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# APPENDIX A

## GLOSSARY OF TERMS

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Conservative Behavior : There is no loss or gain of the constituents in solution during the estuarine mixing; they form most of salt in seawater (Boyle et al.,1974).

Drainage Area (Drainage Basin, Watershed, Catchment area) : The horizontal projection of the area whose surface directs water toward a stream above a specified point on that stream (Gary, McAfee and Wolf, 1977)

Flow Regime : A range of streamflows with similar bed forms, resistance to flow, and mode of sediment transport (Middleton,1965).

Flux : A measure of the rate of transfer of material from one geochemical reservoir to another and from one physical or chemical state to another is flux. The dimensions of the flux are $ML^{-2}T^{-1}$ or $MT^{-1}$, where M is a measure of quantity of material carried by the flux (not necessarily the mass), L is a linear dimension, and T is time (Lerman, 1978).

Hysteresis : A given flow level occuring in different parts of a storm hydrograph (e.g. rising or falling limbs) or in different seasons of

the year is associated with a varing chemical concentration (GESAMP,1987).

Net Flux : The rate of transport of material, derived from river discharge, in an offshore direction across defined marine boundaries in units of mass/time (GESAMP,1987).

Regime : (a) The existence in a stream channel of a balance or grade between erosion and deposition over a period of years.

(b) Condition of a stream with respect to the rate of its average flow as measured by the volumm of water passing different cross sections in a specified period of time (Gary et al.,1977).

Runoff : That part of precipitation appearing in surface streams. It is more restricted than steamflow as it does not include stream channels affected by artificial diversions, storage, or other works of man (Gary et al.,1977).

Specific Transport Rate : Load per unit drainage area obtained by multiplying the average content (in mg/l or ug/l) by the specific runoff of river (Alekin and Brazhnikova,1968; Meybeck,1979).

# APPENDIX B

## SUMMARY OF DATA

# APPENDIX B

## SUMMARY OF DATA

Table 13 The temporal variation of salinity (‰) at Pak Kret Station.

| | December 20,1987 | | | April 8,1988 | | |
|---|---|---|---|---|---|---|
| Time | S | M | B | S | M | B |
| 08.00 | 0.160 | 0.162 | 0.160 | 0.150 | 0.152 | 0.160 |
| 10.00 | 0.160 | 0.162 | 0.165 | 0.157 | 0.157 | 0.160 |
| 12.00 | 0.162 | 0.162 | 0.162 | 0.152 | 0.157 | 0.160 |
| 14.00 | 0.160 | 0.162 | 0.162 | 0.157 | 0.155 | 0.155 |
| 16.00 | 0.162 | 0.162 | 0.162 | 0.150 | 0.162 | 0.157 |
| 18.00 | 0.162 | 0.162 | 0.162 | 0.155 | 0.152 | 0.157 |
| 20.00 | 0.162 | 0.162 | 0.160 | 0.150 | 0.167 | 0.155 |
| 22.00 | 0.160 | 0.160 | 0.157 | 0.150 | 0.152 | 0.162 |
| 24.00 | 0.160 | 0.157 | 0.160 | 0.152 | 0.155 | 0.155 |
| 02.00 | 0.162 | 0.162 | 0.162 | 0.150 | 0.155 | 0.167 |
| 04.00 | 0.162 | 0.162 | 0.162 | 0.160 | 0.167 | 0.167 |
| 06.00 | 0.160 | 0.162 | 0.157 | 0.152 | 0.152 | 0.167 |
| 08.00 | 0.157 | 0.160 | 0.160 | 0.150 | 0.155 | 0.157 |

Table 14 The temporal variation of surface salinity (‰) at Bang Sai Station.

| Time | Mar.25,88 | Apr.8,88 | Apr.22,88 |
|---|---|---|---|
| 08.00 | 0.138 | 0.140 | 0.162 |
| 10.00 | 0.128 | 0.152 | |
| 12.00 | 0.133 | 0.150 | 0.152 |
| 14.00 | 0.130 | 0.152 | |
| 16.00 | 0.138 | 0.150 | 0.160 |
| 18.00 | 0.133 | 0.150 | |
| 20.00 | 0.123 | 0.150 | 0.150 |
| 22.00 | 0.132 | 0.147 | |
| 24.00 | 0.133 | 0.150 | 0.157 |
| 02.00 | 0.128 | 0.140 | |
| 04.00 | 0.128 | 0.147 | 0.155 |
| 06.00 | 0.133 | 0.140 | |
| 08.00 | 0.129 | 0.142 | 0.157 |

Table 15 Summary of daily mean fluxes of discharge ( $m^3$/sec ) and in the unit of t/day of suspended sediment , phosphate-P, total-P, particulate-P, and silicate through the Pak Kret Transect during December 6,1987 to May 6,1988.
Positive (+) flux is export, negative (-) flux represents import.

| Date | Discharge | | | Suspended Sediment | | | Phosphate-P | | | Total-P | | | Particulate-P | | | Silicate | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ebb | Flood | Net | Ebb | Flood | Net | Ebb | Flood | Net | Ebb | Flood | Net | Ebb | Flood | Net | Ebb | Flood | Net |
| Dec.06,87 | 746.52 | -137.66 | 608.86 | 1641.25 | -408.05 | 1233.20 | 1.66 | -0.44 | 1.22 | 2.30 | -0.54 | 1.76 | 0.64 | -0.10 | 0.54 | 387.39 | -78.61 | 308.78 |
| Dec.20,87 | 880.66 | -149.59 | 731.07 | 1170.57 | -245.85 | 924.72 | 0.82 | -0.18 | 0.64 | 1.84 | -0.44 | 1.40 | 1.02 | -0.26 | 0.76 | 344.36 | -68.19 | 276.17 |
| Jan.05,88 | 619.52 | -309.21 | 310.31 | 993.64 | -536.55 | 457.09 | 0.53 | -0.28 | 0.25 | 2.38 | -1.03 | 1.35 | 1.85 | -0.75 | 1.10 | 256.55 | -61.98 | 194.57 |
| Jan.19,88 | 393.89 | -333.02 | 60.87 | 861.82 | -615.85 | 245.97 | 0.37 | -0.35 | 0.02 | 2.51 | -2.18 | 0.33 | 2.14 | -1.84 | 0.30 | 188.39 | -204.36 | -15.97 |
| Mar.13,88 | 448.84 | -429.29 | 19.55 | 2972.13 | -3030.63 | -58.50 | 2.23 | -2.78 | -0.55 | 5.76 | -6.40 | -0.64 | 3.57 | -3.74 | -0.17 | 135.43 | -187.10 | -51.67 |
| Mar.25,88 | 464.32 | -359.15 | 105.17 | 3320.72 | -2355.66 | 965.06 | 2.24 | -1.70 | 0.54 | 4.32 | -3.70 | 0.62 | 2.09 | -2.00 | 0.09 | 199.46 | -180.90 | 18.56 |
| Apr.08,88 | 404.43 | -438.04 | -33.61 | 4161.94 | -5900.40 | -1738.46 | 2.41 | -3.16 | -0.75 | 6.46 | -7.65 | -1.19 | 4.07 | -4.35 | -0.28 | 141.75 | -154.03 | -12.28 |
| Apr.22,88 | 432.35 | -159.22 | 273.13 | 4004.42 | -1984.51 | 2019.91 | 1.85 | -0.87 | 0.98 | 5.80 | -2.91 | 2.89 | 3.88 | -2.06 | 1.82 | 118.57 | -36.37 | 82.20 |
| May.06,88 | 456.220 | -392.910 | 63.310 | 3076.85 | -3052.63 | 24.22 | 2.12 | -1.81 | 0.31 | 5.23 | -5.69 | -0.46 | 3.10 | -3.87 | -0.77 | 149.63 | -117.13 | 32.50 |

Table 16 Summary of daily mean fluxes of discharge ( $m^3$/sec ) and in the unit of t/day of suspended sediment, phosphate-P, total-P, particulate-P, and silicate through the Bang Sai Transect during March 25,1988 to April 22,1988.
Positive (+) flux is export, negative (-) flux represents import.

| Date | Discharge | | | Suspended Sediment | | | Phosphate-P | | | Total-P | | | Particulate-P | | | Silicate | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ebb | Flood | Net | Ebb | Flood | Net | Ebb | Flood | Net | Ebb | Flood | Net | Ebb | Flood | Net | Ebb | Flood | Net |
| Mar.25,88 | 279.11 | -133.17 | 145.94 | 3837.16 | -1970.05 | 1867.11 | 1.910 | -0.900 | 1.010 | 6.880 | -3.620 | 3.260 | 4.970 | -2.710 | 2.260 | 116.79 | -39.91 | 76.88 |
| Apr.08,88 | 211.84 | -173.82 | 38.02 | 2176.50 | -1651.18 | 525.32 | 0.660 | -0.570 | 0.090 | 3.150 | -2.670 | 0.480 | 2.490 | -2.110 | 0.380 | 116.83 | -70.54 | 46.29 |
| Apr.22,88 | 277.60 | -169.71 | 107.89 | 1564.6 | -923.41 | 641.19 | 1.040 | -0.597 | 0.443 | 2.030 | -1.200 | 0.830 | 0.991 | -0.605 | 0.386 | 44.960 | -35.320 | 9.640 |

