Table A4.3.1 Specifications of Projects Requiring EIA and Appraisal Organizations

| | Specifications | by MOSTE | by DOSTE |
|---|---|---|---|
| 1 | Mining | Big and medium mine | Small |
| 2 | Oil exploring and refinery, oil chemicals and gas oil | All | |
| 3 | Chemical plant | All | |
| 4 | Steel plant | All | |
| 5 | Non-ferrous metal plant | All | |
| 6 | Leather plant | Over 1,000 T/year | Rest |
| 7 | Textile plant | Over 30 mil. m/year | Rest |
| 8 | Plant protection chemical plant | All | |
| 9 | Rubber and paint plant | All | |
| 10 | Plastic plant | Over 1,000 T/year | Rest |
| 11 | Radiation plant | All | |
| 12 | Airport | All | |
| 13 | Export processing zone | All | |
| 14 | Hydropower dam water reservation | Over 100 mil. $m^3$/year | Rest |
| 15 | Irrigation system | Above limitation | |
| 16 | Thermal and other kinds of power plant | Over 30MV | Rest |
| 17 | Cement plant | Over 500,000 T/year | Rest |
| 18 | Paper and paper pulp mill | Over 40,000 T/year | Rest |
| 29 | Pharmaceutical plant | Central | Rest |
| 20 | Fertilizer plant | Over 100,000 T/year | Rest |
| 21 | Food processing plant | Over 1,000 T/year | Rest |
| 22 | Sugar plant | Over 100,000 T/year | Rest |
| 23 | Hospital | Over 500 beds | Rest |
| 24 | Railway, Motorway of grades 1,2 and 3 | Over 50 km | Rest |
| 25 | Power transmission station | Over 11o kV | Rest |
| 26 | Tourism and entertainment resort | Over 100 ha | Rest |
| 27 | Oil and gasoline store | Over 3,000 $m^3$ | Rest |
| 28 | Poisonous chemicals store | All | |
| 29 | Plantation | Over 2,000 ha | Rest |
| 30 | Wood exploiting farm | Over 3,000 ha | Rest |
| 31 | Industrial forestation farm | Over 2,000 ha | Rest |
| 32 | Aqua cultural farm | Over 200 ha | Rest |
| 33 | Port | Over 100,000 T/year | Rest |
| 34 | Ply-wood factory | Over 500,000 $m^2$/year | Rest |
| 35 | Migration area | Over 500 households | Rest |
| 36 | Alluvial plain | Over 500 ha | Rest |
| 37 | Engineering factory | Over 50,000 T/year | Rest |
| 38 | Telecommunication station | Radar station and central broadcasting station | Rest |
| 39 | Freezing plant | Large and medium scale | Small |
| 40 | Construction materials factory | Large and medium scale | Small |
| 41 | Hotel and business sector | Large and medium scale | Small |

*Source*: Government Decree No. 175/CP
MOSTE: The Ministry of Science, Technology and Environment
DOSTE: The Provincial Departments of Science, Technology and Environment

Table A4.3.2 (1) Ambient Air Quality Standards (TCVN 5937-1995)

Unit: $mg/m^3$

| No | Parameter | 1 hr – average | 8 hr – average | 24hr - average |
|---|---|---|---|---|
| 1 | CO | 40 | 10 | 5 |
| 2 | $NO_2$ | 0.4 | - | 0.1 |
| 3 | $SO_2$ | 0.5 | - | 0.3 |
| 4 | Lead (Particulate) | - | - | 0.005 |
| 5 | $O_3$ | 0.2 | - | 0.06 |
| 6 | Suspended particulate matter | 0.3 | - | 0.2 |

*Source*: Study Team, constructed based on TCVN5937-1995
*Note*: Standard methods of analysis of ambient air quality parameters are specified in available present TCVNs.

Table A4.3.2 (2) Maximum Permissible Noise Level in Public and Residential Areas (TCVN 5949-1999)

Unit: dB

| No | Area | Period of Time | | |
|---|---|---|---|---|
| | | From 6h am to 18h | From 18h to 22h | From 22h to 6h am |
| 1 | Quit areas:<br>Hospitals, libraries, senatorial, Kindergartens, School | 50 | 45 | 40 |
| 2 | Residential area:<br>Hotels, administration offices<br>Houses, apartment houses, etc. | 60 | 55 | 45 |
| 3 | Commercial and service areas and mix | 70 | 70 | 50 |
| 4 | Small industrial factories<br>Intermingling in residential areas | 75 | 70 | 50 |

*Source*: Study Team, constructed based on TCVN5949-1995

Table A4.3.2 (3) Maximum Allowable Concentration of Hazardous Substances in Ambient Air (TCVN 5938-1995)

Unit: $mg/m^3$

| No | Substances | Chemical formula | Average over 24 hrs | Maximum on one occasion |
|---|---|---|---|---|
| 1 | Acrylonitrile | $CH_2 = CHCN$ | 0.2 | - |
| 2 | Ammonia | $NH_3$ | 0.2 | 0.2 |
| 3 | Aniline | $C_6H_5NH_2$ | 0.03 | 0.05 |
| 4 | Anhydrious vanadium | $V_2O_5$ | 0.002 | 0.05 |
| 5 | Arsenic (inorganic compound, as As) | As | 0.003 | - |
| 6 | Hydrogen arsenic | $AsH_3$ | 0.002 | - |
| 7 | Acetic acid | $CH_3COOH$ | 0.06 | 0.2 |
| 8 | Hydrochloric acid | HCL | 0.06 | - |
| 9 | Nitric acid | $HNO_3$ | 0.15 | 0.4 |
| 10 | Sulfuric acid | $H_2SO_4$ | 0.1 | 0.3 |
| 11 | Benzene | $C_6H_6$ | 0.1 | 1.5 |
| 12 | *Particles containing $SiO_2$* | | | |
| | - dianas 85 - 90% $SiO_2$ | | 0.05 | 0.15 |
| | - diatomic brick 50% $SiO_2$ | | 0.1 | 0.3 |
| | - cement 10% $SiO_2$ | | 0.1 | 0.3 |
| | - dolomite 8% $SiO_2$ | | 0.15 | 0.5 |
| 13 | Particles containing asbestos | | none | none |
| 14 | Cadmium (metal and oxide) as Cd | | 0.001 | 0.003 |
| 15 | Cacbon disulfide | $CS_2$ | 0.005 | 0.03 |
| 16 | Cacbon tetrachloride | $CCl_4$ | 2 | 4 |
| 17 | Chloroform | $CHCl_3$ | 0.02 | - |
| 18 | Tetraethyl lead | $Pb(C_2H_5)_4$ | none | 0.005 |
| 19 | Chlorine | $Cl_2$ | 0.03 | 0.1 |
| 20 | Benzidine | $NH_2C_6H_4C_6H_4NH_2$ | *none* | *none* |
| 21 | Chromium-metal and compound | Cr | 0.0015 | 0.0015 |
| 22 | 1,2 – Dichlorethane | $C_2H_4Cl_2$ | 1 | 3 |
| 23 | DDT | $C_8H_{11}Cl_4$ | 0.5 | - |
| 24 | Hydrogen fluoride | HF | 0.005 | 0.02 |
| 25 | Formaldehyde | HCHO | 0.012 | 0.012 |
| 26 | Hydrogen sulfide | $H_2S$ | 0.008 | 0.008 |
| 27 | Hydrogen cyanide | HCN | 0.01 | 0.01 |
| 28 | Manganese and compound (as $MnO_2$) | $Mn/MnO_2$ | 0.01 | - |
| 29 | Nickel (metal and compound) | Ni | 0.001 | - |
| 30 | Naphthalene | | 4 | - |
| 31 | Phenol | $C_6H_5OH$ | 0.01 | 0.01 |
| 32 | Styrene | $C_6H_5CH = CH_2$ | 0.003 | 0.003 |
| 33 | Toluene | $C_6H_5CH_3$ | 0.6 | 0.6 |
| 34 | Tricloroetylene | $ClHC = CCl_2$ | 1 | 4 |
| 35 | Mercury (metal and compound) | Hg | 0.0003 | - |
| 36 | Vinylchloride | $ClCH = CH_2$ | - | 13 |
| 37 | Gasoline | | 1.5 | 5.0 |
| 38 | Tetrachloroethylene | $C2Cl_4$ | 0.1 | - |

*Source: Study Team, constructed based on TCVN5938-1995*

*Note*: Standard analysis methods of concentration of the substances are specified in available current TCVNs.

Table A4.3.2 (4) Parameter Limits and Allowable Concentrations of Pollutants in Coastal Water (TCVN-5943-1995)

| No | Parameters and substance | Unit | Limitation values | | |
|---|---|---|---|---|---|
| | | | Bathing and recreation area | Aquatic cultivation area | Others |
| 1 | Temperature | °C | 30 | - | - |
| 2 | Odor | mg/l | Not detectable | - | - |
| 3 | PH value | mg/l | 6.5 - 8.5 | 6.5 - 8.5 | 6.5 - 8.5 |
| 4 | Dissolved oxygen | mg/l | > 4 | > 5 | > 4 |
| 5 | $BOD_5$ (20°C) | mg/l | < 20 | < 10 | < 20 |
| 6 | Suspended solid | mg/l | 25 | 50 | 200 |
| 7 | Arsenic | mg/l | 0.05 | 0.01 | 0.05 |
| 8 | Ammonia (as N) | mg/l | 0.1 | 0.5 | 0.5 |
| 9 | Cadmium | mg/l | 0.005 | 0.005 | 0.01 |
| 10 | Lead | mg/l | 0.1 | 0.05 | 0.1 |
| 11 | Chromium (VI) | mg/l | 0.05 | 0.05 | 0.05 |
| 12 | Chromium (III) | mg/l | 0.1 | 0.1 | 0.2 |
| 13 | Chloride | mg/l | - | 0.01 | - |
| 14 | Copper | mg/l | 0.02 | 0.01 | 0.02 |
| 15 | Fluoride | mg/l | 1.5 | 1.5 | 1.5 |
| 16 | Zinc | mg/l | 0.1 | 0.01 | 0.1 |
| 17 | Manganese | mg/l | 0.1 | 0.1 | 0.1 |
| 18 | Iron | mg/l | 0.1 | 0.1 | 0.3 |
| 19 | Mercury | mg/l | 0.005 | 0.005 | 0.01 |
| 20 | Sulfide | mg/l | 0.01 | 0.005 | 0.01 |
| 21 | Cyanide | mg/l | 0.01 | 0.01 | 0.02 |
| 22 | Phenol compounds | mg/l | 0.001 | 0.001 | 0.002 |
| 23 | Oil and fat film | mg/l | 0 | 0 | 0.3 |
| 24 | Oil and fat suspension | mg/l | 2 | 1 | 5 |
| 25 | Total pesticides | mg/l | 0.05 | 0.01 | 0.05 |
| 26 | Coliform | MPN/ 100 ml | 1,000 | 1,000 | 1,000 |

*Source: Study Team, constructed based on TCVN5943-1995*

Table A4.3.2 (5) Parameter Limits and Maximum Allowable Concentration of Pollutants in Surface Water (TCVN-5942-1995)

| No. | Parameters | Unit | Limitation value | |
|---|---|---|---|---|
| | | | A | B |
| 1 | PH | Mg/l | 6 - 8.5 | 5.5 - 9 |
| 2 | $BOD_5$ (20°C) | Mg/l | < 4 | < 25 |
| 3 | COD | Mg/l | < 10 | < 35 |
| 4 | Dissolved oxygen | Mg/l | > 6 | >2 |
| 5 | Suspended solids | Mg/l | 20 | 80 |
| 6 | Arsen | Mg/l | 0.05 | 0.1 |
| 7 | Barium | Mg/l | 1 | 4 |
| 8 | Cadmium | Mg/l | 0.01 | 0.02 |
| 9 | Lead | Mg/l | 0.05 | 0.1 |
| 10 | Chromium (VI) | Mg/l | 0.05 | 0.05 |
| 11 | Chromium (III) | Mg/l | 0.1 | 1 |
| 12 | Copper | Mg/l | 0.1 | 1 |
| 13 | Zinc | Mg/l | 1 | 2 |
| 14 | Manganese | Mg/l | 0.1 | 0.8 |
| 15 | Nickel | Mg/l | 0.1 | 1 |
| 16 | Iron | Mg/l | 1 | 2 |
| 17 | Mercury | Mg/l | 0.001 | 0.002 |
| 18 | Tin | Mg/l | 1 | 2 |
| 19 | Ammonia (as N) | Mg/l | 0.05 | 1 |
| 20 | Fluoride | Mg/l | 1 | 1.5 |
| 21 | Nitrate (as N) | Mg/l | 10 | 15 |
| 22 | Nitrite (as N) | Mg/l | 0.01 | 0.05 |
| 23 | Cyanide | Mg/l | 0.01 | 0.05 |
| 24 | Phenol compounds | Mg/l | 0.001 | 0.02 |
| 25 | Oil and grease | Mg/l | 0 | 0.3 |
| 26 | Detergent | Mg/l | 0.5 | 0.5 |
| 27 | Coliform | MPN/100 ml | 5,000 | 10,000 |
| 28 | Total pesticides (except DDT) | Mg/l | 0.15 | 0.15 |
| 29 | DDT | Mg/l | 0.01 | 0.01 |
| 30 | Gross alpha activity | Bq/l | 0.1 | 0.1 |
| 31 | Gross beta activity | Bq/l | 1.0 | 1.0 |

*Source*: Study Team, constructed based on TCVN5942-1995

*Note:*

- Values in the column A are applied to the surface water using for source of domestic water supply with appropriate treatments.
- Values in the column B are applied to the surface water using for the purpose other than domestic water supply. Quality criteria of water for aquatic life are specified in a separate standard.

Table A4.3.2 (6) Water Quality Standards for Industrial Effluents Discharged into Rivers Using for Domestic Water Supply (TCVN 6980:2001)

| Parameters | Q > 200 $m^3/s$ | | | Q = 50- 200 $m^3/s$ | | | Q < 50 $m^3/s$ | | |
|---|---|---|---|---|---|---|---|---|---|
| | F1 | F2 | F3 | F1 | F2 | F3 | F1 | F2 | F3 |
| 1.Color, Co-Pt at pH=7 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 |
| 2. Odor | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 3. $BOD_5$ (20°C), mg/l | 40 | 35 | 35 | 30 | 25 | 25 | 20 | 20 | 20 |
| 4. COD, mg/l | 70 | 60 | 60 | 60 | 50 | 50 | 50 | 40 | 40 |
| 5. Suspended Solid, mg/l | 50 | 45 | 45 | 45 | 40 | 40 | 40 | 30 | 30 |
| 6.Arsenic, As, mg/l | 0.2 | 0.2 | 0.2 | 0.15 | 0.15 | 0.15 | 0.1 | 0.05 | 0.05 |
| 7.Lead, Pb, mg/l | 0.1 | 0.1 | 0.1 | 0.08 | 0.08 | 0.08 | 0.06 | 0.06 | 0.06 |
| 8. Oil and grease, mg/l | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| 9. Fat, mg/l | 20 | 20 | 20 | 10 | 10 | 10 | 5 | 5 | 5 |
| 10.Copper, Cu, mg/l | 0.4 | 0.4 | 0.4 | 0.3 | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 |
| 11.Zinc, Zn, mg/l | 1 | 1 | 1 | 0.7 | 0.7 | 0.7 | 0.5 | 0.5 | 0.5 |
| 12.Total Phosphorous, mg/l | 10 | 10 | 10 | 6 | 6 | 6 | 4 | 4 | 4 |
| 13.Chloride, $Cl^-$, mg/l | 600 | 600 | 600 | 600 | 600 | 600 | 600 | 600 | 600 |
| 14.Coliform, MPN/100ml | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 |

Note :
Q is river water flow rate, $m^3/s$
F is effluent flow, $m^3$/day (24 h)
F1 – from 50 to < 500 $m^3$/day
F2- from 500 to <5,000 $m^3$/day
F3- equal or higher than 5,000 $m^3$/day

Table A4.3.2 (7) Water Quality Standards for Industrial Effluents Discharged into Lakes Using for Domestic Water Supply (TCVN 6981:2001)

| Parameters | $V > 100x\ 10^6\ m^3$ | | | $V = (10\text{-}100) \times 10^6\ m^3$ | | | $V < 10 \times 10^6\ m^3$ | | |
|---|---|---|---|---|---|---|---|---|---|
| | F1 | F2 | F3 | F1 | F2 | F3 | F1 | F2 | F3 |
| 1.Color, Co-Pt at pH=7 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 | 20 |
| 2. Odor | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 3. $BOD_5$ (20°C), mg/l | 30 | 30 | 30 | 20 | 20 | 20 | 15 | 15 | 15 |
| 4. COD, mg/l | 60 | 60 | 60 | 40 | 40 | 40 | 30 | 30 | 30 |
| 5. Suspended Solid, mg/l | 50 | 50 | 50 | 40 | 40 | 40 | 30 | 20 | 15 |
| 6.Arsenic, As, mg/l | 0.05 | 0.04 | 0.04 | 0.04 | 0.03 | 0.03 | 0.03 | 0.02 | 0.02 |
| 7.Lead, Pb, mg/l | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| 8. Oil and grease, mg/l | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| 9. Fat, mg/l | 20 | 20 | 20 | 10 | 10 | 10 | 5 | 5 | 5 |
| 10.Copper, Cu, mg/l | 0.4 | 0.4 | 0.4 | 0.3 | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 |
| 11.Zinc, Zn, mg/l | 1 | 0.8 | 0.8 | 0.7 | 0.7 | 0.7 | 0.5 | 0.5 | 0.5 |
| 12.Total Phosphorous, mg/l | 10 | 8 | 8 | 8 | 6 | 6 | 6 | 4 | 4 |
| 13.Chloride, $Cl^-$, mg/l | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 |
| 14.Coliform, MPN/100ml | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 |

Note :
Q is lake water volume, $m^3$
F is effluent flow, $m^3$/day (24 h)
F1 – from 50 to < 500 $m^3$/day
F2- from 500 to <5,000 $m^3$/day
F3- equal or higher than 5,000 $m^3$/day

Table A4.3.2 (8) Water Quality Standards for Industrial Effluents Discharged into Rivers Using for Water Sports and Recreation (TCVN 6982:2001)

| Parameters | Q > 200 $m^3/s$ | | | Q = 50- 200 $m^3/s$ | | | Q < 50 $m^3/s$ | | |
|---|---|---|---|---|---|---|---|---|---|
| | F1 | F2 | F3 | F1 | F2 | F3 | F1 | F2 | F3 |
| 1.Color, Co-Pt at pH=7 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| 2. Odor | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 3. $BOD_5$ (20°C), mg/l | 50 | 40 | 40 | 40 | 30 | 30 | 30 | 30 | 30 |
| 4. COD, mg/l | 100 | 80 | 80 | 80 | 60 | 60 | 60 | 60 | 60 |
| 5. Suspended Solid, mg/l | 100 | 90 | 90 | 90 | 80 | 80 | 80 | 70 | 70 |
| 6.Arsenic, As, mg/l | 0.1 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.06 | 0.06 | 0.06 |
| 7.Lead, Pb, mg/l | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 |
| 8.Chromium, Cr (IV), mg/l | 0.1 | 0.08 | 0.08 | 0.08 | 0.08 | 0.08 | 0.06 | 0.06 | 0.06 |
| 9.Total Phosphorous, mg/l | 10 | 8 | 8 | 8 | 6 | 6 | 6 | 5 | 5 |
| 10.Chloride, $Cl^-$, mg/l | 600 | 600 | 600 | 600 | 600 | 600 | 600 | 600 | 600 |
| 11.Coliform, MPN/100ml | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 |

