

Quality Assessment Report for Water Quality Monitoring July – September 1999



Submitted to the
Technical Oversight Committee

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This report is an assessment of the SFWMD laboratory and field sampling performance in Total Phosphorus (TP) monitoring for the following projects/stations during the third quarter of 1999:

- Conservation Area Inflow and Outflows (CAMB)
S12A, S12B, S12C, S12D, S333
- Everglades National Park Inflow Monitoring (ENP)
S18C, S332, S175, S176, S177
- Everglades Protection Area (EVPA)
LOX3 to LOX16
- Non-Everglades Construction Project (NECP)
S334

The South Florida Water Management District's Comprehensive Quality Assurance Plan (CQAP) requires analysis of laboratory quality control (QC) samples and the collection and analysis of field QC samples along with routine samples to assess the data quality.

Field Quality Control Assessment

Field QC measures consist of equipment blanks (EB), field blanks (FB), split samples (SS), and replicate samples (RS). Data not meeting set criteria are flagged using the Florida Department of Environmental Protection's (FDEP) data qualifier codes.

Project Code	Field Precision		Blanks (EB/FB)	
	Mean % RSD	Comments	Result	Comments
CAMB	7.8% (mean conc=0.012 mg/L)	All acceptable	Except for 1 EB, with 0.008 mg/L P value, all were <2*MDL	All acceptable
ENP	23% (mean conc=0.006 mg/L)	All acceptable	All <2*MDL	All acceptable
EVPA	11.9% (mean conc=0.011 mg/L)	All acceptable	All <2*MDL	All acceptable
NECP	-	All acceptable	All <2*MDL	All acceptable
CSS	39.6% (mean conc.=0.006 mg/L)	Routine sample from S332 (9/8/99) was flagged for failing field precision; values for split and replicate samples from this trip were 0.009 and 0.008, respectively.	All <2*MDL	All acceptable

Notes:

- 1) All TP analyses were conducted by SFWMD laboratory.
- 2) Field precision acceptance criteria: <15%. This criteria is applied only if values >PQL.
- 3) FB and EB acceptance criteria: must be <=2xMDL
- 4) Associated samples are flagged when concentrations are low enough as compared to blank values for possibility of contamination.

Field sampling precision was generally excellent, with poorer precision at or below PQL, (PQL=0.016 mg/L for TP). Based on field precision checks and blanks, less than 1% of:

334 total TP data points for CAMB, CSS, ENP, EVPA, and NECP did not meet the QC criteria and had to be flagged. Only two of those data points are associated with any of stations covered in this report, as presented below.

Project	Date Collected	Station	Laboratory	Flag Code	Comment
CSS*	8/4/1999	S332	SFWMD	J5	May not be true composite
CSS*	9/9/1999	S332	SFWMD	J3	Failed field precision criteria

* Sample collection for CSS project was conducted by a private contractor.

Field Audit Summary

A summary of relevant field audits performed during the third quarter is presented below:

Project	Date of audit	Summary	Suggestions and/or Recommended Corrective Action
NECP	9/30/99	Miami-Dade DERM is beginning to learn, and become responsible for, this project. A staff from SFWMD-WQM Division accompanied and trained staff from DERM on the collection.	No deficiencies were noted, therefore no corrective action was necessary. The auditor recommended for DERM to collect samples in the event that there is uncertainty regarding the flow/no flow requirement.

Laboratory Quality Control Assessment

Routine laboratory QC samples include QC checks, matrix spikes, and precision checks. The charts presented on the following pages show recoveries from various levels of QC samples for TP analysis at SFWMD laboratory. Statistical evaluation of precision and matrix spike recoveries are also included. Portion of or an entire analytical run is generally rejected if QC recoveries are outside the set limits. Data is flagged accordingly if any deficiency is noted after the samples have exceeded the required holding times.

Except for QC5, recoveries for the QC samples are within $\pm 10\%$ from the true value, which are acceptable. QC5, with a true value of 0.008 mg/L, is less than the practical quantitation limit, and recoveries, mostly within 110-125%, were to be expected. Organic check is a solution prepared from phytic acid, a stable form of organic phosphate. Recoveries for this check sample are between 95-105%, indicating that the digestion process was effective. The same material is used to do matrix spikes, the mean recovery for which was 103%.

The precision target for TP analysis during this period was 5.8%, and as the report shows, mean %RPDs were 1.2 and 1.3 for low and high level analyses, respectively. The maximum RPD during this period was 5.8%.