Table 17 Monthly mean fluxes of suspended sediment (SS), phosphate-P, total-P, particulate-P and silicate ,in unit of g/sec, through the Pak Kret Transect in the Chao Phraya River during December 1987 to December 1988.
** No observation in February 1988.

| Month | SS.(x $10^3$ g/sec ) | Phosphate-P | Total-P | Particulate-P | Silicate |
|---|---|---|---|---|---|
| Dec. 87 | 8.52 | 8.30 | 13.46 | 5.16 | 2249.76 |
| Jan. 88 | 4.51 | 2.43 | 11.96 | 9.53 | 1080.58 |
| Feb. 88 | ** | ** | ** | ** | ** |
| Mar. 88 | 15.18 | 11.99 | 26.45 | 14.46 | 932.90 |
| Apr. 88 | 18.32 | 10.23 | 26.14 | 15.91 | 512.94 |
| May. 88 | 22.89 | 17.01 | 42.15 | 25.05 | 1034.80 |
| June 88 | 34.09 | 22.88 | 55.70 | 32.83 | 2246.16 |
| July 88 | 29.83 | 21.85 | 58.94 | 37.09 | 2193.64 |
| Aug. 88 | 30.83 | 12.91 | 63.75 | 50.84 | 2204.16 |
| Sep. 88 | 141.90 | 37.20 | 260.43 | 223.22 | 1880.96 |
| Oct. 88 | 249.43 | 61.60 | 508.98 | 447.37 | 3568.78 |
| Nov. 88 | 26.20 | 20.57 | 79.05 | 58.48 | 5672.96 |
| Dec. 88 | 10.09 | 13.30 | 36.12 | 22.82 | 2696.89 |

Table 18 Summary of material concentrations collected on December 6-7,1987 at Pak Kret Station.

| Time | Suspended Sed. (mg/l) | | | Phosphate-P (μmole/l) | | | Total - P ( μmole/l) | | | Particulate-P(μmole/l) | | | Silicate (μmole/l) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | S | M | B | S | M | B | S | M | B | S | M | B | S | M | B |
| 08.00 | 58 | 16 | 40 | 1.22 | 0.89 | 1.02 | 1.59 | 1.08 | 1.23 | 0.37 | 0.19 | 0.21 | 211 | 213 | 210 |
| 10.00 | 16 | 17 | 41 | 1.02 | 0.98 | 1.22 | 1.13 | 1.30 | 1.51 | 0.11 | 0.32 | 0.29 | 205 | 213 | 215 |
| 12.00 | 29 | 27 | 19 | 0.92 | 1.08 | 1.17 | 1.04 | 1.18 | 1.27 | 0.12 | 0.10 | 0.10 | 199 | 200 | 210 |
| 14.00 | 19 | 19 | 45 | 0.92 | 0.92 | 0.92 | 1.12 | 1.15 | 1.10 | 0.20 | 0.23 | 0.18 | 205 | 200 | 173 |
| 16.00 | 15 | 14 | 14 | 0.74 | 0.92 | 0.89 | 0.96 | 1.00 | 1.15 | 0.22 | 0.08 | 0.26 | 202 | 210 | 215 |
| 18.00 | 19 | 19 | 17 | 0.92 | 1.08 | 1.12 | 1.08 | 1.19 | 1.29 | 0.16 | 0.11 | 0.17 | 426 | 265 | 227 |
| 20.00 | 24 | 15 | 9 | 0.60 | 1.08 | 1.08 | 1.16 | 1.30 | 1.24 | 0.56 | 0.22 | 0.16 | 210 | 200 | 202 |
| 22.00 | 41 | 8 | 13 | 0.89 | 0.89 | 0.84 | 1.06 | 1.54 | 1.22 | 0.17 | 0.65 | 0.38 | 193 | 213 | 178 |
| 24.00 | 28 | 54 | 47 | 1.17 | 0.89 | 0.92 | 1.23 | 1.19 | 1.25 | 0.06 | 0.30 | 0.33 | 250 | 240 | 440 |
| 02.00 | 33 | 30 | 21 | 1.02 | 0.84 | 0.89 | 1.15 | 1.35 | 1.54 | 0.13 | 0.51 | 0.65 | 228 | 215 | 192 |
| 04.00 | 34 | 17 | 35 | 0.68 | 0.74 | 0.78 | 0.94 | 1.49 | 1.60 | 0.26 | 0.75 | 0.82 | 230 | 205 | 200 |
| 06.00 | 22 | 17 | 44 | 0.89 | 0.68 | 0.64 | 1.00 | 1.01 | 0.79 | 0.11 | 0.33 | 0.15 | 200 | 199 | 183 |
| 08.00 | 29 | 25 | 38 | 0.74 | 0.84 | 0.74 | 2.42 | 1.22 | 0.96 | 1.68 | 0.38 | 0.22 | 210 | 202 | 190 |
| Max. | 58 | 54 | 47 | 1.22 | 1.08 | 1.22 | 2.42 | 1.54 | 1.60 | 1.68 | 0.75 | 0.82 | 426 | 265 | 440 |
| Min. | 15 | 8 | 9 | 0.60 | 0.68 | 0.64 | 0.94 | 1.00 | 0.79 | 0.06 | 0.08 | 0.10 | 193 | 199 | 173 |
| Average | 28 | 21 | 29 | 0.90 | 0.91 | 0.94 | 1.22 | 1.23 | 1.24 | 0.32 | 0.32 | 0.30 | 228 | 213 | 218 |
| SD. | 11.3 | 10.9 | 13.5 | 0.17 | 0.12 | 0.17 | 0.38 | 0.16 | 0.22 | 0.41 | 0.20 | 0.20 | 59.0 | 18.3 | 65.9 |

Table 19 Summary of material concentrations collected on December 20-21,1987 at Pak Kret Station.

| Time | Suspended Sed. (mg/l) | | | Phosphate-P (μmole/l) | | | Total - P ( μmole/l) | | | Particulate-P(μmole/l) | | | Silicate (μmole/l) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | S | M | B | S | M | B | S | M | B | S | M | B | S | M | B |
| 08.00 | 12 | 8 | 13 | 0.60 | 0.20 | 0.28 | 0.86 | 1.35 | 0.50 | 0.26 | 1.15 | 0.32 | 191 | 181 | 178 |
| 10.00 | 16 | 3 | 16 | 0.52 | 0.32 | 0.60 | 0.96 | 1.22 | 1.07 | 0.44 | 0.90 | 0.47 | 165 | 188 | 213 |
| 12.00 | 3 | 11 | 3 | 0.68 | 0.36 | 0.36 | 1.01 | 0.55 | 0.65 | 0.33 | 0.19 | 0.29 | 175 | 203 | 202 |
| 14.00 | 9 | 7 | 4 | 0.35 | 0.35 | 0.33 | 0.93 | 0.83 | 0.81 | 0.58 | 0.48 | 0.48 | 183 | 201 | 187 |
| 16.00 | 12 | 9 | 9 | 0.64 | 0.28 | 0.24 | 0.89 | 0.65 | 0.91 | 0.25 | 0.37 | 0.67 | 181 | 182 | 163 |
| 18.00 | 16 | 12 | 14 | 0.36 | 0.44 | 0.48 | 0.53 | 0.74 | 1.03 | 0.17 | 0.30 | 0.55 | 135 | 110 | 189 |
| 20.00 | 5 | 20 | 22 | 0.20 | 0.36 | 0.28 | 0.62 | 0.72 | 0.72 | 0.42 | 0.36 | 0.44 | 199 | 183 | 184 |
| 22.00 | 17 | 26 | 27 | 0.76 | 0.36 | 0.28 | 0.91 | 0.86 | 0.82 | 0.15 | 0.50 | 0.54 | 188 | 184 | 191 |
| 24.00 | 18 | 7 | 39 | 0.32 | 0.64 | 0.24 | 1.15 | 1.27 | 0.77 | 0.83 | 0.63 | 0.53 | 179 | 190 | 199 |
| 02.00 | 19 | 21 | 23 | 0.40 | 0.36 | 0.28 | 0.67 | 0.94 | 1.26 | 0.27 | 0.58 | 0.98 | 158 | 183 | 190 |
| 04.00 | 19 | 20 | 21 | 0.32 | 0.12 | 0.60 | 0.74 | 0.84 | 0.79 | 0.42 | 0.72 | 0.19 | 193 | 172 | 113 |
| 06.00 | 21 | 16 | 14 | 0.36 | 0.36 | 0.28 | 0.99 | 1.03 | 1.03 | 0.63 | 0.67 | 0.75 | 197 | 96 | 208 |
| 08.00 | 36 | 24 | 46 | 0.24 | 0.60 | 0.64 | 1.26 | 0.65 | 1.42 | 1.02 | 0.05 | 0.78 | 138 | 121 | 183 |
| Max. | 36 | 26 | 46 | 0.76 | 0.64 | 0.64 | 1.26 | 1.35 | 1.42 | 1.02 | 1.15 | 0.98 | 199 | 203 | 213 |
| Min. | 3 | 3 | 3 | 0.20 | 0.12 | 0.24 | 0.53 | 0.55 | 0.60 | 0.15 | 0.05 | 0.19 | 135 | 96 | 113 |
| Average | 16 | 14 | 19 | 0.44 | 0.37 | 0.38 | 0.89 | 0.90 | 0.91 | 0.44 | 0.53 | 0.54 | 176 | 169 | 185 |
| SD. | 7.9 | 7.1 | 12.1 | 0.17 | 0.13 | 0.14 | 0.20 | 0.24 | 0.23 | 0.25 | 0.28 | 0.21 | 20.2 | 34.0 | 24.2 |

