E4743 V2

Partial Risk Sharing Facility for Energy Efficiency (PRSF)

Appendix
to
Environmental Risk Management Framework
(Baseline Analysis)

Volume II

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SMALL INDUSTRIES DEVELOPMENT BANK OF INDIA (SIDBI)

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APPENDIX TO ENVIRONMENTAL RISK MANAGEMENT FRAMEWORK - PRSF

BASELINE ANALYSIS

1.0 Location Based Environmental Sensitivity of Large Sector Industries

1.1 CEPI of Industrial Clusters across India

The PRSF target large industries (including PAT sector) are located in several states across India and most of them are located in the notified industrial clusters developed by the respective State Governments, while some of them are located outside the notified industrial clusters. In year 2009, the Central Pollution Control Board[1] (CPCB) in association with Indian Institute of Technology, New Delhi has carried out an environmental assessment of 88 major industrial clusters across India. Based on this study, a Comprehensive Environmental Pollution Index (CEPI) was assigned to these industrial clusters to prioritize planning needs to improve their environment status.

The Comprehensive Environmental Pollution Index (CEPI) has been computed considering four factors namely Pollutants (weightage-30), Pathway (weightage-20), Receptor (weightage-30) and additional applicable high-risk element (weightage-20) like on inadequacy of pollution control measures in large, medium & small scale industries, existence or non existence of ETPs, CETPs, Air pollution control devices & unorganized waste disposal arrangements among others. The CEPI of 88 industrial clusters/areas is given in **Table 1.**

Table 1: CEPI of Industrial Clusters across India

S. No.	CEPI Index	Designated Status	No. of Industrial Clusters
1	70 & Above	Critically Polluted Areas	43
2	60 to 69.9	Severely Polluted Areas	32
3	50 to 59.9	Highly Polluted Areas	10
4	Below 50	Non Polluted Areas	3
		Total	**88**

Source: CPCB, MoEF, Government of India

Based on the CEPI, the Ministry of Environment & Forests (MoEF) had imposed moratorium in January 2010 on expansion or setting up new industries in all the 43 critically polluted designated areas. The respective SPCBs were directed to prepare an area specific mitigation plan in consultation with stake holders for improving the environmental status of the respective industrial cluster/area. The action plans were to be finalized by CPCB and implemented by the SPCBs. Based on the satisfactory implementation of the mitigation plans, MOEF has lifted the moratorium on 25 of these critically polluted industrial areas, while the moratorium is still in force for the

[1] CPCB is statutory body under the Ministry of Environment and Forests. Government of India

remaining 18 critically polluted areas as on date. The location map of 88 industrial clusters with CEPI designated by CPCB is given in **Figure 1**. The list of 88 industrial clusters considered for designating CEPIs, MoEF's communication regarding moratorium along with a list of 18 critically polluted areas, which are still covered under MOEF's moratorium is given in **attachment 1.** The analysis present in the subsequent section hereunder relates to PAT sector, which also apply to other large scale industries.

Figure 1: Location of Industrial Clusters with CEPI designated by CPCB

1.2 PAT Sectors and CEPI of Industrial Clusters

Out of the 334 DCs under PAT sectors, 253 are located in clusters/areas with CEPI less than 50 indicating their 'not polluted' status, while 10 are situated in 'highly polluted' areas and 28 are situated in 'severely polluted' areas. The remaining 43 DCs are situated in 'critically polluted' areas and out of these 18 are located in such 'critically polluted' areas for which MOEF's moratorium on expansion or modernization of industry is still in force as on date. The summary of the PAT sector DCs and CEPI of the respective industrial areas are given in **Table 2.**

Table 2: PAT Sector DCs and CEPI of respective Industrial Clusters

S. No.	PAT Sectors	DCs under PAT	CEPI of Industrial Areas in which PAT DCs are located				
			Not Polluted (< 50)	Highly Polluted (50-60)	Severely Polluted (60-70)	Critically Polluted (70 & Above)	
						Moratorium lifted	Moratorium continuing
1	Aluminium	10	7	-	-	1	2
2	Cement	85	79	1		3	2
3	Chlor Alkali	22	16	-	2	3	1
4	Fertilizer	29	20	1	1	6	1
5	Iron & Steel	67	38	5	16	4	4
6	Pulp & Paper	31	25	3		2	1
7	Textile	90	68	-	9	6	7
8	**Total**	**334**	**253**	**10**	**28**	**25**	**18**

2.0 Green Rating Program and PAT Sector DCs

2.1 Green Rating Initiative by CSE

The Centre for Science and Environment (CSE) has carried out a Green Rating Program (GRP) for benchmarking of environmental performance of Indian Manufacturing Sector. CSE is a public interest research and advocacy organization based in New Delhi. CSE researches into, lobbies for and communicates the urgency of development that is both sustainable and equitable.

The GRP carried out by CSE uses a 5 step procedure for ranking the sector specific industrial establishments and is conducted through a) Voluntary data disclosure by sector specific industrial establishments; b) Visit to industries to ensure the credibility of information provided and c) Secondary data from NGOs, media, local community and other stakeholders

The GRP-CSE also consider Life Cycle Analysis (LCA) to rate the actual performance of sector specific industrial establishments along with the perception of local community, NGOs, regulators, media as part of rating assessment. The GRP-CSE covered both industries that offered to participate and/or those refused to

participate in the program. The 5 step procedure of GRP by CSE is given in **Figure 2**.

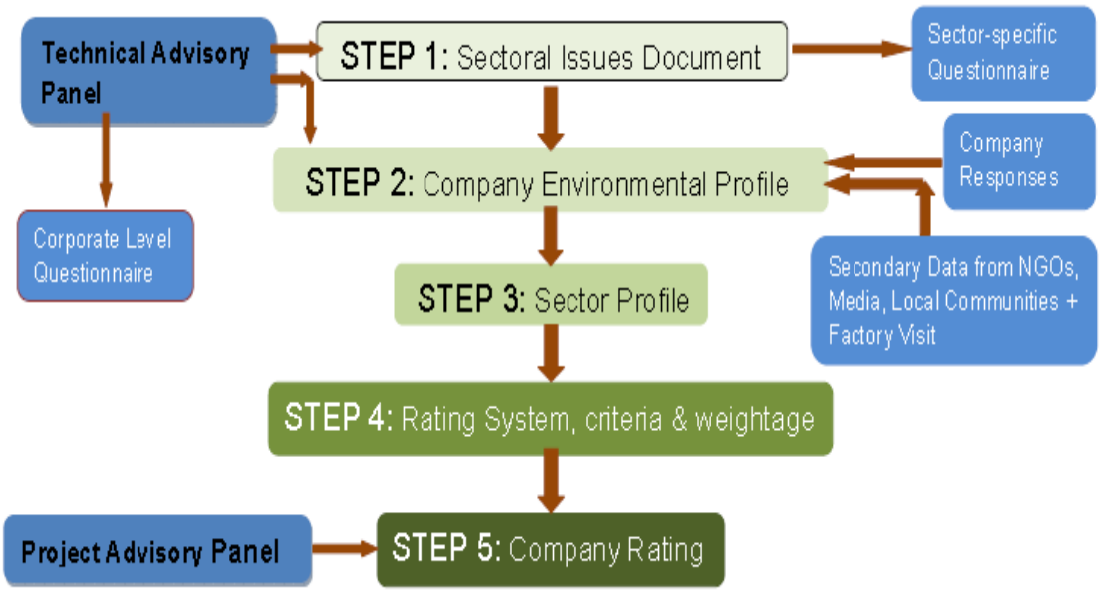
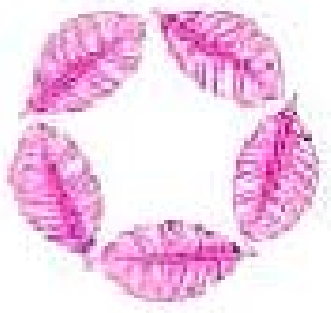


Figure 2: GRP Rating Procedure by CSE

The top ranking scale under the GRP by CSE is a FIVE LEAVES Award for Industrial Establishments, which scored above 75%. The ranking scale adopted under the GRP is given in **Table 3**.

Table 3: Green Rating Program by CSE- Rating Scale

S. No.	Range	Award	GRP Rating Logo
1	Above 75%	5 Leaves Award	
2	50% - 75%	4 Leaves Award	
3	35% - 49.9%	3 Leaves Award	
4	25% - 34.9%	2 Leaves Award	
5	15% - 24.9%	1 Leaves Award	
6	Less than 15%	No Award	

The GRP of CSE is available for four PAT sectors, namely Cement, Paper and Pulp, Iron & Steel and Chlor Alkali and none of the industries under these sectors have been awarded the highest 5 leave award, scoring more than 75%. Only one Industry under cement Sector has been awarded a 4 Leave award and most other (more than 50%) industries covered under GRP have been awarded the 2 and 3 Leave awards.

An assessment was made to bring out the standing of the PAT sector Industries with respect to GRP by CSE. The analysis showed that the only cement industry to be

awarded 4 Leave award by CSE, incidentally is also covered under PAT sector also and most other(more than 50%) industries under PAT sectors covered by CSE have been awarded 2 and 3 Leave awards, indicating a mid range standing of the PAT sectors in the GRP-CSE rating program. The GRP of CSE for PAT DCs is given in **Table 4**. The score card and GRP rating of the PAT sectors covered by CSE are given in **attachment 2.**

Table 4: GRP of DCs under PAT Sectors by CSE

S. No.	PAT Sectors	No. of PAT DCs	Industries covered under GRP-CSE	PAT DCs under GRP	GRP-CSE Rating							
					Industries under GRP				PAT DCs under GRP			
					1L	2L	3L	4L	1L	2L	3L	4L
1	Aluminium*	10	-	-	Sector not covered under GRP-CSE							
2	Cement	85	41	35	1	17	17	1	1	14	14	1
3	Chlor Alkali	22	25	16	6	9	7	*	3	6	5	*
4	Fertilizer	29	-	-	Sector not covered under GRP-CSE							
5	Iron & Steel	67	21	16	5	5	3	*	3	4	3	*
6	Pulp & Paper	31	28	17	10	13	3	*	6	8	3	*
7	Textile	90	-	-	Sector not covered under GRP-CSE							
8	Total	334	115	84								

Note: * indicates that none qualified for 4L award level

2.2 GRP by CII

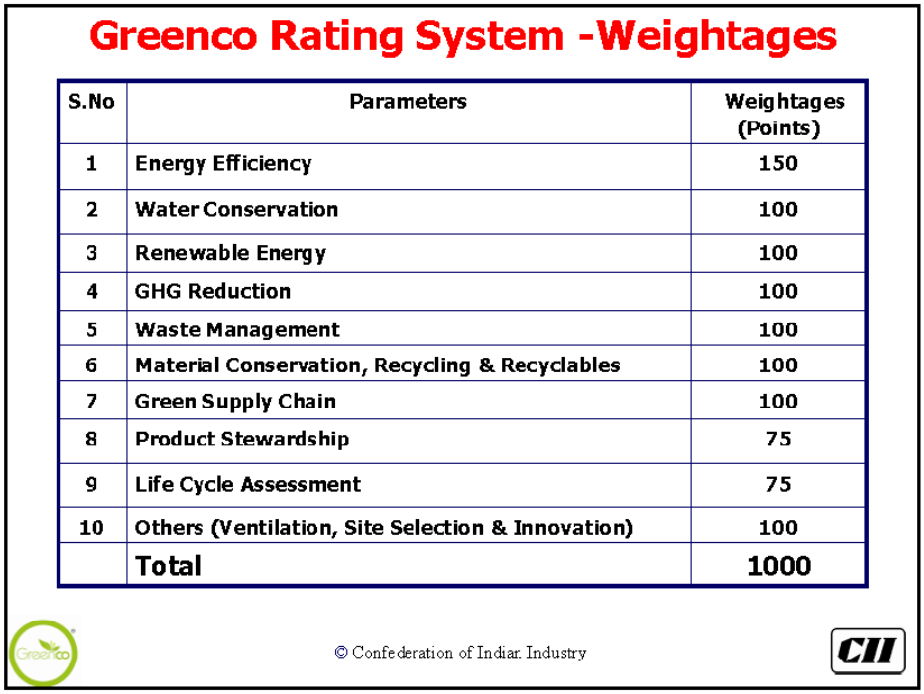
The Confederation of Indian Industry (CII) has also launched a GreenCo Rating system for Indian manufacturing sector. It is deemed to be a voluntary system that seeks commitment from Industries from both manufacturing and service sectors for optimal utilization of natural resources from pre-production to waste disposal stage including supply chain.

CII is a non-government, not-for-profit, industry led and industry managed organization, playing a proactive role in India's development process. Founded over 118 years ago, India's premier business association CII has over 7100 member organizations, from the private as well as public sectors, including SMEs and MNCs, and an indirect membership of over 90,000 companies from around 257 national, regional and sectoral associations.

CII charts change by working closely with Government on policy issues, interfacing with thought leaders, and enhancing efficiency, competitiveness and business opportunities for industry through a range of specialized services and global linkages. It also provides a platform for consensus-building and networking on diverse issues.

The GreenCo program by CII has received contributions from USEPA and research agencies in Switzerland and covers both new and existing facilities and covers all

aspects of environment, energy, water, green house gas emissions and waste management. The assigned weightage for various parameters and threshold criteria for certification levels adopted by CII for GreenCo Rating is given in **Figure 3 & 4.**



Greenco Rating System -Weightages

S.No	Parameters	Weightages (Points)
1	Energy Efficiency	150
2	Water Conservation	100
3	Renewable Energy	100
4	GHG Reduction	100
5	Waste Management	100
6	Material Conservation, Recycling & Recyclables	100
7	Green Supply Chain	100
8	Product Stewardship	75
9	Life Cycle Assessment	75
10	Others (Ventilation, Site Selection & Innovation)	100
	Total	**1000**

Figure 3: CII- Greenco Rating System- Weightage Scale

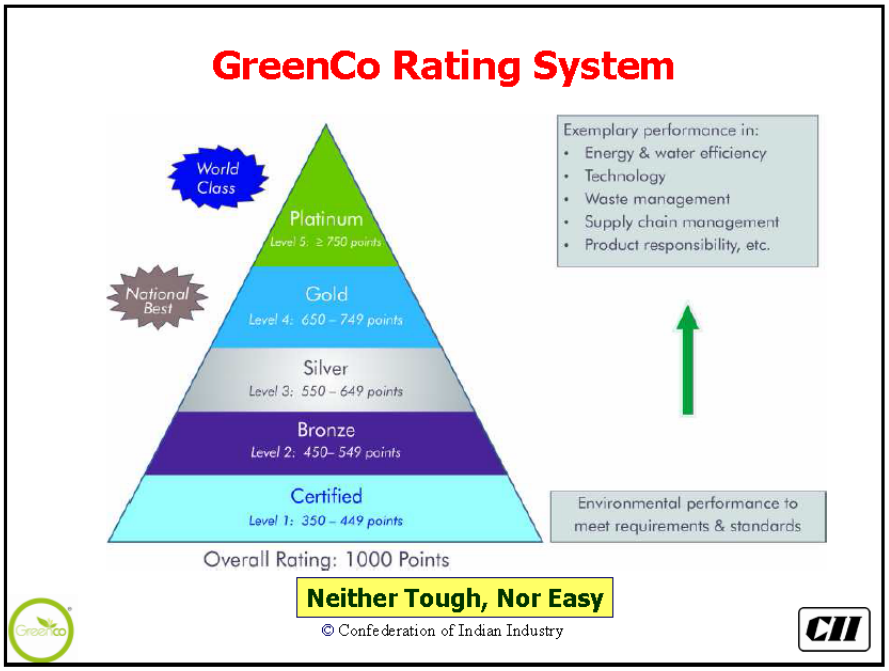


Figure 4: Certification Levels of Greenco Rating System of CII

At present, several Industries under PAT sectors like Aluminium, Paper & Pulp and Cement have signed up for CII's GreenCo program and a few Industries in Paper

and Pulp and Cement Industries have been even awarded Gold and Silver rating. However, the information about DCs under PAT, which have been already awarded or enrolled for GreenCo rating, are not available at present.

3.0 General EHS Practices and Accreditations of PAT Sector Industries

The PAT sector industries, being large scale, capital intensive and managed by large corporate groups, industry specific environment, health and safety (EHS) practices are expected to be in place and comply with all the relevant National and State Regulations. One of the indicator(s) to ascertain this aspect is through the status of their accreditations to ISO 9001, ISO 14001, SA 8000, OHSAS 18001 among others. Out of the 7 PAT sectors, the accreditations were checked for industries under Aluminium and Chlor-Alkali sectors and the status is given in **Table 5**. The accreditations status is expected to be similar for other PAT sectors.

Table 5: Accreditations Status of PAT Sector Industries

S. No	PAT Sectors*	DCs under PAT	No. of DCs having Accreditations/Certifications			
			ISO 9001	ISO 14001	SA8000	OHSAS 18001
1	Aluminium	10	9	9	2	9
2	Chlor-Alkali	22	19	20	3	4
Note: * Compiling accreditations was limited to Aluminium and Chor-Alkali sectors as a sample check						

4.0 National Regulatory Requirements for PAT Sector Industries

The PAT sector industries are governed several laws and regulations pertaining to pollution prevention and environment protection, notified by the Government of India. These laws and regulations include: *The Environmental Protection Act,*(1986); *The Water (Prevention and Control of Pollution) Act, 1974, as amended upto 1988, The Air (Prevention and Control of Pollution) Act, 1981 as amended upto 1987 and Environmental Impact Assessment Notification, 2006 with latest amendments.* Some of the relevant regulations to PAT sector Industries are summarized hereunder

4.1 Regulations for Establishment and Operation of an Industry

- Every industry is required to obtain **Consent for Establishment** and **Consent for Operation** from the respective State Pollution Control Boards under the Water (Prevention & Control of Pollution) Act, 1974 and under the Air (Prevention & Control of Pollution) Act, 1981.

4.2 Regulations Concerning Water Pollution

- Without the consent of the State Pollution Control Board[2]:
  - it is not permitted to establish any industry, operation or process, or any treatment and disposal system, which is likely to discharge sewage or effluent

[2] Water (Prevention and Control of Pollution) Act, 1974

into a stream or well or sewer or on land (b) it is not permitted to bring into use any new or altered outlets for the discharge of sewage (c) it is not permitted to begin to make any new discharge of sewage.

- It is not permitted to cause or permit any poisonous, noxious or polluting matter[3] to enter (whether directly or indirectly) into any stream or well or sewer or on land[4].
- It is not permitted to cause or permit to enter into any stream any other matter, which may, either directly or in combination with similar matters, impede the proper flow of the water of the stream leading to aggravation of pollution due to other causes[5].

- Every person carrying on any industry (any operation or process, or treatment and disposal system, which consumes water or gives rise to sewage effluent or trade effluent) is liable to pay water cess and furnish returns as prescribed. For the purpose of measuring and recording the quantity of water consumed, every person carrying on any industry shall affix meters as prescribed[6].

4.3 Regulations Concerning Air Pollution

- No person shall establish or operate any industrial plant without the previous consent of the State Pollution Control Board. No person operating any industrial plant shall discharge or cause or permit to be discharged the emission of any air pollutant in excess of the standards laid down by the State Pollution Control Board[7].

4.4 Regulations Concerning Noise Pollution

- Noise generated by automobiles, construction equipment, and other industrial activity must be within the recommended ambient noise standards for day and night hours[8].

4.5 Regulations Concerning Hazardous Materials and Wastes

- For an industrial activity in which a hazardous chemical[9] is involved, a safety report must be sent to the concerned authority at least 90 days before commencing the activity, the major accident hazards must be identified, adequate steps taken to prevent such major accidents and persons working at the site must be provided with information, training and equipment to ensure their safety[10].
- Every owner shall take out, before starting handling of any hazardous substance[11], insurance policy providing for contracts of insurance and thereby be insured against liability to give relief in case of death or injury to any person (other

[3] Determined in accordance with standards laid down by the State Pollution Control Board.
[4] Water (Prevention and Control of Pollution) Act, 1974
[5] Water (Prevention and Control of Pollution) Act, 1974
[6] Water (Prevention and Control of Pollution) Cess (Amendment) Act, 2003
[7] The Air (Prevention and Control of Pollution) Act, 1981
[8] Environment (Protection) Rules, 1986.
[9] See http://www.MoEF.nic.in/legis/hsm/hsm2.html
[10] The Manufacture, Storage and Import of Hazardous Chemical Rules, 1989. Viewed at http://www.MoEF.nic.in/legis/hsm/hsm2.html on 7 December 2011.
[11] See http://envfor.nic.in/legis/public/so227(e).html

than a workman) or damage to any property resulting from an accident[12].

- Hazardous wastes[13] generated in an establishment shall be sent or sold to a recycler or re-processor or re-user registered/authorized by the State Pollution Control Board. While handling hazardous wastes, all steps must be taken to contain contaminants and prevent accidents and provide workers with the training, equipment and information necessary to ensure their safety[14].
- Setting up of medical diagnostic x-ray equipment requires the regulatory consents (layout approval and registration) of the Atomic Energy Regulatory Board (AERB)[15].
- Every institution generating bio-medical waste (hospital, nursing home, clinic, dispensary, veterinary institution, animal house, pathological laboratory, blood bank) is required to ensure that the bio-medical waste is treated and disposed of in accordance with the prescribed procedures and standards (ensure requisite treatment of bio-medical waste at a waste treatment facility)[16].
- No person shall produce or use Ozone Depleting Substances[17] without the required registration with the Small Industries Services Institute, Small Industries Development Organization[18].

5.0 National Standards for Industrial Effluents and Emissions

- The Environment (Protection) Rules, 1986 stipulates industry specific and general standards for emission or discharge of environmental pollutants from industries, operations or processes.
- The specified emission standards are to be complied by an industry or operation or process and shall not exceed specified standards or limits for the relevant parameters
- The State Pollution Control Board(s) may specify more stringent standards for the relevant parameter with respect to specific industry or location(s) on a case to case basis.

The national emission and / or effluent discharge standards, as applicable to the PAT sector industries are given in **attachment 3**.

[12] The Public Liability insurance Act, 1991. Viewed at http://envfor.nic.in/legis/public/public1.html on 6 December 2011.
[13] See http://www.MoEF.nic.in/legis/hsm/hsm2.html.
[14] Hazardous Wastes (Management, Handling and Transboundary Movement) Rules, 2008.
[15] Guidelines for obtaining regulatory consents from AERB for medical diagnostic x-ray equipment. Atomic Energy Regulatory Board. Viewed at www.aerb.gov.in on 5 December 2011.
[16] Bio-Medical Waste (Management and Handling) Rules, 1998. Viewed at http://www.MoEF.nic.in/legis/hsm/biomed.html on 7 December 2011.
[17] Phase out date for CFCs (used in refrigeration, chillers and metered dose inhalers), Halons (used in fire extinguishers) and Carbontetrachloride (used as solvent process agent in metal cleaning and textile industry) is 2010. Phase out date for Methlychloroform and Methlybromide is 2015. Phase out date for HCFCs (used in air-conditioners) is 2030.
[18] The Ozone Depleting Substances (Regulation and Control) Rules, 2000. Ozone Cell, Ministry of Environment and Forests, Government of India. Viewed at http://www.ozonecell.com on 8 December 2011.

6.0 WBG Guidelines for PAT Sector Industries

The general and industry specific Environmental, Health and Safety (EHS) guidelines of the WBG (The World Bank Group) are technical reference documents with specific examples of Good International Industry Practice(s). The industry specific EHS guidelines are designed to be used together with general EHS Guidelines, which provide guidance on most common EHS issues potentially applicable to all PAT sector industries among others.

The EHS guidelines contain performance levels and measures that are generally considered to be achievable in new facilities by existing technology at reasonable costs. Application of the EHS guidelines to existing facilities may involve the establishment of site-specific targets, with an appropriate time scales for achieving them. The applicability of the EHS guidelines should be tailored to the hazards and risks established for each industry on the basis of site specific variables such as host country context, assimilative capacity of the environment, and other industry specific factors. When host country regulations differ from the levels and measures presented in the EHS guidelines, industry is expected to achieve whichever is more stringent. If less stringent levels or measures than those provided in these EHS guidelines are appropriate, in view of specific project circumstances, a full and detailed justification for any proposed alternatives is needed and the justification shall demonstrate that the choice for any alternate performance levels is protective of human health and the environment.

The general and industry specific EHS guidelines of the World Bank as relevant to the PAT sector Industries are given in **attachment 4**.

7.0 Comparison of PAT Sector Specific National Standards and WBG Guidelines

A comparison of the GoI emission standards and the WBG-EHS guidelines for each of the PAT sector Industries was made in order to list out similarities, dissimilarities and gaps, if any. The review/comparison indicate the following salient points

- The CPCB, GoI has Ambient Air Quality (AAQ) standards for 12 parameters, whereas as WBG-EHS guideline values are available for only 5 parameters, and exclude parameters like Lead, CO, Ammonia, Benzene, Benzo Pyrene, Arsenic and Nickel. The AAQ parameters covered by both CPCB and WBG are SPM, PM_{10}, $PM_{2.5}$,Oxides of Sulphur and Nitrogen
- The WBG guideline values has staged approach or targets, achievable over the project life cycle whereas CPCB has fixed targets for all parameters during the complete lifecycle of a project or an industry
- The WBG guideline values are more stringent for parameters, for which both WBG guideline values and CPCB limits are available and comparable in terms of units
- For liquid effluents. CPCB has set limits based on the mode of disposal. Disposal into inland water or surface water bodies has stringent limits as compared to

other mode of disposal like discharge into public sewers and on land for irrigation. The WBG have stringent guideline values, irrespective of mode of effluent disposal

- Both WBG and CPCB have general as well as industry specific guideline values or limits for both liquid effluents as well as stack (gaseous) emissions. In most cases, WBG guideline values and CPCB limits are not comparable straightaway either in terms of parameters or the specified units of parameter(s).
- In few cases, despite the limits and guidelines are available for same parameters, but are not comparable as the WBG guideline values are based on concentrations (viz.mg/Nm^3), whereas CPCB limits are based on production rates (kg/MT).
- The WBG guideline values are generally stringent as compared to CPCB limits for both effluents and stack emissions parameters, wherever both are comparable but there are some instances, where CPCB limits have also been found to be stringent than WBG guideline values.

A summary of WBG-EHS guidelines and CPCB limits for effluents and stack emissions as applicable to all PAT sector industries are given in **attachment 5**.

8.0 Clean Technology Initiatives of MoEF, GOI

The Technical EIA guidance manuals[19] MoEF for PAT sector industries enlist several clean technologies, which can reduce the emissions and also concurrently act as energy efficiency measures. The EIA manuals are reference documents to be followed for preparing the Environment Impact Assessment for seeking environmental clearances for new industries and/or for modernization of existing industries. Such clean technologies will be considered by MoEF, while according environmental clearances for new industries or modernization of existing industries. Nevertheless, the clean technologies indicated in these manuals are relevant to even existing industries, which intend to implement measures for emission reductions as well as to undertake energy efficiency measures.

9.0 Corporate Responsibility for Environmental Protection-MoEF Charter

The MoEF has launched a charter on "Corporate Responsibility for Environmental Protection (CREP)" in March 2003 with an objective to go beyond the compliance of regulatory norms for prevention & control of pollution through various measures including waste minimization, in-plant process control & adoption of cleaner technologies. The Charter, at present is voluntary and has set targets concerning conservation of water, energy, recovery of chemicals, reduction in pollution, elimination of toxic pollutants, process & management of residues that are required to be disposed off in an environmentally sound manner. The action points and target

[19] Technical EIA manuals can be seen at http://envfor.nic.in/modules/others/eia-manuals

limits for pollution control applicable for various PAT sector industries are given in **attachment 6**.

10.0 Good International Industry Practices - WBG

The general and industry specific EHS guidelines of the WBG also enlist several Good International Industry Practice (GIIP), which are relevant to PAT sector industries and contribute to emission reduction and concurrently improve energy efficiency.

The clean technology measures/recommendations enlisted in Technical EIA guidance manuals of MoEF, CREP charter action points and targets for adoption of cleaner technologies for emission reductions and Good International Industry Practices of WBG, which can contribute to emission reduction and concurrently improve energy efficiency in industries, are summarized in **attachment 7**. Furthermore, Ministry of Environment, Japan has prepared a Manual for Quantitative Evaluation of the Co-Benefits Approach to Climate Change Projects, which consists of activities having co benefit approach towards energy efficiency and concurrent reduction in environmental protection. The measures suggested by MoEF, Japan relevant PAT sectors are quite similar to those summarized in **attachment 7**.

ATTACHMENT 1

LIST OF INDUSTRIAL CLUSTERS DESIGNATED WITH CEPI AND MOEF's COMMUNICATION REGARDING MORATORIUM FOR CRITICALLY POLLUTED AREAS

- Understanding Western Ghats Report
  - Marathi Version
  - English Version
- Report of the Western Ghats Ecology Expert Panel
- Plastic-Free Dapoli
- Green Calendar 2012
- Important Letters
- Green Words
- Legislation
- Environmental NGOs in Maharashtra

COMPREHENSIVE ENVIRONNEMENTAL POLLUTION INDEX (CEPI)

- About CEPI
- CEPI Table & Graphical representation
- Temporary restrictions on developmental projects

About CEPI

Central Pollution Control Board (CPCB) in association with Indian Institute of Technology, New Delhi carried out an environmental assessment of industrial clusters across the India. Based on this, comprehensive environmental pollution index was calculated to identify polluted industrial clusters in the country. This was done to priorities planning needs to improve quality of environment in these industrial clusters. Total 88 industrial areas have been selected for this study.

Comprehensive Environmental Pollution Index (CEPI) is calculated considering four factors Namely Pollutants, Pathway, Receptor and additional high risk element. Each of these factors comprises Sub-factors. Details of which are given below:

A) Pollutant:

This factor is calculated as A = A1 x A2
Where A1 is Presence of toxins and
A2 is Scale of industrial activities.

Maximum Score for this factor is considered as 30.

B) Pathway:

This factor is calculated as B = B1 + B2 + B3
Where B1 is Pollutant concentration,
B2 is Impact on people and
B3 is Impact on Eco-geological feature.

Maximum Score for this factor is considered as 20.

C) Receptor:

This factor is calculated as C = C1 x C2 + C3
Where C1 is Potentially affected population,
C2 is Level of exposure and
C3 is Risk of sensitive receptors.

Maximum Score for this factor is considered as 30.

D) Additional high risk element:

This factor depends on inadequacy of pollution control measures for large scale, medium & small scale industries. It is cumulative of ETPs, CETPs, Air pollution control devices & unorganized waste disposal.

Maximum Score for this factor is considered as 20.

On the above basis score for these factors calculated as
Score = A + B + C +D = 30 + 20 + 30 + 20 = 100

CEPI based on above mentioned score is calculated for Air, Water and land.
Following table indicates the CEPI score for industrial areas/ clusters in descending order for the 88 locations in all over the India.

