APPENDIX C

PARAMETERS, DETECTION LEVELS, HOLDING TIMES AND ANALYTICAL RECOVERIES

Appendix C. Parameters, Detection Levels, Holding Times and Acceptable Analytical Recoveries (Revised Aug 2007)

Constituent	Laboratory	Minimum Sample Size	Units	Method	RL	Field Duplicate RPD/Recovery	Holding Time/ Preservation	Container	Completeness
Dissolved Oxygen	CVRWQCB	500 mL	mg/L	a/360.1	0.1	N/A	on site	500 mL Polyethylene	95%
pH	CVRWQCB	500 mL	None	a/150.1	0.1	N/A	on site	500 mL Polyethylene	95%
Specific Conductance	CVRWQCB	500 mL	umhos/cm	a/b/120.1	1	RPD<10%	28 days - Cool, 4 °C in the dark	500 mL Polyethylene	95%
Temperature	CVRWQCB	500 mL	^{o}C	a/temperature	0.1	N/A	on site	500 mL Polyethylene	95%
Turbidity	CVRWQCB	500 mL	NTU	a	1	RPD<10%	on site	500 mL Polyethylene	95%
Total Alkalinity	SFL	800 mL	mg/L	SM2320B	5.0	RPD<15%	14 days - Cool, 4 °C in the dark	500 mL/1 L Polyethylene	95%

Appendix C. Parameters, Detection Levels, Holding Times and Acceptable Analytical Recoveries (Revised Aug 2007) continued…

Constituent	Laboratory	Minimum Sample Size	Units	Method	RL	Field Duplicate RPD/Recovery	Holding Time/ Preservation	Container	Completeness
Total Dissolved Solids	SFL	300 mL	mg/L	SM2540C	10	RPD<15%	7 days - Cool, 4 °C in the dark	500 mL/1 L Polyethylene	95%
Total Hardness	SFL	500 mL	mg/L	EPA 130.2	5.0	RPD<15%	180 days- Cool, 4 °C in the dark	500 mL/1 L Polyethylene	95%
Total Suspended Solids	SFL	1000 mL	mg/L	SM2540D	1.0	RPD<20%	7 days - Cool, 4 °C in the dark	500 mL/1 L Polyethylene	95%
Metals in Water									
Arsenic, Total & Dissolved[d]	SFL	500 mL	µg/L	SM3114B	2	4-20 ±4 At concentrations greater than the ranges shown, acceptable recovery is 80 - 120%	180 days - When preserved to a pH < 2 using nitric acid within 24 hours of sample collection	500 mL/1 L Polyethylene	95%
Cadmium, Total & Dissolved[d]	SFL	500 mL	µg/L	SM3113B to MDL	0.1	0.1-10 ±3 At concentrations greater than the ranges shown, acceptable recovery is 80 - 120%	180 days - When preserved to a pH < 2 using nitric acid within 24 hours of sample collection	500 mL/1 L Polyethylene	95%

Appendix C. Parameters, Detection Levels, Holding Times and Acceptable Analytical Recoveries (Revised Aug 2007) continued…

Constituent	Laboratory	Minimum Sample Size	Units	Method	RL	Field Duplicate RPD/Recovery	Holding Time/ Preservation	Container	Completeness
Copper,Total & Dissolved[d]	SFL	500 mL	µg/L	SM3113B	1	1-20 ± 5 At concentrations greater than the ranges shown, acceptable recovery is 70 - 130%	180 days - When preserved to a pH < 2 using nitric acid within 24 hours of sample collection	500 mL /1 L Polyethylene	95%
Lead, Total & Dissolved[d]	SFL	500 mL	µg/L	SM3113B	3	5-25 ± 8 At concentrations greater than the ranges shown, acceptable recovery is 60 - 140%	180 days - When preserved to a pH < 2 using nitric acid within 24 hours of sample collection	500 mL/1 L Polyethylene	95%
Mercury, Total & Dissolved[d]	SFL	500 mL	µg/L	SM3112B to MDL	0.1	0.1-10 ±.5 At concentrations greater than the ranges shown, acceptable recovery is 70 - 130%	28 days- Cool, 4 °C in the dark	500 mL/1 L Polyethylene	95%
Nickel, Total & Dissolved[d]	SFL	500 mL	µg/L	EPA 249.2	3	5-25 ± 6 At concentrations greater than the ranges shown, acceptable recovery is 65-135%	180 days - When preserved to a pH < 2 using nitric acid within 24 hours of sample collection	500 mL/1 L Polyethylene	95%
Zinc,Total & Dissolvedd	SFL	500 mL	µg/L	SM3111B	2	1-20 ± 6 - At concentrations greater than the ranges shown, acceptable recovery is 70 - 130%	180 days - When preserved to a pH < 2 using nitric acid within 24 hours of sample collection	500 mL/1 L Polyethylene	95%

