

**ESCWA****EEA****EEAA**

Distr.  
LIMITED  
E/ESCWA/ENR/1999/WG.3/CP.5  
10 June 1999  
ORIGINAL: ENGLISH

---

**Economic and Social Commission for Western Asia**

Expert Group Meeting on the Harmonization of  
Environmental Standards in the Energy Sector  
of the ESCWA Member States  
29 June - 1 July 1999  
Cairo, Egypt

**UN ECONOMIC AND SOCIAL COMMISSION  
FOR WESTERN ASIA**

**8 JUL 1999**

**LIBRARY + DOCUMENT SECTION**

**COUNTRY PAPER  
SAUDI ARABIA  
MINISTRY OF DEFENSE AND AVIATION**

---

Note: This document has been reproduced in the form in which it was received, without formal editing. The opinions expressed are those of the author and do not necessarily reflect the views of ESCWA.

99-0643

# **Environmental Management and Standards in the Kingdom of Saudi Arabia**

Dr. Khalid A. Mously  
Meteorology and Environmental Protection Administration  
Ministry of Defense and Aviation  
P.O.Box 1358, Jeddah 21431  
Kingdom of Saudi Arabia

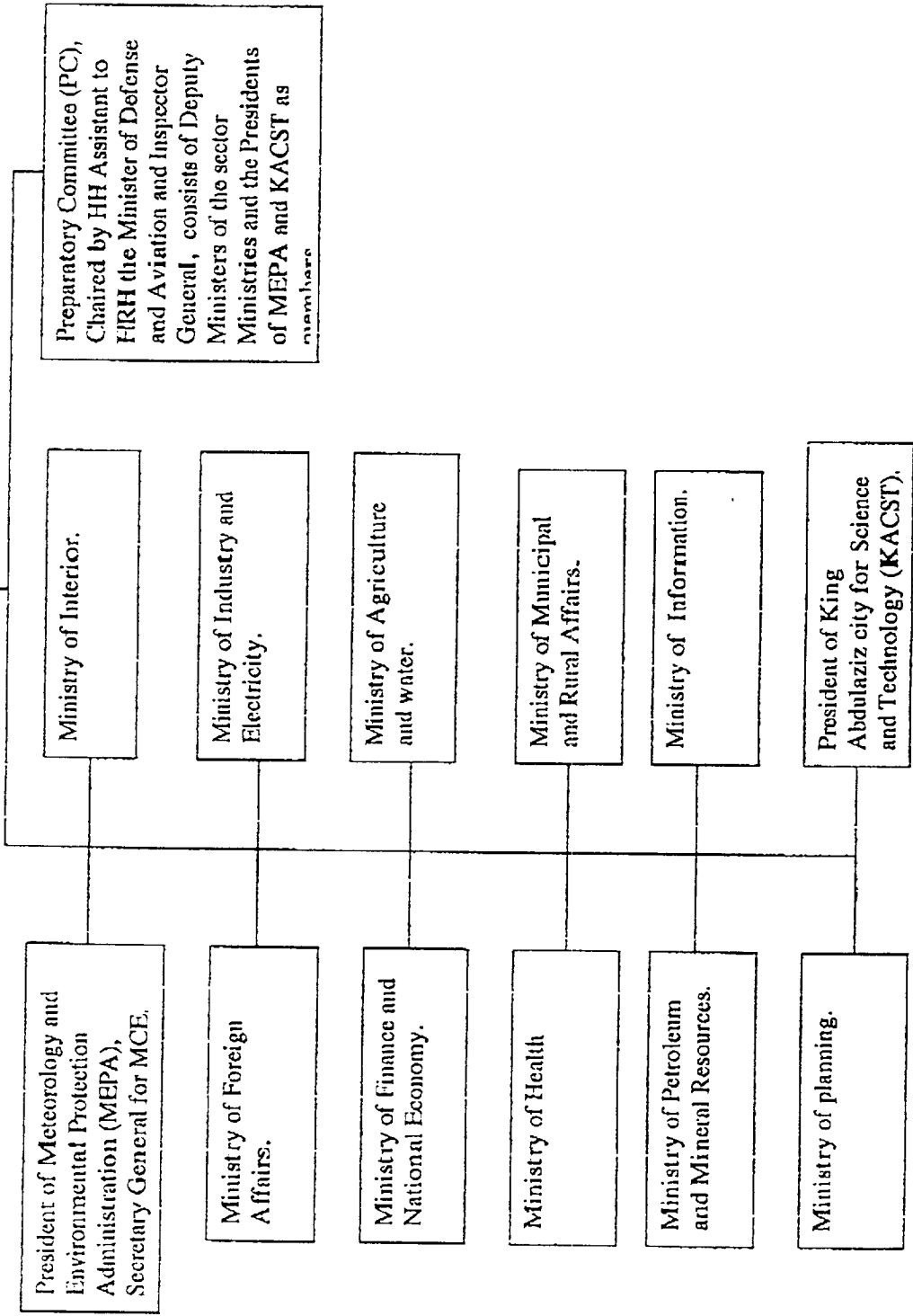
## **Abstract:**

The present status of the environmental management in the Kingdom of Saudi Arabia is reviewed in details. Ministerial Committee on Environment (MCE) and Preparatory Committee, Environmental Standards, Hazardous, and medical waste management are the main topics that are discussed. Special details given to the role of Meteorology and Environmental Protection Administration (MEPA) and it's achievements.

## **Introduction:**

Environmental Management in the Kingdom of Saudi Arabia has been directed by Article thirty two (32) of the basic system of Governance which calls for the protection and conservation of environment and its development and control of all kinds of pollution. Pursuant to the Royal Decree No. 7/M/8903 dated 21/4/1401 which assigned the Meteorology and Environmental Protection Administration (MEPA) for the control of pollution and protection of environment in accordance with the arrangement set forth in the decision of the Supreme Commission for administrative reform No. 86 dated 20/8/1399, MEPA has established the Environmental Protection Standards. The purpose of these standards is to provide appropriate bases for the evaluation and regulation of industrial and urban activities that currently exist in the Kingdom and to help in the

