) for the 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 99 are presented in **Table 5** (March 2012). 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, $2 < Z < 3$ is questionable and $Z > 3$ is unsatisfactory.

Table 5. Performance in PT Study 99 for TP, March 2012.

Sample Number	1	2	3	4	5	6	7	8	9	10
Assigned Value, mg/L	0.002	0.067	0.225	0.124	0.577	0.002	0.385	0.011	0.015	0.172
Reported Results, mg/L	<0.002	0.069	0.228	0.127	0.589	<0.002	0.391	0.011	0.015	0.173
Z-Score	NA	0.4	0.3	0.3	0.4	NA	0.3	0.0	0.0	0.1

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.

REFERENCES

Code of Federal Regulations (CFR). Title 40, Part 136, Appendix B. Definition and Procedure for the Determination and Procedure for the Determination of the Method Detection Limit.

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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): Field QC sample prepared using sampling equipment that has been brought to the site or processing area pre-cleaned 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 (AFW), sample transport and storage conditions, and laboratory process.

Field Blank (FB): FBs are collected by pouring AFW 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 AFW, 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 AFW, sample transport and storage conditions and laboratory 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 Replicate Sample (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.

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, December 2010–December 2011.

Sample	Date	SFWMD	FDEP	%RPD/Comments
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
EVPA	13-Dec-11	0.008 (J)	0.008 (I) (J)	<PQL
EVPA	13-Dec-11	0.008 (J)	0.007 (I) (J)	<PQL
EVPA	13-Dec-11	0.009 (J)	0.009 (I) (J)	<PQL
EVPA	13-Dec-11	0.007 (J)	0.007 (I) (J)	<PQL

Notes:

Qualifier codes:

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

J: sample associated with $EB \geq MDL$ and ≤ 10 times of EB

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 January 1 to March 31, 2012. One hundred twenty-two results were reported. Four results were qualified with code "I".

Project	Date Collected	Station	TP Result (mg/L)	Qualifier Code
PIE	3-Jan-12	S18C	0.006	
PIE	3-Jan-12	S332DX	0.007	
EVPA	4-Jan-12	LOX3	0.005	
EVPA	4-Jan-12	LOX4	0.009	
EVPA	4-Jan-12	LOX5	0.006	
EVPA	4-Jan-12	LOX7	0.006	
EVPA	4-Jan-12	LOX8	0.008	
EVPA	4-Jan-12	LOX9	0.003	I
EVPA	4-Jan-12	LOX10	0.008	
PIN	4-Jan-12	S12A	0.011	
PIN	4-Jan-12	S12C	0..005	
PIN	4-Jan-12	S12D	0.010	
PIN	4-Jan-12	S333	0.009	
PIN	4-Jan-12	S356-334	0.006	
EVPA	5-Jan-12	LOX6	0.005	
EVPA	5-Jan-12	LOX11	0.007	
EVPA	5-Jan-12	LOX12	0.006	
EVPA	5-Jan-12	LOX13	0.006	
EVPA	5-Jan-12	LOX14	0.006	
EVPA	5-Jan-12	LOX15	0.006	
EVPA	5-Jan-12	LOX16	0.006	
PIE	9-Jan-12	S18C	0.004	
PIE	10-Jan-12	S332DX	0.005	
PIN	11-Jan-12	S12A	0.010	
PIN	11-Jan-12	S12D	0.008	
PIN	11-Jan-12	S333	0.008	
PIN	11-Jan-12	S355A	0.009	
PIN	11-Jan-12	S355B	0.006	
PIN	11-Jan-12	S356-334	0.008	
PIE	17-Jan-12	S332DX	0.006	
PIE	17-Jan-12	S18C	0.005	
PIN	18-Jan-12	S12A	0.012	
PIN	18-Jan-12	S12D	0.007	