CEPI Table

List of industrial clusters

Sr. No.	Industrial Cluster / Area	Air	Water	Land	CEPI	
1	Anklesh war (Gujarat)	72.00	72.75	75.75	88.50	Ac_Wc_Lc
2	Vapi (Gujarat)	74.00	74.50	72.00	88.09	Ac_Wc_Lc
3	Ghaziabad (Uttar Pradesh)	68.50	75.25	71.50	87.37	Ac_Wc_Lc

4	Chandrapur (Maharashtra)	70.75	67.50	66.50	83.88	Ac_Wc_Lc
5	Korba (Chhatisgarh)	67.00	57.00	72.50	83.00	Ac_Ws_Lc
6	Bhiwadi (Rajasthan)	71.00	69.00	59.50	82.91	Ac_Wc_Ls
7	Angul Talcher (Orissa)	64.00	69.00	65.75	82.09	Ac_Wc_Lc
8	Vellore (North Aroot) (Tamilnadu)	69.25	65.25	62.50	81.79	Ac_Wc_Lc
9	Singrauli (Uttar Pradesh)	70.50	64.00	59.50	81.73	Ac_Wc_LS
10	Ludhiana (Punjab)	68.00	66.00	64.75	81.66	Ac_Wc_Lc
11	Nazafgarh drain basin (including Ananad Parvat, Naraina, Okhla and Wazirpur), Delhi	52.13	69.00	65.25	79.54	As_Wc_Lc
12	Noida (Uttar Pradesh)	65.75	64.00	60.00	78.90	Ac_Wc_Lc
13	Dhanbad (Jharkand)	64.50	59.00	65.50	78.63	Ac_Ws_Lc
14	Dombivali (Maharashtra)	66.00	63.50	57.50	78.41	Ac_Wc_Ls
15	Kanpur (Uttar Pradesh)	66.00	63.50	56.00	78.09	Ac_Wc_Ls
16	Cuddalore (Tamilnadu)	54.00	65.25	64.00	77.45	As_Wc_Lc
17	Aurangabad (Maharashtra)	64.75	60.50	59.50	77.44	Ac_Wc_Ls
18	Faridabad (Haryana)	63.50	59.00	62.75	77.07	Ac_Ws_Lc
19	Agra (Uttar Pradesh)	59.00	63.75	59.50	76.48	As_Wc_Ls
20	Manali (Tamilnadu)	64.00	59.00	58.00	76.32	Ac_Ws_Ls
21	Haldia (West Bengal)	53.75	64.50	57.00	75.43	As_Wc_Ls
22	Ahmedabad (Gujarat)	62.75	58.00	58.00	75.28	Ac_Ws_LS
23	Jodhpur (Rajasthan)	52.00	65.50	54.00	75.19	As_Wc_Ls
24	Cochin, Greater (Kerala)	57.00	64.00	54.00	75.08	As_Wc_Ls
25	Mandi Gobind Garh (Punjab)	62.00	55.50	62.00	75.08	Ac_Ws_Lc
26	Howrah (West Bengal)	57.00	54.50	63.50	74.84	As_Ws_Lc
27	Vatva (Gujarat)	60.00	62.00	56.00	74.77	Ac_Wc_Ls
28	Ib Valley (Orissa)	61.00	56.50	59.00	74.00	Ac_Ws_Ls
29	Varansi-Mirzapur (Uttar Pradesh)	58.00	62.00	53.50	73.79	As_Wc_Ls
30	Navi Mumbai (Maharashtra)	61.00	59.00	55.50	73.77	Ac_Ws_Ls
31	Pali (Rajasthan)	52.00	64.00	52.00	73.73	As_Wc_Ls
32	Mangalore (Karnataka)	61.75	57.75	54.00	73.68	Ac_Ws_Ls
33	Jharsuguda (Orissa)	61.00	56.50	56.00	73.34	Ac_Ws_Ls
34	Coimbatore (Tamil Nadu)	62.25	58.75	45.50	72.38	Ac_Ws_Ln
35	Bhadravati (Karnataka)	62.75	56.50	45.50	72.33	Ac_Ws_Ln
36	Tarapur (Maharashtra)	60.75	56.00	51.25	72.01	Ac_Ws_Ls
37	Panipat (Haryana)	55.75	56.50	59.00	71.91	As_Ws_Ls
38	Indore (Madhya Pradesh)	59.00	57.50	52.00	71.26	As_Ws_Ls
39	Bhavnagar (Gujarat)	54.50	57.50	57.75	70.99	As_Ws_Ls
40	Vishakhapatnam (Andhra Pradesh)	57.00	57.50	55.00	70.82	As_Ws_Ls
41	Junagarh (Gujarat)	53.25	52.50	59.50	70.82	As_Ws_Ls
42	Asansole (West Bengal)	58.38	56.25	50.50	70.20	As_Ws_Ls
43	Patancheru- -Bollaram (Andhra Pradesh)	50.00	59.00	54.00	70.07	As_Ws_Ls
44	Paradeep (Orissa)	54.00	58.50	48.00	69.26	As_Ws_Ln
45	Nashik (Maharashtra)	55.00	57.50	50.25	69.25	As_Ws_Ls
46	Chembur (Maharashtra)	59.75	50.75	46.00	69.19	As_Ws_Ln
47	Baddi (Himachal Pradesh)	56.00	54.50	54.50	69.07	As_Ws_Ls
48	Kala Amb (Himachal Pradesh)	56.75	54.50	51.00	68.77	As_Ws_Ls
49	Dewas (Madhya Pradesh)	51.50	57.50	51.50	68.77	As_Ws_Ls
50	Batala (Punjab)	51.00	56.50	54.50	68.59	As_Ws_Ls
51	Tirupur (Tamil Nadu)	56.75	50.75	53.00	68.38	As_Ws_Ls
52	Durgapur (West Bengal)	49.50	58.50	47.50	68.26	An_Ws_Ln
53	Raichur (Karnataka)	59.75	46.50	44.50	68.07	As_Wn_Ln
54	Bidar (Karnataka)	58.75	49.00	44.00	67.64	As_Wn_Ln
55	Singhbhum, West (Bihar)	55.50	51.50	51.50	67.30	As_Ws_Ls
56	Mettur (Tamilnadu)	46.00	58.00	46.50	66.98	An_Ws_Ln
57	Vadodara (Gujarat)	57.00	48.00	48.00	66.91	As_Wn_Ln
58	Jaipur (Rajasthan)	55.00	52.00	50.50	66.82	As_Ws_Ls

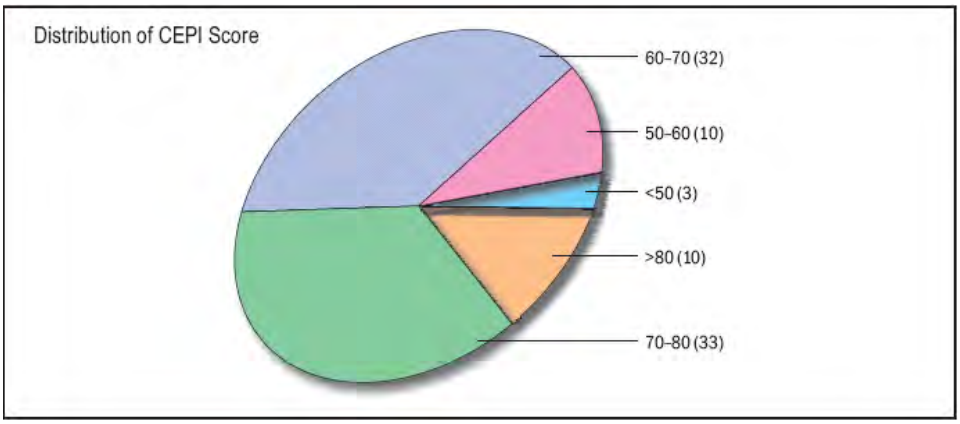
59	Rajkot (Gujarat)	45.50	54.50	55.50	66.76	An_Ws_Ls
60	Nagda -Ratlam (Madhya Pradesh)	44.50	54.50	56.00	66.67	An_Ws_Ls
61	Jamshedpur (Jharkhand)	55.75	55.50	42.00	66.06	As_Ws_Ln
62	Pimpari-Chinchwad (Maharashtra)	55.25	52.50	46.00	66.06	As_Ws_Ln
63	Raipur (Chhatisgarh)	56.50	42.00	49.00	65.45	As_Wn_Ln
64	Saraikela (Jharkhand)	50.50	49.00	54.00	65.38	As_Wn_Ls
65	Ramgarh (Jharkhand)	44.00	53.00	54.50	65.11	An_Ws_Ls
66	Pinia (Karnataka)	56.75	46.00	42.00	65.11	As_Wn_Ln
67	Pitampur (Madhya Pradesh)	47.75	54.00	50.50	65.09	An_Ws_Ls
68	Jalandhar (Punjab)	52.00	52.00	52.00	64.98	As_Ws_Ls
69	Moradabad (Uttar Pradesh)	54.00	49.00	47.50	64.71	As_Wn_Ln
70	Bada Jamtara (Jharkhand)	48.00	52.50	52.50	64.47	An_Ws_Ls
71	Aligarh (Uttar Pradesh)	53.00	48.00	48.00	63.83	As_Wn_Ln
72	Parwanoo (Himachal Pradesh)	53.00	47.50	48.50	63.83	As_Wn_Ln
73	Haridwar (Uttarakhand)	51.75	48.00	40.00	61.01	As_Wn_Ln
74	Vijaywada (Andhra Pradesh)	52.00	41.50	43.00	60.57	As_Wn_Ln
75	Ferozabad (Uttar Pradesh)	49.00	47.00	47.75	60.51	An_Wn_Ln
76	Mathura (Uttar Pradesh)	48.00	48.00	48.00	59.98	An_Wn_Ln
77	Meerut (Uttar Pradesh)	50.00	47.50	39.50	59.38	As_Wn_Ln
78	Erode (Tamil Nadu)	47.38	47.25	43.50	58.19	An_Wn_Ln
79	Surat (Gujarat)	46.00	46.75	45.50	57.90	An_Wn_Ln
80	Kathedan (Andhra Pradesh)	44.50	47.00	45.50	57.73	An_Wn_Ln
81	Kukatpalli (Andhra Pradesh)	41.50	47.00	43.50	56.56	An_Wn_Ln
82	Hajipur (Bihar)	43.50	44.00	44.50	55.12	An_Wn_Ln
83	Gwalior (Madhya Pradesh)	45.88	38.50	42.00	54.63	An_Wn_Ln
84	Udhamsingh Nagar (Uttarakhand)	44.00	41.25	44.25	54.37	An_Wn_Ln
85	Bhillai- Durg (Chhatisgarh)	44.00	35.00	33.50	50.57	An_Wn_Ln
86	Bulandsahar-Khurza (Uttar Pradesh)	42.00	33.50	36.50	49.09	An_Wn_Ln
87	Burnihat (Assam)	39.00	34.50	34.50	46.26	An_Wn_Ln
88	Digboi (Assam)	32.00	32.75	38.00	44.55	An_Wn_Ln

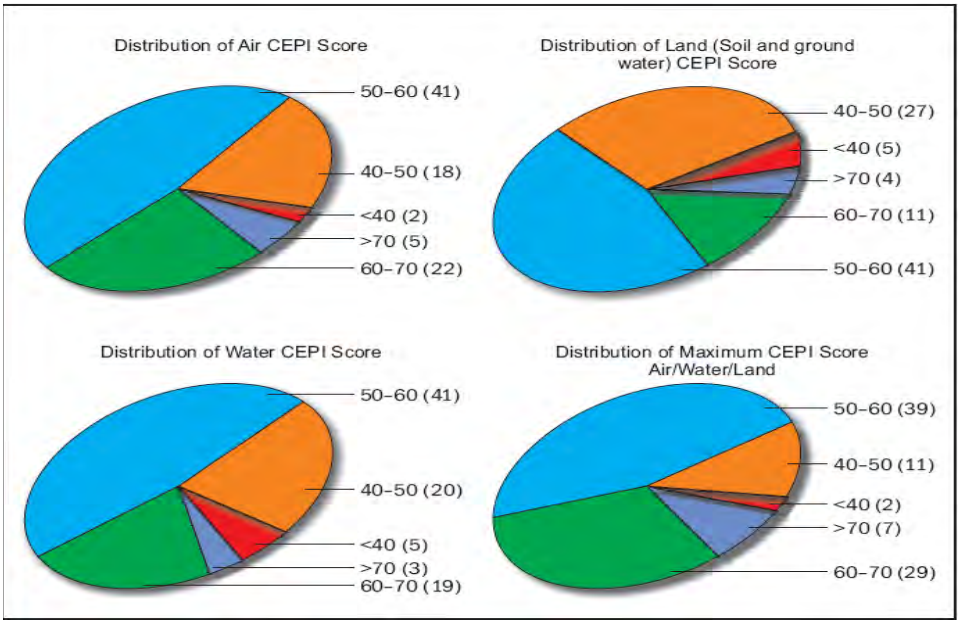
The last column of the table indicates the status of air, water and land environment in terms of subscript as Critical (c) / Severe (s) / Normal (n). When the total score is more than 60 pollution index is consider as Critical in the respective environmental component.(Ac means pollution level of environmental component “Air” is critical.)

Out of 88 industrial clusters 8 clusters belongs to Maharashtra these are namely Chandrapur, Dombivali, Aurangabad, Navi Mumbai, Tarapur, Nashik, Chembur, Pimpari-Chinchwad.

Graphical representation

Graphical Distribution





Temporary restrictions on developmental projects

Ministry of Environment & Forest vide Office Memorandum J 11013/ 52010- IA. II (I) dated 13 January 2010 imposes temporary restriction on developmental projects in identified clusters as

(a) In the industrial clusters with CEPI Score above 70, Environmental clearance will not be granted for developmental projects. This condition will apply for 8 months i.e. upto August 2010 during this time CPCB along with respective state pollution control board will finalize time-bound action plan for improving the environmental qualities in these areas.

(b) The developmental projects from industrial area with CEPI score between 60 and 70 will be considered as projects located in critically polluted areas. Environmental Clearance will be accorded to these projects as per **MoEF Circular No. J-11013/18/2009-IA II (I) dated 25 August 2009**.

(c) Various state government had expressed the difficulties in implementing the above referred Office Memorandum due to inadequate details about the boundaries of polluted areas. So the details of these clusters were clarified by **MoEF vide Office Memorandum J-11013/5/2010-IA.II (I)**.

(d) **Ministry of Environment & Forests vide Office Memorandum dated 30th August, 2010 extended the moratorium up to 31st October, 2010**

No. J-11013/5/2010-IA.II(I)
Government of India
Ministry of Environment & Forests

Paryavaran Bhavan,
C.G.O. Complex, Lodi Road,
New Delhi-110003.
Telefax: 24362434

Dated the 30th March, 2012

Office Memorandum

Sub: Consideration of projects for environmental clearance based on Comprehensive Environmental Pollution Index (CEPI) - Extension of Moratorium till further orders - Regarding.

Ministry of Environment & Forests vide Office Memorandum of even no. dated 13.1.2010 had imposed a moratorium up to 31.8.2010 on consideration of projects for environmental clearance to be located in critically polluted areas / industrial clusters identified by Central Pollution Control Board. The details of the industrial clusters / areas were further specified in the Office Memorandum dated 15.3.2010. It was envisaged that during the period of moratorium, time bound action plans will be prepared by the respective SPCBs / PCCs for improving the environmental quality in these industrial clusters / areas. The action plans so prepared would be finalized by CPCB.

2. The status of preparation of action plans has been reviewed in the Ministry of Environment & Forests from time to time based on the inputs received from Central Pollution Control Board (CPCB). In accordance with the information received from the Central Pollution Control Board that the respective SPCBs and the local stakeholders have initiated some work on implementation of the submitted action plans in respect of the industrial areas / clusters of (i) Tarapur (Maharashtra), (ii) Pattencherru-Bollaram (Andhra Pradesh), (iii) Coimbatore (Tamil Nadu), (iv) Vapi (Gujarat) and (v) Mandi-Govindgarh (Punjab) (vi) Agra (Uttar Pradesh), (vii) Aurangabad (Maharashtra), (viii) Bhavnagar (Gujarat), (ix) Cuddalore (Tamil Nadu), (x) Dombivalli (Maharashtra), (xi) Ludhiana (Punjab), (xii) Navi Mumbai (Maharashtra), (xiii) Varanasi-Mirzapur (Uttar Pradesh), (xiv) Angul Talchar (Orissa), (xv) Faridabad (Haryana), (xvi) Gaziabad (Uttar Pradesh), (xvii) Indore (Madhya Pradesh), (xviii) Junagadh (Gujarat), (xix) Noida (Uttar Pradesh), (xx) Panipat (Haryana), (xxi) Bhadravati (Karnataka), (xxii) Mangalore (Karnataka) and (xxiii) Greater Kochi (Kerala) (xxiv) Singrauli (Madhya Pradesh Part and Uttar Pradesh Part), and (xxv) Ib Valley, Jharsuguda (Orissa), Ministry of Environment & Forests have lifted the moratorium on consideration of projects for environmental clearance in the above mentioned 25 industrial clusters / areas vide this Ministry's O.M.s of even no. dated 26th October, 2010, 15th February, 2011, 31st March, 2011, 23rd May, 2011 and 5th July, 2011. In the remaining 18 identified critically polluted industrial clusters / areas, the moratorium was extended up to 31st March, 2012.

The matter has been considered further. The Central Pollution Control Board has been requested to provide an update on the progress of implementation of action

plans, cluster by cluster, in various industrial clusters and their expected impact in terms of the improvement of the relevant pollution indicators. It has been decided that the moratorium would continue in the remaining 18 industrial clusters till the matter is reviewed in the light of update to be provided by Central Pollution Control Board regarding the implementation of action plans. Accordingly, the moratorium in the 18 industrial clusters is extended till further orders.

This issues with the approval of the Competent Authority.

(S.K. Aggarwal)
Director

To

1. All the Officers of IA Division
2. Chairpersons / Member Secretaries of all the SEIAAs/SEACs
3. Chairman, CPCB **with a request to review the whole matter and submit the status report, cluster by cluster for taking further necessary action in this regard.**
4. Member Secretaries of all SPCBs / UTPCCs.

Copy to:-

1. PS to MEF
2. PPS to Secretary (E&F)
3. PPS to SS(JMM)
4. PPS to JS(RG)
5. Website, MoEF
6. Guard File

ATTACHMENT 2

SCORE CARD / GRP RATING BY CSE FOR PAT SECTOR INDUSTRIES

Chlor-alkali Sector: Rating Scorecard

Green Rating for Chlor Alkali Sector			
COMPANY	SCORE	RANK	RATING
Chemfab Alkalis Ltd.	46.6	1	
Shriram Alkalis & Chemicals Ltd	45.3	2	
Indian Rayon & Industries Ltd.	38.8	3	
Indian Petrochemicals Corporation Ltd.	38.6	4	
Search Chem Industries Ltd.	36.2	5	
Sree Rayalseems Alkalies & Allied Chemicals Ltd.	35.4	6	
TamilNadu Petroproducts Ltd.	35.0	7	
Gujarat Alkalies & Chemicals Ltd. - Vadodra	33.0	8	
Grasim Industries Ltd.	30.4	9	
BILT chemicals	30.36	10	
Century Rayon Ltd.	29.6	11	
Gujarat Alkalies & Chemicals Ltd. - Dahej	28.9	12	
Shriram Chemicals & Fertilizers Ltd.	28.7	13	
DCW Ltd.	28.2	14	
SIEL Ltd.	27.4	15	
Bihar Caustic and Chemicals Ltd.	25.4	16	
Kanoria Chemicals Ltd.	24.8	17	
Standard Industries Ltd.	24.2	18	
Hukumchand Jute & Industries Ltd. (HJI - GMMCO)	21.7	19	
NRC Ltd. - Chemical Division	20.3	20	
Punjab Alkalies & Chemicals Ltd.	19.9	21	
Travancore Cochin Chemicals Ltd.	15.1	22	
Andhra Sugars - Kovvur	0.0	23	-
Andhra Sugars - Saggonda	0.0	23	-
Chemplast Sanmar Ltd.	0.0	23	-

More DTE Articles

- No concrete plans
- On paper
- Backyard mess

Pulp and Paper Sector: Rating Scorecard 1

The first green rating of the Pulp & paper sector ranked JK Papers as the best manufacturer of paper in the country.

28 Pulp and Paper mills

Company	Score	Rank	Rating
J K Paper Mills, Orissa	42.75	1	
Andhra Pradesh Paper Mills Ltd, Andhra Pradesh	38.50	2	
Sinar Mas Pulp & Paper (India) Ltd, Maharashtra	37.40	#	
BILT-Ballarpur Unit, Maharashtra	33.44	3	
Hindustan Newsprint Ltd, Kerala	33.30	4	
South India Viscose Industries Ltd, Tamil Nadu	31.73	5	
Pudumjee Pulp & Paper Mills Ltd, Maharashtra	31.44	6	
Tamil Nadu Newsprint & Papers Ltd, Tamil Nadu	31.40	7	
ITC-Bhadrachalam Paperboards Ltd, Andhra Pradesh	31.15	8	
Century Pulp & Paper, Uttar Pradesh	31.07	9	
Nagaon Paper Mills, Assam	28.70	10	
Seshasayee Paper & Boards Ltd, Tamil Nadu	28.20	11	
West Coast Paper Mills Ltd, Karnataka	27.67	12	
BILT-Asthi Unit, Maharashtra	27.10	13	
BILT-Yamunanagar Unit, Haryana	25.70	14	
Central Pulp Mills Ltd, Gujarat	25.35	15	
Star Paper Mills Ltd, Uttar Pradesh	24.76	16	
Shree Vindhya Paper Mills Ltd, Maharashtra	24.70	17	
BILT-Sewa Unit, Orissa	23.75	18	
Orient Paper Mills, Madhya Pradesh	22.10	19	
Mysore Paper Mills Ltd, Karnataka	21.60	20	
Cachar Paper Mills, Assam	21.43	21	
Rama Newsprint & Papers Ltd, Gujarat	21.10	22	
BILT-Chaudwar Unit, Orissa	21.06	23	
Nath Pulp & Paper Mills Ltd, Maharashtra	20.80	24	
Grasim Industries Ltd (Mavoor), Kerala	20.65	25	
Mukerian Papers, Punjab	20.01	26	
Amrit Paper, Punjab	19.01	27	

More DTE Articles

- No concrete plans
- On paper
- Backyard mess

Cement Sector: Rating Scorecard

Overall performance of Indian Cement plants.

CEMENT PLANT	PERCENTAGE OBTAINED	RANK	AWARD
MCL-Alathiyur Factory	51	1	
GACL-Gujarat Unit	48	2	
Lakshmi Cement	46	3	
ACC-Gagal Cement Works	46	3	
Prism Cement Limited	46	3	
GACL-Darlaghat Unit	45	4	
UCL- Andhra Pradesh Cement Works	43	5	
Lafarge India Limited	42	6	
GIL -Grasim Cement	40	7	
Binani Cement Limited	40	7	
Chettinad Cement Corporation Limited	40	7	
Sanghi Industries Limited (Cement Division)	40	7	
UCL-Gujarat Cement Works	39	8	
GACL-Maratha Cement Works	39	8	
GIL-Aditya Cement	38	9	
Vasavadatta Cement	37	10	
GIL-Rajashree Cement	35	11	
Jaypee Cement Limited - Bela Unit	35	11	
GACL- Rajasthan Unit	34	12	
UCL-Hirmi Cement Works	34	12	
Saurashtra Cement Limited	33	12	
GIL-Vikram Cement	33	13	
ACC-Wadi Cement Works	33	13	
MCL-Jayanthipuram Factory	32	14	
Birla Corporation: Chittor Cement Works	31	15	
ACC-Jamul Cement Works	31	15	
Zuari Cements	30	16	
CTIL-Manikgarh Cement	30	15	
OPIL-Orient Cement	30	16	
ACC-Kymore Cement Works	29	17	
Birla Corporation: Satna Cement Works and Birla Vikas Cement	29	17	
UCL-Awarpur Cement Works	29	17	
Shree Cement Limited	29	17	
Gujarat Siddhee Cement Limited	29	17	
Jaypee Cement Limited - Rewa Unit	27	18	
Andhra Cements-Durga Cement Works	20	19	
CTIL-Maihar Cement	0	20	
Diamond Cement Limited	0	20	
India Cement Limited – Shankarnagar Unit	0	20	

Iron & Steel Sector

Plant	Score (%)	Rating
Ispat Industries Limited, Raigad, Maharashtra	40	
Essar Steel Limited, Hazira, Gujarat	39	
Rashtriya Ispat Nigam Limited, Visakhapatnam, Andhra Pradesh	36	
Neelachal Ispat Nigam Limited, Kalinganagar, Odisha	33	
Tata Steel Limited, Jamshedpur, Jharkhand	32	
JSW Steel Limited, Vijayanagar, Bellary, Karnataka	27	
Visa Steel Limited, Kalinganagar, Odisha	26	
Godawari Power and Ispat Limited, Raipur, Chhattisgarh	26	
Jindal Steel and Power Limited, Raigarh, Chhattisgarh	24	
Jai Balaji Industries Limited, Banskopa, Durgapur, West Bengal	23	
SAIL Rourkela, Odisha	21	
Bhushan Power and Steel Limited, Sambalpur, Odisha	20	
Usha Martin Limited, Jamshedpur	15	
Welspun Maxsteel Limited, Raigad, Maharashtra*	9	
SAIL Bhilai, Chhattisgarh*	9	
SAIL Durgapur, West Bengal*	7	
SAIL Bokaro, Jharkhand*	7	
Jayaswal Neco Industries Limited, Raipur, Chhattisgarh*	4	
SAIL IISCO Burnpur, West Bengal*	3	
Monnet Ispat and Energy Limited, Raigarh, Chhattisgarh*	3	
Bhushan Steel Limited, Dhenkanal, Odisha*	2	

These companies did not participate in the rating. Their performance is based on secondary information and community survey

ATTACHMENT 3

INDUSTRY SPECIFIC NATIONAL EMISSION STANDARDS FOR PAT SECTORS

NATIONAL AMBIENT AIR QUALITY STANDARDS (2009)

Pollutants	Time Weighted Average	Concentration in Ambient Air		Methods of Measurement
		Industrial, Residential, Rural and other Areas	Ecologically Sensitive Area (Notified by Central Government)	
Sulphur Dioxide (SO_2), µg/m³	Annual * 24 Hours **	50 80	20 80	-Improved West and Gaeke Method -Ultraviolet Fluorescence
Nitrogen Dioxide (NO_2), µg/m³	Annual * 24 Hours **	40 80	30 80	-Jacob & Hochheiser modified (NaOH-$NaAsO_2$) Method -Gas Phase Chemiluminescence
Particulate Matter (Size less than 10µm) or PM_{10}, µg/m³	Annual * 24 Hours **	60 100	60 100	-Gravimetric -TEOM -Beta attenuation
Particulate Matter (Size less than 2.5µm) or $PM_{2.5}$, µg/m³	Annual * 24 Hours **	40 60	40 60	-Gravimetric -TEOM -Beta attenuation
Ozone (O_3) µg/m³	8 Hours * 1 Hour **	100 180	100 180	-UV Photometric -Chemiluminescence -Chemical Method
Lead (Pb) µg/m³	Annual * 24 Hours **	0.50 1.0	0.50 1.0	-AAS/ICP Method after sampling on EPM 2000 or equivalent filter paper -ED-XRF using Teflon filter
Carbon Monoxide(CO), mg/m³	8 Hours ** 1 Hour **	02 04	02 04	-Non dispersive Infrared (NDIR) Spectroscopy
Ammonia (NH_3), µg/m³	Annual * 24 Hours **	100 400	100 400	-Chemiluminescence -Indophenol blue method
Benzene (C_6H_6), µg/m³	Annual *	05	05	-Gas Chromatography (GC) based continuous analyzer -Adsorption and desorption followed by GC analysis
Benzo(a)Pyrene (BaP) Particulate phase only, ng/m³	Annual *	01	01	-Solvent extraction followed by HPLC/GC analysis
Arsenic (As), ng/m³	Annual *	06	06	-AAS/ICP Method after sampling on EPM 2000 or equivalent filter paper
Nickel (Ni), ng/m³	Annual *	20	20	-AAS/ICP Method after sampling on EPM 2000 or equivalent filter paper

* Annual Arithmetic mean of minimum 104 measurements in a year at a particular site taken twice a week 24 hourly at uniform intervals.

** 24 hourly or 8 hourly or 1 hourly monitored values, as applicable, shall be complied with 98% of the time in a year. 2% of the time, they may exceed the limits but not on two consecutive days of monitoring.

NOTE: Whenever and wherever monitoring results on two consecutive days of monitoring exceed the limits specified above for the respective category, it shall be considered adequate reason to institute regular or continuous monitoring and further investigations.

[1][SCHEDULE – VI]

(See rule 3A)

GENERAL STANDARDS FOR DISCHARGE OF ENVIRONMENTAL POLLUTANTS PART-A : EFFLUENTS

S. No.	Parameter	Standards			
		Inland surface water	Public Sewers	Land for irrigation	Marine coastal areas
1	2			3	
		(a)	(b)	(c)	(d)
1.	Colour and odour	See 6 of Annexure-I	--	See 6 of Annexure -I	See 6 of Annexure-I
2.	Suspended solids mg/l, Max.	100	600	200	(a) For process waste water- 100 (b) For cooling water effluent 10 percent above total suspended matter of influent.
3.	Particulate size of suspended solids	Shall pass 850 micron IS Sieve	--	--	(a) Floatable solids, max. 3 mm. (b) Settleable solids, max. 850 microns.
[2]4.	***	*	--	***	--
5.	pH Value	5.5 to 9.0	5.5 to 9.0	5.5 to 9.0	5.5 to 9.0
6.	Temperature	shall not exceed 5°C above the receiving water temperature	--	--	shall not exceed 5°C above the receiving water temperature

[1] Schedule VI inserted by Rule 2(d) of the Environment (Protection) Second Amendment Rules, 1993 notified vide G.S.R. 422(E) dated 19.05.1993, published in the Gazette No. 174 dated 19.05.1993.

[2] Omitted by Rule 2(d)(i) of the Environment (Protection) Third Amendment Rules, 1993 vide Notification No.G.S.R.801(E), dated 31.12.1993.

S. No.	Parameter	Standards			
		Inland surface water	Public Sewers	Land for irrigation	Marine coastal areas
1	2	3			
		(a)	(b)	(c)	(d)
7.	Oil and grease mg/l Max.	10	20	10	20
8.	Total residual chlorin mg/l Max.	1.0	--	--	1.0
9.	Ammonical nitrogen (as N), mg/l Max.	50	50	--	50
10.	Total Kjeldahl Nitrogen (as NH_3) mg/l, Max.	100	--	--	100
11.	Free ammonia (as NH_3) mg/l, Max.	5.0	--	--	5.0
12.	Biochemical Oxygen demand [1][3 days at 27°C] mg/l max.	30	350	100	100
13.	Chemical Oxygen Demand, mg/l, max.	250	--	--	250
14.	Arsenic (as As), mg/l, max.	0.2	0.2	0.2	0.2
15.	Mercury (as Hg), mg/l, Max.	0.01	0.01	--	0.01
16.	Lead (as Pb) mg/l, Max.	0.1	1.0	--	2.0
17.	Cadmium (as Cd) mg/l, Max.	2.0	1.0	--	2.0
18.	Hexavalent Chromium (as Cr+6), mg/l max.	0.1	2.0	--	1.0

[1] Substituted by Rule2 of the Environment (Protection) Amendment Rules, 1996 notified by G.S.R.176, dated 2.4.1996 may be read as BOD (3 days at 27°C) wherever BOD 5 days 20°C occurred.

Parameter	Standards			
	Inland surface water	Public Sewers	Land for irrigation	Marine coastal areas
2		3		
	(a)	(b)	(c)	(d)
Total chromium (as Cr.) mg/l, Max.	2.0	2.0	--	2.0
Copper (as Cu) mg/l, Max.	3.0	3.0	--	3.0
Zinc (As Zn.) mg/l, Max.	5.0	15	--	15
Selenium (as Se.) mg/l, Max.	0.05	0.05	--	0.05
Nickel (as Ni) mg/l, Max.	3.0	3.0	--	5.0
* * *	*	*	*	*
* * *	*	*	*	*
* * *	*	*	*	*
Cyanide (as CN) mg/l Max.	0.2	2.0	0.2	0.2
* * *	*	*	*	*
Fluoride (as F) mg/l Max.	2.0	15	--	15
Dissolved Phosphates (as P), mg/l Max.	5.0	--	--	--
* * *	*	*	*	*
Sulphide (as S) mg/l Max.	2.0	--	--	5.0
Phenoile compounds (as C_6H_5OH) mg/l, Max.	1.0	5.0	--	5.0

mitted by Rule 2(d)(i) of the Environment (Protection) Third Amendment Rules, 1993 vide Notification o.G.S.R.801(E), dated 31.12.1993.

S. No.	Parameter	Standards			
		Inland surface water	Public Sewers	Land for irrigation	Marine coastal areas
1	2			3	
		(a)	(b)	(c)	(d)
34.	Radioactive materials :				
	(a) Alpha emitter micro curie/ml.	10^{-7}	10^{-7}	10^{-8}	10^{-7}
	(b) Beta emitter micro curie/ml.	10^{-6}	10^{-6}	10^{-7}	10^{-6}
35.	Bio-assay test	90% survival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent	90% survival of fish after 96 hours in 100% effluent
36.	Manganese (as Mn)	2 mg/l	2 mg/l	--	2 mg/l
37.	Iron (as Fe)	3 mg/l	3 mg/l	--	3 mg/l
38.	Vanadium (as V)	0.2 mg/l	0.2 mg/l	--	0.2 mg/l
39.	Nitrate Nitrogen	10 mg/l	--	--	20 mg/l
[1]40.	* * *	*	*	*	*

Sr. No.	**Industry**	Parameter	Standards
1	**2**	3	4
		Grower / Small (<10ha) / Medium (10-25ha) / Large (>25ha)	
		Free Based (cm): 30 / 60 / 90	
		Distance (m): 50 / 100 / 150	
		(vi) Raw, Treated and/or diluted effluent shall be discharged into surface water body or used for recharging groundwater under any circumstances what so ever].	
36.	**ALUMINIUM PLANTS:**	**EMISSIONS**	
	(a) Aluminia Plant:		
	(i) Raw Material Handling	Primary and Secondary Crusher Particulate Matter	150
	(ii) Precipitation Area		
	- Calcination	Particulate matter	250
		Carbon Monoxide	1% max.
		Stack Height	H=14 $(Q)^{0.3}$ Where Q is emission rate of SO_2 in kg/hr and H-Stack height in meters.
	(b)Smelter Plant	Particulate Matter	
	(i)Green Anode Shop	Particulate Matter	150
	[1] [(ii)Anode Bake Oven	Particulate Matter	50 mg/Nm^3
		Total Fluoride (F)	0.3 kg/MT of Aluminium.
	(iii)Pot room	Particulate matter	150
		Total Fluoride For Soderberg* Technology	2.8 Kg/ton by 31st December 2006
		For Pre-baked Technology	0.8 kg/t by 31st December 2006

[1] Substituted by Rule 2(iv) (a) amended by Rule 2 (IV) (a) of the Environment (Protection) First Amendment Rules, 2006 notified vide Notification G.S.R.46(E), dated 3.2.2006.

