

ENVIRONMENTAL DISCHARGE STANDARD

**National Environment Commission
Royal Government of Bhutan
August 2004**



དཔལ་ལྷན་འབྲུག་གཞུང་།
རྒྱལ་ཡོངས་མཐའ་འཁོར་གནས་སྤངས་ལྷན་ཚོགས་ཡིག་ཚང་།
ROYAL GOVERNMENT OF BHUTAN
NATIONAL ENVIRONMENT COMMISSION SECRETARIAT

FOREWORD

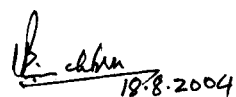
In 1999, the National Environment Commission with technical and financial assistance from the Asian Development Bank (ADB) published six sectoral environmental assessment guidelines for the mining, roads, industries, hydropower, transmission lines and forestry sectors. Several stakeholder consultation workshops and seminars were conducted before the guidelines were published. These guidelines were intended to guide different project proponents through the process of acquiring an environmental clearance for their projects. The Environmental Assessment 2000 (EA Act 2000) was passed by the National Assembly in 2000 and the Regulations under the Act were adopted two years later. Stakeholder feedback and our experiences in implementing the EA Act and the guidelines indicated that there was a need to revise the guidelines in order to make them more practical and relevant to the Bhutanese context and also to streamline them with the provisions of the EA Act 2000. It was also felt that there was a need for two more sectoral guidelines for urban development and tourism as rapid developments in these two sectors was becoming a concern for Bhutan. Therefore, in 2003 the NEC once again revisited these guidelines and revised and updated them to make them more practical and functional documents. Several Environmental Codes of Best Practices (ECOPs) have also been produced to support these environmental assessment guidelines.

The NEC is grateful to the ADB for being so forthcoming with technical and financial assistance to revise and update these guidelines. The revision and updating of these guidelines were accomplished through close consultation with all the various stakeholders. We would also like to express our gratitude and appreciation to all the line ministries and stakeholders for their active participation, support and inputs. We are confident that the revised guidelines will be more useful documents that facilitate and expedite the environmental clearance process as project proponents will now have a better understanding of what information must be provided in order to attain an environmental clearance.

In Bhutan, environmental conservation has been embraced as one of the four pillars of Gross National Happiness - the other three pillars being good governance, socio-economic development and cultural preservation. However, with the expansion of developmental activities in the country, it is becoming very difficult to strike a sustainable balance between environmental conservation and socio-economic development. The number of industries is on the rise every year

while the demand for rural access to market facilities in the form of farm roads and feeder roads is increasing with every Five Year Plan - in the 9th Five Year Plan alone there is a plan to develop 588kms of farm roads. Environmental issues such as waste disposal related to urbanization are also becoming serious concerns for Bhutan. Bhutan is lauded by the international community for its sound environmental policies and the political will to implement these policies. However, environmental problems are becoming more and more visible and instruments like the EA Act 2000 must be implemented effectively to support the government's sound environmental policies and to ensure that Bhutan remains clean and green.

The environmental assessment process endeavors to mitigate and prevent the undesirable impacts of developmental activities. It is in no way intended to hamper socio-economic development in Bhutan but to guide project proponents in making the right investments in land, manpower, technology and mitigation measures to ensure that their projects have the least possible impacts on the environment. With the revision and updating of the old guidelines and the publication of two new guidelines on Urban Development and Tourism and relevant ECOPs, the NEC is hopeful that the private sector, line ministries and competent authorities under the Regulations for Environmental Clearance of Projects find the guidelines more useful, practical, informative and easy to comply with. It is the sincere wish and hope of NEC that all the stakeholders, both public and private will make the best use of these guidelines, which in turn will help in protecting our fragile ecology. Sound implementation of these guidelines will go a long way in minimizing the negative impacts of developmental activities on Bhutan's environment.



Nado Rinchen
Deputy Minister for Environment

NECS, PO Box 466, Thimphu, Bhutan

Telephone: (975-2) 323384/325856/324323/326993

Fax: (975-2) 323385

Email addresses:

AED

admec@druknet.net.bt

Technical Division

EIA Section: eanec@druknet.net.bt

RMS Section: rnrnec@druknet.net.bt

ICO section: cunec@druknet.net.bt

Policy Coordination Division

Policy Analysis Section: ppdnec@druknet.net.bt

Legal Section: legalnec@druknet.net.bt

Table of Contents

| | | |
|----------|---|----------|
| 1 | Environmental Standard for Water ----- | 1 |
| 2 | Environmental Standard for Air ----- | 3 |
| 3 | Environmental Standard for Noise ----- | 4 |

1 Environmental Standard for Water¹

For specific industries discussed below, the standards mentioned under each table should be followed. However, for parameters not covered under each specific industry, the standards of general industry will be applied.

