

Quality Assessment Report for Water Quality Monitoring

January – March 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 January 1, 2010 through March 31, 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 TOC, collected from January 1, 2011 through March 31, 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.

Additionally, provided is an explanation of procedure to qualify field blanks and associated samples for EVPA project collected on December 6, 2010.

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-four data points were missing (not collected) due to lack of flow, shallow water depth or insufficient water level.

Table 1. Missing data for January 1 to March 31, 2011.

Project	Collection Date	Station	Comments
EVPA	4-Jan-11	LOX3	Total depth less than 0.10 m, no sample collected.
EVPA	4-Jan-11	LOX5	Total depth less than 0.10 m, no sample collected.
EVPA	4-Jan-11	LOX10	Total depth less than 0.10 m, no sample collected.
PIE	4-Jan-11	BERMB3	Site dry, no samples collected.
PIN	5-Jan-11	S12B	No flow, no sample collected.
PIN	5-Jan-11	S12C	No flow, no sample collected.
PIN	5-Jan-11	S12D	No flow, no sample collected.
PIE	10-Jan-11	BERMB3	Site dry, no samples collected.
PIN	11-Jan-11	S12B	No flow, no sample collected.
PIN	11-Jan-11	S12C	No flow, no sample collected.
PIN	11-Jan-11	S12D	No flow, no sample collected.
PIN	11-Jan-11	S355A	No flow, no sample collected.
PIN	11-Jan-11	S355B	No flow, no sample collected.
PIN	19-Jan-11	S12B	No flow, no sample collected.
PIN	19-Jan-11	S12C	No flow, no sample collected.
PIN	19-Jan-11	S12D	No flow, no sample collected.
PIN	19-Jan-11	S355A	No flow, no sample collected.
PIN	19-Jan-11	S355B	No flow, no sample collected.
PIE	24-Jan-11	BERMB3	Site dry, no samples collected.
PIN	25-Jan-11	S12B	No flow, no sample collected.
PIN	25-Jan-11	S12C	No flow, no sample collected.
PIN	25-Jan-11	S12D	No flow, no sample collected.
PIN	25-Jan-11	S355A	No flow, no sample collected.
PIN	25-Jan-11	S355B	No flow, no sample collected.
PIN	1-Feb-11	S12B	No flow, no sample collected.
PIN	1-Feb-11	S12C	No flow, no sample collected.
PIN	1-Feb-11	S12D	No flow, no sample collected.
EVPA	2-Feb-11	LOX3	Total depth less than 0.10 m, no sample collected.
EVPA	2-Feb-11	LOX5	Total depth less than 0.10 m, no sample collected.
EVPA	2-Feb-11	LOX9	Total depth less than 0.10 m, no sample collected.
EVPA	2-Feb-11	LOX10	Total depth less than 0.10 m, no sample collected.
PIE	7-Feb-11	BERMB3	Site dry, no samples collected.
PIN	8-Feb-11	S12B	No flow, no sample collected.
PIN	8-Feb-11	S12C	No flow, no sample collected.
PIN	8-Feb-11	S12D	No flow, no sample collected.
PIN	8-Feb-11	S355A	No flow, no sample collected.
PIN	8-Feb-11	S355B	No flow, no sample collected.
PIN	15-Feb-11	S12B	No flow, no sample collected.
PIN	15-Feb-11	S12C	No flow, no sample collected.
PIN	15-Feb-11	S12D	No flow, no sample collected.
PIN	15-Feb-11	S355A	No flow, no sample collected.

Project	Collection Date	Station	Comments
PIN	15-Feb-11	S355B	No flow, no sample collected.
PIE	22-Feb-11	BERMB3	Site dry, no samples collected.
PIN	23-Feb-11	S12B	No flow, no sample collected.
PIN	23-Feb-11	S12C	No flow, no sample collected.
PIN	23-Feb-11	S12D	No flow, no sample collected.
PIN	23-Feb-11	S355A	No flow, no sample collected.
PIN	23-Feb-11	S355B	No flow, no sample collected.
PIN	1-Mar-11	S12B	No flow, no sample collected.
PIN	1-Mar-11	S12C	No flow, no sample collected.
PIN	1-Mar-11	S12D	No flow, no sample collected.
EVPA	2-Mar-11	LOX6	Total depth less than 0.10 m, no sample collected.
EVPA	3-Mar-11	LOX3	Total depth less than 0.10 m, no sample collected.
EVPA	3-Mar-11	LOX4	Total depth less than 0.10 m, no sample collected.
EVPA	3-Mar-11	LOX5	Total depth less than 0.10 m, no sample collected.
EVPA	3-Mar-11	LOX9	Total depth less than 0.10 m, no sample collected.
EVPA	3-Mar-11	LOX10	Total depth less than 0.10 m, no sample collected.
PIE	7-Mar-11	BERMB3	Site dry, no samples collected.
PIN	8-Mar-11	S12B	No flow, no sample collected.
PIN	8-Mar-11	S12C	No flow, no sample collected.
PIN	8-Mar-11	S12D	No flow, no sample collected.
PIN	8-Mar-11	S355A	No flow, no sample collected.
PIN	8-Mar-11	S355B	No flow, no sample collected.
PIN	15-Mar-11	S12B	No flow, no sample collected.
PIN	15-Mar-11	S12C	No flow, no sample collected.
PIN	15-Mar-11	S12D	No flow, no sample collected.
PIN	15-Mar-11	S355A	No flow, no sample collected.
PIN	15-Mar-11	S355B	No flow, no sample collected.
PIE	21-Mar-11	BERMB3	Site dry, no samples collected.
PIN	29-Mar-11	S12B	No flow, no sample collected.
PIN	29-Mar-11	S12C	No flow, no sample collected.
PIN	29-Mar-11	S12D	No flow, no sample collected.
PIN	29-Mar-11	S355A	No flow, no sample collected.
PIN	29-Mar-11	S355B	No flow, no sample collected.

