

Annex K

Relevant Criteria and Standards

1.1 INTERNATIONAL TECHNICAL STANDARDS

1.1.1 Air Quality

Ambient Air Quality

The *IFC General EHS Guidelines: Air Emissions and Ambient Air Quality* require projects with the potential for significant ambient air quality impacts to prevent or minimise impacts by ensuring that emissions do not result in pollutant concentrations that reach or exceed relevant national legislated ambient air quality guidelines and standards.

According to the *IFC General EHS Guidelines: Air Emissions and Ambient Air Quality*, national air quality standards should be used as the primary assessment criterion (**Table 1.1**). If the national air quality standard is absent, other international guidelines such as the WHO should be used instead.

Table 1.1 IFC Standards - relating to WHO Standards on Ambient Air Quality

Air Pollution	Averaging Period	Guideline Value in $\mu\text{g m}^{-3}$ ^(b)
SO ₂	24-hour	125 (interim target -1)
		50 (interim target -2)
		20 (guideline)
	10-minute	500 (guideline)
Nitrogen Dioxide	1-year	40 (guideline)
	1-hour	200 (guideline)
Particulate Matter less than or equal to 10 microns (PM ₁₀)	1-year	70 (interim target -1)
		50 (interim target -2)
		30 (interim target -3)
		20 (guideline)
	24-hour ^(c)	150 (interim target -1)
		100 (interim target -2)
		75 (interim target -3)
		50 (guideline)
Particulate Matter less than or equal to 2.5 microns (PM _{2.5})	1-year	35 (interim target -1)
		25 (interim target -2)
		15 (interim target -3)
		10 (guideline)
	24-hour	75 (interim target -1)
		50 (interim target -2)
		37.5 (interim target -3)
		25 (guideline)
Ozone (O ₃)	8-hour daily maximum	160 (interim target -1)
		100 (guideline)

Notes: Extracted from *WBG EHS General Guidelines, Environmental Chapter, Section 1.1, Table 1.1.1 based on World Health Organization (WHO). Air Quality Guidelines Global Update, 2005.*

Interim targets are provided in recognition of the need for a staged approach to achieving the recommended guidelines.

PM₁₀ 24-hour value is the 99th percentile.

Air emissions

IFC General EHS Guidelines: Construction and Decommissioning

The IFC General EHS Guidelines: Construction and Decommissioning recommends measures for controlling fugitive dust from construction works and air emissions from the operation of diesel powered construction equipment. They do not provide any emission standards for specific air quality parameters.

Applicable specific IFC guidelines for the project

IFC EHS Guidelines for Thermal Power Plants

For project uses natural gas as fuel, emissions guidelines in

Table 1.2 are applicable.

Table 1.2 *Emission Guidelines for Combustion Turbine (in mg/Nm³ or as indicated)^(a)*

Combustion Technology / Fuel	Particulate Matter (PM)		Sulphur Dioxide (SO ₂)	Nitrogen Oxides (NO _x)	Dry Gas, Excess O ₂ Content (%)
	NDA ^(b)	DA ^(b)	NDA/DA	NDA/DA	
Natural Gas (all turbine types of Unit > 50MWth)	N/A	N/A	N/A	51 (25 ppm)	15%

Notes:

^(a) Extracted from IFC EHS General Guidelines for Thermal Power Plant, Table 6(B), p21 dated December 19, 2008.

^(b) NDA: Non Degraded Airshed

DA: Degraded Airshed (poor air quality)

Airshed should be considered as being degraded if nationally legislated air quality standards are exceeded or, in their absence, if WHO Air Quality Guidelines are exceeded significantly. For detailed notes and explanation refer to IFC EHS General Guidelines for Thermal Power plants, Table 6(B).

1.1.2

Noise

The General EHS Guidelines: Environmental – Noise Management⁽¹⁾ and the General EHS Guidelines: Construction and Decommissioning⁽²⁾ are relevant to the Project. In assessing noise according to IFC standards, measurements should be undertaken at the noise sensitive receptors located outside the project property boundary. **Table 1.3** below presents the prescribed IFC standards on noise impacts in the surrounding industrial and residential areas.