S = Surface ; M = Middepth ; B = Bottom

Table 20 Summary of material concentrations collected on January 5-6,1988 at Pak Kret Station.

| Time | Suspended Sed. (mg/l) | | | Phosphate-P (μmole/l) | | | Total - P ( μmole/l) | | | Particulate-P(μmole/l) | | | Silicate ( μmole/l) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | S | M | B | S | M | B | S | M | B | S | M | B | S | M | B |
| 08.00 | 20 | 32 | 18 | 0.35 | 0.43 | 0.26 | 1.06 | 1.15 | 1.08 | 0.71 | 0.72 | 0.82 | 178 | 153 | 194 |
| 10.00 | 36 | 36 | 42 | 0.43 | 0.31 | 1.23 | 2.33 | 2.25 | 2.88 | 1.90 | 1.94 | 1.65 | 77 | 102 | 59 |
| 12.00 | 18 | 10 | 45 | 0.40 | 0.40 | 0.62 | 1.32 | 1.08 | 1.10 | 0.92 | 0.68 | 0.48 | 178 | 166 | 129 |
| 14.00 | 13 | 17 | 16 | 0.53 | 0.53 | 0.53 | 1.08 | 2.09 | 1.21 | 0.55 | 1.56 | 0.68 | 184 | 118 | 199 |
| 16.00 | 10 | 12 | 13 | 0.53 | 0.75 | 0.47 | 1.03 | 2.09 | 0.92 | 0.50 | 1.34 | 0.45 | 190 | 230 | 201 |
| 18.00 | 16 | 19 | 14 | 0.35 | 0.31 | 0.40 | 1.82 | 0.90 | 0.92 | 1.47 | 0.59 | 0.52 | 177 | 101 | 230 |
| 20.00 | 6 | 19 | 6 | 0.50 | 0.25 | 0.40 | 0.84 | 0.95 | 1.54 | 0.34 | 0.70 | 1.14 | 192 | 243 | 202 |
| 22.00 | 16 | 13 | 22 | 0.32 | 0.43 | 0.25 | 1.38 | 1.54 | 2.21 | 1.06 | 1.11 | 1.96 | 220 | 238 | 176 |
| 24.00 | 44 | 20 | 30 | 0.22 | 0.40 | 0.13 | 1.94 | 1.62 | 0.95 | 1.72 | 1.22 | 0.82 | 172 | 223 | 161 |
| 02.00 | 13 | 43 | 3 | 0.54 | 0.25 | 0.18 | 0.99 | 1.92 | 3.12 | 0.45 | 1.67 | 2.94 | 170 | 136 | 158 |
| 04.00 | 35 | 15 | 23 | 0.47 | 0.68 | 0.09 | 1.23 | 1.98 | 1.66 | 0.76 | 1.30 | 1.57 | 150 | 235 | 231 |
| 06.00 | 21 | 23 | 32 | 0.40 | 0.47 | 0.35 | 1.74 | 1.26 | 1.90 | 1.34 | 0.79 | 1.55 | 137 | 140 | 100 |
| 08.00 | | 13 | 31 | 0.47 | 0.43 | 0.43 | 0.77 | 1.58 | 1.66 | 0.30 | 1.15 | 1.23 | 207 | 158 | 92 |
| Max. | 44 | 43 | 45 | 0.54 | 0.75 | 1.23 | 2.33 | 2.25 | 3.12 | 1.90 | 1.94 | 2.94 | 220 | 243 | 231 |
| Min. | 6 | 10 | 3 | 0.22 | 0.25 | 0.09 | 0.77 | 0.90 | 0.92 | 0.30 | 0.59 | 0.45 | 77 | 101 | 59 |
| Average | 21 | 21 | 25 | 0.42 | 0.43 | 0.41 | 1.35 | 1.57 | 1.63 | 0.92 | 1.14 | 1.22 | 172 | 173 | 154 |
| SD. | 11.1 | 9.7 | 12.3 | 0.09 | 0.14 | 0.28 | 0.45 | 0.45 | 0.70 | 0.51 | 0.41 | 0.69 | 34.2 | 52.0 | 52.3 |

Table 21 Summary of material concentrations collected on January 19-20,1988 at Pak Kret Station.

| Time | Suspended Sed. (mg/l) | | | Phosphate-P (μmole/l) | | | Total - P ( μmole/l) | | | Particulate-P(μmole/l) | | | Silicate ( μmole/l) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | S | M | B | S | M | B | S | M | B | S | M | B | S | M | B |
| 08.00 | 17 | 14 | 6 | 0.41 | 0.22 | 0.37 | 1.98 | 2.54 | 1.93 | 1.57 | 2.32 | 1.56 | 190 | 235 | 254 |
| 10.00 | 10 | 36 | 13 | 0.30 | 0.67 | 0.52 | 2.26 | 2.16 | 2.31 | 1.96 | 1.49 | 1.79 | 271 | 256 | 285 |
| 12.00 | 24 | 29 | 20 | 0.52 | 0.30 | 0.30 | 2.21 | 2.64 | 2.87 | 1.69 | 2.34 | 2.57 | 234 | 204 | 253 |
| 14.00 | 27 | 27 | 15 | 0.37 | 0.33 | 0.30 | 2.63 | 2.31 | 2.02 | 2.26 | 1.98 | 1.72 | 276 | 259 | 190 |
| 16.00 | 22 | 19 | 19 | 0.48 | 0.30 | 0.30 | 2.26 | 1.98 | 1.98 | 1.78 | 1.68 | 1.68 | 226 | 203 | 250 |
| 18.00 | 20 | 22 | 22 | 0.70 | 0.41 | 0.52 | 2.02 | 1.84 | 1.65 | 1.32 | 1.43 | 1.13 | 228 | 189 | 198 |
| 20.00 | 18 | 12 | 28 | 0.22 | 0.67 | 0.22 | 2.31 | 1.51 | 2.64 | 2.09 | 0.84 | 2.42 | 226 | 249 | 261 |
| 22.00 | 23 | 12 | 60 | 0.33 | 0.48 | 0.59 | 2.12 | 2.02 | 3.72 | 1.79 | 1.54 | 3.13 | 273 | 240 | 223 |
| 24.00 | 27 | 44 | 47 | 0.30 | 0.63 | 0.26 | 2.26 | 2.96 | 3.34 | 1.96 | 2.33 | 3.08 | 211 | 195 | 211 |
| 02.00 | 26 | 29 | 43 | 0.22 | 0.44 | 0.37 | 1.93 | 2.49 | 2.73 | 1.71 | 2.05 | 2.36 | 186 | 178 | 140 |
| 04.00 | 20 | 16 | 36 | 0.48 | 0.19 | 0.22 | 3.76 | 2.35 | 5.36 | 3.28 | 2.16 | 5.14 | 198 | 274 | 236 |
| 06.00 | 18 | 26 | 12 | 0.37 | 0.33 | 0.22 | 2.31 | 2.68 | 1.98 | 1.94 | 2.35 | 1.76 | 240 | 190 | 149 |
| 08.00 | 33 | 17 | 22 | 0.30 | 0.30 | 0.22 | 2.59 | 2.02 | 1.88 | 2.29 | 1.72 | 1.66 | 210 | 271 | 189 |
| Max. | 33 | 44 | 60 | 0.70 | 0.67 | 0.59 | 3.76 | 2.96 | 5.36 | 3.28 | 2.35 | 5.14 | 276 | 274 | 285 |
| Min. | 10 | 12 | 6 | 0.22 | 0.19 | 0.22 | 1.93 | 1.51 | 1.65 | 1.32 | 0.84 | 1.13 | 186 | 178 | 140 |
| Average | 24 | 25 | 29 | 0.38 | 0.41 | 0.34 | 2.36 | 2.27 | 2.65 | 1.97 | 1.86 | 2.31 | 228 | 226 | 218 |
| SD. | 5.6 | 9.3 | 15.2 | 0.13 | 0.16 | 0.12 | 0.45 | 0.38 | 0.98 | 0.46 | 0.44 | 1.00 | 29.2 | 32.9 | 42.2 |

S = Surface ; M = Middepth ; B = Botton

Table 22 Summary of material concentrations collected on March 13-14,1988 at Pak Kret Station.