FIELD QUALITY CONTROL

Field QC measures consist of equipment blanks (EB), field-cleaned equipment blanks (FCEB), split samples (SS), and replicate samples (RS). **Table 2** summarizes EB and FCEB results for projects of interest to the Technical Oversight Committee (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 projects. **Table 4** summarizes the qualified field blank. TP was qualified a "PMF" code in the EB at LOX8 for improper field procedure. **Table 5**

shows all TP data qualified with a “PMF” code associated with this field generated blanks (FCEB).

Table 2. Field and equipment blank results.

Type of Blank	Project	Number of Blanks Collected	Number of Detected Blanks	% < 0.002 mg/L	% ≥ 0.002 mg/L
EB	PIN	1	0	100	0
	EVPA	2	0	100	0
	PIE	1	0	100	0
FCEB	EVPA	8	0	100	0
	PIE	14	0	100	0
	PIN	13	0	100	0

Notes:

- Only blanks from sampling events containing samples collected at stations listed in the Introduction are included in this table. The QC blanks may have been collected during the sampling event on the day adjacent to the collection date for the compliance samples.
- FCEB and EB acceptance criteria 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 field replicates.

Project Code	Number of Triplicates	Date Collected	% RSD	Average Value (mg/L)	Comments
PIN	1	5-Jan-11	13.5	0.011	A precision criterion was met.
PIN*	1	7-Feb-11	3.3	0.062	A precision criterion was met.
PIE	1	3-Jan-11	10.8	0.023	A precision criterion was met.
EVPA*	1	8-Mar-11	8.7	0.007	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 ≤ 20%. The laboratory applied this criterion only if sample values were greater than the practical quantitation limit (PQL), which is four times the MDL.

Table 4. Field blanks qualified with “PMF” qualifier code

Type of Blank	Project	Station	Date Collected	Value (mg/L)	Comments
EB	EVPA	LOX8	3-Mar-11	0.002U	Improper field protocol

Notes:

- The blank collected was technically not as an "EB" as defined in the Field Sampling Quality Manual. Since the syringe used to process the samples was cleaned and reused for multiple samples, an "FCEB" should have been collected as required. Instead a new syringe was used to collect an "EB" after all samples had been processed.

Table 5. List of qualified data

Project Code	Date Collected	Station	Flag	Result (mg/L)	Comments
EVPA	3-Mar-11	LOX7	PMF	0.012	Sample associated with improper field procedure (see Table4).
EVPA	3-Mar-11	LOX8	PMF	0.015	Sample associated with improper field procedure (see Table4).

Notes:

Since the equipment cleaning process was not correctly assessed for possible carryover with a "FCEB" as required, the data collected from the samples processed on this sampling trip was qualified as well.

FIELD AUDIT

During this quarter, one audit was conducted on the sample processing of the EVPA project in WCA 1 collected by the Water Quality Monitoring Division and U.S. Fish and Wildlife Service's personnel.

One corrective action and one process improvement were issued as a result of improper processing protocol which was corrected immediately. The corrective action from this audit is 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 January 1, 2011 through March 31, 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 95 to 102%, and mean central line value of 99.5% based on 523 results. The acceptable control limit is 90-110%.

Figure 2a shows the recoveries for laboratory control sample (LCS3) at TP concentration 0.020 mg/L varied from 90 to 105%, and mean central line value of 97.5% based on 98 results. The acceptable control limit is 90-110%.

