



MAR 18 1993

DENR ADMINISTRATIVE ORDER NO. 14
Series of 1993

**SUBJECT: REVISED AIR QUALITY STANDARDS OF 1992, REVISING
AND AMENDING THE AIR QUALITY STANDARDS OF 1978**

Pursuant to the provisions of Section 6 (i) of Presidential Decree No. 984, otherwise known as the "Pollution Decree of 1976", and by virtue of Executive Order No. 192, Series of 1987, the Department of Environment and Natural Resources hereby adopts and promulgates the following rules and regulations:

Section 1. Title. - These rules and regulations shall be known as the "Air Quality Standards and Rules and Regulations Relating to Air Pollution Control of 1993".

Section 2. Scope. - These rules and regulations shall apply to all industrial emissions and other establishments which are potential sources of air pollution.

Section 3. Definitions. - The following words and phrases when used in this Chapter shall, unless the context clearly indicates otherwise, have the following meanings:

(a) "Acid Mist" means minute liquid droplets of any acid, including, but not limited to, sulfuric acid, sulfur trioxide, hydrochloric acid and nitric acid.

(b) "Air Pollutant" or "Air Impurity" or "Air Contaminant" means any matter found in the atmosphere other than oxygen, nitrogen, water vapor, carbon dioxide and the inert gases in their natural or normal concentrations, and includes smoke, dust, soot, cinders, fly ash, solid particles of any kind, gases, fumes, mists, odors and radio-active substances.

(c) "Air Pollutant Source" or "Source" means any identifiable piece of process equipment at, from, or by means of which there is emitted into the atmosphere any pollutant(s). A "facility" is composed of one or more air pollutant sources.

(d) "Airborne Dust" means minute solid particles released into or carried into the atmosphere by natural forces or by any fuel-burning, combustion, or process equipment or device, or by construction works, or by mechanical or industrial processes.

(e) "Control Equipment" means:

(1) any apparatus for separating any air impurities from the gas medium in which they are carried;

(2) any device used for securing the more efficient operation of any fuel-burning equipment;

(3) any other device used for the purpose of limiting or reducing air pollutants; and

(4) any device to indicate or record air pollution to give warning of excessive pollution, provided that such device is used in conjunction with the equipment as defined in items (1) and (2) and (3) above.

(f) "Equivalent Method" means any method of sampling and analyzing for an air pollutant deemed by the Department to be equivalent in sensitivity, accuracy, reproducibility and selectivity to the selected U.S. EPA Comparison Methods or other internationally accepted methods.

(g) "Existing Source" means any source already erected, installed, and in operation; or any source for which construction has been offered for bidding or actual construction has commenced prior to the effectivity date of these revised Rules and Regulations, except that any existing source which in the considered opinion of the Department has undergone a modification after the date of adoption of an applicable rule or regulation, shall be reclassified and considered a new source.

(h) "Fly Ash" means any solid particulate matter capable of being gas-borne and consisting essentially of fused ash and/or partially burned materials like coal, wood, bagasse or other combustible matter.

(i) "Fuel-burning Equipment" means any equipment, device, or contrivance and all appurtenances thereto, including ducts, breechings, fuel-feeding equipment, ash removal equipment, controls, stacks, and chimneys, used primarily, but not exclusively, to burn any fuel for the purpose of direct process applications or indirect heating such as in the production of hot air or hot water.

(j) "Fuel-burning Steam Generators" means furnaces and boilers which produce steam by combustion of liquid, solid or gaseous fuels.

(k) "Fugitive Particulate" means the particulate matter which escapes and becomes airborne from unenclosed industrial operation, or that which escapes from incompletely or partially enclosed operation into the outside atmosphere without passing or being conducted through a flue pipe, stack or other structure.

(l) "Fumes" means an airborne colloidal system which is formed by chemical reactions or by processes such as combustion, distillation, sublimation, calcination or condensation, and containing particulate matter of a size generally less than 1.0 micron.

(m) "Guide" or "Guideline Value" means the concentration of air over specified periods classified as short-term and long-term periods which are intended to serve as objectives or goals for the protection of health and/or public welfare. These values are not necessarily intended for direct enforcement but only for air quality management purposes such as determining time trends, evaluating stages of deterioration or enhancement of the air quality and in general use as basis for taking positive action in preventing, controlling or abating pollution.

(n) "Incinerator" means any equipment, device or contrivance and all appurtenance thereof used primarily for destruction by burning solid, semi-solid, liquid, gaseous combustible wastes and/or other similar materials.

(o) "Major Source" or "Facility" means any source or sources for which the potential emission rate after air pollution control equipment has been installed is equal to or greater than 100 tonnes per year of any of the following pollutants- particulate matter, sulfur oxides, nitrogen oxides or volatile organic compounds. Best available control technology is used in major sources.

(p) "Modification" means any process change, or any physical change in, or change in the method of operation of, an existing equipment or source, which increases the potential emission rate of any air contaminant emitted by such source, or which results in the emission of any contaminant not previously emitted except that:

(1) routine maintenance, repair and replacement shall not be considered physical changes; and

(2) the following shall not be considered a change in the method of operation;

(i) an increase in the production rate, if such increase does not exceed the operating designed capacity of the existing source.

(ii) an increase in hours of operation

(q) "New Source" means any plant, equipment, or installation in any trade, business, or establishment which generates, emits or disposes air impurities into the atmosphere and constructed after the effectivity date of these revised rules and regulations. This includes any existing stationary source transferred or moved to a different location or site for the purpose of installation, operation or use after such date.