Sr. No.	**Industry**	Parameter	Standards
1	**2**	3	4

* Separate standards for VSS, HSS, PBSW & PBCW as given in column 4 stands abolished

		[1][(c) Standards for forage fluoride	
		- Twelve consecutive months average	- 40 ppm
		- Two consecutive months average	- 60 ppm
		- One month average	- 80 ppm]
[*]37.	**STONE CRUSHING UNIT**	Suspended Particulate Matter (SPM)	The Standards consist of two paras : **(i) Implementation of the following Pollution Control measures:** (a) Dust containment cum suppression system for the equipment. (b) Construction of wind breaking walls. (c) Construction of the metalled roads within the premises. (d) Regular cleaning and wetting of the ground within the premises. (e) Growing of a green belt along the periphery.

[1] Inserted by Rule 2(IV)(b) of the Environment (Protection) First Amendment Rules, 2006 notified by G.S.R.46(E), dated 3.2.2006.

[*] Standards notified at Sl. No. 11 may also be referred.

Sr. No.	**Industry**	Parameter	Standards
1	**2**	3	4
		Cadmium (as Cd)	2.0
		Nickei (as Ni)	3.0
		Zinc (as Zn)	5.0
		Hexavalent	0.1
		Chromium as (Cr) Total Chromium (as Cr)	2.0
		Copper (as Cu)	3.0
		Lead (as Pb)	0.1
		Iron (as Fe)	3.0
		Total Metal	10.0
[1][10.	**CEMENT PLANTS**		not to exceed mg/Nm^3
		A. TOTAL DUST	
		Plant Capacity	
		(i)200 tonnes/day (all sections)	400
		(ii) Greater than 200 tonnes/day (all sections)	250
		B. EMISSIONS	

(i) For Cement Plants, including Grinding Units, located in critically polluted* or urban areas with a population of one lakh and above (including 5 Km distance outside urban boundary):

Particulate Matter 100mg/Nm^3

(ii) New Cement Kilns, including Grinding Units to be installed after the date of notification:

Particulate Matter 50 mg/Nm^3

* As per the guidelines of the Central Pollution Control Board]

[1] Substituted by Rule 2(I) of the Environment (Protection) First Amendment Rules, 2006 notified by G.S.R.46(E), dated 3.2.2006.

Sr. No.	**Industry**	Parameter	Standards
1	**2**	3	4
[1][2]27.	**ASBESTOS MANUFACTURING UNITS (INCLUDING ALL PROCESSES INVOLVING THE USE OF ASBESTOS)**	- Pure Asbestos material	0.5 fibre */cc for one year from the date of notification 0.2 fibre */cc after one year from the date of notification]
		- Total Dust	2 mg/m^3 (normal)
28.	**CALOR ALKALI (CAUSTIC SODA)**	**EMISSIONS**	Concentration in mg/m^3 (normal)
	(a) Mercury Cell	Mercury (from hydrogen gas holder stack)	0.2
	(b) All processes	Chlorine (from hypo tower)	15.0
	(c) All processes	Hydro chloric acid vapours and mist (from hydro chloric acid plant)	35.0
29.	**LARGE PULP AND PAPER**	**EMISSIONS**	Concentration in mg/m^3 (normal)
		Particulate matter	250**
		H_2S	10
30.	**INTEGRATED IRON AND STEEL PLANTS:**	I. **EMISSIONS**	
	(a) Coke Oven	Particulate mater	50
	(b) Refractory material plant	Particulate matter	150
		II. **EFFLUENTS**	Concentration in mg/l except for pH.
	(a) Coke oven		
	By product plant.	pH	6.0 – 8.0
		Suspended Solids	100

1 Standards mentioned at Sl. No.27 amended by Rule 2(III) of the Environment (Protection) First Amendment Rules, 2006 notified vide Notification G.S.R.46(E), dated 3.2.2006.

2 S.No. 27 to 31 and entries relating thereto inserted vide GSR 913(E) dt. 24.10.89 published in the Gazette No. 554 dt. 24.10.89.

** This standard of 250 mg/m^3 (normal) shall apply only for a period of 3 years with effect from the date on which the Environment (protection) Second Amendment Rules, 1989 came into force. After three years the standard to be applicable is 15 mg/m^3 (normal).

Sr. No.	**Industry**	Parameter	Standards	
1	**2**	3	4	
17.	**FERTILIZER INDUSTRY**		Concentration in the effluent not to exceed milligramme per litre (except for pH)	
		EFFLUENTS	Plants Commissioned January 1, 1982 onwards	Plants Commissioned Prior to January 1, 1982
		- Straight Nitrogeneous Fertilizers, Excluding the Calcium Ammonium Nitrate and Ammonium Nitrate Fertilizers		
			(a)	(b)
		pH	6.5 – 8.0	6.5 – 8.0
		Ammonical Nitrogen	50	75
		Total Kjeldahl Nitrogen	100	150
		Free Ammonical Nitrogen	4	4
		Nitrate Nitrogen	10	10
		Cynide as CN	0.2	0.2
		Vanadium as V	0.2	0.2
		Arsenic as As	0.2	0.2
		Suspended solids	100	100
		Oil and Grease	10	10
		*Hexavalent Chromium as Cr.	0.1	0.1
		*Total Chromium as Cr.	2.0	2.0
		Straight Nitrogenous Fertilizers, including Calcium Ammonium Nitrate and Ammonium Nitrate Fertilizers	Plants Commissioned January 1, 1982 onwards	Plants Commissioned prior to January 1, 1982

* To be complied with at the outlet of Chromate removal unit.

Sr. No.	**Industry**	Parameter	Standards	
1	**2**	3	4	
			(a)	(b)
		pH	6.5 – 8.0	6.5 – 8.0
		Ammonical Nitrogen	50	75
		Total Kjeidahl Nitrogen		150
		Free Ammonical Nitrogen	4	4
		Nitrate Nitrogen	20	20
		Cynide as CN	0.2	0.2
		Vanadium as V	0.2	0.2
		Arsenic as As	0.2	0.2
		Suspended solids	100	100
		Oil and Grease	10	10
		*Hexavalent Chromium as Cr	0.1	0.1
		*Total Chromium as Cr	2.0	2.0
		Complex Fertilizers excluding Calcium Ammonium Nitrate, Ammonium Nitrate & Ammonium Nitrophosphate Feritilizers	Plants Commissioned January 1, 1982 onwards	Plants Commissioned prior to January 1, 1982
			(a)	(b)
		pH	6.5 – 8.0	6.5 – 8.0
		Ammonical Nitrogen	50	75
		Free Ammonical Nitrogen	4	4
		Total Kjeldahl Nitrogen	100	100
		Nitrate Nitrogen	10	10

* To be complied with at the outlet of Chromate removal unit.

Sr. No.	**Industry**	Parameter	Standards	
1	**2**	3	4	
		Cynide as CN	0.2	0.2
		Vanadium as V	0.2	0.2
		Arsenic as As	0.2	0.2
		Phsophate as P	5	5
		Suspended solids	100	100
		Oil and Grease	10	10
		*Fluoride as F	10	10
		**Hexavalent Chromium as Cr	0.1	0.1
		**Total Chromium as Cr	2.0	2.0
		Complex Fertilizers including Calcium Ammonium Nitrate, Ammonium Nitrate & Ammonium Nitrophosphate Fertilizers	Plants Commissioned January 1, 1982 onwards	Plants Commissioned prior to January 1, 1982
			(a)	(b)
		pH	6.5 – 8.0	6.5 – 8.0
		Ammonical Nitrogen	50	75
		Free Ammonical Nitrogen	100	100
		Nitrate Nitrogen	20	20
		Cynide as CN	0.2	0.2
		Vanadium as V	0.2	0.2
		Arsenic as As	0.2	0.2

* To be complied with at the outlet of fluoride removal unit. If the recipient system so demand, fluoride as F shall be limited to 1.5 mg/l.

** To be complied with at the outlet of Chromate removal unit.

Sr. No.	**Industry**	Parameter	Standards	
1	**2**	3	4	
		Phosphate as P	5	5
		Oil and Grease	10	10
		Suspended Solids	10	100
		*Fluoride as F	10	10
		**Hexavalent Chromium as Cr.	0.1	0.1
		**Total Chromium as Cr	2.0	2.0
		Straight Phosphate Fertilizers		
		pH	7.0 –9.0	
		Phosphate as P	5	
		Oil and Grease	10	
		Suspended Solids	100	
		*Fluoride as F	10	
		**Hexavalent Chromium as Cr	0.1	
		**Total Chromium as Cr	2.0	
	Emissions			
	Phosphatic Fertilizers (Fluorides and Particulate matter emission)	Phosphorice acid manufacturing unit Granulation mixing and grinding of rock phosphate	25 milligramme per normal cubic metre as total Fluoride 150 milligramme per normal cubic metre of particulate matter.	
	Urea (Particulate matter emission)	Pricing tower Commissioned prior to 01.01.1982	150 milligramme per normal cubic metre of 2 kilogramme per tone of product.	
		Commissioned after 1.1.1982	50 milligramme per normal cubic metre or 0.5 kilogramme per tonne of product	

* To be complied with at the outlet of fluoride removal unit. If the recipient system so demand, fluoride as F shall be limited to 1.5 mg/l.

** To be complied with at the outlet of Chromate removal unit.

Sr. No.	**Industry**	Parameter	Standards
1	**2**	3	4
		Phenol	1.0
		Cynide	0.2
		BOD [1][(3 days at 27^oC)]	30
		COD	250
		Ammonical Nitrogen	50
		Oil and Grease	10
	(b)Other plants such as sintering plant, blast furnace, steel melting and rolling mill:	pH	6.0 – 9.0
		Suspended Solids	100
		Oil and Grease	10
31.	**RE-HEATING (REVERBERATORY) FURNACES:**	**EMISSIONS**	Concentration in mg/m^3 (normal)
	Capacity : All sizes		
	Sensitive area	Particulate matter	150
	Other area	Particulate matter	450
[2][32.	**FOUNDRIES**	**EMISSIONS**	
	(a) Cupola Capacity (Melting Rate) :		
	Less than 3 mt./hr.	Particulate Matter	450
	3 mt/hr. and above	Particulate Matter	150
	Note : It is essential that stack is constructed over the cupola beyond the charging door and emissions are directed through the stack which should be at least six times the diameter of cupola.		
	(b) Arc Furnaces :		
	Capacity: All sizes	Particulate Matter	150

[1] Substituted by Rule 2 of the Environment (Protection) Amendment Rules, 1996 notified by G.S.R.176(E), dated 2.4.1996 may be read as BOD (3 days at 27^oC) wherever BOD 5 days 20^oC occurred

[2] S.No. 32 to 47 and entries relating thereon inserted vide GSR 742(E) dt. 30.8.90 published in the Gazette No. 365 dated 30.8.90.

Sr. No.	**Industry**	Parameter	Standards
1	**2**	3	4
	(c) Induction Furnace		
	Capacity: All sizes	Particulate Matter	150
	Note : In respect of Arc Furnaces and Induction Furnaces provision has to be made for collecting the fumes before discharging the emissions through the stack.		
33.	**THERMAL POWER PLANTS**	STACK HEIGHT/LIMIT IN METERS*	
		Power generation capacity :	
		- 500 MW and above	275
		- 200 MW/210 MW and above to less than 500 MW	220
		- Less than 200 MW/210 MW	H-14$(Q)^{0.3}$ where Q is emission rate of SO_2 in *kg/hr. and *H Stack height in metres.
		Steam generation capacity:	
		- Less than 2 ton/hr.	½ times the neighbouring building height or 9 metres (whichever is more)
		- More than 2 ton/hr. to 5 ton/hr.	12
		- More than 5 ton/hr. to 10 ton/hr.	15
		- More than 10 ton./hr.	18
		- More than 15 ton/hr. to 20 ton/hr.	*21
		- More than 20 ton/hr. to 25 ton/hr	24
		- More than 25 ton/hr. to 30 ton/hr.	27
		- More than 30 ton/hr.	30 or using formula H-14$(Q)^{0.3}$ (whichever is more) Q is emission rate of SO_2 in kg/hr and *H-Stack height in meters.

* Correction have been made as per Corrigendum Notification no. S.O. 8(E) dt. 31.12.1990.

Integrated Iron & Steel Standards.

MINISTRY OF ENVIRONMENT AND FORESTS

NOTIFICATION

New Delhi, the 31st March, 2012

G.S.R. 277(E).—In exercise of the powers conferred by sections 6 and 25 of the Environment (Protection) Act, 1986 (29 of 1986), the Central Government hereby makes the following rules further to amend the Environment (Protection) Rules, 1986, namely:-

1. (1) These rules may be called the Environment (Protection) (Third Amendment) Rules, 2012.

(2) They shall come into force on the date of their publication in the Official Gazette.

2. In the Environment (Protection) Rules, 1986, in Schedule I,-

(a) (i) serial number 12 relating to "Coke Ovens" and entries relating thereto shall be omitted;

(ii) for serial number 24 relating to "Iron and Steel (Integrated)" and entries relating thereto, the following serial number and entries shall be substituted, namely:-

S. No.	Industry	Parameter	Standard		
(1)	(2)	(3)	(4)		
"24.	Integrated Iron and Steel Plant	**A.- Coke oven (by- product type)**			
		a. Effluent Standards			
			Limiting concentration in mg/l, except for pH		
		pH	6.0-8.50		
		Suspended solids	100		
		BOD, 3 days at 27°C	30		
		COD	250		
		Oil and grease	10		
		Ammonical nitrogen, as N	50		
		Cyanide (as CN^-)	0.2		
		Phenol	1.0		
		b. Emission Standards			
			New Batteries (at green field site)	Rebuild Batteries	Existing Batteries
		(i) Fugitive Visible Emissions			

(1)	(2)	(3)	(4)		
		Leakage from door	5(PLD)*	10(PLD)*	10(PLD)*
		Leakage from charging lids	1(PLL)**	1(PLL)**	1(PLL)**
		Leakage from AP Covers	4(PLO)†	4(PLO)†	4(PLO)†
		Charging emission (Second/ charge)	16(with HPLA)#	50(with HPLA)#	75
		***PLD- Percent leaking doors; **PLL- Percent leaking lids;**			
		†PLO- Percent Leaking off takes and #HPLA – Aspiration through high pressure liquor injection in gooseneck.			
		(ii) Stack Emission Standards			
		SO_2 (mg/ Nm^3)	800	800	800
		NOx (mg/ Nm^3)	500	500	500
		Particulate matter (mg/Nm^3)	50	50	50
		Particulate matter during charging of stamp charging batteries(mg/Nm^3)	25	25	25
		Sulphur in Coke Oven gas used for heating (mg/Nm^3)	800	-	-
		(iii) Fugitive Emissions: Benzo (a) Pyrene (BaP)			
		Battery area (top of the battery) (µg/ m^3)	5	5	5
		Other units in coke oven plant (µg/ m^3)	2	2	2
		B.- Sintering Plant			
		a. Effluent Standards			
			Limiting concentration in mg/l, except for pH		
		pH	6.0- 8.50		
		Suspended solids	100		
		Oil and grease	10		
		b. Emission Standards			
		Particulate matter (mg/Nm^3)	150		
		C.- Blast Furnace			
		a. Effluent Standards			
			Limiting concentration in mg/l, except for pH		
		pH	6.0- 8.5		
		Suspended solids (mg/l)	50		
		Oil and grease (mg/l)	10		
		Cyanide as CN^- (mg/l)	0.2		
		Ammonical Nitrogen,	50		

(1)	(2)	(3)	(4)	
		as NH_3–N (mg/l)		
		b. Emission Standards		
		(i) Stack Emissions		
			Existing Units	New Units
			BF Stove	
		Particulate matter (mg/Nm^3)	50	30
		SO_2 (mg/Nm^3)	250	200
		NO_x (mg/Nm^3)	150	150
		CO (vol/vol)	1% (max.)	1% (max.)
		(ii) Space Dedusting / Other stacks of BF area		
		Particulate matter (mg/Nm^3)	100	50
		(iii) Fugitive Emission		
			Existing Units	New Units
		Particulate matter (Size less than 10 microns) PM_{10}($\mu g/m^3$)	4000	3000
		SO_2 ($\mu g / m^3$)	200	150
		NO_x ($\mu g / m^3$)	150	120
		Carbon monoxide ($\mu g / m^3$) - 8 hours	5000	5000
		1 hours	10,000	10,000
		Lead, as Pb in fugitive dust ($\mu g / m^3$) at Cast House	2	2
		D.- Steel Making Shop- Basic Oxygen Furnace		
		a. Effluent Standards		
		pH (mg/l)	6.0- 8.5	
		Suspended solids (mg/l)	100	
		Oil and grease (mg/l)	10	
		(i) Stack Emissions		
			Existing Units	New Units
			• Converters	
		Particulate matter (mg/Nm^3)		
		— Blowing/ Lancing operation	300	Should be with gas recovery
		— Normal operation	150	Should be with gas recovery
		•• Secondary Emission Stack : De-dusting of de-sulphurisation, Secondary refining etc.		
		Particulate matter (mg/Nm^3)	100	50

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(1)	(2)	(3)	(4)	
		(ii) Fugitive Emissions		
			Existing Units	New Units
		Particulate matter (size less than 10 microns) PM_{10} ($\mu g/m^3$)	4000	3000
		SO_2 ($\mu g / m^3$)	200	150
		NO_x ($\mu g / m^3$)	150	150
		CO ($\mu g / m^3$) - 8 hours	5,000	5,000
		1 hours	10,000	10,000
		Lead, as Pb in dust at Converter floor ($\mu g / m^3$)	2	2
		E.- Rolling Mills		
		a. Effluent Standards		
		pH	6.0-9.0	
		Suspended solids (mg/l)	100	
		Oil and grease (mg/l)	10	
		b. Emission Standards		
		Particulate matter (mg/Nm^3)	150	
		Re- Heating (Reverberatory) Furnaces		
			Sensitive area	Other area
		Particulate matter (mg/Nm^3)	150	250
		F.- Arc Furnaces		
		Emission Standards		
		Particulate matter (mg/Nm^3)	150	
		G.- Induction Furnaces		
		Emission Standards		
		Particulate matter (mg/Nm^3)	150	
		H.- Cupola Foundary		
		Emission Standards		
			melting capacity less than 3 tonne/hr	melting capacity 3 tonne/hr and above
		Particulate matter (mg/Nm^3)	450	150
		SO_2 (mg/Nm^3)	300, corrected at 12% CO_2	
		I.- Calcination Plant/ Lime Kiln/Dolomite Kiln		
		Emission Standards		
			capacity upto 40t/day	capacity above 40t/day

(1)	(2)	(3)	(4)	
		Particulate matter (mg/Nm^3)	500	150
		J.- Refractory Unit		
		Emission Standards		
		Particulate matter (mg/Nm^3)	150	
		Note: 1. The height of the each process stack shall be a minimum of 30 metres or as per the formula $H = 14 (Q)^{0.3}$ (whichever is more), *where "H" is the height of stack in metre; and "Q" is the maximum quantity of SO_2 in kg/hr expected to be emitted through the stack at rated capacity of the plant(s) and calculated as per the norms of gaseous emission.* 2.The plants having separate stack for gaseous emission for the scrubbing unit, the height of this stack shall be equal to main stack of the plant or 30 metres, whichever is higher. 3. It is essential that stack constructed over the cupola beyond the charging door and emissions shall be directed through the stack which should be at least six times the diameter of cupola. 4. In respect of Arc Furnaces and Induction Furnaces provision shall be made for collecting the fumes before discharging the emissions through the stack. 5. Foundries shall install scrubber, followed by a stack of height atleast six times the diameter of the Cupola beyond the charging door. 6. Recovery type converters shall be installed in new plants or expansion projects.		
		Stormwater		
		Note: (i) Stormwater shall not be allowed to mix with effluent, scrubber water and/ or floor washings. (ii) Stormwater shall be channellized through separate drains as per natural gradient, passing through High Density Polyethylene (HDPE) lined pits, each having holding capacity of 10 minutes (hourly average) of rainfall.".		

(iii) serial number 30 relating to "Integrated Iron and Steel Plants" and the entries relating there to shall be omitted;

(iv) serial number 79 relating to "Coke Oven Plants" and the entries relating there to shall be omitted.

(b) In Schedule VI, General Emission Standards Part D, III, Load/ Mass based standards, for serial number 5, Coke Oven and entries relating thereto, the following serial number and entries shall be inserted, namely:-

(1)	(2)	(3)	(4)
"5	Integrated Iron and Steel Plant	Carbon Monoxide in coke oven	3 Kg/ tonne of coke produced
		Particulate matter during coke pushing in coke oven	5 gramme/ tonne of coke produced
		Particulate matter for quenching operation in Coke Oven	50 gramme/ tonne of coke produced .".

[F. No. Q-15017/60/2007-CPW]
RAJNEESH DUBE, Jt. Secy.

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पर्यावरण और वन मंत्रालय

अधिसूचना

नई दिल्ली, 31 मार्च, 2012

सा.का.नि. 277(अ).—केन्द्रीय सरकार, पर्यावरण (संरक्षण) अधिनियम, 1986 (1986 का 29) की धारा 6 और धारा 25 द्वारा प्रदत्त शक्तियों का प्रयोग करते हुए, पर्यावरण (संरक्षण) नियम, 1986 का और संशोधन करने के लिए निम्नलिखित नियम बनाती है, अर्थात्:-

1. (1) इन नियमों का संक्षिप्त नाम पर्यावरण (संरक्षण) (तृतीय संशोधन) नियम, 2012 है।

(2) ये राजपत्र में प्रकाशन की तारीख को प्रवृत्त होंगे।

2. पर्यावरण (संरक्षण) नियम, 1986 की, अनुसूची I में, -

(क) (i) क्रम संख्या 12, कोक ओवन से संबंधित विद्यमान प्रविष्टियों का लोप किया जाएगा;

(ii) क्रम संख्या 24, लौह व इस्पात(एकीकृत) और उससे संबंधित प्रविष्टियों के स्थान पर निम्नलिखित संख्यांक और प्रविष्टियां रखी जाएंगी, अर्थात् :-

क्र.सं.	उद्योग	पैरामीटर	मानक
(1)	(2)	(3)	(4)
"24.	एकीकृत लौह व इस्पात संयंत्र	**अ.- कोक ओवन (सह- उत्पाद प्रकार)**	
		क. बहिस्राव मानक	
			सान्द्रण सीमा मि.ग्रा. ./लीटर में, pH को छोड़कर
		pH	6.0-8.50
		निलंबित कण	100

(1)	(2)	(3)	(4)
		BOD, 27° सैंटीग्रेड पर 3 दिन	30
		COD	250
		तेल एवं ग्रीस	10
		अमोनिकल नाइट्रोजन, N के रूप में	50
		साइनाइड (CN^- के रूप में)	0.2
		फिनॉल	1.0

ख. उत्सर्जन मानक

	नई बैट्रियां (शुचित क्षेत्र स्थल में)	पुन: निर्मित बैट्रियां	विद्यमान बैट्रियां
(i) प्लावक दृश्य उत्सर्जन			
दरवाजे से रिसाव	5(PLD)*	10(PLD)*	10(PLD)*
भराई ढक्कनों से रिसाव	1(PLL)**	1(PLL)**	1(PLL)**
ए.पी. ढक्कनों से रिसाव	4(PLO)†	4(PLO)†	4(PLO)†
भराई के समय उत्सर्जन (द्वितीय)	16(HPLA के साथ)#	50(HPLA के साथ)#	75

***PLD- रिसाव वाले दरवाजों का प्रतिशत; **PLL- रिसाव वाले ढक्कनों का प्रतिशत;**

†PLO- रिसाव ऑफटेक प्रतिशत में और #HPLA – ग्रूजनेक में उच्च दाब पर तरल अंत: क्षेपक के समय अपेक्षा

(ii) स्टैक उत्सर्जन मानक			
SO_2(मि.ग्रा./नॉर्मल घनमीटर)	800	800	800
NOx (मि.ग्रा. /नॉर्मल घनमीटर)	500	500	500
विविक्त पदार्थ (मि.ग्रा./नॉर्मल घनमीटर)	50	50	50
स्टैम्प चार्जिंग बैट्री भराई करने के दौरान विविक्त पदार्थ(मि.ग्रा./नॉर्मल घनमीटर)	25	25	25
गंधक(मि.ग्रा./नॉर्मल घनमीटर) गर्म करने के लिए उपयोग किये जा रहे कोक ऑवन गैस में	800	-	-
(iii) प्लावक उत्सर्जन: बैन्जो -ए- पाईरीन *(BaP)*			
बैट्री क्षेत्र (बैट्री के ऊपरी भाग पर) (माईक्रोग्राम/ घनमीटर)	5	5	5
कोक ऑवन प्लांट की अन्य इकाईयां (माईक्रोग्राम / घनमीटर)	2	2	2

आ.- निसादीय संयंत्र

क. बहिस्राव मानक

	सान्द्रण सीमा मि.ग्रा. ./लीटर में, pH को छोड़कर
pH	6.0- 8.50
निलम्बित ठोस कण	100
तेल एवं ग्रीस	10

(1)	(2)	(3)	(4)	
		ख. उत्सर्जन मानक		
		विविक्त पदार्थ (मि.ग्रा./नॉर्मल घनमीटर)	150	
		इ.- ब्लास्ट फरनेस		
		क. बहिस्राव मानक		
		pH	6.0- 8.5	
		निलम्बित ठोस कण(मि.ग्रा./ली)	50	
		तेल एवं ग्रीस(मि.ग्रा./ली)	10	
		साइनाइड (CN^- के रूप में) (मि.ग्रा./ली)	0.2	
		अमोनिकल नाइट्रोजन, NH_3–N के रूप में (मि.ग्रा./ली)	50	
		ख. उत्सर्जन मानक		
		(i) चिमनी के द्वारा उत्सर्जन		
			विद्यमान इकाईयां	नई इकाईयां
		ब्लास्ट फर्नेस स्टोव		
		विविक्त पदार्थ (मि.ग्रा. /नॉर्मल.घन.मीटर)	50	30
		SO_2 (मि.ग्रा./नॉर्मल घनमीटर)	250	200
		NO_x (मि.ग्रा./नॉर्मल घनमीटर)	150	150
		CO (घनत्व/मात्रा)	1% (अधि.)	1% (अधि.)
		(ii) कार्यक्षेत्र में धूल/ब्लास्ट फर्नेस क्षेत्र की अन्य चिमनियां		
		विविक्त पदार्थ (मि.ग्रा. /नॉर्मल घनमीटर)	100	50
		(iii) प्लावक उत्सर्जन		
			विद्यमान इकाईयां	नई इकाईयां
		विविक्त पदार्थ (10 माईक्रोन से कम आकार) PM_{10}(माईक्रोग्राम / घनमीटर)	4000	3000
		SO_2 (माईक्रोग्राम/ घनमीटर)	200	150
		NO_x (माईक्रोग्राम/ घनमीटर)	150	120
		कार्बन मोनोक्साइड(माईक्रोग्राम/ घनमीटर) - 8 घंटे	5000	5000
		- 1 घंटे	10,000	10,000
		सीसा, प्लावक धूल में Pb के रूप में (माईक्रोग्राम / घनमीटर), ढलाई घर में	2	2
		ई.- स्टील निर्माण शॉप- आधारभूत ऑक्सीजन भट्टी		
		क. बहिस्राव मानक		
		pH	6.0- 8.5	
		निलम्बित ठोस कण(मि.ग्रा./ली)	100	
		तेल एवं ग्रीस(मि.ग्रा./ली)	10	

(1)	(2)	(3)	(4)	
		(i) चिमनी के द्वारा उत्सर्जन		
			विद्यमान इकाईयां	नई इकाईयां
		• परिवर्तक		
		विविक्त पदार्थ (मि.ग्रा./नॉर्मल घनमीटर)		
		- फूंकनी/ चीराई प्रचालन	300	गैस प्रतिप्राप्ति के साथ होना चाहिए
		- सामान्य प्रचालन	150	गैस प्रतिप्राप्ति के साथ होना चाहिए
		•• माध्यमिक उत्सर्जन चिमनी : डि-सल्फ्यूरिसेशन की धूल झड़ाई, माध्यमिक परिशोधन, आदि		
		विविक्त पदार्थ (मि.ग्रा. /नॉर्मल घनमीटर)	100	50
		(ii) प्लावक उत्सर्जन		
			विद्यमान इकाईयां	नई इकाईयां
		विविक्त पदार्थ (10 माईक्रोन से कम आकार) PM_{10}(माईक्रोग्राम/ घनमीटर)	4000	3000
		SO_2 (माईक्रोग्राम/ घनमीटर)	200	150
		NO_x (माईक्रोग्राम/ घनमीटर)	150	150
		CO(माईक्रोग्राम/ घनमीटर)		
		- 8 घंटे	5,000	5,000
		- 1 घंटे	10,000	10,000
		सीसा, Pb के रूप में(माईक्रोग्राम/ घनमीटर) परिवर्तक तल पर धूल में	2	2
		उ. - रोलिंग मिल		
		क. बहिस्राव मानक		
		pH	6.0-9.0	
		निलम्बित ठोस कण(मि.ग्रा./ली)	100	
		तेल एवं ग्रीस (मि.ग्रा./ली)	10	
		ख. उत्सर्जन मानक		
		विविक्त पदार्थ (मि.ग्रा./नॉर्मल घनमीटर)	150	
		पुनः ताप (रिवरबरेट्री) भट्टी		
			संवेदनशील क्षेत्र	अन्य क्षेत्र
		विविक्त पदार्थ (मि.ग्रा./नॉर्मल घनमीटर)	150	250

(1)	(2)	(3)	(4)
		ए.- आर्क फर्नेस	
		उत्सर्जन मानक	
		विविक्त पदार्थ (मि.ग्रा./नॉर्मल घनमीटर)	150
		ऐ.- इंडक्शन फर्नेस	
		उत्सर्जन मानक	
		विविक्त पदार्थ (मि.ग्रा. /नॉर्मल घनमीटर)	150
		ओ.- क्यूपला फाउन्ड्री	
		उत्सर्जन मानक	
			3 टन/घंटा से कम की प्रगलन क्षमता: 450 ; 3 टन/घंटा और इससे अधिक की प्रगलन क्षमता: 150
		विविक्त पदार्थ (मि.ग्रा./नॉर्मल घनमीटर)	
		SO_2 (मि.ग्रा. /नॉर्मल घनमीटर)	300, 12% CO_2 पर
		औ.- कैल्सीनेशन संयंत्र/ चूना भट्टी/डोलोमाइट भट्टी	
		उत्सर्जन मानक	
			40टन/दिन तक की क्षमता: 500 ; 40टन/दिन से अधिक की क्षमता: 150
		विविक्त पदार्थ (मि.ग्रा./नॉर्मल घनमीटर)	
		(3)	(4)
		अं.- उच्चतापसह इकाई	
		उत्सर्जन मानक	
		विविक्त पदार्थ (मि.ग्रा./नॉर्मल घनमीटर)	150

टिप्पणी:

1. प्रत्येक प्रक्रिया स्टैक की न्यूनतम ऊंचाई 30 मीटर या $H = 14 (Q)^{0.3}$ सूत्र के अनुरूप, जो भी अधिक हो, होनी चाहिए । *"H"* का अर्थ चिमनी की ऊंचाई मीटरों में, और *"Q"* का अर्थ गैसीय उत्सर्जन कि.ग्रा/घंटे में मानक के अनुरूप परिकलित और संयंत्र की स्थापित क्षमता पर चिमनी के माध्यम से उत्सर्जित होने वाले SO_2 की संभावित अधिकतम मात्रा है।
2. स्क्रबिंग इकाई के गैसीय उत्सर्जन हेतु संयंत्र की पृथक चिमनी होने पर इस चिमनी की ऊंचाई संयंत्र की मुख्य चिमनी की ऊंचाई के बराबर या 30 मीटर, जो भी अधिक हो, होगी।
3. क्यूपला इकाई में गैस उत्सर्जन के लिए चिमनी की लंबाई कम से कम क्यूपला के व्यास के छः गुणा, इसके भराई दरवाजे के ऊपर होना आवश्यक है।
4. आर्क फर्नेस और इंडक्शन फर्नेस के संदर्भ में उत्सर्जनों को चिमनी के माध्यम से उत्सर्जित किये जाने से पहले धुंऐ को एकत्रित किये जाने का प्रावधान किया जाएगा।

98 9/12-2.