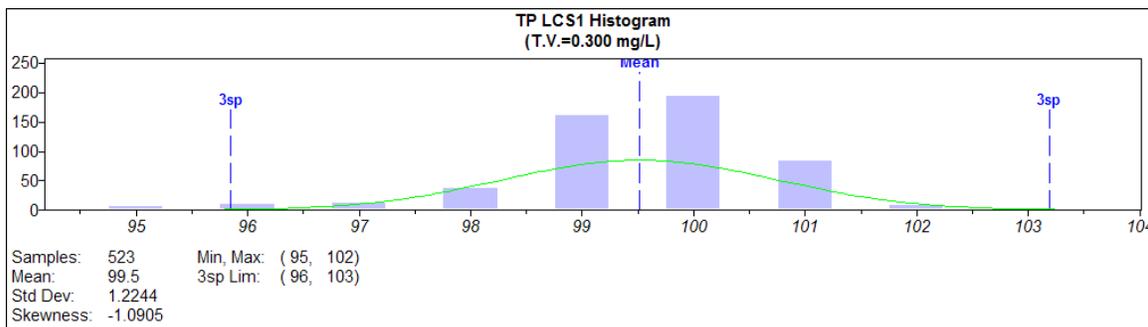
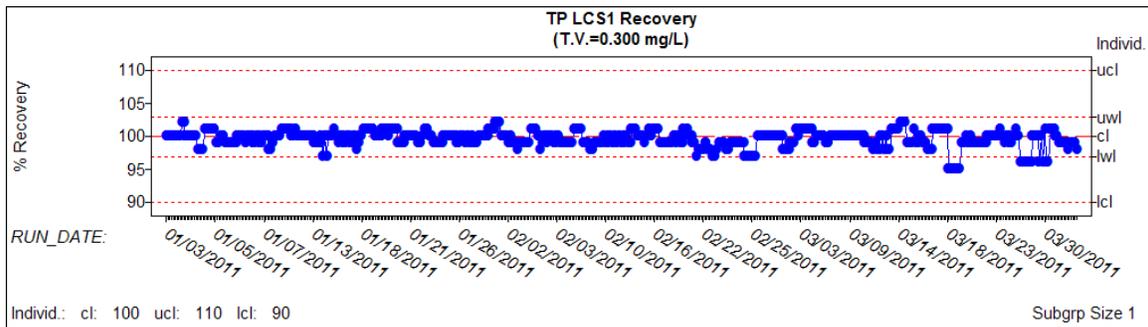
Figure 3a shows the recoveries for continuing calibration verification sample (CCV) at TP concentration 0.200 mg/L varied from 98 to 103%, and mean central line value of 100.2% based on 425 results. The acceptable control limit is 95-105%.

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.

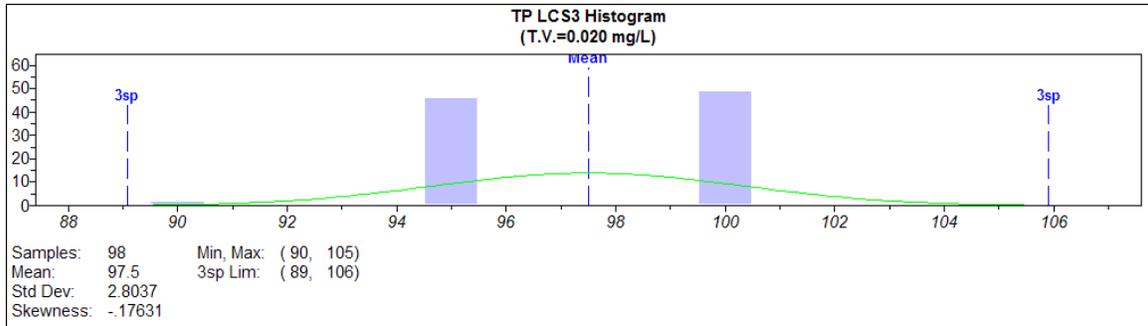
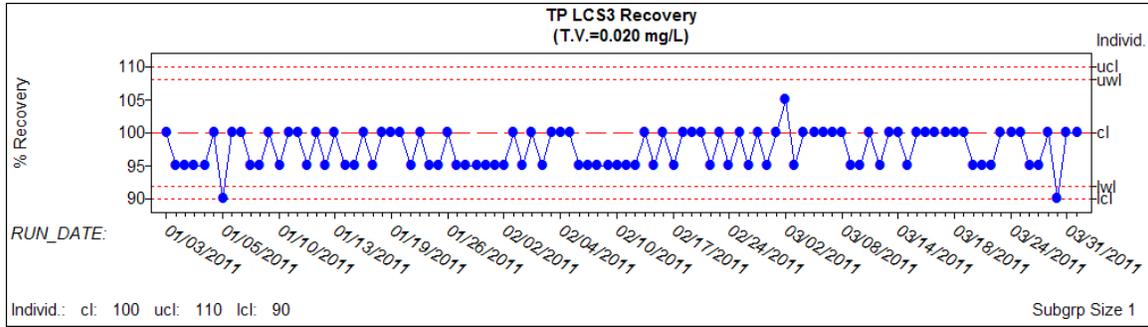
Figures 5 and 6 present the precision and matrix spike recoveries for TP analyses during the reporting period. If QC recoveries are outside the set limits, then the SFWMD’s laboratory usually rejects the analytical batch. If any deficiencies are noted, the samples have exceeded the required holding times, 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 100.9 percent.

