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ENVIRONMENTAL IMPACT ASSESSMENT

OF

THE EXPANSION PROJECT

IN ALEXANDRIA

COMPANY FOR PORTLAND CEMENT

CONSTRUCTION

OF

A NEW CEMENT PRODUCTION LINE

KILN No. 5

EL-MAX, ALEXANDRIA GOVERNORATE

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Chapter (I)

PREFACE

I.1. Introduction

The Egyptian government encourages investments in the field of heavy industries. Cement industry is one of the important industries in developing fields as it is tightly related to solving housing problems by increasing construction rates, as well as the basic structure projects and other industries.

To confront the heavy demand to cement, Egypt, now imports more than two million tons of cement this year to bridge the gap between demand and production. Therefore, the country encourages the expansion in this industry to save the hard currency paid in importing cement.

As the investment cost of such heavy industries is very high and the profits are long-term, and as Alexandria Company for Portland Cement is ready to finance the new expansion subjectively with no need of the government finance or foreign loans, so the new expansion will increase the cement production, which Egypt needs.

Alexandria Company for Portland cement has made a request for expansion by making a new production line in the current factory. The Prime Minister agreed to exclude this project from the decree of the deputy

Ministry Ruler No. (2) for 1996 as the company had contracted the project on 25/2/1995.

The Egypt's law No. (4) for 1994 for environmental protection stated that the authorized administration should evaluate the environmental effect of the new construction according to the elements, specifications and the principles, which are issued by the Egypt Environment Affairs Agency (EEAA) by agreement with the authorized administration. According to the guidebook of the procedures of evaluating the environmental effects, issued in Oct. 1996 by the Institution of environment affairs, the activity of the forthcoming establishment is included in the black list, which is submitted to Ministry of Industry and Mineral Wealth. That requires a comprehensive evaluation to its environmental effects and to determine the nature of its activity, its effect and the production mass. This procedure applies, particularly to constructions, which produce more 50 tons per hour.

It is known that the evaluation of the environmental effect to industrial constructions is a recent environmental concept, which is required after being clear that many of the developing projects and industries lead to environmental disasters. The United States was the first country, which issued in Jan. 1970 the first law, which obliged all the forthcoming projects to make an environmental evaluation, then many countries did the same and Egypt was one of them.

The environmental assessment means studying the technical aspects of the expected effects of this project on the environment and comparing them with the suggested alternatives according to economical and environmental basics to choose the best.

Environmental protection is a corner stone to any developed society. Natural life needs full protection. This protection needs effective regulations and procedures to get natural environment without damage or pollution. Therefore, we can see that we are dealing better, now with the limited resources, the ways of using the basic and alternatives materials and the new ways of production which protect the environment against harm or make it less.

Undoubtedly, using the modern technology is very important in making the environment problems less, so that the environment will be protected through all the steps of the project and its products.

1.2. Elements of the study

The study of the environmental evaluation of the expansions, which presented by Alexandria Company for Portland Cement required the following procedures:

1. Gathering the available data about the location of the company and the suggested activity.
2. Field inspections to the location to study the district weather.

- 4- Field inspections to study the type of the soil and resources of water and electricity.
- 5- Marking out the raw materials used and studying the environmental impact of these materials or their products.
- 6- Studying the industrial processes and related emissions or liquid, solid and gaseous air pollutants according to the results of the actual existing establishment.
- 7- Marking out the local environmental regulations of the suggested activity.
- 8- Analyzing the gained results to determine the good and bad effects of the project on the environment.
- 9- Getting sure that:
 - a) The environment components (air, water and soil) will not be affected badly
 - b) The environment resources will not be exhausted.
 - c) The living beings will not be harmed.
- 10- Suggesting the required recommendations to lessen the expected bad effects.

The gained data and studies were used to cover the following points:

- 1- The executive synopsis.
- 2- The legal, political and administrative frame.
- 3- The project description.

5. Description of the surrounding environment, (normal, vital, social, cultural).
6. The potential environmental effects of the project.
7. Analyzing the project alternatives.
8. The plan of decreasing the bad effects.
9. The follow-up and monitoring plan.