(1)	(2)	(3)	(4)
		5. फाउन्ड्री में स्क्रबर स्थापित किया जाएगा तथा इसमें चिमनी की ऊंचाई कम से कम, इसके भराई दरवाजे के ऊपर, इस क्यूपला के व्यास के छः गुणा होना आवश्यक होगी। 6. नएं संयंत्रों और विस्तार परियोजनाओं में प्रति प्राप्ति प्रकार के परिवर्तक स्थापित किये जाएंगे।	
		वर्षाजल टिप्पणी: (i) किसी इकाई के वर्षा जल को बहिस्राव, मार्जक जल और/अथवा तलधुलाई अपजल के साथ मिलाने की अनुमति नहीं दी जाएगी। (ii) इकाई की अंतसीमा के वर्षा जल को वर्षा के 10 मिनट की संग्रहण क्षमता (घंटे के औसत) वे उच्च घनत्व पोलीइथलीन (एचडीपीई) परत वाले गर्त के माध्यम से अलग नाली के द्वारा बहाय जाएगा।"।	

(iii) क्रम संख्या 30, एकीकृत लौह व इस्पात संयंत्र से सम्बन्धित विद्यमान प्रविष्टियों का लोप किया जायेगा; और

(iv) क्रम संख्या 79, कोक आंवन संयंत्र से सम्बन्धित विद्यमान प्रविष्टियों का लोप किया जायेगा।

(ख) अनुसूची VI, में सामान्य उत्सर्जन मानक भाग घ, III, भार/ समूह आधारित मानक, क्रम संख्या 5, कोक ऑवन इनसे संबंधित प्रविष्टियों के स्थान पर निम्नलिखित क्रम संख्यांक और प्रविष्टियां अन्तःस्थापित की जाएंगी, अर्थात्:-

"5	एकीकृत लौह व इस्पात संयंत्र	**कोक ऑवन में कार्बन मोनोऑक्साइड**	**3 कि.ग्रा./टन उत्पादित कोयला**
		कोक ऑवन में कोयला डालते समय विविक्त पदार्थ	**5 ग्रा./टन उत्पादित कोयला**
		कोक ऑवन में आग बुझाने के दौरान विविक्त पदार्थ	**50 ग्रा./टन उत्पादित कोयला ।"।**

[फा. सं. क्यू-15017/60/2009-सीपी

रजनीश दुबे, संयुक्त

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Sr. No.	**Industry**	Parameter	Standards
1	**2**	3	4
14.	**SMALL PULP AND PAPER INDUSTRY**		Concentration not be exceed mg/l (except for pH and sodium absorption ratio)
	*Discharge into inland surface water	pH	5.5 – 9.0
		Suspended Solids	100
		BOD	30
	Disposal on land	pH	5.5 – 9.0
		Suspended Solids	100
		BOD	100
		Sodium Absorption Ratio	26
		[1][Absorbable Organic Halogens (AOX) in effluent discharge	3.00 kg/ton of paper produced with effect from the date of publication of this notification. 2.00 kg/ton of paper produced with effect from the 1st day of March, 2006.

Explanation.- These standards shall apply to all small scale Pulp and Paper Mills having capacity below 24,000 MT per annum]

[2]15.	**FERMENTATION INDUSTRY (DISTILLERIES, MALTRIES AND BREWERIES)**		Concentration in the effluents not to exceed milligramme per litre (except for pH and colour & odour)
		pH	5.5 – 9.0
		Colour & Odour	All efforts should be made to remove colour and unpleasant odour as far as practicable.
		Suspended Solids	100
		[3][BOD (3 days at 27°C)]	
		[4][-disposal into inland surface waters or river/ streams]	30
		- disposal on land or for irrigation]	100
		**[(2)….(7)]	

1 Inserted by Rule 2 (i) of the Environment (Protection) Third Amendments Rules, 2005 notified vide Notification G.S.R.546(E), dated 30.8.2005.

2 Entries relating to S.No. 15 corrected in terms of SO 12(E), dt. 8.1.90 published in the Gazette no. 10 dt. 8.1.90.

3 Substituted by Rule 2 of the Environment (Protection) Amendment Rules, 1996 notified by G.S.R.176(E), dated 2.4.1996 may be read as BOD (3 days at 27°C) wherever BOD 5 days 20°C occurred.

4 Substituted vide Rule 3(a) of the Environment (Protection) (Amendments) Rules, 1996 notified vide G.S.R.186(E), dated 2.4.1996

Sr. No.	**Industry**	Parameter	Standards
1	**2**	3	4
6.	**COTTON TEXTILE INDUSTRIES (COMPOSITE AND PROCESSING)**		Concentration not to exceed, milligramme per litre (except for pH and bioassay)
		Common	
		pH	5.5 to 9
		Suspended solids	100
		Bio-Chemical Oxygen Demand[1][3days at 27^oC]	150
		Oil and grease	10
		Bio-assay test	90% survival of fish of after 96 hours
		Special:	
		Total chromium as (Cr)	2
		Sulphide (as S)	2
		Phenolic compounds (as C_4H_2OH)	5

The special parameters are to be stipulated by the Central Board in case of Union territories and State Boards in case of States depending upon the dye used in the industry. Where the industry uses chrome dyes, sulphur dyes and/or phenolic compounds in the dyeing/printing process, the limits on chromium of 2 mg/litre, sulphides of 2 mg/litre and phenolic compounds of 5 mg/litre respectively shall be imposed.

Where the quality requirement of the recipient system so warrants, the limit of BOD should be lowered upto 30 according to the requirement by the State Boards for the States and the Central Board for the union territories.

A limit on sodium absorption ratio of 26 should be imposed by the State Boards for the States and the Central Board for the Union territories if the disposal of effluent is to be made on land.

[1] Substituted by Rule 2 of the Environment (Protection) Amendment Rules, 1996 notified by G.S.R.176(E), dated 2.4.1996 may be read as BOD (3 days at 27^oC) wherever BOD 5 days 20^oC occurred.

92. STANDARDS FOR EFFLUENTS FROM TEXTILE INDUSTRY

Parameter	Concentration not to exceed, milligram per litre (mg/l), except pH
pH	5.5 – 9.0
Total suspended solids	100
Bio-chemical oxygen demand (BOD)	30
Chemical oxygen demand (COD)	250
Total residual chlorine	1
Oil and grease	10
Total chromium as Cr	2
Sulphide as S	2
Phenolic compounds as C_6H_5OH	1

Note:

1. Where the treated effluent is discharged into municipal sewer leading to terminal treatment plant, the BOD may be relaxed to 100 mg/l and COD to 400 mg/l

2. The quantity of effluent (litre per kilogram of product) shall not exceed 100, 250 and 80 in composite cotton textile industry, composite woolen textile industry and textile processing industry, respectively.

93. PRIMARY WATER QUALITY CRITERIA FOR BATHING WATER

In a water body or its part, water is subjected to several types of uses. Depending on the types of uses and activities, water quality criteria have been specified to determine its suitability for a particular purpose. Among the various types of users there is one use that demands highest level of water quality or purity and that is termed as "Designated Best Use" in that stretch of water body. Based on this, water quality requirements have been specified for different uses in terms of primary water quality criteria. The primary water quality criteria for bathing water are specified along with the rationale in Table 1.

ATTACHMENT 4

INDUSTRY SPECIFIC WBG-EHS GUIDELINES FOR PAT SECTORS

Ambient Air Quality

General Approach

Projects with significant[5,6] sources of air emissions, and potential for significant impacts to ambient air quality, should prevent or minimize impacts by ensuring that:

- Emissions do not result in pollutant concentrations that reach or exceed relevant ambient quality guidelines and standards[9] by applying national legislated standards, or in their absence, the current WHO Air Quality Guidelines[10] (see Table 1.1.1), or other internationally recognized sources[11];
- Emissions do not contribute a significant portion to the attainment of relevant ambient air quality guidelines or standards. As a general rule, this Guideline suggests 25 percent of the applicable air quality standards to allow additional, future sustainable development in the same airshed.[12]

At facility level, impacts should be estimated through qualitative or quantitative assessments by the use of baseline air quality assessments and atmospheric dispersion models to assess potential ground level concentrations. Local atmospheric, climatic, and air quality data should be applied when modeling dispersion, protection against atmospheric downwash, wakes, or eddy effects of the source, nearby[13] structures, and terrain features. The dispersion model applied should be internationally recognized, or comparable. Examples of acceptable emission estimation and dispersion modeling approaches for point and fugitive sources are

Table 1.1.1: WHO Ambient Air Quality Guidelines[7,8]

	Averaging Period	Guideline value in µg/m³
Sulfur dioxide (SO_2)	24-hour	125 (Interim target-1) 50 (Interim target-2) 20 (guideline)
	10 minute	500 (guideline)
Nitrogen dioxide (NO_2)	1-year	40 (guideline)
	1-hour	200 (guideline)
Particulate Matter PM_{10}	1-year	70 (Interim target-1) 50 (Interim target-2) 30 (Interim target-3) 20 (guideline)
	24-hour	150 (Interim target-1) 100 (Interim target-2) 75 (Interim target-3) 50 (guideline)
Particulate Matter $PM_{2.5}$	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	8-hour daily maximum	160 (Interim target-1) 100 (guideline)

[5] Significant sources of point and fugitive emissions are considered to be general sources which, for example, can contribute a net emissions increase of one or more of the following pollutants within a given airshed: PM10: 50 tons per year (tpy); NOx: 500 tpy; SO2: 500 tpy; or as established through national legislation; and combustion sources with an equivalent heat input of 50 MWth or greater. The significance of emissions of inorganic and organic pollutants should be established on a project-specific basis taking into account toxic and other properties of the pollutant.

[6] United States Environmental Protection Agency, Prevention of Significant Deterioration of Air Quality, 40 CFR Ch. 1 Part 52.21. Other references for establishing significant emissions include the European Commission. 2000. "Guidance Document for EPER implementation." http://ec.europa.eu/environment/ippc/eper/index.htm ; and Australian Government. 2004. "National Pollutant Inventory Guide." http://www.npi.gov.au/handbooks/pubs/npiguide.pdf

[7] World Health Organization (WHO). Air Quality Guidelines Global Update, 2005. PM 24-hour value is the 99th percentile.

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

[9] Ambient air quality standards are ambient air quality levels established and published through national legislative and regulatory processes, and ambient quality guidelines refer to ambient quality levels primarily developed through clinical, toxicological, and epidemiological evidence (such as those published by the World Health Organization).

[10] Available at World Health Organization (WHO). http://www.who.int/en

[11] For example the United States National Ambient Air Quality Standards (NAAQS) (http://www.epa.gov/air/criteria.html) and the relevant European Council Directives (Council Directive 1999/30/EC of 22 April 1999 / Council Directive 2002/3/EC of February 12 2002).

[12] US EPA Prevention of Significant Deterioration Increments Limits applicable to non-degraded airsheds.

Table 1.3.1 Indicative Values 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 phosphorus	mg/l	2
Oil and grease	mg/l	10
Total suspended solids	mg/l	50
Total coliform bacteria	MPN[b] / 100 ml	400[b]

Notes:
[a] Not applicable to centralized, municipal, wastewater treatment systems which are included in EHS Guidelines for Water and Sanitation.
[b] MPN = Most Probable Number

Emissions from Wastewater Treatment Operations

Air emissions from wastewater treatment operations may include hydrogen sulfide, methane, ozone (in the case of ozone disinfection), volatile organic compounds (e.g., chloroform generated from chlorination activities and other volatile organic compounds (VOCs) from industrial wastewater), gaseous or volatile chemicals used for disinfection processes (e.g., chlorine and ammonia), and bioaerosols. Odors from treatment facilities can also be a nuisance to workers and the surrounding community. Recommendations for the management of emissions are presented in the Air Emissions and Ambient Air Quality section of this document and in the EHS Guidelines for Water and Sanitation.

Residuals from Wastewater Treatment Operations

Sludge from a waste treatment plant needs to be evaluated on a case-by-case basis to establish whether it constitutes a hazardous or a non-hazardous waste and managed accordingly as described in the Waste Management section of this document.

Occupational Health and Safety Issues in Wastewater Treatment Operations

Wastewater treatment facility operators may be exposed to physical, chemical, and biological hazards depending on the design of the facilities and the types of wastewater effluents managed. Examples of these hazards include the potential for trips and falls into tanks, confined space entries for maintenance operations, and inhalation of VOCs, bioaerosols, and methane, contact with pathogens and vectors, and use of potentially hazardous chemicals, including chlorine, sodium and calcium hypochlorite, and ammonia. Detailed recommendations for the management of occupational health and safety issues are presented in the relevant section of this document. Additional guidance specifically applicable to wastewater treatment systems is provided in the EHS Guidelines for Water and Sanitation.

Monitoring

A wastewater and water quality monitoring program with adequate resources and management oversight should be developed and implemented to meet the objective(s) of the monitoring program. The wastewater and water quality monitoring program should consider the following elements:

- *Monitoring parameters*: The parameters selected for monitoring should be indicative of the pollutants of concern from the process, and should include parameters that are regulated under compliance requirements;
- *Monitoring type and frequency*: Wastewater monitoring should take into consideration the discharge characteristics from the process over time. Monitoring of discharges from processes with batch manufacturing or seasonal process variations should take into consideration of time-dependent

Table 1. Air Emissions for Nickel, Copper, Lead, Zinc, and Aluminum Smelting & Refining*

Pollutant	Smelting Type	Units	Guideline Value
SO_2	Cu, Pb, Zn, Ni—primary roasting, smelting, and sintering		>99.1% conversion efficiency (for ~ 1 – 4 percent SO_2 off gas) >99.7 % conversion efficiency (for >5 percent SO_2 off gas)
	All[1]—Other processes, including materials pre-treatment, secondary smelting, thermal refining, melting, and slag fuming and cleaning)	mg/Nm^3	<50 – 200[2,3] <500[4]
NO_x	All[1]	mg/Nm^3	100 - 300[5,6,7]
Acid Mists / Gases	All[1,9]	mg/Nm^3	50[8,2]
VOC/solvents (as C)	All[1]	mg/Nm^3	5 - 15[10]
Dust[23]	All[1]	mg/Nm^3	1 – 5[4,11,12]
TOC (as C)	All[1]	mg/Nm^3	5 – 50[13,14]
Dioxins	All[1]	ng TE/m3	0.1 – 0.5[4,11,15,16,17]
Ammonia	All[1]	mg/Nm^3	5[18]
Chlorine	All[1]	mg/Nm^3	0.5[2,19]
CO and carbonyls	All[1]	mg/Nm^3	5[20]
Arsine	All[1]	mg/Nm^3	0.5[7]
Mercury	All[1]	mg/Nm^3	0.02
Hydrogen Chloride	Aluminum	mg/Nm^3	5[2]
Hydrogen Fluoride	Aluminum	mg/Nm^3	0.5[11,21]
Total Fluoride	Aluminum	mg/Nm^3	0.8[11,21]
Polyfluorinated hydrocarbons	Aluminum	mg/Nm^3	0.1 (anode effects / cell / day)

Source: Based in part on EU BREF in the Non-Ferrous Metals Industries (2001). *Associated emissions to air are given as daily averages based on continuous monitoring and standard conditions of 273 K, 101.3 kPa, measured oxygen content and dry gas without dilution of the gases with air. In cases where continuous monitoring is not practicable the value should be the average over the sampling period.If thermal cleaning and pyrolysis systems (e.g. swarf drying and de-coating) are used to destroy combustion products (e.g. VOCs and dioxins) oxygen content 6% dry.

1. All types of smelting for Aluminum, Copper, Lead & Zinc, Nickel (& Cobalt)
2. Alkali scrubber (semi-dry and fabric filter, wet scrubber or double alkali using lime, magnesium hydroxide, sodium hydroxide).
3. Combinations of sodium or alumina/aluminum sulphate in combination with lime.
4. Fabric filter with lime injection
5. Low Nox burner;
6. Oxy-fuel burner
7. Oxidizing scrubber
8. De-mister
9. Excluding Aluminum smelting.
10. Containment, condenser, carbon and bio-filter
11. Fabric filter
12. Temperature control
13. Afterburner
14. Optimized combustion
15. Afterburner followed by quenching
16. Adsorption by activated carbon
17. Oxidation catalyst
18. Acidic scrubber
19. Collection and re-use
20. Process control and sealed reactor
21. Alumina scrubber
22. Excluding Aluminum smelting
23. Emissions of metals are dependent on the composition of the dust produced by the processes. The composition varies widely and is influenced by the process that is the source of dust and by the raw materials that are being processed.

Resource Use

Table 3 provides an example of energy and water use from selected processes in the smelting and refining sector, which can be considered as an indicator of the efficiency of the sector and may be used to track performance changes over time.

Environmental Monitoring

Environmental monitoring programs for this sector should be implemented to address all activities that have been identified to have potentially significant impacts on the environment, during normal operations and upset conditions. Environmental monitoring activities should be based on direct or indirect indicators of emissions, effluents, and resource use applicable to the particular project.

Monitoring frequency should be sufficient to provide representative data for the parameter being monitored. Monitoring should be conducted by trained individuals following monitoring and record-keeping procedures and using properly calibrated and maintained equipment. Monitoring data should be analyzed and reviewed at regular intervals and compared with the operating standards so that any necessary corrective actions can be taken. Additional guidance on applicable sampling and analytical methods for emissions and effluents is provided in the **General EHS Guidelines**.

Table 2. Effluent Levels for Nickel, Copper, Lead, Zinc, and Aluminum Smelting & Refining

Pollutant	Smelting type	Units	Guideline Value
pH		S.U.	6 - 9
Total Suspended solids	Aluminum	mg/l	20
COD	Aluminum	mg/l	50
Fluorides	Aluminum	mg/l	5
Hydrocarbons	Aluminum	mg/l	5
Copper (Cu)	Copper	mg/l	0.1
Lead (Pb)	Lead & Zinc	mg/l	0.1
Arsenic (As)	Copper, Lead & Zinc	mg/l	0.05
Nickel (Ni)	Copper	mg/l	0.1
Cadmium (Cd)	Copper, Lead & Zinc	mg/l	0.05
Zinc (Zn)	Copper, Lead & Zinc	mg/l	0.2
Mercury (Hg)	Lead & Zinc	mg/l	0.01
Temperature Increase	All	°C	< 3[a]
Toxicity	To be determined on a case specific basis		

Source: Based in part on EU BREF in the Non-Ferrous Metals Industries

[a] At the edge of a scientifically established mixing zone which takes into account ambient water quality, receiving water use, potential receptors and assimilative capacity

Table 3. Energy and Water Consumption

Facility Type	Energy Use (GJ/t)[a]
Copper--production from concentrate	14 – 20
Copper—electro-refining	1.1 – 1.4
Alumina production	8 – 13.5
Aluminum--primary production (electrolysis, including anode production)	53 - 61
Lead—shaft furnace, primary	6.8 – 10.3[b]
Lead—shaft furnace, secondary	4.4 – 5.5[b]
Lead—rotary furnace, secondary, with CX system and Na2SO4 production	4.0 – 4.7[b]
Lead—QSL	2.3 – 3.5[b]
Lead—Kivcet	4.9[b]
Lead—top blown rotary converter	4.0 – 4.4[b]
Zinc—electrolysis	15
Zinc—imperial smelting furnace & New Jersey distillation	44[b]
Zinc—Waelz kiln	26[b,c]
Zinc—slag fuming	7.7[b,d]
Nickel—matte from sulfide ores containing 4 – 15% Ni	25 – 65
Nickel--refining	17 - 20
Facility Type	**Water Use (kg/t)**
Alumina production	1000 – 6000
Aluminum--primary production (electrolysis, including anode production)	200 - 12000

Sources: EU BREF in the Non-Ferrous Metals Industries

Notes:

a Gigajoules (10^9 Joules) per metric ton

b Calculated based on quantities of coke, coal, natural gas, and electric power used and typical head values of the petroleum fuels.

c Per ton of Waelz oxide leached

d Per ton of slag

Table 1. Effluent Guidelines		
Pollutants	**Units**	**Guideline Value**
Total Suspended Solids	mg/L	50
pH	S.U.	6 – 9
COD	mg/L	150
BOD_5	mg/L	50
Oil and Grease	mg/L	10
Arsenic	mg/L	0.1
Cadmium	mg/L	0.05
Chromium (VI)	mg/L	0.1
Copper	mg/L	0.3
Cyanide	mg/L	1
Cyanide Free	mg/L	0.1
Cyanide WAD	mg/L	0.5
Iron (total)	mg/L	2.0
Lead	mg/L	0.2
Mercury	mg/L	0.002
Nickel	mg/L	0.5
Phenols	mg/l	0.5
Zinc	mg/L	0.5
Temperature	°C	<3 degree differential
Note: Metals concentrations represent total metals.		

These levels should be achieved, without dilution, at least 95 percent of the time that the plant or unit is operating, to be calculated as a proportion of annual operating hours. Deviation from these levels in consideration of specific, local project conditions should be justified in the environmental assessment.

Combustion source emissions guidelines associated with steam- and power-generation activities from sources with a capacity equal to or lower than 50 MWth are addressed in the **General EHS Guidelines** with larger power source emissions addressed in the EHS Guidelines for Thermal Power. Guidance on ambient considerations based on the total load of emissions is provided in the **General EHS Guidelines**.

Environmental Monitoring

Environmental monitoring programs for this sector should be implemented to address all activities that have been identified to have potentially significant impacts on the environment, during normal operations and upset conditions. Environmental monitoring activities should be based on direct or indirect indicators of emissions, effluents, and resource use applicable to the particular project In some mining projects monitoring should extend for a minimum period of three years after closure or longer if site conditions warrant.

Monitoring frequency should be sufficient to provide representative data for the parameter being monitored. Monitoring should be conducted by trained individuals following monitoring and record-keeping procedures and using properly calibrated and maintained equipment. Monitoring data should be analyzed and reviewed at regular intervals and compared with the operating standards so that any necessary corrective actions can be taken. Additional guidance on applicable sampling and analytical methods for emissions and effluents is provided in the **General EHS Guidelines**.

2.2 Occupational Health and Safety Performance

Occupational Health and Safety Guidelines

Occupational health and safety performance should be evaluated against internationally published exposure guidelines, of which examples include the Threshold Limit Value (TLV®) occupational exposure guidelines and Biological Exposure Indices (BEIs®) published by American Conference of

plants that needs to be assessed, prevented, and mitigated through emergency procedures and equipment. The presence of moisture may result in burns. Facilities for immediate washing of the affected body surface should be available, including eyewash facilities where quicklime is handled. The handling areas should be covered and enclosed, if possible, to avoid generation of a dust hazard. Additional guidance on the management of chemical hazards is presented in the General EHS Guidelines.

1.3 Community Health and Safety

Community health and safety impacts during the construction, operation, and decommissioning of cement and lime manufacturing facilities are common to those of most industrial facilities and are discussed in the General EHS Guidelines.

2.0 Performance Indicators and Monitoring

2.1 Environment

Emissions and Effluent Guidelines

Tables 1, 2 and 3 present emission and effluent guidelines for this sector. Guideline values for process emissions and effluents in this sector are indicative of good international industry practice as reflected in relevant standards of countries with recognized regulatory frameworks. These guidelines are achievable under normal operating conditions in appropriately designed and operated facilities through the application of pollution prevention and control techniques discussed in the preceding sections of this document. These levels should be achieved, without dilution, at least 95 percent of the time that the plant or unit is operating, to be calculated as a proportion of annual operating hours. Deviation from these levels in consideration of specific, local project conditions should be justified in the environmental assessment.

Table 1. Air emission levels for cement manufacturing*

Pollutants	Units	Guideline Value
Particulate Matter (new kiln system)	mg/Nm^3	30[a]
Particulate Matter (existing kilns)	mg/Nm^3	100
Dust (other point sources incl. clinker cooling, cement grinding)	mg/Nm^3	50
SO_2	mg/Nm^3	400
NO_X	mg/Nm^3	600
HCl	mg/Nm^3	10[b]
Hydrogen fluoride	mg/Nm^3	1[b]
Total Organic Carbon	mg/Nm^3	10
Dioxins–furans	mg TEQ/Nm^3	0.1[b]
Cadmium & Thallium (Cd+Tl)	mg/Nm^3	0.05[b]
Mercury (Hg)	mg/Nm^3	0.05[b]
Total Metals[c]	mg/Nm^3	0.5

NOTES:
* Emissions from the kiln stack unless otherwise noted. Daily average values corrected to 273 K, 101.3 kPa, 10 percent O_2, and dry gas, unless otherwise noted.
[a] 10 mg/Nm^3 if more than 40 percent of the resulting heat release comes from hazardous waste.
[b] If more than 40 percent of the resulting heat release comes from hazardous waste, average values over the sample period of a minimum of 30 minutes and a maximum of 8 hours.
[c] Total Metals = Arsenic (As), Lead (Pb), Cobalt (Co), Chromium (Cr), Copper (Cu), Manganese (Mn), Nickel (Ni), Vanadium (V), and Antimony (Sb)

Effluent guidelines are applicable for direct discharges of treated effluents to surface waters for general use. Site-specific discharge levels may be established based on the availability and conditions in use of publicly operated sewage collection and treatment systems or, if discharged directly to surface waters, on the receiving water use classification as described in the General EHS Guidelines. Emissions guidelines are applicable to process emissions. Combustion source emissions guidelines associated with steam- and power-generation activities from

sources with a capacity equal to or lower than 50 MWth are addressed in the **General EHS Guidelines** with larger power source emissions addressed in the **EHS Guidelines for Thermal Power**. Guidance on ambient considerations based on the total load of emissions is provided in the **General EHS Guidelines**.

Table 2. Air emission levels: Lime manufacturing

Pollutants	Units	Guideline Value[a]
Dust	mg/Nm^3	50
SO_2	mg/Nm^3	400
NO_X	mg/Nm^3	500
HCl	mg/Nm^3	10

NOTES:
[a] Daily average values corrected to 273°K, 101.3 kPa, 10% O_2, and dry gas, unless otherwise noted

Table 3. Effluent levels: Cement and lime mnfg.

Pollutants	Units	Guideline Value
pH	S.U.	6–9
Total suspended solids	mg/L	50
Temperature increase	°C	<3[a]

[a] At the edge of a scientifically established mixing zone which takes into account ambient water quality, receiving water use, potential receptors and assimilative capacity

Resource Use and Waste

The following Tables 4–7 provide examples of resource use and waste generation in this sector that can be considered as indicators of this sector's efficiency and may be used to track performance changes over time.

Table 4. Resource and energy consumption.

Inputs per unit of product	Unit	Industry benchmark
Fuel energy – cement	GJ/t clinker	3.0–4.2[a,b,c,d,g]
Electric energy – cement	kWh/t equivalent cement	90–150[a,b,c]
Electric energy – clinker grinding	kWh/t	40–45
Fuel energy – lime	GJ/t lime	4–4.7 mixed-feed shaft kilns[b] 3.6–6 advanced shaft and rotary kilns[b]
Electric energy – lime	kWh/t equivalent lime	5–15 mixed-feed shaft kilns[b] 20–40 advanced shaft and rotary kilns[b]
Materials Substitute raw materials used in production of clinker	%	2–10[a,f,h]
Substitute raw materials in production of cement	%	0–70/80 with blast furnace slag =0–30 with fly ash

NOTES: Please see table 5 for notes and sources.

Table 5. Emission and waste generation.

Outputs per unit of product	Unit	Industry benchmark
Waste	kg/t	0.25–0.6[a]
Emissions Dust	g/t equivalent cement	20–50[a]
NO_X	g/t equivalent cement	600–800[b]
SO_X	kg/t	0.1–2.0[a,h]
CO_2 From decarbonation[i] From fuel[i]	kg/t kg/t equivalent cement	400–525[a,e,f,h,k] 150–350[a,e,f,h]

[a] Buzzi–Unicem (2004).
[b] IPPC (2001).
[c] Ernest Orlando Lawrence, Berkeley National Laboratory (2004).
[d] NRCan (2001).
[e] CIF (2003).
[f] Italcementi Group (2005).
[g] Environment Canada (2004).
[h] Lafarge (2004).
[i] Influenced by the variable quantities of fly ash and other additives used.
[j] CO2 emissions from waste incineration (at least from the biodegradable fraction) are regarded as neutral in several countries.
[k] World Business Council on Sustainable Development, Cement Sustainability Initiative, 2002.

Table 1. Air Emissions Levels

Pollutant	Units	Guideline Value
Ammonia Plants		
NH_3	mg/Nm³	50
NO_x	mg/Nm³	300
Particulate Matter	mg/Nm³	50
Nitric Acid Plants		
NO_x	mg/Nm³	300
N_2O	mg/Nm³	800
NH_3	mg/Nm³	10
Sulfuric Acid Plants		
SO_2	mg/Nm³	450 (2 kg/t acid)
SO_3	mg/Nm³	60 (0.075 kg/t acid)
H_2S	mg/Nm³	5
NO_x	mg/Nm³	200
Phosphoric / Hydrofluoric Acids Plants		
Fluorides (gaseous) as HF	mg/Nm³	5
Particulate Matter/CaF_2	mg/Nm³	50 (0.10 kg/t phosphate rock)
Chlor-alkali / Hydrochloric Acid Plants		
Cl_2	mg/Nm³	1 (partial liquefaction) 3 (complete liquefaction
HCl	ppmv	20
Hg	mg/Nm³	0.2 (annual average emission of 1 g/t chlorine)
Soda Ash Plants		
NH_3	mg/Nm³	50
H_2S	mg/Nm³	5
NO_x	mg/Nm³	200
Particulate Matter	mg/Nm³	50
Carbon Black		
SO_2	mg/Nm³	850
NO_x	mg/Nm³	600
CO	mg/Nm³	500
Particulate Matter	mg/Nm³	30
VOC	mg/Nm³	50
Coal Tar Distillation		
Tar fume	mg/Nm³	10
VOC	mg/Nm³	50
Particulate Matter	mg/Nm³	50

Table 2. Effluent Levels

Pollutant	Units	Guideline Value
pH	S.U.	6-9
Temperature Increase	°C	<3
Ammonia Plants		
NH_3	mg/l	10 (0.1 kg/t)[1]
TSS	mg/l	30
Nitric Acid Plants		
NH_3	mg/l	10
Nitrates	g/t	25
TSS	mg/l	30
Sulfuric Acid Plants		
Phosphorus	mg/l	5
Fluoride	mg/l	20
TSS	mg/l	30
Phosphoric Acid Plants		
Phosphorus	mg/l	5
Fluoride	mg/l	20
TSS	mg/l	30
Hydrofluoric Acid Plants		
Fluorides	kg/tonne HF	1
Suspended Solids	kg/tonne HF	1
	mg/l	30
Chlor-alkali /Hydrochloric Acid Plant		
TSS	mg/l	20[2]
COD	mg/l	150[2]
AOX	mg/l	0.5[2]
Sulfides	mg/l	1
Chlorine	mg/l	0.2[2]
Mercury	--	0.05 mg/l 0.1 g/t chlorine
Toxicity to Fish Eggs	T_F	2
Soda Ash Plants		
Suspended solids	kg/t	270
Phosphorus	kg/t	0.2
TSS	mg/l	30
Ammonia (as N)	mg/l	10
Carbon Black Plants		
COD	mg/l	100
Suspended Solids	mg/l	20
Coal Tar Distillation Plants		
BOD_5	mg/l	35 (monthly average) 90 (daily maximum)
TSS	mg/l	50 (monthly average) 160 (daily maximum)
Anthracene, Naphthalene and Phenanthrene (each)	µg/l	20 (monthly average) 60 (daily maximum)

Notes:
1. Load based guideline: 0.1 kg/t of product
2. Non-asbestos diaphragm plants

Resource Use, Energy Consumption, Emission and Waste Generation

Tables 3 and 4 provide examples of resource consumption and waste generation benchmarks in this sector. Industry benchmark values are provided for comparative purposes only and individual projects should target continual improvement in these areas.

Table 3. Resource and Energy Consumption

Product	Unit	Industry Benchmark
Ammonia	GJ lower heating value (LHV)/tonne NH_3	28.8 to 31.5[1]
Phosphoric Acid	Tonne phosphate rock/tonne P_2O_5	2.6-3.5 [1]
	KWh/tonne P_2O_5	120-180 [1]
	m^3 cooling water/tonne P_2O_5	100-150 [1]
Hydrofluoric Acid	Tonne CaF_2/tonne HF	2.1-2.2 [4]
	Tonne H_2SO_4/tonne HF	2.6-2.7 [4]
	KWh/tonne HF	150-300 [4]
Chlor-Alkali	KWh/tonne Cl_2	3000 without Cl liquefaction 3200 with Cl liquefaction / evaporation[3]
	Tonne NaCl/tonne Cl_2	1.750 [3]
	g Hg/tonne of chlorine capacity (mercury cell plants)	0.2-0.5 [3]
Soda Ash	GJ/tonne soda ash	9.7-13.6[2]
	Tonne limestone/tonne soda ash	1.09-1.82 [2]
	Tonne NaCl/tonne soda ash	1.53-1.80 [2]
	m^3 cooling water/tonne soda ash	50-100 [2]
Carbon Black	KWh/tonne carbon black	430-550 [2]
	GJ/tonne carbon black	1.55-2 [2]

Notes:
1. European Fertilizer Manufacturers Association (EFMA). 2000.
2. EU IPPC - Reference Document on Best Available Techniques in Large Volume Inorganic Chemicals - Solid and Others industry. December 2006.
3. EU IPPC - Reference Document on Best Available Techniques in the Chlor-Alkali Manufacturing industry December 2001.
4. EU IPPC - Reference Document on Best Available Techniques in Large Volume Inorganic Chemicals – Ammonia, Acids and Fertilizers Industries. October 2006.