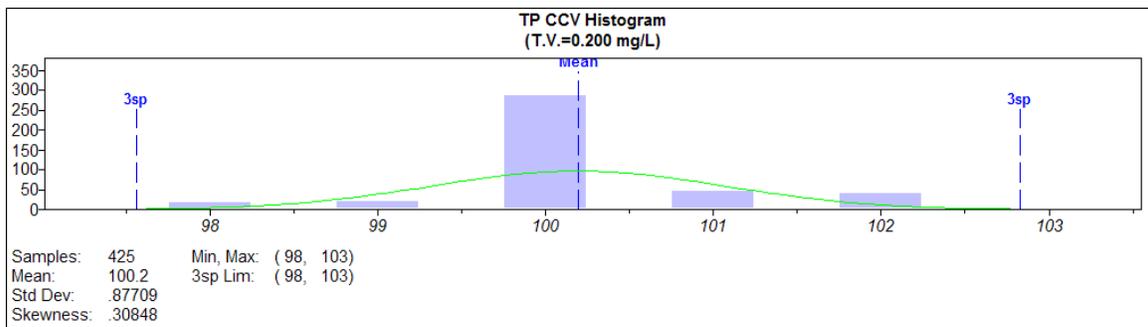
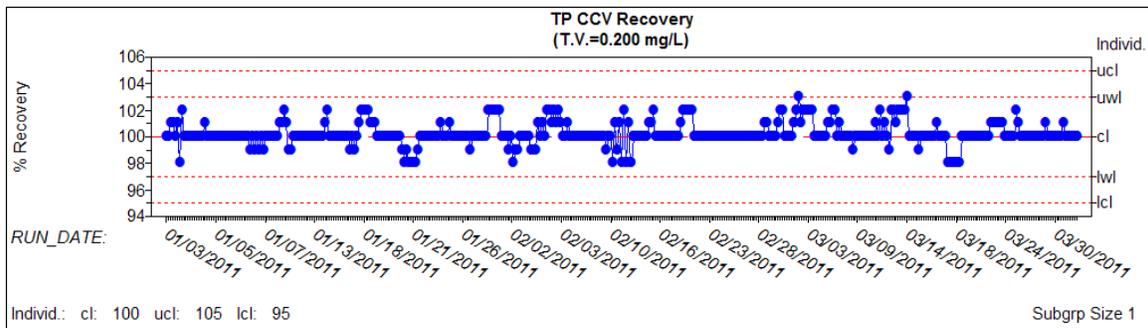
Figures 1b through 6b show the distributed of quality control samples in the roughly symmetrical bell-shape form with most values clustered around the central line.



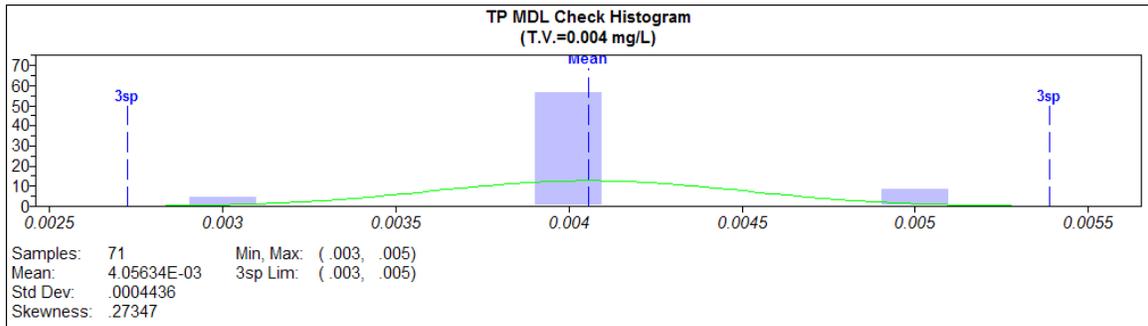
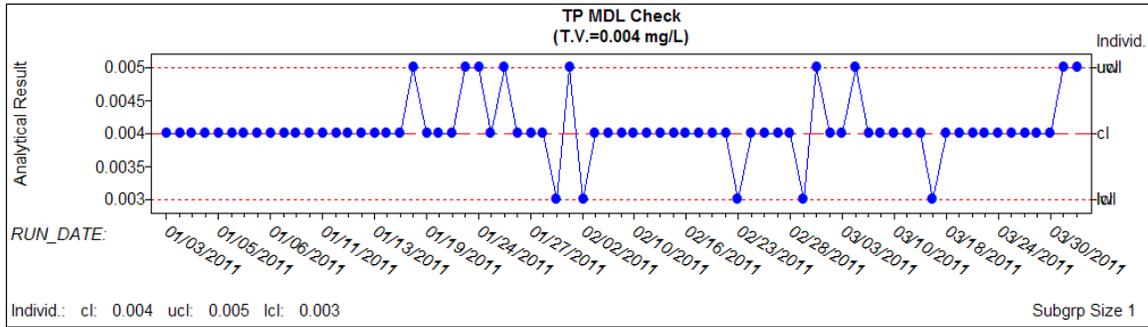
Figures 1a and 1b. TP QC (Laboratory Control Sample, 0.300 mg/L) sample recoveries and histogram.