| Time | Suspended Sed. (mg/l) | | | Phosphate-P (μmole/l) | | | Total - P ( μmole/l) | | | Particulate-P(μmole/l) | | | Silicate ( μmole/l) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | S | M | B | S | M | B | S | M | B | S | M | B | S | M | B |
| 08.00 | | 43 | 42 | 2.21 | 2.11 | 1.90 | 4.14 | 3.13 | 8.65 | 1.93 | 1.02 | 6.75 | | 272 | 279 |
| 10.00 | 40 | 62 | | 2.48 | 2.00 | 2.74 | 3.22 | 3.31 | 6.03 | 0.74 | 1.31 | 3.29 | 283 | 104 | |
| 12.00 | 57 | 64 | 42 | 2.32 | 2.27 | 2.53 | 4.09 | 4.14 | 4.19 | 1.77 | 1.87 | 1.66 | 147 | 58 | 165 |
| 14.00 | 64 | 88 | 47 | 2.48 | 2.37 | 2.10 | 4.55 | 3.45 | 4.32 | 2.07 | 1.08 | 2.22 | 94 | 95 | 154 |
| 16.00 | 76 | 82 | 64 | 3.40 | 2.27 | 2.06 | 4.69 | 5.38 | 4.60 | 1.29 | 3.11 | 2.54 | 88 | 123 | 111 |
| 18.00 | 67 | 91 | 109 | 2.21 | 2.00 | 1.25 | | 6.40 | 6.76 | | 4.40 | 5.51 | 90 | 147 | 97 |
| 20.00 | 67 | 102 | 82 | 2.06 | 1.90 | 2.43 | 4.29 | 3.95 | 6.03 | 2.23 | 2.05 | 3.60 | 214 | 168 | 192 |
| 22.00 | 123 | 118 | 75 | 1.95 | 1.15 | 1.95 | 6.21 | 6.07 | 5.94 | 4.26 | 4.92 | 3.99 | 143 | 164 | 249 |
| 24.00 | 100 | 114 | 118 | 1.10 | 2.11 | 1.79 | 6.81 | 4.60 | 7.13 | 5.71 | 2.49 | 5.34 | 105 | 116 | 66 |
| 02.00 | 90 | 104 | 88 | 1.79 | 2.06 | 1.20 | 5.57 | | | 3.78 | | | 192 | 190 | |
| 04.00 | 105 | 100 | 100 | 3.85 | 1.95 | 2.35 | 5.94 | 3.91 | 5.75 | 2.09 | 1.96 | 3.40 | 151 | 129 | 100 |
| 06.00 | 79 | | 92 | 2.32 | | | 5.43 | 3.54 | 5.43 | 3.11 | | | 131 | | 62 |
| 08.00 | 66 | 64 | 87 | 2.11 | 1.90 | 1.95 | 5.01 | 5.98 | 5.47 | 2.90 | 4.08 | 3.52 | 174 | 209 | 105 |
| Max. | 123 | 118 | 118 | 3.85 | 2.37 | 2.74 | 6.81 | 6.40 | 8.65 | 5.71 | 4.92 | 6.75 | 283 | 272 | 279 |
| Min. | 40 | 43 | 42 | 1.10 | 1.15 | 1.20 | 3.22 | 3.13 | 4.19 | 0.74 | 1.02 | 1.66 | 88 | 58 | 62 |
| Average | 99 | 86 | 79 | 2.33 | 2.01 | 2.02 | 5.00 | 4.49 | 5.86 | 2.66 | 2.57 | 3.80 | 151 | 148 | 144 |
| SD. | 22.1 | 22.4 | 24.5 | 0.66 | 0.30 | 0.45 | 0.99 | 1.12 | 1.20 | 1.33 | 1.31 | 1.45 | 55.6 | 55.1 | 68.5 |

Table 23 Summary of material concentrations collected on March 25-26,1988 at Pak Kret Station.

| Time | Suspended Sed. (mg/l) | | | Phosphate-P (μmole/l) | | | Total - P ( μmole/l) | | | Particulate-P(μmole/l) | | | Silicate ( μmole/l) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | S | M | B | S | M | B | S | M | B | S | M | B | S | M | B |
| 08.00 | 85 | 70 | 60 | 2.30 | 2.25 | 2.25 | 3.10 | 3.19 | 3.18 | 0.80 | 0.94 | 0.93 | 223 | 179 | 339 |
| 10.00 | 74 | 66 | 52 | 2.25 | 2.00 | 1.95 | 3.73 | 3.19 | 2.76 | 1.48 | 1.19 | 0.81 | 158 | 164 | 209 |
| 12.00 | 64 | 72 | 82 | 2.40 | 2.45 | 2.40 | 3.99 | 3.73 | 3.63 | 1.59 | 1.28 | 1.23 | 296 | 106 | 261 |
| 14.00 | 80 | 70 | 75 | 2.10 | 2.20 | 2.40 | 3.60 | 3.58 | 3.87 | 1.50 | 1.38 | 1.47 | 230 | 206 | 133 |
| 16.00 | | 95 | 89 | 2.65 | 2.15 | 1.90 | 4.68 | 3.73 | 4.20 | 2.03 | 1.58 | 2.30 | | 162 | 234 |
| 18.00 | 98 | 86 | 65 | 1.80 | 1.60 | 1.80 | 4.29 | 3.19 | 3.90 | 2.49 | 1.59 | 2.10 | 213 | 234 | 203 |
| 20.00 | 135 | | 143 | 1.85 | 1.70 | 1.45 | 3.29 | 3.92 | 4.55 | 1.44 | 2.22 | 3.10 | 281 | | 66 |
| 22.00 | 110 | 137 | 76 | 2.10 | 1.50 | 1.65 | 5.75 | 3.97 | 3.39 | 3.65 | 2.47 | 1.74 | 195 | 217 | 164 |
| 24.00 | 109 | 53 | 55 | 1.70 | 1.45 | 0.85 | 3.24 | 3.49 | 3.78 | 1.54 | 2.04 | 2.93 | 183 | 277 | 249 |
| 02.00 | 76 | 81 | 95 | 1.85 | 2.10 | 1.85 | 4.50 | 4.55 | 3.58 | 2.65 | 2.45 | 1.73 | 245 | 273 | |
| 04.00 | 84 | 105 | 127 | 2.50 | 1.75 | 2.00 | 4.43 | 3.68 | 4.84 | 1.93 | 1.93 | 2.84 | 356 | 148 | 135 |
| 06.00 | 47 | 81 | 92 | 3.50 | | 1.65 | 5.70 | | 4.26 | 3.20 | | 2.61 | 239 | 221 | 165 |
| 08.00 | 58 | 80 | | 2.90 | 2.70 | | 4.92 | 5.65 | 5.40 | 2.02 | 2.95 | | 182 | 155 | |
| Max. | 135 | 137 | 143 | 2.90 | 2.70 | 2.40 | 5.75 | 5.65 | 5.40 | 3.65 | 2.95 | 3.10 | 356 | 277 | 339 |
| Min. | 47 | 53 | 52 | 1.70 | 1.45 | 0.85 | 3.10 | 3.19 | 2.76 | 0.80 | 0.94 | 0.81 | 158 | 106 | 66 |
| Average | 85 | 83 | 84 | 2.22 | 1.99 | 1.85 | 4.25 | 3.82 | 3.95 | 2.02 | 1.84 | 1.98 | 233 | 195 | 196 |
| SD. | 23.7 | 20.9 | 26.6 | 0.35 | 0.38 | 0.41 | 0.84 | 0.67 | 0.68 | 0.76 | 0.58 | 0.75 | 53.4 | 49.7 | 71.2 |

S = Surface ; M = Middepth ; B = Bottom

Table 24 Summary of material concentrations collected on April 8-9,1988 at Pak Kret Station.