(r) "Non-Attainment Area" means an airshed or a region that does not meet any of the ambient standards or guidelines set in the regulations.

(s) "Normal Cubic Meter" (Ncm) means the volume of dry gas

which occupies a cubic meter measured at twenty five degrees celsius (25°C) and at an absolute pressure equivalent to seven hundred sixty (760) mm Hg.

(t) "Opacity" means a state which renders materials partially or wholly impervious to rays of light, causing obstruction of the observer's view.

(u) "Owner" or "Operator" means any person who owns, leases, operates, controls or supervises any facility, article, machine, equipment, other contrivance or source.

(v) "Particulate Matter" or "Suspended Particulate" means any material, other than uncombined water, which exists in a finely divided form as a liquid or solid.

(w) "Point of Emission" means the point in the stack, chimney, flue or duct which is selected by the Department or its authorized officers for the purpose of sampling and determining the concentration and rates of emission of air impurities in the residual gases after completion of the process and before admixture with atmospheric air.

(x) "Practicable" means having regard, among other things, to local conditions and circumstances and to the current state of technical knowledge. And the term, "best practicable means" as determined by the Department includes the provision for emission control and the efficient maintenance of a plant and the proper use thereof and the supervision by or in behalf of the owner or operator.

(y) "Refuse" means any waste or other discarded or abandoned matter consisting of garbage, rubbish, ashes, street debris, dead animals, abandoned vehicles, industrial wastes, demolition wastes, construction wastes, special wastes, or sewage treatment residues.

(z) "Ringelmann Chart" means the chart described in the U.S. Bureau of Mines, Information Circular No. 8333 and No. 7718, and used for measuring smoke density.

(aa) "Standard" or "Limit" means the concentration of any air contaminant which, in order to protect public health and/or public welfare, shall not be exceeded at a particular region or zone, and at a specified period of time. Standards are enforceable and must be complied with by the owner or person in charge of an industrial operation, process or trade.

(bb) "Smoke" means gas-borne particulates resulting from incomplete combustion, consisting predominantly, but not exclusively, of carbon, ashes, or other combustible material.

(cc) "Stack" or "Duct" means any flue, pipeline, chimney or other contrivance arranged to conduct emission into the open air.

(dd) "Tonne" means 1000 kilograms.

(ee) "Variance" means a temporary suspension in the compliance with an emission standard for specified period of time in order to allow time to study, institute and/or finance an appropriate and adequate control equipment or technology to meet regulatory standards or requirements. Variance shall not be used as a ploy to avoid compliance with any standard. It shall be granted only under exceptional cases and for a reasonable period of time, usually less than one year and in no case allows a public nuisance to exist as a result of the variance. Submission of attainable plans and progress report towards this particular air pollution problem are the usual conditions.

(ff) "Visible Emission" means an emission greater than five percent opacity.

(gg) "Volatile Organic Compound" means any compound containing carbon and hydrogen, or carbon and hydrogen in combination with any other element which has an absolute vapor pressure of 0.10 kg/cm^2 equivalent to 77.6 mm Hg or greater under actual storage conditions. Organic solvents include diluents and thinners and are defined as chemical compounds of carbon which are liquids at standard conditions and which are used as dissolvers, viscosity reducers, or cleaning agents.

Section 4. National Emission Standards for Smoke and Particulate Matter for Stationary Sources

(a) *Visible Opacity Standard for Smoke*

(1) The opacity of smoke emitted from any point of emission in all stationary sources determined in accordance with the provisions of these Rules and Regulations shall be such that, when compared in the appropriate manner with the Ringelmann Chart or an equivalent method approved by the Department, visible emission shall not appear darker than Shade 1 on the chart.

(2) Exception to Regulation 58 (a)(i) may be allowed under the following circumstances:

(2.1) The opacity limit hereinbefore prescribed shall not apply to the emission of dark smoke for less than five (5) minutes in a period of one hour provided that the total period of such emission shall not exceed an aggregate of 15 minutes in any 24 hours; provided further that at no time should the opacity be darker than shade 3 of the Chart; and provided finally that this provision shall not apply to cases of dark smoke emissions resulting from cold-start and up-set conditions, the latter of which is however further regulated under paragraph (6) of Section 63(e) hereof.

(2.2) Neither shall said opacity limit apply to existing sources when in the opinion of the Department, it is not reasonably practicable to achieve these standards and a permission has been granted in writing for a conditional variation of these Rules and Regulations.

(b) *Maximum Permissible Emission Limits for Particulate Matter*

For any source, industry or process, the maximum permissible limits for particulate matter in the effluent gas measured at the point of emission, or after completion of the process and before admixture with atmospheric air, shall be in accordance with Table 1.

Table 1. Maximum Emission Limits in mg/Ncm for Particulates in Stationary Sources

	<u>New Source</u>	<u>Existing Source</u>	
	1993	After 1978	Before 1978
1. <u>Fuel Burning Steam Generators</u>			
a) Urban or Industrial Areas	150	300	500
b) Other Areas	200	300	500
2. Incinerators	200	300	--
3. Cement Plants (Kilns, etc)	150	300	500
4. Smelting Furnaces	150	300	500
5. Other Stationary Sources	200	300	500

Notes for Table 1.

(1). For existing sources, the applicable date classification in columns (3) and (4) refers to the initial plant construction or modification, whichever is appropriate.