Ministerial Committee on Environment (MCE),  
 chaired by HRH Prince Sultan Bin Abdulaziz, the  
 Second Deputy Premier and Minister of Defense  
 and Aviation and Inspector General.



MEPA, on the other hand, also represents the Kingdom at various international and regional environmental forums.

**Environmental Protection General Directorate (EPGD)** is the Environmental wing of MEPA and is responsible for the control of pollution and protection of the environmental quality and natural resources from deterioration and degradation.

EPGD is divided into four Directorates (i) Pollution control and standards Directorate. (ii) Directorate of Natural Resources (iii) Directorate of Human Ecology and (iv) Directorate of Marine Environment.

Pollution Control and Standards Directorate is responsible for the (i) development of environmental standards (ii) inventory of pollution sources (iii) environmental audit and compliance (iv) enforcement of standards.

### **Environmental Standards:**

MEPA Promulgated its first Environmental Standards in 1401 H with the Revised Version published in 1409 H. these standards are comprised of

- Air Quality standards and
- Water Quality standards.

### **Air Quality standards:**

The Air Quality standards consists of

- Ambient Air Quality standards and
- Source Emission standards.

In future, source Water Quality Standards need to be revised and upgraded with special reference to existing major critical industries in the country such as petroleum refineries, fertilizer industry, power and desalination plants, chemicals factories, textile industry and tanneries etc.

#### **AIR Quality Standards:**

Proposed modifications form the source emission standards include 50% reduction in the maximum allowable SO<sub>2</sub> limits from combustion facilities and inclusion of trace metals in the Source Emission Standards for the industries mentioned above.