Project	Date Collected	Station	TP Result (mg/L)	Qualifier Code
PIN	18-Jan-12	S333	0.008	
PIN	18-Jan-12	S356-334	0.008	
PIE	23-Jan-12	S332DX	0.005	
PIE	23-Jan-12	S18C	0.004	
PIN	24-Jan-12	S12A	0.008	
PIN	24-Jan-12	S12D	0.007	
PIN	24-Jan-12	S333	0.008	
PIN	24-Jan-12	S356-334	0.006	
PIE	30-Jan-12	S18C	0.004	
PIE	30-Jan-12	S332DX	0.006	
PIN	31-Jan-12	S12A	0.014	
PIN	31-Jan-12	S12D	0.008	
PIN	31-Jan-12	S333	0.009	
PIN	31-Jan-12	S356-334	0.008	
PIE	6-Feb-12	S18C	0.003	I
PIE	6-Feb-12	S332DX	0.006	
EVPA	7-Feb-12	LOX6	0.005	
EVPA	7-Feb-12	LOX11	0.007	
EVPA	7-Feb-12	LOX12	0.006	
EVPA	7-Feb-12	LOX13	0.006	
EVPA	7-Feb-12	LOX14	0.007	
EVPA	7-Feb-12	LOX15	0.005	
EVPA	7-Feb-12	LOX16	0.007	
PIN	7-Feb-12	S12A	0.014	
PIN	7-Feb-12	S12D	0.007	
PIN	7-Feb-12	S333	0.011	
PIN	7-Feb-12	S355A	0.013	
PIN	7-Feb-12	S355B	0.016	
PIN	7-Feb-12	S356-334	0.009	
EVPA	8-Feb-12	LOX4	0.010	
EVPA	8-Feb-12	LOX5	0.009	
EVPA	8-Feb-12	LOX7	0.009	
EVPA	8-Feb-12	LOX8	0.010	
EVPA	8-Feb-12	LOX9	0.009	
EVPA	8-Feb-12	LOX10	0.011	
PIE	13-Feb-12	S18C	0.004	
PIE	13-Feb-12	S332DX	0.005	
PIN	14-Feb-12	S12A	0.011	
PIN	14-Feb-12	S12D	0.008	
PIN	14-Feb-12	S333	0.008	

Project	Date Collected	Station	TP Result (mg/L)	Qualifier Code
PIN	14-Feb-12	S356-334	0.007	
PIE	21-Feb-12	S18C	0.005	
PIE	21-Feb-12	S332DX	0.006	
PIN	22-Feb-12	S12A	0.012	
PIN	22-Feb-12	S12D	0.009	
PIN	22-Feb-12	S333	0.009	
PIN	22-Feb-12	S356-334	0.008	
PIE	27-Feb-12	S18C	0.004	
PIE	27-Feb-12	S332DX	0.005	
PIN	28-Feb-12	S12A	0.014	
PIN	28-Feb-12	S12D	0.028	
PIN	28-Feb-12	S333	0.010	
PIN	28-Feb-12	S356-334	0.008	
PIE	5-Mar-12	S18C	0.004	
PIE	5-Mar-12	S332DX	0.007	
EVPA	6-Mar-12	LOX4	0.006	
EVPA	6-Mar-12	LOX7	0.008	
EVPA	6-Mar-12	LOX8	0.010	
PIN	6-Mar-12	S12A	0.012	
PIN	6-Mar-12	S12D	0.009	
PIN	6-Mar-12	S333	0.011	
PIN	6-Mar-12	S355A	0.013	
PIN	6-Mar-12	S355B	0.013	
PIN	7-Mar-12	S356-334	0.008	
EVPA	7-Mar-12	LOX6	0.005	
EVPA	7-Mar-12	LOX11	0.006	
EVPA	7-Mar-12	LOX12	0.005	
EVPA	7-Mar-12	LOX13	0.007	
EVPA	7-Mar-12	LOX14	0.006	
EVPA	7-Mar-12	LOX15	0.005	
EVPA	7-Mar-12	LOX16	0.007	
PIE	12-Mar-12	S18C	0.003	I
PIE	12-Mar-12	S332DX	0.005	
PIN	13-Mar-12	S12A	0.018	
PIN	13-Mar-12	S12D	0.009	
PIN	13-Mar-12	S333	0.011	
PIN	13-Mar-12	S356-334	0.007	
PIE	19-Mar-12	S18C	0.004	
PIE	19-Mar-12	S332DX	0.006	
PIN	20-Mar-12	S12A	0.018	

Project	Date Collected	Station	TP Result (mg/L)	Qualifier Code
PIN	20-Mar-12	S12D	0.010	
PIN	20-Mar-12	S333	0.008	
PIN	20-Mar-12	S356-334	0.010	
PIE	26-Mar-12	S18C	0.003	I
PIE	26-Mar-12	S332DX	0.006	
PIN	27-Mar-12	S12A	0.022	
PIN	27-Mar-12	S12D	0.013	
PIN	27-Mar-12	S333	0.010	
PIN	27-Mar-12	S356-334	0.011	

Notes:

Qualifier codes:

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