Table 1.3 *IFC General EHS Guidelines for Noise Levels at Receptors*

Area	Maximum Allowable Noise Level (1 hour) ^(a) dB(A)	
	Daytime 0700 – 2200 hours	Night-time 2200 – 0700 hours
Residential, institutional, educational	55	45
Industrial/commercial areas	70	70

IFC EH&S Guidelines: Noise Management (April 2007). Available from

<http://www.ifc.org/wps/wcm/connect/06e3b50048865838b4c6f66a6515bb18/1-7%2BNoise.pdf?MOD=AJPERES>

IFC EH&S Guidelines: Construction and Decommissioning (April 2007). Available from

<http://www.ifc.org/wps/wcm/connect/3aa0bc8048855992837cd36a6515bb18/4%2BConstruction%2Band%2BDecommissioning.pdf?MOD=AJPERES>

Note: Noise impacts should not exceed the levels presented in this table, or result in a maximum increase in background levels of 3dBA at the nearest receptor location off-site.

1.1.3

Water Quality

Effluent Standards

The relevant guidelines for properly managing the wastewater generated from project are *IFC General EHS Guidelines: Environmental – Wastewater and Ambient Water Quality (Section 1.3); construction and decommissioning (Section 4)*, additional to the applicable specific IFC guidelines including *IFC EHS Guidelines for Thermal Power Plants*.

Table 1.4 IFC Effluent Guidelines Standards for Treated Sanitary Sewage Discharges^(a)

Pollutants	Units	Guideline Value
pH	pH	6 – 9
BOD	mg/l	30
COD	mg/l	125
Total Nitrogen	mg/l	10
Total Phosphorous	mg/l	2
Oil and grease	mg/l	10
Total suspended solids	mg/l	50
Total coliform bacteria	MPNb/100 ml	400

Note: ^(a) Not applicable to centralized, municipal, wastewater treatment systems which are included in EHS Guidelines for Water and Sanitation.

^(b) MPN = Most Probable Number

Table 1.5 IFC Effluent Guidelines Standards for Thermal Power Plants

Parameter	mg/L, except pH and temp.
pH	6 – 9
TSS	50
Oil and grease	10
Total residual chlorine	0.2
Chromium – Total (Cr)	0.5
Copper (Cu)	0.5
Iron (Fe)	1
Zinc (Zn)	1
Lead (Pb)	0.5
Cadmium (Cd)	0.1
Mercury (Hg)	0.005
Arsenic (As)	0.5
Temperature increase by thermal discharge from cooling system	<ul style="list-style-type: none"> • Site specific requirement to be established by the EA. • Elevated temperature areas due to discharge of once-through cooling water (e.g., 1 Celsius above, 2 Celsius above, 3 Celsius above ambient water temperature) should be minimized by adjusting intake and outfall design through the project specific EA depending on the sensitive aquatic ecosystems around the discharge point.

Note: Applicability of heavy metals should be determined in the EA. Guideline limits in the Table are from various references of effluent performance by thermal power plants.

Water Quality for Irrigation

Guidelines for evaluation of water quality for irrigation are given in **Table 1.6**.