#### **Hazardous and Medical Waste Management**

PCSD has also developed Standards for the control and management of Hazardous waste in the Kingdom. These standards deal with various stages of hazardous waste management starting from collection and transportation of waste to its treatment and safe and environmentally sound disposal. In addition, the following waste management guidelines have also been prepared:

- Acid and Alkali waste
- Treatment and disposal of lead petrol sludge
- Management of used lubricating oils
- Electroplating wastes
- Management of PCBs
- Management of medical wastes
- Management of oil refinery wastes
- Management of Asbestos

Pollution Load Assessment Study was conducted in collaboration of World Bank (1993-1995)

### **2.3 Environmental monitoring:**

A number of environmental monitoring studies are being conducted by MEPA on the power plants, desalination plants, oil refineries, industrial and municipal discharges and ground water quality.

### **2.4 City Files:**

MEPA has started environmental city files program includes inventory of pollution sources (air emission, water discharges and solid hazardous and non-hazardous waste) and monitoring the levels of various pollutants in the ambient environment (ambient air and water quality).

### **2.5 CHEMSAFE program:**

MEPA in coordination with other sector ministries and (KACST) has initiated "National Chemical Safety" (CHEMSAFE) Program.

KACST would maintain the database of the chemicals manufactured, imported, exported and used in the Kingdom while MEPA would maintain the database of the chemicals manufactured, imported, exported and used in the Kingdom while MEPA would be responsible for hazardous Waste Management in the country.

### **3.Environmental Impact Assessment Reports:**

MEPA reviews environmental impact assessment reports submitted by various development projects to evaluate its environmental impacts and implications. This is the process, which ultimately leads to the issuance of "Environmental Permit to Construct and Operate".

Table 1: Ambient Air Quality Standards

Pollutant	30 day/1hr av.	12 month/24 hr av.	12month/annual av.	Measurement Method.
Sulfur Dioxide (SO <sub>2</sub> )	730 ug/m <sup>3</sup> (0.28 ppm)	365 ug/m <sup>3</sup> (0.14 ppm)	80 ug/m <sup>3</sup>	Pararosaniline Method.
Inhalable Particulates (IP)		340 ug/m <sup>3</sup> (max)	80 ug/m <sup>3</sup>	Size selective high vol. sampler
Photochemical Oxidants (O <sub>3</sub> )	298 ug/m <sup>3</sup> (0.15 ppm)			Chemiluminescence
Nitrogen Dioxide (NO <sub>2</sub> )	660 ug/m <sup>3</sup> (0.35 ppm)		100 ug/m <sup>3</sup>	Chemiluminescence
Carbon Monoxide (CO)	40 mg/m <sup>3</sup> (35 ppm)*			
Hydrogen Sulfide (H <sub>2</sub> S)		40 ug/m <sup>3</sup> (0.03 ppm)**		Gas bubbler methylene blue method
Fluoride***				Specific ion electrode method.

\* 30 day-period/8hr average for CO is 10 mg/m<sup>3</sup> (9ppm).

\*\* 12 month period one-hour average for H<sub>2</sub>S is 200 ug/m<sup>3</sup> (0.14 ppm).

\*\*\* 30 day-period/monthly average for fluoride is 1.0 ug/m<sup>3</sup> (0.001 ppm)

7. Anode Bake Plants: Limit the emission of total fluorides to no more than 0.05 Kg/metric ton
8. Iron and Steel Plants: Electric Arc Furnaces limit the emission of particulates to no more than 12mg/dscm.
9. Lime Manufacturing plants: Rotary Kilns no more than 0.2 Kg/metric ton of limestone feed material.
10. Visible emissions from all industrial activities (except for water vapor shall be controlled to 20 % maximum capacity except for three-minutes during any continuous sixty-minute period.