| Time | Suspended Sed. (mg/l) | | | Phosphate-P (nmole/l) | | | Total - P (nmole/l) | | | Particulate-P(nmole/l) | | | Silicate (nmole/l) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | S | M | B | S | M | B | S | M | B | S | M | B | S | M | B |
| 08.00 | 67 | 130 | 120 | 2.80 | 3.25 | 2.80 | 6.70 | 7.40 | 4.30 | 3.90 | 4.15 | 1.50 | 336 | 45 | 75 |
| 10.00 | 110 | 145 | 137 | 3.05 | 2.90 | | 5.20 | 6.60 | 6.00 | 2.15 | 3.70 | 6.00 | 138 | 49 | 84 |
| 12.00 | 120 | 126 | 119 | 2.75 | 3.00 | 2.60 | 7.20 | 4.80 | 6.30 | 4.45 | 1.80 | 3.70 | 179 | 58 | 111 |
| 14.00 | 127 | 94 | 61 | 2.05 | 2.25 | 1.85 | 6.60 | 4.00 | 7.20 | 4.55 | 1.75 | 5.35 | 78 | 173 | |
| 16.00 | 147 | 85 | 98 | 2.25 | 2.75 | 2.90 | 6.00 | 5.70 | 4.90 | 3.75 | 2.95 | 2.00 | 81 | 234 | 245 |
| 18.00 | 164 | | 173 | 2.60 | 2.70 | 1.15 | 5.20 | 10.60 | 5.30 | 2.60 | 7.90 | 5.15 | 170 | | 104 |
| 20.00 | 170 | | 124 | | 1.75 | 2.20 | 4.40 | 5.80 | 4.80 | | 4.05 | 2.60 | 141 | | 302 |
| 22.00 | 190 | | 122 | 2.35 | 2.05 | 2.05 | 6.20 | 5.40 | 6.40 | 3.85 | 3.35 | 4.35 | 121 | | 255 |
| 24.00 | 186 | 171 | 170 | 2.80 | 2.90 | 2.00 | 5.20 | 6.60 | 5.00 | 3.40 | 3.70 | 3.00 | 111 | 71 | 123 |
| 02.00 | 165 | 199 | 146 | 3.05 | 2.65 | | 9.10 | 5.40 | 9.90 | 6.05 | 2.75 | | 158 | 111 | 290 |
| 04.00 | 130 | | 105 | 3.00 | 2.75 | | 5.50 | 6.30 | 5.90 | 2.50 | 3.55 | | 104 | | 75 |
| 06.00 | 127 | | 130 | 3.05 | 3.00 | 2.70 | 5.80 | 7.20 | | 2.75 | 4.20 | | 121 | | 136 |
| 08.00 | 222 | 120 | 93 | 2.75 | 3.25 | 2.60 | 5.50 | 4.90 | 6.39 | 2.75 | 1.65 | 3.70 | 66 | 149 | 158 |
| Max. | 222 | 199 | 173 | 3.05 | 3.25 | 2.90 | 9.10 | 10.60 | 9.90 | 6.05 | 7.90 | 6.00 | 336 | 234 | 302 |
| Min. | 67 | 85 | 61 | 2.05 | 1.75 | 1.15 | 4.40 | 4.00 | 4.30 | 2.15 | 1.65 | 1.50 | 66 | 45 | 75 |
| Average | 148 | 134 | 123 | 2.71 | 2.71 | 2.29 | 6.12 | 6.21 | 5.11 | 3.56 | 3.50 | 3.74 | 139 | 111 | 155 |
| SD. | 38.9 | 35.3 | 29.4 | 0.32 | 0.43 | 0.51 | 1.12 | 1.58 | 1.40 | 1.06 | 1.54 | 1.41 | 66.1 | 64.3 | 82.9 |

Table 25 Summary of material concentrations collected on April 22-23,1988 at Pak Kret Station.

| Time | Suspended Sed. (mg/l) | | | Phosphate-P (nmole/l) | | | Total - P (nmole/l) | | | Particulate-P(nmole/l) | | | Silicate (nmole/l) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | S | M | B | S | M | B | S | M | B | S | M | B | S | M | B |
| 08.00 | 82 | 110 | 65 | 1.95 | 1.95 | 1.70 | 5.47 | 5.41 | | 3.52 | 3.46 | | 55 | 53 | 155 |
| 10.00 | 91 | 50 | 101 | 1.70 | 2.05 | 2.14 | | 2.50 | | | 0.45 | | 90 | 176 | 83 |
| 12.00 | 75 | 95 | 86 | 2.05 | 2.24 | 1.51 | | | 5.05 | | | 3.54 | 118 | 107 | 87 |
| 14.00 | 94 | 122 | 144 | 1.70 | 1.89 | 1.61 | 4.52 | 3.09 | 7.24 | 2.82 | 1.20 | 5.63 | 110 | 126 | |
| 16.00 | 111 | 125 | 145 | 1.99 | 1.89 | 0.78 | 5.99 | 5.23 | | 4.00 | 3.34 | | 80 | 72 | 107 |
| 18.00 | 104 | 132 | 93 | 1.61 | 1.31 | 1.66 | 4.52 | 1.90 | 5.62 | 2.91 | 0.59 | 4.96 | 84 | | 144 |
| 20.00 | 90 | 93 | 115 | 1.36 | 1.61 | 1.41 | | 5.09 | 6.04 | | 3.48 | 4.63 | 107 | 148 | 213 |
| 22.00 | 119 | 145 | 113 | 1.61 | 1.51 | 1.31 | | 6.90 | 5.19 | | 5.39 | 3.88 | 71 | 122 | 67 |
| 24.00 | | | | | | | | | | | | | | | |
| 02.00 | | | | | | | | | | | | | | | |
| 04.00 | 128 | 100 | 139 | 1.99 | 1.95 | 2.05 | 5.86 | 5.19 | 4.50 | 3.87 | 3.24 | 2.45 | 62 | 89 | 32 |
| 06.00 | 113 | 107 | 112 | 1.95 | 1.85 | 2.09 | | 5.77 | 5.23 | | 3.92 | 4.14 | 95 | | 75 |
| 08.00 | 94 | 109 | 95 | 1.85 | 1.85 | 1.85 | 3.41 | 2.82 | 5.64 | 1.56 | 0.97 | 3.79 | 99 | 58 | 59 |
| Max. | 128 | 145 | 145 | 2.05 | 2.24 | 2.14 | 5.99 | 6.90 | 7.24 | 4.00 | 5.39 | 5.63 | 118 | 176 | 213 |
| Min. | 75 | 50 | 65 | 1.36 | 1.31 | 0.78 | 3.41 | 1.90 | 4.50 | 1.56 | 0.45 | 2.45 | 62 | 53 | 32 |
| Average | 100 | 108 | 110 | 1.80 | 1.83 | 1.65 | 4.96 | 4.39 | 5.81 | 3.11 | 2.60 | 4.13 | 89 | 106 | 102 |
| SD. | 15.5 | 23.9 | 24.2 | 0.21 | 0.25 | 0.38 | 0.91 | 1.58 | 0.84 | 0.82 | 1.59 | 0.90 | 17.8 | 39.3 | 51.1 |

S = Surface ; M = Middepth ; B = Bottom

Table 26 Summary of material concentrations collected on May 6-7,1988 at Pak Iret Station.

| Time | Suspended Sed. (mg/l) | | | Phosphate-P (nmole/l) | | | Total - P (nmole/l) | | | Particulate-P(nmole/l) | | | Silicate (nmole/l) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | S | M | B | S | M | B | S | M | B | S | M | B | S | M | B |
| 08.00 | 75 | 75 | 71 | 1.78 | 2.29 | 2.29 | 4.82 | 3.82 | 4.91 | 3.04 | 1.53 | 2.62 | 56 | 168 | |
| 10.00 | 72 | 65 | 79 | 2.19 | 2.14 | 2.24 | 3.43 | 4.73 | 4.82 | 1.24 | 2.59 | 2.58 | 130 | 181 | 78 |
| 12.00 | 74 | 68 | 82 | 2.09 | 1.93 | 1.78 | 4.45 | 3.58 | 4.53 | 2.36 | 1.65 | 2.75 | 50 | 158 | 44 |
| 14.00 | 87 | 75 | 131 | 2.04 | 1.83 | 2.24 | 3.29 | 4.95 | 7.63 | 1.25 | 3.12 | 5.39 | | 200 | 206 |
| 16.00 | 104 | 95 | 71 | 1.68 | 2.04 | 1.73 | 3.53 | 5.68 | 5.01 | 1.85 | 3.64 | 3.28 | 98 | 165 | 171 |
| 18.00 | 103 | 88 | 69 | 1.68 | 2.14 | 1.68 | 4.91 | 4.77 | 4.41 | 3.23 | 2.63 | 2.73 | 193 | 143 | 199 |
| 20.00 | 98 | 73 | 71 | 1.78 | 2.09 | 1.68 | 4.50 | 2.95 | 4.95 | 2.72 | 0.86 | 3.27 | 71 | 113 | 133 |
| 22.00 | 101 | 100 | 89 | 1.53 | 1.63 | 1.63 | 5.45 | 5.58 | 5.23 | 3.92 | 3.95 | 3.60 | 114 | 128 | 186 |
| 24.00 | 128 | 95 | 115 | 1.83 | 1.99 | 1.88 | 7.58 | 6.54 | 6.91 | 5.75 | 4.55 | 5.03 | 82 | 171 | 71 |
| 02.00 | 48 | 97 | 86 | 2.39 | 2.19 | 2.04 | 5.20 | 4.44 | 7.06 | 2.81 | 2.25 | 5.02 | 239 | 87 | 189 |
| 04.00 | 72 | 84 | 83 | 2.09 | 2.14 | 2.09 | 4.67 | 5.49 | 5.44 | 2.58 | 3.35 | 3.35 | 100 | 75 | 79 |
| 06.00 | 73 | 75 | 74 | 2.44 | 2.04 | 2.04 | 5.23 | 4.05 | 5.23 | 2.79 | 2.01 | 3.19 | 119 | 150 | 122 |
| 08.00 | 70 | 63 | 68 | 2.29 | 2.09 | 2.04 | 4.44 | 4.77 | 3.15 | 2.15 | 2.68 | 1.11 | 109 | 211 | 135 |
| Max. | 128 | 100 | 131 | 2.44 | 2.29 | 2.29 | 7.58 | 6.54 | 7.63 | 5.75 | 4.55 | 5.39 | 239 | 211 | 206 |
| Min. | 48 | 63 | 68 | 1.53 | 1.63 | 1.63 | 3.29 | 2.95 | 3.15 | 1.24 | 0.86 | 1.11 | 50 | 75 | 44 |
| Average | 85 | 81 | 84 | 1.99 | 2.04 | 1.95 | 4.73 | 4.72 | 5.33 | 2.75 | 2.58 | 3.38 | 113 | 150 | 134 |
| SD. | 20.1 | 12.4 | 18.2 | 0.28 | 0.16 | 0.22 | 1.06 | 0.94 | 1.17 | 1.13 | 1.00 | 1.14 | 52.4 | 39.0 | 53.1 |