Glossary

Equipment blank (EB). Analyte-free water that is processed on-site through all sampling equipment used in routine sample processing. EB values are indicative of effectiveness of decontamination process.

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.

Split sample (SS). A second aliquot of 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.

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

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 system over a given time period.

Accuracy. The agreement between the actual obtained result and the expected result. QC check samples having a known or "true" value are used to test for the accuracy of a measurement system.

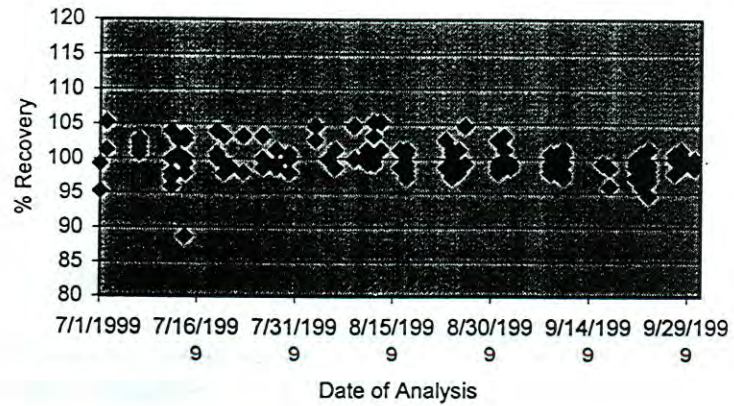
Method Detection Limit (MDL). The smallest concentration of an analyte of interest that can be measured and reported with 99 percent confidence that the concentration is greater than zero. The MDLs are determined from the analysis of a sample in a given matrix, using accepted sampling and analytical 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 EPA.

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 4 times the MDL.

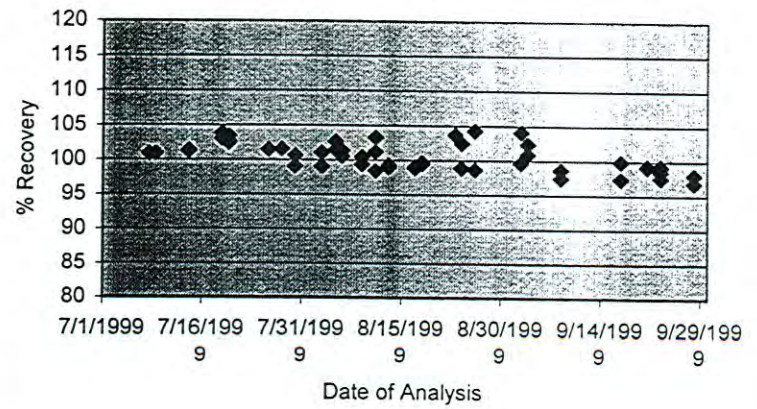
Relative Standard Deviation (RSD). A measure of precision, used when comparing more than two results. It is calculated as: $\%RSD = [\text{Std. Deviation} \div \text{Mean}] * 100$

Relative Percent Difference (RPD). A measure of precision, used when comparing two values. It is calculated as: $\%RPD = \text{Absolute}[\text{Value 1} - \text{Value 2}] \div \text{Mean} * 100$.

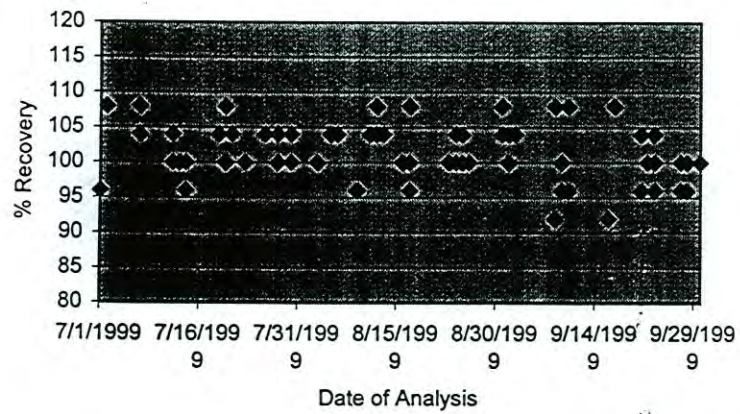
TP QC1 Recovery
(TV=0.15 mg/L)



