2017-6

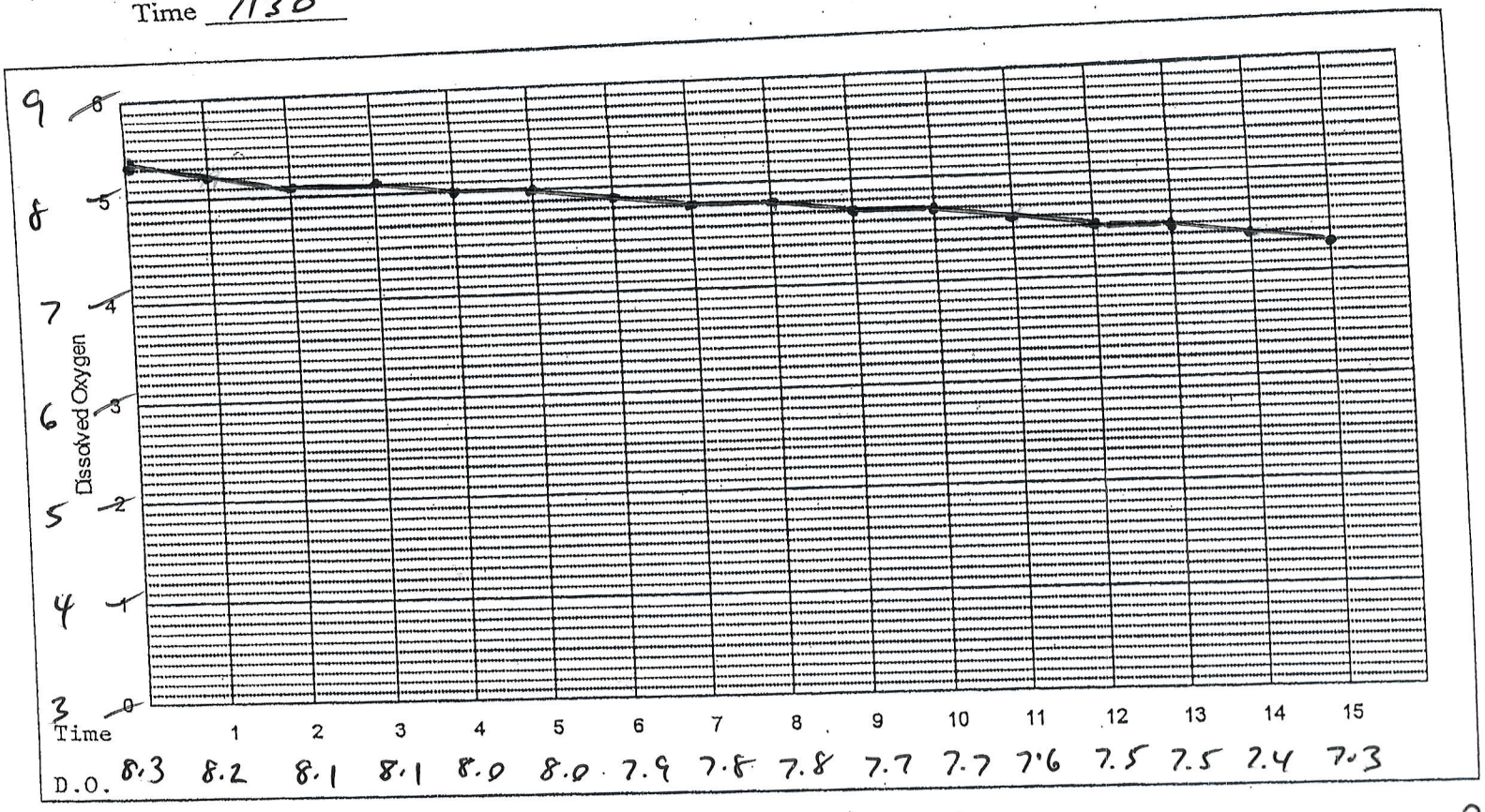
TB

Specific Oxygen Uptake Rate
SOUR

10-17-17

Date ~~10-16-17~~ Sample Location DIS #2 Temperature 21.6°C

Time 1130



Begin Temp 21.7° Average Temp 21.6°C End Temp 21.5°

Enter D.O. readings at each elapsed minute on the graph.
Graph the data and determine the time period where the slope is constant with a best fit line.
Use the first and last D.O. reading from this constant slope portion of the graph in the OUR formula.

Oxygen Uptake Rate (OUR) (S.M. 2710B)

$$\text{OUR mg } O_2\text{/L/hr} = \frac{\text{Begin Dissolved Oxygen - End Dissolved Oxygen}}{\text{Elapsed Time}} * 60$$

$$\text{OUR} = \frac{8.3 \text{ mg/L} - 7.3 \text{ mg/l}}{15 \text{ Minutes}} * 60 = 4 \text{ mg } O_2\text{/L/hr}$$

Specific Oxygen Uptake Rate (SOUR)

1. SOUR mg O_2/hr/g = $\frac{\text{OUR mg } O_2 \text{ /L/hr}}{\text{\% Total Solids} * 1000 \text{ g/L}}$

Note: enter total solids as a decimal, see S.M. 2540 G

SOUR = $\frac{4}{.014}$ mg O_2/L/hr * 1000 g/L = .286 mg O_2/hr/g

Temperature Adjustment

SOUR @ Average Temp * Adjustment, or correction factor = SOUR @ 20° C

.286 mg O_2/ hr/g @ 21.6 °C * .90 = .257 mg O_2/hr/g @ 20° C

Note: See adjustment formula and correction factors on the next page.

Brett Ward
Municipal Technical Advisory Service

Specific Oxygen Uptake Rate

Temperature Adjustment

SOUR is determined at the digester's ambient temperature and then adjusted as follows.

$$SOUR@20°C = SOUR\ @\ Ambient\ Temp. * A^{(20\text{-}Ambient\ temp.)}$$

Where A = 1.05 above 20°
= 1.07 below 20°
These factors are good between 10° C and 30° C

Simplified

SOUR @20° C = SOUR @ Ambient Temp. * Correction

$$Correction = A^{(20\text{-}Ambient\ Temp)}$$

Temp° C	Correction
10	1.97
11	1.84
12	1.72
13	1.60
14	1.50
15	1.40
16	1.31
17	1.22
18	1.14
19	1.07
20	1.00
21	0.95
22	0.90
23	0.86
24	0.82
25	0.78
26	0.75
27	0.71
28	0.68
29	0.64
30	0.61

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10-17-17

Sludge Total and Volatile Solids
Total Solids see S.M. 2540 G

Date 10-16-17 Sample Location Dig #2 Sampler TB
Time 1130
Test Time 1155

Weight of Dish	A =	45.7189
Weight of Dish and Wet Sludge	B=	69.3381
Weight of Wet Sludge	C=	23.6192
Weight after Drying	D=	46.041
Weight after Ignition	E=	NA

% Solids = (D-A) *100
(B-A)

%Total Solids = (46.041 - 45.7189) / (69.3381 - 45.7189) = (.3221) / (23.6192) = .014 *100 = 1.4

% Volatile = (D-E) * 100
(C-A)

% Volatile = (-) / (-) = ( ) / ( ) = * 100

Metric Tons = gallons * 8.34 * Total Solids as a decimal
2205