S = Surface ; M = Middepth ; B = Bottom

Table 27 Summary of material concentrations collected on March 25-26,1988 at Bang Sai Station.

| Time | 8.00 | 10.00 | 12.00 | 14.00 | 16.00 | 18.00 | 20.00 | 22.00 | 24.00 | 02.00 | 04.00 | 06.00 | 08.00 | Average | Max. | Min. | SD. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Suspended Sediment(mg/l) | 151 | 171 | 153 | 136 | 172 | 165 | 191 | 191 | 157 | 194 | 169 | 179 | 155 | 168 | 194 | 136 | 17 |
| Phosphate-P (μmole/l) | 1.75 | 2.55 | 1.50 | 2.45 | 2.90 | 2.95 | 2.60 | 3.00 | 3.45 | 2.75 | 2.20 | 2.60 | 2.55 | 2.56 | 3.45 | 1.50 | 0.50 |
| Total-P (μmole/l) | 9.65 | 11.26 | 9.46 | 9.02 | 9.75 | 9.99 | 10.21 | 10.82 | 10.87 | 9.99 | 11.02 | 9.70 | 10.14 | 10.14 | 11.26 | 3.02 | 0.64 |
| Particulate-P (μmole/l) | 7.90 | 8.71 | 7.96 | 6.57 | 6.85 | 7.04 | 7.61 | 7.82 | 7.42 | 7.24 | 8.82 | 7.10 | 7.59 | 7.59 | 8.82 | 6.57 | 0.64 |
| Silicate (μmole/l) | 314 | 146 | 135 | 364 | 151 | 178 | 163 | 127 | 153 | 102 | 139 | 111 | 140 | 171 | 364 | 102 | 75 |

Table 28 Summary of material concentrations collected on April 8-9,1988 at Bang Sai Station.

| Time | 8.00 | 10.00 | 12.00 | 14.00 | 16.00 | 18.00 | 20.00 | 22.00 | 24.00 | 02.00 | 04.00 | 06.00 | 08.00 | Average | Max. | Min. | SD. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Suspended Sediment(mg/l) | 147 | 98 | 98 | 108 | 113 | 85 | 178 | 93 | 99 | 133 | 144 | 104 | 167 | 121 | 178 | 85 | 29 |
| Phosphate-P (μmole/l) | 1.20 | 1.75 | 1.50 | 1.05 | 1.45 | 1.15 | 1.15 | 1.45 | 1.55 | 1.10 | 1.20 | 1.00 | 1.15 | 1.28 | 1.75 | 1.00 | 0.22 |
| Total-P (μmole/l) | 6.00 | 6.60 | 7.10 | 6.70 | 6.30 | 5.20 | 5.00 | 5.60 | 5.70 | 6.30 | 6.60 | 6.30 | 6.00 | 6.11 | 7.10 | 5.00 | 0.58 |
| Particulate-P (μmole/l) | 4.80 | 4.85 | 5.60 | 5.65 | 4.85 | 4.05 | 3.85 | 4.15 | 4.15 | 5.20 | 5.40 | 5.30 | 4.85 | 4.82 | 5.65 | 3.85 | 0.58 |
| Silicate (μmole/l) | 171 | 304 | 183 | 192 | 210 | 261 | 290 | 158 | 139 | 240 | 88 | 280 | 147 | 205 | 304 | 88 | 64 |

Table 29 Summary of material concentrations collected on April 22-23,1988 at Bang Sai Station.

| Time | 8.00 | 10.00 | 12.00 | 14.00 | 16.00 | 18.00 | 20.00 | 22.00 | 24.00 | 02.00 | 04.00 | 06.00 | 08.00 | Average | Max. | Min. | SD. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Suspended Sediment(mg/l) | 35 | 49 | 75 | 44 | 58 | 102 | 94 | 113 | 58 | 104 | 61 | 61 | 62 | 70 | 113 | 35 | 24 |
| Phosphate-P (μmole/l) | 1.31 | 1.56 | 1.36 | 1.89 | 1.56 | 1.99 | 0.88 | 1.51 | 1.66 | 1.27 | 1.51 | 1.70 | 1.31 | 1.50 | 1.99 | 0.88 | 0.28 |
| Total-P (μmole/l) | 3.43 | 1.95 | 2.90 | 2.14 | 2.05 | 4.86 | 2.86 | 2.52 | 1.71 | 3.43 | 3.95 | 3.42 | 3.43 | 2.97 | 4.86 | 1.71 | 0.87 |
| Particulate-P (μmole/l) | 2.12 | 0.39 | 1.54 | 0.25 | 0.49 | 2.87 | 1.98 | 1.01 | 0.05 | 2.16 | 2.44 | 1.72 | 2.12 | 1.47 | 2.87 | 0.05 | 0.89 |
| Silicate (μmole/l) | 91 | 56 | 98 | 48 | 71 | 48 | 116 | 40 | 107 | 113 | 94 | 69 | 63 | 78 | 116 | 40 | 25 |

Table 30 Summary of material concentrations collected on May 6-7,1988 at Bang Sai Station.
* ..... no measurement

| Time | 8.00 | 10.00 | 12.00 | 14.00 | 16.00 | 18.00 | 20.00 | 22.00 | 24.00 | 02.00 | 04.00 | 06.00 | 08.00 | Average | Max. | Min. | SD. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Suspended Sediment(mg/l) | 60 | 54 | 67 | 46 | 50 | 69 | * | * | * | * | * | * | * | 58 | 69 | 46 | 8 |
| Phosphate-P (μmole/l) | 0.71 | 1.37 | 1.37 | 1.48 | 1.58 | 1.37 | * | * | * | * | * | * | * | 1.31 | 1.58 | 0.71 | 0.28 |
| Total-P (μmole/l) | 2.29 | 3.43 | 3.68 | 3.73 | 4.36 | 5.23 | * | * | * | * | * | * | * | 3.79 | 5.23 | 2.29 | 0.89 |
| Particulate-P (μmole/l) | 1.58 | 2.06 | 2.31 | 2.25 | 2.78 | 3.86 | * | * | * | * | * | * | * | 2.47 | 3.86 | 1.58 | 0.71 |
| Silicate (μmole/l) | 133 | 242 | 87 | 76 | * | * | * | * | * | * | * | * | * | 135 | 242 | 76 | 66 |

Table 31 Summary of hydrological factors collected on December 6-7,1987 at Pak Kret Station.

| Time | Tide | Va | Vc | Area * | Discharge | Water level |
|---|---|---|---|---|---|---|
| 08.00 | F | -0.371 | 0.400 | 2321.80 | -860.46 | 3.45 |
| 10.00 | F | -0.416 | 0.450 | 2358.62 | -980.71 | 3.60 |
| 12.00 | F | -0.070 | 0.068 | 2373.34 | -167.25 | 3.66 |
| 14.00 | E | 0.259 | 0.276 | 2363.52 | 610.98 | 3.62 |
| 16.00 | E | 0.290 | 0.311 | 2361.07 | 685.05 | 3.61 |
| 18.00 | E | 0.212 | 0.225 | 2373.34 | 504.10 | 3.66 |
| 20.00 | E | 0.324 | 0.349 | 2346.34 | 761.38 | 3.55 |
| 22.00 | E | 0.641 | 0.699 | 2302.16 | 1475.45 | 3.37 |
| 24.00 | E | 0.784 | 0.857 | 2255.53 | 1767.72 | 3.18 |
| 02.00 | E | 0.645 | 0.703 | 2211.35 | 1425.24 | 3.00 |
| 04.00 | E | 0.576 | 0.627 | 2186.80 | 1259.18 | 2.90 |
| 06.00 | E | 0.188 | 0.198 | 2238.34 | 420.79 | 3.11 |
| 08.00 | E | 0.053 | 0.049 | 2294.80 | 122.30 | 3.34 |

Table 32 Summary of hydrological factors collected on December 20-21,1987 at Pak Kret Station.

