

Quality Assessment Report for Water Quality Monitoring

April - June 2005



Submitted to the
Technical Oversight Committee

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Quality Assessment Report for Water Quality Monitoring April – June 2005

I. Introduction

This report is an assessment of the District laboratory analysis and field sampling for Total Phosphorus (TP) monitoring primarily for the following projects/stations during the 2nd quarter of 2005:

- Conservation Area Inflow and Outflows (CAMB)
S12A, S12B, S12C S12D, S333
- Everglades National Park Inflow Monitoring (ENP)
S175, S176, S177, S18C, S332, S332D
- Everglades Protection Area (EVPA)
LOX3 to LOX16
- Non-Everglades Construction Project (NECP)
S334

Since field QCs are collected for trips that include multiple project samples for the stations of interest, the report may also cover information on stations or project other than those listed above.

The District's Field Sampling Quality Manual states the minimum requirement followed in field sample collection. The Laboratory Quality Manual states the minimum requirement followed in laboratory sample preparation and analysis, as well as in data verification and validation. The results of laboratory and field quality control during this quarter are presented in Sections II and III of this report.

II. Field Sampling Quality Assessment

A. Quality Control

Field QC measures consist of equipment blanks (EB), field cleaned equipment blanks (FCEB), field blanks (FB), split samples (SS) and replicate samples (RS). Table 1 summarizes EB and FCEB results for all projects of interest to the TOC. All of 185 blanks were within the acceptance criteria. Table 2 summarizes field precision results. Field sampling precision was acceptable.

Data not meeting the set criteria for blanks, field precision or sampling protocols are flagged using FDEP data qualifier codes. A comprehensive list of flagged data for all trips that include samples for CAMB, ENP, EVPA and NECP during this quarter is presented in Table 3.

B. EVPA-Refuge LOX stations Sampling

An assessment of field sampling and laboratory analysis was conducted to further determine the validity of data collected in May and June 2005 for the EVPA Project Refuge (LOX) sites, and also to determine if further action is needed to help ensure that the data generated for this project is of acceptable and verifiable quality.

1. Sampling Responsibilities

Sampling for the EVPA-LOX stations has been the primary responsibility of the US Fish and Wildlife (Refuge) since early 2001. Management of this contract and field project management is the responsibility of the District. During the months of May and June 2005, there were changes in sampling personnel, as the previous Refuge samplers left USFWS. During this series of personnel changes in the Refuge, there was no training nor evaluation of capability (audit) conducted by the District's staff.

2. Compliance to Chapter 62-160, F.A.C. and DEP SOP FA3300 (DEP 01/001, 2004)

USFWS does not have its own field sampling quality manual (FSQM); contract specifies that collection for the Refuge should follow the District's FSQM. This was noted in 12/2004 field audit by SFWMD as one of the findings. In this document, the Refuge should have a discussion on its training program and how it assesses the capability of the new samplers, as well as other agency-specific protocols.

3. Adherence to SFWMD FSQM and EVPA SOP

The refuge personnel indicated that they follow the SOP and District FSQM. There was no indication that any of the sampling personnel was deliberately not following any of the SOP or FSQM provisions.

4. General Quality Practices

Sampling technique is very critical for this project and any other projects where water depth is very shallow, bottom layer is unconsolidated floc, and the site is packed with detritus and vegetation. Helicopter impact, bumping against vegetation leaves, wading, bottle suction, and sampler movement can cause resuspension of floc or detritus material into the water column. Some of these were observed by a District's field auditor/trainer during actual collection, when he joined the Refuge sampling personnel during the July sampling event.

Sampling from helicopter float is an option given to the professional judgment of the sampling personnel, and is usually done when the water is too deep for wading. On 5/3/05, samples from LOX6, LOX16, LOX15, and LOX12 sites were collected from the helicopter float, with total depths at 0.18, 0.63, 0.61, and 0.61, respectively. On the June event, samples from S5AD, LOX15, and LOX12 were taken off the float, with total depths between 0.66 to >1m. The samplers indicated that they use their judgment to determine when to wade or when to sample off the float. This is not a contradiction of the SOP or FSQM provision, however, sampling off the float, especially when water depth are this shallow, can disturb the floc layer and yield questionable data. *Sampling off the float when water depth is <0.2m, as was done in LOX6 should not have been done.*

The FSQM and SOP also specifies the use of smaller sample bottle, e.g. 60 mL instead of 2 liter bottles, to minimize disturbance of the underlying material. On the May event, sample from LOX 7 was collected into a 2 liter bottle. LOX7 had 148 mg/L TSS from the May sampling event.

Documentation of field observations must be completed prior to leaving each site. On the 7/11/05 trip, sampling depth column on the header sheet was left blank. One sampling personnel on this trip indicated that they usually divide the total depth in half, and fill the sampling depth column in the laboratory. This was pointed out during the 7/11/05 briefing with the Refuge staff.