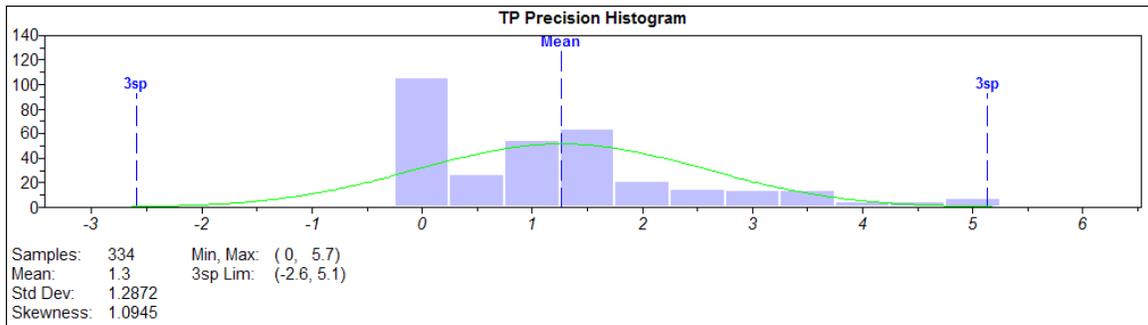
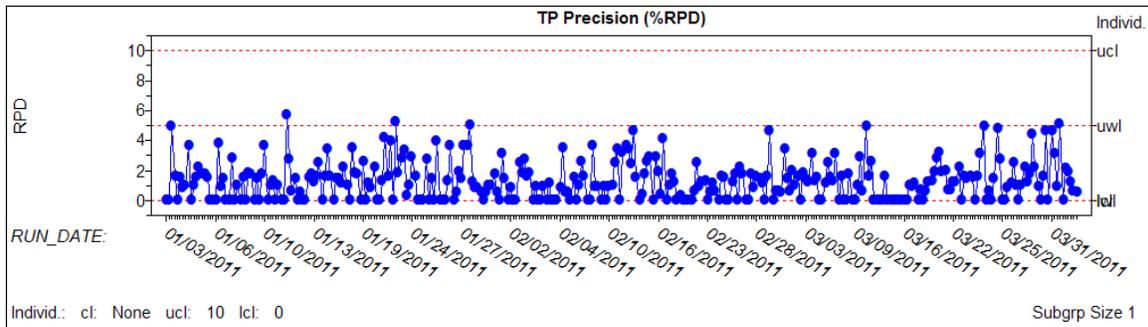
Figures 2a and 2b. TP QC (Laboratory Control Sample, 0.020 mg/L) sample recoveries and histogram.



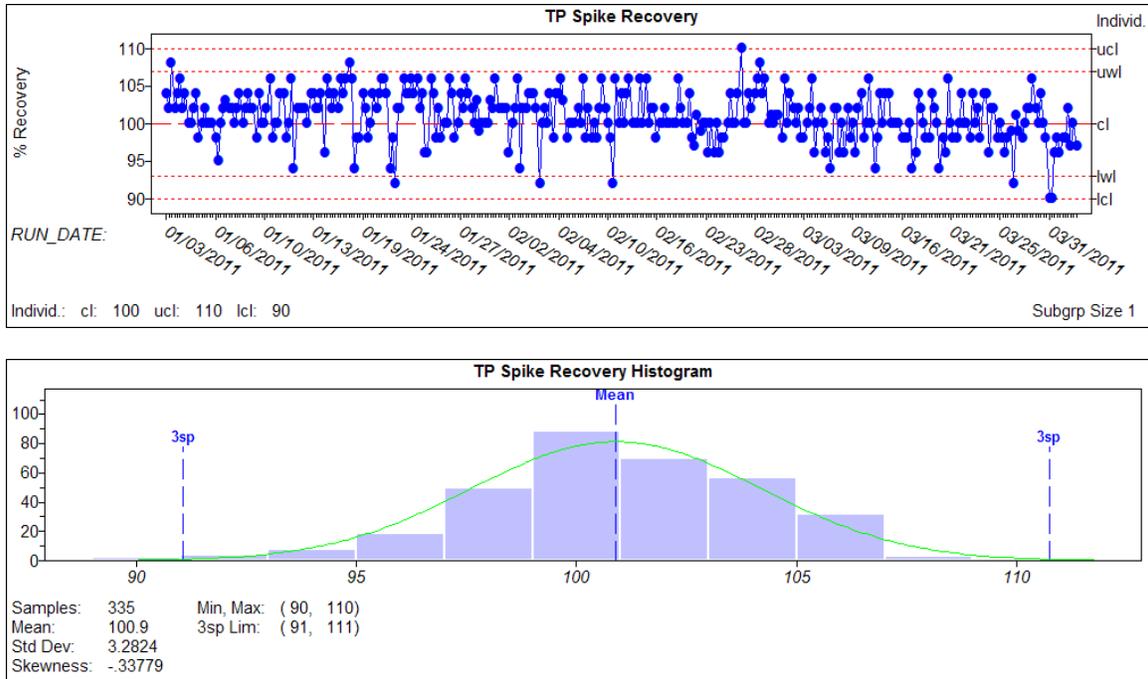
Figures 3a and 3b. TP QC (Continuing Calibration Verification Sample, 0.200 mg/L) sample recoveries and histogram.