Note :
Q is river water flow rate, $m^3/s$
F is effluent flow, $m^3$/day (24 h)
F1 – from 50 to < 500 $m^3$/day
F2- from 500 to <5,000 $m^3$/day
F3- equal or higher than 5,000 $m^3$/day

Table A4.3.2 (9) Water Quality Standards for Industrial Effluents Discharged into Lakes Using for Waters Sports and Recreation (TCVN 6983:2001)

| Parameters | $V > 100x\ 10^6\ m^3$ | | | $V = (10\text{-}100) \times 10^6\ m^3$ | | | $V < 10 \times 10^6\ m^3$ | | |
|---|---|---|---|---|---|---|---|---|---|
| | F1 | F2 | F3 | F1 | F2 | F3 | F1 | F2 | F3 |
| 1.Color, Co-Pt at pH=7 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| 2. Odor | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 3. $BOD_5$ (20°C), mg/l | 50 | 40 | 40 | 30 | 30 | 30 | 30 | 20 | 20 |
| 4. COD, mg/l | 100 | 80 | 80 | 70 | 60 | 60 | 60 | 40 | 40 |
| 5. Suspended Solid, mg/l | 80 | 80 | 80 | 70 | 70 | 60 | 60 | 50 | 50 |
| 6.Arsenic, As, mg/l | 0.1 | 0.08 | 0.08 | 0.08 | 0.07 | 0.07 | 0.06 | 0.06 | 0.06 |
| 7.Lead, Pb, mg/l | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |
| 8. Chromium, Cr (VI), mg/l | 0.1 | 0.08 | 0.08 | 0.08 | 0.07 | 0.07 | 0.06 | 0.06 | 0.06 |
| 9.Total Phosphorous, mg/l | 8 | 6 | 6 | 6 | 5 | 5 | 5 | 4 | 4 |
| 10. Mercury, Hg, mg/l | 0.005 | 0.005 | 0.005 | 0.005 | 0.004 | 0.004 | 0.004 | 0.004 | 0.004 |
| 11.Chloride, $Cl^-$, mg/l | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 |
| 12.Coliform, MPN/100ml | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 | 3,000 |

Note :
Q is lake water volume, $m^3$
F is effluent flow, $m^3$/day (24 h)
F1 – from 50 to < 500 $m^3$/day
F2- from 500 to <5,000 $m^3$/day
F3- equal or higher than 5,000 $m^3$/day

Table A4.3.2 (10) Water Quality Standards for Industrial Effluents Discharged into Rivers Using for Protection of Aquatic Life
*(TCVN 6984:2001)*

| Parameters | Q > 200 $m^3/s$ | | | Q = 50- 200 $m^3/s$ | | | Q < 50 $m^3/s$ | | |
|---|---|---|---|---|---|---|---|---|---|
| | F1 | F2 | F3 | F1 | F2 | F3 | F1 | F2 | F3 |
| 1.Color, Co-Pt at pH=7 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| 2. Odor | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 3. Suspended Solid, mg/l | 100 | 100 | 100 | 90 | 80 | 80 | 80 | 80 | 80 |
| 4. pH | 6-8.5 | 6-8.5 | 6-8.5 | 6-8.5 | 6-8.5 | 6-8.5 | 6-8.5 | 6-8.5 | 6-8.5 |
| 5. $BOD_5$ (20°C), mg/l | 50 | 45 | 40 | 40 | 35 | 30 | 30 | 20 | 20 |
| 6. COD, mg/l | 100 | 90 | 80 | 80 | 70 | 60 | 60 | 50 | 50 |
| 7.Arsenic, As, mg/l | 0.1 | 0.1 | 0.1 | 0.08 | 0.08 | 0.08 | 0.05 | 0.05 | 0.05 |
| 8.Cadmium, Cd, mg/l | 0.02 | 0.02 | 0.02 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| 9.Lead, Pb, mg/l | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| 10.Iron, Fe, mg/l | 5 | 5 | 5 | 4 | 4 | 4 | 3 | 3 | 3 |
| 11. Cyanide,$CN^-$, mg/l | 0.1 | 0.1 | 0.1 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| 12. Oil and grease, mg/l | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| 13. Fat, mg/l | 20 | 20 | 20 | 10 | 10 | 10 | 5 | 5 | 5 |
| 14.Organic Phosphorous, mg/l | 1 | 1 | 0.8 | 0.8 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| 15.Total Phosphorous, mg/l | 10 | 8 | 8 | 6 | 6 | 6 | 5 | 5 | 4 |
| 16.Chloride, $Cl^-$, mg/l | 1,000 | 1,000 | 1,000 | 800 | 800 | 800 | 750 | 750 | 750 |
| 17. Active Surfacetant, mg/l | 10 | 10 | 10 | 5 | 5 | 5 | 5 | 5 | 5 |
| 18.Coliform, MPN/100ml | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 |
| 19.PCB, mg/l | 0.02 | 0.02 | 0.02 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |

Note :
Q is river water flow rate, $m^3/s$
F is effluent flow, $m^3$/day (24 h)
F1 – from 50 to < 500 $m^3$/day
F2- from 500 to <5,000 $m^3$/day
F3- equal or higher than 5,000 $m^3$/day

Table A4.3.2 (11) Water Quality Standards for Industrial Effluents Discharged Into Lakes Using for Protection of Aquatic Life (TCVN 6985:2001)

| Parameters | $V > 100x\ 10^6\ m^3$ | | | $V = (10\text{-}100)\ x\ 10^6\ m^3$ | | | $V < 10\ x\ 10^6\ m^3$ | | |
|---|---|---|---|---|---|---|---|---|---|
| | F1 | F2 | F3 | F1 | F2 | F3 | F1 | F2 | F3 |
| 1.Color, Co-Pt at pH=7 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| 2. Odor | light | light | Light | light | light | light | light | light | light |
| 3. Suspended Solid, mg/l | 100 | 90 | 90 | 80 | 70 | 70 | 70 | 70 | 70 |
| 4. pH | 6-8.5 | 6-8.5 | 6-8.5 | 6-8.5 | 6-8.5 | 6-8.5 | 6-8.5 | 6-8.5 | 6-8.5 |
| 5. $BOD_5$ (20°C), mg/l | 50 | 40 | 40 | 40 | 30 | 30 | 30 | 20 | 20 |
| 6. COD, mg/l | 90 | 80 | 80 | 70 | 60 | 60 | 50 | 50 | 50 |
| 7.Arsenic, As, mg/l | 0.1 | 0.07 | 0.07 | 0.05 | 0.05 | 0.04 | 0.04 | 0.03 | 0.03 |
| 8.Cadmium, Cd, mg/l | 0.02 | 0.015 | 0.015 | 0.01 | 0.01 | 0.01 | 0.005 | 0.01 | 0.01 |
| 9.Lead, Pb, mg/l | 0.5 | 0.4 | 0.4 | 0.3 | 0.3 | 0.3 | 0.2 | 0.1 | 0.1 |
| 10.Iron, Fe, mg/l | 5 | 5 | 5 | 4 | 4 | 4 | 3 | 3 | 3 |
| 11. Cyanide,$CN^-$, mg/l | 0.1 | 0.1 | 0.1 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |
| 12. Oil and grease, mg/l | 10 | 10 | 10 | 5 | 5 | 5 | 5 | 5 | 5 |
| 13. Fat, mg/l | 10 | 10 | 10 | 7 | 7 | 7 | 5 | 5 | 5 |
| 14.Organic Phosphorous, mg/l | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.3 | 0.3 | 0.3 |
| 15.Total Phosphorous, mg/l | 6 | 6 | 6 | 5 | 5 | 5 | 4 | 4 | 4 |
| 16.Chloride, $Cl^-$, mg/l | 750 | 750 | 700 | 650 | 600 | 600 | 500 | 500 | 500 |
| 17.Chlorine, mg/l | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 18. Active Surfacetant, mg/l | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| 19.Coliform, MPN/100ml | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 |
| 20.PCB, mg/l | 0.05 | 0.04 | 0.04 | 0.04 | 0.03 | 0.03 | 0.01 | 0.01 | 0.01 |

Note :

Q is lake water volume, $m^3$

F is effluent flow, $m^3$/day (24 h)

F1 – from 50 to < 500 $m^3$/day

F2- from 500 to <5,000 $m^3$/day

F3- equal or higher than 5,000 $m^3$/day

Table A4.3.2 (12) Water Quality Standards for Industrial Effluents Discharged into Coastal Waters Using for Protection of Aquatic Life (TCVN 6986:2001)

| Parameters | Permissible limits | | |
|---|---|---|---|
| | F1 | F2 | F3 |
| 1.Color, Co-Pt at pH=7 | 50 | 50 | 50 |
| 2. Odor | light | light | light |
| 3. Suspended Solid, mg/l | 100 | 80 | 50 |
| 4. pH | 5-9 | 5-9 | 5-9 |
| 5. $BOD_5$ (20°C), mg/l | 50 | 20 | 10 |
| 6. COD, mg/l | 100 | 80 | 50 |
| 7.Arsenic, As, mg/l | 1 | 0.5 | 0.1 |
| 8.Lead, Pb, mg/l | 1 | 0.5 | 0.5 |
| 9.Chromium, Cr (VI), mg/l | 1 | 0.5 | 0.1 |
| 10.Copper, Cu, mg/l | 1 | 0.5 | 0.1 |
| 11.Zinc, Zn, mg/l | 2 | 1 | 1 |
| 12.Manganese,Mn, mg/l | 5 | 5 | 1 |
| 13.Mercury, Hg, mg/l | 0.005 | 0.001 | 0.001 |
| 14.Total Nitrogent (as N), mg/l | 20 | 15 | 10 |
| 15. Oil and grease, mg/l | 10 | 5 | 5 |
| 16. Fat, mg/l | 30 | 20 | 10 |
| 17.Organic Phosphorous, mg/l | 0.5 | 0.2 | 0.2 |
| 18. Active Surfacetant, mg/l | 10 | 5 | 5 |
| 19.Coliform, MPN/100ml | 5,000 | 5,000 | 5,000 |

Note :
F is effluent flow, $m^3$/day (24 h)
F1 – from 50 to < 500 $m^3$/day
F2- from 500 to <5,000 $m^3$/day
F3- equal or higher than 5,000 $m^3$/day

Table A4.3.2 (13) Water Quality Standards for Industrial Effluents Discharged into Coastal Waters Using for Waters Sports and Recreation (TCVN 6987:2001)

| Parameters | Permissible limits | | |
|---|---|---|---|
| | F1 | F2 | F3 |
| 1.Temperature, °C | 50 | 50 | 50 |
| 2. Odor | light | light | light |
| 3.Color, Co-Pt at pH=7 | 30 | 30 | 30 |
| 4. Suspended Solid, mg/l | 100 | 80 | 60 |
| 5. pH | 5.5-8.5 | 5.5-8.5 | 5.5-8.5 |
| 6. $BOD_5$ (20°C), mg/l | 50 | 40 | 30 |
| 7. COD, mg/l | 100 | 80 | 50 |
| 8.Arsenic, As, mg/l | 1 | 0.5 | 0.1 |
| 9.Lead, Pb, mg/l | 0.5 | 0.4 | 0.4 |
| 10.Chromium, Cr (VI), mg/l | 1 | 0.5 | 0.1 |
| 11.Floride, F, mg/l | 25 | 25 | 15 |
| 12.Mercury, Hg, mg/l | 0.005 | 0.004 | 0.004 |
| 13.Sulfide, $S^{2-}$, mg/l | 1 | 0.5 | 0.5 |
| 14.Total Nitrogent (as N), mg/l | 20 | 15 | 10 |
| 15.Total Phosphorous, mg/l | 6 | 5 | 4 |
| 16. Oil and grease, mg/l | 5 | 5 | 5 |
| 17. Fat, mg/l | 10 | 10 | 10 |
| 18. Active Surfacetant, mg/l | 10 | 5 | 5 |
| 19.Coliform, MPN/100ml | 3,000 | 3,000 | 3,000 |

Note :
F is effluent flow, $m^3$/day (24 h)
F1 – from 50 to < 500 $m^3$/day
F2- from 500 to <5,000 $m^3$/day
F3- equal or higher than 5,000 $m^3$/day

Table A4.3.2 (14) Air Quality Standards for Inorganic Substances in Industrial Emission Discharged in Industrial Zones (TCVN 6991:2001)

Unit : mg/Nm$^3$

| No | Pollutant | Level A Technology $K_{CN}$ = 0.6 | | | Level B Technology $K_{CN}$ = 0.75 | | | Level C Technology $K_{CN}$ = 1 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | $Q_1$ $K_Q$=1 | $Q_2$ $K_Q$=0.75 | $Q_3$ $K_Q$=0.5 | $Q_1$ $K_Q$=1 | $Q_2$ $K_Q$=0.75 | $Q_3$ $K_Q$=0.5 | $Q_1$ $K_Q$=1 | $Q_2$ $K_Q$=0.75 | $Q_3$ $K_Q$=0.5 |
| 1 | Antimony | 15 | 11.25 | 7.5 | 18.75 | 14.0625 | 9.375 | 25 | 18.75 | 12.5 |
| 2 | Arsenic | 6 | 4.5 | 3 | 7.5 | 5.625 | 3.75 | 10 | 7.5 | 5 |
| 3 | Cadmium | 0.6 | 0.45 | 0.3 | 0.75 | 0.5625 | 0.375 | 1 | 0.75 | 0.5 |
| 4 | Lead | 6 | 4.5 | 3 | 7.5 | 5.625 | 3.75 | 10 | 7.5 | 5 |
| 5 | Copper | 12 | 9 | 6 | 15 | 11.25 | 7.5 | 20 | 15 | 10 |
| 6 | Zinc | 18 | 13.5 | 9 | 22.5 | 16.875 | 11.25 | 30 | 22.5 | 15 |
| 7 | Chlorine | 12 | 9 | 6 | 15 | 11.25 | 7.5 | 20 | 15 | 10 |
| 8 | Hydrogen Chloride | 120 | 90 | 60 | 150 | 112.5 | 75 | 200 | 150 | 100 |
| 9 | Florine, Hydrogen Fluoride | 6 | 4.5 | 3 | 7.5 | 5.625 | 3.75 | 10 | 7.5 | 5 |
| 10 | Hydrogen Sulfide | 1.2 | 0.9 | 0.6 | 1.5 | 1.125 | 0.75 | 2 | 1.5 | 1 |
| 11 | Carbon Monoxide | 300 | 225 | 150 | 375 | 281.25 | 187.5 | 500 | 375 | 250 |
| 12 | Sulfur Dioxide | 300 | 225 | 150 | 375 | 281.25 | 187.5 | 500 | 375 | 250 |
| 13 | Nitogen Oxides (All sources) | 600 | 450 | 300 | 750 | 562.5 | 375 | 1,000 | 750 | 500 |
| 14 | Nitogen Oxides (from Acid Production Enterprises) | 600 | 450 | 300 | 750 | 562.5 | 375 | 1,000 | 750 | 500 |
| 15 | Sulfuric Acid | 21 | 15.75 | 10.5 | 26.25 | 19.6875 | 13.125 | 35 | 26.25 | 17.5 |
| 16 | Nitric Acid | 42 | 31.5 | 21 | 52.5 | 39.375 | 26.25 | 70 | 52.5 | 35 |
| 17 | Ammonia | 60 | 45 | 30 | 75 | 56.25 | 37.5 | 100 | 75 | 50 |

Q1 applied for the emission sources with flow rate of less than 5,000 m$^3$/h (Q < 5,000 m$^3$/h).
Q2 applied for the emission sources with flow rate of equal or more than 5,000 m$^3$/h and less than 20,000 m$^3$/h.
Q3 applied for the emission sources with flow rate of equal or more than 20,000 m$^3$/h.
Level A Technology : applied for the industries equipped with new and modern facilities, those equivalent to the present technolgy level in the World.
Level B Technology : Applied for the existing industries (Level C) equipped with pollution control facilities or for the existing industries (Level A), those have been operated before the time of issue of the standards.
Level C Technology : Applied for the existing industries, those have been operated before the time of issue of the Environmental Protection Law (i.e before January, 1994).
$K_{CN}$ : Technology Level Coefficient.
$K_Q$ : Emission Source Size Coefficient.
$K_V$ : Regional Coefficient.

Table A4.3.2 (15) Air Quality Standards for Inorganic Substances in Industrial Emission Discharged in Urban Regions (TCVN 6992:2001)

Unit : mg/Nm$^3$

| No | Pollutant | Level A Technology $K_{CN}$ = 0.6 | | | Level B Technology $K_{CN}$ = 0.75 | | | Level C Technology $K_{CN}$ = 1 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | $Q_1$ $K_Q$=1 | $Q_2$ $K_Q$=0.75 | $Q_3$ $K_Q$=0.5 | $Q_1$ $K_Q$=1 | $Q_2$ $K_Q$=0.75 | $Q_3$ $K_Q$=0.5 | $Q_1$ $K_Q$=1 | $Q_2$ $K_Q$=0.75 | $Q_3$ $K_Q$=0.5 |
| 1 | Antimony | 12 | 9 | 6 | 15 | 11.25 | 7.5 | 20 | 15 | 10 |
| 2 | Arsenic | 4.8 | 3.6 | 2.4 | 6 | 4.5 | 3 | 8 | 6 | 4 |
| 3 | Cadmium | 0.48 | 0.36 | 0.24 | 0.6 | 0.45 | 0.3 | 0.8 | 0.6 | 0.4 |
| 4 | Lead | 4.8 | 3.6 | 2.4 | 6 | 4.5 | 3 | 8 | 6 | 4 |
| 5 | Copper | 9.6 | 7.2 | 4.8 | 12 | 9 | 6 | 16 | 12 | 8 |
| 6 | Zinc | 14.4 | 10.8 | 7.2 | 18 | 13.5 | 9 | 24 | 18 | 12 |
| 7 | Chlorine | 9.6 | 7.2 | 4.8 | 12 | 9 | 6 | 16 | 12 | 8 |
| 8 | Hydrogen Chloride | 96 | 72 | 48 | 120 | 90 | 60 | 160 | 120 | 80 |
| 9 | Florine, Hydrogen Fluoride | 4.8 | 3.6 | 2.4 | 6 | 4.5 | 3 | 8 | 6 | 4 |
| 10 | Hydrogen Sulfide | 0.96 | 0.72 | 0.48 | 1.2 | 0.9 | 0.6 | 1.6 | 1.2 | 0.8 |
| 11 | Carbon Monoxide | 240 | 180 | 120 | 300 | 225 | 150 | 400 | 300 | 200 |
| 12 | Sulfur Dioxide | 240 | 180 | 120 | 300 | 225 | 150 | 400 | 300 | 200 |
| 13 | Nitogen Oxides (All sources) | 480 | 360 | 240 | 600 | 450 | 300 | 800 | 600 | 400 |
| 14 | Nitogen Oxides (from Acid Production Enterprises) | 480 | 360 | 240 | 600 | 450 | 300 | 800 | 600 | 400 |
| 15 | Sulfuric Acid | 16.8 | 12.6 | 8.4 | 21 | 15.75 | 10.5 | 28 | 21 | 14 |
| 16 | Nitric Acid | 33.6 | 25.2 | 16.8 | 42 | 31.5 | 21 | 56 | 42 | 28 |
| 17 | Ammonia | 48 | 36 | 24 | 60 | 45 | 30 | 80 | 60 | 40 |

Q1 applied for the emission sources with flow rate of less than 5,000 m$^3$/h (Q < 5,000 m$^3$/h).
Q2 applied for the emission sources with flow rate of equal or more than 5,000 m$^3$/h and less than 20,000 m$^3$/h.
Q3 applied for the emission sources with flow rate of equal or more than 20,000 m$^3$/h.
Level A Technology : applied for the indudtries equipped with new and modern facilities, those equivalent to the present technolgy level in the World.
Level B Technology : Applied for the existing industries (Level C) equipped with pollution control facilities or for the existing industries (Level A), those have been operated before the time of issue of the standards.
Level C Technology : Applied for the existing industries, those have been operated before the time of issue of the Environmental Protection Law (i.e before January, 1994).
$K_{CN}$ : Technology Level Coefficient.
$K_Q$ : Emission Source Size Coefficient.
$K_V$ : Regional Coefficient.

