ANNEX 3.2 GUIDELINES FOR SELF-MONITORING AND REPORTING BY THE INDUSTRY

Guidelines for Self-Monitoring and Reporting by the Industry

Final Report
March 1998

The guidelines for self-monitoring and reporting by the industry was approved by the Pakistan Environmental Protection Council (PEPC) in August, 1999. The text of the Final Draft is as follows:

1. Scope

These guidelines would be applicable to industry both in public as well as private sectors.

2. Overview

The Environmental Standard Committee (ESC) was constituted in March 1996 to prepare recommendations for the implementation of National Environmental Quality Standards (NEQS). In its meeting held on September 23, 1997, ESC decided that guidelines for self monitoring will be prepared and finalized at the earliest after due consultation with the industry.

The proposed `Guidelines for Self-Monitoring and Reporting by the Industry' covered in this document describe the monitoring and reporting guidelines for industrial effluents and gaseous emissions. Supporting guidelines on sampling procedures, handling, transport, storage and preservation of samples, procedures for analysis of various pollutants in the effluents/gaseous emissions and their flow rates measurements have also been prepared and issued.

3. Legal Basis

The Environmental Protection Act, 1997 approved by the President of Pakistan contains the following clauses that provide a legal basis for environmental monitoring:

- Section 6(1) (i): The Federal Agency shall establish systems and procedures for surveys, surveillance, monitoring, measurement, examination, investigation, research, inspection and audit to prevent and control pollution, and to estimate the costs of cleaning up pollution and rehabilitating the environment in various sectors; and

- Section 11 Prohibition of certain discharge or emissions: (1) Subject to the provision of this Act and the rules and regulations made thereunder no person shall discharge or emit or allow the discharge or emission or any effluent or waste or air pollution or noise in an amount, concentration or level which is in excess of the National Environmental Quality Standards or, where applicable the standards established under sub-clause (i) of clause (g) of sub-section (1) of section 6.

Application of the law would require monitoring and reporting against the complete list of NEQS issued under the relevant legislation. However, such an approach is neither necessary nor cost effective. Recognizing the lack of experience and technical capacity in the industry, the monitoring and reporting framework should be simple, and implementable in prevailing local conditions. In addition to legal considerations, the following factors have been given due consideration in development of the monitoring and reporting guidelines:

- Pollution Levels: Frequent monitoring is needed in the industry where pollution impacts are high.

- Toxicity of Pollutants: More toxic pollutants need to be measured more frequently.

- Cost of Monitoring: A balance has to be sought between the need for the data and the cost of acquiring the data.

4. Categorization of Industries

In accordance with the international standards and practices the industries have been categorized as follows:

- Category A.
- Category B.
- Category C.

5. Priority Parameters and Monitoring and Reporting Schedules

Priority parameters for liquid effluents and gaseous emissions and recommended monitoring frequencies for the three categories of industry are given in Tables A through F. Sample reporting formats are also attached. Explanatory notes are as follows:

The following two plant conditions have been considered:

- Normal plant operating conditions
- Start-up and Upset Conditions

For liquid effluents, a reporting frequency of monthly for Category A, quarterly for Category B, and biannually for Category C is recommended. For gaseous emissions, monitoring and reporting of relevant NEQS parameters is proposed in Table D. Reporting frequency of monthly for category A and quarterly for category B have been recommended (Tables E & F).

The level of emissions can be substantially higher during plant start-ups and upset conditions. In addition to priority parameters for monitoring under normal operating conditions, a shorter list of parameters for monitoring under plant start-up and upset conditions is proposed for Category A industries only. For selected industries, additional parameters and more frequent monitoring may be specified by EPA. In order to verify and monitor the self-reporting process, random checks will be made by EPAs from time to time in consultation with the industrial unit concerned. Interested NGOs will be allowed to

accompany EPAs on such visits to ensure transparency (and neutrality) in the monitoring process.

For parameters other then those for which pollution charges have been proposed, the existing NEQS will apply as given under section 11 (1) of Pakistan Environmental Protection Act, 1997.

6. Recording and Reporting of Plant Start-up and Upset Schedules

Industries in Category A would be required to maintain a record of times during which start-up and upset conditions occur. Total time for start-up and upset conditions would be reported on a periodic basis. Sample reporting formats are attached herewith.