Table 1.6 Guidelines for Interpretation of Water Quality for Irrigation

Potential Irrigation Problem				Units	Degree of Restriction on Use		
					None	Slight to Moderate	Severe
Salinity (affects crop water availability)²							
	EC _w			dS/m	< 0.7	0.7 – 3.0	> 3.0
	(or)						
	TDS			mg/l	< 450	450 – 2000	> 2000
Infiltration (affects infiltration rate of water into the soil. Evaluate using EC_w and SAR together)³							
SAR	= 0 – 3	and EC _w	=		> 0.7	0.7 – 0.2	< 0.2
	= 3 – 6		=		> 1.2	1.2 – 0.3	< 0.3
	= 6 – 12		=		> 1.9	1.9 – 0.5	< 0.5
	= 12 – 20		=		> 2.9	2.9 – 1.3	< 1.3
	= 20 – 40		=		> 5.0	5.0 – 2.9	< 2.9
Specific Ion Toxicity (affects sensitive crops)							
	Sodium (Na) ⁴						
	surface irrigation			SAR	< 3	3 – 9	> 9
	sprinkler irrigation			me/l	< 3	> 3	
	Chloride (Cl) ⁴						
	surface irrigation			me/l	< 4	4 – 10	> 10
	sprinkler irrigation			me/l	< 3	> 3	
	Boron (B) ⁵			mg/l	< 0.7	0.7 – 3.0	> 3.0
	Trace Elements (see Table 21)						
Miscellaneous Effects (affects susceptible crops)							
	Nitrogen (NO ₃ - N) ⁶			mg/l	< 5	5 – 30	> 30
	Bicarbonate (HCO ₃)						
	(overhead sprinkling only)			me/l	< 1.5	1.5 – 8.5	> 8.5
	pH				Normal Range 6.5 – 8.4		

Source: FAO (1994) Retrieved from <http://www.fao.org/DOCRp/003/T0234e/T0234E01.htm#ch1.4>

Drinking Water

WHO guidelines for drinking water quality are given in **Table 1.7**.

Table 1.7 WHO Guidelines for Drinking-Water Quality

Parameter	World Health Organization
1,2-dichloroethane	"
Acrylamide	"
Antimony	ns
Arsenic	10µg/l
Barium	700µg/l
Benzene	10µg/l
Benzo(a)pyrene	"
Boron	2.4mg/l
Bromate	"
Cadmium	3 µg/l
Chromium	50µg/l
Copper	"
Cyanide	"
Epichlorohydrin	"
Fluoride	1.5 mg/l
Lead	"
Mercury	6 µg/l

Parameter	World Health Organization
Nickel	"
Nitrate	50 mg/l
Nitrite	"
Pesticides (individual)	"
Pesticides — Total	"
Polycyclic aromatic hydrocarbons I	"
Selenium	40 µg/l
Tetrachloroethene and Trichloroethene	40µg/l

Note: Guidelines for Drinking-water Quality, Fourth Edition; World Health Organisation; 2011

1.1.4

Soil

There are no Myanmar soil or groundwater regulations/standards. In the absence of local country standards, it is ERM's practice to use globally recognized 'Dutch Ministry of Public Housing, Land-use and Environmental Guidelines - Soil and Groundwater Standards' to assess soil quality and to determine the need, if any, for remedial action.

Table 1.8 Dutch Standards for Soil Quality

Parameter	LOQ	Standard 1	Standard 2
Oil and Grease			
- Kerosene Range Hydrocarbons	20.8-23.8	N/A	N/A
- Diesel Range Hydrocarbons	20.8-23.8	N/A	N/A
- Heavy Oil Range Hydrocarbons	83.1-95.3	N/A	N/A
- Gasoline Range Hydrocarbons	13.6-16.6	N/A	N/A
- Benzene	0.181-0.221	1	0.01
- Toluene	0.181-0.221	130	0.01
- Ethylbenzene	0.181-0.221	50	0.03
- Xylenes (total)	0.544-0.664	25	0.1
Cadmium (Cd)	1.00	12	0.8
Chromium (Cr)	2.50	380	100
Hexavalent Chromium (Cr ⁺⁶)	0.10	78	N/A
Lead (Pb)	5.00	530	85
Mercury (Hg)	0.10	10	0.3
Nickel (Ni)	2.00	210	35
Selenium (Se)	0.01	100	0.7
Silver (Ag)	1.5	15	N/A
Arsenic	0.0020	55	29
Barium (Ba)	5.00	625	160
Copper (Cu)	1.50	190	36
Iron (Fe)	2.50	N/A	N/A
Manganese (Mn)	1.00	N/A	N/A
Zinc (Zn)	0.50	720	140

Note: Standard 1 adopted are Intervention Values (from Annex A of Circular on Target Values and Intervention Values for Soil Remediation (*Dutch Standards, 2000*))
Standard 2 adopted are Target Values (from Annex A of Circular on Target Values and Intervention Values for Soil Remediation (*Dutch Standards, 2000*))