During the 7/11/05 sample processing, observation on the amount of floc or particulate in the sample was done upon filling the sample bottles. Mr. Smith indicated that was how they have been doing this.

5. Amount of Particulates in the Samples

Based on the available facts and an analysis of the field notes, TP, total dissolved P (TDP) and total suspended solids (TSS) data, it is evident that the high TP in the samples were due to high content of solids in the some of the samples collected. Porewater diffusion into the water column could also have been a factor. The objective of water sampling for this project is to obtain representative samples and the facts indicate that the samples collected were not representative.

Whether the high level of TSS was due to sampler error, helicopter impact, or other factors is not known. The fact is that the samplers assigned on these two events were inexperienced, and according to field documentation, this was each of these individual's first sampling trip as the primary collectors. A primary collector, for the purpose of this report, was the person in charge of actually collecting the water samples.

TSS results far exceeds the average TSS concentration in the area over the recent 2.5 year period, and exceeds 3 times the standard deviation for TSS for 4 sites in May (LOX7, LOX11, LOX8, LOX14), and 4 sites in June (LOX7, LOX8, LOX9, LOX11). There were no TSS data for May LOX4, LOX6 and June LOX3, LOX5 to make the same determination for these sites.

TSS data along with TP, TDP, and depth of sampling for May and June samples are presented in AppendixTable 1.

Analysis of Total Suspended Solids (TSS) data from all sampled LOX sites from 1/2003 to 6/2005:

Max	27 mg/L
Mean	4 mg/L
SD	3.8
3*SD	11.5
N	276
Number of TSS≤3 mg/L	237
Outliers (not included in above calculations)	
Lox12, 6/14/04	92 mg/L
Lox7, 5/2/05	148 mg/L
Lox11, 5/3/05	204 mg/L

Based on three times the standard deviation, the upper control limits for TSS during 1/2003 to 6/2005 is 15.5 mg/L TSS. Eighteen out of 279 observations from 1/2003 to 6/2005 (includes the 3 outliers) exceeded the upper control limit. For May and June sampling, there were 8 samples with TSS>15.5; some sites did not have TSS data. This constitutes 40% of all samples collected during these two months, with 2 sites exceeding 100 mg/L. Because of these spurious high levels of TSS, potential of porewater diffusion into the water column, and the fact that collection was done by inexperienced samplers, the quality of the entire sampling event is questionable.

6. Field QC

Equipment blanks and sampling precision results in May and June events met criteria. However, there was an incidence on high value for field cleaned equipment blank (FCEB) associated with 5/16/05 LOXA (expanded WCA1) sampling trip. Collection was performed by the same samples as in the routine LOX sites. The TP result obtained by the laboratory for this LOXA FCEB was 0.061 mg/L; and the re-analysis result (0.060 mg/L) confirmed this high value. This might actually be highly contaminated blank or a result of sample mix-up, but in either case, is an indication of sampling error. All samples associated with this trip were flagged with a "V" qualifier. No other field blanks failed criteria during May or June sampling trips.

7. Corrective Actions and Rationale:

- a) Flag all data for May and June 2005 sampling events with a “?” qualifier; add a comment: sampling quality is questionable based on sampling assessment findings.
- b) Training and Demonstration of Capability by Field Sampling Personnel
Re-training of Refuge personnel was initiated during the July sampling event. Demonstration of capability (DOC) will be determined by SFWMD upon evaluation of the field documentation and sample results from these two trips. Any new samplers should go through intensive training and DOC prior to collecting actual samples.

A workshop on field sampling has been scheduled for 9/26/05, in accordance with TOC recommendation.
- c) Collection of Total Suspended Solids (TSS) whenever possible
Whenever water depth permits collection of a larger volume of sample (aside from TP sample), TSS should be collected from the same grab sample as that used for TP. TSS data can be useful screening indicator of the quality of water sample collected.
- e) Re-evaluate and enhance District’s procedure for review and data assessment to enable a more timely detection of outliers
- f) Finalize the EVPA Project Monitoring Plan and distribute this to all stakeholders

Table 1. Field and equipment blank results

Type of Blank	Project	# Blanks collected	% ≤0.002
EB	CAMB	48	100
	ENP	3	100
	EVPA	2	100
	NECP	1	100
FCEB	CAMB	76	100
	ENP	23	100
	EVPA	13	100
	NECP	6	100
FB	CAMB	6	100
	ENP	2	100
	EVPA	5	100

**Note: FCEB for 5/16/05 collection for LOXA project=0.061 mg/L TP. This value was confirmed by re-analysis. It was inconclusive if the sample with high blank value was really a blank, or if there was sample mix-up. Blank and associated samples were flagged.*