<b>Pollutants</b>	<b>Guidelines (at the edge of mixing zone)</b>
<b>Chloride</b>	<b>5%</b>
<b>Residual Chlorine</b>	<b>5%</b>
<b>Chromium (total)</b>	<b>5%</b>
<b>Copper</b>	<b>5%</b>
<b>Cyanide (total)</b>	<b>5%</b>
<b>Lead</b>	<b>5%</b>
<b>Mercury</b>	<b>5%</b>
<b>Nickel</b>	<b>5%</b>
<b>Total Phosphate</b>	<b>5%</b>
<b>Zinc</b>	<b>5%</b>

**Biological Pollutants**

<b>Total Coliform</b>	<b>70 MPN/100ml (average for thirty-day period)</b>
-----------------------	---

**Notes:**

**\* All references to the percentage are maximum changes from typical local baseline conditions.**

**\*\* Facilities using, transferring or storing oil and petroleum hydrocarbons are required to prepare, maintain and update a spill prevention, control and clean-up plan.**

**Table 4: Specific Pretreatment Guidelines For Discharge to Central Treatment Facilities**

<b>Pollutants</b>	<b>Guidelines</b>
<b><u>Physicochemical Pollutants</u></b>	
Total Suspended Solids	2,000 (max)
PH	5-10 pH Units
Temperature	60°C (max)
<b><u>Organic Pollutants</u></b>	
Chemical Oxygen Demand	1,500
Total Organic Carbon	1,000
Oil & Grease	120
Phenols	150
Total Chlorinated Hydrocarbons	0.5
<b><u>Inorganic Pollutants</u></b>	
Arsenic	1.0
Cadmium	0.5
Chromium (total)	2.0
Copper	1.0
Cyanide (total)	1.0
Lead	1.0
Mercury	0.01
Nickel	2.0
Zinc	10.0

**Note: All parameters are expressed as mg/l unless otherwise stated.**

**Table 3 . Effluent Discharge Standards**

<b>Pollutants</b>	<b>Allowable Levels</b>
<b>Chemical and Physical Parameters</b> 1- Floatables 2- pH 3- TPS 4- Temperature 5- Turbidity	Non 6-9 pH units 8-15 mg/l(max) Determine case by case basis 75 Ntu (max)
<b>Organic Pollutants</b> 1- BOD 2- COD 3- T. Organic C 4- T. Kjeldahl N 5- T. Chlorinated HC 6- Oil & Grease 7- Phenols	25 ppm 150 ppm 50 ppm 5 ppm 0.1 ppm 8- 15 ppm 0.1 ppm
<b>Non-Organic Pollutants</b> 1- ammonia 2- Arsenic 3- Cadmium 4- R. Chlorine 5- T. Chromium 6- Copper 7- Cyanide 8- Lead 9- Mercury 10- Nickel 11- Phosphate P 12- Zinc	1.0 ppm 0.1 ppm 0.02 ppm 0.5 ppm 0.1 ppm 0.2 ppm 0.05 ppm 0.10 ppm 0.001 ppm 0.20 ppm 1.0 ppm 1.0 ppm
<b>Biological Parameter</b> 1- T. Coliform	1000 MPN/100ml

**Table 2: Receiving Water Guidelines**

<b>Pollutants</b>	<b>Guidelines</b> (at the edge of mixing zone)
<b><u>Physico-chemical Pollutants</u></b>	
<b>Floatable</b>	<b>None attributable to the discharge</b>
<b>PH</b>	<b>0.1 pH Units (maximum change from typical local baseline conditions)</b>
<b>Total Suspended Solids</b>	<b>5%*</b>
<b>Temperature</b>	<b>1°C (maximum change from typical local baseline conditions)</b>
<b>Oil &amp; Grease</b>	<b>Management Measures Required**</b>
<b>Dissolved Oxygen</b>	<b>5%</b>
<b>Turbidity</b>	<b>5%</b>
<b><u>Organic Pollutants</u></b>	
<b>Chemical Oxygen Demand</b>	<b>5%</b>
<b>Total Organic Carbon</b>	<b>5%</b>
<b>Total Kjeldahl Nitrogen</b>	<b>5%</b>
<b>Chlorinated Hydrocarbons</b>	<b>5%</b>
<b>Oil &amp; Grease</b>	<b>5%</b>
<b>Phenols</b>	<b>5%</b>
<b><u>Inorganic Pollutants</u></b>	
<b>Ammonia</b>	<b>5%</b>
<b>Arsenic</b>	<b>5%</b>
<b>Cadmium</b>	<b>5%</b>