Appendix C. Parameters, Detection Levels, Holding Times and Acceptable Analytical Recoveries (Revised Aug 2007) continued…

Constituent	Laboratory	Minimum Sample Size	Units	Method	RL	Field Duplicate RPD/Recovery	Holding Time/ Preservation	Container	Completeness
Minerals in Water									
Bicarbonate	SFL	200 mL	mg/L	SM2320B	5.0	RPD<15%	14 days - Cool, 4 °C in the dark	500 mL/1 L Polyethylene	95%
Calcium	SFL	500 mL	mg/L	SM3111B	0.1	RPD<15%	180 days- Cool, 4 °C in the dark	500 mL/1 L Polyethylene	95%
Chloride	SFL	50 mL	mg/L	EPA 300.0	1.0	RPD<15%	28 days - Cool, 4 °C in the dark	500 mL/1 L Polyethylene	95%
Magnesium	SFL	500 mL	mg/L	EPA 242.1	0.02	RPD<15%	180 days - Cool, 4 °C in the dark	500 mL/1 L Polyethylene	95%
Potassium	SFL	500 mL	mg/L	EPA 258.1	0.10	RPD<15%	180 days - Cool, 4 °C in the dark	500 mL/1 L Polyethylene	95%
Sodium	SFL	500 mL	mg/L	SM3111B	0.10	RPD<15%	180 days - Cool, 4 °C in the dark	500 mL/1 L Polyethylene	95%

Appendix C. Parameters, Detection Levels, Holding Times and Acceptable Analytical Recoveries (Revised Aug 2007) continued…

Constituent	Laboratory	Minimum Sample Size	Units	Method	RL	Field Duplicate RPD/Recovery	Holding Time/ Preservation	Container	Completeness
Sulfate	SFL	100 mL	mg/L	EPA 300.0	0.5	RPD<15%	28 days - Cool, 4 °C in the dark	500 mL/1 L Polyethylene	95%
Nutrients in Water									
Ammonia as N[d]	Basic	300 mL	mg/L	350.1	0.05	80 – 120% Recovery	28 days - Cool, 4 C, H2SO4 to pH <2	Polyethylene	95%
Ammonia[d]	SFL	300 mL	mg/L	EPA 350.3	0.20	80 – 120% Recovery	28 days - Cool, 4 C, H2SO4 to pH <2	Polyethylene	95%
Nitrate as N	Basic	100 mL	mg/L	353.2	0.05	80 – 120% Recovery	2 days - Cool, 4 °C in the dark	Polyethylene	95%
Nitrate	SFL	100 mL	mg/L	EPA 300.0	0.05	80 – 120% Recovery	2 days - Cool, 4 °C in the dark	Polyethylene	95%

Appendix C. Parameters, Detection Levels, Holding Times and Acceptable Analytical Recoveries (Revised Aug 2007) continued…

Constituent	Laboratory	Minimum Sample Size	Units	Method	RL	Field Duplicate RPD/Recovery	Holding Time/ Preservation	Container	Completeness
Total Phosphorous[d]	Basic	150 mL	mg/L	SM 4500P	0.05	80 – 120% Recovery	28 days - Cool, 4 °C in the dark	Polyethylene	95%
Ortho Phosphate[d]	Basic	150 mL	mg/L	SM 4500P-E	0.05	80 – 120% Recovery	2 days - Cool, 4 °C	Polyethylene	95%
Ortho Phosphate[d]	SFL	150 mL	mg/L	EPA 365.3	0.01	80 – 120% Recovery	2 days - Cool, 4 °C in the dark	Polyethylene	95%
Total Kjldahl Nitrogen[d]	Basic	300 mL	mg/L	351.2	0.2	80 – 120% Recovery	28 days - Cool, 4 °C in the dark, H2SO4 to pH <2	Polyethylene	95%
Total Kjldahl Nitrogen[d]	SFL	300 mL	mg/L	EPA 351.3	0.50	80 – 120% Recovery	28 days - Cool, 4 °C in the dark, H2SO4 to pH <2	Polyethylene	95%

Appendix C. Parameters, Detection Levels, Holding Times and Acceptable Analytical Recoveries (Revised Aug 2007) continued…