Table A4.3.2 (16) Air Quality Standards for Inorganic Substances in Industrial Emission Discharged in Rural and Mountainous Regions (TCVN 6993:2001)

Unit : mg/Nm$^3$

| No | Pollutant | Level A Technology $K_{CN}$ = 0.6 | | | Level B Technology $K_{CN}$ = 0.75 | | | Level C Technology $K_{CN}$ = 1 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | $Q_1$ $K_Q$=1 | $Q_2$ $K_Q$=0.75 | $Q_3$ $K_Q$=0.5 | $Q_1$ $K_Q$=1 | $Q_2$ $K_Q$=0.75 | $Q_3$ $K_Q$=0.5 | $Q_1$ $K_Q$=1 | $Q_2$ $K_Q$=0.75 | $Q_3$ $K_Q$=0.5 |
| 1 | Antimony | 18 | 13.5 | 9 | 22.5 | 16.875 | 11.25 | 30 | 22.5 | 15 |
| 2 | Arsenic | 7.2 | 5.4 | 3.6 | 9 | 6.75 | 4.5 | 12 | 9 | 6 |
| 3 | Cadmium | 0.72 | 0.54 | 0.36 | 0.9 | 0.675 | 0.45 | 1.2 | 0.9 | 0.6 |
| 4 | Lead | 7.2 | 5.4 | 3.6 | 18 | 6.75 | 4.5 | 12 | 9 | 6 |
| 5 | Copper | 14.4 | 10.8 | 7.2 | 27 | 13.5 | 9 | 24 | 18 | 12 |
| 6 | Zinc | 21.6 | 16.2 | 10.8 | 18 | 20.25 | 13.5 | 36 | 27 | 18 |
| 7 | Chlorine | 14.4 | 10.8 | 7.2 | 80 | 13.5 | 9 | 24 | 18 | 12 |
| 8 | Hydrogen Chloride | 144 | 108 | 72 | 180 | 135 | 90 | 240 | 180 | 120 |
| 9 | Florine, Hydrogen Fluoride | 7.2 | 5.4 | 3.6 | 9 | 6.75 | 4.5 | 12 | 9 | 6 |
| 10 | Hydrogen Sulfide | 1.44 | 1.08 | 0.72 | 1.8 | 1.35 | 0.9 | 2.4 | 1.8 | 1.2 |
| 11 | Carbon Monoxide | 360 | 270 | 180 | 450 | 337.5 | 225 | 600 | 450 | 300 |
| 12 | Sulfur Dioxide | 360 | 270 | 180 | 450 | 337.5 | 225 | 600 | 450 | 300 |
| 13 | Nitogen Oxides (All sources) | 720 | 540 | 360 | 900 | 675 | 450 | 1,200 | 900 | 600 |
| 14 | Nitogen Oxides (from Acid Production Enterprises) | 720 | 540 | 360 | 900 | 675 | 450 | 1,200 | 900 | 600 |
| 15 | Sulfuric Acid | 25.2 | 18.9 | 12.6 | 31.5 | 23.625 | 15.75 | 42 | 31.5 | 21 |
| 16 | Nitric Acid | 50.4 | 37.8 | 25.2 | 63 | 47.25 | 31.5 | 84 | 63 | 42 |
| 17 | Ammonia | 72 | 54 | 36 | 90 | 67.5 | 45 | 120 | 90 | 60 |

Q1 applied for the emission sources with flow rate of less than 5,000 m$^3$/h (Q < 5,000 m$^3$/h).
Q2 applied for the emission sources with flow rate of equal or more than 5,000 m$^3$/h and less than 20,000 m$^3$/h.
Q3 applied for the emission sources with flow rate of equal or more than 20,000 m$^3$/h.
Level A Technology : applied for the indudtries equipped with new and modern facilities, those equivalent to the present technolgy level in the World.
Level B Technology : Applied for the existing industries (Level C) equipped with pollution control facilities or for the existing industries (Level A), those have been operated before the time of issue of the standards.
Level C Technology : Applied for the existing industries, those have been operated before the time of issue of the Environmental Protection Law (i.e before January, 1994).
$K_{CN}$ : Technology Level Coefficient.
$K_Q$ : Emission Source Size Coefficient.
$K_V$ : Regional Coefficient.

Table A4.3.2 (17) Air Quality Standards for Organic Substances in Industrial Emission Discharged in Industrial Zones (TCVN 6994:2001)

Unit : mg/Nm$^3$

| No | Pollutant | Level A Technology $K_{CN}$ = 0.6 | | | Level B Technology $K_{CN}$ = 0.75 | | | Level C Technology $K_{CN}$ = 1 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | $Q_1$ $K_Q$=1 | $Q_2$ $K_Q$=0.75 | $Q_3$ $K_Q$=0.5 | $Q_1$ $K_Q$=1 | $Q_2$ $K_Q$=0.75 | $Q_3$ $K_Q$=0.5 | $Q_1$ $K_Q$=1 | $Q_2$ $K_Q$=0.75 | $Q_3$ $K_Q$=0.5 |
| 1 | Acetone | 1,440 | 1,080 | 720 | 1,800 | 1,350 | 900 | 2,400 | 1,800 | 1,200 |
| 2 | Acetaldehyde | 162 | 121.5 | 81 | 202.5 | 151.875 | 101.25 | 270 | 202.5 | 135 |
| 3 | Benzene | 48 | 36 | 24 | 60 | 45 | 30 | 80 | 60 | 40 |
| 4 | Butane | 1,410 | 1,057.5 | 705 | 1,762.5 | 1,321.875 | 196.875 | 525 | 393.75 | 262.5 |
| 5 | n-Butanol | 180 | 135 | 90 | 225 | 168.75 | 112.5 | 300 | 225 | 150 |
| 6 | Ethanol | 1,140 | 855 | 570 | 1,425 | 1,068.75 | 712.5 | 1,900 | 1,425 | 950 |
| 7 | Formaldehyde | 3.6 | 2.7 | 1.8 | 4.5 | 3.375 | 2.25 | 6 | 4.5 | 3 |
| 8 | Methanol | 156 | 117 | 78 | 195 | 146.25 | 97.5 | 260 | 195 | 130 |
| 9 | Phenol | 11.4 | 8.55 | 5.7 | 14.25 | 10.6875 | 7.125 | 19 | 14.25 | 9.5 |
| 10 | Toluene | 450 | 337.5 | 225 | 562.5 | 421.875 | 281.25 | 750 | 562.5 | 375 |
| 11 | Xylene | 522 | 391.5 | 261 | 652.5 | 489.375 | 326.25 | 870 | 652.5 | 435 |

Q1 applied for the emission sources with flow rate of less than 5,000 m$^3$/h (Q < 5,000 m$^3$/h).
Q2 applied for the emission sources with flow rate of equal or more than 5,000 m$^3$/h and less than 20,000 m$^3$/h.
Q3 applied for the emission sources with flow rate of equal or more than 20,000 m$^3$/h.
Level A Technology : applied for the indudtries equipped with new and modern facilities, those equivalent to the present technolgy level in the World.
Level B Technology : Applied for the existing industries (Level C) equipped with pollution control facilities or for the existing industries (Level A), those have been operated before the time of issue of the standards.
Level C Technology : Applied for the existing industries, those have been operated before the time of issue of the Environmental Protection Law (i.e before January, 1994).
$K_{CN}$ : Technology Level Coefficient.
$K_Q$ : Emission Source Size Coefficient.
$K_V$ : Regional Coefficient.

Table A4.3.2 (18) Air Quality Standards for Organic Substances in Industrial Emission Discharged in Urban Regions (TCVN 6995:2001)

Unit : mg/Nm$^3$

| No | Pollutant | Level A Technology $K_{CN}$ = 0.6 | | | Level B Technology $K_{CN}$ = 0.75 | | | Level C Technology $K_{CN}$ = 1 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | $Q_1$ $K_Q$=1 | $Q_2$ $K_Q$=0.75 | $Q_3$ $K_Q$=0.5 | $Q_1$ $K_Q$=1 | $Q_2$ $K_Q$=0.75 | $Q_3$ $K_Q$=0.5 | $Q_1$ $K_Q$=1 | $Q_2$ $K_Q$=0.75 | $Q_3$ $K_Q$=0.5 |
| 1 | Acetone | 1,152 | 864 | 576 | 1,440 | 1,080 | 720 | 1,920 | 1,440 | 960 |
| 2 | Acetaldehyde | 129.6 | 97.2 | 64.8 | 162 | 121.5 | 81 | 216 | 162 | 108 |
| 3 | Benzene | 38.4 | 28.8 | 19.2 | 48 | 36 | 24 | 64 | 48 | 32 |
| 4 | Butane | 1,128 | 846 | 564 | 1,410 | 1,057.5 | 705 | 1,880 | 1,410 | 940 |
| 5 | n-Butanol | 144 | 108 | 72 | 180 | 135 | 90 | 240 | 180 | 120 |
| 6 | Ethanol | 912 | 684 | 456 | 1,140 | 855 | 570 | 1,520 | 1,140 | 760 |
| 7 | Formaldehyde | 2.88 | 2.16 | 1.44 | 3.6 | 2.7 | 1.8 | 4.8 | 3.6 | 2.4 |
| 8 | Methanol | 124.8 | 93.6 | 62.4 | 156 | 117 | 78 | 208 | 156 | 104 |
| 9 | Phenol | 9.12 | 6.84 | 4.58 | 11.4 | 8.55 | 5.7 | 15.2 | 11.4 | 7.6 |
| 10 | Toluene | 360 | 270 | 180 | 450 | 337.5 | 225 | 600 | 450 | 300 |
| 11 | Xylene | 417.6 | 313.2 | 208.8 | 522 | 391.5 | 261 | 696 | 522 | 348 |

Q1 applied for the emission sources with flow rate of less than 5,000 m$^3$/h (Q < 5,000 m$^3$/h).
Q2 applied for the emission sources with flow rate of equal or more than 5,000 m$^3$/h and less than 20,000 m$^3$/h.
Q3 applied for the emission sources with flow rate of equal or more than 20,000 m$^3$/h.
Level A Technology : applied for the indudtries equipped with new and modern facilities, those equivalent to the present technolgy level in the World.
Level B Technology : Applied for the existing industries (Level C) equipped with pollution control facilities or for the existing industries (Level A), those have been operated before the time of issue of the standards.
Level C Technology : Applied for the existing industries, those have been operated before the time of issue of the Environmental Protection Law (i.e before January, 1994).
$K_{CN}$ : Technology Level Coefficient.
$K_Q$ : Emission Source Size Coefficient.
$K_V$ : Regional Coefficient.

Table A4.3.2 (19) Air Quality Standards for Organic Substances in Industrial Emission Discharged in Rural and Mountainous Regions (TCVN 6996:2001)

Unit : mg/Nm$^3$

| No | Pollutant | Level A Technology $K_{CN}$ = 0.6 | | | Level B Technology $K_{CN}$ = 0.75 | | | Level C Technology $K_{CN}$ = 1 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | $Q_1$ $K_Q$=1 | $Q_2$ $K_Q$=0.75 | $Q_3$ $K_Q$=0.5 | $Q_1$ $K_Q$=1 | $Q_2$ $K_Q$=0.75 | $Q_3$ $K_Q$=0.5 | $Q_1$ $K_Q$=1 | $Q_2$ $K_Q$=0.75 | $Q_3$ $K_Q$=0.5 |
| 1 | Acetone | 1,728 | 1,296 | 864 | 2,160 | 1,620 | 1,080 | 2,880 | 2,160 | 1,440 |
| 2 | Acetaldehyde | 194.4 | 145.8 | 97.2 | 243 | 182.25 | 121.5 | 324 | 243 | 162 |
| 3 | Benzene | 57.6 | 43.2 | 28.8 | 72 | 54 | 36 | 96 | 72 | 48 |
| 4 | Butane | 1,692 | 1,269 | 846 | 2,115 | 1,586.25 | 1,057.5 | 2,820 | 2,115 | 1,410 |
| 5 | n-Butanol | 216 | 162 | 108 | 270 | 202.5 | 135 | 360 | 270 | 180 |
| 6 | Ethanol | 1,368 | 1,026 | 684 | 1,710 | 1,282.5 | 855 | 2,280 | 1,710 | 1,140 |
| 7 | Formaldehyde | 4.32 | 3.24 | 2.16 | 5.4 | 4.05 | 2.7 | 7.2 | 5.4 | 3.6 |
| 8 | Methanol | 187.2 | 140.4 | 93.6 | 234 | 175.5 | 117 | 312 | 234 | 156 |
| 9 | Phenol | 13.68 | 10.26 | 6.84 | 17.1 | 12.825 | 8.55 | 22.8 | 17.1 | 11.4 |
| 10 | Toluene | 540 | 405 | 270 | 675 | 506.25 | 337.5 | 900 | 675 | 450 |
| 11 | Xylene | 626.4 | 469.8 | 313.2 | 783 | 587.25 | 391.5 | 1,044 | 783 | 522 |

Q1 applied for the emission sources with flow rate of less than 5,000 m$^3$/h (Q < 5,000 m$^3$/h).
Q2 applied for the emission sources with flow rate of equal or more than 5,000 m$^3$/h and less than 20,000 m$^3$/h.
Q3 applied for the emission sources with flow rate of equal or more than 20,000 m$^3$/h.
Level A Technology : applied for the indudtries equipped with new and modern facilities, those equivalent to the present technolgy level in the World.
Level B Technology : Applied for the existing industries (Level C) equipped with pollution control facilities or for the existing industries (Level A), those have been operated before the time of issue of the standards.
Level C Technology : Applied for the existing industries, those have been operated before the time of issue of the Environmental Protection Law (i.e before January, 1994).
$K_{CN}$ : Technology Level Coefficient.
$K_Q$ : Emission Source Size Coefficient.
$K_V$ : Regional Coefficient.

Table A4.4.1 Result of Sediment Quality Tests

## 1. Physical Items

| Item | | Thi Vai Survey Area (Phu My) | | | | | Thi Vai Survey Area (Cai Mep) | | | | | Ben Dinh-Sao Mai Survey Area | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| Bulk Density ($g/cm^3$) | | 1.5942 | 1.2142 | 1.2460 | 1.3900 | 1.7406 | 1.2346 | 1.3538 | 1.4479 | 1.3140 | 1.4435 | 1.8880 | 1.5430 | 1.4056 | 1.3664 | 1.2376 |
| Water Content (%) | | 49 | 44 | 45 | 40 | 24 | 46 | 33 | 34 | 39 | 12 | 34 | 32 | 34 | 38 | 34 |
| Ignition Loss (%) | | 4 | 4 | 7 | 7 | 6 | 5 | 5 | 7 | 5 | 5 | 6 | 7 | 6 | 6 | 8 |
| Graine Size (%) | >0.84mm | 3.0 | 7.8 | 33.8 | 34.5 | 36.5 | 13.0 | 15.5 | 20.5 | 18.5 | 18.5 | 61.5 | 12.0 | 11.5 | 17.0 | 19.0 |
| | >0.50mm | 3.5 | 8.1 | 10.3 | 13.8 | 19.3 | 11.3 | 15.0 | 11.3 | 13.8 | 10.5 | 11.3 | 10.3 | 11.8 | 12.3 | 11.0 |
| | >0.297mm | 9.8 | 8.4 | 13.8 | 14.3 | 16.3 | 12.3 | 21.3 | 12.3 | 14.3 | 11.0 | 10.0 | 9.8 | 11.8 | 12.8 | 11.3 |
| | >0.125mm | 3.9 | 7.9 | 15.8 | 14.0 | 15.5 | 12.0 | 25.5 | 14.0 | 18.5 | 10.3 | 8.3 | 31.0 | 17.5 | 19.9 | 15.0 |
| | >0.053mm | 1.3 | 9.9 | 13.5 | 12.8 | 11.0 | 14.0 | 8.5 | 12.5 | 12.0 | 10.0 | 5.0 | 18.0 | 21.5 | 16.0 | 12.3 |
| | <0.053mm | 78.6 | 58.0 | 13.0 | 10.8 | 1.5 | 37.5 | 14.3 | 29.5 | 23.0 | 39.8 | 4.0 | 19.0 | 26.0 | 22.2 | 31.5 |

## 2. Health Items

| Item | Unit | Thi Vai Survey Area (Phu My) | | | | | Thi Vai Survey Area (Cai Mep) | | | | | Ben Dinh-Sao Mai Survey Area | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| Cadmium | (ppm) | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Cyanogen | (ppm) | 0.003 | 0.002 | 0.004 | 0.006 | 0.005 | 0.006 | 0.005 | 0.004 | 0.005 | 0.004 | 0.006 | 0.006 | 0.006 | 0.005 | 0.007 |
| Lead | (ppm) | 3.96 | 8.42 | 10.80 | 8.50 | 2.00 | 9.50 | 10.00 | 10.80 | 10.80 | 14.40 | 3.50 | 10.10 | 14.00 | 16.42 | 30.50 |
| Hexavalent Chromium | (ppm) | 14.23 | 12.80 | 9.90 | 8.30 | 1.84 | 8.90 | 8.10 | 9.90 | 1.30 | 10.15 | 0.20 | 3.74 | 7.65 | 11.20 | 1.90 |
| Arsenic | $(ppm)*10^{-3}$ | 4.0 | 3.2 | 3.5 | 3.7 | 4.5 | 4.2 | 3.8 | 2.8 | 3.5 | 4.1 | 3.5 | 4.2 | 5.6 | 3.2 | 3.2 |
| Mercury | $(ppm)*10^{-3}$ | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 |
| Alkyl Mercury | $(ppm)*10^{-3}$ | ND | | | | | | | | | | | | | | |
| PCB | $(ppm)*10^{-3}$ | 0.02 | 0.04 | 0.23 | 0.21 | 0.06 | 0.12 | 1.42 | 0.63 | 0.32 | 0.44 | 0.50 | 0.82 | 0.32 | 0.16 | 1.22 |

**ND**: Not Detected
The Quantity of this parameter that may be present in this sample is below the limits of detection of the analysis method employed.
It should be noted that the value ND does not imply that there is no amount of this substance in the water, but rather than, if it is present, it is in amounts so small that the analytical method cannot determine the quantity.