| Time | Tide | Va | Vc | Area * | Discharge | Water level |
|---|---|---|---|---|---|---|
| 08.00 | F | -0.452 | 0.490 | 2302.16 | -1040.48 | 3.37 |
| 10.00 | F | -0.193 | 0.204 | 2326.71 | -450.02 | 3.47 |
| 12.00 | E | 0.110 | 0.112 | 2346.34 | 258.68 | 3.55 |
| 14.00 | E | 0.350 | 0.377 | 2321.80 | 812.18 | 3.45 |
| 16.00 | E | 0.572 | 0.623 | 2316.89 | 1325.71 | 3.43 |
| 18.00 | E | 0.525 | 0.571 | 2311.98 | 1214.21 | 3.41 |
| 20.00 | E | 0.587 | 0.639 | 2267.80 | 1330.42 | 3.23 |
| 22.00 | E | 0.685 | 0.748 | 2213.80 | 1516.88 | 3.01 |
| 24.00 | E | 0.637 | 0.695 | 2164.71 | 1379.53 | 2.81 |
| 02.00 | E | 0.733 | 0.801 | 2113.17 | 1549.17 | 2.60 |
| 04.00 | E | 0.502 | 0.545 | 2088.62 | 1047.82 | 2.50 |
| 06.00 | F | -0.030 | 0.023 | 2223.62 | -66.25 | 3.05 |
| 08.00 | F | -0.237 | 0.252 | 2294.80 | -543.43 | 3.34 |

Note: E = Ebb Va = Corrected velocity (m/sec)
F = Flood Vc = Velocity at the center of the river (m/sec)
* Cross-sectional area in $m^2$ ; Discharge in $m^3$/sec
Water level in m
Positive (+) value in ebb direction
Negative (-) value in flood direction

Table 33 Summary of hydrological factors collected on January 5-6,1988 at Pak Kret Station.

| Time | Tide | Va | Vc | Area * | Discharge | Water level |
|---|---|---|---|---|---|---|
| 08.00 | F | -0.585 | 0.637 | 2216.25 | -1296.17 | 3.02 |
| 10.00 | F | -0.604 | 0.658 | 2272.71 | -1372.34 | 3.25 |
| 12.00 | F | -0.353 | 0.380 | 2297.25 | -809.83 | 3.35 |
| 14.00 | E | 0.028 | 0.021 | 2272.71 | 63.60 | 3.25 |
| 16.00 | E | 0.240 | 0.255 | 2265.34 | 542.59 | 3.22 |
| 18.00 | E | 0.202 | 0.213 | 2272.71 | 458.07 | 3.25 |
| 20.00 | E | 0.216 | 0.229 | 2255.53 | 487.23 | 3.18 |
| 22.00 | E | 0.629 | 0.686 | 2199.07 | 1383.53 | 2.95 |
| 24.00 | E | 0.634 | 0.691 | 2137.71 | 1354.59 | 2.70 |
| 02.00 | E | 0.644 | 0.702 | 2076.35 | 1336.36 | 2.45 |
| 04.00 | E | 0.797 | 0.872 | 2027.26 | 1616.31 | 2.25 |
| 06.00 | E | 0.023 | 0.015 | 2113.17 | 47.67 | 2.60 |
| 08.00 | F | -0.374 | 0.404 | 2211.35 | -827.52 | 3.00 |

Table 34 Summary of hydrological factors collected on January 19-20,1988 at Pak Kret Station.

| Time | Tide | Va | Vc | Area * | Discharge | Water level |
|---|---|---|---|---|---|---|
| 08.00 | F | -0.504 | 0.548 | 2208.89 | -1114.15 | 2.99 |
| 10.00 | F | -0.461 | 0.500 | 2255.53 | -1039.80 | 3.18 |
| 12.00 | F | -0.334 | 0.359 | 2280.07 | -760.49 | 3.28 |
| 14.00 | F | -0.162 | 0.169 | 2265.34 | -366.48 | 3.22 |
| 16.00 | E | 0.175 | 0.184 | 2255.53 | 395.48 | 3.18 |
| 18.00 | E | 0.145 | 0.150 | 2240.80 | 324.02 | 3.12 |
| 20.00 | E | 0.324 | 0.349 | 2191.71 | 711.20 | 2.92 |
| 22.00 | E | 0.412 | 0.446 | 2118.07 | 873.03 | 2.62 |
| 24.00 | E | 0.373 | 0.403 | 2059.17 | 768.71 | 2.38 |
| 02.00 | E | 0.379 | 0.409 | 1990.44 | 753.85 | 2.10 |
| 04.00 | E | 0.401 | 0.434 | 1936.44 | 777.16 | 1.88 |
| 06.00 | F | -0.156 | 0.163 | 2088.62 | -326.56 | 2.50 |
| 08.00 | F | -0.494 | 0.536 | 2162.26 | -1067.17 | 2.80 |

Note: E = Ebb Va = Corrected velocity (m/sec)
F = Flood Vc = Velocity at the center of the river (m/sec)
* Cross-sectional area in $m^2$ ; Discharge in $m^3$/sec
Water level in m
Positive (+) value in ebb direction
Negative (-) value in flood direction

Table 35 Summary of hydrological factors collected on March 13-14,1988 at Pak Kret Station.

| Time | Tide | Va | Vc | Area * | Discharge | Water level |
|---|---|---|---|---|---|---|
| 08.00 | F | -0.371 | 0.400 | 2297.25 | -851.36 | 3.35 |
| 10.00 | F | -0.278 | 0.298 | 2304.62 | -641.59 | 3.38 |
| 12.00 | F | -0.108 | 0.109 | 2265.34 | -243.61 | 3.22 |
| 14.00 | E | 0.258 | 0.275 | 2199.07 | 566.48 | 2.95 |
| 16.00 | E | 0.554 | 0.603 | 2137.71 | 1184.53 | 2.70 |
| 18.00 | E | 0.475 | 0.516 | 2076.35 | 987.23 | 2.45 |
| 20.00 | E | 0.591 | 0.644 | 2039.53 | 1205.72 | 2.30 |
| 22.00 | E | 0.432 | 0.468 | 2002.71 | 865.31 | 2.15 |
| 24.00 | E | 0.186 | 0.196 | 2039.53 | 379.73 | 2.30 |
| 02.00 | F | -0.277 | 0.297 | 2125.44 | -589.78 | 2.65 |
| 04.00 | F | -0.507 | 0.551 | 2186.80 | -1108.94 | 2.90 |
| 06.00 | F | -0.464 | 0.503 | 2240.80 | -1039.09 | 3.12 |
| 08.00 | F | -0.704 | 0.769 | 2280.07 | -1605.57 | 3.28 |

Table 36 Summary of hydrological factors collected on March 25-26,1988 at Pak Kret Station.

| Time | Tide | Va | Vc | Area * | Discharge | Water level |
|---|---|---|---|---|---|---|
| 08.00 | F | -0.041 | 0.035 | 2282.53 | -92.76 | 3.29 |
| 10.00 | F | -0.082 | 0.081 | 2287.43 | -188.08 | 3.31 |
| 12.00 | E | 0.215 | 0.228 | 2243.25 | 482.55 | 3.13 |
| 14.00 | E | 0.593 | 0.646 | 2162.26 | 1282.19 | 2.80 |
| 16.00 | E | 0.572 | 0.623 | 2091.07 | 1196.49 | 2.51 |
| 18.00 | E | 0.684 | 0.747 | 2027.26 | 1387.23 | 2.25 |
| 20.00 | E | 0.485 | 0.527 | 1990.44 | 966.18 | 2.10 |
| 22.00 | E | 0.039 | 0.033 | 2083.71 | 80.91 | 2.48 |
| 24.00 | F | -0.508 | 0.552 | 2162.26 | -1098.45 | 2.80 |
| 02.00 | F | -0.486 | 0.528 | 2208.89 | -1074.21 | 2.99 |
| 04.00 | F | -0.449 | 0.487 | 2235.89 | -1004.47 | 3.10 |
| 06.00 | F | -0.232 | 0.247 | 2248.16 | -522.22 | 3.15 |
| 08.00 | F | -0.146 | 0.152 | 2257.98 | -330.59 | 3.19 |

Note: E = Ebb Va = Corrected velocity (m/sec)
F = Flood Vc = Velocity at the center of the river (m/sec)
* Cross-sectional area in $m^2$ ; Discharge in $m^3$/sec
Water level in m
Positive (+) value in ebb direction
Negative (-) value in flood direction

Table 37 Summary of hydrological factors collected on April 8-9,1988 at Pak Kret Station.

| Time | Tide | Va | Vc | Area * | Discharge | Water level |
|---|---|---|---|---|---|---|
| 08.00 | F | -0.172 | 0.180 | 2255.53 | -387.32 | 3.18 |
| 10.00 | F | -0.194 | 0.205 | 2260.44 | -439.25 | 3.20 |
| 12.00 | E | 0.255 | 0.272 | 2181.89 | 556.14 | 2.88 |
| 14.00 | E | 0.847 | 0.927 | 2103.35 | 1781.55 | 2.56 |
| 16.00 | E | 0.584 | 0.636 | 2034.62 | 1188.10 | 2.28 |
| 18.00 | E | 0.613 | 0.668 | 1965.90 | 1204.85 | 2.00 |
| 20.00 | E | 0.193 | 0.204 | 1990.44 | 384.98 | 2.10 |
| 22.00 | F | -0.559 | 0.608 | 2137.71 | -1194.19 | 2.70 |
| 24.00 | F | -0.653 | 0.712 | 2186.80 | -1427.21 | 2.90 |
| 02.00 | F | -0.554 | 0.603 | 2223.62 | -1232.13 | 3.05 |
| 04.00 | F | -0.190 | 0.200 | 2235.89 | -424.37 | 3.10 |
| 06.00 | F | -0.133 | 0.137 | 2235.89 | -297.03 | 3.10 |
| 08.00 | F | -0.164 | 0.172 | 2257.98 | -371.41 | 3.19 |