## **Air Pollution Source Standards:**

1. Combustion Facilities  $\geq$  30 megawatts (100 MBTU/hr) shall utilize appropriate gas cleaning equipment to limit emission to the following rates:

- 43 ng/j (0.1 lb/MBTU) of total particulates.
- 1 ug/j (2.3 lb/MBTU) of  $\text{SO}_2$
- 130 ng/j (0.3 lb/MBTU) of  $\text{NO}_x$  for oil fired facilities.
- 86 ng/j (0.2 lb/MBTU) of  $\text{NO}_x$  for gas fired facilities.

## 2. Petroleum and Petrochemical Facilities

2.1 Storage Vessels which have capacity  $>1000$  barrels (5614 cubic feet) shall be equipped for vapor emission control as follows:

- Vapor recovery or equivalent systems are required for VOC having a vapor pressure in excess of 570 mm Hg. Floating roof tanks shall be considered adequate for storage of crude oil providing a consistent seal inspection and reporting program is implemented by owner.
- Floating roof with double boot seal or equivalent systems are required for VOC having a vapor pressure in excess of 78 mm Hg (1.5 psi) but less than 570 mm Hg (11 psi)

## 2.2 FCC unit catalyst regenerators

- CO boilers or high temperature regeneration to limit CO emissions to 500 ppm and
- Appropriate air cleaners to limit particulate emissions to 1.0 Kg per metric ton of coke burn-off

## 2.3 Fuel Gas Combustion Process

#### **4. Certification of Environmental Laboratories:**

Recently, MEPA has started a program of "Environmental Laboratory Certification" to maintain high standards of analytical work and to ensure precision and accuracy of test results in the field of environment.

#### **Environmental Awareness**

Recognizing the importance of environmental awareness in the environmental management and critical role of Non-Governmental organization, the Kingdom has established " Saudi Environmental Awareness Program (SEAP) with a joint role of public and private sector. SEAP has been established with the objective of increasing environmental awareness among teachers, students and citizen and residents through education and publicity materials. Environmental protection has also been included in the curricula at school and college level.

**Environmental Society** under the patronage of HRH prince Majed Bin Abdulaziz, Governor of Makkah Region has been established with the aim of strengthening the role of academia, education institutions, citizens and trading community in the environmental protection and management.

#### **Regional Co-operation:**

MEPA plays an active role in the regional environmental activities representing the Kingdom in the meetings of the GCC "Environmental Committee" as well as ROPME and Arab League meetings.

In future, PCSD plans to develop waste management guidelines for various other fields like pesticides.

In order to encourage private sector to share its responsibility in the hazardous and medical waste management, MEPA has certified a number of private sector companies to develop hazardous and medical waste transport, treatment and disposal facilities in various parts of the Kingdom. These facilities include incinerators, Class I & Class II Landfills, De-chlorination of PCBs etc.

### **Achievements of MEPA:**

MEPA has achieved many goals including (I) promulgation of Environmental standards (II) survey and inventory of gaseous and liquid emissions and discharges and solid waste, (III) developmental projects (V) compliance with the regulations and standards (VI) monitoring of ambient air quality and marine environment (VII) National Oil spill Contingency plane (VIII) Draft National Coastal Zone Management Plan (IX) Draft Environmental Law (X) Standards and Guidelines for Hazardous Waste Management, Medical Waste Management, Asbestos etc.