Table A4.4.2 (1) Result of Water Quality Tests

## 1. General Items

| Item | Depth | Thi Vai Survey Area (Phu My) | | | | | Thi Vai Survey Area (Cai Mep) | | | | | Ben Dinh-Sao Mai Survey Area | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| Temperature (℃) | Surface | 32.4 | 31.7 | 32.1 | 31.6 | 31.9 | 31.4 | 30.9 | 31.1 | 30.8 | 30.7 | 30.3 | 30.5 | 30.7 | 30.9 | 31.4 |
| | Middle | 31.8 | 31.5 | 32.4 | 31.9 | 31.1 | 30.9 | 30.7 | 30.7 | 30.7 | 30.6 | 30.3 | 30.4 | 30.6 | 30.6 | 31.3 |
| | Bottom | 31.5 | 31.1 | 32.0 | 31.4 | 31.0 | 30.9 | 30.6 | 30.9 | 30.6 | 30.5 | 30.3 | 30.2 | 30.6 | 30.7 | 31.4 |
| Salinity (%) | Surface | 2.55 | 2.56 | 2.57 | 2.55 | 2.59 | 2.65 | 2.66 | 2.60 | 2.62 | 2.63 | 2.71 | 2.72 | 2.68 | 2.63 | 2.73 |
| | Middle | 2.51 | 2.57 | 2.56 | 2.57 | 2.60 | 2.64 | 2.64 | 2.64 | 2.55 | 2.61 | 2.72 | 2.67 | 2.68 | 2.66 | 2.64 |
| | Bottom | 2.51 | 2.57 | 2.55 | 2.60 | 2.63 | 2.65 | 2.63 | 2.62 | 2.61 | 2.65 | 2.76 | 2.61 | 2.68 | 2.65 | 2.53 |
| Specific Gravity ($g/cm^3$) | Surface | 1.0111 | 1.0100 | 1.0099 | 1.0110 | 1.0151 | 1.0146 | 1.0153 | 1.0142 | 1.0144 | 1.0142 | 1.1375 | 1.1305 | 1.1387 | 1.1423 | 1.1438 |
| | Middle | 1.0114 | 1.0102 | 1.0107 | 1.0115 | 1.0153 | 1.0139 | 1.0151 | 1.0135 | 1.0150 | 1.0147 | 1.1417 | 1.1315 | 1.1389 | 1.1437 | 1.1439 |
| | Bottom | 1.0117 | 1.0107 | 1.0110 | 1.0117 | 1.0155 | 1.0145 | 1.0158 | 1.0156 | 1.0156 | 1.0149 | 1.1419 | 1.1315 | 1.1388 | 1.1439 | 1.1439 |
| pH | Surface | 7.3 | 7.3 | 7.3 | 7.5 | 7.5 | 7.8 | 7.8 | 7.7 | 7.8 | 7.8 | 7.9 | 8.0 | 8.0 | 7.9 | 7.9 |
| | Middle | 7.3 | 7.3 | 7.4 | 7.4 | 7.4 | 7.7 | 7.8 | 7.7 | 7.8 | 7.8 | 8.0 | 8.0 | 8.0 | 7.9 | 7.9 |
| | Bottom | 7.1 | 7.3 | 7.4 | 7.4 | 7.4 | 7.8 | 7.7 | 7.8 | 7.7 | 7.7 | 8.0 | 8.0 | 8.0 | 7.8 | 7.9 |
| DO (mg/l) | Surface | 3.2 | 4.2 | 4.4 | 3.7 | 3.9 | 4.4 | 5.0 | 4.7 | 5.2 | 5.4 | 5.1 | 4.4 | 5.0 | 4.4 | 5.3 |
| | Middle | 3.3 | 3.1 | 3.2 | 4.7 | 4.0 | 4.9 | 4.0 | 4.6 | 4.4 | 4.9 | 5.4 | 4.5 | 4.5 | 4.3 | 4.2 |
| | Bottom | 3.1 | 3.6 | 3.6 | 4.0 | 3.3 | 4.6 | 4.6 | 5.6 | 4.3 | 4.6 | 4.7 | 4.3 | 4.5 | 4.8 | 4.3 |
| Transparency (cm) | Surface | > 30 | < 30 | > 30 | > 30 | > 30 | > 30 | < 30 | > 30 | < 30 | > 30 | > 30 | < 30 | > 30 | > 30 | < 30 |
| | Middle | > 30 | > 30 | > 30 | < 30 | > 30 | < 30 | > 30 | > 30 | > 30 | < 30 | > 30 | < 30 | < 30 | < 30 | < 30 |
| | Bottom | > 30 | > 30 | > 30 | > 30 | > 30 | < 30 | < 30 | > 30 | > 30 | < 30 | < 30 | < 30 | < 30 | > 30 | < 30 |

## 2. Organic Pollution Items

| Item | Depth | Thi Vai Survey Area (Phu My) | | | | | Thi Vai Survey Area (Cai Mep) | | | | | Ben Dinh-Sao Mai Survey Area | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| $BOD_5$ (mg/l) | Surface | 7 | 6 | 7 | 5 | 6 | 4 | 5 | 6 | 6 | 6 | 6 | 6 | 6 | 4 | 5 |
| | Middle | 7 | 6 | 7 | 5 | 6 | 5 | 5 | 6 | 6 | 6 | 6 | 6 | 6 | 5 | 6 |
| | Bottom | 6 | 6 | 6 | 5 | 6 | 6 | 6 | 6 | 6 | 6 | 7 | 6 | 5 | 5 | 6 |
| Total Coliform (MNP/100ml) | Surface | 600 | 300 | 800 | 400 | 1500 | 400 | 600 | 300 | 900 | 600 | 4300 | 400 | 1000 | 900 | 600 |
| | Middle | 550 | 700 | 350 | 400 | 900 | 400 | 800 | 300 | 400 | 900 | 900 | 400 | 800 | 400 | 600 |
| | Bottom | 550 | 800 | 400 | 900 | 900 | 900 | 500 | 400 | 400 | 400 | 7500 | 900 | 900 | 700 | 400 |
| N-Hexane (mg/l) | Surface | 0.04 | < 0.01 | < 0.01 | 0.12 | 0.06 | 0.02 | 0.07 | 0.07 | 0.09 | < 0.01 | 0.15 | 0.21 | 0.12 | 0.15 | 0.01 |
| | Middle | 0.04 | 0.06 | 0.02 | 0.02 | < 0.01 | 0.03 | 0.08 | 0.02 | 0.01 | 0.03 | 0.01 | 0.01 | 0.01 | 0.01 | 0.16 |
| | Bottom | 0.05 | 0.10 | 0.05 | < 0.01 | < 0.01 | 0.12 | 0.09 | 0.02 | 0.01 | 0.07 | < 0.01 | 0.01 | 0.02 | 0.03 | 0.21 |

**ND**: Not Detected
The Quantity of this parameter that may be present in this sample is below the limits of detection of the analysis method employed.
It should be noted that the value ND does not imply that there is no amount of this substance in the water, but rather than, if it is present, it is in amounts so small that the analytical method cannot determine the quantity.

Table A4.4.2 (2) Result of Water Quality Tests

3. Health Items

| Item | Depth | Thi Vai River (Phu My Area) | | | | | Thi Vai River (Cai Mep Area) | | | | | Ganh Rai Bay (Vung Tau Area) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| Cadmium ($mg/l$) $10^{-3}$ | Surface | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| | Middle | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| | Bottom | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Cyanogen ($mg/l$) | Surface | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| | Middle | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| | Bottom | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Lead ($mg/l$) $10^{-3}$ | Surface | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| | Middle | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| | Bottom | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Hexavalent Chromium ($mg/l$) | Surface | 0.020 | 0.027 | 0.030 | 0.034 | 0.027 | 0.021 | 0.033 | 0.032 | 0.028 | 0.033 | 0.035 | 0.037 | 0.040 | 0.039 | 0.033 |
| | Middle | 0.025 | 0.027 | 0.034 | 0.039 | 0.025 | 0.023 | 0.035 | 0.029 | 0.028 | 0.034 | 0.038 | 0.037 | 0.035 | 0.034 | 0.032 |
| | Bottom | 0.021 | 0.029 | 0.029 | 0.036 | 0.020 | 0.024 | 0.031 | 0.035 | 0.026 | 0.035 | 0.039 | 0.034 | 0.036 | 0.035 | 0.037 |
| Arsenic ($mg/l$) $10^{-6}$ | Surface | < 0.01 | 0.20 | 0.29 | 0.26 | 0.48 | 0.56 | 0.49 | 0.71 | 0.53 | 0.44 | 1.38 | 0.83 | 0.79 | 0.89 | 1.43 |
| | Middle | < 0.01 | 0.34 | 0.34 | 0.24 | 0.35 | 0.42 | 0.49 | 0.69 | 0.41 | 0.39 | 1.35 | 1.25 | 0.65 | 0.68 | 0.96 |
| | Bottom | 0.09 | 0.21 | 0.34 | 0.34 | 0.32 | 0.46 | 0.45 | 0.70 | 0.45 | 0.40 | 1.33 | 0.61 | 0.59 | 0.65 | 0.87 |
| Mercury ($mg/l$) $10^{-6}$ | Surface | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 |
| | Middle | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 |
| | Bottom | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 | < 0.2 |
| Alkyl Mercury ($mg/l$) | Surface | ND | | | | | | | | | | | | | | |
| | Middle | | | | | | | | | | | | | | | |
| | Bottom | | | | | | | | | | | | | | | |
| PCB ($\mu g/l$) | Surface | ND | ND | 0.01 | 0.01 | ND | ND | 0.01 | 0.01 | 0.02 | 0.01 | ND | ND | 0.02 | 0.01 | 0.03 |
| | Middle | ND | ND | 0.01 | 0.01 | 0.34 | 0.01 | 0.01 | 0.01 | 0.01 | 0.02 | ND | 0.03 | 0.02 | 0.02 | 0.03 |
| | Bottom | ND | ND | 0.01 | 0.01 | 0.34 | 0.01 | 0.15 | 0.02 | 0.01 | 0.03 | ND | 0.02 | 0.02 | 0.03 | 0.03 |

**ND**: Not Detected
The Quantity of this parameter that may be present in this sample is below the limits of detection of the analysis method employed.
It should be noted that the value ND does not imply that there is no amount of this substance in the water, but rather than, if it is present,
*it is in amounts so small that the analytical method cannot determine the quantity.*

**Appendix 6.4.1. Ship Call 2000 in HCMC Port Group**

(1) Ports in HCMC Port Group

(a) Shipcalls by a kind of Vessel

| Vessel Size (D.W.T) | Container | Dry Cargo | Liquid/Oil | Passenger | Others | Total |
|---|---|---|---|---|---|---|
| | | | | | | |
| <1,000 | 14 | 152 | 37 | 7 | 22 | 232 |
| 1,000-2,999 | 150 | 284 | 309 | 10 | 19 | 772 |
| 3,000-5,999 | 184 | 269 | 81 | 8 | 14 | 556 |
| 6,000-9,999 | 698 | 603 | 152 | 0 | 31 | 1484 |
| 10,000-19,999 | 521 | 205 | 50 | 0 | 6 | 782 |
| 20,000-29,999 | 11 | 67 | 67 | 0 | 1 | 146 |
| 30,000-39,999 | 0 | 48 | 47 | 0 | 0 | 95 |
| >40,000 | 0 | 0 | 11 | 0 | 0 | 11 |
| | | | | | | |
| Total | 1578 | 1628 | 754 | 25 | 93 | 4078 |

(b) Main Vessels

| Vessel Name | G.R.T. | D.W.T. | Length | Draught |
|---|---|---|---|---|
| (Container) | | | | |
| CANADIAN EXPRESS | 12,963 | 20,482 | 141 | 9.8 |
| UNI FORTUNE | 13,395 | 18,828 | 162 | 9.8 |
| SUMIRE | 14,089 | 17,732 | 164 | 8.9 |
| SATSUKI | 14,089 | 17,705 | 164 | 8.9 |
| SUZURAN | 14,089 | 17,704 | 164 | 8.9 |
| DA SHENG | 16,895 | 17,607 | 169 | 9.0 |
| CONTSHIP ASIA | 13,315 | 16,768 | 159 | 10.1 |
| BLUE BRIDGE | 9,892 | 16,120 | 150 | 9.3 |
| PHONG CHAU | 17,845 | 16,030 | 174 | 9.8 |
| PHU XUAN | 17,845 | 16,030 | 174 | 9.0 |
| (Dry Cargo) | | | | |
| UNITED SAGE | 38,864 | 74,577 | 224 | 11.0 |
| BFIGHT DAYS | 36,120 | 68,676 | 224 | 12.0 |
| M.G.TSANGARIS | 35,592 | 64,310 | 225 | |
| PLATITERA | 36,000 | 63,893 | 224 | 11.5 |
| SHENZEN SEA | 34,928 | 61,393 | 225 | 12.0 |
| 30 AGUSTOS | 32,324 | 60,589 | 207 | |
| 29 EKIM | 32,324 | 60,554 | 206 | 11.0 |
| AGIOS GEORGIOS | 29,499 | 52,067 | 190 | 10.0 |
| FENG HAI | 27,176 | 47,919 | 188 | |
| SONG HAI | 27,585 | 47,201 | 190 | |
| (Liquid/Oil) | | | | |
| CIELO DI SINHGAPORE | 29,485 | 51,267 | 194 | 12.7 |
| HALIA | 28,277 | 46,878 | 183 | 12.0 |
| PORT ALEXANDRE | 28,226 | 45,999 | 183 | |
| MARIETTA C | 25,117 | 45,574 | 183 | 11.0 |
| OLIMPIC VENTURE | 25,202 | 44,128 | 182 | |
| PURPLE STAR | 23,721 | 42,740 | 194 | 11.5 |
| YELLOW STAR | 23,721 | 42,548 | 194 | 11.5 |
| ROMAN | 24,731 | 42,300 | 182 | 12.5 |
| BRIGHT EXPRESS | 25,664 | 42,235 | 180 | 11.6 |
| LIYUN | 25,526 | 41,267 | 195 | 9.0 |

(2) Sai Gon Port

(a) Shipcalls by a kind of Vessel

| Vessel Size (D.W.T) | Container | Dry Cargo | Passenger | Others | Total |
|---|---|---|---|---|---|
| | | | | | |
| <1,000 | 0 | 43 | 7 | 5 | 55 |
| 1,000-2,999 | 0 | 92 | 10 | 6 | 108 |
| 3,000-5,999 | 47 | 87 | 7 | 5 | 146 |
| 6,000-9,999 | 149 | 158 | 1 | 6 | 314 |
| 10,000-19,999 | 141 | 120 | 0 | 3 | 264 |
| 20,000-29,999 | 0 | 40 | 0 | 2 | 42 |
| 30,000-39,999 | 0 | 13 | 0 | 0 | 13 |
| >40,000 | 0 | 15 | 0 | 0 | 15 |
| | | | | | |
| Total | 337 | 568 | 25 | 27 | 957 |

(b) Main Vessels

| Vessel Name | G.R.T. | D.W.T. | Length | Draught |
|---|---|---|---|---|
| (Container) | | | | |
| PHONG CHAU | 17,845 | 16,030 | 174 | 9.8 |
| BANOWAITI | 12,471 | 15,213 | 147 | 8.5 |
| AUSTRALIAN EXPRESS | 9,949 | 14,900 | 150 | 8.2 |
| MARINE RICKMERS | 11,925 | 14,381 | 150 | 12.0 |
| THAILAND STAR 1 | 10,524 | 14,100 | 151 | 8.3 |
| CAPE SORRELL | 10,925 | 13,700 | 151 | 8.3 |
| MALAYSIA STAR 1 | 9,678 | 12,750 | 146 | 8.9 |
| VIET NAM STAR 1 | 9,367 | 12,725 | 147 | 8.3 |
| MARE ADRIATICUM | 9,581 | 12,721 | 150 | 8.5 |
| HAU GIANG 02 | 9,816 | 12,665 | 150 | 9.3 |
| (Dry Cargo) | | | | |
| UNITED SAGE | 38,864 | 74,577 | 224 | 11.0 |
| M.G.TSANGARIS | 35,592 | 64,310 | 225 | |
| SHENZEN SEA | 34,928 | 61,393 | 225 | 12.0 |
| 29 EKIM | 32,324 | 60,554 | 206 | 11.0 |
| FENG HAI | 27,176 | 47,919 | 188 | |
| GRIFFIN | 26059 | 45,734 | 186 | |
| GOLDEN PROTEA | 25,982 | 45,725 | 186 | 10.0 |
| HAN HAI | 26063 | 45,569 | 186 | 11.6 |
| GRAND OCEAN | 26,014 | 43,609 | 186 | 10.0 |
| PHA LAI | 2,861 | 43,554 | 104 | 6.6 |
| (Others) | | | | |
| CONCORD | 17,117 | 29,591 | 170 | 11.0 |
| PEGASUS LEADER | 57,566 | 22,747 | 200 | |
| FORTUNE EPOCH | 9,992 | 11,464 | 128 | |
| DEUTSCHLAND | 22,496 | 7,823 | 175 | 5.8 |
| CROWN ODYSSEY | 34,242 | 5,286 | 188 | 7.3 |
| MAXIM GORKIY | 24,220 | 4,759 | 195 | 8.2 |
| UNIVERSE EXPLORER | 22,162 | 4,470 | 188 | 9.0 |
| PACIFIC VENUS | 26,518 | 4,202 | 183 | 6.5 |
| ASTOR | 20,606 | 3,880 | 177 | 6.1 |
| R TWO | 30,277 | 2,000 | 168 | 5.4 |

(3) Tan Cang

(a) Shipcalls by a kind of Vessel

| Vessel Size (D.W.T) | Container | Dry Cargo | Others | Total |
|---|---|---|---|---|
| | | | | |
| <1,000 | 0 | 12 | 0 | 12 |
| 1,000-2,999 | 0 | 7 | 5 | 12 |
| 3,000-5,999 | 45 | 7 | 0 | 52 |
| 6,000-9,999 | 145 | 15 | 0 | 160 |
| 10,000-19,999 | 192 | 10 | 0 | 202 |
| 20,000-29,999 | 11 | 1 | 0 | 12 |
| 30,000-39,999 | 0 | 0 | 0 | 0 |
| >40,000 | 0 | 0 | 0 | 0 |
| | | | | |
| Total | 393 | 52 | 5 | 450 |

(b) Main Vessels

| Vessel Name | G.R.T. | D.W.T. | Length | Draught |
|---|---|---|---|---|
| (Container) | | | | |
| CANADIAN EXPRESS | 12,963 | 20,482 | 141 | 9.8 |
| CUMBRIAN EXPRESS | 12,963 | 20,482 | 140 | 9.8 |
| UNI FOREVER | 13,995 | 18,113 | 162 | 9.8 |
| MING CHUN | 10,382 | 15,099 | 150 | 8.7 |
| NORDBEACH | 11,998 | 14,140 | 157 | 8.8 |
| NORDBEACH | 11,998 | 14,140 | 157 | 8.8 |
| INGA S | 11,964 | 14,600 | 150 | 8.6 |
| CHANA BHUM | 9,675 | 13,825 | 146 | 8.3 |
| BANI BHUM | 9,675 | 13,825 | 146 | 8.3 |
| ANAN BHUM | 9,675 | 13,825 | 146 | 8.5 |
| STADT BERLIN | 9,528 | 12,900 | 146 | 8.3 |
| (Dry Cargo) | | | | |
| LONG KIM | 14,921 | 25,420 | 160 | 10.2 |
| THOR SEA | 10,572 | 16,247 | 149 | 9.8 |
| SAI GON I | 7,760 | 15,179 | 141 | 8.9 |
| SONG DUONG | 8,462 | 15,120 | 144 | 8.9 |
| HA GIANG | 7,194 | 11,884 | 135 | 7.9 |
| CHUONG DUONG | 7,317 | 11,857 | 135 | 7.9 |
| CHUONG DUONG | 7,317 | 11,857 | 135 | 7.9 |
| SITTWE | 7,783 | 11,660 | 134 | 8.2 |
| LONG THANH | 7,163 | 11,463 | 125 | 8.3 |
| VAN XUAN | 8,384 | 11,235 | 135 | 7.9 |