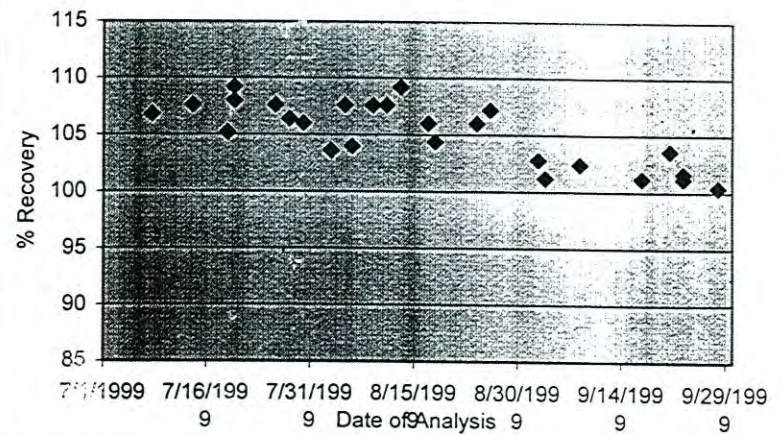
TP QC2 Recovery
(TV=1.5 mg/L)

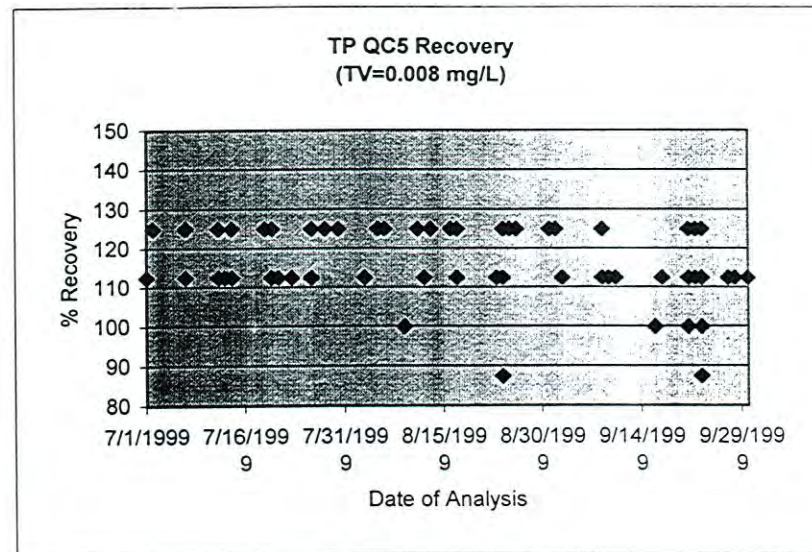
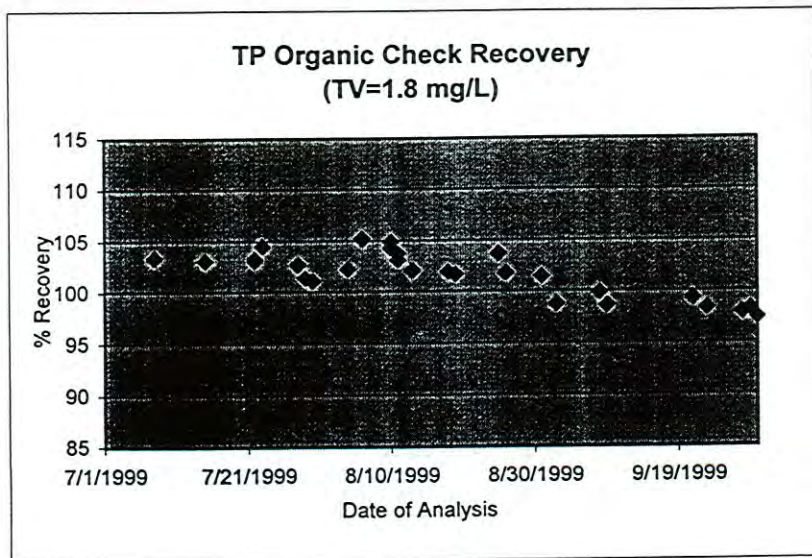


TP QC3 Recovery
(TV=0.025 mg/L)



TP QC4 Recovery
(TV=0.25 mg/L)





TP Precision Data

7/1/99 - 9/30/99

Acceptance Limit: <5.8%

Low Level (0-0.2)

Max	5.8 %
Mean	1.7 %
SD	1.2
n	98

High Level (0.2-2)

Max	4.3 %
Mean	1.3 %
SD	1.0
n	39

TP Spike Recovery Data

7/1/99 - 9/30/99

Acceptance Limit: 90-110%

Min	110.8 %
Max	90.7 %
Mean	102.8 %
Std Dev	4.2
3 x SD	12.6
LCL	90.2 %
UCL	115.4 %
# of Obs	133