Table 38 Summary of hydrological factors collected on April 22-23,1988 at Pak Kret Station.

| Time | Tide | Va | Vc | Area * | Discharge | Water level |
|---|---|---|---|---|---|---|
| 08.00 | F | -0.017 | 0.009 | 2248.16 | -38.52 | 3.15 |
| 10.00 | E | 0.014 | 0.005 | 2243.25 | 30.33 | 3.13 |
| 12.00 | E | 0.399 | 0.431 | 2162.26 | 861.93 | 2.80 |
| 14.00 | E | 0.655 | 0.715 | 2088.62 | 1368.80 | 2.50 |
| 16.00 | E | 0.548 | 0.596 | 2014.99 | 1103.78 | 2.20 |
| 18.00 | E | 0.543 | 0.591 | 1948.71 | 1058.66 | 1.93 |
| 20.00 | E | 0.544 | 0.592 | 1965.90 | 1069.78 | 2.00 |
| 22.00 | F | -0.598 | 0.652 | 2118.07 | -1267.47 | 2.62 |
| 24.00 | E | | | | | |
| 02.00 | E | | | | | |
| 04.00 | F | -0.308 | 0.331 | 2235.89 | -689.15 | 3.10 |
| 06.00 | F | -0.183 | 0.192 | 2235.89 | -408.20 | 3.10 |
| 08.00 | F | -0.028 | 0.021 | 2235.89 | -62.57 | 3.10 |

Note: E = Ebb Va = Corrected velocity (m/sec)
F = Flood Vc = Velocity at the center of the river (m/sec)
* Cross-sectional area in $m^2$ ; Discharge in $m^3$/sec
Water level in m
Positive (+) value in ebb direction
Negative (-) value in flood direction

Table 39 Summary of hydrological factors collected on May 6-7,1988 at Pak Kret Station.

| Time | Tide | Va | Vc | Area * | Discharge | Water level |
|---|---|---|---|---|---|---|
| 08.00 | F | -0.031 | 0.024 | 2257.98 | -69.31 | 3.19 |
| 10.00 | F | -0.061 | 0.057 | 2213.80 | -134.00 | 3.01 |
| 12.00 | E | 0.536 | 0.583 | 2127.89 | 1140.62 | 2.66 |
| 14.00 | E | 0.663 | 0.723 | 2049.35 | 1357.88 | 2.34 |
| 16.00 | E | 0.677 | 0.739 | 1978.17 | 1339.33 | 2.05 |
| 18.00 | E | 0.525 | 0.571 | 1921.71 | 1009.25 | 1.82 |
| 20.00 | F | -0.227 | 0.241 | 2113.17 | -479.40 | 2.60 |
| 22.00 | F | -0.808 | 0.884 | 2196.62 | -1775.17 | 2.94 |
| 24.00 | F | -0.682 | 0.744 | 2255.53 | -1537.32 | 3.18 |
| 02.00 | F | -0.342 | 0.368 | 2272.71 | -776.52 | 3.25 |
| 04.00 | E | 0.023 | 0.015 | 2223.62 | 50.16 | 3.05 |
| 06.00 | E | 0.178 | 0.187 | 2230.98 | 397.22 | 3.08 |
| 08.00 | E | 0.017 | 0.009 | 2248.16 | 38.52 | 3.15 |

Table 40 Summary of hydrological factors collected on March 25-26,1988 at Bang Sai Station.

| Time | Tide | Va | Vc | Area * | Discharge | Water level |
|---|---|---|---|---|---|---|
| 08.00 | E | 0.048 | 0.043 | 1882.00 | 90.10 | 3.39 |
| 10.00 | F | -0.045 | 0.040 | 1900.00 | -85.80 | 3.44 |
| 12.00 | F | -0.054 | 0.050 | 1903.00 | -103.14 | 3.45 |
| 14.00 | E | 0.238 | 0.253 | 1836.00 | 436.44 | 3.26 |
| 16.00 | E | 0.437 | 0.473 | 1747.00 | 762.73 | 3.01 |
| 18.00 | E | 0.452 | 0.490 | 1658.00 | 749.35 | 2.76 |
| 20.00 | E | 0.461 | 0.500 | 1565.00 | 721.47 | 2.50 |
| 22.00 | E | 0.386 | 0.417 | 1516.00 | 585.13 | 2.36 |
| 24.00 | F | -0.136 | 0.140 | 1629.00 | -220.83 | 2.68 |
| 02.00 | F | -0.256 | 0.273 | 1747.00 | -446.87 | 3.01 |
| 04.00 | F | -0.205 | 0.217 | 1829.00 | -375.25 | 3.24 |
| 06.00 | F | -0.178 | 0.187 | 1865.00 | -332.06 | 3.34 |
| 08.00 | F | -0.075 | 0.073 | 1871.00 | -140.31 | 3.36 |

Note: E = Ebb Va = Corrected velocity (m/sec)
F = Flood Vc = Velocity at the center of the river (m/sec)
* Cross-sectional area in $m^2$ ; Discharge in $m^3$/sec
Water level in m
Positive (+) value in ebb direction
Negative (-) value in flood direction

Table 41 Summary of hydrological factors collected on April 8-9,1988 at Bang Sai Station.

| Time | Tide | Va | Vc | Area * | Discharge | Water level |
|---|---|---|---|---|---|---|
| 08.00 | E | 0.066 | 0.063 | 1814.00 | 119.64 | 3.20 |
| 10.00 | F | -0.090 | 0.090 | 1854.00 | -167.53 | 3.31 |
| 12.00 | F | -0.042 | 0.037 | 1865.00 | -79.17 | 3.34 |
| 14.00 | E | 0.305 | 0.327 | 1783.00 | 543.12 | 3.11 |
| 16.00 | E | 0.404 | 0.437 | 1690.00 | 682.84 | 2.85 |
| 18.00 | E | 0.389 | 0.420 | 1597.00 | 620.72 | 2.59 |
| 20.00 | E | 0.452 | 0.490 | 1508.00 | 681.56 | 2.34 |
| 22.00 | F | -0.072 | 0.070 | 1473.00 | -106.47 | 2.24 |
| 24.00 | F | -0.325 | 0.350 | 1658.00 | -539.51 | 2.76 |
| 02.00 | F | -0.283 | 0.303 | 1765.00 | -499.34 | 3.06 |
| 04.00 | F | -0.232 | 0.247 | 1847.00 | -429.04 | 3.29 |
| 06.00 | F | -0.099 | 0.100 | 1889.00 | -187.77 | 3.41 |
| 08.00 | F | -0.042 | 0.036 | 1907.00 | -79.22 | 3.46 |

Table 42 Summary of hydrological factors collected on April 22-23,1988 at Bang Sai Station.

| Time | Tide | Va | Vc | Area * | Discharge | Water level |
|---|---|---|---|---|---|---|
| 08.00 | E | 0.147 | 0.153 | 1825.00 | 268.84 | 3.23 |
| 10.00 | E | 0.051 | 0.047 | 1847.00 | 95.10 | 3.29 |
| 12.00 | E | 0.138 | 0.143 | 1825.00 | 252.35 | 3.23 |
| 14.00 | E | 0.346 | 0.373 | 1701.00 | 588.87 | 2.88 |
| 16.00 | E | 0.425 | 0.460 | 1640.00 | 696.74 | 2.71 |
| 18.00 | E | 0.458 | 0.497 | 1544.00 | 707.60 | 2.44 |
| 20.00 | E | 0.437 | 0.473 | 1462.00 | 638.30 | 2.21 |
| 22.00 | E | 0.023 | 0.016 | 1480.00 | 34.73 | 2.26 |
| 24.00 | F | -0.346 | 0.373 | 1687.00 | -584.03 | 2.84 |
| 02.00 | F | -0.316 | 0.340 | 1701.00 | -538.13 | 3.11 |
| 04.00 | F | -0.256 | 0.273 | 1804.00 | -461.45 | 3.29 |
| 06.00 | F | -0.142 | 0.147 | 1857.00 | -263.49 | 3.32 |
| 08.00 | F | -0.042 | 0.037 | 1854.00 | -78.70 | 3.31 |

Note: E = Ebb Va = Corrected velocity (m/sec)
F = Flood Vc = Velocity at the center of the river (m/sec)
* Cross-sectional area in $m^2$ ; Discharge in $m^3$/sec
Water level in m
Positive (+) value in ebb direction
Negative (-) value in flood direction

# BIOGRAPHY

Miss Piyarat Pitiwatanakul was born on 3rd September 1959 in Lopburi. She graduated with a B.Sc. in Marine Science from Chulalongkorn University in 1981. She works as a hydrologist in the Hydrology Section, Surveying and Chart Reproduction Division, Harbour Department, Bangkok, Thailand.