(4) VICT

(a) Shipcalls by a kind of Vessel

| Vessel Size (D.W.T) | Container | Dry Cargo | Others | Total |
|---|---|---|---|---|
| | | | | |
| <1,000 | 2 | 0 | 0 | 2 |
| 1,000-2,999 | 17 | 0 | 1 | 18 |
| 3,000-5,999 | 16 | 0 | 0 | 16 |
| 6,000-9,999 | 131 | 11 | 0 | 142 |
| 10,000-19,999 | 88 | 0 | 0 | 88 |
| 20,000-29,999 | 0 | 0 | 0 | 0 |
| 30,000-39,999 | 0 | 0 | 0 | 0 |
| >40,000 | 0 | 0 | 0 | 0 |
| | | | | |
| Total | 254 | 11 | 1 | 266 |

(b) Main Vessels

| Vessel Name | G.R.T. | D.W.T. | Length | Draught |
|---|---|---|---|---|
| (Container) | | | | |
| UNI FORTUNE | 13,995 | 18,828 | 162 | 9.8 |
| UNI FORWARD | 13,995 | 18,821 | 162 | 13.3 |
| UNI FOREVER | 13,995 | 18,813 | 162 | 9.8 |
| SUMIRE | 14,089 | 17,732 | 164 | 8.9 |
| SATSUKI | 14,089 | 17,705 | 164 | 8.9 |
| SUZURAN | 14,089 | 17,704 | 164 | 8.9 |
| DA SHENG | 16,895 | 17,607 | 169 | 9.0 |
| CONTSHIP ASIA | 13,315 | 16,768 | 159 | 10.1 |
| ERNST RICKMERS | 14,278 | 15,315 | 158 | 9.2 |
| ANAN BHUM | 9,675 | 13,825 | 146 | 8.5 |

(5) Ben Nghe Port

(a) Shipcalls by a kind of Vessel

| Vessel Size (D.W.T) | Container | Dry Cargo | Others | Total |
|---|---|---|---|---|
| | | | | |
| <1,000 | 6 | 27 | 0 | 33 |
| 1,000-2,999 | 38 | 74 | 0 | 112 |
| 3,000-5,999 | 1 | 46 | 2 | 49 |
| 6,000-9,999 | 94 | 99 | 6 | 199 |
| 10,000-19,999 | 94 | 25 | 0 | 119 |
| 20,000-29,999 | 0 | 11 | 0 | 11 |
| 30,000-39,999 | 0 | 4 | 0 | 4 |
| >40,000 | 0 | 5 | 0 | 5 |
| | | | | |
| Total | 233 | 291 | 8 | 532 |

(b) Main Vessels

| Vessel Name | G.R.T. | D.W.T. | Length | Draught |
|---|---|---|---|---|
| (Container) | | | | |
| SUMIRE | 14,089 | 17,732 | 164 | 8.9 |
| SATSUKI | 14,089 | 17,705 | 164 | 8.9 |
| SUZURAN | 14,089 | 17,704 | 164 | 8.9 |
| PHU XUAN | 17,845 | 16,030 | 174 | 9.0 |
| PHONG CHAU | 17,845 | 16,030 | 174 | 9.8 |
| PHONG CHAU | 17,845 | 16,030 | 174 | 9.8 |
| SAIPAN VOYAGER | 10,774 | 14,646 | 162 | 7.7 |
| HAU GIANG 02 | 9,816 | 12,665 | 150 | 9.3 |
| BUNGA MAS 9 | 9,380 | 12,250 | 145 | 11.0 |
| BUANA SINAR | 9,896 | 12,170 | 151 | 10.8 |
| (Dry Cargo) | | | | |
| 30 AGUSTOS | 32,324 | 60,589 | 207 | |
| AGIOS GEORGIOS | 29,499 | 52,067 | 190 | 10.0 |
| SEA BANIAN | 26,136 | 45,724 | 186 | |
| SKAUSTRANS | 24,609 | 41,824 | 184 | 11.2 |
| PACIFIC HOPE | 22,147 | 38,855 | 181 | 11.0 |
| CENK KAPTANOGLU | 22,378 | 35,739 | 186 | 9.5 |
| SEA CONQUEROR | 19,867 | 33,663 | 182 | 10.0 |
| WINSTAR | 18,041 | 31,214 | 175 | 10.5 |
| JEON JIN | 17,688 | 27,815 | 177 | 10.6 |
| RIFKI BEY | 15,735 | 25,426 | 161 | 10.2 |

(6) Nha Be Port Area

(a) Shipcalls by a kind of Vessel

| Vessel Size (D.W.T) | Dry Cargo | Liquid/Oil | Others | Total |
|---|---|---|---|---|
| | | | | |
| <1,000 | 15 | 25 | 4 | 44 |
| 1,000-2,999 | 18 | 129 | 3 | 150 |
| 3,000-5,999 | 11 | 23 | 2 | 36 |
| 6,000-9,999 | 14 | 76 | 2 | 92 |
| 10,000-19,999 | 1 | 16 | 0 | 17 |
| 20,000-29,999 | 0 | 41 | 0 | 41 |
| 30,000-39,999 | 0 | 39 | 0 | 39 |
| >40,000 | 0 | 7 | 0 | 7 |
| | | | | |
| Total | 59 | 356 | 11 | 426 |

(b) Main Vessels

| Vessel Name | G.R.T. | D.W.T. | Length | Draught |
|---|---|---|---|---|
| (Dry Cargo) | | | | |
| PRINCESS MEIWA | 6,303 | 10,212 | 134 | 7.5 |
| QING ANN | 6,375 | 9,930 | | 7.9 |
| KSAR CHELILALA | 3,135 | 9,779 | | 9.9 |
| LONG HAI | 5,083 | 8,332 | | 7.2 |
| NINH BINH | 5,051 | 8,294 | 118 | 7.2 |
| HA TAY | 5,051 | 8,200 | 118 | 7.2 |
| DIBENA UNITY | 4,750 | 7,844 | | 7.0 |
| ARTEMIS | 7,565 | 7,760 | | 8.0 |
| THOR SAILOR | 572 | 6,225 | | 9.4 |
| LIAN XING | 4,430 | 6,116 | | 6.9 |
| (Liquid/Oil) | | | | |
| PETROBULK CAPE | 23,127 | 37,615 | 175 | 11.0 |
| RYUJIN MARU | 20,854 | 37,884 | 178 | 11.0 |
| FRATELLID'ALESIO | 21,739 | 38,741 | 192.00 | |
| OCEAN QUEEN | 21,579 | 39,733 | 183.00 | 11.4 |
| LIYUN | 25,526 | 41,267 | 195.00 | 9.0 |
| BRIGHT EXPRESS | 25,664 | 42,235 | 180 | 11.6 |
| YELLOW STAR | 23,721 | 42,548 | 194.00 | 11.5 |
| PURPLE STAR | 23,721 | 42,740 | 194.00 | 11.5 |
| PORT ALEXANDRE | 28,226 | 45,999 | 183.00 | |
| CIELO DI SINHGAPORE | 29,485 | 51,267 | 194.43 | 12.7 |

(7) Sai Gon Petro

(a) Shipcalls by a kind of Vessel

| Vessel Size (D.W.T) | Dry Cargo | Liquid/Oil | Others | Total |
|---|---|---|---|---|
| | | | | |
| <1,000 | 0 | 1 | 0 | 1 |
| 1,000-2,999 | 0 | 97 | 0 | 97 |
| 3,000-5,999 | 0 | 14 | 0 | 14 |
| 6,000-9,999 | 0 | 17 | 0 | 17 |
| 10,000-19,999 | 0 | 16 | 0 | 16 |
| 20,000-29,999 | 1 | 6 | 0 | 7 |
| 30,000-39,999 | 0 | 2 | 0 | 2 |
| >40,000 | 0 | 3 | 0 | 3 |
| | | | | |
| Total | 1 | 156 | 0 | 157 |

(b) Main Vessels

| Vessel Name | G.R.T. | D.W.T. | Length | Draught |
|---|---|---|---|---|
| (Dry Cargo) | | | | |
| HELIKON | 12,474 | 20,717 | 159 | 9.7 |
| (Liquid/Oil) | | | | |
| HALIA | 28,277 | 46,878 | 183 | 12.0 |
| MARIETTA C | 25,117 | 45,574 | 183 | 11.0 |
| ROMAN | 24,731 | 42,300 | 182 | 12.5 |
| MELODY | 19,337 | 33,380 | 171 | 11.6 |
| ERVILIA | 18,654 | 31,374 | 170 | 10.6 |
| OCEAN JUPITER | 18,357 | 29,999 | 163 | 11.4 |
| NIKMARY | 15,797 | 29,960 | 179 | 11.0 |
| CONCORD | 17,117 | 29,591 | 170 | 11.0 |
| MOKRAN | 15,105 | 25,650 | 171 | 12.6 |
| MINAB 1 | 15,005 | 25,559 | 171 | 9.6 |

## Appendix 6.4.2 Shipcalls 2000 in Thi Vai - Vung Tau Area

(1) Thi Vai River and Vung Tau Port Group

(a) Shipcalls by a kind of Vessel in Thi Vai River Port Group

| Vessel Size (D.W.T) | Oil Tanker | Dry Cargo | Others | Total |
|---|---|---|---|---|
| <1,000 | 72 | 168 | 48 | 288 |
| 1,000-2,999 | 513 | 43 | 1 | 557 |
| 3,000-5,999 | 55 | 57 | 2 | 114 |
| 6,000-9,999 | 19 | 107 | 24 | 150 |
| 10,000-19,999 | 0 | 1 | 0 | 1 |
| 20,000-29,999 | 0 | 0 | 0 | 0 |
| 30,000-39,999 | 0 | 0 | 0 | 0 |
| >40,000 | 0 | 0 | 0 | 0 |
| | | | | |
| Total | 659 | 376 | 75 | 1110 |

(b) Shipcalls by a kind of Vessel in Vung Tau Port Group

| Vessel Size (D.W.T) | Oil Tanker | Dry Cargo | Others | Total |
|---|---|---|---|---|
| <1,000 | 52 | 76 | 110 | 238 |
| 1,000-2,999 | 136 | 143 | 36 | 315 |
| 3,000-5,999 | 110 | 42 | 36 | 188 |
| 6,000-9,999 | 147 | 33 | 21 | 201 |
| 10,000-19,999 | 0 | 0 | 0 | 0 |
| 20,000-29,999 | 0 | 0 | 0 | 0 |
| 30,000-39,999 | 0 | 0 | 0 | 0 |
| >40,000 | 0 | 0 | 0 | 0 |
| | | | | |
| Total | 445 | 294 | 203 | 942 |

(2) Go Dau Port Area

(a) Shipcalls by a kind of vessel

| Vessel Size (D.W.T) | Oil Tanker | Dry Cargo | Others | Total |
|---|---|---|---|---|
| <1,000 | 41 | 146 | 23 | 210 |
| 1,000-2,999 | 112 | 21 | 1 | 134 |
| 3,000-5,999 | 50 | 17 | 1 | 68 |
| 6,000-9,999 | 17 | 33 | 0 | 50 |
| 10,000-19,999 | 0 | 1 | 0 | 1 |
| 20,000-29,999 | 0 | 0 | 0 | 0 |
| 30,000-39,999 | 0 | 0 | 0 | 0 |
| >40,000 | 0 | 0 | 0 | 0 |
| | | | | |
| Total | 220 | 218 | 25 | 463 |

(b) Main vessels

| Ship's Name | GRT | DWT | Length | Draught |
|---|---|---|---|---|
| (Oil tanker) | | | | |
| BUDI 1 | 3,727 | 7,033 | | 6.7 |
| OCEAN BEE | 4,206 | 6,954 | | 6.6 |
| SUN CHALLENGER | 3,866 | 6,576 | | 7.0 |
| SUN CHEMIST | 3,866 | 6,576 | | 6.0 |
| DRAGONARIA | 4,206 | 6,555 | | 6.8 |
| SIRI MONGKOL | 3,769 | 6,337 | | 6.8 |
| OCEAN BLOSSOM II | 3,277 | 5,791 | | 6.8 |
| PRETTY FALCON | 4,408 | 5,787 | | 4.6 |
| MERCURY 2 | 3,207 | 5,616 | | 6.7 |
| BAUHINIA | 3,734 | 5,581 | | 6.7 |
| (Dry cargo) | | | | |
| SANG THAI YRANU | 5,986 | 10,016 | | 7.9 |
| HERO | | 9,500 | | 5.3 |
| PROCEEDER | 6,715 | 8,932 | | 7.0 |
| TROPICAL DAMSEL | 5,451 | 8,880 | | 6.9 |
| PANDURATA | 6,488 | 8,773 | | 7.1 |
| ANNA - M | 5,131 | 8,616 | | 7.0 |
| APOLLO LIMA | 6,655 | 8,500 | | 7.2 |
| SITI AZLINA | 4,908 | 7,988 | | 6.7 |
| FEI YUN LING | 7,942 | 7,508 | | 7.5 |
| NAN GUAN LING | 4,425 | 7,352 | | 6.8 |

(3) Phu My Port

(a) Shipcalls by a kind of vessel

| Vessel Size (D.W.T) | Oil Tanker | Dry Cargo | Others | Total |
|---|---|---|---|---|
| <1,000 | 12 | 22 | 22 | 56 |
| 1,000-2,999 | 3 | 22 | 0 | 25 |
| 3,000-5,999 | 0 | 40 | 0 | 40 |
| 6,000-9,999 | 2 | 70 | 24 | 96 |
| 10,000-19,999 | 0 | 0 | 0 | 0 |
| 20,000-29,999 | 0 | 0 | 0 | 0 |
| 30,000-39,999 | 0 | 0 | 0 | 0 |
| >40,000 | 0 | 0 | 0 | 0 |
| | | | | |
| Total | 17 | 154 | 46 | 217 |

(b) Main vessels

| Ship's Name | GRT | DWT | Length | Draught |
|---|---|---|---|---|
| (Oil Tanker) | | | | |
| BAO YUN SHAN | 5,654 | 6,720 | | |
| BAO XING SHAN | 4,035 | 6,503 | | |
| SAN FONG | 4,890 | 5,762 | | |
| | | | | |
| (Dry Cargo) | | | | |
| WEI HANG 6 | 4,287 | 9,965 | | |
| KAMO | 8,145 | 9,433 | | |
| ALVA ENDEAVOUR | 6,156 | 9,100 | | |
| FRIDERIKE OLDEN | 9,510 | 9,095 | | |
| SAKTI | 7,760 | 8,739 | | |
| LOVE LETER | 6,500 | 8,592 | | |
| HEKTOR | 2,474 | 8,427 | | |
| TOLGAM | 1,159 | 8,340 | | |
| CHANG YI | 3,556 | 7,498 | | |
| FENWAY | 4,987 | 7,410 | | |

(4) Cai Mep Port

(a) Shipcalls by a kind of vessel

| Vessel Size (D.W.T) | Oil Tanker | Dry Cargo | Others | Total |
|---|---|---|---|---|
| <1,000 | 19 | 0 | 3 | 22 |
| 1,000-2,999 | 398 | 0 | 0 | 398 |
| 3,000-5,999 | 5 | 0 | 1 | 6 |
| 6,000-9,999 | 0 | 0 | 0 | 0 |
| 10,000-19,999 | 0 | 0 | 0 | 0 |
| 20,000-29,999 | 0 | 0 | 0 | 0 |
| 30,000-39,999 | 0 | 0 | 0 | 0 |
| >40,000 | 0 | 0 | 0 | 0 |
| | | | | |
| Total | 422 | 0 | 4 | 426 |

(b) Main vessels

| Ship's Name | GRT | DWT | Length | Draught |
|---|---|---|---|---|
| (Oil Tanker) | | | | |
| PHUOC THANG 02 | 2,863 | 3,100 | | |
| VP 02 | 2,863 | 3,100 | | |
| PHUOC THANG 09 | 1,229 | 2,000 | | |
| VP 09 | 1,229 | 2,000 | | |

(5) Vung Tau Port Area

(a) Shipcalls by a kind of vessel

| Vessel Size (D.W.T) | Oil Tanker | Dry Cargo | Others | Total |
|---|---|---|---|---|
| <1,000 | 52 | 76 | 110 | 238 |
| 1,000-2,999 | 136 | 143 | 36 | 315 |
| 3,000-5,999 | 110 | 42 | 36 | 188 |
| 6,000-9,999 | 147 | 33 | 21 | 201 |
| 10,000-19,999 | 0 | 0 | 0 | 0 |
| 20,000-29,999 | 0 | 0 | 0 | 0 |
| 30,000-39,999 | 0 | 0 | 0 | 0 |
| >40,000 | 0 | 0 | 0 | 0 |
| | | | | |
| Total | 445 | 294 | 203 | 942 |

(b) Main vessels

| Ship's Name | GRT | DWT | Length | Draught |
|---|---|---|---|---|
| (Oil Tanker) | | | | |
| STELLATA | 6456 | 9999 | | |
| PACFIC AQUARIUS | 7949 | 9999 | | |
| KYEEMA SPIRIT | 2619 | 9999 | | |
| SOEI | 2237 | 9999 | | |
| APTERAM | 1423 | 9999 | | |
| KYEEMA SPIRIT | 2619 | 9999 | | |
| ALLORO | 2237 | 9999 | | |
| YUGAWASAN | 2263 | 9998 | | |
| RAINBOW RIVER | 7943 | 9997 | | |
| DAI HUNG | 8055 | 9997 | | |
| (Dry Cargo) | | | | |
| PACFIC LIBRA | 7331 | 9998 | | |
| CENTURY RIVER | 7944 | 9994 | | |
| GLORY SELATAN 5 | 1673 | 8705 | | |
| BALABAC STRAIT | 6264 | 8679 | | |
| GLORY SELATAN 8 | 1668 | 8633 | | |
| GLORY SELATAN 6 | 1673 | 8639 | | |
| GOLDEN GLIN | 6113 | 8380 | | |
| MIEN TRUNG 9 | | 8245 | | |
| OCEAN LEO | 7624 | 8212 | | |
| IVORY BAY | 5470 | 8119 | | |