Table 4. Emissions, Effluents and Waste Generation

Parameter	Unit	Industry Benchmark
Ammonia Plants		
CO_2 from process	tonne/tonne NH_3	1.15-1.3 [1]
NO_X (advanced conventional reforming processes and processes with reduced primary reforming)	kg/tonne NH_3	0.29 – 0.32
NO_X (heat exchange autothermal reforming)	kg/tonne NH_3	0.175
Nitric Acid Plants		
N_2O	kg/tonne 100% HNO_3	0.15-0.6 [4]
NO_X	ppmv	5-75 [4]
Sulfuric Acid Plants		
SO_2 (Sulfur burning, double contact/double absorption)	mg/Nm^3	30-350 [1][4]
SO_2 (Single contact/single absorption)	mg/Nm^3	100-450[4]
Phosphoric / Hydrofluoric Acid Plants		
Fluorides	mg/Nm^3	0.6-5[4]
SO_2	kg/tonne HF	0.001 – 0.01[4]
Solid Waste (phosphogypsum)	tonne/tonne P_2O_5	4-5 [1]
Anhydrite ($CaSO_4$)	tonne/tonne HF	3.7 [4]
Chlor Alkali Plants		
Cl_2 (partial liquefaction)	mg/Nm^3	<1 [3]
Cl_2 (total liquefaction)	mg/Nm^3	<3 [3]
Chlorates (brine circuit)	g/l	1-5 [3]
Bromates (brine circuit)	mg/l	2-10 [3]
Soda Ash Plants		
CO_2	Kg/tonne soda ash	200-400 [2]
Cl	Kg/tonne soda ash	850-1100 [2]

2.0 Performance Indicators and Monitoring

2.1 Environment

Emissions and Effluent Guidelines

Tables 1 and 2 present emission and effluent guidelines for this sector. Guideline values for process emissions and effluents in this sector are indicative of good international industry practice as reflected in relevant standards of countries with recognized regulatory frameworks. These guidelines are achievable under normal operating conditions in appropriately designed and operated facilities through the application of pollution prevention and control techniques discussed in the preceding sections of this document.

Emissions guidelines are applicable to process emissions. Combustion source emissions guidelines associated with steam and power generation activities from sources with a capacity equal to or lower than 50 thermal megawatts thermal input (MWth) are addressed in the **General EHS Guidelines** with larger power source emissions addressed in the **EHS Guidelines for Thermal Power**. Guidance on ambient considerations based on the total load of emissions is provided in the **General EHS Guidelines**.

Effluent guidelines are applicable for direct discharges of treated effluents to surface waters for general use. Site-specific discharge levels may be established based on the availability and conditions in the use of publicly operated sewage collection and treatment systems or, if discharged directly to surface waters, on the receiving water use classification as described in the **General EHS Guidelines**. These levels should be achieved, without dilution, at least 95 percent of the time that the plant or unit is operating, to be calculated as a proportion of annual operating hours. Deviation from these levels in consideration of specific, local project conditions should be justified in the environmental assessment.

Table 1. Air Emissions Levels for Nitrogenous Fertilizers Manufacturing Plants

Pollutant	Unit	Guideline Value
Ammonia Plants[1]		
NH_3	mg/Nm^3	50
NO_X	mg/Nm^3	300
PM	mg/Nm^3	50
Nitric Acid Plants		
NO_X	mg/Nm^3	200
N_2O	mg/Nm^3	800
NH_3	mg/Nm^3	10
PM	mg/Nm^3	50
Urea / UAN Plants		
Urea (prilling/granulation)	mg/Nm^3	50
NH_3 (prilling/granulation)	mg/Nm^3	50
PM	"	50
AN / CAN Plants		
PM	mg/Nm^3	50
NH_3	mg/Nm^3	50

Notes:
1. NO_X in flue-gas from the primary reformer. The other emissions are from process, prilling towers, etc.
NO_X in all types of plants: temperature 273K (0°C), pressure 101.3 kPa (1 atmosphere), oxygen content 3% dry for flue gas.

Resource Use, Energy Consumption, Emission and Waste Generation

Table 3 provides examples of resource consumption/generation indicators for energy in this sector. Industry benchmark values are provided for comparative purposes only and individual projects should target continual improvement in these areas.

Table 2. Effluents Levels for Nitrogenous Fertilizers Manufacturing Plants

Pollutant	Unit	Guideline Value
pH	S.U.	6-9
Temperature Increase	°C	<3
Ammonia Plants		
NH_3	mg/l	5
Total nitrogen	mg/l	15
TSS	mg/l	30
Nitric Acid Plants		
NH_3	mg/l	5
Total Nitrogen	mg/l	15
TSS	mg/l	30
Urea Plants		
Urea(prilling/granulation)	mg urea/l	1
NH_3(prilling/granulation)	mg/l	5
AN / CAN Plants		
AN	mg/l	100
NH_3	mg/l	5
Total Nitrogen	mg/l	15
TSS	mg/l	30

Table 3. Resource and Energy Consumption/Generation

Product	Unit	Industry Benchmark
Ammonia	GJ lower heating value (LHV)/ton NH_3	28.4 to 32.0[1]
Urea	GJ/ton urea	0.4-0.45 [1] [2]
AN/CAN	KWh/ ton AN/CAN	25-60/10-50 [1] [2]
	kg Steam/ton AN/CAN	0-50/150-200 [1]
Nitric Acid (Energy Generation)	GJ/ton HNO_3 (100%)	2.4 – 1.6 [2] (BAT – Average)

Sources:
1. European Fertilizer Manufacturers Association (EFMA) (2000)
2. EU IPPC Reference Document on Best Available Techniques in Large Volume Inorganic Chemicals – Ammonia, Acids and Fertilizers Industries (2006)

Environmental Monitoring

Environmental monitoring programs for this sector should be implemented to address all activities that have been identified to have potentially significant impacts on the environment, during normal operations and upset conditions. Environmental monitoring activities should be based on direct or indirect indicators of emissions, effluents, and resource use applicable to the particular project.

Monitoring frequency should be sufficient to provide representative data for the parameter being monitored. Monitoring should be conducted by trained individuals following monitoring and record-keeping procedures and using properly calibrated and maintained equipment. Monitoring data should be analyzed and reviewed at regular intervals and compared with the operating standards so that any necessary corrective actions can be taken. Additional guidance on applicable sampling and analytical methods for emissions and effluents is provided in the **General EHS Guidelines**.

2.2 Occupational Health and Safety

Occupational Health and Safety Guidelines

Occupational health and safety performance should be evaluated against internationally published exposure guidelines, of which examples include the Threshold Limit Value (TLV®) occupational exposure guidelines and Biological Exposure Indices (BEIs®) published by American Conference of Governmental Industrial Hygienists (ACGIH),[18] the Pocket Guide to Chemical Hazards published by the United States National Institute for Occupational Health and Safety (NIOSH),[19] Permissible Exposure Limits (PELs) published by the Occupational Safety and Health Administration of the United

[18] Available at: http://www.acgih.org/TLV/ and http://www.acgih.org/store/
[19] Available at: http://www.cdc.gov/niosh/npg/

Monitoring data should be analyzed and reviewed at regular intervals and compared with the operating standards so that any necessary corrective actions can be taken. Additional guidance on applicable sampling and analytical methods for emissions and effluents is provided in the **General EHS Guidelines**.

Table 1. Air Emissions Guidelines for Phosphate Fertilizers Plants

Pollutant	Units	Guideline Value
Phosphoric Acid Plants		
Fluorides (gaseous) as HF	mg/Nm^3	5
Particulate Matter	mg/Nm^3	50
Phosphate Fertilizer Plants		
Fluorides (gaseous) as HF	mg/Nm^3	5
Particulate Matter	mg/Nm^3	50
Ammonia	mg/Nm^3	50
HCl	mg/Nm^3	30
NO_X	mg/Nm^3	500 nitrophosphate unit 70 mix acid unit

Table 2. Effluents Guidelines for Phosphate Fertilizer Plants

Pollutant	Units	Guideline Value
pH	S.U.	6-9
Total Phosphorus	mg/L	5
Fluorides	mg/L	20
	kg/ton NPK	0.03
	kg/ton Phosphorus oxide (P_2O_5)	2
TSS	mg/L	50
Cadmium	mg/L	0.1
Total Nitrogen	mg/L	15
Ammonia	mg/L	10
Total Metals	mg/L	10

Resource Use and Energy Consumption, Emission and Waste Generation

Table 3 provides examples of resource consumption indicators for energy and water in this sector. Table 4 provides examples of emission and waste generation indicators in this sector. Industry benchmark values are provided for comparative purposes only and individual projects should target continual improvement in these areas.

Table 3. Resource and Energy Consumption

Product	Unit	Industry Benchmark
Phosphoric Acid	Ton phosphate rock/ton P_2O_5	2.6-3.5 (1)
	Ton H_2SO_4/ton P_2O_5	2.1-2.3 (1)
	KWh/ton P_2O_5	120-180 (1)
	m^3 cooling water/ton P_2O_5	100-150 (1)
NPK A	KWh/ton NPK	30-33 (1)(2)
	Total energy for drying MJ/ton NPK	300-320 (1)(2)
NPK B	KWh/ton NPK	50 (1)(2)
	Total energy for drying MJ/ton NPK	450 (1)(2)
NPK C	KWh/ton NPK	50-109 (2)
NPK C	m^3 cooling water/ton NPK	17 (2)
NPK C	Ton CO_2 required/ton P_2O_5	1 (1)(2)
SSP	KWh/ton SSP	19-34 (2)
SSP	m^3 water/ton SSP	0.1-2 (2)

Notes:
NPK PLANTS A Granulation with a Pipe Reactor and Drum with ammoniation
NPK PLANTS B Mixed Acids Process
NPK PLANTS C Nitrophosphate Process
1. European Fertilizer Manufacturers Association (EFMA). 2000.
2. EU IPPC - Reference Document on Best Available Techniques in Large Volume Inorganic Chemicals – Ammonia, Acids and Fertilizers Industries. December 2006

Table 4. Emissions, Effluents and Waste Generation		
Parameter	**Unit**	**Industry Benchmark**
Phosphoric acid plants		
Fluoride SO_2	mg/Nm³kg/ton HF	5–300.001 – 0.01
Solid Waste Generation (phosphogypsum) (thermal/wet process)	ton/ton P_2O_5	3.2/4-5 (1)
NPK Production – Nitrophosphate Process		
NH_3 air emissions	kg/ton P_2O_5	0.2
NO_X (as NO_2) air emissions	kg/ton P_2O_5	1.0
Fluoride airFluorides air emissions	kg/ton P_2O_5	0.01
Total nitrogen effluents	kg/ton P_2O_5	0.001 – 0.01
P_2O_5 effluents	kg/ton P_2O_5	1.2
Fluorides effluents	kg/ton P_2O_5	0.7
NPK Production – Mixed Acids Process		
NH_3 emissions	kg/ton NPK	0.2
NO_X (as NO_2) emissions	kg/ton NPK	0.3
Fluorides emissions	kg/ton NPK	0.02
Dust emissions	kg/ton NPK	0.2
Total nitrogen effluents	kg/ton NPK	0.2
Fluorides effluents	kg/ton NPK	0.03
Fluorides air emissions	mg/Nm³	0.4-4
Dust air emissions	mg/Nm³	30-50
Chloride air emissions	mg/Nm³	19-20

2.2 Occupational Health and Safety Performance

Occupational Health and Safety Guidelines

Occupational health and safety performance should be evaluated against internationally published exposure guidelines, of which examples include the Threshold Limit Value (TLV®) occupational exposure guidelines and Biological Exposure Indices (BEIs®) published by American Conference of Governmental Industrial Hygienists (ACGIH),[19] the Pocket Guide to Chemical Hazards published by the United States National Institute for Occupational Health and Safety (NIOSH),[20] Permissible Exposure Limits (PELs) published by the Occupational Safety and Health Administration of the United States (OSHA),[21] Indicative Occupational Exposure Limit Values published by European Union member states,[22] or other similar sources.

Accident and Fatality Rates

Projects should try to reduce the number of accidents among project workers (whether directly employed or subcontracted) to a rate of zero, especially accidents that could result in lost work time, different levels of disability, or even fatalities. Facility rates may be benchmarked against the performance of facilities in this sector in developed countries through consultation with published sources (e.g. US Bureau of Labor Statistics and UK Health and Safety Executive)[23].

Occupational Health and Safety Monitoring

The working environment should be monitored for occupational hazards relevant to the specific project. Monitoring should be designed and implemented by accredited professionals[24] as part of an occupational health and safety monitoring program. Facilities should also maintain a record of occupational accidents and diseases and dangerous occurrences and accidents. Additional guidance on occupational health and safety monitoring programs is provided in the **General EHS Guidelines**.

[19] Available at: http://www.acgih.org/TLV/ and http://www.acgih.org/store/
[20] Available at: http://www.cdc.gov/niosh/npg/
[21] Available at: http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9992
[22] Available at: http://europe.osha.eu.int/good_practice/risks/ds/oel/
[23] Available at: http://www.bls.gov/iif/ and http://www.hse.gov.uk/statistics/index.htm
[24] Accredited professionals may include Certified Industrial Hygienists, Registered Occupational Hygienists, or Certified Safety Professionals or their equivalent.

Effluent guidelines are applicable for direct discharges of treated effluents to surface waters for general use. Site-specific discharge levels may be established based on the availability and conditions in the use of publicly operated sewage collection and treatment systems or, if discharged directly to surface waters, on the receiving water use classification as described in the **General EHS Guidelines**. These levels should be achieved, without dilution, at least 95 percent of the time that the plant or unit is operating, to be calculated as a proportion of annual operating hours. Deviation from these levels in consideration of specific, local project conditions should be justified in the environmental assessment.

Table 1 - Effluents Levels for Foundries

Pollutants	Units	Guideline Value
pH	-	6-9
Total suspended solids	mg/L	35
Oil and grease	mg/L	10
Temperature increase	°C	3[a]
COD	mg/L	125
Phenol	mg/L	1
Cadmium	mg/L	0.01
Chromium (total)	mg/L	0.5
Copper	mg/L	0.5
Lead	mg/L	0.2
Nickel	mg/L	0.5
Zinc	mg/L	0.5
Tin	mg/L	2
Ammonia	mg/L (as N)	5
Fluoride	mg/L (as F)	5
Iron	mg/L	5
Aluminum	kg/t	0.02[b]

NOTES:
[a] At the edge of a scientifically established mixing zone which takes into account ambient water quality, receiving water use, potential receptors and assimilative capacity
[b] Aluminum smelting and casting

Table 2. Air Emission Levels for Foundries(1)

Pollutant	Units	Guideline Value
Particulate Matter	mg/Nm^3	20(2)
		50(3)
Oil Aerosol / Mist	mg/Nm^3	5
NO_X	mg/Nm^3	400(4)
		120(5)
		150(6)
SO_2	mg/Nm^3	400(8)
		50(9)
		120(7)
VOC	mg/Nm^3	20(10)
		30
		150(11)
PCDD/F	ng TEQ/ Nm^3	0.1
CO	mg/Nm^3	200(12)
		150(13)
Amines	mg/Nm^3	5(14)
Chlorine	mg/Nm^3	5(15)
Pb, Cd and their compounds	mg/Nm^3	1-2(16)
Ni, Co, Cr, Sn and their compounds	mg/Nm^3	5
Cu and their compounds	mg/Nm^3	5-20(17)
Chloride	mg/Nm^3	5(18)
Fluoride	mg/Nm^3	5(19)
H_2S	ppm v/v	5

NOTES:
1. References conditions for limits. For combustion gases: dry, temperature 273K (0°C), pressure 101.3 kPa (1 atmosphere), oxygen content 3% dry for liquid and gaseous fuels, 6% dry for solid fuels. For non-combustion gases: no correction for water vapor or oxygen content, temperature 273K (0°C), pressure 101.3 kPa (1 atmosphere).
2. Particulate matter emissions where toxic metals are present
3. Particulate matter emissions where toxic metals are not present
4. Ferrous metal melting. Maximum emissions level considered on BAT base and based on cokeless cupola furnaces
5. Non-ferrous metal melting (shaft furnaces)
6. From thermal sand reclamation systems/regeneration units
7. Maximum emissions level considered on BAT base and based on cold blast cupola furnaces
8. Non-ferrous metal melting (shaft furnaces)
9. Ferrous metal melting (cupola furnaces)
10. Non-ferrous metal melting (shaft furnaces)
11. Ferrous metal melting (EAFs). Cupola furnaces may have higher emission levels (up to 1,000 mg/N_3)
12. Non-ferrous metal melting (shaft furnaces)
13. Cold box molding and core making shop
14. Non-ferrous metal melting (aluminum)
15. Thermal sand reclamation systems and solvent based investment foundry coating, shelling, and setting operation
16. Higher value applicable to non-ferrous metal foundries from scrap
17. Higher value applicable to copper and its alloy producing processes
18. Furnace emissions where chloride flux is used
19. Furnace emissions where fluoride flux is used

without dilution, at least 95 percent of the time that the plant or unit is operating, to be calculated as a proportion of annual operating hours. Deviation from these levels in consideration of specific, local project conditions should be justified in the environmental assessment.

Environmental Monitoring

Environmental monitoring programs for this sector should be implemented to address all activities that have been identified to have potentially significant impacts on the environment, during normal operations and upset conditions. Environmental monitoring activities should be based on direct or indirect indicators of emissions, effluents, and resource use applicable to the particular project.

Monitoring frequency should be sufficient to provide representative data for the parameter being monitored. Monitoring should be conducted by trained individuals following monitoring and record-keeping procedures and using properly calibrated and maintained equipment. Monitoring data should be analyzed and reviewed at regular intervals and compared with the operating standards so that any necessary corrective actions can be taken. Additional guidance on applicable sampling and analytical methods for emissions and effluents is provided in the General EHS Guidelines.

Resource Use and Emission / Waste Generation

Table 3 provides examples of resource consumption indicators for energy and water in this sector, whereas Table 4 provides examples of emission and waste generation indicators. Industry benchmark values are provided for comparative purposes only and individual projects should target continual improvement in these areas.

Table 1. Air Emission Levels for Integrated Steel Mills[c]

Pollutant	Units	Guideline Value
Particulate Matter	mg/Nm^3	20-50[a]
Oil Mist	mg/Nm^3	15
NO_X	mg/Nm^3	500 750 (coke oven)
SO_2	mg/Nm^3	500
VOC	mg/Nm^3	20
PCDD/F	ng TEQ/ Nm^3	0.1
Carbon Monoxide (CO)	mg/Nm^3	100 (EAF) 300 (coke oven)
Chromium (Cr)	mg/Nm^3	4
Cadmium (Cd)	mg/Nm^3	0.2
Lead (Pb)	mg/Nm^3	2
Nickel (Ni)	mg/Nm^3	2
Hydrogen Chloride (HCl)	mg/Nm^3	10
Fluoride	mg/Nm^3	5
Hydrogen Fluoride (HF)	mg/Nm^3	10
H_2S	mg/Nm^3	5
Ammonia	mg/Nm^3	30
Benzo(a)pirene	mg/Nm^3	0.1
Tar fume[b]	mg/Nm^3	5

Notes:

[a] Lower value where toxic metals are present

[b] Tar fume measured as organic matter extractable by solvent from total matter collected by membrane filter

[c] Reference conditions for limits. For combustion gases: dry, temperature 273K (0°C), pressure 101.3 kPa (1 atmosphere), oxygen content 3% dry for liquid and gaseous fuels, 6% dry for solid fuels. For non-combustion gases: no correction for water vapor or oxygen content, temperature 273K (0°C), pressure 101.3 kPa (1 atmosphere).

Table 2. Effluents Levels for Integrated Steel Mills Sector

Pollutants	Units	Guideline Value
pH	-	6-9
TSS	mg/L	35
Oil and grease	mg/L	10
Temperature increase	°C	<3[a]
COD	mg/L	250
Phenol	mg/L	0.5
Cadmium	mg/L	0.01
Chromium (total)	mg/L	0.5
Chromium (hexavalent)	mg/L	0.1
Copper	mg/L	0.5
Lead	mg/L	0.2
Tin	mg/L	2
Mercury	mg/L	0.01
Nickel	mg/L	0.5
Zinc	mg/L	2
Cyanides (free)	mg/L	0.1
Cyanides (total)	mg/L	0.5
Total Nitrogen	mg/L	30
Ammonia	mg/L (as N)	5
Total Phosphorous	mg/L	2
Fluoride	mg/L (as F)	5
Sulfides	mg/L	0.1
Iron	mg/L	5
PAH	mg/L	0.05
Toxicity	To be determined on a case specific basis	

[a] At the edge of a scientifically established mixing zone which takes into account ambient water quality, receiving water use, potential receptors and assimilative capacity

Table 3. Resources and Energy Consumption (1)

Inputs per unit of Product	Mass Load Unit	Industry Benchmark					
		Sinter	Coke Ovens	BF	BOF	EAF	Rolling
Electricity, direct	MJ/t product	90-120	20-170	270-370	40-120	1250-1800	70-140 kWh/t
Fuel	MJ/t product	60-200	3,200-3,900	1,050-2,700	20-55	-	1,100-2 200
Water	m^3/t product	0.01-0.35	1-10	1-50	0.5-5	3	1-15

Sources:
1. European Commission, IPPC, "BREF Document on the Production of Iron and Steel" and "Reference Document in BAT in the Ferrous Metals Processing Industry". December 2001
2. UK Environmental Agency. 2001, 2002. Technical Guidance Notes. IPPC S2.01, S2.04. Benchmark values.

Table 4. Emission / Waste Generation

Outputs per unit of product	Unit	Industry Benchmark					
Emissions (1) (2)		Sinter	Coke Ovens	BF	BOF	EAF	Rolling
Particulate Matter	Kg/T product	0.04-0.4	0.05-3.5	0.005	0.2	0.02	0.002-0.040
CO	Kg/T product	12-40	0.40-4.5	0.8-1.75	1.5-8	0.75-4	0.005-0.85
NO_X	Kg/T product	0.4-0.65	0.45-0.7	0.01-0.6	-	0.12-0.25	0.08-0.35
VOC	Kg/T product	0.15	0.12-0.25	-	-	-	-
PCDD/F	µgl-TEQ/T product	1-10	--	-	-	0.07-9	-
Waste (1)		**Sinter**	**Coke Ovens**	**BF**	**BOF**	**EAF**	**Rolling**
Solid Waste	Kg/T product	0.9-15	-	200-300	85-110	110-180	70-150
Sludge	Kg/T product	0.3	-	3-5	-	-	-
Waste Water	m^3/ T product	0.06	0.3-0.4	0.1-3	-	-	0.8-15

Sources:
1. European Commission, IPPC, "BREF Document on the Production of Iron and Steel" and "Reference Document in BAT in the Ferrous Metals Processing Industry" December 2001
2. UK Environmental Agency. 2001, 2002. Technical Guidance Notes. IPPC S2.01, S2.04. Benchmark values.

Annex B - Effluents and Emissions Guidelines / Resource Use Benchmarks

Table 1 (a)—Effluent Guidelines for Pulp and Paper Facilities–Bleached Kraft Pulp, Integrated

Parameter	Units	Guideline
Flow [a]	m^3/ADt	50
pH		6 – 9
TSS	kg/ADt	1.5
COD	kg/ADt	20
BOD_5	kg/ADt	1
AOX	kg/ADt	0.25
Total N	kg/ADt	0.2[e]
Total P	kg/ADt	0.03

Table 1 (b)—Effluent Guidelines for Pulp and Paper Facilities–Unbleached Kraft Pulp, Integrated

Parameter	Units	Guideline
Flow [a]	m^3/ADt	25
pH		6 – 9
TSS	kg/ADt	1.0
COD	kg/ADt	10
BOD_5	kg/ADt	0.7
Total N	kg/ADt	0.2
Total P	kg/ADt	0.02

Table 1 (c)—Effluent Guidelines for Sulfite Pulp and Paper Facilities—Sulfite Pulp, Integrated and Non-Integrated

Parameter	Units	Guideline
Flow [a]	m^3/ADt	55[d]
pH		6 – 9
TSS	kg/ADt	2.0
COD	kg/ADt	30[c]
BOD_5	kg/ADt	2.0
AOX	kg/ADt	0.005
Total N	kg/ADt	0.5
Total P	kg/ADt	0.05

Table 1 (d)—Effluent Guidelines for CTMP Facilities

Parameter	Units	Guideline
Flow [a]	m^3/ADt	20
pH		6 – 9
TSS	kg/ADt	1.0
COD	kg/ADt	5
BOD_5	kg/ADt	1.0
Total N	kg/ADt	0.2
Total P	kg/ADt	0.01

Table 1 (e)—Effluent Guidelines for Pulp and Paper Facilities—Mechanical Pulping, Integrated		
Parameter	Units	Guideline
Flow [a]	m^3/ADt	20
pH		6 – 9
TSS	kg/ADt	0.5
COD	kg/ADt	5.0
BOD_5	kg/ADt	0.5
AOX	kg/ADt	0.01
Total N	kg/ADt	0.1
Total P	kg/ADt	0.01

Table 1(f)—Effluent Guidelines for Pulp and Paper Facilities—Recycled Fiber, Without Deinking, Integrated		
Parameter	Units	Guideline
Flow [a]	m^3/ADt	10
pH		6 – 9
TSS	kg/ADt	0.15
COD	kg/ADt	1.5
BOD_5	kg/ADt	0.15
AOX	kg/ADt	0.005
Total N	kg/ADt	0.05
Total P	kg/ADt	0.005

Table 1(g)—Effluent Guidelines for Pulp and Paper Facilities—Recycled Fiber, With Deinking, Integrated		
Parameter	Units	Guideline
Flow [a]	m^3/ADt	15
pH		6 – 9
TSS	kg/ADt	0.3
COD	kg/ADt	4.0
BOD_5	kg/ADt	0.2
AOX	kg/ADt	0.005
Total N	kg/ADt	0.1
Total P	kg/ADt	0.01

Table 1 (h)—Effluent Guidelines for Pulp and Paper Facilities—Recycled Fiber Tissue Mills		
Parameter	Units	Guideline
Flow [a]	m^3/ADt	25
pH		6 – 9
TSS	kg/ADt	0.4
COD	kg/ADt	4.0
BOD_5	kg/ADt	0.5
AOX	kg/ADt	0.005
Total N	kg/ADt	0.25
Total P	kg/ADt	0.015

Table 1 (i)—Effluent Guidelines for Pulp and Paper Facilities—Uncoated Fine Paper Mills

Parameter	Units	Guideline
Flow [a]	m^3/ADt	15
pH		6 – 9
TSS	kg/ADt	0.4
COD	kg/ADt	2.0
BOD_5	kg/ADt	0.25
AOX	kg/ADt	0.005
Total N	kg/ADt	0.2
Total P	kg/ADt	0.01

Table 1(j)—Effluent Guidelines for Pulp and Paper Facilities—Coated Fine Paper Mills

Parameter	Units	Guideline
Flow [a]	m^3/ADt	15
pH		6 – 9
TSS	kg/ADt	0.4
COD	kg/ADt	1.5
BOD_5	kg/ADt	0.25
AOX	kg/ADt	0.005
Total N	kg/ADt	0.2
Total P	kg/ADt	0.01

Table 1 (k)—Effluent Guidelines for Pulp and Paper Facilities—Tissue Mills

Parameter	Units	Guideline
Flow [a]	m^3/ADt	25 k
pH		6 – 9
TSS	kg/ADt	0.4
COD	kg/ADt	1.5
BOD_5	kg/ADt	0.4
AOX	kg/ADt	0.01
Total N	kg/ADt	0.25
Total P	kg/ADt	0.015

Table 1 (l)—Effluent Guidelines for Pulp and Paper Facilities—Fiber Preparation, Non-Wood

Parameter	Units	Guideline
Flow [a]	m^3/ADt	50
pH		6 – 9
TSS	kg/ADt	2.0
COD	kg/ADt	30
BOD_5	kg/ADt	2.0
Total N	kg/ADt	0.5
Total P	kg/ADt	0.05

Table 2—Emission Guidelines for Pulp and Paper Facilities

Parameter	Type of Mill	Units	Guideline Value
TSP	Kraft, bleached	kg/ADt	0.5
	Kraft, unbleached—Integrated	kg/ADt	0.5
	Sulfite, integrated and non-integrated	kg/ADt	0.15
SO_2 as S	Kraft, bleached	kg/ADt	0.4
	Kraft, unbleached—Integrated	kg/ADt	0.4
	Sulfite, integrated and non-integrated	kg/ADt	1.0
NO_x as NO2	Kraft, bleached	kg/ADt	1.5 for hardwood pulp 2.0 for softwood pulp
	Kraft, unbleached—Integrated	kg/ADt	1.5 for hardwood pulp 2.0 for softwood pulp
	Sulfite, integrated and non-integrated	kg/ADt	2.0
TRS as S	Kraft, bleached	kg/ADt	0.2
	Kraft, unbleached—Integrated	kg/ADt	0.2

Sources: European Commission. 2001. Integrated Pollution Prevention and Control (IPPC) Reference Document on Best Available Techniques in the Pulp and Paper Industry. December 2001; and U.S. EPA National Emission Standards for Hazardous Air Pollutants For Source Categories, 40 CFR Part 63.

Notes:

TSP= total suspended particulates

SO2 = sulfur dioxide

S = sulfur

NO2 = nitrogen dioxide

N = nitrogen

TRS = total reduced sulfur compounds

Kg/ADt = kilograms of pollut ant per 1,000 kg of air dry pulp

2.0 Performance Indicators and Monitoring

2.1 Environment

Emissions and Effluent Guidelines

Tables 1 and 2 present emission and effluent guidelines for this sector. Guideline values for process emissions and effluents in this sector are indicative of good international industry practice as reflected in relevant standards of countries with recognized regulatory frameworks. These guidelines are achievable under normal operating conditions in appropriately designed and operated facilities through the application of pollution prevention and control techniques discussed in the preceding sections of this document. These levels should be achieved, without dilution, at least 95 percent of the time that the plant or unit is operating, to be calculated as a proportion of annual operating hours. Deviation from these levels in consideration of specific, local project conditions should be justified in the environmental assessment.

Effluent guidelines are applicable for direct discharges of treated effluents to surface waters for general use. Site-specific discharge levels may be established based on the availability and conditions in use of publicly operated sewage collection and treatment systems or, if discharged directly to surface waters, on the receiving water use classification as described in the **General EHS Guidelines**.

Emissions guidelines are applicable to process emissions. Combustion source emissions guidelines associated with steam- and power-generation activities from sources with a heat input capacity equal to or lower than 50 MW are addressed in the **General EHS Guidelines** with larger power source emissions addressed in the **EHS Guidelines for Thermal Power**. Guidance on ambient considerations based on the total load of emissions is provided in the **General EHS Guidelines**.

Table 1. Air emission levels for textile industry[d]

Pollutants	Units	Guideline Value
VOCs	mg/Nm^3	2 / 20 / 50 / 75 / 100 / 150 [a b]
Chlorine	mg/Nm^3	5
Formaldehyde	mg/Nm^3	20
Ammonia	mg/Nm^3	30
Particulates	mg/Nm^3	50[c]
H_2S	mg/Nm^3	5
CS_2	mg/Nm^3	150

NOTES:
[a] Calculated as total carbon.
[b] As the 30-minute mean for stack emission. Applicability of guideline values:
- 2 mg/Nm^3 for VOCs classified as carcinogenic or mutagenic with mass flow greater than or equal to 10 g/hour;
- 20 mg/Nm^3 for discharges of halogenated VOCs with a mass flow equal or greater than 100 g/hour;
- 50 mg/Nm3 for waste gases from drying for large installations (solvent consumption >15 t/a);
- 75 mg/Nm^3 for coating application processes for large installations (solvent consumption >15 t/a);
- 100mg/Nm^3 for small installations (solvent consumption <15 t/a).
- If solvent is recovered from emissions and reused, the limit value is 150 mg/Nm^3
[c] As the 30-minute mean for stack emissions.
[d] Guideline values are applicable to installations with a solvent consumption > 5t/a.