Table 1-1: Discharge standard for cooling Tower

| Parameters | Maximum value | Unit |
|------------|---------------|------|
| Chlorine | 0.5 | mg/L |

Table 1-2: Discharge standard for Food Industry

| Parameters | Maximum value | Unit |
|---------------------|---------------|------|
| Ammonia (as N) | 15 | mg/L |
| Pesticide residuals | 0.05 | mg/L |

Table 1-3: Discharges standard for Textile and Carpet Industry

| Parameters | Maximum value | Unit |
|----------------------|---------------|------|
| Copper | 0.5 | mg/L |
| NH ₃ as N | 8.0 | mg/L |
| Phenol | 0.5 | mg/L |
| Sulfide | 0.2 | mg/L |

Table 1-4: Discharge standard for Fibreboard Industry

| Parameters | Maximum value | Unit |
|----------------------|---------------------|---------------------|
| Formalin | No acceptable level | No acceptable level |
| NH ₃ as N | 8.0 | mg/L |
| Phenol | 0.5 | mg/L |

Table 1-5: Discharge standard for Electric Arc Furnace wastewater stream

| Parameters | Maximum value | Unit |
|---------------|---------------|------|
| Arsenic | 0.1 | mg/L |
| Chromium (VI) | 0.1 | mg/L |
| Lead | 0.1 | mg/L |
| Mercury | 0.001 | mg/L |

¹The standard for drinking water is derived from the World Health Organization (WHO) standard.

Table 1-6: Discharge standard for Industries (general)

| Parameters | Maximum value | Unit |
|------------------------|----------------------|-------------|
| pH | 6-9 | |
| Temperature increase | <3 | oC |
| Total suspended solids | 50.0 | mg/L |
| Oil and grease | 10.0 | mg/L |
| BOD5 | 50.0 | mg/L |
| COD | 250.0 | mg/L |
| Coliforms | 400 | Mpn/100mL |
| Ammonia (as N) | 50.0 | mg/L |
| Arsenic | 0.25 | mg/L |
| Benzine | 0.1 | mg/L |
| Cadmium | 0.1 | mg/L |
| Chromium total | 0.5 | mg/L |
| Copper | 3.0 | mg/L |
| Cyanide | 0.2 | mg/L |
| Iron | 3.5 | mg/L |
| Lead | 0.8 | mg/L |
| Mercury | 0.005 | mg/L |
| Nickel | 3.0 | mg/L |
| Phenol | 2.0 | mg/L |
| Sulphide | 10.0 | mg/L |
| Zinc | 5.0 | mg/L |
| Total metals | 10.0 | mg/L |

Table 1-7: Discharge standard for Mining

| Parameters | Maximum value | Unit |
|------------------------|----------------------|-------------|
| pH | 6-9 | |
| Total suspended solids | 50 | mg/L |
| Oil and grease | 10 | mg/L |
| Cyanide (total) | 0.2 | mg/L |
| Arsenic | 0.1 | mg/L |
| Cadmium | 0.1 | mg/L |
| Chromium (VI) | 0.1 | mg/L |
| Iron | 3.5 | mg/L |

| | | |
|------------------------------|-------|------|
| Copper | 0.5 | mg/L |
| Lead | 0.1 | mg/L |
| Mercury | 0.001 | mg/L |
| Nickel | 0.5 | mg/L |
| Nitrate (explosive residual) | 2.0 | mg/L |
| Total metals | 10 | mg/L |
| Zinc | 2.0 | mg/L |

2 Environmental Standard for Air

Table 2-1: Emission standard for Industry at Stack

| Parameters | Standard | Unit |
|--|--------------------|--------------------|
| Particulates | 300-400 | mg/Nm ³ |
| Volatile organic compounds (VOCs) | 20 | mg/Nm ³ |
| Oxides of Nitrogen (NOX) | 470 | mg/Nm ³ |
| Oxides of sulphur (SOX) | 1,000 | mg/Nm ³ |
| Carbon Monoxide (CO) | 5,000 | mg/Nm ³ |
| Hydrogen Sulphide (H ₂ S) 140 | mg/Nm ³ | |
| Ammonia | 35 | mg/Nm ³ |
| Arsenic | 20 | mg/Nm ³ |
| Cadmium | 0.05 | mg/Nm ³ |
| Chlorine | 30 | mg/Nm ³ |
| Copper | 30 | mg/Nm ³ |
| Fluoride | 25 | mg/Nm ³ |
| Lead | 30 | mg/Nm ³ |
| Mercury | 3 | mg/Nm ³ |

Table 2-2: Motor vehicle emission standard

| Parameter | Measuring system | Maximum permissible limit (%) | Unit |
|------------------|-------------------------|--------------------------------------|------------------------|
| Diesel vehicle | Bosch | 80 | Hertz Smoke Unit (HSU) |
| Gasoline vehicle | Normal | 5.0 | Volume CO |

3 Environmental Standard for Noise

Table 3-1: Noise standard as per land use category²

| Land use Category | Max Leq | | |
|--------------------------|------------------------|--------------------------|--------------|
| | Day³ | Night⁴ | Unit |
| Industrial | 75 | 70 | Db (decibel) |
| Commercial | 65 | 55 | DB |
| Rural/Residential | 55 | 45 | DB |

² Noise levels to be achieved at the plant boundary

³ Day time equals 6AM - 9PM

⁴ Night time equals 9PM - 6AM