**Appendix 6.4.3 Shipcalls 1998 in HCMC Port Group**

(1) Ports in HCMC Port Group

(a) Shipcalls by a kind of vessel

| Vessel Size (D.W.T) | Container | Dry Cargo | Liquid Carg | Passenger | RO/RO | Others | Total |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| <1,000 | 2 | 148 | 42 | 7 | 0 | 16 | 215 |
| 1,000-2,999 | 4 | 216 | 209 | 7 | 3 | 10 | 449 |
| 3,000-5,999 | 192 | 272 | 74 | 9 | 14 | 3 | 564 |
| 6,000-9,999 | 441 | 476 | 101 | 4 | 1 | 4 | 1,027 |
| 10,000-19,999 | 485 | 324 | 74 | 0 | 6 | 2 | 891 |
| 20,000-29,999 | 1 | 79 | 102 | 0 | 0 | 1 | 183 |
| 30,000-39,999 | 6 | 20 | 71 | 0 | 0 | 2 | 99 |
| >40,000 | 1 | 18 | 5 | 0 | 0 | 2 | 26 |
| | | | | | | | |
| Total | 1,132 | 1,553 | 678 | 27 | 24 | 40 | 3,454 |

(2) Sai Gon Port

(a) Shipcalls by a kind of vessel

| Vessel Size (D.W.T) | Container | Dry Cargo | RO/RO | Passenger | Others | Total |
|---|---|---|---|---|---|---|
| | | | | | | |
| <1,000 | 0 | 23 | 0 | 7 | 1 | 31 |
| 1,000-2,999 | 1 | 143 | 3 | 7 | 8 | 162 |
| 3,000-5,999 | 120 | 171 | 14 | 9 | 2 | 316 |
| 6,000-9,999 | 103 | 251 | 1 | 3 | 5 | 363 |
| 10,000-19,999 | 152 | 154 | 6 | 0 | 2 | 314 |
| 20,000-29,999 | 1 | 50 | 0 | 0 | 1 | 52 |
| 30,000-39,999 | 0 | 16 | 0 | 0 | 0 | 16 |
| >40,000 | 0 | 13 | 0 | 0 | 0 | 13 |
| | | | | | | |
| Total | 377 | 821 | 24 | 26 | 19 | 1267 |

(b) Main Vessels in Sai Gon Port

| Vessel Name | G.R.T | D.W.T. | Length | Draught |
|---|---|---|---|---|
| (Container) | | | | |
| Nzol Challenger | 14,385 | 21,060 | 166 | 10 |
| Seven Seas Aurora | 14,293 | 19,900 | 166 | 9.7 |
| Bauhinia | 13,603 | 17,030 | 155 | 10 |
| SS Singapore | 11,955 | 16,950 | 157 | 9.3 |
| Australian Express | 9,949 | 14,900 | 150 | 8.2 |
| Zim Bangkok | 9,336 | 14,621 | 98 | 5.6 |
| Hanoi Glory | 11,252 | 13,527 | 153 | 8.7 |
| Hau Giang | 9,415 | 12,800 | 133 | 9.4 |
| J. Truster | 10,211 | 12,764 | 150 | 9.1 |
| Hau Giang 02 | 9,816 | 12,665 | 150 | 9.1 |
| (Dry Cargo) | | | | |
| Tai An Hai | 27,417 | 47,698 | 190 | 11.7 |
| Florid Raibow 2 | 26,040 | 45,212 | 188 | 9 |
| Orient Kiver 2 | 25,899 | 43,595 | 186 | 11 |
| Bunga Orkid Dua | 25,498 | 43,216 | 185 | 11.2 |
| Fikret Manoglu | 24,943 | 42,842 | 190 | 11 |
| Desert Song | 24,969 | 42,294 | 190 | 11 |
| Mihalsf | 24,606 | 42,264 | 183 | 11.2 |
| Jin Da | 23,624 | 41,346 | 190 | 11.3 |
| Delta | 25,206 | 41,260 | 186 | - |
| Top Glory | 23,186 | 41,061 | 183 | 11.2 |
| (Ro-Ro) | | | | |
| Trono | 10,697 | 14,871 | 148 | 9 |
| Quito | 15,863 | 12,290 | 158 | 8.9 |
| Reina Rosa | 9,992 | 11,000 | 128 | 7.6 |
| Asian Victory | 14,433 | 6,146 | 133 | 8.5 |
| San Mateo | 11,248 | 4,002 | 130 | 7.1 |
| (Passenger) | | | | |
| Albatros | 12,402 | 6,708 | 185 | 9 |
| Marco Polo | 11,040 | 6,472 | 177 | 7.5 |
| Royal Viking Sun | 18,923 | 6,150 | 203 | 7.2 |
| Black Watch | 14,334 | 5,656 | 205 | 7.6 |
| Maxim Gorkiy | 12,110 | 4,759 | 195 | 8.2 |

(3) Tan Cang

(a) Shipcalls by a kind of vessele

| Vessel Size (D.W.T) | Container | Dry Cargo | Others | Total |
|---|---|---|---|---|
| | | | | |
| <1,000 | 1 | 1 | 2 | 4 |
| 1,000-2,999 | 3 | 5 | 1 | 9 |
| 3,000-5,999 | 60 | 12 | 2 | 74 |
| 6,000-9,999 | 278 | 10 | 0 | 288 |
| 10,000-19,999 | 259 | 15 | 2 | 276 |
| 20,000-29,999 | 0 | 2 | 1 | 3 |
| 30,000-39,999 | 6 | 0 | 1 | 7 |
| >40,000 | 1 | 0 | 0 | 1 |
| | | | | |
| Total | 608 | 45 | 9 | 662 |

(b)Main vessels

| Vessel Name | GRT | DWT | Length | Draught |
|---|---|---|---|---|
| (Container) | | | | |
| Ardmore | 11,788 | 51,414 | 146 | 8.8 |
| Argonaut | 23,658 | 39,338 | 201 | 11.1 |
| Uni Handsome | 12,262 | 17,824 | 155 | 9.3 |
| Uni Humanity | 12,262 | 17,807 | 155 | 9.3 |
| Ardmore | 11,788 | 15,414 | 146 | 8.8 |
| Asimont | 11,788 | 15,407 | 146 | 8.8 |
| Olandia | 9,367 | 12,750 | 147 | 8.3 |
| Han Giang 02 | 9,816 | 12,665 | 150 | 9.1 |
| Hansa Rostock | 9,606 | 12,594 | 150 | 8.3 |
| ST. Irene | 9,601 | 12,577 | 150 | 8.3 |
| (Dry Cargo) | | | | |
| Giorgis | 14,814 | 25,660 | 159 | 9.9 |
| Jollity | 12,503 | 22,266 | 164 | 9.9 |
| Fushun | 11,403 | 18,602 | 153 | - |
| Asean Unity | 19,676 | 15,900 | 181 | 9.8 |
| Setorader | 9,242 | 15,680 | 141 | 9 |
| Endurance | 9,007 | 15,431 | 150 | 9.2 |
| Fairy Eagle | 10,139 | 14,090 | 144 | - |
| Hai Duong | 9,415 | 12,800 | 133 | - |
| Saint Irene | 9,601 | 12,577 | 150 | 8.3 |
| Mare Hibernum | 9,600 | 12,500 | 150 | 8.3 |
| (Others) | | | | |
| Ocean Opal | 18,672 | 32,230 | 163 | 11.4 |
| Petrolim 01 | 12,746 | 22,651 | 156 | 10.1 |
| Pranedya | 12,746 | 22,651 | 158 | 9 |
| Lila Bhum | 8,443 | 10,901 | 136 | 8 |
| Retalink 3 | 3,441 | 4,999 | 103 | - |

(4) Ben Nghe Port

(a) Shipcalls by a kind of Vessel

| Vessel Size (D.W.T) | Container | Dry Cargo | Others | Total |
|---|---|---|---|---|
| | | | | |
| <1,000 | 0 | 6 | 0 | 6 |
| 1,000-2,999 | 0 | 36 | 0 | 36 |
| 3,000-5,999 | 8 | 59 | 1 | 68 |
| 6,000-9,999 | 57 | 97 | 1 | 155 |
| 10,000-19,999 | 67 | 59 | 0 | 126 |
| 20,000-29,999 | 0 | 17 | 2 | 19 |
| 30,000-39,999 | 0 | 3 | 0 | 3 |
| >40,000 | 0 | 0 | 0 | 0 |
| | | | | |
| Total | 132 | 277 | 4 | 413 |

(b) Main Vessels

| Vessel Name | G.R.T | D.W.T. | Length | Draught |
|---|---|---|---|---|
| (Container) | | | | |
| Sumire | 14,089 | 17,732 | 164 | 8.9 |
| Satsuki | 14,089 | 17,732 | 164 | 8.9 |
| Suzuran | 14,089 | 17,704 | 164 | 8.9 |
| Bunga Mas 10 | 9,380 | 12,250 | 145 | 8 |
| Bunga Mas 9 | 9,380 | 12,250 | 144 | - |
| Bunga Mas 11 | 8,612 | 10,325 | 140 | 7.5 |
| Bunga Mas Lima | 8,957 | 9,125 | 133 | 7.7 |
| Bunga Mas Lapan | 8,957 | 9,000 | 133 | 7.7 |
| Bunga Mas Tijuh | 8,957 | 8,998 | 133 | 7.9 |
| Hub Trader | 7,218 | 8,453 | 122 | 7 |
| (Dry Cargo) | | | | |
| Pacific Hope | 22,147 | 38,855 | 180 | 11 |
| Aspidoforos | 21,030 | 35,055 | 176 | 11.4 |
| Rickmers Titanjin | 23,239 | 31,507 | 183 | 11.5 |
| Flag Lion | 17,833 | 27,704 | 174 | 10 |
| Attica | 16,201 | 27,306 | 182 | 10.5 |
| Pan Dynamic | 15,824 | 26,717 | 167 | 9 |
| Maritime Rayong | 16,598 | 26,060 | 173 | - |
| Sea Fortune | 16,047 | 25,303 | 176 | - |
| Hill Harmony | 15,622 | 24,683 | 155 | - |
| Gunkul 3 | 15,012 | 23,983 | 163 | 9.7 |
| | | | | |
| (Others) | | | | |
| Petrolimex 01 | 10,835 | 22,651 | 158 | 10.1 |
| Ratana Naree | 9,848 | 20,000 | | |
| Crystal Symphony | 25,552 | 7,947 | 238 | 8 |
| Orient Grace | 3,111 | 5,824 | 102 | 7 |

(5) Nha Be Port Area

(a) Shipcalls by a kind of Vessel in Nha Be Port Area

| Vessel Size (D.W.T) | Container | Dry Cargo | Liquid Cargo | Total |
|---|---|---|---|---|
| | | | | |
| <1,000 | 0 | 0 | 8 | 8 |
| 1,000-2,999 | 0 | 1 | 25 | 26 |
| 3,000-5,999 | 1 | 0 | 15 | 16 |
| 6,000-9,999 | 0 | 0 | 20 | 20 |
| 10,000-19,999 | 0 | 0 | 9 | 9 |
| 20,000-29,999 | 0 | 0 | 19 | 19 |
| 30,000-39,999 | 0 | 0 | 20 | 20 |
| >40,000 | 0 | 0 | 0 | 0 |
| | | | | |
| Total | 1 | 1 | 116 | 118 |

(b) Main Vessels

| Vessel Name | G.R.T. | D.W.T. | Length | Draught |
|---|---|---|---|---|
| (Liquid Cargo) | | | | |
| Ocean Queen | 18,343 | 39,733 | 182.9 | 11.4 |
| Diyyinah | 20,995 | 38,602 | 192.6 | 11.7 |
| Hsing Yun | 21,697 | 38,000 | 194.5 | 11.2 |
| Ryujin Maru | 17,726 | 37,842 | 187 | 11 |
| Petrobulk Cape | 19,658 | 37,615 | 175.4 | 11 |
| Emerald Sea | 17,547 | 37,440 | 184.5 | |
| Da Qing 436 | 19,587 | 37,314 | 170.5 | 9.3 |
| Great Promise | 19,502 | 34,999 | 170.5 | 11.2 |
| Value | 16,005 | 32,769 | 180 | |
| Ocean Amber | 15,869 | 32,230 | 170.7 | 11.4 |

## Appendix 8

**Table A 8.1.1 Port Tariff**

| International or Domestic | International | | | Domestic | | | | |
|---|---|---|---|---|---|---|---|---|
| Effective | From January 1st, 2001 | | | From January 1 st,1998 | | | | |
| Working Time Overtime Work | 7:00 - 17:00<br>5:00 - 7:00= 1.20<br>17:00 - 22:00= 1.20<br>22:00 - 5:00= 1.40<br>Holidays & Sundays = 1.50 | | | 7:00 - 17:00<br>5:00 - 7:00= 1.20<br>17:00 - 22:00= 1.20<br>22:00 - 5:00= 1.40<br>Holidays & Sundays = 1.50 | | | | |
| 1. Pilot Charges | ( Unit: US$/GRT - sea mile) | | | ( Unit: US$/GRT - sea mile)[Effective: from 2001.1.1] | | | | |
| | Distance | Rates | Minimum Charge (Unit: US$/Vessel) | | Rates | | Minimum Charge (Unit: VND/time) | |
| | Up to 10 miles | 0.0034 | 100 | | | | | |
| | Up to 30 miles | 0.0031 | 120 | | | | | |
| | Up to 60 miles | 0.00262 | 150 | Arriving / | | | | |
| | Over 60 miles | 0.0022 | 170 | Leaving | 17.7 | | 1,150,000 | |
| 2. Tugboat Assistance Charges | (Unit: US$/HP-hour) | | | (VND/HP-hour) | | | | |
| | under 500 HP | 0.34 | | under 500 HP | 2,500 | | | |
| | from 501 to 1,000 HP | 500HP is 170 and from 501st upward is 0.26 | | from 500 to 1,000 HP | 2,000 | | | |
| | from1,001to1,500HP | 1,000HP is 300 and from 1,001th upward is 0.15 | | over 1,000 hp | 1,500 | | | |
| | over 1,500HP | 1,500HP is 375 and from 1,501th upward is 0.05 | | | | | | |
| 3. Wharfage dues | | | | | | | | |
| (1) On Vessels | | | | | | | | |
| 1) Berth | 0.0035 US$/GRT-hour | | | 240 VND/GRT-day | | | | |
| 2) Buoy | 0.0014US$/GRT-hour | | | 120 VND/GRT-day | | | | |
| 3) Minimum | | | | 100,000 VND/vessel-day | | | | |
| (2) On Cargoes | at Quay 0.30 US$/ton | | | 1,000 VND/ton | | | | |
| | at Buoy 0.15 US$/ton | | | 500 VND/ton | | | | |
| 4. Cargo Handling Services | (except Container) | | ( Unit: US$/ton) | (Unit: VND/ton) | | | | |
| | | Ship - Truck Barge | Ship - Warehouse Storage Area | | Ship - Truck Barge | | Ship - Warehouse Storage Area | |
| | Cargo Group | | | Cargo Group | Ship Crane | Port's Crane | Ship Crane | Port's Crane |
| | 1 | 2 | 2.9 | 1 | 6,070 | 9,200 | 9,260 | 12,070 |
| | 2 | 2.75 | 3.66 | 2 | 7,830 | 12,630 | 11,470 | 16,270 |
| | 3 | 3.56 | 4.74 | 3 | 11,710 | 16,510 | 15,080 | 22,840 |
| | 4 | 3.86 | 5.14 | 4 | 11,980 | 19,660 | 16,260 | 24,900 |
| | 5 | 4.06 | 5.41 | 5 | 15,620 | 23,300 | 20,040 | 27,720 |
| | 6 | 4.36 | 5.81 | 6 | 15,960 | 23,640 | 20,950 | 28,270 |
| | 7 | 4.6 | 6.13 | 7 | 19,110 | 26,970 | 24,870 | 32,540 |
| (1) Handling at Berth | 8 | 4.85 | 6.46 | 8 | 22,980 | 34,500 | 37,720 | 47,320 |
| | Cargo Group | Handling at Buoy | Warehouse,Yard - Truck | Cargo Group | Handling at Buoy | | Warehouse, Yard - Truck | |
| | 1 | 2.3 | 0.73 | 1 | 7,110 | | 4,070 | |
| | 2 | 3.08 | 0.9 | 2 | 8,950 | | 4,590 | |
| | 3 | 4.13 | 1.27 | 3 | 12,980 | | 5,280 | |
| | 4 | 4.52 | 1.32 | 4 | 13,260 | | 6,200 | |
| | 5 | 4.78 | 1.47 | 5 | 16,240 | | 6,340 | |
| (2) Handling at Buoy | 6 | 5.17 | 1.6 | 6 | 17,900 | | 6,910 | |
| and Warehouse, Yard | 7 | 5.49 | 1.69 | 7 | 19,880 | | 8,630 | |
| - Truck | 8 | 5.81 | 1.79 | 8 | 24,700 | | 17,620 | |