Table 2. Effluent levels for the textile industry [a]		
Pollutants	Units	Guideline Value
pH	--	6 – 9
BOD	mg/L	30
COD	mg/L	160
AOX	mg/L	1
TSS	mg/L	50
Oil and Grease	mg/L	10
Pesticides	mg/L	0.05-0.10 [b]
Cadmium	mg/L	0.02
Chromium (total)	mg/L	0.5
Chromium (hexavalent)	mg/L	0.1
Cobalt	mg/L	0.5
Copper	mg/L	0.5
Nickel	mg/L	0.5
Zinc	mg/L	2
Phenol	mg/L	0.5
Sulfide	mg/L	1
Total Phosphorous	mg/L	2
Ammonia	mg/L	10
Total Nitrogen	mg/L	10
Color	m^{-1}	7 (436 nm, yellow) 5 (525 nm, red) 3 (620 nm, blue)
Toxicity to Fish Eggs	T.U. 96h	2
Temperature increase	°C	<3
Coliform bacteria	MPN/100ml	400

[a] At the edge of a scientifically established mixing zone which takes into account ambient water quality, receiving water use, potential receptors and assimilative capacity
[b] 0.05 mg/L for total pesticides (organophosphorous pesticides excluded); 0.10 mg/l for organophosphorous pesticides.

Resource Use

Tables 3 and 4 provide examples of industry-specific indicators for resource and energy consumption and waste generation. These benchmark values are provided for comparative purposes only, and individual projects should target continual improvement in these areas.

Table 3. Resource and energy consumption [a]			
Process	Electrical Energy (kWh/kg)	Thermal Energy (MJ/kg)	Water Consumption (l / kg)
Wool Scouring	0.3	3.5	2–6
Yarn Finishing	–	–	70–120
Yarn Dyeing	0.8–1.1	13–16	15–30 (dyeing) 30–50 (rinsing)
Loose Fiber Dyeing	0.1– 0.4	4–14	4–15 (dyeing) 4–20 (rinsing)
Knitted Fabric Finishing	1–6	10–60[2]	70–120
Woven Fabric Finishing	0.5–1.5	30–70[3]	50–100
Dyed Woven Fabric Finishing	–	–	<200

[a] European Commission (2003b). The data of "industry benchmarks" originate from only a limited number of installations.
[b] The higher value is for mills also having spinning and coning sections.
[c] The higher value is for mills also having spinning, twisting, and coning sections.

ATTACHMENT 5

COMPARISON OF NATIONAL EMISSION STANDARDS AND WBG-EHS GUIDELINES SPECIFIC TO PAT SECTOR INDUSTRIES

Comparison of National Emission Standards and WBG-EHS guidelines specific to PAT sector industries for Aluminium Sector

S. No.	Emission / Pollutant Parameters		WBG / IFC Emission Standards	CPCB, GOI Emission Standards
A	**Ambient Air Quality Emission Standards for Mining Operations**			
1	SO_2 (µg/m^3)	Annual	Not specified	50
		24-hour	125 (interim target-1) 50 (interim target-2) **20 (guideline**)	**80**
		10 minutes	500 (guideline)	Not specified
2	NO_2 (µg/m^3)	Annual	**40 (guideline)**	**40**
		24-hour	Not specified	80
		1-hour	200 (guideline)	Not specified
3	PM_{10} (µg/m^3)	Annual	70 (interim target-1) 50 (interim target-2) 30 (interim target-3) **20 (guideline)**	**60**
		24-hour	150 (interim target-1) 100 (interim target-2) 75 (interim target-3) **50 (guideline)**	**100**
4	$PM_{2.5}$ (µg/m^3)	Annual	35 (interim target-1) 25 (interim target-2) 15 (interim target-3) **10 (guideline)**	**40**
		24-hour	75 (interim target-1) 50 (interim target-2) 37.5 (interim target-3) **25 (guideline)**	**60**
5	Ozone (µg/m^3)	8-hourly max 1-hour	160 (interim target-1) **100 (guideline)**	**100**
			Not specified	180
6	Lead (Pb) (µg/m^3)	Annual	Not specified	0.50
		24-hour		1.0
7	CO (µg/m^3)	8-hour	Not specified	0.2
		1-hour		0.4
8	Ammonia (µg/m^3)	Annual	Not specified	100
		24-hour		400
9	Benzene (µg/m^3)	Annual	Not specified	0.5
10	BaP (ng/m^3)	Annual	Not specified	0.1
11	Arsenic (ng/m^3)	Annual	Not specified	0.6
12	Nickel (ng/m^3)	Annual	Not specified	20
B	**Raw Material Handling Operations**			
1	PM (1° & 2° crusher) (µg/m^3)		Not specified	150
C	**Stack Emissions for Calcination Operations**			
1	PM (µg/m^3)		Not specified	250
2	CO (% max)		Not specified	1%
3	Stack height (m)	General	H_G= H + 1.5L	Not specified
		When SO_2 emission is estimated in kg/hr	Not specified	H=14 $(Q)^{0.3}$

S. No.	Emission / Pollutant Parameters		WBG / IFC Emission Standards	CPCB, GOI Emission Standards
		When PM is estimated as Q(tones/hr)	Not specified	H= 74 ($Q^{0.27}$)
D	**Stack Emissions for Smelting Operations**			
1	SO_2 (mg/Nm^3)		50-200 [1]	Not specified
2	NO_x (mg/Nm^3)		100-300 [1]	Not specified
3	Dust (mg/Nm^3)	Green Anode Shop	**1-5** [1]	**150**
		Anode Bake Oven		**50**
		Pot Room		**150**
4	TOC (as C) (mg/Nm^3)		5-50[1]	Not specified
5	Dioxins (ngTE/m^3)		0.1-0.5[1]	Not specified
6	Arsenic (mg/Nm^3)		0.5[1]	Not specified
7	Mercury (mg/Nm^3)		0.02[1]	Not specified
8	Hydrogen Chloride (mg/Nm^3)		5[1]	Not specified
9	Hydrogen Fluoride (mg/Nm^3)		0.5[1]	Not specified
10	Total Fluoride	Anode Bake Oven	0.8[1] (mg/Nm^3)	0.3 kg/MT of aluminium
		Soderberg Technology		2.8 kg/ton by 31st Dec 2006
		Pre Baked Technology		0.8 kg/t by 31st dec 2006
11	Forage Fluoride (ppm)	12 Consecutive Months	Not specified	40
		2 Consecutive Months		60
		One Month Average		80
12	Polyfluorinated Hydrocarbons (mg/Nm^3)		0.1[1]	Not specified
E	**Effluent Standards for Smelting Operations**			
1	pH		**6-9**	**5.5-9**
2	TSS (mg/l)	Inland Surface Water	**20***	**100**
		Public Sewer		**600**
		Land for Irrigation		**200**
		Marine Coastal Areas		**For process w/w- 100** **For cooling water effluent- 10% > TSS (influent)**
3	COD (mg/l)	Inland Surface Water	**50**	**250**
		Marine Coastal Areas		**250**
4	Fluorides (mg/l)	Inland Surface Water	**5**	2.0
		Public Sewers		**15**
		Marine Coastal Areas		**15**
5	Hydrocarbons (mg/l)		5	Not specified
6	Temperature Increase (° C)	Inland Surface Water	**< 3°**	**< 5°**
		Marine Coastal Areas		**< 5°**
	[1] All types of smelting for Aluminium * CPCB has notified effluent standards for 39 parameters, whereas IFC has notified standards for only 6 parameters, given above.			

Comparison of National Emission Standards and WBG-EHS guidelines specific to PAT sector industries for Cement Sector

S. No.	Emission / Pollutant Parameters		WBG / IFC Emission Standards	CPCB, GOI Emission Standards
A	**Ambient Air Quality Emission Standards for Mining Operations**			
1	SO_2 (µg/m^3)	Annual	Not specified	50
		24-hour	125 (interim target-1) 50 (interim target-2) **20 (guideline**)	**80**
		10 minutes	500 (guideline)	Not specified
2	NO_2 (µg/m^3)	Annual	40 (guideline)	40
		24-hour	Not specified	80
		1-hour	200 (guideline)	Not specified
3	PM_{10} (µg/m^3)	Annual	70 (interim target-1) 50 (interim target-2) 30 (interim target-3) **20 (guideline)**	**60**
		24-hour	150 (interim target-1) 100 (interim target-2) 75 (interim target-3) **50 (guideline)**	**100**
4	$PM_{2.5}$ (µg/m^3)	Annual	35 (interim target-1) 25 (interim target-2) 15 (interim target-3) **10 (guideline)**	**40**
		24-hour	75 (interim target-1) 50 (interim target-2) 37.5 (interim target-3) **25 (guideline)**	**60**
5	Ozone (µg/m^3)	8-hourly max 1-hour	160 (interim target-1) 100 (guideline)	100
			Not specified	180
6	Lead (Pb) (µg/m^3)	Annual	Not specified	0.50
		24-hour		1.0
7	CO (µg/m^3)	8-hour	Not specified	0.2
		1-hour		0.4
8	Ammonia (µg/m^3)	Annual	Not specified	100
		24-hour		400
9	Benzene (µg/m^3)	Annual	Not specified	0.5
10	BaP (ng/m^3)	Annual	Not specified	0.1
11	Arsenic (ng/m^3)	Annual	Not specified	0.6
12	Nickel (ng/m^3)	Annual	Not specified	20
B	**Stack and other Emissions Standards**			
1	Particulate Matter (mg/Nm^3)	New Kiln	**30**	**50**
		Existing Kilns	**100**	**100**
2	Dust (mg/Nm^3)	Other Point Sources	50	Not Specified
		For Plant Capacity-200 tonnes/day	Not Specified	400
		>200 tonnes/day	Not Specified	250

S. No.	Emission / Pollutant Parameters		WBG / IFC Emission Standards	CPCB, GOI Emission Standards
3	SO_2 (mg/Nm^3)		400	*
4	NO_x (mg/Nm^3)		600	*
5	HCl (mg/Nm^3)		10	Not Specified
6	Hydrogen Fluoride (mg/Nm^3)		1	Not Specified
7	TOC (mg/Nm^3)		10	Not Specified
8	Dioxins- Furans (mg TEQ/Nm^3)		0.1	**
9	Cadmium & Thalium (mg/Nm^3)		0.05	Not Specified
10	Mercury (mg/Nm^3)		0.05	Not Specified
11	Total Metals (mg/Nm^3)		0.5	Not Specified
C	**Liquid Effluent Emissions Standards**			
1	PH	Inland Surface Water	**6-9**	**5.5-9.0**
		Public Sewers		**5.5 – 9.0**
		Land For Irrigation		**5.5 – 9.0**
		Marine Coastal Areas		**5.5 – 9.0**
2	TSS (mg/L)	Inland Surface Water	**50**	**100**
		Public Sewers		**600**
		Land For Irrigation		**200**
		Marine Coastal Areas		For process w/w – **100**
				For cooling water effluent **10 % above TSS of influent**
3	Temperature increase (°C)	Inland Surface Water	< 3	< 5
		Public Sewers		Not Specified
		Land For Irrigation		Not Specified
		Marine Coastal Areas		< 5

* Gaseous pollutants are not a problem in cement industry, since the emission of such gases is prevented in the process itself. Four gases particularly are considered harmful, viz. carbon monoxide, NOx, sulphur dioxide, and hydrogen sulphide. Rotary kilns in India are found to emit such gases in traces only. In developed countries, limits have already been prescribed for NOx and, SO2 in the kiln stack . However, in India only two states, namely, Meghalaya and Gujarat have done this. CPCB is reported to be contemplating to fix the emission limits for SO2 and NOx.

**It has been reported that doioxin and furan emission concentrations are low regardless of the type of fuel used and measurements carried out by VDZ (German Cement Industry) showed that cement kilns can complied with an emission level of 0.1 TEQ/Nm3, which is the limit prescribed for hazardous waste incineration plants as per European countries' legislations.(source-Moef EIA manual for cement)

Comparison of National Emission Standards and WBG-EHS guidelines specific to PAT sector industries for Chlor Alkali Sector

S.No.	Air Emissions		WBG / IFC Emission Standards	CPCB
A	**Ambient Air**			
1.	SO_2 ($\mu g/m^3$)	Annual	Not specified	50
		24-hour	125 (interim target-1) 50 (interim target-2) **20 (guideline**)	**80**
		10 minutes	500 (guideline)	Not specified
2.	NO_2 ($\mu g/m^3$)	Annual	40 (guideline)	40
		24-hour	Not specified	80
		1-hour	200 (guideline)	Not specified
3.	PM_{10} ($\mu g/m^3$)	Annual	70 (interim target-1) 50 (interim target-2) 30 (interim target-3) **20 (guideline)**	**60**
		24-hour	150 (interim target-1) 100 (interim target-2) 75 (interim target-3) **50 (guideline)**	**100**
4.	$PM_{2.5}$ ($\mu g/m^3$)	Annual	35 (interim target-1) 25 (interim target-2) 15 (interim target-3) **10 (guideline)**	**40**
		24-hour	75 (interim target-1) 50 (interim target-2) 37.5 (interim target-3) **25 (guideline)**	**60**
5.	Ozone ($\mu g/m^3$)	8-hourly max	160 (interim target-1) **100 (guideline)**	**100**
		1-hour	Not specified	180
6.	Lead (Pb) ($\mu g/m^3$)	Annual	Not specified	0.50
		24-hour		1.0
7.	CO ($\mu g/m^3$)	8-hour	Not specified	0.2
		1-hour		0.4
8.	Ammonia ($\mu g/m^3$)	Annual	Not specified	100
		24-hour		400
9.	Benzene (Annual) ($\mu g/m^3$)		Not specified	0.5
10.	BaP (Annual) (ng/m^3)		Not specified	0.1
11.	Arsenic (Annual) (ng/m^3)		Not specified	0.6
12.	Nickel (Annual) (ng/m^3)		Not specified	20

Stack Emissions Standards for Chlor Alkali Sector

S.NO	Emissions/Pollutants		WBG / IFC Emission Standards	CPCB
1.	Mercury(Hydrogen gas holder) (mg/Nm^3)		**0.2**	**0.2**
2.	Chlorine (mg/Nm^3)	Hypo tower	Not Specified	**15**
		For process areas including chlorine liquefaction	**3**	Not Specified
		Partial liquefaction	**1**	Not Specified
3.	Hydrochlorine vapor/mist (mg/Nm^3)		**20** (ppmv)	**35**

Effluent Discharge Standards for Chlor Alkali Sector

S.NO	Emissions/Pollutants		WBG / IFC Emission Standards	CPCB
1.	Mercury (mg/l)		**0.05 mg/l** & 0.1 g/t chlorine	**0.01**
2.	w/w flow rate containing mercury (Kl/tonne of NaOH production)		Not specified	10
3.	pH		**6-9**	**5.5-9.0**
4.	TSS (mg/l)	Inland Surface Water	**20**	**100**
		Public Sewers		**600**
		Land for irrigation		**200**
		Marine coastal areas		For process w/w-**100**
				For cooling water effluent- **10% above suspended matter of influent.**
5.	COD (mg/l)	Inland Surface Water	**150**	**250**
		Public Sewers		Not Specified
		Land for irrigation		Not Specified
		Marine coastal areas		250
6.	AOX (mg/l)		0.5	Not Specified
7.	Sulfites (mg/l)		1	Not Specified
8.	Chlorine (mg/l)	Inland Surface Water	**0.2**	**1.0** (Total residual chlorine)
		Public Sewers		Not Specified
		Land for irrigation		Not Specified
		Marine coastal areas		**1.0** (Total residual chlorine)

Comparison of National Emission Standards and WBG-EHS guidelines specific to PAT sector industries
For
Fertilizer Sector

S.No.	Air Emissions		WBG / IFC Emission Standards	CPCB
A	**Ambient Air**			
1.	SO_2 ($\mu g/m^3$)	Annual	Not specified	50
		24-hour	125 (interim target-1) 50 (interim target-2) **20 (guideline**)	**80**
		10 minutes	500 (guideline)	Not specified
2.	NO_2 ($\mu g/m^3$)	Annual	**40 (guideline)**	**40**
		24-hour	Not specified	80
		1-hour	200 (guideline)	Not specified
3.	PM_{10} ($\mu g/m^3$)	Annual	70 (interim target-1) 50 (interim target-2) 30 (interim target-3) **20 (guideline)**	**60**
		24-hour	150 (interim target-1) 100 (interim target-2) 75 (interim target-3) **50 (guideline)**	**100**
4.	$PM_{2.5}$ ($\mu g/m^3$)	Annual	35 (interim target-1) 25 (interim target-2) 15 (interim target-3) **10 (guideline)**	**40**
		24-hour	75 (interim target-1) 50 (interim target-2) 37.5 (interim target-3) **25 (guideline)**	**60**
5.	Ozone ($\mu g/m^3$)	8-hourly max	160 (interim target-1) **100 (guideline)**	**100**
		1-hour	Not specified	180
6.	Lead (Pb) ($\mu g/m^3$)	Annual	Not specified	0.50
		24-hour		1.0
7.	CO ($\mu g/m^3$)	8-hour	Not specified	0.2
		1-hour		0.4
8.	Ammonia ($\mu g/m^3$)	Annual	Not specified	100
		24-hour		400
9.	Benzene (Annual) ($\mu g/m^3$)		Not specified	0.5
10.	BaP (Annual) (ng/m^3)		Not specified	0.1
11.	Arsenic (Annual) (ng/m^3)		Not specified	0.6
12.	Nickel (Annual) (ng/m^3)		Not specified	20

Stack Emissions Standards for Fertilizer Sector

S.No.	Type of Fertilizer	Emissions /Pollutants	CPCB		WBG / IFC Emission Standards	
1.	Phosphatic Fertilizers	Fluorides (mg/Nm^3) (Phosphoric acid manufacturing unit Granulation mixing and grinding of rock phosphate)	**25**		**5 as HF**	
		Particulate Matter (mg/Nm^3)	**150**		**50**	
		Ammonia (mg/Nm^3)	Not specified		50	
		HCl (mg/Nm^3)	Not specified		30	
		NOx (mg/Nm^3)	Not specified		500 (nitro-phosphate unit) 70 (mixed acid unit)	
2.	Urea	Particulate matter (mg/Nm^3)	**Pre 1982**	**Post 1982**	Not specified	
			50 (mg/Nm^3) Or 0.5 kg/t	150 (mg/Nm^3) Or 2 kg/t		
3.	Phosphoric acid plants	Fluorides as HF (mg/Nm^3)	Not specified		5	
		Particulate Matter (mg/Nm^3)	Not specified		50	
4.	Complex Fertilizer (NPK)				**Nitro-phosphate Process**	**Mixed acid process**
		NH_3 (Kg/ton)	Not specified		0.2 (P_2O_5)	0.2 (NPK)
		NOx (as NO_2) (Kg/ton)	Not specified		1.0 (P_2O_5)	0.3 (NPK)
		Fluoride (Kg/ton)	Not specified		0.01 (P_2O_5)	0.02 (NPK) or 0.4 – 4 mg/Nm^3
		Dust	Not specified		Not specified	0.2 (NPK) or 30 – 50 mg/Nm^3
		Chloride (mg/Nm^3)	Not specified		Not specified	19 - 20
5.	**Nitrogenous Fertilizer**					
	Ammonia plant	NH_3 mg/Nm^3	Not specified		50	
		NOx mg/Nm^3	Not specified		300	
		PM mg/Nm^3	Not specified		50	

S.No.	Type of Fertilizer	Emissions /Pollutants	CPCB	WBG / IFC Emission Standards
	Nitric Acid Plant	NO_x mg/Nm^3	300 (Kg/t of weak acid before concentration)	200
		N_2O mg/Nm^3	Not specified	800
		NH_3 mg/Nm^3	Not specified	10
		PM mg/Nm^3	Not specified	50
	Sulphuric acid plant	SO_2	4 kg/t of concentrated (100%) acid produced	Not specified
	Urea/UAN Plants	Urea (prilling/granulation) mg/Nm^3	Not specified	50
		NH_3 (prilling/ granulation) mg/Nm^3	Not specified	50
		PM mg/Nm^3	Not specified	50
	AN/CAN Plants	PM mg/Nm^3	Not specified	50
		NH_3 mg/Nm^3	Not specified	50

Effluents Discharge Standards for Fertilizer Sector

S. No	Parameters	Type of Fertilizers													
		Straight Nitrogenous Fertilizer						Complex Fertilizer						Straight Phosphatic Fertilizer	
		Excluding Calcium Ammonium Nitrate & Ammonium Nitrate			Including Calcium Ammonium Nitrate & Ammonium Nitrate			Excluding Calcium Ammonium Nitrate & Ammonium Nitrate & Nitro-phosphate			Including Calcium Ammonium Nitrate & Ammonium Nitrate & Nitro-phosphate				
		CPCB		WBG / IFC*	CPCB		WBG / IFC*	CPCB		WBG / IFC*	CPCB		WBG / IFC*		CPCB	WBG / IFC*
		Pre-1982	Post 1982		Pre 1982	Post 1982		Pre 1982	Post 1982		Pre 1982	Post 1982	Nitro-phosphate process	Mixed acid process		
1.	pH	**6.5-8.0**	**6.5-8.0**	**6.0-9.0**	**6.5-8.0**	**6.5-8.0**		**6.5-8.0**	**6.5-8.0**		**6.5-8.0**	**6.5-8.0**	**-**		**7.0-9.0**	**6.0-9.0**
2.	Ammoniacal Nitrogen	75	50	**-**	**75**	**50**	**100**	75	50	-	75	50	-		-	-
3.	Total Kjeldhal Nitrogen	**100**	**150**	**15**	**50**	**-**	**15**	150	100	-	-	-	0.001-0.01 (kg/t P_2O_5)	0.2 kg/t of NPK	-	15
4.	Free Ammoniacal Nitrogen	4	4	-	4	4	-	4	4	-	150	100	-		-	-
5.	Nitrate Nitrogen	10	10	-	20	20	-	10	10	-	20	20	-		-	**-**
6.	Cyanide as CN	0.2	0.2	-	0.2	0.2	-	0.2	0.2	-	0.2	0.2	-		-	**-**
7.	Vanadium as V	0.2	0.2	-	0.2	0.2	-	0.2	0.2	-	0.2	0.2	-		-	**-**
8.	Arsenic as As	0.2	0.2	-	0.2	0.2	-	0.2	0.2	-	0.2	0.2	-		-	-
9.	Suspended Solids	**100**	**100**	**30**	**100**	**100**	**30**	100	100	-	100	100	-		**100**	**50**
10.	Oil & grease	10	10	-	10	10	-	10	10	-	10	10	-		10	**-**
11.	Cr as Cr^{+6} (at outlet)	0.1	0.1	-	0.1	0.1	-	0.1	0.1	-	0.1	0.1	-		0.1	**-**
12.	Total Chromium as Cr (at outlet of Cr removal unit)	2.0	2.0	-	2.0	2.0	-	2.0	2.0	-	2.0	2.0	-		2.0	**-**
13.	Phosphate as P	-	-	-	-	-	-	5	5	-	5	5	-		5	**-**
14.	Fluoride as F^- (at the outlet of the F removal unit, if recipient system demand, F shall be limited to 1.5mg/l)	-	-	-	-	-	-	10	10	-	10	10	0.7 kg/t of NPK	0.03 kg/t of NPK	**10**	**20 mg/l** **Or 2 kg/t of P_2O_5**
15.	Total phosphorous	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	5
16.	Cadmium	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	0.1
17.	Ammonia	**-**	**-**	5	**-**	**-**	5	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	10
18.	Total metals	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	10
19.	P_2O_5	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	1.2 kg/t of P_2O_5		**-**	-
20.	Urea (prilling/ granulation)	-	-	-	-	-	1	-	-	-	-	-	**-**		**-**	-

*** WBG / IFC Emission Standards**

Comparison of National Emission Standards and WBG-EHS guidelines specific to PAT sector industries
For
Iron & Steel Sector

S. No.	Air Emissions		WBG / IFC Emission Standards	CPCB
	Ambient Air			
A	**Mining**			
1.	SO_2 ($\mu g/m^3$)	Annual	Not specified	50
		24-hour	125 (interim target-1) 50 (interim target-2) **20 (guideline**)	**80** **100 (For Iron ore mining)**
		10 minutes	500 (guideline)	Not specified
2.	NO_2 ($\mu g/m^3$)	Annual	40 (guideline)	40
		24-hour	Not specified	80
		1-hour	200 (guideline)	Not specified
3.	PM_{10} ($\mu g/m^3$)	Annual	70 (interim target-1) 50 (interim target-2) 30 (interim target-3) **20 (guideline)**	**60**
		24-hour	150 (interim target-1) 100 (interim target-2) 75 (interim target-3) **50 (guideline)**	**100**
4.	$PM_{2.5}$ ($\mu g/m^3$)	Annual	35 (interim target-1) 25 (interim target-2) 15 (interim target-3) **10 (guideline)**	**40**
		24-hour	75 (interim target-1) 50 (interim target-2) 37.5 (interim target-3) **25 (guideline)**	**60**
5.	Ozone ($\mu g/m^3$)	8-hourly max	160 (interim target-1) 100 (guideline)	100
		1-hour	Not specified	180
6.	Lead (Pb) ($\mu g/m^3$)	Annual	Not specified	0.50
		24-hour		1.0
7.	CO ($\mu g/m^3$)	8-hour	Not specified	0.2
		1-hour		0.4
8.	Ammonia ($\mu g/m^3$)	Annual	Not specified	100
		24-hour		400
9.	Benzene (Annual) ($\mu g/m^3$)		Not specified	0.5
10.	BaP (Annual) (ng/m^3)		Not specified	0.1
11.	Arsenic (Annual) (ng/m^3)		Not specified	0.6
12.	Nickel (Annual) (ng/m^3)		Not specified	20

CPCB / WBG / IFC Emission Standards for Iron & Steel Sector

S. No	Air Emissions / Pollutants	Coke Oven		Sinter Plant		Blast Furnace			BOF			Rolling Mills		Arc Furnace		Induction Furnace		Cupola Furnace		Kiln		Refractory Unit		IFC for Integrated Steel plants
		CPCB	WBG / IFC (kg/t)	CPCB	WBG / IFC (kg/t)	CPCB		WBG / IFC (kg/t)	CPCB		WBG / IFC (kg/t)	CPCB	WBG / IFC (kg/t)	CPCB	WBG / IFC (kg/t)	CPCB	WBG / IFC (kg/t)	CPCB	WBG / IFC (kg/t)	CPCB	WBG / IFC (kg/t)	CPCB	WBG / IFC (kg/t)	(mg/Nm^3)
						Existing units	New Units		Existing units	New Units														
1.	SO_2 (mg/Nm^3)	800				250	200											300	400					500
2.	NOx (mg/Nm^3)	500	0.45-0.7		0.4-0.65	150	150	0.01-0.6					0.08-0.35		0.12-0.25				50					500 750 (Coke oven)
3.	PM (mg/Nm^3)	25	0.05-3.5	150	0.04-0.4	50	30	0.005	150		0.2	150	0.002-0.040	150	0.02	150						150		20-50
	Blowing/lancing recovery)					100	50		300	***														
	Melting capacity < 3 t/hr																	450						
	Melting capacity ≥ 3 t/hr																							
	Melting Capacity ≤ 40 t/day																	150						
	Melting Capacity > 40t/day								100											500				
	PM (space dedusting) (mg/Nm^3)									50										150				
4.	Sulphur (mg/Nm^3)	800																						
5.	CO (vol/vol)		0.40-4.5		12-40	1% (max)	1% (max)	0.8-1.75			1.5-8		0.005-0.85		0.75-4									100 (EAF) 300 (Coke oven)
6.	VOC		0.12-0.25		0.15																			20
7.	PCDD/F (TEQ/t)				1-10										0.07-9									0.1 (ng TEQ/Nm^3)
8.	Oil Mist																							15
9.	Chromium																							4
10.	Cadmium (Cd)																							0.2
11.	Lead																							2
12.	Nickel																							2
13.	HCl																							10
14.	F																							5
15.	HF																							10
16.	H_2S																							10
17.	Ammonia																							30

S. No	Air Emissions / Pollutants	Coke Oven		Sinter Plant		Blast Furnace			BOF			Rolling Mills		Arc Furnace		Induction Furnace		Cupola Furnace		Kiln		Refractory Unit		IFC for Integrated Steel plants
		CPCB	WBG / IFC (kg/t)	CPCB	WBG / IFC (kg/t)	CPCB		WBG / IFC (kg/t)	CPCB		WBG / IFC (kg/t)	CPCB	WBG / IFC (kg/t)	CPCB	WBG / IFC (kg/t)	CPCB	WBG / IFC (kg/t)	CPCB	WBG / IFC (kg/t)	CPCB	WBG / IFC (kg/t)	CPCB	WBG / IFC (kg/t)	
						Existing units	New Units		Existing units	New Units														(mg/Nm^3)
18.	BaP																							0.1
19.	Tar fume																							5
20.	Fugitive Emissions																							
	BaP	2																						
	PM_{10} (µg/m^3)					4000	3000		4000	3000														
	SO_2 (µg/m^3)					200	150		200	100														
	NOx (µg/m^3)					150	120		150	150														
	CO (µg/m^3) -8 hours					5000	5000		5000	5000														
	-1 hour					10000	10000		10000	10000														
	Lead (µg/m^3)					2	2		2	2														

*** Should be with gas recover

Effluents Discharge Standards for Iron & Steel Sector

S. No	EFFLUENTS	CPCB Standards (in mg/l except for pH and temp.)						WBG / IFC standards (in mg/l except for pH and Temp.)		CPCB (General w/w Discharge standards) (mg/l)			
		Coke-oven	Sinter plant	Blast furnace	Sponge iron plant	Basic oxygen furnace	Rolling Mills	Integrated iron & Steel Plants	Foundries	1	2	3	4
1.	pH	6.0-8.50	6.0-8.50	6.0-8.50	5.5-9.0	6.0-8.50	6.0-9.0	6.0-9.0	6-9	5.5-9.0			
2.	TSS	**100**	**100**	**50**	**≤ 100**	**100**	**100**	**35**	**35**	**100**	**600**	**200**	**100 (For process w/w) For cooling water effluent 10% above TSS**
3.	Oil & Grease	**10**	**10**	**10**	**≤ 10**	**10**	**10**	**10**	**10**	**10**	**20**	**10**	**20**
4.	Temperature Increase							**< 3**	**< 3**	**< 5**			
5.	BOD (3-day and 5-day	30								30	350	100	100
6.	COD	**250**			**≤ 250**			**250**	**125**	**250**	**-**	**-**	**250**
7.	Phenol	**1.0**						**0.5**	**1**	**1**	**5**	**-**	**5**
8.	Cadmium							**0.01**	**0.01**	**2**	**1**	**-**	**2**
9.	Chromium total							**0.5**	**0.5**	**2**	**2**	**-**	**2**
10.	Chromium (hexavalent)							**0.1**		**1**	**2**	**-**	**1**
11.	Copper							**0.5**	**0.5**	**3**	**3**	**-**	**3**
12.	Lead							**0.2**	**0.2**	**1**	**1**	**-**	**2**
13.	Tin							2					
14.	Mercury							**0.01**		**0.01**	**0.01**	**-**	**0.01**
15.	Nickel							**0.5**	**0.5**	**3**	**3**	**-**	**5**
16.	Zinc							**2**		**5**	**15**	**-**	**15**
17.	Cyanides	0.2		0.2				**0.1**		**2**			
18.	Cyanides (total)							0.5					
19.	Total Nitrogen							**30**		**100**	**-**	**-**	**100**
20.	Ammonia	50		50				**5**		**5**	**-**	**-**	**5**
21.	Total Phosphorous							2					
22.	Fluoride							**5**		**2**	**15**	**-**	**15**
23.	Sulfides							**0.1**		**2**	**-**	**-**	**5**
24.	Iron							**5**	**5**	**3**	**3**	**-**	**3**
25.	PAH							0.05					
26.	Toxicity							**To be determined on case specific basis**					

1. Inland Surface Water
2. Public Sewers
3. Land for Irrigation
4. Marine coastal areas

Comparison of National Emission Standards and WBG-EHS guidelines specific to PAT sector industries
For
Pulp & Paper Sector

S.No.	Air Emissions		WBG / IFC Emission Standards	CPCB Emission Standards
Ambient Air				
1.	SO_2 ($\mu g/m^3$)	Annual	Not specified	50
		24-hour	125 (interim target-1) 50 (interim target-2) **20 (guideline**)	**80**
		10 minutes	500 (guideline)	Not specified
2.	NO_2 ($\mu g/m^3$)	Annual	40 (guideline)	40
		24-hour	Not specified	80
		1-hour	200 (guideline)	Not specified
3.	PM_{10} ($\mu g/m^3$)	Annual	70 (interim target-1) 50 (interim target-2) 30 (interim target-3) **20 (guideline)**	**60**
		24-hour	150 (interim target-1) 100 (interim target-2) 75 (interim target-3) **50 (guideline)**	**100**
4.	$PM_{2.5}$ ($\mu g/m^3$)	Annual	35 (interim target-1) 25 (interim target-2) 15 (interim target-3) **10 (guideline)**	**40**
		24-hour	75 (interim target-1) 50 (interim target-2) 37.5 (interim target-3) **25 (guideline)**	**60**
5.	Ozone ($\mu g/m^3$)	8-hourly max	160 (interim target-1) 100 (guideline)	100
		1-hour	Not specified	180
6.	Lead (Pb) ($\mu g/m^3$)	Annual	Not specified	0.50
		24-hour		1.0
7.	CO ($\mu g/m^3$)	8-hour	Not specified	0.2
		1-hour		0.4
8.	Ammonia ($\mu g/m^3$)	Annual	Not specified	100
		24-hour		400
9.	Benzene (Annual) ($\mu g/m^3$)		Not specified	0.5
10.	BaP (Annual) (ng/m^3)		Not specified	0.1
11.	Arsenic (Annual) (ng/m^3)		Not specified	0.6
12.	Nickel (Annual) (ng/m^3)		Not specified	20