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



Figures 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 (January-March 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 Limit of Detection

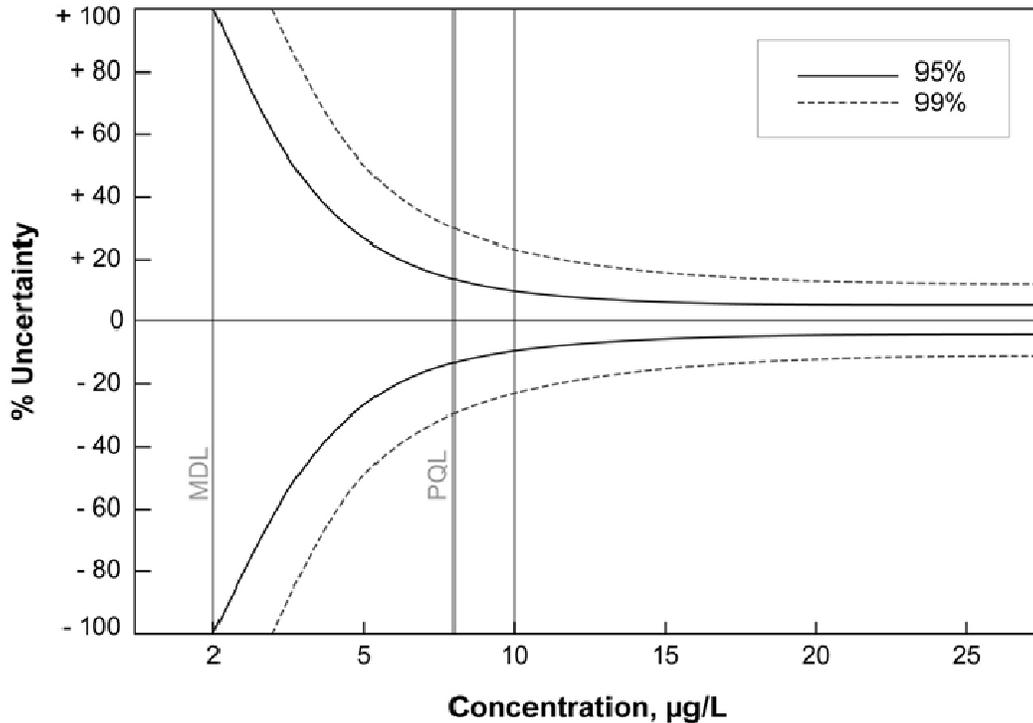


Figure 7. Uncertainty of TP measurement close to the detection limit.

METHOD DETECTION LIMIT AND PRACTICAL QUANTITATION LIMIT

MDL checks are routinely analyzed with each analytical run. From January 1 to March 31, 2011, 71 results for MDL checks were reported for TP measurements. The calculated MDL from these results was determined to be 1 microgram per liter ($\mu\text{g/L}$), using the procedure described in 40 CFR 136 Appendix B and the calculated PQL for this period was 4 $\mu\text{g/L}$. At this concentration, the relative uncertainty in the measured value is estimated to be ± 30 percent at the 95 percent confidence level (Taylor 1987).

The reported values between the MDL (established at 2 $\mu\text{g/L}$) and PQL (established at 8 $\mu\text{g/L}$) 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. Due to the low water depths the split samples were not collected for the last quarter (January –March 2011). Therefore the statistical evaluation contains the EVPA Quarterly Splits conducted between the FDEP and the SFWMD's laboratory from December 2009 to December 2010 (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 0.645. 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.

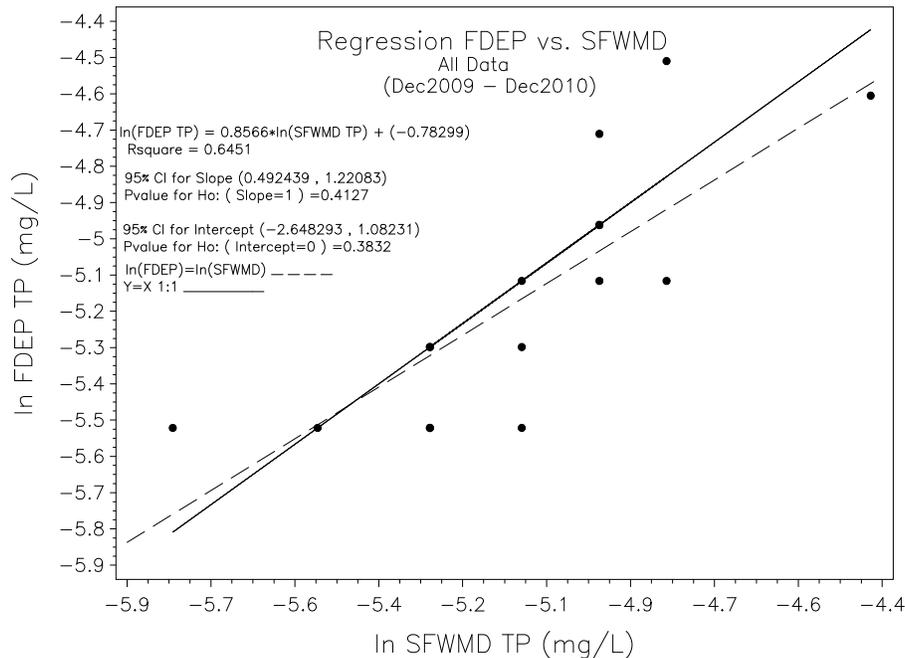


Figure 8. Regression analysis for all TP data.

Table 6 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 0.483 and 0.473 respectively.

TP \geq 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.