7. New Industries

For the new industries, EIA guidelines may specifically set a prior requirement of Approval of Plant Operation. Once after the plant start-up, a comprehensive monitoring report for all NEQS parameters for normal plant operations may be required to establish that the plant does meet the environmental commitments made in the EIA submitted. Subsequent monitoring will then be limited to priority parameters only as suggested in this proposal.

8. Solid Waste

Regulations for solid waste are under preparation. Monitoring and reporting procedures for solid waste will be prepared after the NEQS for solid waste are approved by the PEPC and released by the Federal EPA.

9. Special Cases

Large industrial units and projects such as Saindek, Pakistan Steel Mills, Thermal Power Plants, Wah Ordinance Factory etc., will be categorized as special industries and would be identified by the concerned EPAs and EPDs. All special industries, in addition to compliance with these guidelines (for category A) may be required to follow more strict and specific monitoring and reporting requirements to be formulated by EPA.

10. Review and Revisions

Necessary changes in these guidelines will be made from time to time in view of the experience gained through implementation.

11. Environmental Database

In view of the large volumes and diverse nature of data, systems support will be required for compilation and management of data. Regular monitoring and reporting of data will help develop the environmental databases at provincial levels, which will be a part of the Federal EPA, National Environmental Database.

Table - A : Priority Parameters for Monitoring of Liquid Effluents: Category - A

S.No	Industry	Priority Parameters for Normal Plant Conditions to be Reported on a Monthly Basis [1]	Priority Parameters for Start-up and Upset Conditions to be Recorded on an Hourly Basis
1.	Chlor-Alkali (Mercury Cell)	Effluent Flow, Temperature, pH, TSS, Chlorine, Mercury, Chlorides	Effluent Flow, Temperature, pH, TSS, Mercury, Chlorides
2.	Chlor-Alkali (Diaphragm Cell)	Effluent Flow, Temperature, pH, TSS, Chlorine, Chlorides	Effluent Flow, Temperature, pH, TSS, Chlorides
3.	Metal Finishing and Electroplating [2]	Effluent Flow Temperature, pH, TSS, Oil & Grease, Arsenic, Cadmium, Chromium (trivalent), Chromium (hexavalent), Lead, Nickle, Mercury, Silver, Zinc, Fluorides, Cyanides	Effluent Flow, Temperature, pH, TSS
4.	Nitrogenous Fertilizer	Effluent Flow, Temperature, pH, TSS, Ammonia, COD	Effluent Flow, Temperature, pH, TSS
5.	Phosphate Fertilizer	Effluent Flow, Temperature, pH, TSS, Cadmium, Fluorides, COD	Effluent Flow, Temperature, pH, TSS
6.	Pulp and Paper	Effluent Flow, Temperature, pH, COD, TSS, TDS, Sulfides, BOD_5	Effluent Flow, Temperature, pH, TDS, TSS
7.	Pesticides Formulation	Effluent Flow, Pesticides	Effluent Flow
8.	Petroleum Refining	Effluent Flow, Temperature, pH, COD, TSS, BOD_5, Oil & Grease, Phenolic, Compounds	Effluent Flow Temperature, pH, TSS
9.	Steel Industry[3]	Effluent Flow, Temperature, pH, COD, TSS, TDS, Chromium (trivalent), Iron, Oil & Grease, Cadmium Copper	Effluent Flow Temperature, pH, TSS
10.	Synthetic Fiber	Effluent Flow, Temperature, pH, BOD_5,COD, TSS, Oil & Grease, Sulfides	Effluent Flow Temperature, pH, TSS
11.	Tanning and Leather Finishing	Effluent Flow, Temperature, pH, BOD_5,COD, TSS, Sulfide, Oil & grease, Chromium (trivalent), Chromium (hexavalent), TDS, Phenolic, Compounds	Effluent Flow Temperature, pH, TSS
12.	Textile Processing	Effluent Flow, Temperature, pH, COD, TSS, TDS, Chromium, Copper, BOD_5	Effluent Flow Temperature, pH, TSS
13.	Pigments and Dyes	Effluent Flow, pH, Temperature, COD, Lead, Copper, Zinc	Effluent Flow Temperature, pH
14.	Thermal Power Plants (oil fired and coal fired)	Effluent Flow, Temperature, pH, TSS, Oil & Grease	Effluent Flow Temperature, pH
15.	Rubber Products	COD, Cadmium, TSS	TSS
16.	Paints, Varnishes & Lacquers	pH, TSS, COD, Lead, Chromium, Cadmium, Zinc, Barium	pH, TSS
17.	Pesticides	COD, Mercury, Pesticides	COD
18.	Printing	COD, Lead	COD
19.	Industrial Chemicals	pH, COD, TDS, Phenolic Compounds, Cyanide, Ammonia, cadmium, Lead[2], Chromium[2], Mercury[2], Nickle[2], Zinc[2], Arsenic[2]	pH, COD, TDS
20.	Oil & Gas Production	Effluent Flow, Temperature, pH, COD, TSS, TDS, Oil & Grease, Chloride, BOD_5, Phenolic, Compounds	Effluent Flow, Temperature, pH, TSS, TDS
21.	Petrochemicals	Effluent Flow, Temperature, pH, COD, TSS, TDS, Oil & Grease, BOD_5, Phenolic, Compounds	Effluent Flow, Temperature, pH, TSS, TDS