(2). For fuel-burning steam generators or sources, the concentration of particulate matter at the point of emission shall be corrected on the basis of 12% CO₂ by volume.

(3). For the purpose of this table, the following definitions apply.

(a) "Other Stationary Sources" means a trade, process, industrial plant, or fuel burning equipment other than thermal power plants, industrial boilers, cement plants, incinerators and smelting furnaces.

(b) "Urban Area" means a poblacion or central district of cities or municipalities having at least 50,000 population, or twin political subdivisions with contiguous boundary which essentially form one community whose population is more than 50,000 inhabitants. Inside these centers of population are some scattered industrial establishments.

(c) "Industrial Area" means a well-defined, exclusive land use area in various stages of development that are primarily established for industrial subdivisions, manufacturing and other industry mixes with provisions for common support infrastructures, facilities and services such as roads, water supply, power supply, communication systems, housing, storm drainage, sanitary sewerage systems, industrial wastewater treatment facilities, etc. These areas which are usually from 200 to 500 hectares in size are registered with the HLURB or any other duly authorized government entities as industrial estates, parks or area. Export processing zones also fall under this category of land use.

(d) "Other Areas" means all areas other than an urban or industrial area.

(4). Owners or operators of existing sources constructed before 1978 shall comply with the 1978 emission standards (column "3", Table-1) for particulates within five years after the effectivity of these revised rules and regulations.

Section 5. National Emission Standards for Source Specific Air Pollutants. (NESSAP)

(a) For any trade, industry, process, fuel-burning equipment or industrial plant emitting air pollutants, the concentration at the point of emission shall not exceed the limits set in Table 2.

Table 2 National Emission Standards for Source Specific Air Pollutants (NESSAP)

POLLUTANT[†]	STANDARD APPLICABLE TO SOURCE	MAXIMUM PERMISSIBLE LIMITS (µg/Ncu)	METHOD OF ANALYSIS^a
1. Antimony & its Cmpds.	Any source	10 as Sb	AAS ^b
2. Arsenic & its Cmpds.	Any source	10 as As	AAS ^b

3.	Cadmium & its Cmpds.	Any source	10 as Cd	AAS ^b
4.	Carbon Monoxide	Any industrial source	500 as CO	Orsat Analysis
5.	Copper & its Cmpds.	Any industrial source	100 as Cu	AAS ^b
6.	Hydrofluoric Acid and Fluorine Cmpds.	Any source other than the manufacture of Aluminum from Alumina	50 as HF	Titration with Ammonium Thiocyanate
7.	Hydrogen Sulfide	i) Geothermal power plants ii) Geothermal Exploration and Well Testing iii) Any source other than (i) and (ii)	c,d e 7 as H ₂ S	Cadmium Sulfide Method Cadmium Sulfide Method
8.	Lead	Any trade, industry or process	10 as Pb	AAS ^b
9.	Mercury	Any source	5 as elemental Hg	AAS ^b /Cold-Vapor Technique or Hg Analyzer
10.	Nickel and its Cmpds. except Nickel Carbonyl ⁹	Any source	20 as Ni	AAS ^b
11.	NO _x	i) Manufacture of Nitric Acid ii) Fuel burning steam generators Existing Source New Source Coal-fired Oil-fired iii) Any source other than (i) and (ii) Existing Source New Source	2,000 as acid and NO _x calculated as NO ₂ 1,500 as NO ₂ 1,000 as NO ₂ 500 as NO ₂ 1,000 as NO ₂ 500 as NO ₂	Phenol-disulfonic acid Method -do- -do-
12.	Phosphorous Pentoxide	Any source	200 as P ₂ O ₅	Spectrophotometry
13.	Zinc & its Cmpds.	Any source	100 as Zn	AAS ^b

^a Other equivalent methods approved by the Department may be used.

^b Atomic Absorption Spectrophotometry

^c All new geothermal power plants starting construction by 01 January 1994 shall control H₂S emissions to not more than 150 g/GMW-Hr.

- d All existing geothermal power plants shall control H₂S emissions to not more than 200
g/GMW-Hr. within 5 years from the date of effectivity of these revised regulations.
e Best practicable control technology for air emissions and liquid discharges. Compliance
with air and water quality standards is required.
f Provisional Guideline
g Emission limit of Nickel Carbonyl shall not exceed 0.5 mg/Ncm.
* Limits of other air pollutants not included in this table but appearing in the 1978
regulations shall be maintained.

(b) *Absence of Emission Standard for Other Air Pollutants*

(1) Where no emission or ambient standard is prescribed hereof for a specific air pollutant that is potentially harmful to public health and/or public welfare, the owner or operator of an industrial plant, establishment or stationary source shall conduct its operation or process by the best practicable means as may be necessary to prevent or minimize air pollution; provided that if at any time any question arises as to what is the best practicable means available for the purpose of this paragraph, the same shall be determined by the Secretary or his duly authorized representative.

(2) The absence of the ambient air or emission standard for a specific air pollutant shall not preclude the Department to take appropriate action to control such pollutants to assure the health, welfare and comfort of the general population.

(c) *Emission Limits for Non-Attainment Areas*

Subject to public hearing and approval of the Department, emission limits more stringent than those prescribed in Section 58, 59 and 60 hereof, may be promulgated in regions or specific geographical areas that do not meet, or are projected to exceed the air quality guidelines in Section 62 hereof. Where no such limits are prescribed in non-attainment areas or where no alleviation of the situation is forthcoming, the Secretary at his discretion may prohibit the establishment of new stationary sources that contribute significant pollution and/or initiate such appropriate action for the replacement of old, obsolete existing plants with new ones that are provided with adequate or effective control equipment.