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

All Data	Summary Statistics			
	Lab	N	Mean (mg/L)	Median (mg/L)
	FDEP	16	0.006	0.006
	SFWMD	16	0.006	0.006
	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	0.483
Median of Differences	0.000	Median of Differences = 0	Signed Rank	0.473

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

All results for this analysis fell into the TP less than 0.020 mg/L range. The results for all “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 97 are presented in **Table 7** (December 2010-March 2011). 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 7. Performance in PT Study 97 for TP, December 2010-March 2011.

Sample Number	1	2	3	4	5	6	7	8	9	10
Assigned Value, mg/L	0.273	0.315	0.168	0.546	0.003	0.022	0.002	0.869	0.008	0.713
Reported Results, mg/L	0.274	0.317	0.169	0.559	0.002	0.021	<0.002	0.877	0.007	0.725
Z-Score	0.0	0.1	0.1	0.4	-0.7	-0.4	NA	0.1	-0.4	0.3

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

- SFWMD. 2010a. Field Sampling Quality Manual, SFWMD-FIELD-QM-001-06. South Florida Water Management District, Water Quality Monitoring Division. West Palm Beach, FL.
- 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.
- Environmental Analytical Measurement Uncertainty Estimation. Nested Hierarchical Approach. William S. Ingersoll, Defense Technical Information Center #ADA396946, 2001

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, December 2009–December 2010.

Sample	Date	SFWMD	FDEP	%RPD/Comments
EVPA	2-Dec-09	0.004 (I)	<0.004** (U)	<PQL
EVPA	1-Dec-09	0.008	0.011**	31.6
EVPA	2-Dec-09	0.004 (I)	<0.004** (U)	<PQL
EVPA	2-Dec-09	0.007 (I)	0.009** (I)	<PQL
EVPA	1-Mar-10	0.006 (I)	0.005 (I)	<PQL
EVPA	1-Mar-10	0.008	0.006 (I)	<PQL
EVPA	1-Mar-10	0.005 (I)	<0.004 (U)	<PQL
EVPA	2-Mar-10	0.005 (I)	<0.004 (U)	<PQL
EVPA	2-Jun-10	0.005 (I)	0.005 (I)	<PQL
EVPA	2-Jun-10	0.007 (I)	0.006 (I)	<PQL
EVPA	3-Jun-10	0.005 (I)	0.005 (I)	<PQL
EVPA	3-Jun-10	0.012	0.010	18.2
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

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 = 0.008 mg/L

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

EXPLANATION OF PROCEDURE TO QUALIFY FIELD BLANKS AND ASSOCIATED SAMPLES FOR EVPA PROJECT COLLECTED ON 12/6/10

At the last TOC meeting, there was inquiry regarding contaminated field blanks and associated qualified samples.

In the October – December QA Report for WQM, **Table 4** summarized the contaminated field blanks. TP was detected in the EB at LOX4 and in the FCEB at S356-334 at and above the method detection limit (MDL). **Table 5** showed all TP data qualified with a “J9” code associated with these field generated blanks.

Table 4. Field blanks \geq MDL

Type of Blank	Project	Station	Date Collected	Value (mg/L)	Comments
EB	EVPA	LOX4	6-Dec-10	0.002	EB \geq MDL
FCEB	PIN	S356-334	14-Dec-10	0.003	FCEB \geq MDL

Table 5. List of qualified data

Project Code	Date Collected	Station	Flag	Result (mg/L)	Comments
EVPA	6-Dec-10	LOX4	J9	0.007	Sample associated with EB \geq MDL and \leq 10 times of EB (see Table4).
PIN	14-Dec-10	S333	J9	0.006	Sample associated with FCEB \geq MDL and \leq 10 times of FCEB (see Table4).

- 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.)

Here is the clarification:

On 12/6/10, processing of samples was running behind schedule and was in danger of being carried out beyond the allowed processing deadline. In order to avoid going beyond this deadline staff decided to use a second set of equipment to help process the samples. This resulted in a second quality control equipment blank being generated for this second set of equipment. This second set of equipment was then used to process a single sample which had been collected at LOX4 and designated P47524-11. All other samples processed on this date were processed through the first sampling train.

Since the quality control samples collected through the first sampling train were less than the MDL, the samples associated with this equipment were not qualified. Unfortunately, the second set of equipment returned equipment blank with a TP value greater than the method detection limit (MDL). This quality control result, coupled with the fact that the actual sample value for P47524-11 was less than 10 times the value of the equipment blank, required that TP data from P47524-11 be qualified with a ‘J’. Since P47524-11 was the only sample associated with the second set of equipment it was the only result that was qualified.

APPENDIX B

Total phosphorus results for projects and their associated stations specified in the Introduction from January 1 to March 31, 2011.