[1]. Industry using chromium in its cooling water system will also report Chromium (trivalent, hexavalent) in addition to the stipulated priority parameters for each sector.

[2]. Priority parameters will be limited to those occurring in chemicals and raw-materials used.

[3]. Steel Industry includes steel re-rolling mills, electric furnaces, and foundries.

Table - B : Priority Parameters for Monitoring of Liquid Effluents: Category - B

S. No.	Industry	Priority Parameters for Normal Plant Conditions to be Reported on a Quarterly Basis [1]
1.	Dairy Industry	Effluent Flow, Temperature, pH, BOD_5, COD, TSS, TDS, Oil & Grease
2.	Fruit and Vegetable Processing	Effluent Flow, Temperature, pH, BOD_5, COD, TSS,
3.	Glass Manufacturing	Effluent Flow, Temperature, pH, COD, TSS, Oil & Grease
4.	Sugar	Effluent Flow, Temperature, pH, BOD_5, COD, TSS, Oil & Grease
5.	Detergent	pH, COD, Oil & Grease, An-ionic Detergent
6.	Photographic	pH, COD, Silver, Cyanide, Fluoride
7.	Glue Manufacture	BOD_5, COD, pH
8.	Oil & Gas Exploration	Effluent Flow, Temperature, pH, COD, TSS, TDS, Oil & Grease, Chloride, BOD_5, Phenolic, Compounds
9.	Thermal Power Plants (Gas Fired)	Effluent Flow, Temperature, pH, TSS, Oil & Grease
10.	Vegetable Oil & Ghee Mills	Effluent Flow, Temperature, pH, BOD_5, COD, TSS, Oil & Grease
11.	Woolen Mills	Effluent Flow, Temperature, pH, BOD_5, COD, TSS, TDS, Chromium, Oil & Grease
12.	Plastic Materials and Products	TSS
13.	Wood and Cork Products	pH, TSS, COD, Phenolic, Compounds

[1] Industry using chromium in its cooling water system will also report chromium (trivalent, hexavalent) in addition to the stipulated priority parameters for each sector.

Table - C : Priority Parameters for Monitoring of Liquid Effluents: Category - C

S. No.	Industry	Priority Parameters for Normal Plant Conditions to be Reported on a Biannual Basis [1]
1.	Pharmaceutical (formulation) industry, marble crushing, Cement, and any other industry as notified by EPAs	Effluent Flow, Temperature, pH, COD, TSS, TDS

[1] Industry using chromium in its cooling water system will also report chromium (trivalent, hexavalent) in addition to the stipulated priority parameters for each sector.

Table - D : Priority Parameters for Monitoring of Gaseous Emissions

S. No.	Emission Source	Priority Parameters[2] for Reporting
1.	Boiler, Ovens, Furnaces and Kilns Gas Fired	CO, NOx
	Oil Fired	CO, NOx, SOx, Particulates
	Coal	CO, NOx, SOx, Particulates
	Bagasse and Firewood	CO, Particulates
2.	Brick Kilns	CO, NOx, SOx, Particulates
3.	Thermal Power Plants	SOx, NOx, Particulates
4.	Process Emissions [1]	Particulates, Ammonia, Chlorine, H_2S, Flouride, SOx, NOx, CO, Mercury*, Lead*, Zinc*, Cadmium, Arsenic*, Antimony*

[1]. Process emissions involving fuel combustion will also include parameters as for Boilers, Ovens, Furnaces and Kilns.