Table 2. Field precision summary

Project Code	Numbers of triplicates	Mean % RSD	Comments
CAMB	3	10.5	Precision criteria were met
ENP	1	2.8	Precision criteria were met
EVPA	3	5.2	Precision criteria were met

NECP	3	1.6	Precision criteria were met
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Notes

- 1) Collection was done by either the District staff or its contractors (Refuge, ENP, DERM, Broward County DPEP, or private). Project management and collection for LOXA is handled by the Refuge.
- 2) All TP analyses were conducted by the District's Chemistry laboratory.
- 3) Field precision acceptance criteria: <20%. This criteria was applied only if sample values >PQL.
- 4) FB, FCEB and EB acceptance criteria: Must be ≤MDL.
- 5) Associated samples are flagged when concentrations are less than five times the resulting blank values for possibility of contamination.

Table 3. List of flagged data

PROJECT	SAMPLE ID	STATION ID	DATE COLLECTED	SAMPLE TYPE	Orig. VALUE
EVPA	P22546-10	LOX7	5/2/2005	SAMP	0.108
EVPA	P22546-11	LOX4	5/2/2005	SAMP	0.043
EVPA	P22546-12	LOX4	5/2/2005	FCEB	-0.002
EVPA	P22546-2	S5AD	5/2/2005	SAMP	0.204
EVPA	P22546-3	S5AD	5/2/2005	RS	0.201
EVPA	P22546-9	LOX8	5/2/2005	SAMP	0.046
EVPA	P22547-10	LOX12	5/3/2005	SAMP	0.009
EVPA	P22547-11	LOX12	5/3/2005	FCEB	-0.002
EVPA	P22547-2	LOX6	5/3/2005	SAMP	0.049
EVPA	P22547-5	LOX11	5/3/2005	SAMP	0.069
EVPA	P22547-6	LOX13	5/3/2005	SAMP	0.015
EVPA	P22547-7	LOX14	5/3/2005	SAMP	0.018
EVPA	P22547-8	LOX16	5/3/2005	SAMP	0.012
EVPA	P22547-9	LOX15	5/3/2005	SAMP	0.009
EVPA	P22548-1	S5AD	6/13/2005	EB	-0.002
EVPA	P22548-10	LOX7	6/13/2005	SAMP	0.022
EVPA	P22548-11	LOX4	6/13/2005	SAMP	0.016
EVPA	P22548-12	LOX4	6/13/2005	FCEB	-0.002
EVPA	P22548-2	S5AD	6/13/2005	SAMP	0.145
EVPA	P22548-3	S5AD	6/13/2005	RS	0.149
EVPA	P22548-4	S5AD	6/13/2005	RS	0.151
EVPA	P22548-5	LOX3	6/13/2005	SAMP	0.023
EVPA	P22548-6	LOX5	6/13/2005	SAMP	0.026
EVPA	P22548-7	LOX10	6/13/2005	SAMP	0.027
EVPA	P22548-8	LOX9	6/13/2005	SAMP	0.027
EVPA	P22548-9	LOX8	6/13/2005	SAMP	0.018
EVPA	P22549-10	LOX12	6/14/2005	SAMP	0.007
EVPA	P22549-11	LOX12	6/14/2005	FCEB	-0.002
EVPA	P22549-2	LOX6	6/14/2005	SAMP	0.014
EVPA	P22549-5	LOX11	6/14/2005	SAMP	0.037
EVPA	P22549-6	LOX13	6/14/2005	SAMP	0.011
EVPA	P22549-7	LOX14	6/14/2005	SAMP	0.014
EVPA	P22549-8	LOX16	6/14/2005	SAMP	0.038
EVPA	P22549-9	LOX15	6/14/2005	SAMP	0.007