### **2. Studies:**

#### **2.1 Marine Ecosystem**

In addition to routine monitoring programs, MEPA has also carried out various comprehensive marine environment studies for eastern coast of Saudi Arabia. Prominent among them are; Eighteen (18) months studies for ROPME (1985-1986), MEPA-IUCN study (1987).

#### **2.2 Inventory of Pollutants:**

### **Ambient Air Quality standards:**

The Ambient Air Quality standards include standards for pollutants such as on sulfur dioxide, inhalable particulate, photochemical oxidants (ozone), oxides of nitrogen, carbon monoxide, hydrogen sulfide and fluorides etc. These standards are listed in table 1

### **Source Emission standards:**

The Source Emission standards address the emissions from cement plants and mining operations, fertilizer industry, combustion facilities, petroleum refining and Aluminum electroplating.

### **Water Quality Standards:**

The water Quality standards mainly consists of

- Receiving Water Guidelines (RWG)
- Performance Standards for direct Discharge (PSDD)
- Pre-treatment Guidelines for Discharge to Central Treatment Facility (PGDCTF).

These standards have already passed through minor revisions and modifications and its new versions were regularly published, the latest in 1409 H.

### **Revision of Standards:**

#### **Water Quality standards:**

Presently, PCSD has proposed major modifications and upgrade of these standards with special emphasis on the Water Body Classification and quality limits of such water bodies based on its "best Uses" for various physic-chemical and biological parameters, trace metals and organic constituents for the water quality standards.



functions of the Preparatory Committee are to act as a clearinghouse for MCE and prepare necessary studies and actions for the MCE's review and approval. MEPA acts as the Secretariat of the preparatory committee also.

**Meteorology and Environmental Protection Administration (MEPA):**

Meteorology and Environmental Protection Administration (MEPA) is the central government agency for environment in the Kingdom of Saudi Arabia which is part of the Ministry of Defense and Aviation. MEPA was established by a Royal Decree (No. 7/M/8903 dated 21 R. Al-Thani 1401 H) in 1980 from the Directorate of Meteorology by adding environmental responsibilities to its functions.

**Functions and Responsibilities:**

The functions and responsibilities of MEPA as described in the referenced Royal Decree are;

- Conducting environmental surveys
- Recommending environmental protection regulations
- Preparing environmental standards
- Assessing existing pollution levels
- Recommending practical measures for dealing with emergency environmental plans and
- Keep abreast of developments in the field of environment on the international level.

In addition, MEPA also acts as a national environmental advisory body for other sector ministries and governmental agencies involved in the activities related to the environment.

planning, design, execution and operation of facilities that will be established in a manner which shall not adversely affect the health, safety and welfare of the people and which shall help in prompting their overall economic and social well-being and in protecting the Kingdom's environment in general.

### **Ministerial Committee on Environment (MCE):**

The Ministerial Committee on Environment (MCE), chaired by HRH Prince Sultan Bin Abdulaziz, the Second Deputy Premier and Minister of Defense and Aviation and Inspector General, is the highest institutional and decision making authority on environmental issues in the Kingdom. The MCE is composed of the concerned sector ministries namely Ministries of Interior, Foreign Affairs, Finance and National Economy, Health, Industry and Electricity, Agriculture and water, Municipal and Rural Affairs, Information, Petroleum and Mineral Resources, planning, as well as Presidents of King Abdulaziz city for Science and Technology (KACST), and Meteorology and Environmental Protection Administration (MEPA) as Secretary General for MCE. The functions and responsibilities of the MCE are as follows:

- To establish the Kingdom's position on environmental issues at national, regional and international levels;
- To formulate a National Environmental strategy; and

To coordinate and follow-up on environmental activities within the kingdom.

### **Preparatory Committee (PC):**

The MCE is assisted by Preparatory Committee Chaired by HH Assistant to HRH the Minister of Defense and Aviation and Inspector General consists of Deputy Ministers of the sector Ministries and the Presidents of MEPA and KACST as members. The