Constituent	Laboratory	Minimum Sample Size	Units	Method	RL	Field Duplicate RPD/Recovery	Holding Time/ Preservation	Container	Completeness
Total Phosphorous[d]	Basic	150 mL	mg/L	SM 4500P	0.05	80 – 120% Recovery	28 days - Cool, 4 °C in the dark	Polyethylene	95%
Total Phosphorous[d]	SFL	150 mL	mg/L	EPA 365.2	0.02	80 – 120% Recovery	2 days - Cool, 4 °C in the darkC	Polyethylene	95%
Freshwater Toxicity									
48h % Survival, *Ceriodaphnia*	SFL	1000 mL	Adult Count (% survival)	EPA 821-R-02-012, Table 12		Significant difference, or RPD<20%	36 Hr - Cool, 4 °C in the dark	1L Glass	95%
96h % Survival, Fathead Minnow (*Pimephales*), non-renewal	SFL	1000 mL	% Survival	EPA 821-R-02-012, Table 14		Significant difference, or RPD<20%	36 Hr - Cool, 4 °C in the dark	1L Glass	95%
96h Algae (*Selenastrum*) growth	SFL	1000 mL	Cell Count (growth or reduction) cell/mL	EPA 821-R-02-013, 1003.0		Significant difference, or RPD<20%	36 Hr - Cool, 4 °C in the dark	1L Glass	95%

Appendix C. Parameters, Detection Levels, Holding Times and Acceptable Analytical Recoveries (Revised Aug 2007) continued…

Constituent	Laboratory	Minimum Sample Size	Units	Method	RL	Field Duplicate RPD/Recovery	Holding Time/ Preservation	Container	Completeness
Chronic Toxicity, *Ceriodaphnia*	SFL	1000 mL	Adult Count (% survival)	EPA 821-R-02-013, 1002.0		Significant difference, or RPD<20%	36 Hr - Cool, 4 °C in the dark	1L Glass	95%
Chronic Toxicity, *Ceriodaphnia*	SFL	1000 mL	Larval Count (num/rep)	EPA 821-R-02-013, 1002.0		Significant difference, or RPD<20%	36 Hr - Cool, 4 °C in the dark	1L Glass	95%
Chronic Toxicity, Fathead Minnow (*Pimephales*)	SFL	1000 mL	% Survival	EPA 821-R-02-013, 1000.0		Significant difference, or RPD<20%	36 Hr - Cool, 4 °C in the dark	1L Glass	95%
Chronic Toxicity, Fathead Minnow (*Pimephales*)	SFL	1000 mL	Weight (mg/ind)	EPA 821-R-02-013, 1000.0		Significant difference, or RPD<20%	36 Hr - Cool, 4 °C in the dark	1L Glass	95%
Bacteria in Water									
Total & Fecal Coliform, 15 tube Multiple tube fermentation	SFL	125 mL	MPN/100 mL	SM9221B, E	e		6 Hr to lab, 8h to analysis - Cool, 4 °C in the dark	Sterile Plastic	95%
Total Coliform & E. Coli, MTF + MUG	SFL	125 mL	MPN/100 mL	SM9221B + MUG	e		6 Hr to lab, 8h to analysis - Cool, 4 °C in the dark	Sterile Plastic	95%

Appendix C. Parameters, Detection Levels, Holding Times and Acceptable Analytical Recoveries (Revised Aug 2007) continued…

Constituent	Laboratory	Minimum Sample Size	Units	Method	RL	Field Duplicate RPD/Recovery	Holding Time/ Preservation	Container	Completeness
Total Coliform	CVRWQCB	100 mL	MPN	Colilert® 18 by Idexx		95% CI	6 Hr - Cool, 4 °C in the dark	100 mL Polyethylene	95%
E. Coli	CVRWQCB	100 mL	MPN	Colilert® 18 by Idexx		95% CI	6 Hr - Cool, 4 °C in the dark	100 mL Polyethylene	95%
Organics in Water									
Total Organic Carbon	SFL	100 mL / 125 mL	mg/L, %	SM5310C	0.20	RPD<20%	28 days - Cool, 4 °C in the dark, H2SO4 to pH <2	250 mL Glass-Amber	95%

a. A YSI 6600 and a 600XLM Instrument is used to determine field EC, pH, Temp, DO, Turb.

b. A YSI 3200 Bench Top conductivity meter is used to determine lab EC.

c. Laboratory is determined through SWAMP - SJSU Master Contract

d. Samples analyzed as part of the Grassland Bypass Program and are set based on those Waste Discharge Requirements.

e. low range2-2400; mid range 20-2400; high range 200-240000; very high range 2000-2400000

*Carlson, R.M. 1978. Automated separation and conductimetric determination of ammonia and dissolved carbon dioxide. Analytical Chemistry 50:1528-1531.

*Carlson, R.M. 1986. Continuous flow reduction of nitrate to ammonia with granular zinc. Analytical Chemistry 58:1590-1591.

**Yu, Z., Northup, R.R. and Dahlgren, R.A. 1994. Determination of dissolved organic nitrogen using persulfate oxidation and conductimetric quantification of nitrate-nitrogen. Commun. Soil Sci. Plant Anal. 25:3161-3169.

*** low range 2-2400; mid range 20-24000; high range 200-240000; very high range 2000-2,400,000

SFL = Sierra Foothill Laboratory
Basic = Basic Laboratory
CVRWQCB = in house processing in the Central Valley Regional Water Quality Control Board laboratory