Table 4 Samples not collected (Missing TPO4 results) or rejected by laboratory

Project	Date Collected	Station	Comments
CAMB	18-Apr-05	S12A	No flow, no samples collected
CAMB	16-May-05	S12A	No flow, no samples collected
CAMB	31-May-05	S12A	No flow, no samples collected
CAMB	13-Jun-05	S12A	No flow, no samples collected
CAMB	4-Apr-05	S12B	No flow, no samples collected
CAMB	2-May-05	S12B	No flow, no samples collected
CAMB	31-May-05	S12B	No flow, no samples collected
CAMB	13-Jun-05	S12B	No flow, no samples collected
CAMB	5-Apr-05	S12C	No flow, no samples collected
CAMB	2-May-05	S12C	No flow, no samples collected
CAMB	31-May-05	S12C	No flow, no samples collected
CAMB	2-May-05	S12D	No flow, no samples collected
CAMB	27-Jun-05	S333	No flow, no samples collected
ENP	5-Apr-05	S18C	No flow, no samples collected
ENP	12-Apr-05	S18C	No flow, no samples collected
ENP	19-Apr-05	S18C	No flow, no samples collected
ENP	20-Apr-05	S18C	No flow, no samples collected
ENP	26-Apr-05	S18C	No flow, no samples collected
ENP	3-May-05	S18C	No flow, no samples collected
ENP	10-May-05	S18C	No flow, no samples collected
ENP	17-May-05	S18C	No flow, no samples collected
ENP	24-May-05	S18C	No flow, no samples collected
ENP	28-Jun-05	S176	No flow, no samples collected
ENP	13-Apr-05	S332D	No flow, no samples collected
ENP	31-May-05	S332D	Sample not acidified (improper preservation); rejected by the lab
EVPA	4-Apr-05	LOX3	Tdepth<0.10 m, no samples collected
EVPA	2-May-05	LOX3	Tdepth<0.10 m, no samples collected
EVPA	4-Apr-05	LOX5	Tdepth<0.10 m, no samples collected
EVPA	2-May-05	LOX5	Tdepth<0.10 m, no samples collected
EVPA	4-Apr-05	LOX9	Tdepth<0.10 m, no samples collected
EVPA	2-May-05	LOX9	Tdepth<0.10 m, no samples collected
EVPA	2-May-05	LOX10	Tdepth<0.10 m, no samples collected
NECP	27-Jun--05	S334	Gate closed, no flow, no sample collected

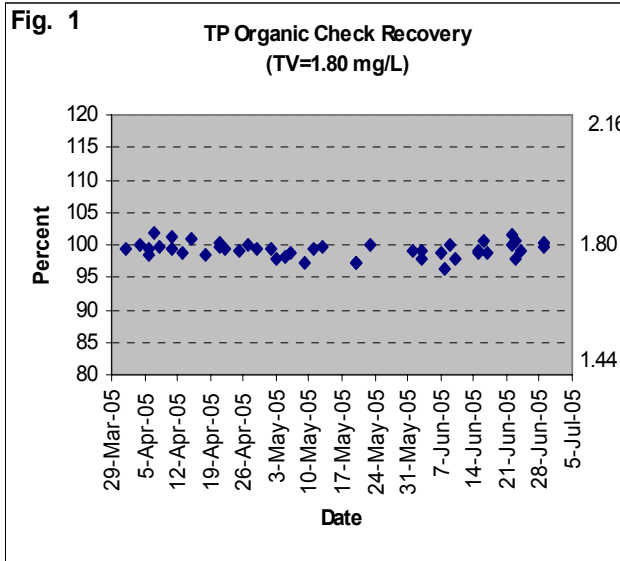
III. Laboratory Quality Control Assessment

Routine laboratory QC samples include method blanks, detection limit checks, QC checks, matrix spikes, and precision checks. The laboratory's protocols include evaluation of initial calibration prior to analysis of samples and running continuing calibration verification checks, QCs, and continuing calibration blanks (CCBs). Figures 1-6 show recoveries from various levels of QC samples for the TP analysis at SFWMD laboratory. Figure 7 is a plot of laboratory method blanks, i.e. analyte-free water that are processed and analyzed in the same manner as regular samples. Statistical evaluation of precision and matrix spikes recoveries is also included. A 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 and the samples have exceeded the required holding times and can not be reanalyzed.

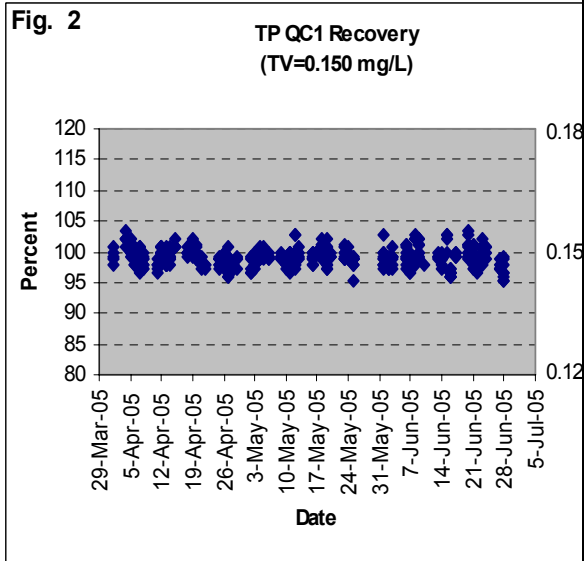
Recoveries for the QC samples are generally within $\pm 10\%$ from the true value, which are acceptable. The MDL check (QC5), with a true value of 0.004 mg/L, had a mean recovery of 100.0%. The MDL check daily results indicate the laboratory consistently achieved the 0.002 mg/L MDL.