1.3. General data about the establishment

- Title:** Alexandria Company for Portland Cement, in Al-Max, (Fifth Expansion).
- Address:** 583, Al-Moasker St., AL-Max, Alexandria.
- Productive mass:** 1.5 million tons of clinker per year.
- Legal position:** Private sector company follows the England Blue Circle company
- Chairman of the board:** Eng. Hasan Ali Hasan Al-Sum.
- Director-in-charge:** Eng. Robert Farendal.
- Tax Card No.:** 840 (date of issue : 25/8/1993)
- Commercial Register No.:** 117350 (date of issue : 23/10/1963)
- Invested Costs:** 546 millions L.E
- Fixed Capital:** 250 millions L.E
- Instruments & machines costs:** 415,361,691 L.E.
- Project Nature:** Industrial (in the stage of construction)
- Electricity Filters guarantee No:** No more than 100 mg/m³.

1.4. Project Synopsis

The new expansion will be constructed on 26,000m² area inside the borders of the company which is located at 583, Al-Moasker st., Al-Max, Alexandria.

The production power of the new expansion is estimated by 1.5 million tons of clincker per year.

The total cost of the project is nearly 546 millions L.E and the company will finance the whole project.

As a whole, the factory is nearby:

- 1- Paved main roads.
- 2- Energy resources.
- 3- Resources of raw materials(clay and limestone).

Chapter (2)

SPECIFICATIONS OF THE SURROUNDING ENVIRONMENT OF THE ESTABLISHMENT LOCATION

2.1. Location geography:

The location has been chosen according to social and economical respects.

The area of the expansion is 26.000m², located at 583, Al-Moasker St., Al-Max, Alexandria.

- 1- The west-coastal side: a piece of land owned by Properties Authority and it is 20m street width.
- 2- The east-coastal side: Apex of the triangle of the railway lines.
- 3- The southeast side: a curved line begins from south to north near On-Zegheiw road.
- 4- The southwest side: un-straightforward side.

~~There is no any earthquakes activities in this area~~

2.2. Climate of the location area

The climate of the expansion area is a Mediterranean climate; dry and hot in summer, while in winter it is warm and rainy. The temperature ranges between 35 C° in summer and 17 C° in winter. The lowest

temperature in winter during the night is 9 C°. North and north west wind blows on this area.

2.3. Water Resources

The water pipeline of the factory is supplied by Alexandria Water Authority. The Nile water is, chemically appropriate to different uses; especially after chemical treatment.

It is well-known that after building the High Dam there were no floods. During winter, there might be heavy rain and storms.

Chapter (3)

DESCRIPTION OF THE SUGGESTED PROJECT

3.1 The industrial processes

Cement manufacture includes serial technological stages that depend on:

1. Preparation of raw materials
2. Drying unit of the first stage raw materials.
3. Milling of raw materials.
4. Drying after milling and mixing.
5. Homogeneity silo
6. Manufacturing of clinker.
7. Milling of clinker.
8. Storage and filling of cement.
9. The helping services.

3.1.1 Preparation and crushing of raw materials

The ^{two} ~~two~~ main raw materials in cement manufacturing are limestone and clay. Source of limestone is mine number 689A with area of 1.5 km, It is located at 250 South Alexandria – Matrouh road from coastal mark 24 km to mark 25km. Another source is the mine number 689B with area of 2km x 1km and located from mark 28km to mark 30 on the same road.

The limestone is transported by trucks to the crushers inside the company where it is

crushed to a size less than 25 micrometers then it is transported to the storage area in the plant then to the raw mills by conveyors .

Clay is transported from its mine number 1122/1964 desert clay at east of Hamam area to the storage areas in the company by dump trucks then it is transported to the raw mills by conveyors that are used for feeding mills by the iron ores and other additives.

3.1.2 Drying unit of the first stage

Clay and stone after preparation are transported by conveyors to the drying units where the first drying for materials (clay and stone) is conducted.

3.1.3 Milling of materials.

After drying, the materials are transported to the feeding containers of raw mills then to inside mills by feeding trays where the milling operation are conducted to obtain a product with softness of 14%. The raw mills are controlled directly from the control room .

3.1.4 Drying of materials after milling and mixing

Materials are transported ,after milling operations, to drying rooms where they are dried by hot gases.

3.1.5 Homogeneity silo

The product is transported to the homogeneity silo where it is stirred till homogeneity then pushed by air left to the container of heat exchange.