Section 6 - Control of Sulfur Compound Emissions

(a) *Sulfur Content of Fossil Fuels for Existing Sources*

(1). *Initial Specifications, 1993 - 1996:*

In order to prevent and/or control increasing emissions of SO₂ into the atmosphere, and unless otherwise allowed or exempted in writing by the Department, or directed to use low-sulfur fuels, all owners or operators of existing stationary sources shall burn in any fuel burning equipment, only liquid or solid fuel containing sulfur not exceeding the percentages by weight in

accordance with the following schedule:

(a). <u>Liquid Fuel</u>	<u>Metro Manila</u>	<u>Outside Metro Mla</u>
(i). Fuel Oil (All grades)		
July 1, 1993	- 3.5%	3.8%
January 1, 1996	- 3.0%	3.0%
(ii). Industrial Diesel		
July 1, 1993	- 0.7%	0.8%
January 1, 1996	- 0.5%	0.5%
(b). <u>Solid Fuel (Coal)</u>		
July 1, 1993	- 2.5%	2.5%
January 1, 1996	- 1.0%	1.0%

(2). *Further Reduction of Sulfur Content of Fossil Fuels*

Two years after the effectivity of these revised regulations the Secretary shall, after consultation with the Department of Energy or its equivalent, the national oil companies and concerned government agencies and private entities, promulgate new and lower sulfur content specifications of fossil fuels as an alternative approach to control SO₂ emissions in existing stationary sources; provided that if no such requirement is promulgated after January 1, 1996, the Secretary shall require existing major sources to install appropriate SO₂ control equipment to meet the emission standards in accordance with Section 60 (b) (1) within five years; and provided finally that existing smaller fuel burning equipment shall comply with the requirements under Section 60 (c) or Section 61 of these regulations.

(b) *Maximum Permissible Emission Limits for Sulfur Oxides in Stationary Sources*

(1). Existing Sources

(i). Manufacture of Sulfuric Acid and Sulf(on)ation Process	-	2.0 gm/Ncm as SO ₃
(ii). Fuel Burning Steam Generators	-	1.5 gm/Ncm as SO ₂
(iii). Other Stationary Sources except (i) and (ii)	-	1.0 gm/Ncm as SO ₃

(2). New Sources

(i). Manufacture of Sulfuric Acid and Sulf(on)ation Process	-	1.5 gm/Ncm as SO ₃
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(ii). Fuel Burning Steam Generators

January 1, 1994	-	1.0 gm/Ncm as SO ₂
January 1, 1998	-	0.7 gm/Ncm as SO ₂

(iii). Other Stationary Sources - 0.2 gm/Ncm as SO₃ except (i) and (ii)

(3) The applicable method of measurement for SO₂ is the barium-thorin titration method.

(c) When an existing source of sulfur oxides emission is unable to comply with the emission limits under this section, the Secretary shall require in writing the owner or operator of said source to institute any one or a combination of the following corrective measures which should be implemented or completed within a specific period of time to be agreed upon between the Department and the owner/operator of the source.

(i) Use a specified sulfur content of fuel;

(ii) Erect or alter the height or dimensions of the stack to reduce ground level concentrations of sulfur dioxide at a specified level which shall not exceed 80 ug/Ncm (24-hr. sampling) above background level; or

(iii) Alter the method of operation or industrial process to prevent or reduce pollution.

(d) *Penalty for Non-Compliance*

For a period to be determined by the Secretary and provided that the resulting effect of SO₂ on the atmosphere does not pose an immediate threat to life, public health or welfare, animal, or plant life or property, any existing source that complies with the provision of sub-section (a) (1) but cannot comply with the SO₂ emission standard in sub-section (b) (1) of these regulations may be allowed to operate and be issued a temporary permit for one year on condition that it pays first a penalty of fine for polluting the air environment in the amount equivalent to P20.00 per kilogram of SO₂ discharged per day in exceedance of the allowable emission limit; provided further the calculated amount of the fine does not exceed P5,000.00 per day in accordance with Section 9 (a) of PD 984.

e) *Hydrogen Sulfide Emissions*

Any exit gas stream containing hydrogen sulfide which is discharge into the atmosphere from any source shall be vented, incinerated, flared or otherwise disposed of in such a manner that hydrogen sulfide and sulfur dioxide ambient standards are not violated.

Section 7. Variance

(1). Upon application, the Secretary at the discretion may grant a variance from the pertinent emission limits and related requirements under Section 58, Sections 59 and Section 60 of these regulations. Variances and renewals thereof may be granted under any of the following grounds:

(a). There is no practical means or technology available for meeting the emission standard or the adequate control of air pollutant involved;

(b). Compliance with the particular emission standard or related requirements will necessitate the taking of measures which, because of their extent or cost, must spread over a considerable period of time. A variance granted under this instance shall prescribe a timetable for compliance or the implementation of measures required.

(2) The applicant for a variance shall support his application with such information as the complete details of the proposed abatement program, time schedule, cost estimates, interim abatement measures, surety bond to be determined by the Department, and other relevant requirements.

(3). The Secretary or his duly designated hearing officer shall hold a hearing on each application for a variance. The hearing procedures under Article 3 of these regulations shall apply at such hearing. In the absence of oppositors or complinants, a technical conference at the DENR Regional level is sufficient.