An organic check is a solution prepared from phytic acid, a stable form of organic phosphate. Recoveries for this check sample are between 96.4 – 101.7%, indicating that the digestion process was effective. The same material is used to prepare matrix spikes, the mean recovery for which was 100.2%. One spike result, i.e. L27202-17, an estuarine sample from St. Lucie Estuary, and unrelated to the projects covered by the Settlement Agreement, had a recovery of 58.6%; the sample was flagged due to matrix interference.

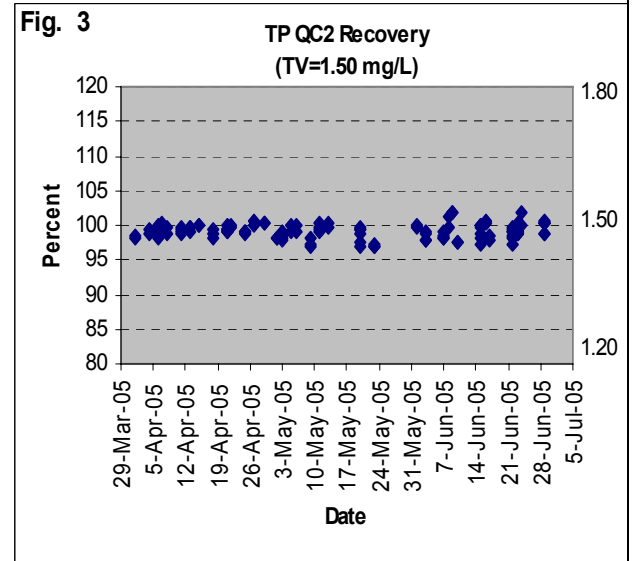
The precision target for TP analysis during this period was 10.0%; mean %RPD achieved was 1.9% and 1.2% for low (0 to 0.200 mg/L) and high level (0.200-2.00 mg/L) analyses, respectively. The maximum RPD during this period were 7.2% and 3.9% for low and high levels, respectively.