Air Emissions Guidelines for Paper & Pulp Industry

S. No	Parameter		WBG / IFC Emission Standards (kg/ADt)	CPCB (mg/Nm^3)
1.	TSP	Kraft bleached	0.5	15 for large mill
		Unbleached	0.5	
		Sulfite	0.15	
2.	SO2 as S	Kraft bleached	0.4	Not Specified
		Unbleached	0.4	
		Sulfite	1	
3.	NOx	Kraft bleached	1.5 for hardwood 2 for softwood	Not Specified
		Unbleached	1.5 for hardwood 2 for softwood	
		Sulfite	2	
4.	TRS as S	Kraft bleached	0.2	Not Specified
		Unbleached	2	
5.	H_2S			10 for large mill

Effluent standards for Paper & Pulp Industry

S. No	Parameter	Plant Type		WBG / IFC Emission Standards (All units in kg/ADt except for flow)	CPCB					
					Kg/t	Mg/l				
						Large mill	Agro based	Waste paper	small	
									Inland	Land
1.	**Flow**	**Kraft Pulp**	**Bleached**	**50 (m^3/ADt)**	**30-110 (m^3/t)**	**175**	**150**	**60**		
			Unbleached	**25**	**20-80**					
		Sulfite		**55**						
		CTMP		**20**						
		Mechanical Pulping		**20**						
		Recycled Fibre	**Without de-inking**	**10**						
			With de-inking	**15**						
		Recycled Fibre Tissue mills		**25**						
		Fine Paper	**Uncoated**	**15**						
			Coated	**15**						
		Tissue mills		**25k**						
		Fiber preparation, non-wood		**50**						
2.	**pH**	**Kraft Pulp**	**Bleached**	6-9					5.5-9.0	5.5-9.0
			Unbleached	6-9						
		Sulfite		6-9						
		CTMP		6-9						
		Mechanical Pulping		6-9						
		Recycled Fibre	**Without de-inking**	6-9						
			With de-inking	6-9						
		Recycled Fibre Tissue mills		6-9						
		Fine Paper	**Uncoated**	6-9						
			Coated	6-9						
		Tissue mills		6-9						
		Fiber preparation, non-		6-9						

S. No	Parameter	Plant Type		WBG / IFC Emission Standards (All units in kg/ADt except for flow)	CPCB					
					Kg/t	Mg/l				
						Large mill	Agro based	Waste paper	small	
									Inland	Land
		wood								
3.	TSS	Kraft Pulp	Bleached	1.5	0.2-10	150	300	70	100	100
			Unbleached	1	0.2-15					
		Sulfite		2						
		CTMP		1						
		Mechanical Pulping		0.5						
		Recycled Fibre	Without de-inking	0.15						
			With de-inking	0.3						
		Recycled Fibre Tissue mills		0.4						
		Fine Paper	Uncoated	0.4						
			Coated	0.4						
		Tissue mills		0.4						
		Fiber preparation, non-wood		2						
4.	COD	Kraft Pulp	Bleached	20	4-90	350	450	120		
			Unbleached	10	7-50					
		Sulfite		30						
		CTMP		5						
		Mechanical Pulping		5						
		Recycled Fibre	Without de-inking	1.5						
			With de-inking	4						
		Recycled Fibre Tissue mills		4						
		Fine Paper	Uncoated	2						
			Coated	1.5						
		Tissue mills		1.5						
		Fiber preparation, non-wood		30						
5.	BOD_5	Kraft Pulp	Bleached	1	0.2-40	30	175	20	30	100
			Unbleached	0.7	1-20					
		Sulfite		2						
		CTMP		1						
		Mechanical Pulping		0.5						
		Recycled Fibre	Without de-inking	0.15						
			With de-inking	0.2						
		Recycled Fibre Tissue mills		0.5						
		Fine Paper	Uncoated	0.25						
			Coated	0.25						
		Tissue mills		0.4						
		Fiber preparation, non-wood		2						

S. No	Parameter	Plant Type		WBG / IFC Emission Standards (All units in kg/ADt except for flow)	CPCB					
					Kg/t	Mg/l				
						Large mill	Agro based	Waste paper	small	
									Inland	Land
6.	AOX (Adsorbable Organohalogens)	Kraft Pulp	Bleached	0.25	0-2	1 kg/t				2 kg/t
			Unbleached							
		Sulfite		0.005						
		CTMP								
		Mechanical Pulping		0.01						
		Recycled Fibre	Without de-inking	0.005						
			With de-inking	0.005						
		Recycled Fibre Tissue mills		0.005						
		Fine Paper	Uncoated	0.005						
			Coated	0.005						
		Tissue mills		0.01						
		Fiber preparation, non-wood								
7.	Total N	Kraft Pulp	Bleached	0.2	0.1-0.8					
			Unbleached	0.2	0.1-1					
		Sulfite		0.5						
		CTMP		0.2						
		Mechanical Pulping		0.1						
		Recycled Fibre	Without de-inking	0.05						
			With de-inking	0.1						
		Recycled Fibre Tissue mills		0.25						
		Fine Paper	Uncoated	0.2						
			Coated	0.2						
		Tissue mills		0.25						
		Fiber preparation, non-wood		0.5						
8.	Total P	Kraft Pulp	Bleached	0.03	5-90					
			Unbleached	0.02	3-40					
		Sulfite		0.05						
		CTMP		0.01						
		Mechanical Pulping		0.01						
		Recycled Fibre	Without de-inking	0.005						
			With de-inking	0.01						
		Recycled Fibre Tissue mills		0.015						
		Fine Paper	Uncoated	0.01						
			Coated	0.01						
		Tissue mills		0.015						
		Fiber preparation, non-wood		0.05						

Comparison of National Emission Standards and WBG-EHS guidelines specific to PAT sector industries
for
Textile Sector

S.No.	Air Emissions		WBG / IFC Emission Standards	CPCB
	Ambient Air			
1.	SO_2 ($\mu g/m^3$)	Annual	Not specified	50
		24-hour	125 (interim target-1) 50 (interim target-2) **20 (guideline**)	**80**
		10 minutes	500 (guideline)	Not specified
2.	NO_2 ($\mu g/m^3$)	Annual	40 (guideline)	40
		24-hour	Not specified	80
		1-hour	200 (guideline)	Not specified
3.	PM_{10} ($\mu g/m^3$)	Annual	70 (interim target-1) 50 (interim target-2) 30 (interim target-3) **20 (guideline)**	**60**
		24-hour	150 (interim target-1) 100 (interim target-2) 75 (interim target-3) **50 (guideline)**	**100**
4.	$PM_{2.5}$ ($\mu g/m^3$)	Annual	35 (interim target-1) 25 (interim target-2) 15 (interim target-3) **10 (guideline)**	**40**
		24-hour	75 (interim target-1) 50 (interim target-2) 37.5 (interim target-3) **25 (guideline)**	**60**
5.	Ozone ($\mu g/m^3$)	8-hourly max	160 (interim target-1) 100 (guideline)	100
		1-hour	Not specified	180
6.	Lead (Pb) ($\mu g/m^3$)	Annual	Not specified	0.50
		24-hour		1.0
7.	CO ($\mu g/m^3$)	8-hour	Not specified	0.2
		1-hour		0.4
8.	Ammonia ($\mu g/m^3$)	Annual	Not specified	100
		24-hour		400
9.	Benzene (Annual) ($\mu g/m^3$)		Not specified	0.5
10.	BaP (Annual) (ng/m^3)		Not specified	0.1
11.	Arsenic (Annual) (ng/m^3)		Not specified	0.6
12.	Nickel (Annual) (ng/m^3)		Not specified	20

S. No	Emission/Pollutant	WBG / IFC[d] Emission Standards	CPCB
1.	VOCs	2/20/50/75/100/150[a b]	Not Specified
2.	Chlorine	5	Not Specified
3.	Formaldehyde	20	Not Specified
4.	Ammonia	30	Not Specified
5.	Particulates	50[c]	Not Specified
6.	H_2S	5	Not Specified
7.	CS_2	150	Not Specified

[a] Calculated as total carbon
[b] As the 30-minute mean for stack emission. Applicability of guideline values:

- 2 mg/Nm3 for VOCs classified as carcinogenic or mutagenic with mass flow greater than or equal to 10 g/hour;
- 20 mg/Nm3 for discharges of halogenated VOCs with a mass flow equal or greater than 100 g/hour;
- 50 mg/Nm3 for waste gases from drying for large installations (solvent consumption >15 t/a);
- 75 mg/Nm³ for coating application processes for large installations (solvent consumption >15 t/a);
- 100mg/Nm³ for small installations (solvent consumption <15 t/a).
- If solvent is recovered from emissions and reused, the limit value is 150 mg/Nm³

[c] As the 30-minute mean for stack emissions
[d] Guideline values are applicable to installations with a solvent consumption > 5 t/a

Effluent Standards for Textile Sector

S. No	Parameter	WBG / IFC Emission Standards (mg/l)	CPCB (mg/l)				
			For Textile	In General			
				1	2	3	4
1.	pH	6-9	5.5-9.0				
2.	BOD	**30**	**30**				
3.	COD	**160**	**250**				
4.	AOX	1					
5.	TSS	**50**	**100**				
6.	Oil & Grease	**10**	**10**				
7.	Pesticides	0.05-0.10[a]					
8.	Cadmium	**0.02**		**2**	**1**	**-**	**2**
9.	Chromium (total)	**0.5**	**2**				
10.	Chromium (Hexavalent)	**0.1**		**1**	**2**	**-**	**2**
11.	Cobalt	0.5					
12.	Copper	**0.5**		**3**	**3**	**-**	**3**
13.	Nickel	**0.5**		**3**	**3**	**-**	**5**
14.	Zinc	**2**		**5**	**15**	**-**	**15**
15.	Phenol	**0.5**	**1**				
16.	Sulfide	**1**	**2**				
17.	Total Phosphorous	2					
18.	Ammonia	**10**		**5**	**-**	**-**	**5**
19.	Total Nitrogen	**10**		**100**	**-**	**-**	**100**
20.	Color (m^{-1})	7 (436 nm, yellow) 5 (525 nm, red) 3 (620 nm, blue)					
21.	Toxicity to fish eggs	2 (T.U.96h)					
22.	Temp. inc. (°C)	< 3		< 5	-	-	< 5
23.	Coliform bacteria	**400**		**2**	**2**	**-**	**2**
24.	Total residual Chlorine		1				

[a] 0.05 mg/l for total pesticides (organophosphorous pesticides excluded); 0.10 mg/l for organo phosphorous pesticides

1. Inland surface water
2. Public Sewers
3. Land for irrigation
4. Marine coastal areas

ATTACHMENT 6

MOEF's CREP CHARTER FOR PAT SECTOR INDUSTRIES

CHARTER
ON
CORPORATE RESPONSIBILITY
FOR
ENVIRONMENTAL PROTECTION
ACTION POINTS
FOR
17 CATEGORIES OF INDUSTRIES

CENTRAL POLLUTION CONTROL BOARD
MINISTRY OF
ENVIRONMENT & FORESTS

March 2003

CONTENTS

CHARTER ON CORPORATE RESPONSIBILITY FOR ENVIRONMENT PROTECTION (CREP)

PREFACE

1. Industrial development is an important constituent in our pursuits for economic growth, employment generation and betterment in the quality of life. On the other hand, industrial activities, without proper precautionary measures for environmental protection are known to cause pollution and associated problems. Hence, it is necessary to comply with the regulatory norms for prevention and control of pollution. Alongside, it is also imperative to go beyond compliance through adoption of clean technologies and improvement in management practices. Commitment and voluntary initiatives of industry for responsible care of the environment will help in building a partnership for pollution control. This is the very purpose of this Charter.

2. With this in view, a series of industry- specific interaction meetings have been organized as per details given below, to formulate the Charter on Corporate Responsibility for Environmental Protection (CREP).

Sr. No.	Industrial sector	Workshop Organized at	Date
1.	Aluminium	Kolkata by WBPCB	12.12.2002
2.	Cement	Ballabgarh by NCB	05.12.2002
3.	Chlor – Alkali	Ahmedabad by GPCB	08.01.2003
4.	Copper	Kolkata by WBPCB	12.12.2002
5.	Distillery	Mumbai by MPCB	03.01.2003
6.	Dyes & dye intermediates	Ahmedabad by GPCB	07.01.2003
7.	Fertilizer	Ahmedabad by GPCB	08.01.2003
8.	Iron & Steel	Kolkata by WBPCB	12.12.2002
9.	Oil Refineries	Guwahati by APCB	10.01.2003
10.	Pesticides	Ahmedabad by GPCB	07.01.2003
11.	Petrochemicals	Guwahati by APCB	09.01.2003

12.	Pharmaceuticals	Harderabad by APPCB	11.12.2002
13.	Pulp & Paper	Lucknow by UPPCB	14.12.2002
14.	Sugar	Mumbai by MPCB	03.01.2003
15.	Tannery	Chennai by CLRI	02.01.2003
16.	Thermal Power Plants	Delhi by CPCB	23.12.2002
17.	Zinc	Kolkata by WBPCB	12.12.2002

3. The action points enlisted in the charter are addressed to corporate bodies as well as regulatory agencies. Thus, the charter is a commitment for partnership and participatory action of the concerned stakeholders. The charter is also a road map for progressive improvement in environment management system. Thus, it is not necessarily limited to compliance of end-of-the-pipe effluent and emission standards. In a number of industrial sectors, the targets set in the charter are ahead of effluent and emission standards. During interaction meetings, the representatives of some industrial sectors sought extension of time to meet the regulatory norms because of techno-economic constraints. In case of units falling in such industrial sectors, time bound action had been proposed in the Charter. This measure has been agreed on the understanding that a bank guarantee would be furnished by the concerned units indicating the commitment to the action plan. However, this is without any prejudice to the stipulations made in the existing standards and action already taken/ initiated for the compliance and area- specific requirements warranting stringent actions.

4. The industrial units which are not complying with the national standards notified under the Environment (Protection) Act, 1986, will submit action plan to meet the standards and bank guarantee to respective State Pollution Control Board within 3 Months (by June, 2003).

1.0 LUMINIUM INDUSTRY

Sr. No.	Issues	Action points	Targets
1.	Technology	Allowing Potlines only with Pre-baked Technology	Environment clearance new potlines to be given by MoEF, after June 2003, only with pre-baked technology
2.	Fluoride Emissions	Prescribing maximum size of the plant	Maximum size of the plant shall be decided based on the assimilative capacity of each plant location.
		Revision of fluoride emission standard	For Soderberg Technology 2.8 kg/t by December 2005 [1.0kg/t (VCS) & 1.30 kg/t 9HSS) by December 2010]*
		Phasing out Wet Scrubbing System for fluoride	For Pre-baked Technology 0.8 kg/t By December 2006
		Allowing new Potlines only with Dry Scrubbing System	Environmental clearance for new potlines shall be given by MoEF, after June 2003, only with Dry Scrubbing System.
		Monitoring of fugitive emissions from pot rooms	To start with Indal or any other better method & submit data from January 2004, regularly to SPCBs & CPCB
3.	Fluoride Consumption	Fluoride consumption tonne of aluminum produced (as F)	[For Soderberg Technology 15 kg/t by December 2005 For Pre-baked technology

			10kg/t by December 2005]*
4.	Ambient Fluoride	Forage fluoride standards Measurement of forage fluoride	* Twelve consecutive months average-40 ppm * Two consecutive months Average- 60 ppm * One month – 80 ppm To start monitoring and submit data from January 2004, regularly to SPCBs & CPCB. The locations of monitoring may be selected in collaboration with SPCBs & CPCB
5.	Spent Pot Lining (SPL)	Setting up a centralized SPL treatment & disposal facility with aluminum fluoride recovery and utilization of SPL in steel/ cement industries Limit for pot life, (for new pots installed after December 31, 2003 SPL (Carbon & Refractory) to be disposed in Secured Landfill	[Proposal to be prepared]* [2500 days (average)]* With immediate effect
6.	Red Mud	Phasing Wet disposal Red Mud utilisation	To achieve minimum 50% solids in red mud by Dec. 2005 A proposal for practical utilization to be prepared by Aluminium Association of India within six months
7.	Anoda Baking Oven	Achieving particulate matter limit of 50 mg/Nm^3	By Dec. 2005

* National task Force will submit the proposal within three months

2.0 CEMENT INDUSTRY

1. Cement Plants, which are not complying with notified standards, shall do the following to meet the standards;

Augmentation of existing Air Pollution Control Devices - by July 2003

Replacement of existing Air Pollution Control Devices - by July 2004

2. Cement Plants located in critically polluted or urban areas (including 5 km distance outside urban boundary) will meet 100 mg/ Nm^3 limit or particulate matter by December 2004 and continue working to reduce the emission of particulate matter to 50 mg/Nm^3.
3. The new cement kilns to be accorded NOC/Environmental Clearance w.e.f 01.04.2003 will meet the limit of 50 mg/Nm^3 for particulate matter emissions.
4. CPCB will evolve load based standards by December 2003.
5. CPCB and NCBM will evolve SO_2 and NOx emission standards by June 2004.
6. The Cement industries will control fugitive emissions from all the raw material and products storage and transfer points by December 2003. However, the feasibility for the control of fugitive emissions form limestone and coal storage areas will be decided by the National Task Force (NTF). The NTF shall submit its recommendations within three months.
7. CPCB, NCBM, BIS and Oil refineries will jointly prepare the policy on use of petroleum cokes as fuel in cement kiln by July 2003.
8. After performance evaluation of various types of continuous monitoring equipment and feedback form the industries and equipment manufactures, NTF will decide feasible unit operations/ sections for installation of continuous monitoring equipment. The industry will install the continuous monitoring systems (CMS) by December 2003

9. Tripping in kiln ESP to be minimized by July 2003 as per the recommendations of NTF.
10. Industries will submit the target date to enhance the utilization of waste material by April, 2003.
11. NCBM will carry out a study on hazardous waste utilization in cement kiln by December 2003.
12. Cement industries will carry out feasibility study and submit target dates to CPCB for co-generation of power by July 2003.

* Non complying units shall given bank guarantee to respective SPCBs.

3.0 CHLOR- ALKALI INDUSTRY

1. Complete recycling of mercury bearing effluent by December 2003.
2. Installation of continuous on-line mercury analyzer by June2003.
3. Treatment of cell-room ventilation gas – limit for mercury not to exceed 1 gm/t of product by December 2005.
4. De-mercerisation of caustic soda & limit for mercury in caustic soda at 0.1 gm/of product by December 2004.
5. Reduction of mercury in H_2 gas at 0.5 gm/t by December 2004.
6. Installation of common full-fledged salt washery unit at source by Dec. 2003.
7. Capping existing completed disposal sites by June 2004 (Action plan to be submitted by June 2003).
8. Installation of mercury distillation units by June 2003.
9. Brine sludge treatment and water leachable mercury content in brine mud at < 0.1 mg/I before disposal in Secured Landfill.
10. Reduction of mercury consumption at < 50 gm/t of product by December 2005.
11. Total mercury release to environment at < 2.0 gm/t of product by December 2005.

12. The mercury cell plants will switch over to membrance cell technology in a time bound manner for which action plan will be prepared by respective plants within six months.
13. Industry to submit action plan covering the pollutional and safety aspects for CI_2 handling to prevent any accident/ release of CI_2 within three months.

4.0 COPPER INDUSTRY

1. To meet SO_2 emission limit (2kg/tonne of H_2 SO_4 produced). 50 mg /Nm^3 of acid mist by December 2005. Action plan to be submitted by July 2003.
2. SO_2 Emissions monitoring: Installation / Proper operation, maintenance and calibration of continuous SO_2 monitoring system by 30th June 2003.
3. Proper operation and maintenance of tailing dams.
4. Wastewater treatment and disposal: To achieve Zero discharge through 100 recycle reuse of treated wastewater by 31 st Dec. 2003.
5. House Keeping: To reduce the generation of fugitive dust from vehicle movement and improve overall house keeping by 31 st Dec. 2003.
6. Green Belt: To develop canopy based green belt around the periphery of plant and township as per CPCB guidelines.

5.0 DISTILLERIES

Existing Molasses – Based Distilleries will furnish bank guarantee and Action Plan to concerned State Board to ensure compliance with any combination of the following measures;

1 Compost making with press mud/agricultural residue/ Municipal Waste:

I Concentration and drying/ Incineration:

II treatment of spentwash through biomethanation followed by two stage secondary treatment and dilution of the treated effluent with

process water for irrigation as per norms prescribed by CPCB/MoEF.

IV Treatment of spentwash through bio- machination following by secondary treatment (BOD < 2500 mg/I) for controlled discharge into sea through a proper submerged marine outfall at a point permitted by SPCB/CPCB in consultation with National Institute of Oceanography (NIO), so that Dissolved Oxygen in the mixing zone does not deplete, less than 4.0 mg/I.

V. For taking decision on feasibility of one time controlled land application of treated effluent, a study will be under taken within three months.

The road map for utilization of spentwash by the distilleries to achieve zero discharge of spentwash in inland surface water courses will be as below:-

50% utilization of spentwash	- By March, 2004
75% utilization of spentwash	- By March, 2005
100% utilization of spentwash	- By December, 2005

The 100% utilization of spentwash is achieved, controlled and restricted discharge of treated effluent form lined lagoons during rainy season will be allowed by SPCB/CPCB in such a way that the perceptible colouring of river water bodies does not occur.

1. Monitoring Task Force consisting of CPCB, SPCB, Experts and industry shall be constituted for monitoring the implementation of action points.
2. New Distilleries & Expansion of Existing Distilleries (Mollasses based)

Proposal for Standalone new distilleries and expansion of exiting distilleries will out achieving zero discharge in surface water/ ground water will not be considered MoEF/ SPCB.

* to be decided by SPCB/ CPCB/ MoEF.

6.0 DYES & DYE INTERMEDIATES

Wastewater Management

1. Industry Associations will conduct feasibility study for adoptions of cleaner technologies for H- Acid manufacture (Catalytic hydrogenation and others) Within one year.
2. Industries will submit a proposal for recovery and purification by June 2003.
3. Dye intermediate industries will install salt recovery systems in case of sodium sulphate from dyestuff and reuse recovered salt in the process by December 2003.
4. An action plan for installation /up gradation of incineration systems as per CPCB guidelines to handle concentrated wastewater and reuse of treated weak wastewater will be submitted within six months.
5. Industry Associations will encourage waste exchange for proper use of weak acids. (Action within one year)
6. Wherever possible waste generated from one industry will be utilized by others (e.g use of effluent generated from Vinly Sulphone plant in H- Acid plant). Action plan in this regard will be submitted by April 2004.
7. Industries will regularly monitor ground water quality. This will be initiated immediately.
8. H- Acid industries will examine the feasibility to increases product yield form 1.09 to 1.86 for reducting iron sludge, within six months.
9. In case of dyestuff, wherever possible (to be decided by the task Force within six months), industries will use spray drying instead of salting to minimize load on Effluent Treatment Plants.
10. Industries will submit proposal on adoption of waste minimization practices by June 2003.
11. Existing standards will be reviewed in consultation with industries. Action in this regard will be taken within six months.

Air Pollution Management

1. Industries will minimize loss of volatile organics (solvent recovery of at lead either individually or collectively. An action plan will be submitted by June 2003.
2. Scrubbing systems for Sox and NOx emission will be upgraded by July 2003.

Solid Management

Proper on site storage facilities and final disposal of solid waste on secured landfill will be ensured immediately.

Better Management Practices

Improvement of house keeping such as concreting of floors, sealing of breaches/leakages in the system, replacement of corrosive pipenes, etc to prevent spillages, leakages, fugitive emissions will be done three months.

7.0 FERTILIZER INDUSTRY

Wastewater Management

1. Efforts will be made for conservation of water, particularly with a target to have consumption less than 8.12 and 15 m^3 tonne of urea produced for plant based on gas, naphtha and fuel oil, respectively. In case of plants using Naptha and Gas both as feed stocks, water consumption target of less than 10m^3/ tonne will be achieved. An action plan for this will be submitted by June 2003 and targets be achieved by March 2004.
2. Use of arsenic for CO_2 absorption in ammonia plants and chromate based chemicals for cooling system, which is still continuing in some industries, will be phased out and replaced with non- arsenic and non- chromate systems by December 2003. In this regard, action plan will be submitted by June 2003.
3. Adequate treatment for removal of oil, chromium (till non- chromate based cooling system is in place) and fluoride will be provided to meet the prescribed standards at the source (end respective process unit) itself. Action plan will be firmed up by June 2003 for compliance by March 2004.

4. Proper and complete nitrification and de-nitrification will be ensured wherever such process used for effluent treatment, by September 2003,
5. Ground water monitoring around the storage facilities and beyond the factory premises will be carried out at regular intervals particularly for pH. Fluoride CPCB will finalize the guidelines for groundwater monitoring by December 2003.
6. No effluent arising from process plants and associated facilities will be discharged to the storm water drain. The quality of storm water will be regularly monitored by all the industries.
7. The industries, where waste water/ effluent flows through the storm water drains even during the dry season will install continuous systems for monitoring the storm water quality for pH, ammonia and fluoride. If required, storm water will be routed through effluent treatment plant before discharging. An action plan will be submitted by June 2003 and necessary action will be taken by June 2004.

Air Pollution Management

1 All the upcoming urea plants will have urea prilling towers based on natural draft so at to minimize urea dust emissions.
2. The existing urea plants particularly, the plants having forced draft prilling towers will install appropriate systems (e.g. scrubber. etc.) for achieving existing norms of urea dust emissions. In this regard, industries will submit action plan by June 2003 and completion of necessary actions by June 2004.
3. The sulphuric acid plants having SCSA system will switch over to DCDA system by March 2004 to meet the emission standard for SO_2 as 2kg/tonne of H_2SO^4 produced. An action plan for this will be submitted by June 2003.
4. Sulphuric acid plants having DCDA system will improve the conversion and absorption efficiencies of the system as well as scrubbers to achieve SO_2 emission of 2kg tonne of acid produced in

case of plants having capacity above 300 tpd and 2.5 kg tonne in case of plants having capacity upto 300tpd. An action plan will be submitted by June 2003 and emission levels will be complied with by September 2004.

5. Stack height for sulphuric acid plants will be provided as per the guidelines and on the basis of normal plant operations (and not when the scrubbers are in use)by June 2003. The scrubbed gases are to be letout at the same height of the stock.
6. An action plan for providing proper dust control systems rock phosphare grinding unit in phosphoric acid plants/ single super phosphate plants, so as to achieve particulate emission of 150 mg/Nm^3 will be submitted by September 2003 and complied with by March 2004.
7. Particulate as well as gaseous fluoride will be monitored and adequate control systems will be installed by June 2004 to achieve the norms on total fluoride emissions (25 mg/Nm^3).
8. Continuous SO_2 emission monitoring systems will be installed in sulphuric acid plants (having capacity 200 tpd and above) by March 2004. Action plan for this will be submitted by June 2003.
9. Regular monitoring of ambient air quality with regard to SO_2 NO_x, PM, SO_3, fluoride and acid mist will be carried out.

Solid Waste Management

1. Gypsum will be effectively managed by providing proper lining, dykes with approach roads and monitoring of groundwater quality around storage facilities. Accumulated gypsum will be properly capped. In this regard, action plan will be submitted by June 2003 and for compliance by December 2003.
2. An action plan for proper handling, storage and disposal of spent catalyst having toxic metals will be submitted by June 2003 and implemented by September 2003. The industry will also explore recovery/buy-back of spent catalyst by September 2003.

3. Carbon slurry, sulphurmuck and chalk will be properly managed and disposed of in properly designed landfill either within premises or in common facility. Action plan on this will be submitted by June 2003 and implemented by March 2004.

4. Existing stock of chromium and arsenic bearing sludge will be properly disposed by December 2003. industries will also explore recovery of chromium from the sludge. CPCB will provide guidelines for proper disposal of the sludge.

8.0 INTEGRATED IRON & STEEL INDUSTRY

1. **Coke Oven Plants**

   - To meet the parameters PLD(% leaking colors), PLL (% leaking lids), PLO (% leaking off take), of the notified standards under EPA within three years by December 2005). Industry will submit time bound action plan and PER Chart along with the Bank Guarantee for the implementation or the time.
   - To rebuild at least 40% of the coke oven batteries in next 10 years (by December 2012.).

2. **Steel Melting Shop**

   Fugitive emissions - To reduce 30% by March 2004 and 100% by March 2008 (including installation of secondary de-dusting facilities).

3. **Blast Furnace**

   * Direct inject of reducing agents ---------- by June 2013.

4. **Solid Waste /Hazardous Waste Management**

   Utilization of Steel/ Melting shop (SMS)/ Blast Furnace (BF) Slag as per the following schedule:

   * By 2004 - 70%
   * By 2006 – 80% and
   * By 2007 – 100 %.

   Hazardous Wastes

   - Charge of tar sludge/ ETP sludge to Coke Oven by June 2003.

- Inventorization of the Hazardous waste as per Hazardous Waste (M& H), Rules, 1989 as amended in 2000 and implementation of the Rules by Dec. 2003.
  (tar sludge, acid sludge, waste Lubricating oil and type fuel falls in the category of Hazardous waste).

5. **Water Conservation/ Water Pollution**
   - To reduce specific water consumption to 5 m^3/t for long products and 8 m^3/t for flat products by December 2005.
   - To operate the Co-BP effluent treatment plant efficiently to achieve the notified effluent discharge standards. – by June 2003.
6. Installation of Continuous stack monitoring system & its calibration in major stacks and setting up of the online ambient air quality monitoring stations by June 2005.
7. To operate the existing pollution control equipment efficiently and to keep proper record of run hours, failure time and efficiency with immediate effect. Compliance report in this regard be submitted to CPCB/SPCB every three months.
8. To implement the recommendations of Life Cycle Assessment (LCA) study sponsored by MoEF by December 2003.
9. The industry will initiate the steps to adopt the following clean technologies measures to improve the performance of industry towards production, energy land environment.
   - Energy recovery of top Blast Furnace (BF) gas.
   - Use of Tar- free runner linings.
   - De- dusting of Cast house at tap holes, runners, skimmers ladle and charging points.
   - Suppression of fugitive emissions using nitrogen gas or other inert gas

- To study the possibility of slag and fly ash transportation back to the abandoned mines, to the abandoned mines, to fill up the cavities through empty railway wagons while they return back to the mines and its implementation.
- Processing of the waste containing flux & ferrous wastes through waste recycling plant.
- To implement rainwater harvesting
- Reduction Green House Gases by :
  * Reduction in power consumption
  * Use of by –products gases for power generation
  * Promotion of Energy Optimisation technology including energy/ audit
- To se targets for Resource Conservation such as Raw material, energy and water consumption to match International Standards.
- Up- gradation in the monitoring and analysis facilities for air and water pollution. Also to impart elaborate training to the manpower so that realistic data is obtained in the environmental monitoring laboratories.
- To Improve overall house keeping.

10. Sponge Iron Plants

Inventorisation of sponge iron plants to be completed by SPCBs/CPCE by June 2003 and units will be asked to install proper air pollution control equipment by December 2003 to control primary and secondary emissions.

As per rebuilding schedule submitted to CPCB/MoEF.

9.0 OIL REFINERIES

Air Pollution Management

1. All the refineries located in the critically pollution areas, identified by CPCB, will submit an action plan (within six months) for phase wise reduction of SO_2 emission from the present level.

2. Future refineries will have Sulphur Recovery Unit (SRU) with minimum 99% efficiency.
3. To enhance the efficiency of SRUs in the existing refineries, an expert committee will be constituted to look into various aspects and suggest a road map within six months.
4. With regard to NO_x emission, the new refineries/process units will install low NO_x burners. For retrofitting of low NO_x burners in existing units, the expert committees will suggest the strategies and action plan within six months including NO_x standard.
5. The flare losses will be minimized and monitored regularly.
6. Refineries will install continuous emission monitoring systems for SO_x and NO_x in major stacks with proper calibration facilities. Action plan for this will be submitted within six months.
7. Refineries will also monitor total HO and Benzene in the premises (particularly at loading –loading operations and ETP). The status and action plan will be submitted within six months.

   The expert committee will also suggest an action plan, within six months, for contract and monitoring of hydrocarbon loss & VOC emissions. leak detection and repa (LDAR) programme and vapour recovery systems (for loading & unloading operations within refineries only).

