Appendix E

Calculations for Discharge Monitoring Reporting

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Acronyms:

lbs/day = Pounds per day

mg/L = Milligrams per liter

mgd = Million gallons per day

TSS: Total suspended solids

O&G: Oil and grease

BOD_5: Biochemical oxygen demand

SS: Settleable solids

Part A: Calculations for TSS, O&G, and BOD_5

Formulas Used:

Formula A: Calculate pollutant discharged in lbs/day

= (pollutant sample result in mg/L) x (volume of wastewater discharged on sample day in mgd) x (8.34 lbs/gal)

Example: Seafood is processed for 28 days in September. One time per week, wastewater is analyzed for TSS, O&G, and BOD_5. The operator is required to record the amount of wastewater discharged each day. Monitoring logs show the following data:

Example Data

Date	TSS (mg/L)	O&G (mg/L)	BOD_5 (mg/L)	Total Daily Flow (mgd)
Sept 6	244	142	2,490	0.043
Sept 14	183	95	914	0.050
Sept 20	175	88	2,630	0.041
Sept 28	110	113	2,740	0.035

A-I. Calculate the TSS, O&G, and BOD_5 discharged in lbs/day for each sampling day in September

Date	TSS (mg/L)	O&G (mg/L)	BOD_5 (mg/L)	Total Daily Flow (mgd)	Conversion Factor (lbs / gal)	TSS (lbs/day)	O&G (lbs/day)	BOD_5 (lbs/day)
September 6	244	142	2,490	0.043	8.34	87.5	50.9	893
September 14	183	95	914	0.050	8.34	76.3	39.6	381.1
September 20	175	88	2,630	0.041	8.34	59.8	30.1	899.3
September 28	110	113	2,740	0.035	8.34	32.1	33	799.8

Using Formula A:

= (pollutant sample result in mg/L) x (volume of wastewater discharged on sample day in mgd) x (8.34 lbs/gal)

TSS Example for **Sept. 6** = 244 mg/L TSS x 0.043 mgd x 8.34 lbs/gal = 87.5 lbs TSS/day

O&G Example for **Sept. 28** = 113 mg/L O&G x 0.035 mgd x 8.34 lbs/gal = 33 lbs O&G/day

BOD_5 Example for **Sept. 20** = 2,630 mg/L BOD_5 x 0.041 mgd x 8.34 lbs/gal = 899.3 lbs BOD_5/day

Part B: Calculations for SS

Formulas Used:

Formula A: Calculate SS discharged in lbs/day for each sampling day

= (Imhoff cone SS result (mL/L)) x (SS conversion factor (g/mL)) x (3.785 L/gallon) x (volume of wastewater discharged on sample day in gallons per day) x (1 lb / 454 g)

Formula B: Calculate the 'daily average by month' SS discharge in lbs/day

= (sample date 1 lbs/day + sample date 2 lbs/day + sample date 3 lbs/day + … sample date n lbs/day) / (n)

Formula C: Calculate the monthly total SS discharge in lbs

= (SS daily average by month in lbs/day) x (number of seafood processing days that month)

Formula D: Calculate the year-to-date total SS discharge in lbs

= (month 1 SS monthly total lbs + month 2 SS monthly total lbs + … month m SS monthly total lbs)

Note: n = the total number of samples taken during the month
m = the total number of months (including the current reporting month) elapsed in the year to date

Example: Seafood is processed in January and February. One time per week, wastewater is analyzed for SS. The operator is required to record the amount of wastewater discharged each day. Monitoring logs show the following data:

Example Data

Date	SS (mL/L)	Total Daily Flow (gallons/day)
Jan 3 - 9	No sample taken	No processing Jan 3 – 9
Jan 11	0.1666	684,000
Jan 19	0.3333	416,000
Jan 25	0.4333	1,459,000
Feb 1	0.7333	1,929,000
Feb 9	0.2333	983,000
Feb 15	0.4666	1,838,000
Feb 22	0.3666	1,692,000

B-I. Calculate the SS discharged in lbs/day for each sampling day

Date	SS (mL/L)	Total Daily Flow (gallons/day)	SS (lbs/day)	SS (lbs/month)
No processing Jan 3 - 9	--	--	--	--
Jan 11	0.1666	684,000	1,074	
Jan 19	0.3333	416,000	1,306	
Jan 25	0.4333	1,459,000	5,956	
Jan. Ave.			**2,778**	
				52,791
Feb 1	0.7333	1,929,000	13,326	
Feb 9	0.2333	983,000	2,161	
Feb 15	0.4666	1,838,000	8,079	
Feb 22	0.3666	1,692,000	5,844	
Feb. Ave.			**7,352**	
				198,515

Using Formula A (Assumed conversion factor for example calculations = 1.13 g/mL):
SS lbs/day = (Imhoff cone SS result (mL/L)) x (SS conversion factor (g/mL)) x (3.785 L/gallon) x (volume of wastewater discharged on sample day in gallons per day) x (1 lb / 454 g)

January 11: (0.1666 mL/L) x (1.13 g/mL) x (3.785 L/gallon) x (684,000 gallons per day) x (1 lb / 454 g) = 1,074 lbs/day

February 1: (0.7333 mL/L) x (1.13 g/mL) x (3.785 L/gallon) x (1,929,000 gallons per day) x (1 lb / 454 g) = 13,326 lbs/day

B-II. Calculate the 'Daily Average by Month' SS discharge (lbs/day) for each month

Using Formula B (Note: n = the total number of samples taken during the month):
= (sample date 1 lbs/day + sample date 2 lbs/day + sample date 3 lbs/day + … sample date n lbs/day) / (n)

January: (1,074 lbs/day + 1,306 lbs/day + 5,956 lbs/day) / 3 = 2,778 lbs/day

February: (13,326 lbs/day + 2,161 lbs/day + 8,079 lbs/day + 5,844 lbs/day) / 4 = 7,352 lbs/day

B-III. Calculate the Monthly Total SS Discharge, in lbs

Using Formula C: (assume 19 processing days in January and 27 processing days in February)

= (SS daily average by month in lbs/day) x (number of seafood processing days that month)

January: (2,778 lbs) x (19) = 52,791 lbs

February: (7,352 lbs) x (27) = 198,515 lbs

B-IV. Calculate the year-to-date total SS discharge in lbs

Using Formula D:

= (month 1 SS monthly total lbs + month 2 SS monthly total lbs + … month m SS monthly total lbs)

(January monthly total lbs + February monthly total lbs) = 52,791 lbs + 198,515 lbs = 251,306 lbs