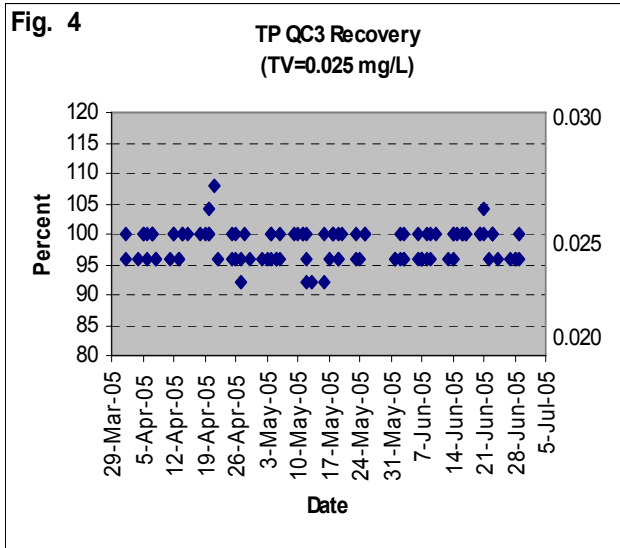
Mean = 99.2%, Max = 101.7%, Min = 96.4%



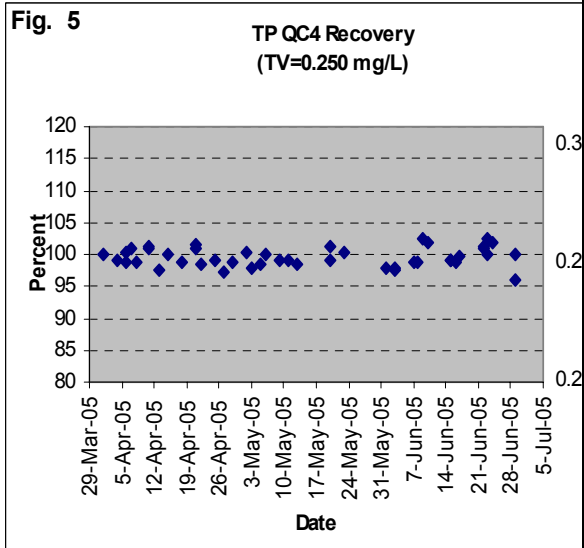
Mean = 99.2%, Max = 103.3%, Min = 95.3%



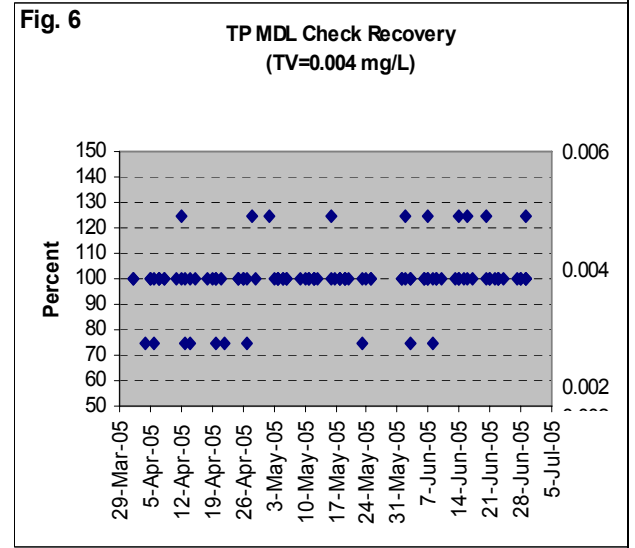
Mean = 99.2%, Max = 101.9%, Min = 96.9%



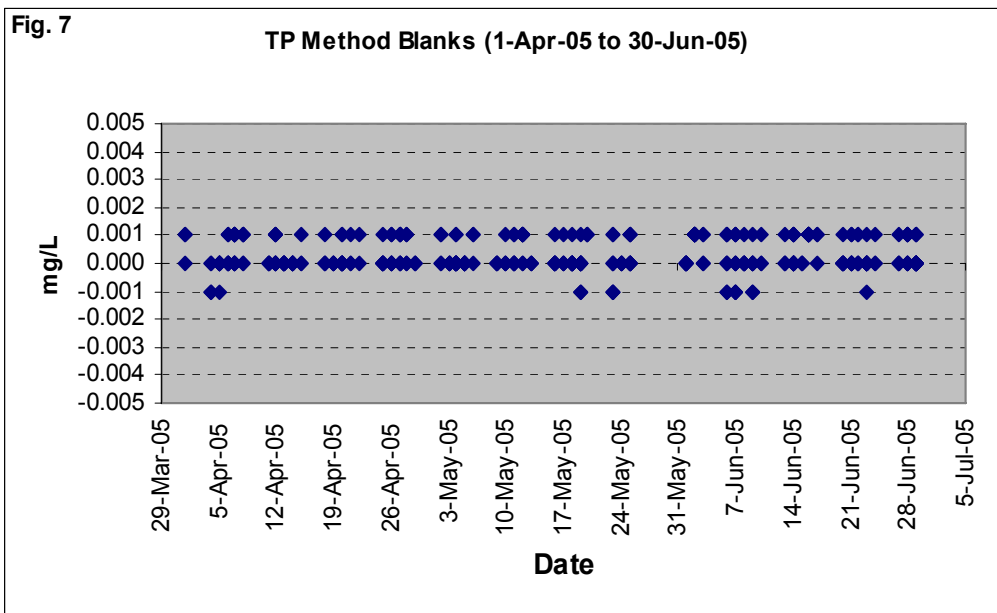
Mean = 98.1%, Max = 108%, Min = 92.0%



Mean=99.6%, Max=102.4%, Min=96%



Mean = 100.0%, Max = 125.0%, Min = 75.0%



TP Spike Recovery Data 4/1/05-6/30/05
Acceptance Limit = 90-110%

Min = 58.6*
 Max = 110%
 Mean = 100.2%
 Std Dev = 4.32
 3xSD = 12.95
 LCL = 87.2%
 UCL = 113%
 n=335

TP Precision Data, Low Level (0-0.200)
4/1/05-6/30/05
Acceptance Limit = <10%

Max = 7.2
 Mean = 1.9
 Std Dev = 1.61
 3xSD = 4.83
 UCL = 6.7
 n = 277

TP Precision Data, High Level (0.20-2.00)
4/1/05-6/30/05
Acceptance Limit = <10%

Max = 3.9
 Mean = 1.2
 Std Dev = 0.87
 3xSD = 2.60
 UCL = 3.8
 n = 42

IV. Inter-Laboratory Quality Control Assessment

A. National Proficiency Testing Results

As a requirement for laboratory certification, the District's laboratory performs proficiency testing (PT) on environmental samples on a semi-annual basis. This study is administered by vendors that have been approved by the National Institute of Science and Technology as PT providers for National Environmental Laboratory Accreditation Conference.

The result of April 2005 study is presented in Table 7.

Table 7. Laboratory Proficiency Testing Results for TP, April 2005

Sample I.D	Reported Value, mg/L	Assigned Value, mg/L	%Recovery	Status	Z-Score
Sample 1 (WP)	3.11	3.15	98.7	Acceptable	0.273
Sample 2 (APG)	0.408	0.413	98.8	Acceptable	0.448

WP=water pollution; APG=Analytical Products Group, Inc.

Glossary

Equipment blank (EB). A general terminology 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 (LCEB) or on-site (field) decontamination (FCEB). EB values are indicative of the effectiveness of the decontamination process.

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.

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 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.

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.

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.