Wastewater management

1. Refineries will prepare action plan for conservation of water resources and maximized reuse recycling treated effluent within six months. The treated effluent discharge quantity (excluding once through cooling water) will be limited to 0.4 m^3/per tonne (for 90% of time) except for the monsoon season.
2. Oil spill response facilities at coastal refineries will be in position within two years. To facilitate this MoEF will coordinate with Coast Guards. Port Trust and departments.

Solid Waste Management

1. Refineries will explore new technologies for reduction in the generations of oils sludge Strategy and action plan for liquidation of existing sludge will be submitted within six months
2. The petroleum coke having high sulphur content will be sold to /reused by organized industries (having consent from SPCBs), which have systems to control SO_2 emissions. This will be ensured by June 2003.

10.0 PESTICIDES INDUSTRY

1. Segregation waste streams

Waste streams should be segregated into COD waste, toxic waste, low OCD waste, inorganic waste etc, for the purpose of providing appropriate treatment- Implementation June 2003 and action plan to be submitted to SPCB immediately.

2. Detoxification and treatment of high COD waste streams

Streams should be detoxified and treated in CTP or thermally destroyed in incinerator, as per CPCB guidelines. The waste streams should be treated suitably before taking to evaporation ponds. Implementation by June 2004 and action plan to be submitted to SPCB by June 2003.

3. Improvement in solvent recovery

a) Solvent recovery should be improved and attempts be made to achieve atleast 90% recovery wherever possible- Implementation by Dec. 2003 and action plan to be submitted to SPCB by June 2003.

b) Rest of the solvents which can not be recovered shall be incinerated .

5. Hazardous air pollutant control

(a) For air pollution control from processes, scrubber efficiency will be improved and maintained as per the best practicable

technology for control of HCI, CI. Methyl Chloride, Phosphorus Pentoxide, Ammonia, H_2S and volatile organic carbons (VOCs)- Implementation by December 2003 and action plan to be submitted to SPCB by June 2003.

(b) An incinerator will be installed, where necessary – Implementation by December 2004 and action plan to be submitted to SPCB by June 2003.

6. Control of fugitive emissions/ VOCs

For control of fugitive emissions (particularly) for hazardous air pollutions). The industries will adopt standard engineering practices. System of leak detection and repair (LDAR) programme especially for solvents, should be developed industries- implementation by March-2004 and action plan to be submitted to SPCB by June 2003.

7. Up- gradation of incinerators

Incinerators will be upgraded to meet CPCB norms hazardous waste incinerators. This is necessary for Halogenated compound and POPs – Implementation target will be decided on the basis of action plan submitted by individual industries by June 2003.

8. Replacement of Bio Assay test by toxicity Factor

The present bio-assay test will be replaced by Toxicity Factor test method developed by CPCB. Toxicity factor of four (TF-4) will be achieved by December 2003 and industries will improve their system to achieve TF-2 by, July 2006. TF test method will be implemented by SPCBs/CPCB/ MoEF- Submission of action plan by June 2003. The Central Pollution Board will organize work – shops on "Toxicity Factor" for industry.

9. Minimum scale of production to afford cost of pollution load.

To be decided, as industries view point is that this can not be done as few products are costly and made in small volume. The matter will be studied in detail by MoEF/ CPCB.

10. **Non- complying Units (as identified by SPCB) should meet the notified standards by December 2003- Bank guarantee to be submitted to SPCB by Non- complying units by June 2003.**

The submissions from pesticides industry regarding speedy clearance and other will be considered by MoEF/ CPCB for examination.

11.0 PETROCHEMICALS

1. **Adoption of state-of- art technology**

State of Art technology will be adopted for both process technology as well sound engineering practices required for control of emission, at the stage of design itself in case of new plants

2. **Management of storm water**

For the storm water generated from process area and tank farm area during initial hours of rain. An arrangement will be made for collection and oil separation including further treatment as required. Such arrangement will include provision for buffer tank (holding tank) and monitoring of effluent quality. This will be accomplished by June 2003.

3. **Effective detoxification and waste water treatment scheme.**

In order to control high COD and persistent organic pollution including toxic constituents, the industry will select appropriate unit operations for pre-treatment of effluent within inside battery limit (ISBL) before sending to the biological treatment systems for better functioning of ETPs. Action plan for the same will be submitted within 6 months and implemented within one year (March, 2004)

4. **Control of emission from combustion**

The industry will submit an action plan within six months for improving thermal efficiency and control of NOx.

5. **Proper functioning of point source emission control systems**

The industry will make efforts for proper operation of pollution control system (mostly scrubbers) and attainment of desired efficiency within six months. The will include backup of power

supply to the control equipment and arrangement for frequent sampling and analysis of all critical pollution in the tall gases.

6. **Leak detection and repair (LDAR) programme**

As a good operating, the industry will adopt periodically leak detection and repair (LDAR) programme to check fugitive emissions within six months. The frequency of the programme will be proportionate to the risk potential of carrying fluid. Based on leak detection as per LDAR programme, action will be taken to eliminate fugitive emissions. this will be a continuous activity.

7. **Handling of halogenated organics**

The industry will submit an action plan within 6 months to ensure that no halogenated organics is sent to the flares in order to avoid formation of persistent organic pollutants. All HAPs had halongenated organics will be routed to the incineration system having end- on –pollution control facility.

8. **Control of fugitive emissions of carcinogenic compounds**

Fugitive emissions of carcinogenic compounds (e.g Benzene) will be controlled by closed vapor collection and recovery system. Measures will be taken to monitor health of the work

9. **Management of solid waste**

Proper facilities will be provided for handling and storage of hazardous waste with manifest system in case transported to other places. For incinerable waste, properly designed incinerator will be installed within the premises or as a common facility. The non-incinerable hazardous waste should be disposed of in a secure-land fill.

10. **Proper operation of incinerator**

Industry will check the design and will adopt sound engineering practices for proper operation of incinerators. Continuous monitoring will be done for operational parameters and specific

parameters in tail gas to ensure the efficient functioning. This will be implemented within 3 months.

11. Optimising the inventory of hazardous chemicals

Efforts will be made to optimize the inventory, particularly of hazardous chemicals. Such information will be made available to the Regulatory Agencies (SPCBs). Inspector of Factory & District Collector.

12. Self – regulation by industry through monitoring and environmental auditing.

Industry will go for self –assessment and regulation by conducting environmental auditing regularly, besides having regular monitoring of pollutants in air emission, liquid effluent and receiving environment.

13. Organizational restructuring and accreditation of environmental manager of industry

For self-evaluation, organizational restructuring will be done and the environmental manager of the industry will be accredited to bring professionalism in environmental management.

12.0 PHARMACEUTICALS

1. Segregation of waste streams

Waste streams should be segregated into high COD waste toxic waste, low COD waste, inorganic waste etc, for the purpose of providing appropriate treatment. Implementation by December, 31, 2003 and action plan to be submitted to SPCB by June 30, 2003.

2. Detoxification and treatment of high COD waste streams

High COD streams should be detoxified and treated in XTP or thermally destroyed in incinerator – Implementation by March 2004 and action plan to be submitted to SPCB by June 2003.

3. Management of solid waste

Proper facilities should be provided for handing and storage of hazardous waste. For final disposal of hazardous waste, recycling and reuse should be given priority, either within the premises or

outside with proper manifest system. In case of incinerable waste, property designed incinerator should be installed within the premises or outside as a common facility. The non-incinerable hazardous waste should be disposed of in properly designed secure-landfill either within the industry's premises or in a common facility-implementation by march 2004 and action plan to be submitted to SPCB by June 2003.

4. **Minimum scale of production to afford cost of pollution control**

For new industries which are not connected with CETP & TSDF and which do not have the economics to install treatment facilities may not be considered for granting consent to establishment. Industry association shall submit proposal to SPCB/CPCB – implementation by December 31, 2003 and action plan to be submitted to SPCB by June 30, 2003.

5. **Long term strategies for reduction in waste**

Consent for establishment and consent for operation under the Water Act will be based on pollution load and concentration of pollutants. Each industry will submit pollution load, concentration of final discharge alongwith water balance to SPCB/CPCB for formulation of strategy – action plan to be submitted to SPCB by June 30, 2003.

6. **Control of air pollution**

Industry will take up in priority the control of hardous air pollutants (such as benzene carbon tetrachloride 1-4 diocane, methanol, toluene, methyl chloride etc). and odorous compounds (mecapatan & hydrogen sulphide) – Implementation by Dec. 2004 and action plan to be submitted to SPCB by June 2003.

7. **Self – regulation by Industry through regular monitoring and environmental auditing**

Industries on their will carry out monitoring environmental parameters, audit it at regular interval and submit the same to SPCB- Implementation by June 2003.

Comment of BDMA- There shall be a policy for accreditating the auditors and the policy guidelines may be issued by MoEF.

8. Organistional restructuring and accreditation of Environmental Manager of Industry

(a) Environment management cell will be created for each industry reporting to CEO directly- Implementation by June 2003.

(b) There should be a certification system for the environmental managers at individual level and common facility level. BDMA may 2003 the programme along with SPCB/ CPCB Implementation by March 31, 2000 and action plan to be submitted to SPCB by July 2003.

9. Optimizing the inventory of hazardous chemicals

The Information shall be submitted to SPCB regularly alongwith rational- action plan to be submitted to SPCB by May 31, 2003.

13.0 PULP & PAPER INDUSTRY

Large Pulp and Paper	Implementation Schedule
Discharge of AOX kg/tonne of paper	AOX 1.5 kg/tonne of paper within 2 years AOX 1.0 kg/ tonne of paper in 5 years
Installation of lime kiln	Within 4 years
Wastewater discharge cum/ tonne of paper	Less than 140* cum/tonne of paper within 2 years Less than 120 cum/tonne in 4 years for units installed before 1992 Less than 100m^3 / tonne of paper per units installed after 1992.
Colour control by burning the reduced sulfur emissions in the boiler/lime-kiln	Installation of odour control system within 4 years.
Utilization of treated effluent for irrigation	Utilization of treated effluent for irrigation wherever possible
Colour removal from the effluent	Indian Paper Manufactures Association to take up project with Central Pulp & Paper Research Institute
Small Pulp and Paper	

Compliance of standard of BOD, COD & AOx	Recovery of chemicals by installation of Chemical recovery plant or utilization of black liquor with no discharge from pulp mill within 3 years OR Shift to waste paper
Upgradation of ETPs so as to meet discharge standards	ETPs to be upgraded within 1 year so as to meet dischaaarge standards.
Waster water discharge/ tonne of paper	Less than 150 cum/tonne of paper within 3 years
Utilization of treated effluent for irrigation	Utilization of treated effluent for irrigation wherever possible
Colour removal from the effluent	Indian Agro and Recycled Paper Manufacturers Association to take up project with CPPRI.

Note:- Non-complying units not meeting notified standards under Environment (Protection) Act.1986 will submit action plan with PERT Chart along with bank guarantee to SPCBs by June30,2003.

14.0 SUGAR INDUSTRY

1. Waste Water Management

- Operation of ETP shall be started atleast one month before starting of cane crushing to achieve desired MLSS so as to meet the prescribed standards from day one of the operation of maill.
- Reduce wastewater generation to 100 litres per tonne of cane by April 2004.
- To achieve zero discharge in inland surface water bodies by December 2004.
- To provide 15 days storage capacity for treated effluent to take care of no demand for irrigation by April 2004.

2. Emission Control

To install ESP/bag filter /high efficiency scrubber to comply with standards for particulate matter emission to< 150 mg/Nm^3 by April 2004.

15.0 TANNERY

(i) All the chrome tanning units in the country will have the Chrome Recovery Plant either on individual basis or on collective basis in the form of Common Chrome Recovery Plant and use the recovered chrome in the tanning process by December 2005.

(ii) Common Chrome Recovery Plant is to be installed and commissioned at Kanpur by December 2004 for which the Feasibility Report has already been prepared. All the chrome tanning units will make their financial contribution to the extent of 10% by June 2003.

(iii) Recovered Chromium is to be utilized in tanning process by December 2004.

2. **Waste Minimization Measures**

(i) Waste minimization circles will be formed in all the clusters of tanneries in the country to implement waste minimization measures and for adoption of clean technologies by March 2004.

(ii) Waste minimization measures as identified by the Task Force to be implemented in all the sanneries by December 2005.

3. **Reduction of Water Consumption in Tannery Units**

(i) All the tanneries will install waste meters and flow meters to measure actual consumption and waste water discharge by December 2003.

(ii) Waste consumption rates will be brought down to 28m^3 /tonne of hides by taking water conservation measures by December 2003.

4. **Compliance of Standards**

All CETPs and ETPs will take the following measuring

(i) Deployment of qualified and well trained

6. **Solid Waste Management**

For solid waste management, the following methods will be adopted.

(i) Utilization of Process sludge for by – product recovery. By December 2004.

(ii) Resource Recovey from process sludge and ETP sludge in the form of Biogas. By : December 2004.

(iii) Safe disposal hazardous sludge and non- hazardous solid wastes. By: December 2005.

7. **Salt from Solar Evaporation**

The following methods will be adopted depending on the site specific conditions:

(i) The following methods will be adopted depending on the site specific conditions:

(ii) Safe land disposal or Sea disposal wherever required.

8. Use of Boron bearing compounds will be dispensed with By : December 2003.

9. Ground water quality monitoring to be strengthened wherever the treated effluents are applied on land for irrigation. By : December 2004.

10. The implementation of recommendations of the Task Force constituted by the Ministry of Environment & Forests, Govt. of India Will commenced by June 2003.

Note:- Non complying units not meeting notified standards under Environment (Protection), 1981 will submit action plan with PERT Chart alongwith Bank Guarantee to SPCB by June 30, 2003.

16.0 THERMAL POWER PLANTS

1. Implementation of Environmental Standards (emission & effluent) in non- compliant* Power Plants (31 & 27)
   - Submission of action plan : June 30, 2003
   - Placement of order for Pollution of control equipment : September, 2003
   - Installation & commission : December 31, 2005.
2. For existing thermal power plants, a feasibility study whall be carried out by Central Electricity Authority (CEA) to examine possibility to reduce the particulate matter emissions to 100 mg/Nm^3. The studies shall also suggest the road map to meet 100 mg/Nm^3. The studies shall also suggest the road map to meet 100 mg/Nm^3 wherever found feasible. CEA shall submit the report by March 2004.
3. New / expansion power projects to be accorded environmental clearance on or after1.4.1.2003 shall meet the limit of 100 mg/Nm^3 for particulate matter.
4. Development of SO_2 & NO_x emission standards for coal based plants by December 2003.
   - New/ expansion power projects shall meet the limit of SO_2 & NO_x w.e.f. 1.1.2005.
   - Wxisting power plants shall meet the limit of SO_2 & NO_X w.e.f. 1.1.2006.
5. Install/activate opacity meters/ continuous monitoring system in all the units by December 31, 2004 with proper calibration system.
6. Development of guidelines/ standards for mearury and other toxic heavy metals emissions by December 2003.
7. Review of stack height requirement and guidelines for power plants based on micro meteorological data by June 2003.
8. Implementation of use of beneficiated coal as per GOI Notification:

Power plants will sign fuel supply agreement (FSA) to meet the requirement as per the matrix prepared by CEA for compliance of the notification as short term measure.

Options/mechanism for setting up of coal washeries as a long term measure

* Coal India will up its own washery
* Sate Electricity Board to set up its own washery
* Coal India to ask private entrepreneurs to set up washeries for CIL and taking washing charges
* SEBs to select a private entrepreneur to set up a washery near pit- head installation of coal beneficiation plant

9. Power plants will indicate their requirement of abandoned coal mines for ash disposal & Coal India/ MOC shall provide the list of abandoned mines by June 2003 to CEA.
10. Power plants will provide dry ash to the users outside the premises or uninterrupted access to the users within six months.
11. Power Plants should provide dry flyash free of cost to the users.
12. State P.W.Ds/ construction & development agencies shall also adhere to the specifications/Schedules of CPWD for ash based products utilization MoEF will take up the matter with State Governments.

13 (i) New plants to be accorded environmental clearance on or after 1.04.2003 shall adopt dry flyash extraction or dry disposal system or Medium (35-40%) ash concentration slurry disposal system or Lean phase with hundred percent ash wate re-circulation system depending upon site specific environmental situation.

(ii) Existing plants shall adopt any of the systems mentioned in 13 (i) by December 2004.

14. Flyash Mission shall prepare guidelines/manuals for flyash utilization by March 2004.

15. New plants shall promote adoption of clean coal and clean power generation technologies

* Units will submit bank guarantee to respective SPCB

17.0 ZINC INDUSTRY

1. Meeting SO_2 emission limit (2kg/tonne of H_2 SO_4 produced), 50 mg/Nm3 of acid mist by Dec 2006. Action plan to be submitted by July 2003.
2. SO_2 Emissions monitoring – Installation/ Proper operation, maintenance and calibration of continuous SO_2 monitoring system by 30th September 2003.
3. Solid and Hazardous Waste disposal: Construction of secured landfill for disposal of hazardous waste such a Jerosite cake, ETP cake and spent catalyst as per CPCB guidelines by 30 th June 2003.
4. Wastewater treatment and disposal: To achieve Zero discharge through 100% recycle/ reuse of treated wastewater by 31 st December 2004.
5. House Keeping: To reduce the generation of fugitive dust from vehicle movement and improve overall house keeping – by 31st December 2003.
6. Green Belt: To develop canopy based green belt around the periphery of plant and township as per CPCB Guidelines

ATTACHMENT 7

CLEAN TECHNOLOGY RECOMMENDATIONS FOR ENERGY EFFICIENCY WITH EMISSION REDUCTION AS ENVIRONMENTAL CO BENEFIT IN PAT SECTOR INDUSTRIES, SMEs AND COMMERCIAL BUILDINGS

CLEAN TECHNOLOGY RECOMMENDATIONS FOR ENERGY EFFICIENCY WITH EMISSION REDUCTION AS ENVIRONMENTAL CO BENEFIT IN PAT SECTOR INDUSTRIES

Summary of Clean Technologies/Practices for Emission Reduction and Energy Efficiency in PAT Sector Industries

PAT Sector – Aluminium

- Storage of dust forming materials in enclosed buildings or containers and transfer using pneumatic or enclosed conveyor systems.
- Reduce off-gas volumes wherever possible (*e.g.* by employing oxygen-smelting processes)
- Use of sealed furnaces and reactors with reduced pressure, or retrofit existing furnaces with maximum sealing (*e.g*. use of a "fourth hole" in the roof of an electric arc furnace to extract the process gases as efficiently as possible)
- Assess alternative smelting and processing technologies that optimize energy use (*e.g.,* flash smelting requires about half of energy of conventional blast furnace smelting,
- Employ heat and energy recovery techniques from gases generated by pyro-metallurgical processes and other similar utilities (*e.g.,* waste heat boilers, heat exchangers, steam-driven drives), Heat recovery techniques will be industry specific and even may include use of oxygen rich air to reduce energy consumption;
- Use of waste heat boilers to capture hot gases generated by smelting or roasting; and use of heat generated by smelting and refining processes to melt secondary materials/processes
- Use low-sulphur fuels (*e.g.,* natural gas instead of heavy fuel oil or coke) and raw materials (*e.g.,* lower sulphur content raw materials)
- Collect and treat acid mist (*e.g.,* using wet scrubbers or mist filters) generated in the milling stages of battery breaking
- Increased use of recycled aluminum; use of recycled aluminum requires significantly less energy than is required for primary production of Aluminium
- Change the reduction technology to minimize use of fossil carbon.
- Use damper controls that change extraction points automatically during different stages of process in order to target extraction effort to the fume source and there by minimize energy consumption. Extraction of fumes at the roof ventilator should be limited to be used as an additional mitigation only (like roof mounted canopy hoods over electric arc furnace to collect charging and tapping fugitive emissions which the fourth hole cannot achieve) and not as an alternative to fourth hole, because of its high energy use and reduced collection efficiency
- Control particulate matter emissions using electrostatic precipitators, bag filters, scrubbers, or cyclones that are appropriate for the exhaust stream characteristics

PAT Sector – Cement

- Partial replacement of limestone either by fly ash or granulated blast furnace slag will conserve energy and reduce air pollution and will also boost reuse of industrial wastes and conservation of natural resources

PAT Sector – Chlor – Alkali

- MBCP (Membrane Cell Process) should be promoted over other processes like MRCP (Mercury Cell Process) and DCP (Diaphragm Cell Process) as MBCP is highly energy-efficient and use of mercury could be avoided, which is environmentally detrimental

PAT Sector – Paper & pulp

- Use energy-efficient processes and equipments such as steam and utility boilers, for black liquor chemical recovery.

PAT Sector – Textile

- Use of non-permanent flame retardants and cross-linking agents with high formaldehyde levels should be avoided.
- Using mechanical dewatering equipment to reduce water content of the incoming fabric and reduce energy consumption in stenter frame.
- Use of automatic systems for temperature control, dosing and dispensing dyes.

PAT Sector – Fertilizer

- Flow meters should be installed for measuring the input water and wastewater discharge from the battery limit
- Adequate control systems should be provided to achieve norms on total fluoride (gaseous and particulate)
- Appropriate systems like scrubbers should be installed for achieving existing norms of urea dust emissions.
- In case of sulphuric acid plants, switch over to DCDA (Double Conversion Double Absorption) from SCSA (Single Conversion Single Absorption) system to meet the emission standards for SO_2

PAT Sector – Iron & Steel

- Energy can be recovered from top Blast Furnace (BF) gas and use of by –products gases for power generation.
- Full capture of off-gases from coke oven, BF and BOF(Basic oxygen furnace) and recycling gases containing CO
- Use of foamy slag practices in electric arc furnace (EAF) process and thereby reducing energy consumption and environmental pollution.
- Use of waste gas through a heat exchanger to recover gas thermal energy, and as a combustion gas to produce hot water and air, and / or steam and power
- Implement good practice for combustion, such as oxygen enrichment or preheating of blast air and automatic control of combustion parameters;
- Reduce fuel consumption in heating and thermal treatment by using recovery gas and / or adopting good combustion control;
- Select fuel with a lower ratio of carbon content to calorific value, such as natural gas (CH_4)
- Some alternative technologies in iron and steel sector, which have energy / environmental benefits, are summarized here under:

- Rapid pre-heating of coal charge and rapid carbonization and further heating of coke carbonized up to medium temperatures can lead to energy and environmental benefits like improved coke strength, reduced coking time, increased potential use of poor coking coal, reduced NOx, smoke and dust emissions and concurrently can lead to reduced energy consumption
- Adaptation of wet coke quenching in old plants can lead to better quality of Coke product ion along with energy recovery and environmental co-benefits like decreased dust, CO_2 and SOx emissions and decreased water consumption efficiency
- Smelting reduction processes, involving the pre-reduction of iron ore by gases from hot bath, prior to melting it in bath will lead to production of direct reduced iron and enable use of excess gas produced for power generation. This will lead to energy and environmental co benefits like low environmental impacts, reduced coke oven or sinter plant emissions, reduced CO_2, SO_2 and NOx emissions, no production of dioxins, furans, tars and phenols.
- Recycling of steel plant dust material and slag will enable effective uses of coal energy

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CLEAN TECHNOLOGY RECOMMENDATIONS FOR ENERGY EFFICIENCY WITH EMISSION REDUCTION AS ENVIRONMENTAL CO BENEFIT IN SMEs

Summary of Clean Technologies/Practices for Emission Reduction and Energy Efficiency in SMEs

The BEE- SME program conducted by BEE and a study[1] carried out, has identified several EE measures relevant for SMEs. The studies have clearly indicated sector specific technologies (SST) and cross-cutting technologies (CCT) to improve the energy efficiency. Some of the indicative measures but not limited to the following to achieve EE in SMEs are summarised hereunder.

Mechanisms to Achieve Energy Efficiency (EE) in SMEs

1	Technology Reengineering	• Replacing the traditionally used source of energy with a new source (coal with diesel / LPG, diesel with LPG etc.) • Installation of equipment for recycling of heat • Installation of equipment for improving insulation and reducing heat loss • Installation of energy efficient machines • Installation of equipment for reducing leakage of electricity • Changes to existing equipment so that more than one unit of output is processed using the same energy • Replacing CRT monitors with TFT / LCD monitors
2	Process Reengineering	• Recycling waste organic products and using them as a source of fuel • Using ambient heat for drying • Using natural wind for drying • Altering the timing of shifts to maximize the use of daylight and day temperature
3	Streamlining Housekeeping Practices	• Using CFL • Using daylight • Use of natural ventilation
4	Sector-Specific Technologies (SST) for EE	SSTs for EE include process furnaces, dryers, jet dyeing machines and hot air generators have large energy saving potential
5	Cross-Cutting Technologies (CCT) for EE	CCTs for EE include boilers, hot water generators, cogeneration, electric motors & drives and pumps have significant scope for energy saving potential

[1] Study conducted by Agence Francaise de Development(AFD), Bureau of Energy Efficiency(BEE), French Environment and Energy Management Agency(ADEME) and The Energy and Resources Institute(TERI)

CLEAN TECHNOLOGY RECOMMENDATIONS FOR ENERGY EFFICIENCY WITH EMISSION REDUCTION AS ENVIRONMENTAL CO BENEFIT IN COMMERCIAL BUILDINGS

User Guide for Energy Conservation Building Code is available at the following link

http://www.beeindia.in/schemes/documents/ecbc/eco3/ecbc/ECBC-User-Guide(Public).pdf

ATTACHMENT 8

ESDD REFERENCE CHECKLIST TEMPLATE
(Applicable for all PRSF Target Sectors)

ESDD REFERENCE CHECKLIST TEMPLATE
(Applicable for all PRSF Target Sectors)

S. No.	Checklist Information	Yes / No / Not Applicable	Guidance for elaboration & inclusion in ESDD
1	Consent(s) / Clearances from SPCB / CPCB	Yes / No	If yes, Check validity, consent, conditions imposed and evidence for compliance of the same by industry. If no or 'Not applicable', state clearly reasons
2	Whether industry has received any notice for regulatory non compliance or violation of norms or consent conditions.	Yes / No	If yes, state reasons, which led to industry being notified as 'non compliant' and actions undertaken to become compliant. State clearly whether the issue has been resolved, if not when it is likely to be resolved and implications, if not resolved.
3	Whether industry carryout periodical environmental monitoring as per the stipulated regulatory norms or on its own initiative	Yes / No	If yes, collect and review last two quarters monitoring report and check for any parameter(s), which exceed permissible limit. Seek clarification for the same state whether the monitoring reports are being periodically submitted to Regulatory Bodies as per stipulated requirements. If no, state reasons clearly for not conducting periodical environmental monitoring.
4	Whether industry has adopted best environmental practices	Yes / No	If yes, state since when and summarise the practices and indicate the associated environmental benefits accrued thereof. If no, state whether industry has any such plans in near future and provide a brief summary and benefits thereof, if such plans are implemented.
5	Whether industry has adopted 'Clean technology initiatives' leading to emission reductions and environmental co-benefits	Yes / No	If yes, briefly summarize and clearly state the extent of emission reduction achieved, if any and state, if it is better than applicable regulatory norms. If no, state whether industry has any such plans in near future for reduction in emissions better than regulatory norms.
6	Whether industry has adopted 'Zero Effluent initiatives' or effluent reuse / recycling	Yes / No	If yes, briefly summarise and clearly state the extent of success achieved, if any If no, state whether industry has any such plans in near future for 'Zero Effluent initiatives' or effluent reuse / recycling
7	Whether industry has adopted performed a self check for regulatory compliances and conducting comprehensive third party environmental audit in last 6 months	Yes / No	If yes, briefly summarise the findings of the report along with documentary evidence. If no, state clearly reasons for not doing so. State whether industry has any definite plan in near future to do so.
8	Whether industry has accreditations like ISO 14000; OHSAS 18001 or	Yes / No	If yes, provide a list of all such accreditations along with documentary evidence.

S. No.	Checklist Information	Yes / No / Not Applicable	Guidance for elaboration & inclusion in ESDD
	has received any recognitions for being environmental or sustainable / friendly initiatives or having best EHS practices		

Note:

All responses to the checklist information shall be briefly summarized and supported with documentary evidence, to the extent possible and compiled in the respective sections of the ESDD report,. A suggested contents of a Typical ESDD Report (Regulatory Compliances and Environmental Co-benefits) is given in attachment 10 to Appendix **(ERMF Baseline Analysis**

ATTACHMENT 9

ESDD REFERENCES CHECKLIST TEMPLATE
(Applicable only for Large Scale PAT Sector Industries)

ESDD REFERENCES CHECKLIST TEMPLATE
(Applicable only for Large Scale PAT Sector Industries)

S. No.	Checklist Item	Yes / No / Not applicable	Guidance for further elaboration & inclusion in ESDD
1	Whether industry is located in the critically polluted or environmentally sensitive areas declared by the State / Central Regulatory bodies	Yes / No	If yes, briefly summarise the sensitivity analysis of the industries in terms of its location in critically polluted and / or environmentally sensitive areas along with moratoriums, imposed by the Govt. of India, if any (Ref. Appendix for Baseline Analysis). Also state the likely impediments for lifting of the moratorium, if known.
2	Whether industry carry any environmental and / or regulatory risks for implementation of EE Proposals	Yes / No	If yes, briefly summarise the risks and / or implications which restrict or limit the implementation of EE proposals to the specific industry. The effort shall be to identify and rule out possible environmental / regulatory risks involved, if any for preparing and implementing EE proposals and seek 'in principle go ahead' from PFI's / PEA for preparation of EE proposals.
3	Identify major gaps between Govt. of India Regulations and corresponding industry specific WBG EHS Guidelines	Yes / No	If yes, bring all major gaps, if any between the GOI regulatory requirements and WBG EHS Guidelines on industry specific emissions, as may be applicable to rule out credit, environmental and / or reputational risks.
4	Whether industry has accreditations like ISO 14000; OHSAS 18001 or has received any recognitions for being environmental or sustainable / friendly initiatives or having best EHS practices	Yes / No	If yes, provide a list of all such accreditations along with documentary evidences.

Note: All responses to the checklist information shall be briefly summarized and supported with documentary evidence, to the extent possible and compiled in the respective sections of the ESDD report,. A suggested contents of a Typical ESDD Report (Regulatory Compliances and Environmental Co-benefits) is given in attachment 10 to Appendix **(ERMF Baseline Analysis**

ATTACHMENT 10

CONTENTS OF A TYPICAL ESDD REPORT
(Regulatory Compliances and Environmental Co-benefits)

CONTENTS OF A TYPICAL ESDD REPORT

(Regulatory Compliances and Environmental Co-benefits)

1. Background / Introduction
2. Brief Summary of Industry Specific EE Proposal
3. Applicable Environmental Regulatory Requirements
4. Regulatory Compliance status of the Specific Industry
5. Non compliances and Remedial actions by Industry
6. Environmental / Regulatory / Reputational risks
7. Best Environmental Practices / Awards / Recognition(s)
8. Anticipated Environmental Benefits of EE Proposals
9. Recommendations
10. Conclusions

Note: ESDD report shall be prepared, briefly summarizing the above and address the various issues mentioned as per the reference checklist template 8 and 9 as well those listed under the Roles & Responsibilities for ESCO's/Host Entities (Section 3 and Exhibit 5). In case of large scale industries, including PAT sector, the ESDD shall specifically cover the additional issues / risks as per the reference checklist template 9.

The ESDD shall include or supported with documentary evidence for all regulatory compliances, periodical monitoring reports, awards / recognitions / best practice among others, wherever applicable under respective sections as per the suggested contents of the ESDD Report.

ATTACHMENT 11

TYPICAL CONTENT FOR AN ENVIRONMENTAL SAFEGUARDS COMPLIANCE AUDIT REPORT

TYPICAL CONTENT FOR AN ENVIRONMENTAL SAFEGUARDS COMPLIANCE AUDIT REPORT

1. Introduction / Background of Host Entities.
2. Objective of Audit
3. Applicable Regulatory Compliances
4. Status of Host Entities Regulatory Compliance Requirements
5. Status on Outstanding Regulatory Issues and/or Consent Conditions
6. Status on Periodical Environmental Monitoring & Compliance of Consent Conditions
7. Corrective Action Plan for Major Gaps in Regulatory Compliance(s)
8. Recommendations
9. Conclusions

Note: Host entity shall submit and / or share the comprehensive environmental audit report along with the Action Taken Report on the suggested Corrective Action Plan, as may be necessary with the ESCOs, to enable their own environmental safeguard due diligence (ESDD), a pre-requisite for appraisal and approval of EE proposals by PFI(s) / PEA. All contents of the Audit Report shall include or supported with adequate documentary evidence for all suggested contents of the Report.

ATTACHMENT 12

LIST OF PARTICIPANTS AND PHOTOGRAPHS TAKEN DURING STAKE HOLDER CONSULTATIONS HELD ON 16TH APRIL 2013 AND 4TH SEPTEMBER 2013

ESCOS' CONSULTATION MEETING
ON
GOI-WORLD BANK'S PROGRAM ON
PARTIAL RISK SHARING FACILITY
16 April 2013
The World Bank, HT House, KG Marg, New Delhi

List of Participants

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Photographs taken during Stake Holder Consultations held on 16th April 2013 and 4th September 2013

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