(4). Any variance or renewal thereof granted this section shall in no case exceed a period of 24 months.

(5). The Department may prescribed such time limits and other conditions that it shall deem appropriate in the granting of a variance.

Section 8. National Ambient Air Quality Guidelines (NAAQG) and Standards

(a). *Criteria Pollutants*

(1) For the purpose of protecting the public health and welfare and reducing damage to property as well as providing an air quality management control strategy for emission limitation from mobile and stationary sources, location of commercial, industrial and residential facilities, and to assist in the promotion and use of an improved transportation system, the hereunder National Ambient Air Quality Guidelines in Table-3 are hereby established.

**Table 3 - National Ambient Air Quality Guideline for
Criteria Pollutants**

Pollutant	Short Term (a)			Long Term (b)		
	ug/Mcm	ppm	Averaging time	ug/Mcm	ppm	Averaging time
Suspended Particulate						
Matter (e) - TSP	230 (f)		24 hours	90	--	1 yr.(c)
PM-10	150 (g)		24 hours	60	--	1 yr.(c)
Sulfur Dioxide (e)	180	0.07	24 hours	80	0.03	1 yr.
Nitrogen Dioxide	150	0.08	24 hours	--	--	--
Photochemical Oxidants	140	0.07	1 hour	--	--	--
as Ozone	60	0.03	8 hours	--	--	--
Carbon Monoxide	35 mg/Mcm	30	1 hour	--	--	--
	10 mg/Mcm	9	8 hours	--	--	--
Lead (d)	1.5	--	3 months (d)	1.0	--	1 yr.

Notes:

- a. Maximum limits represented by ninety eight percentile (98%) values not to be exceeded more than once a year.
- b. Arithmetic mean
- c. Annual Geometric Mean
- d. Evaluation of this guideline is carried out for 24-hour averaging time and averaged over three moving calendar months. The monitored average value for any three months shall not exceed the guideline value.
- e. SO₂ and Suspended Particulates are sampled once every six days when using the manual methods. A minimum number of twelve sampling days per quarter or forty eight sampling days each year is required for these methods. Daily sampling may be done in the future once continuous analyzers are procured and become available.
- f. Limits for Total Suspended Particulates with mass median diameter less than 25-50 um.
- g. Provisional limits for Suspended Particulates with mass median diameter less than 10 microns until sufficient monitoring data are gathered to base a proper guideline.

(2) The applicable methods for sampling and measurement of the above pollutants are as follows:

Sulfur Dioxide - Gas Bubbler and Pararosaniline Method (West and Gaeke Method), or Flame Photometric Detector

Nitrogen Dioxide - Gas Bubbler Griess-Saltzman, or Chemiluminescence Method

Ozone - Neutral Buffer Potassium Iodide (NBKI), or Chemiluminescence Method

Total Suspended Particulates (PM-10) = High volume with 10 micron particle - size inlet; Gravimetric

Carbon Monoxide - Non-dispersive Infra-red Spectrophotometry (NDIR)

Lead - High Volume and Atomic Absorption Spectrophotometry

(3) Other equivalent methods approved by the DEpartment may be adopted.

(b) *Source Specific Pollutants -- National Ambient Standards*

(1) For any industrial establishment or operation, the discharge of air pollutants that result in airborne concentrations in excess of the National Ambient Air Quality Standards shown in Table 4 shall not be permitted. Sampling shall be done at an elevation of at least two (2) meters above the ground level and conducted either at the rproperty line or at a downwind distance of five to twenty times the stack height, whichever is more stringent.

Table 4. National Ambient Air Quality Standards for Source Specific Air Pollutants from Industrial Sources/Operations

*Pollutants (a)	Concentration (c)		Averaing time (min)	Method of Analysis/ Measurement (b)
	ug/Ncm	ppm		
1. Ammonia	200	0.28	30	Nesselerization
2. Carbon Disulfide	30	0.01	30	Tischer Method
3. Chlorine and Chlorine compounds expressed as Cl ₂	100	0.03	5	Methyl Orange
4. Formaldehyde	50	0.04	30	Chromotropic acid method or MBTH-Colorimetric method
5. Hydrogen Chloride	200	0.13	30	Volhard Titration with Iodine solution
6. Hydrogen Sulfide	100	0.07	30	Methylene Blue
7. Lead	20		30	AAS ^b
8. Nitrogen Dioxide	375	0.20	30	Griess-Saltzman
	260	0.14	60	
9. Phenol	100	0.03	30	4-Aminoantipyrine

10. Sulfur Dioxide	470	0.18	30	Colorimetric-Pararosaline
	340	0.13	60	
11. Suspended Particulate				
Matter - TSP	300	--	60	Gravimetric
PM-10	200	--	60	-do-

Notes:

- a. Pertinent ambient standards for Antimony, Arsenic, Cadmium, Asbestos, Nitric Acid and Sulfuric Acid Mists in the 1978 NPCC Rules and Regulations may be considered as guides in determining compliance.
- b. Other equivalent methods approved by the Department may be used.
- c. Ninety-eight percentile (98%) values of 30-min. sampling measured at 25°C and one atmosphere pressure.