Accuracy. The agreement between the actual obtained result and the expected result. QC check samples having 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 MDL’s 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 measurement of precision, used when comparing more than two results. It is calculated as: $\%RSD = [\text{Std. Deviation}/\text{Mean}] * 100$

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

Appendix Table 1. TP, TDP, and TSS data in relation to collector, visual observations of particulates, water depth, and whether sampled from helicopter float or accessed by wading, February to June 2005

Station	Sampler	Date	TP, mg/L	TDP, mg/L	TSS, mg/L	Observations on Particulates in the sample [†]	Total depth, m	Depth to Consolidated Sediment, m	Sampled fr H Float? ^{††}
Lox3	Arrington-USFWS	2/7/2005	NS	NS	NS	NS	0.01	0.10	
Lox4	Arrington-USFWS	2/7/2005	0.026	0.006	12	very heavy large	0.24	0.27	
Lox5	Arrington-USFWS	2/7/2005	NS	NS	NS	NS	0.04	0.15	
Lox6	Arrington-USFWS	2/7/2005	0.006	0.004	<3	light	0.33	0.33	
Lox7	Arrington-USFWS	2/7/2005	0.012	-	-	light	0.17	0.30	
Lox8	Arrington-USFWS	2/7/2005	0.009	0.007	<3	light	0.25	0.35	
Lox9	Arrington-USFWS	2/7/2005	NS	NS	NS	NS	0.05	0.15	
Lox10	Arrington-USFWS	2/7/2005	0.014	-	-	medium	0.13	0.19	
Lox11	Arrington-USFWS	2/7/2005	0.01	0.005	6	heavy	0.26	0.54	Y
Lox12	Arrington-USFWS	2/7/2005	0.006	0.004	<3	light	0.67	0.75	Y
Lox13	Arrington-USFWS	2/7/2005	0.009	0.006	<3	moderate	0.48	0.48	
Lox14	Arrington-USFWS	2/7/2005	0.007	0.007	<3	moderate	0.56	0.57	Y
Lox15	Arrington-USFWS	2/7/2005	0.007	0.005	<3	light	0.62	0.96	Y
Lox16	Arrington-USFWS	2/7/2005	0.008	0.005	<3	moderate	0.63	0.73	Y
FCEB	Arrington-USFWS	2/7/2005	<0.002	0.003	<3				
Lox3	Arrington-USFWS/Atkins-SFWMD	3/7/2005	NS	NS	NS	NS	0.05	0.07	
Lox4	Arrington-USFWS/Atkins-SFWMD	3/7/2005	0.009	--	--	light	0.16	0.25	
Lox5	Arrington-USFWS/Atkins-SFWMD	3/7/2005	NS	NS	NS	NS	0.06	0.14	
Lox6	Arrington-USFWS/Atkins-SFWMD	3/7/2005	0.011	--	--	light	0.19	0.29	
Lox7	Arrington-USFWS/Atkins-SFWMD	3/7/2005	0.02	--	--	heavy small	0.14	0.24	
Lox8	Arrington-USFWS/Atkins-SFWMD	3/7/2005	0.015	0.007	10	heavy small	0.25	0.36	
Lox9	Arrington-USFWS/Atkins-SFWMD	3/7/2005	NS	NS	NS	NS	0.07	0.12	
Lox10	Arrington-USFWS/Atkins-SFWMD	3/7/2005	0.018	--	--	medium	0.16	0.25	
Lox11	Arrington-USFWS/Atkins-SFWMD	3/7/2005	0.026	0.007	11	heavy small	0.27	0.37	
Lox12	Arrington-USFWS/Atkins-SFWMD	3/7/2005	0.018	0.004	14	--	0.50	0.66	
Lox13	Arrington-USFWS/Atkins-SFWMD	3/7/2005	0.009	0.004	11	heavy small	0.25	0.44	
Lox14	Arrington-USFWS/Atkins-SFWMD	3/7/2005	0.011	0.005	11	heavy small	0.42	0.55	
Lox15	Arrington-USFWS/Atkins-SFWMD	3/7/2005	0.01	0.006	<3	heavy	0.49	0.69	
Lox16	Arrington-USFWS/Atkins-SFWMD	3/7/2005	0.01	0.005	3	moderate	0.40	0.62	
FCEB	Arrington-USFWS/Atkins-SFWMD	3/7/2005	<0.002	0.002	3				
Lox3	Arrington-USFWS	4/4/2005	NS	NS	NS	NS	0.04	0.10	
Lox4	Arrington-USFWS	4/4/2005	0.012	0.006	<3	light	0.28	0.31	
Lox5	Arrington-USFWS	4/4/2005	NS	NS	NS	NS	0.06	0.11	
Lox6	Arrington-USFWS	4/5/2005	0.006	0.005	<3	light	0.36	0.48	
Lox7	Arrington-USFWS	4/4/2005	0.01	0.006	<3	moderate	0.21	0.33	
Lox8	Arrington-USFWS	4/4/2005	0.01	0.005	<3	moderate	0.29	0.36	
Lox9	Arrington-USFWS	4/4/2005	NS	NS	NS	NS	0.09	0.15	
Lox10	Arrington-USFWS	4/4/2005	0.009	-	-	light	0.10	0.18	
Lox11	Arrington-USFWS	4/5/2005	0.009	0.005	<3	moderate	0.21	0.36	
Lox12	Arrington-USFWS	4/5/2005	0.004	0.006	<3	moderate	0.50	0.70	Y
Lox13	Arrington-USFWS	4/5/2005	0.009	0.008	<3	moderate	0.43	0.52	Y
Lox14	Arrington-USFWS	4/5/2005	0.008	0.005	<3	--	0.53	0.57	Y
Lox15	Arrington-USFWS	4/5/2005	0.004	0.006	<3	light	0.60	0.83	Y
Lox16	Arrington-USFWS	4/5/2005	0.008	0.005	<3	moderate	0.80	0.54	Y
FCEB	Arrington-USFWS		<0.002	0.002	<3				