[2]. Metal analyses of all gaseous emissions would be carried out once in two years.

* Priority parameters will be limited to those occurring in chemicals and raw-materials used.

Table - E : Priority Parameters for Monitoring of Gaseous Emissions : Category - A

S. No.	Industry	Priority Parameters for Normal Plant Conditions to be Reported on a Monthly Basis	
		Process Emission	Emission from Fired Equipment
1.	Cement	Particulates	CO, *SOx, NOx, Particulates
2.	Glass Manufacturing	Particulates	CO, *SOx, NOx, Particulates
3.	Iron and Steel	Particulates, Fluorides, CO, NOx, SOx	
4.	Nitrogenous Fertilizers	Ammonia, Particulates	CO, *SOx, NOx, Particulates
5.	Phosphate Fertilizers	Ammonia, Fluoride Particulates	
6.	Oil & Gas Production	CO, *SOx, NOx, H_2S, Particulates	
7.	Petroleum Refining	H_2S, NOx, SOx, Particulates	CO, *SOx, NOx, Particulates
8.	Pulp and Paper	Chlorine, SOx	CO, *SOx, NOx, Particulates
9.	Thermal Power Plants (Coal and Oil based)		*SOx, NOx, CO, Heavy Metals and Particulates
10.	Boilers, Ovens, Furnaces and Kilns (Coal and Oil fired)		CO, NOx, *SOx, Particulates
11.	Brick Kilns (Firewood and Bagasse)		CO, Particulates

[1]. Metal analyses of all gaseous emission would be carried out once in two years.

* Only where fuel contains hydrogen sulphide (H_2S) more than 20 ppm.

Table - F : Priority Parameters for Monitoring of Gaseous Emissions : Category - B

S. No.	Industry	Priority Parameters for Normal Plant Conditions to be Reported on a Quarterly Basis	
		Process Emission	**Emission from Fired Equipment**
1.	Sugar	Particulates	CO, *SOx, NOx, Particulates
2.	Textile		CO, *SOx, NOx, Particulates
3.	Chloralkali Plants	Chlorine	
4.	Dairy Industry		CO, NOx, *SOx, Particulates
5.	Fruits and Vegetables		CO, NOx, *SOx, Particulates
6.	Metal Finishing and Electroplating	Particulates	
7.	Boilers, Ovens, Furnaces and Kilns (Gas-Fired)		CO, NOx,

[1]. Metal analyses of all gaseous emission would be carried out once in two years.

* Only where fuel contains hydrogen sulphide (H_2S) more than 20 ppm.

Environmental Monitoring Report, Cover Sheet

Reference No :		Date :
Company Name :		
Address :		
Telephone :		Fax :
Reporting Period :	From :	To :
Total Production During the Reporting Period (kg/tons) :		
Total Start-up and Plant Upset Duration (Hours) :		Total Normal Operating Days :
Name and Address of the Environmental Laboratory :		
Prepared By :		**Reported By :**

Liquid Effluents Monitoring Report

Name of the Industry: Pulp and Paper (Example)		**Reporting Period**			
	NEQS	**Effluent Stream 1**		**Effluent Stream 2**	
Stream Identification					
		Under N.P.C.	**Deviation from NEQS**	**Under N.P.C.**	**Deviation from NEQS**
Date Sampled					
Effluent Flow (m^3/day)					
Temperature	40 (^oC)				
pH	6 - 10				
BOD_5	80 mg/l.				
COD	150 mg/l.				
TSS	150 mg/l.				
TDS	3,500 mg/l.				
Sulfides	1 mg/l.				

Gaseous Emissions Monitoring Report

Name of Industry: Cement (Example)			Reporting Period:		
Parameters	**NEQS**	**Stack 1 N.P.C.**	**Stack 1 Deviation from NEQS**	**Stack 2 N.P.C.**	**Stack 2 Deviation from NEQS**
Stack Identification					
Date Sampled					
Fuel Used					
Carbon Monoxide (CO)	800 mg/Nm^3				
Oxides of Nitrogen (NOx)	400 mg/Nm^3				
Sulfur Oxides (SOx)	400 mg/Nm^3				
Particulates	300 mg/Nm^3				

Note: Fugitive emissions or leaks to be detected and controlled.
N.P.C. = Normal Plant Condition