Section 9. Prohibited Acts

(a) *Fugitive Particulates*

(1). No person shall cause, permit, or allow the emissions of fugitive particulates from any source whatsoever, including; but not limited to, vehicular movement, transportation of materials, construction, alteration, demolition or wrecking, or industry-related activities such as loading, storing or handling without taking reasonable precautions to prevent such emission. Such reasonable precaution shall include, but not be limited to the following:

(a) use, where possible, of water or chemicals for control of dust in the demolition of existing buildings or structure, construction operations, quarrying operations, grading of roads or the clearing of land;

(b) application of asphalt, oil, water, or suitable chemicals on dirt and unpaved roads, materials stockpiles, and other surfaces which can give rise to airborne dusts problems;

(c) installation and use of hoods, fans and fabric filters to enclose and vent the handling of dusty materials. Adequate containment methods shall be employed during sandblasting or other similar operations; and

(d) covering open loaded trucks transporting materials likely to give rise to airborne dust.

(2) No person shall cause or permit the discharge of visible fugitive dusts beyond the boundary line of the property from which the emissions originate.

(3) When dusts, fumes gases, mists, odorous matters vapors or any combination thereof escape from a building or equipment

in such a manner and amount as to cause nuisance or to violate any regulations, the Department may order that the building or equipment in which processing, handling, and storage are done, be tightly enclosed and ventilated in such a way that all emissions or gasborne materials leaving the building or equipment are treated to remove or destroy such air pollutants before discharge into the open air.

(b) *Volatile Organic Compounds Emissions or Organic Compound Emission*

(1) *Storage and Handling of Volatile Organic Compound*

No person shall place, store, or hold in any stationary tank, reservoir, or other container of more than 150,000 liters capacity any volatile organic compounds unless such tank, reservoir, or other container is a pressure sufficient, under normal conditions, to prevent vapor or gas loss to the atmosphere, or is designed and equipped with one of the following vapor loss control devices:

(1.1) A floating roof, consisting of a pontoon type, double deck type roof or internal floating cover, which will rest on the surface of the liquid contents and be equipped with a closure seal or seals to close the space between the roof edge and tank wall in accordance with the American Petroleum Institute (API), the National Fire Protection Association (NFPS) and pertinent Philippine regulations and standards. All tank gauging or sampling devices shall be gas-tight except when tank gauging or sampling is taking place.

(1.2) A vapor recovery system, consisting of a vapor gathering system capable of collecting the volatile organic compounds, vapors, and gases discharged, and a vapor disposal system capable of processing such volatile organic vapors and gases so as to prevent their emission to the atmosphere and with all tank gauging and sampling devices gas-tight except when gauging or sampling is taking place.

(1.3) Other equipment or means of equally acceptable efficiency for purposes of air pollution control as may be approved by the Department.

(2). *Waste Gas Disposal*

No person shall cause or permit the emission of more than 7.0 kg per day of waste gas from any ethylene emission source unless the waste gas stream is properly burned at 704°C for 0.3 second or direct-flame afterburner, or burned in a smoke flare or an equally effective device as approved by the Department. This provision shall not apply to emergency reliefs and vapor blowdown systems.

(3). *Organic solvents*

No person shall cause or permit the emission of more than 1.5 kg. of organic solvents in any one hour, nor more than 7.0 kg. in any one day, from any article, machine, equipment, or other contrivance unless such article, machine, equipment, or other contrivance is provided with an acceptable ventilation and control system approved by the Department.

Paragraph (3) hereof shall not apply to:

(a) The manufacture of organic solvents.

(b) The spraying or other employment of insecticides, pesticides, or herbicides.

(c) Industrial surface coating operations when the coating's solvent make-up is water-based and does not exceed 20 percent of organic materials, by volume.

(c) *Nuisance*

No person shall discharge from any source whatsoever such quantities of air contaminants or other material which constitute nuisance as defined under Art. 694 to 707 of R.A. 886, otherwise known as Civil code of the Philippines.

(d) *Open Burning*

No person shall ignite, cause to be ignited, or maintain any open fire except as follows:

(1) Open fires for the cooking of food for human consumptions.

(2) Fires for recreational or ceremonial purposes.

(3) Fires to abate a fire hazard, provided the hazard is so declared by the fire department.

(4) Fires for the prevention and control of disease or pests.

(5) Fires for the disposal of dangerous materials, when there is no practical alternative method of disposal and burning, if approved by the Department.

(6) Fires for training personnel in the methods of fighting fires.

(7) Fires purposely set for recognized agricultural, forest and wildlife management practices.

(8) Open fire specifically or expressly approved by the Department.

Every application for the erection, installation, resiting or alteration of a chimney shall be accompanied by the following information:

(i) Site plan of a reasonable scale indicating clearly the location of the proposed chimney and buildings within 1000 meters of it, and the height of the tallest building within a radius of 50 meters.

(ii) Details of air impurities to be discharged which shall include the rate of emission concentration and quantity.

(iii) Proposed construction drawings, design parameters and calculation.

Section 10. Source Monitoring, Record Keeping and Testing

(a) The Department may require the owner or operator of any source to install, use, and maintain such monitoring equipment, sample such emissions, and such ambient air pollutants that are significant for a particular industry, establish and maintain such records, and make such periodic reports as the Department shall prescribe. For each major source, moreover, it shall be the responsibility of the owner or operator to install, without waiting for any directive from the Department to (a) sample ambient air quality around the source and (b) either sample emissions from each stack or provide equivalent determination acceptable to the Department, such as those provided for under Section 65 (a) (3).

(b) All analyses and tests shall be conducted in a manner specified by the Department. Results of the analyses and tests shall be calculated and reported in a manner specified by the Department.