Table 1. TP, TDP, and TSS data (con't)

Station	Sampler	Date	TP, mg/L	TDP, mg/L	TSS, mg/L	Observations on Amount of Particulates in the sample [†]	Total depth, m	Depth to Consolidated Sediment, m	Sampled fr H. Float? ^{††}
Lox3	Suratt-ENP	5/2/2005	NS	NS	NS	NS	<0.1	--	
Lox4	Suratt-ENP	5/2/2005	0.043	-	-	heavy	0.13	0.16	
Lox5	Suratt-ENP	5/2/2005	NS	NS	NS	NS	<0.1	--	
Lox6	Suratt-ENP	5/3/2005	0.049	-	-	light	0.18	0.21	Y
Lox7	Suratt-ENP	5/2/2005	0.108	0.028	148	heavy	0.19	0.22	
Lox8	Suratt-ENP	5/2/2005	0.046	0.007	23	heavy	0.36	0.38	
Lox9	Suratt-ENP	5/2/2005	NS	NS	NS		0.09	--	
Lox10	Suratt-ENP	5/2/2005	NS	NS	NS		0.05	--	
Lox11	Suratt-ENP	5/3/2005	0.069	0.007	204	heavy	0.27	0.31	
Lox12	Suratt-ENP	5/3/2005	0.009	0.005	<3	--	0.61	0.62	
Lox13	Suratt-ENP	5/3/2005	0.015	0.007	11	light	0.32	0.39	Y
Lox14	Suratt-ENP	5/3/2005	0.018	0.004	19	heavy settled	0.37	0.43	
Lox15	Suratt-ENP	5/3/2005	0.009	0.005	<3	low	0.61	0.66	Y
Lox16	Suratt-ENP	5/3/2005	0.012	0.006	<3	light	0.63	0.66	Y
FCEB	Suratt-ENP	5/3/2005	<0.002	0.004	<3	--			
Lox3	Rinker-USFWS	6/13/2005	0.023	--	--	medium floc	0.17	0.21	
Lox4	Rinker-USFWS	6/13/2005	0.016	0.011	<3	medium floc	0.32	0.36	
Lox5	Rinker-USFWS	6/13/2005	0.026	--	--	medium floc	0.18	0.21	
Lox6	Rinker-USFWS	6/14/2005	0.014	0.006	9	medium floc	0.32	0.36	
Lox7	Rinker-USFWS	6/13/2005	0.022	0.009	19	heavy floc	0.36	0.37	
Lox8	Rinker-USFWS	6/13/2005	0.018	0.008	12	medium floc	0.32	0.34	
Lox9	Rinker-USFWS	6/13/2005	0.027	0.009	25	medium floc	0.22	0.27	
Lox10	Rinker-USFWS	6/13/2005	0.027	0.006	6	medium floc	0.24	0.26	
Lox11	Rinker-USFWS	6/14/2005	0.037	0.007	51	heavy floc	0.41	0.43	
Lox12	Rinker-USFWS	6/13/2005	0.007	0.005	<3	no floc	0.77	0.8	Y
Lox13	Rinker-USFWS	6/14/2005	0.009	0.004	11	medium floc	0.41	0.45	
Lox14	Rinker-USFWS	6/14/2005	0.014	0.005	8	medium floc	0.51	0.54	
Lox15	Rinker-USFWS	6/13/2005	0.007	0.005	<3	light floc	0.66	0.72	Y
Lox16	Rinker-USFWS	6/14/2005	0.038	0.011	6	very heavy floc	0.53	0.63	
FCEB	Rinker-USFWS	6/13/2005	<0.002	<0.002	<3				--

[†] Based on what was noted on the field notes; according to what was observed in the bucket or bottles during sample processing.

^{††} Based on what was noted on the field notes.