3.1.6 Preparation of clinker

The rotary kiln consists of two stages, initial heating (pre-heater cyclone) and final preparation of materials. The materials are passed inside cyclones through several stages and exposed to hot air from gas burning and after the initial heating and first drying, the product is passed to the kiln for firing and production of clinker then to cooler for cooling the clinker till 85 °C then to clinker silo. The natural gas is used for burning operations inside kiln, the burned gases are passed on electrostatic precipitator for dust removal. The removed dust is settled, transported, collected in storage tanks and discharged in the dust-transportation cars.

3.1.7 Milling of clinker

Trucks are used in transportation of gypsum to feeding crusher for crushing gypsum ore to sizes ranged from 0 to 25 micron then gypsum, clinker and other additives are transported by conveyors to cement mills where these materials are milled by certain percentages. Clinker is milled in two mills with three feeding openings, clinker feeding, gypsum feeding and additives feeding. Each mill has a ventilation system and dust is removed from air by an electrostatic precipitator.

3.1.8 Storage and filling of cement

Cement is transported in the end product to storage silos by special pumps. The storage silos are provided with ventilation systems and bag

house filters. Cement is filled in bags by filling machines or transported without filling in special trucks.

3.1.9 Preparation and instruments

The following instrument are used in the industrial processes:

- (1) Raw crushers
- (2) Two raw mills (185 ton/ hour)
- (3) One drying crusher
- (4) One rotary kiln
- (5) Two cement mills, 85 ton / hour for each.
- (6) Two filling machines.
- (7) Belt and pan conveyors
- (8) Electrostatic precipitators and bag house filters
- (9) Helping instruments.
- (10) Electrical transformer stations.
- (11) Laboratory instruments for quality inspection and insurance .
- (12) Central control unit for industrial processes.

2. Components of raw material

(1) List of raw materials and catalysts

Material	Average consumed amount / day (ton)	Average yearly consumed amount (320 day / year) (ton)
Limestone	6220	1990000
Desert clay	1800	576000
Iron oxide ore	240	77000
Gypsum ore	250	80000
Iron wastes	600	192000

(2) Chemical analysis of limestone samples (collected from its mine)

Component	Limestone	
Carbonates	87	98
Si 21	6	0.2
Al 312	1.5	0.3
Fe 312	1.2	0.2
Ca 1	46.85	54.55
Mg 1	1.75	0.2
S 31	1.5	0.1
Na 12	0.7	0.13
K 12	0.5	0.1
Cl	1.3	0.15
Lost by firing	38.3	43.2

Chemical analysis of a clay sample

Component	Clay	
Calcium carbonates	12	58
Silicon 21	68	32.84
Al ₂ O ₃	10	3.78
Fe ₂ O ₃	5.8	1.82
Ca	5.2	28.38
Mg	1.5	3.75
S	0.1	1
Na	1.64	0.32
K	1.5	0.5
Cl	0.56	
Lost by firing	6	26.04

3.3. Water resources

- The amount of water required for industrial, cooling and drinking consumption is about 3584000 m³/ year.
- The consumed water during production stages is wasted as gases.
- 25 m³/hour for clinker cooling + 12.5 m³/h for cooling kiln gases + 12.2 m³/h for cooling cement in cement mills = 50 m³/h (i.e. 320000 m³/year).
- 63 m³/h for cooling the carrying chairs. This amount is reused, after cooling, in the cooling tower.

Amount of water consumed during cooling and evaporation processes is about 10% (i.e. 5 m³/h as compensation amount should be used = 38400 m³/year)

3.4. Power sources

Electrical power is the main source for running engines of mills, kilns. The consumption rate of electricity is estimated by 160 Miga watt hour per year. This amount is obtained from the general net of electricity . Inside the company ,power stations are used for transformer the high voltage (66 kilo volts)to moderate voltage (33 K V) which is distributed by transformer inside every department .

Natural gas and solar are also considered main sources for operating kilns . The amount required from natural gas is 144 million m³/year. Today 811 x 5 million kilo calorie is used per day instead of 811 k cal per kgm clinker in the past .

3.5 Wastes

3.5.1. Liquid wastes

The used oils are collected in closed containers and transported outside plant for selling .

Solid and maintenance wastes are transported and removed instantaneously .