(c) A person responsible for the emission of air pollutants from any source shall, upon direction of the Department, provide in connection with such sources and related source operations, such sampling and testing facilities exclusive of treatment and sensing devices as may be necessary for the proper determination of the nature and quantity of air pollutants which are or may be emitted as a result of such operation.

(d) Authorized representatives of the Secretary, upon presentation of proper credentials, may at reasonable time have access to and copy records, inspect any monitoring equipment or method to determine its accuracy, and sample any emissions or ambient air quality which the owner or operator of such source is required under these regulations.

(e) When the Department upon investigation, has good reasons to believe that the provisions of this Chapter concerning emission of pollutants are being violated, it may, by notice in writing, require the person responsible for the source of

(e) *General Restrictions:*

(1) No plant or source shall operate at capacities which exceed the limits of operation or capability of a control device to maintain the air emission within the standard limitations imposed by the Rules and Regulations of this Chapter or by relevant permit conditions issued in writing by the Department.

(2) No person shall build, erect, construct, install, or implant any new source, or operate, modify, or rebuild an existing source, or by any other means release or take action which would result in the release of air pollutants into the atmosphere and result in, together with the concentrations of existing air pollutants, ambient air concentration greater than the ambient air quality standards specified in Table 4 of Section 62 of this Chapter.

(3) No person shall build, erect install or use any article, machine, equipment or other contrivance, the use of which will conceal an emission which would otherwise constitute a violation of any of the provisions of this Chapter.

(4) No person shall cause or permit the installation or use of any device or any means which, without resulting in reduction in the total amount of air contaminant emitted, conceals or dilutes any emission of air contaminant which would otherwise violate the provisions of this Chapter.

(5) All pollution control devices and systems shall be properly and consistently maintained and correctly operated in order to maintain emissions in compliance with the provisions of this Chapter. No facilities shall be operated without the control equipment in proper operation, except with the permission of the Department when special circumstances arise.

(6) In the event that any emission source, air pollution control equipment or related facility fails or breaks down in such a manner as to cause the emission of air pollutants in violation of these Rules and Regulations, the person responsible for such source equipment or facility shall notify the Department within 24 hours of such failure or breakdown, and provide a written statement giving all pertinent facts, including the estimated duration of breakdown. The Department shall be notified when the condition causing the failure or breakdown has been corrected and such source equipment or facility is again in operation.

(7) Any person intending to erect, install, resite or alter any chimney, from or through which air impurities may be emitted, shall obtain prior written approval from the Department. This requirement shall not apply for a chimney serving a private residence.

pollutants to conduct tests which will identify the nature and quantity of pollutant emission from the source and to provide the results of said tests to the Department. These tests shall be carried out under the supervision of the Department.

Section 11. Miscellaneous Provisions

(a). Stationary Fuel-Burning Equipment

(1) An owner or operator of a stationary fuel-burning equipment shall, if so required by the Department, provide a means to the satisfaction of the Secretary whereby a person in charge of such a plant or equipment may at all times ascertain without leaving the boiler room, furnace room, or control room, whether or not dark smoke is discharging from any stack or such installation. Such means may include one or more of the following:

(a) a window or opening through which an unobstructed view of the top of the stack may be obtained from the boiler room, furnace room, or control room;

(b) a mirror so placed as to reflect the top of the stack, which reflection shall be visible from the boiler room, furnace room, or control room;

(c) a smoke density indicator and alarm installed so as to indicate adequately in the boiler room, furnace room and control room the density of smoke being discharged;

(d) a closed circuit television installation with the receiver located in the boiler room, furnace room or control room;"

(e) any similar device which may be approved by the Secretary.

(2) All oil-burning equipment shall have heaters capable of heating oil to a temperature appropriate for the oil and burner.

(3) The following major industries are required to install continuous stack monitoring devices for smoke opacity and sulfur oxide emissions:

(a) Fossil-fuel fired Power Plant (including NO_x)

(b) Petroleum refinery

(c) Primary Copper Smelter

(d) Steel Plant, including Ferro-alloy Production Facility (For opacity only)

(4) Existing sources falling under paragraph (3) above shall comply with the requirements of installing continuous monitoring devices within 24 months after the effectivity of the rules and regulations.

(b) *Miscellaneous Equipment*

Reheating furnaces, smoke ovens, bake ovens, coffee heaters, varnish kettles, paint booths and similar equipment shall be so designated that when operating, there is no free flow of objectionable gases into the atmosphere. To minimize the escape of smoke, odors, fly ash or fumes, mechanical, chemical or similar devices shall be used.

Section 12. Air Quality Indices

(a) The following shall describe the six (6) levels of air quality for suspended particulates, sulfur dioxide, photochemical oxidants or ozone, and carbon monoxide anywhere in the Philippines.

(1). Total Suspended Particulates - (24-Hour Average)

Good - 0 to 80 ug/Ncm
Fair - 81 to 230 ug/Ncm
Poor - 231 to 350 ug/Ncm

Serious or Alert Conditions

Very Unhealthful (Alert Level) - 350 ug/Ncm
Hazardous (Warning Level) - 600 ug/Ncm
Extremely Hazardous (Emergency Level)- 900 ug/Ncm

(2). Sulfur Dioxide - (24-Hr. Average)

Good - 0 to 80 ug/Ncm
Fair - 81 to 180 ug/Ncm
Poor - 181 to 650 ug/Ncm

Serious or Alert Conditions

Very Unhealthful (Alert Level) - 650 ug/Ncm
(0.25 ppm)
Hazardous (Warning Level) - 1,570 ug/Ncm
(0.60 ppm)
Extremely Hazardous (Emergency Level)- 2,360 ug/Ncm
(0.90 ppm)

(3). Photochemical Oxidants or Ozone -(1-Hr.)