Table A 8.1.1 Port Tariff

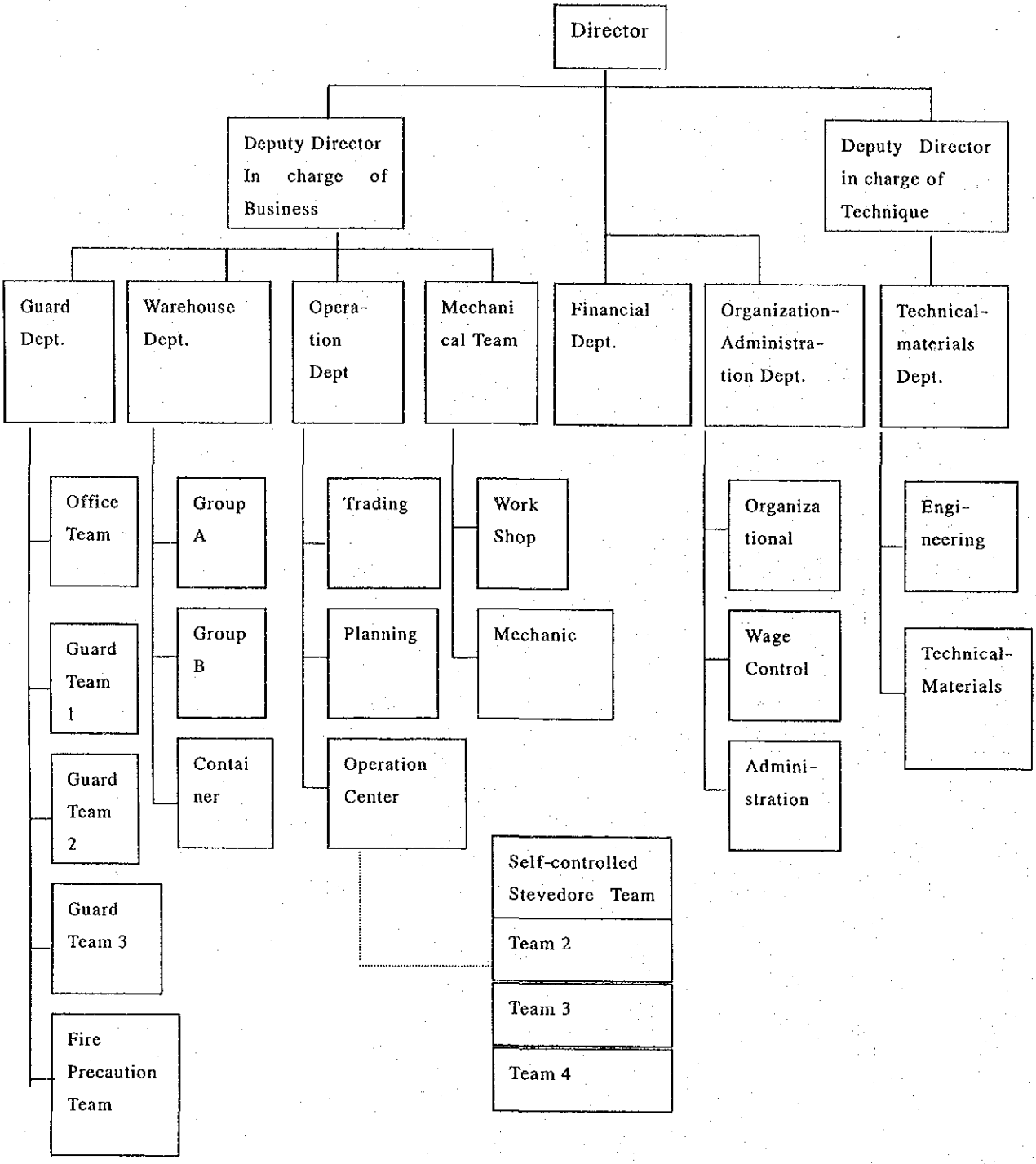
| | International | | | Domestic |
|---|---|---|---|---|
| 5. Storage Charges | | ( Unit: US$/ton-day) | | ( Unit: VND/ton-day ) |
| | | Area 1 & Area 3 | Area 2 | 1 - 30 days |
| | in Warehouse | 0.2 | 0.16 | General 800 |
| | in Yard | 0.1 | 0.08 | Foodstuffs, Agricultural products 400 |
| | Pre-fabricated means (vehicle,crawler, crane,.....) | 4 | 3.2 | Fertilizer, Chemical, Cement 600 |
| | | | | in Storage area 500 |
| 6. Container Handling Charges | ( the case of Area 3) ( Unit: US$/container) | | | ( Unit : VND/unit) |
| | | ship-truck | ship-warehouse | warehouse - truck |
| | 20 feet or smaller | | | 20 feet : Empty 42,000 (Cargo Group 4) |
| | stuffed | 30 | 57 | 23 Min. 100,000 (Cargo Group 4 ) |
| | empty | 20 | 34 | 15 |
| | 40 feet | | | 40 feet : Empty 80,000( Cargo Group 4 ) |
| | stuffed | 45 | 85 | 35 Min. 170,000( Cargo Group 8 ) |
| | empty | 29 | 50 | 23 |
| | over 40 feet | | | |
| | stuffed | 67 | 127 | 53 |
| | empty | 44 | 80 | 34 |
| 7. Container Storage Charges | ( the case of Area 3) (Unit: US$/container-day) | | | |
| | | stuffed | empty | |
| | 20 feet or smaller | 2 | 1 | |
| | 40 feet | 3 | 1.5 | |
| | over 40 feet | 4.5 | 2.3 | not confirmed |
| 8. Lighterage for Container | | ~ 3 mile | over 3 mile, additional charge for each mile | |
| (Unit: US$/container) stuffed Container | 20 feet | 10 | 0.4 | |
| | 40 feet | 20 | 0.8 | |
| | over 40 feet | 30 | 1 | |
| empty Container | 20 feet | 7 | 0.25 | |
| | 40 feet | 14 | 0.5 | |
| | over 40 feet | 16 | 0.8 | not confirmed |
| 9. Labor Employing Charges | ( Unit: US$/person - hour) | | | |
| | Skilled Labor | Unskilled Labor | Diver | |
| | 3 | 1 | 35 | not confirmed |
| 10. Mooring Dues | ( Unit: US$/time) | | | ( Unit : VND/time ) |
| | | at Quay | at Buoy | at Quay: mooring / unmooring; at Buoy: mooring / unmooring |
| | under 500 GRT | 11 | 40 | < 2000: 60,000 / 50,000 / 110,000 / 70,000 |
| | from 1,001 to 1,500 GRT | 18 | 65 | 2,000 - 4,000: 70,000 / 60,000 / 140,000 / 100,000 |
| | from 1,501 to 4,000 GRT | 34 | 108 | |
| | from 4,001 to 10,000 GRT | 51 | 150 | 4,000 - 6,000: 85,000 / 75,000 / 160,000 / 130,000 |
| | from 10,001 to 15,000 GRT | 67 | 172 | |
| | from 15,001 GRT upward | 84 | 194 | > 6,000: 150,000 / 140,000 / 170,000 / 165,000 |
| 11. Other Charges | | | | |
| (1) Shooting Rubbish | ( US$/vessel) | | | |
| | | at Quay | at Buoy | |
| | Rates for one time | 20 | 50 | not confirmed |
| (2) Fresh Water Supply | ( Unit: US$/m3) | | | ( Unit : VND/m3) |
| | by conduit from port | 2.5 | | at Quay 15,000 |
| | by ship | 3.5 | | at Buoy 22,000 |

*Table A 8.1.1 Port Tariff*

| | | International | | Domestic | |
|---|---|---|---|---|---|
| Effective | | from July 1st, 2001 | | from July 1st, 2001 | |
| (1) Tonnage Dues | 1) Entrance | 0.085 US$/GRT | | 250 VND/GRT | |
| | 2) Exit | 0.085 US$/GRT | | 250 VND/GRT | |
| (2) Maritime Safety Charges | | Area 1 & 3 | Area 2 | 1) Entrance < 2,000GRT : 250VND/GRT<br>2,000GRT< : 500VND/GRT<br>2) Exit < 2,000GRT : 250VND/GRT<br>2,000 GRT< : 500VND/GRT | |
| | | - Conventional vessel | | | |
| | | Entrance 0.24 US$/GRT | 0.18US$/GRT | | |
| | | Exit 0.24 US$/GRT | 0.18 US$/GRT | | |
| (3) Clearance Fees | | below of 600 GRT | 20 US$/trip | under 200 GRT | 30,000 VND/trip |
| | | from 600 GRT to 1,000 GRT | 50 US$/trip | from 200 GRT below 1,000 GRT | 50,000 VND/trip |
| | | above 1,000 GRT | 100 US$/trip | from 1,000GRT below 5,000GRT | 100,000 VND/trip |
| | | | | over 5,000 GRT | 200,000 VND/trip |

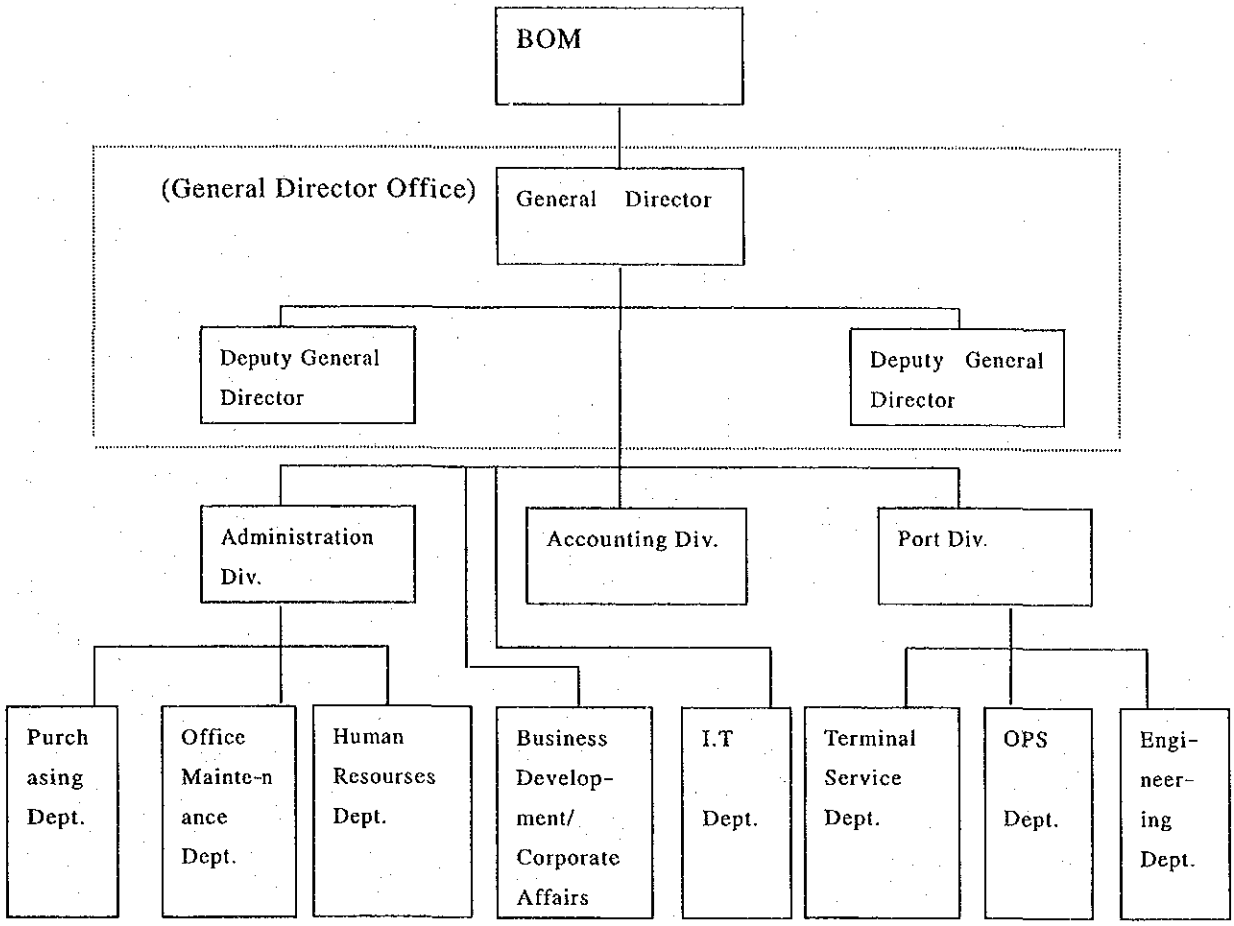
*Source: 1/ Decision No.85/2000/QD-BVGCP, No. 86/2000/QD-BVGCP, No.48/QD/BTC*

2/ The Study on the Port Development Plan in the Key Area of the Central Region in the Socialist Republic of Vietnam(JICA)




Source: Ben Nghe Port

**Figure A8.1.1 Organization Chart of Ben Nghe Port**




Source: VICT

**Figure A8.1.2 Organization Chart of VICT**

# Appendix 11-A Present Domestic Cargo OD Matrices, 2000

*(Unit:'000 tons)*

**All Commodities**

| All | North | Central | South | SFEA | Mekong | Total |
|---|---|---|---|---|---|---|
| North | 4 | 1,986 | 75 | 2,429 | 229 | 4,723 |
| Central | 433 | 160 | 2 | 332 | 151 | 1,078 |
| South | 0 | 0 | 0 | 0 | 0 | 0 |
| SFEA | 3,314 | 568 | 0 | 0 | 0 | 3,882 |
| Mekong | 715 | 197 | 0 | 0 | 0 | 912 |
| Total | 4,466 | 2,912 | 77 | 2,761 | 380 | 10,595 |

**Cement and Clinker**

| 6 | North | Central | South | SFEA | Mekong | Total |
|---|---|---|---|---|---|---|
| North | 4 | 603 | 0 | 1,137 | 0 | 1,744 |
| Central | 0 | 19 | 0 | 81 | 15 | 115 |
| South | 0 | 0 | 0 | 0 | 0 | 0 |
| SFEA | 0 | 0 | 0 | 0 | 0 | 0 |
| Mekong | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 4 | 622 | 0 | 1,218 | 15 | 1,859 |

**Rice and Other Food Crops**

| 1 | North | Central | South | SFEA | Mekong | Total |
|---|---|---|---|---|---|---|
| North | 0 | 2 | 0 | 1 | 0 | 3 |
| Central | 33 | 1 | 0 | 0 | 0 | 35 |
| South | 0 | 0 | 0 | 0 | 0 | 0 |
| SFEA | 734 | 107 | 0 | 0 | 0 | 842 |
| Mekong | 715 | 197 | 0 | 0 | 0 | 912 |
| Total | 1,482 | 308 | 0 | 1 | 0 | 1,791 |

**Fertilizers**

| 7 | North | Central | South | SFEA | Mekong | Total |
|---|---|---|---|---|---|---|
| North | 0 | 278 | 44 | 295 | 89 | 706 |
| Central | 0 | 89 | 0 | 74 | 0 | 163 |
| South | 0 | 0 | 0 | 0 | 0 | 0 |
| SFEA | 194 | 46 | 0 | 0 | 0 | 240 |
| Mekong | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 194 | 413 | 44 | 369 | 89 | 1,109 |

**Wood and Forestry Products**

| 3 | North | Central | South | SFEA | Mekong | Total |
|---|---|---|---|---|---|---|
| North | 0 | 0 | 0 | 0 | 0 | 0 |
| Central | 0 | 0 | 0 | 7 | 135 | 143 |
| South | 0 | 0 | 0 | 0 | 0 | 0 |
| SFEA | 0 | 0 | 0 | 0 | 0 | 0 |
| Mekong | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 7 | 135 | 143 |

**Coal and Other Mining Products**

| 8 | North | Central | South | SFEA | Mekong | Total |
|---|---|---|---|---|---|---|
| North | 0 | 537 | 0 | 420 | 0 | 957 |
| Central | 0 | 0 | 0 | 108 | 0 | 108 |
| South | 0 | 0 | 0 | 0 | 0 | 0 |
| SFEA | 0 | 0 | 0 | 0 | 0 | 0 |
| Mekong | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 537 | 0 | 528 | 0 | 1,065 |

**Steel and Iron**

| 4 | North | Central | South | SFEA | Mekong | Total |
|---|---|---|---|---|---|---|
| North | 0 | 0 | 0 | 141 | 0 | 142 |
| Central | 0 | 0 | 0 | 3 | 0 | 3 |
| South | 0 | 0 | 0 | 0 | 0 | 0 |
| SFEA | 194 | 0 | 0 | 0 | 0 | 194 |
| Mekong | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 194 | 0 | 0 | 145 | 0 | 339 |

**Petroleum Products**

| 9 | North | Central | South | SFEA | Mekong | Total |
|---|---|---|---|---|---|---|
| North | 0 | 370 | 1 | 0 | 0 | 371 |
| Central | 0 | 0 | 0 | 0 | 0 | 0 |
| South | 0 | 0 | 0 | 0 | 0 | 0 |
| SFEA | 2,079 | 398 | 0 | 0 | 0 | 2,477 |
| Mekong | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 2,079 | 768 | 1 | 0 | 0 | 2,848 |

**Construction Materials**

| 5 | North | Central | South | SFEA | Mekong | Total |
|---|---|---|---|---|---|---|
| North | 0 | 78 | 0 | 51 | 97 | 226 |
| Central | 0 | 0 | 0 | 24 | 0 | 24 |
| South | 0 | 0 | 0 | 0 | 0 | 0 |
| SFEA | 0 | 0 | 0 | 0 | 0 | 0 |
| Mekong | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 78 | 0 | 75 | 97 | 249 |

**Manufactured Products**

| 11 | North | Central | South | SFEA | Mekong | Total |
|---|---|---|---|---|---|---|
| North | 0 | 118 | 30 | 383 | 43 | 574 |
| Central | 400 | 51 | 2 | 34 | 2 | 488 |
| South | 0 | 0 | 0 | 0 | 0 | 0 |
| SFEA | 113 | 17 | 0 | 0 | 0 | 130 |
| Mekong | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 513 | 185 | 31 | 418 | 45 | 1,192 |

# Appendix 11-B Future Domestic Cargo OD Matrices, 2010

(Unit:'000 tons)

**All Commodities**

| All | North | Central | South | SFEA | Mekong | Total |
|---|---|---|---|---|---|---|
| North | 115 | 1,206 | 95 | 4,288 | 219 | 5,924 |
| Central | 1,345 | 528 | 100 | 794 | 779 | 3,546 |
| South | 25 | 1 | 0 | 11 | 88 | 124 |
| SFEA | 3,098 | 3,972 | 5 | 62 | 55 | 7,193 |
| Mekong | 1,621 | 520 | 167 | 152 | 183 | 2,644 |
| Total | 6,204 | 6,228 | 367 | 5,307 | 1,325 | 19,431 |

**Cement and Clinker**

| 6 | North | Central | South | SFEA | Mekong | Total |
|---|---|---|---|---|---|---|
| North | 72 | 571 | 48 | 169 | 0 | 860 |
| Central | 4 | 52 | 46 | 43 | 110 | 254 |
| South | 0 | 0 | 0 | 0 | 16 | 16 |
| SFEA | 0 | 0 | 0 | 1 | 11 | 13 |
| Mekong | 0 | 0 | 80 | 80 | 42 | 202 |
| Total | 76 | 623 | 174 | 293 | 178 | 1,345 |

**Rice and Other Food Crops**

| 1 | North | Central | South | SFEA | Mekong | Total |
|---|---|---|---|---|---|---|
| North | 0 | 28 | 1 | 58 | 26 | 113 |
| Central | 235 | 11 | 1 | 23 | 8 | 279 |
| South | 20 | 1 | 0 | 0 | 2 | 23 |
| SFEA | 1,577 | 369 | 0 | 0 | 0 | 1,946 |
| Mekong | 1,266 | 288 | 2 | 0 | 3 | 1,559 |
| Total | 3,098 | 696 | 5 | 81 | 39 | 3,919 |

**Fertilizers**

| 7 | North | Central | South | SFEA | Mekong | Total |
|---|---|---|---|---|---|---|
| North | 2 | 247 | 12 | 395 | 73 | 729 |
| Central | 16 | 315 | 9 | 158 | 15 | 514 |
| South | 0 | 0 | 0 | 0 | 1 | 1 |
| SFEA | 263 | 53 | 0 | 0 | 1 | 318 |
| Mekong | 16 | 62 | 31 | 27 | 34 | 170 |
| Total | 297 | 677 | 52 | 580 | 125 | 1,731 |

**Wood and Forestry Products**

| 3 | North | Central | South | SFEA | Mekong | Total |
|---|---|---|---|---|---|---|
| North | 0 | 4 | 0 | 14 | 16 | 34 |
| Central | 49 | 31 | 0 | 14 | 256 | 349 |
| South | 0 | 0 | 0 | 0 | 44 | 44 |
| SFEA | 6 | 0 | 4 | 0 | 19 | 30 |
| Mekong | 7 | 2 | 0 | 0 | 66 | 75 |
| Total | 62 | 38 | 4 | 27 | 400 | 532 |

**Coal and Other Mining Products**

| 8 | North | Central | South | SFEA | Mekong | Total |
|---|---|---|---|---|---|---|
| North | 0 | 182 | 0 | 2,732 | 0 | 2,913 |
| Central | 20 | 1 | 0 | 60 | 0 | 81 |
| South | 0 | 0 | 0 | 10 | 0 | 10 |
| SFEA | 36 | 12 | 0 | 57 | 0 | 104 |
| Mekong | 0 | 0 | 21 | 21 | 0 | 42 |
| Total | 56 | 194 | 21 | 2,879 | 0 | 3,150 |

**Steel and Iron**

| 4 | North | Central | South | SFEA | Mekong | Total |
|---|---|---|---|---|---|---|
| North | 13 | 21 | 0 | 265 | 1 | 300 |
| Central | 7 | 0 | 0 | 90 | 9 | 107 |
| South | 0 | 0 | 0 | 0 | 0 | 0 |
| SFEA | 201 | 5 | 0 | 4 | 0 | 210 |
| Mekong | 0 | 1 | 10 | 10 | 2 | 24 |
| Total | 220 | 28 | 11 | 369 | 12 | 640 |