Project	Date Collected	Station	TP Result (mg/L)	Qualifier Code
PIE	3-Jan-11	S18C	0.007	I
PIE	4-Jan-11	S332DX	0.006	I
EVPA	4-Jan-11	LOX8	0.008	
EVPA	4-Jan-11	LOX7	0.006	I
EVPA	4-Jan-11	LOX4	0.008	
PIN	5-Jan-11	S12A	0.010	
EVPA	5-Jan-11	LOX6	0.005	I
EVPA	5-Jan-11	LOX11	0.004	I
EVPA	5-Jan-11	LOX13	0.004	I
EVPA	5-Jan-11	LOX14	0.004	I
EVPA	5-Jan-11	LOX16	0.005	I
PIN	5-Jan-11	S333	0.006	I
EVPA	5-Jan-11	LOX15	0.004	I
EVPA	5-Jan-11	LOX12	0.005	I
PIN	5-Jan-11	S355A	0.008	
PIN	5-Jan-11	S355B	0.035	
PIN	5-Jan-11	S356-334	0.008	
PIE	10-Jan-11	S332DX	0.006	I
PIE	10-Jan-11	S18C	0.007	I
PIN	11-Jan-11	S12A	0.015	
PIN	11-Jan-11	S333	0.007	I
PIN	11-Jan-11	S356-334	0.008	
PIE	18-Jan-11	S332DX	0.006	I
PIE	18-Jan-11	S18C	0.005	I
PIN	19-Jan-11	S12A	0.015	
PIN	19-Jan-11	S333	0.006	I
PIN	19-Jan-11	S356-334	0.008	
PIE	24-Jan-11	S332DX	0.005	I
PIE	24-Jan-11	S18C	0.007	I
PIN	25-Jan-11	S12A	0.012	
PIN	25-Jan-11	S333	0.006	I
PIN	25-Jan-11	S356-334	0.008	
PIE	31-Jan-11	S332DX	0.004	I
PIE	31-Jan-11	S18C	0.004	I
PIN	1-Feb-11	S12A	0.011	
PIN	1-Feb-11	S333	0.007	I
PIN	1-Feb-11	S355A	0.017	
PIN	1-Feb-11	S355B	0.031	
PIN	1-Feb-11	S356-334	0.009	

Project	Date Collected	Station	TP Result (mg/L)	Qualifier Code
EVPA	2-Feb-11	LOX8	0.008	
EVPA	2-Feb-11	LOX7	0.007	I
EVPA	2-Feb-11	LOX4	0.009	
EVPA	3-Feb-11	LOX6	0.005	I
EVPA	3-Feb-11	LOX11	0.005	I
EVPA	3-Feb-11	LOX13	0.006	I
EVPA	3-Feb-11	LOX14	0.005	I
EVPA	3-Feb-11	LOX16	0.007	I
EVPA	3-Feb-11	LOX15	0.004	I
EVPA	3-Feb-11	LOX12	0.006	I
PIE	7-Feb-11	S332DX	0.005	I
PIE	7-Feb-11	S18C	0.004	I
PIN	8-Feb-11	S12A	0.019	
PIN	8-Feb-11	S333	0.009	
PIN	8-Feb-11	S356-334	0.017	
PIE	14-Feb-11	S332DX	0.006	I
PIE	14-Feb-11	S18C	0.004	I
PIN	15-Feb-11	S12A	0.018	
PIN	15-Feb-11	S333	0.009	
PIN	15-Feb-11	S356-334	0.014	
PIE	22-Feb-11	S332DX	0.009	
PIE	22-Feb-11	S18C	0.004	I
PIN	23-Feb-11	S12A	0.028	
PIN	23-Feb-11	S333	0.013	
PIN	23-Feb-11	S356-334	0.012	
PIE	28-Feb-11	S332DX	0.011	
PIE	28-Feb-11	S18C	0.005	I
PIN	1-Mar-11	S12A	0.034	
PIN	1-Mar-11	S333	0.015	
PIN	1-Mar-11	S355A	0.062	
PIN	1-Mar-11	S355B	0.049	
PIN	1-Mar-11	S356-334	0.011	
EVPA	3-Mar-11	LOX7	0.012	PMF
EVPA	3-Mar-11	LOX8	0.015	PMF
EVPA	2-Mar-11	LOX11	0.007	I
EVPA	2-Mar-11	LOX12	0.006	I
EVPA	2-Mar-11	LOX13	0.007	I
EVPA	2-Mar-11	LOX14	0.007	I
EVPA	2-Mar-11	LOX15	0.007	I
EVPA	2-Mar-11	LOX16	0.007	I
PIE	7-Mar-11	S332DX	0.007	I
PIE	7-Mar-11	S18C	0.004	I
PIN	8-Mar-11	S12A	0.032	
PIN	8-Mar-11	S333	0.017	

Project	Date Collected	Station	TP Result (mg/L)	Qualifier Code
PIN	8-Mar-11	S356-334	0.013	
PIE	14-Mar-11	S332DX	0.008	
PIE	14-Mar-11	S18C	0.006	I
PIN	15-Mar-11	S12A	0.066	
PIN	15-Mar-11	S333	0.027	
PIN	15-Mar-11	S356-334	0.018	
PIE	21-Mar-11	S332DX	0.011	
PIE	21-Mar-11	S18C	0.007	I
PIN	22-Mar-11	S12A	0.074	
PIN	22-Mar-11	S333	0.036	
PIN	22-Mar-11	S356-334	0.020	
PIE	28-Mar-11	S332DX	0.012	
PIE	28-Mar-11	S18C	0.007	I
PIN	29-Mar-11	S12A	0.050	
PIN	29-Mar-11	S333	0.031	
PIN	29-Mar-11	S356-334	0.024	

Notes:

Qualifier codes:

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

PMF: Project Manager Flag