Good - 0 to 80 ug/Ncm
Fair - 81 to 160 ug/Ncm
Poor - 161 to 350 ug/Ncm

Serious or Alert Conditions

Very Unhealthful (Alert Level)	-	350 ug/Ncm (0.18 ppm)
Hazardous (Warning Level)	-	780 ug/Ncm (0.40 ppm)
Extremely Hazardous (Emergency Level)	-	1,180 ug/Ncm (0.60 ppm)

(4). Carbon Monoxide - (8-Hr. Average)

Good	-	0 to 5 mg/Ncm
Fair	-	5.1 to 10 mg/Ncm
Poor	-	10.1 to 17 mg/Ncm

Serious or Alert Levels

Very Unhealthful (Alert Level)	-	17 mg/Ncm (15 ppm)
Hazardous (Warning Level)	-	34 mg/Ncm (30 ppm)
Extremely Hazardous (Emergency Level)	-	46 mg/Ncm (40 ppm)

(b) Actions to be Taken During Very Unhealthful to Extremely Hazardous Conditions:

(1). Very Unhealthful Air Quality (Alert level)- At this air quality level, elderly persons and those with existing heart or lung disease should stay indoors and reduce physical activity. Other actions that must be taken are as follows:

(i) Pedestrians should avoid heavy traffic areas, particularly in areas where alert is raised. People, especially those with heart or respiratory diseases, should stay indoors and rest as much as possible. Unnecessary trips should be postponed. Persons should report to the nearest health center if they experience eye or throat irritation. Highly sensitive individuals, especially those suffering from anemia or other diseases that decrease the oxygen carrying capacity of the blood or those with cardio-respiratory diseases, should consult their doctors.

(ii) There should be voluntary restriction on the use of vehicles. Persons operating motor vehicles should eliminate all necessary operations. They should refrain from driving a car for non-urgent business. Car pools or public transportation should be used whenever possible.

(iii) All forms of open burning should be prohibited.

(iv) Certain commercial and industrial establishments should make preparations to cut and be requested to cooperate in cutting down the emission of pollutants concerned which shall be put into action as required when Alert No. 2 is raised.

(2) Hazardous Air Quality (Warning Level) - At this level, elderly persons and those with existing diseases should stay indoor and avoid physical exertion and the general population should avoid outdoor activity. Other actions that must be taken are as follows:

(i) The public should be requested to comply with all previous restrictions.

(ii) Motor vehicles should avoid areas under alert.

(iii) Main arteries of thoroughfares should be closed to traffic. Traffic should be re-routed away from the affected area, if possible. The operation of retail and non-essential commercial and business operations such as restaurants and entertainment establishments in the affected area, should be curtailed.

(iv) All forms of open burning and incineration should be prohibited.

(v) There should be selective curtailment of industrial activities, especially those contributing to the emission of pollutants concerned. Whenever possible, a cleaner substitute fuel should be used.

(3). Extremely Hazardous Air Quality (Emergency Level)

At this level, all persons should remain indoors, keeping windows and doors closed and that all persons should minimize physical exertion and avoid traffic. Other actions that must be taken are as follows:

(i) The public should be requested to comply with all previous restrictions.

(ii) The use of motor vehicles shall be prohibited except in emergencies with the approval of the government.

(iii) There shall be a major curtailment of all activities in the affected area. All places of employment, such as those for construction or manufacturing and public and private offices, except those vital for public safety and the enforcement of the emergency plan; retail and wholesale trade business establishments except those in the distribution of drugs, surgical supplies and blood; schools, libraries and establishments rendering amusement and recreation facilities, including motion pictures, shall immediately cease operation.

(iv) All forms of open burning and incineration shall be prohibited.

(v) All non-essential pollution-producing operations shall be stopped. Essential pollution-producing operations shall be curtailed to a level to just prevent equipment damage.

(vi) Certain industrial pollution-producing operations contributing to the emission of the pollutants concerned shall be curtailed as directed by the Department.

(c) Curtailement Action by Industrial Sector During Episodes

All concerned industries, in consultation with DENR, shall within two years upon effectivity of these regulations prepare and submit to DENR detailed curtailement action programs for each alert level.

Section 13. Penalties - Any person or group of persons found violating or failing to comply with any Order or Decision of the Department and/or the Pollution Adjudication Board or any provision of these Regulations, shall be liable under Section 9 of the Pollution Control Law (PD No. 984) and/or Section 106 of the 1978 NPCC Rules and Regulations, as amended.


Section 14. Separability Clause. - Any Section or provision of these regulations declared to be unconstitutional or invalid by a competent court, the other sections or provisions hereof shall remain to be in force.

Section 15. Repealing Clause. - Any provision of the 1978 Rules and Regulations, as amended, the Air Quality Standards of 1993, and other existing rules and regulations of the Department of which are inconsistent herewith are hereby repealed.

Section 16. Amendments. - This Regulations may be amended and/or modified from time to time by the Department.

Section 17. Effectivity. - This Regulations shall take effect thirty (30) days after publication in the official gazette or any newspaper of general circulation.

APPROVED:


ANGEL C. ALCALA
Secretary
Department of Environment
and Natural Resources