**Petroleum Products**

| 9 | North | Central | South | SFEA | Mekong | Total |
|---|---|---|---|---|---|---|
| North | 27 | 8 | 1 | 105 | 49 | 191 |
| Central | 516 | 66 | 43 | 275 | 379 | 1,280 |
| South | 2 | 0 | 0 | 0 | 19 | 22 |
| SFEA | 763 | 3,459 | 0 | 0 | 18 | 4,241 |
| Mekong | 163 | 128 | 17 | 9 | 32 | 349 |
| Total | 1,471 | 3,662 | 61 | 390 | 497 | 6,081 |

**Construction Materials**

| 5 | North | Central | South | SFEA | Mekong | Total |
|---|---|---|---|---|---|---|
| North | 0 | 13 | 0 | 10 | 0 | 23 |
| Central | 57 | 0 | 0 | 50 | 1 | 108 |
| South | 0 | 0 | 0 | 0 | 0 | 0 |
| SFEA | 35 | 14 | 0 | 0 | 0 | 49 |
| Mekong | 125 | 28 | 1 | 1 | 2 | 158 |
| Total | 218 | 54 | 1 | 61 | 3 | 338 |

**Manufactured Products**

| 11 | North | Central | South | SFEA | Mekong | Total |
|---|---|---|---|---|---|---|
| North | 1 | 132 | 32 | 541 | 55 | 761 |
| Central | 441 | 52 | 0 | 81 | 1 | 575 |
| South | 3 | 0 | 0 | 1 | 6 | 9 |
| SFEA | 216 | 60 | 1 | 0 | 6 | 283 |
| Mekong | 44 | 12 | 4 | 4 | 2 | 66 |
| Total | 705 | 256 | 38 | 627 | 69 | 1,695 |

# Appendix 11-C Future Domestic Cargo OD Matrices, 2020

(Unit:'000 tons)

**All Commodities**

| All | North | Central | South | SFEA | Mekong | Total |
|---|---|---|---|---|---|---|
| North | 153 | 3,862 | 172 | 5,171 | 1,046 | 10,404 |
| Central | 2,612 | 1,304 | 334 | 2,719 | 2,418 | 9,387 |
| South | 100 | 78 | 0 | 24 | 383 | 585 |
| SFEA | 3,753 | 7,941 | 26 | 41 | 191 | 11,951 |
| Mekong | 3,164 | 1,646 | 433 | 356 | 360 | 5,958 |
| Total | 9,783 | 14,831 | 964 | 8,310 | 4,398 | 38,286 |

**Cement and Clinker**

| 6 | North | Central | South | SFEA | Mekong | Total |
|---|---|---|---|---|---|---|
| North | 74 | 449 | 13 | 143 | 0 | 679 |
| Central | 237 | 353 | 145 | 1,066 | 825 | 2,626 |
| South | 0 | 34 | 0 | 18 | 162 | 214 |
| SFEA | 0 | 16 | 8 | 7 | 47 | 79 |
| Mekong | 0 | 0 | 193 | 193 | 75 | 460 |
| Total | 311 | 853 | 358 | 1,427 | 1,109 | 4,058 |

**Rice and Other Food Crops**

| 1 | North | Central | South | SFEA | Mekong | Total |
|---|---|---|---|---|---|---|
| North | 1 | 132 | 13 | 337 | 320 | 803 |
| Central | 529 | 80 | 29 | 159 | 210 | 1,006 |
| South | 41 | 2 | 0 | 0 | 7 | 50 |
| SFEA | 1,917 | 573 | 0 | 0 | 0 | 2,490 |
| Mekong | 1,643 | 449 | 11 | 4 | 13 | 2,119 |
| Total | 4,130 | 1,237 | 53 | 499 | 549 | 6,469 |

**Fertilizers**

| 7 | North | Central | South | SFEA | Mekong | Total |
|---|---|---|---|---|---|---|
| North | 19 | 325 | 47 | 490 | 175 | 1,056 |
| Central | 94 | 447 | 41 | 293 | 110 | 986 |
| South | 5 | 4 | 0 | 1 | 11 | 21 |
| SFEA | 334 | 60 | 0 | 0 | 4 | 399 |
| Mekong | 167 | 298 | 83 | 65 | 90 | 702 |
| Total | 619 | 1,134 | 171 | 850 | 389 | 3,163 |

**Wood and Forestry Products**

| 3 | North | Central | South | SFEA | Mekong | Total |
|---|---|---|---|---|---|---|
| North | 0 | 26 | 0 | 52 | 36 | 114 |
| Central | 111 | 83 | 0 | 30 | 283 | 507 |
| South | 2 | 2 | 0 | 0 | 84 | 88 |
| SFEA | 23 | 8 | 15 | 0 | 35 | 80 |
| Mekong | 35 | 30 | 2 | 0 | 113 | 180 |
| Total | 171 | 148 | 17 | 83 | 550 | 969 |

**Coal and Other Mining Products**

| 8 | North | Central | South | SFEA | Mekong | Total |
|---|---|---|---|---|---|---|
| North | 0 | 2,522 | 0 | 2,535 | 0 | 5,057 |
| Central | 0 | 77 | 0 | 17 | 0 | 94 |
| South | 0 | 30 | 0 | 0 | 0 | 30 |
| SFEA | 47 | 321 | 0 | 24 | 0 | 392 |
| Mekong | 0 | 96 | 3 | 3 | 0 | 102 |
| Total | 47 | 3,045 | 3 | 2,579 | 0 | 5,674 |

**Steel and Iron**

| 4 | North | Central | South | SFEA | Mekong | Total |
|---|---|---|---|---|---|---|
| North | 23 | 68 | 0 | 459 | 4 | 554 |
| Central | 36 | 39 | 24 | 250 | 59 | 407 |
| South | 0 | 0 | 0 | 3 | 1 | 4 |
| SFEA | 181 | 11 | 0 | 10 | 0 | 203 |
| Mekong | 0 | 11 | 44 | 44 | 7 | 106 |
| Total | 240 | 129 | 68 | 766 | 71 | 1,273 |

**Petroleum Products**

| 9 | North | Central | South | SFEA | Mekong | Total |
|---|---|---|---|---|---|---|
| North | 34 | 135 | 42 | 334 | 392 | 937 |
| Central | 879 | 157 | 94 | 497 | 898 | 2,524 |
| South | 46 | 6 | 0 | 0 | 99 | 151 |
| SFEA | 874 | 6,809 | 0 | 0 | 85 | 7,768 |
| Mekong | 783 | 589 | 64 | 23 | 51 | 1,509 |
| Total | 2,615 | 7,697 | 199 | 853 | 1,524 | 12,889 |

**Construction Materials**

| 5 | North | Central | South | SFEA | Mekong | Total |
|---|---|---|---|---|---|---|
| North | 0 | 17 | 0 | 28 | 1 | 46 |
| Central | 166 | 1 | 0 | 193 | 7 | 367 |
| South | 0 | 0 | 0 | 0 | 0 | 0 |
| SFEA | 61 | 28 | 0 | 0 | 0 | 89 |
| Mekong | 329 | 104 | 8 | 4 | 1 | 446 |
| Total | 556 | 150 | 8 | 225 | 9 | 949 |

**Manufactured Products**

| 11 | North | Central | South | SFEA | Mekong | Total |
|---|---|---|---|---|---|---|
| North | 3 | 187 | 56 | 793 | 119 | 1,159 |
| Central | 561 | 66 | 1 | 213 | 28 | 869 |
| South | 7 | 0 | 0 | 2 | 20 | 29 |
| SFEA | 316 | 114 | 3 | 0 | 20 | 452 |
| Mekong | 208 | 69 | 26 | 20 | 11 | 334 |
| Total | 1,093 | 437 | 86 | 1,028 | 197 | 2,842 |

# Appendix 13-A Cargo Flow by Shipping Area/Route

## SFEA Outgoing Flow, Year 2000

('000 tons)

| Shipping Route/Area | Rice & Food Crops | Industrial Crops | Fishery Products | Wood/ Forestry Products | Coal / Other Mining Products | Steel / Iron | Fertilizers | Construction Materials | Cement / Clinker | Manufactured Goods | Dry Cargo Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| East Asia | 868 | 78 | 390 | 64 | 0 | 0 | 0 | 0 | 0 | 1,386 | 2,786 |
| North and South America | 66 | 43 | 137 | 22 | 0 | 0 | 0 | 0 | 0 | 137 | 405 |
| Europe | 317 | 196 | 47 | 8 | 0 | 0 | 0 | 0 | 0 | 1,076 | 1,644 |
| Middle East, South Asia and Myanmar | 960 | 17 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 60 | 1,037 |
| Indonesia, Brunei and Oceania | 561 | 5 | 10 | 2 | 0 | 0 | 0 | 0 | 0 | 60 | 638 |
| Thailand, Malaysia and Singapore | 528 | 43 | 30 | 5 | 0 | 0 | 0 | 0 | 0 | 262 | 868 |
| Foreign Trade Total | 3,300 | 382 | 614 | 101 | 0 | 0 | 0 | 0 | 0 | 2,981 | 7,378 |
| Other Vietnamese Ports | 841 | 0 | 0 | 0 | 0 | 193 | 240 | 0 | 0 | 130 | 1,404 |
| Total | 4,141 | 382 | 614 | 101 | 0 | 193 | 240 | 0 | 0 | 3,111 | 8,782 |

## SFEA Incoming Flow, Year 2000

('000 tons)

| Shipping Route/Area | Coal & Other Mining Products | Construction Materials | Rice & Food Crops | Steel & Iron | Fertilizers | Cement & Clinkers | Forest Product | Manufactured Goods | Dry Cargo Total |
|---|---|---|---|---|---|---|---|---|---|
| East Asia | 0 | 0 | 0 | 1,146 | 1,314 | 70 | 10 | 3,120 | 5,660 |
| North and South America | 0 | 0 | 0 | 12 | 203 | 11 | 0 | 157 | 383 |
| Europe | 0 | 0 | 0 | 550 | 615 | 33 | 0 | 638 | 1,836 |
| Middle East, South Asia and Myanmar | 0 | 0 | 0 | 32 | 3 | 0 | 5 | 73 | 113 |
| Indonesia, Brunei and Oceania | 0 | 0 | 0 | 46 | 475 | 25 | 50 | 230 | 826 |
| Thailand, Malaysia and Singapore | 0 | 0 | 0 | 214 | 376 | 20 | 35 | 1,009 | 1,654 |
| Foreign Trade Total | 0 | 0 | 0 | 2,000 | 2,986 | 159 | 100 | 5,227 | 10,472 |
| Other Vietnamese Ports | 528 | 75 | 1 | 144 | 369 | 1,218 | 7 | 418 | 2,760 |
| Total | 528 | 75 | 1 | 2,144 | 3,355 | 1,377 | 107 | 5,645 | 13,232 |

## SFEA Outgoing Flow, Year 2010

('000 tons)

| Shipping Route/Area | Rice & Food Crops | Industrial Crops | Fishery Products | Wood/ Forestry Products | Coal / Other Mining Products | Steel / Iron | Fertilizers | Construction Materials | Cement / Clinker | Manufactured Goods | Dry Cargo Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| East Asia | 1,236 | 143 | 437 | 63 | 0 | 0 | 0 | 0 | 0 | 3,098 | 4,978 |
| North and South America | 94 | 79 | 154 | 22 | 0 | 0 | 0 | 0 | 0 | 306 | 654 |
| Europe | 451 | 359 | 53 | 8 | 0 | 0 | 0 | 0 | 0 | 2,405 | 3,277 |
| Middle East, South Asia and Myanmar | 1,367 | 31 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 134 | 1,533 |
| Indonesia, Brunei and Oceania | 799 | 9 | 11 | 2 | 0 | 0 | 0 | 0 | 0 | 134 | 955 |
| Thailand, Malaysia and Singapore | 752 | 79 | 34 | 5 | 0 | 0 | 0 | 0 | 0 | 586 | 1,455 |
| Foreign Trade Total | 4,700 | 700 | 688 | 100 | 0 | 0 | 0 | 0 | 0 | 6,664 | 12,852 |
| Other Vietnamese Ports | 1,946 | 0 | 0 | 30 | 48 | 206 | 318 | 49 | 11 | 283 | 2,891 |
| Total | 6,646 | 700 | 688 | 130 | 48 | 206 | 318 | 49 | 11 | 6,947 | 15,743 |

## SFEA Incoming Flow, Year 2010

('000 tons)

| Shipping Route/Area | Coal & Other Mining Products | Construction Materials | Rice & Food Crops | Steel & Iron | Fertilizers | Cement & Clinkers | Forest Product | Manufactured Goods | Dry Cargo Total |
|---|---|---|---|---|---|---|---|---|---|
| East Asia | 0 | 0 | 0 | 752 | 1,536 | 0 | 0 | 8,271 | 10,560 |
| North and South America | 0 | 0 | 0 | 8 | 237 | 0 | 0 | 416 | 661 |
| Europe | 0 | 0 | 0 | 361 | 719 | 0 | 0 | 1,691 | 2,771 |
| Middle East, South Asia and Myanmar | 0 | 0 | 0 | 21 | 4 | 0 | 0 | 194 | 218 |
| Indonesia, Brunei and Oceania | 0 | 0 | 0 | 30 | 555 | 0 | 0 | 610 | 1,195 |
| Thailand, Malaysia and Singapore | 0 | 0 | 0 | 140 | 440 | 0 | 0 | 2,675 | 3,255 |
| Foreign Trade Total | 0 | 0 | 0 | 1,313 | 3,491 | 0 | 0 | 13,857 | 18,661 |
| Other Vietnamese Ports | 2,823 | 61 | 81 | 365 | 580 | 292 | 27 | 627 | 4,856 |
| Total | 2,823 | 61 | 81 | 1,678 | 4,071 | 292 | 27 | 14,484 | 23,517 |

## SFEA Outgoing Flow, Year 2020

('000 tons)

| Shipping Route/Area | Rice & Food Crops | Industrial Crops | Fishery Products | Wood/ Forestry Products | Coal / Other Mining Products | Steel / Iron | Fertilizers | Construction Materials | Cement / Clinker | Manufactured Goods | Dry Cargo Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| East Asia | 1,473 | 298 | 628 | 63 | 0 | 0 | 0 | 0 | 0 | 6,653 | 9,116 |
| North and South America | 112 | 164 | 221 | 22 | 0 | 0 | 0 | 0 | 0 | 658 | 1,176 |
| Europe | 538 | 749 | 76 | 8 | 0 | 0 | 0 | 0 | 0 | 5,165 | 6,536 |
| Middle East, South Asia and Myanmar | 1,629 | 65 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 288 | 1,982 |
| Indonesia, Brunei and Oceania | 952 | 19 | 16 | 2 | 0 | 0 | 0 | 0 | 0 | 288 | 1,277 |
| Thailand, Malaysia and Singapore | 896 | 164 | 48 | 5 | 0 | 0 | 0 | 0 | 0 | 1,258 | 2,371 |
| Foreign Trade Total | 5,600 | 1,460 | 989 | 100 | 0 | 0 | 0 | 0 | 0 | 14,310 | 22,459 |
| Other Vietnamese Ports | 2,490 | 0 | 0 | 80 | 368 | 193 | 398 | 89 | 71 | 452 | 4,141 |
| Total | 8,090 | 1,460 | 989 | 180 | 368 | 193 | 398 | 89 | 71 | 14,762 | 26,600 |

## SFEA Incoming Flow, Year 2020

('000 tons)

| Shipping Route/Area | Coal & Other Mining Products | Construction Materials | Rice & Food Crops | Steel & Iron | Fertilizers | Cement & Clinkers | Forest Product | Manufactured Goods | Dry Cargo Total |
|---|---|---|---|---|---|---|---|---|---|
| East Asia | 0 | 0 | 0 | 2,913 | 1,952 | 0 | 0 | 18,100 | 22,965 |
| North and South America | 0 | 0 | 0 | 31 | 302 | 0 | 0 | 911 | 1,243 |
| Europe | 0 | 0 | 0 | 1,398 | 913 | 0 | 0 | 3,701 | 6,013 |
| Middle East, South Asia and Myanmar | 0 | 0 | 0 | 81 | 4 | 0 | 0 | 423 | 509 |
| Indonesia, Brunei and Oceania | 0 | 0 | 0 | 117 | 706 | 0 | 0 | 1,334 | 2,157 |
| Thailand, Malaysia and Singapore | 0 | 0 | 0 | 544 | 558 | 0 | 0 | 5,853 | 6,956 |
| Foreign Trade Total | 0 | 0 | 0 | 5,084 | 4,435 | 0 | 0 | 30,323 | 39,842 |
| Other Vietnamese Ports | 2,555 | 225 | 499 | 756 | 849 | 1,420 | 83 | 1,028 | 7,415 |
| Total | 2,555 | 225 | 499 | 5,840 | 5,284 | 1,420 | 83 | 31,351 | 47,257 |

**Table A13.4.6 -1 Estimated Capacities of Major Inland Waterway Ports in the South**

| No. | Port | Unit | Projected Capacity | | Port type |
|---|---|---|---|---|---|
| | | | 2010 | 2020 | General |
| 1 | HCMC Port | 1,000 tons | 2,000 | 3,000 | " |
| 2 | Vinh Long Port | " | 700 | 950 | " |
| 3 | Long Xuyen Port | " | 850 | 1,400 | " |
| 4 | Cao Lanh Port | " | 700 | 1,150 | " |
| 5 | Ca Mau Port | " | 390 | 470 | " |
| 6 | HCMC Port | 1,000 pax | 1,500 | 2,400 | Passenger |
| 7 | Can Tho Port | " | 1,200 | 1,700 | Passenger |

Source: Master Plan of Vietnamese Inland Waterways Transport Development by 2020

**Table 13.4.6 -2 Development Plan of Major Waterways in the South**

| Route | Length(km) | Period | Plan |
|---|---|---|---|
| Saigon -Kien Luong (via Cho Gao Canal) | 318 | up to 2020 | Upgrade to Class III (B=30m, H=3m) |
| Saigon -Kien Luong (via Dong Thap Muoi) | 288 | 1998-2020 | Upgrade to Class III (B=20m, H=3m) |
| Saigon -Ca Mau | 330 | 1998-2020 | Upgrade to Class III (B=30m, H=3m) |
| Saigon -Moc Hoa | 129 | 1998-2020 | Upgrade to Class III (B=30m, H=2m) |
| Saigon -Ben Keo | 156 | 1998-2020 | Upgrade to Class III (B=30m, H=2m) |
| HCMC -Ben Suc | 101 | 1998-2020 | Upgrade to Class III (B=40m, H=3m) |
| Cau Dinh An -Tan Chau | (Hau River) | up to 2020 | Maintain to meet Class I (B-100m, H=7m) |
| Cua Tieu -Cambodia | 277 | up to 2020 | Maintain to meet Class I (B-100m, H=6m) |

Source: VITRANSS

**Table 13.4.6-3 Outline of Phu Dinh Port**

| Estimated cargoes (thousand tons) | | Max. DWT | |
|---|---|---|---|
| 2002 | 843 | Barge | 300 |
| 2010 | 2,105 | Lash Barge | 1,000 |
| 2020 | 2,531 | Vessel | 200 |
| Port areas (ha) | | Budget (bil VND) | |
| 52.2 | | 281 | |

Source: FS report on Phu Dinh Port, 1999, MOT