A station for swage water treatment was constructed in the old plant .
Since water is used for cooling in closed circles , it is reused in the cooling
tower after treatment . No sanitary water is present

3.5.2. Emissions to outdoor air

Emissions from cement manufacturing to the outdoor air is
considered the main source of air pollution . The following procedures are
used for reducing these emissions .

- (1) Electrostatic precipitators in kiln area , By-pass cooler and cement mills. These precipitators are designed for reducing emissions to less than 100 mg/m^3 .
- (2) Bag house filters in filling machines . They reduce emissions to less than 30 mg/m^3 .

3.5.3. Solid wastes

Solid wastes of cement manufacturing are

- (1) Cement dust which is collected by the By-pass . It is mixed with water and transformed to solid and hard masses for removal processes .
- (2) Dust of cement mill fans and filling machines . It is collected by closed circles used in the industrial operations and recycled .
- (3) Closed silo for smoke dust with capacity of 150 ton is discharged by cars (The rate is 1 m / day)
- (4) Bad and broken cement bags are collected and recycled

3.6. Work system in the plant

The 24 hour shift system is applied in the plant daily all over the week. The shift time is 7 hour/day for 6 days/week .

3.7.Storage

The following stores are present in the plant :

- (1) Closed stone store , 140 x 45 meter with capacity of 40000 tons . Its expansion will make its area 260 x 45 meter and capacity of 75000 tons .
- (2) Closed clay and iron oxide store , 170 x 45 m , 45000 tons capacity .
- (3) Mixing and homogeneity silo . 15000 tons capacity .
- (4) Closed clinker store , 28000 tons capacity .
- (5) Two closed cement 10000 tons capacity for each and a new one will be also constructed with capacity of 10,000 tons.

3.8. Activities before constructions

Construction period will continue 52 months. About 1000 workers participate in this work for 8-24 hour daily. The construction operations require heavy instruments such as drillers, raisers and hydraulic crushers.

As general, construction of a new plant or residential unit is accompanied by some impacts including the following :

3.8.1. Air pollution

Sources of air pollution during construction operations include emission of sands and excitation of dust as a result of car and heavy

instrument movements . For reducing levels of air pollutants during these operations, several control measure are considered such as transportation of the burned material in down wind areas, good instruments with no oil leakage and low levels of exhausted smoke and gases, and using of water showers for reducing excitation of dust. Assessment of these air pollutant level is very important and is conducted continuously by the Occupational Health and Air pollution center – High Institute of Public Health – Alexandria University (Annex 1)

8.8.2. Noise

Sources of noise pollution are drillers and drawers machines that are used only during the first stages. The other instruments used in the construction operations are the same instruments usually used in construction of residential units.

8.8.3. Water and electricity resources

During construction stage, 300 –500 m of water is used for building and drinking purposes. This amount is transported by cars from the old plant. Two electrical generators are used efficiently for lighting purposes as well as providing the construction location with the electrical current. Both of two generators are operated by diesel fuel.

B.9. Invested cost of the establishment

Item	Cost with thousand L.E.
(1) Invested costs	
Lands	5000
Buildings	120581
Instruments & machines	296000
Transportation	1300
Furniture	400
Pre-operating costs	5281
Working capital	17438
Pre-operating profits	100,000
Total	546000
(2) Expected operating costs	
A. Changed costs	
Raw materials	12122
Filling bags	17856
Electricity	24640
Fuels	30960
Spare parts and maintenance materials	20606
Total	106184
B. Constant costs	
Salaries	36000
Other costs	20000
Bad and unusable materials	55021
Loan profits	32791
Total	143812
Total (changed + constant)	250000

Chapter (4)

THE LEGAL AND ORGANIZATIONAL RESPECTS

4.1. Introduction

The industrial establishment which are built at new districts, are submitted to many legislation and regulations issued by various authorities for the safety of residents, labours and environment. These legislation include:

- 1- The specifications of buildings in the new cities, issues by the Authority of New Constructing Societies.
- 2- The regulations of establishing industrial projects, issued by General Authority of Manufacture.
- 3- The ministerial resolution No (9) in 1989 about the restrictions of draining the industrial liquid waste in the public sewer of the new cities.
- 4- The executive regulations No (338) in 1992, which attached to the environment law No (4) in 1994 about environment protection.
- 5- Legislation of protecting the industrial environment and dangers of pollution which include:
 - * Labour law No (137) in 1981
 - * Minister of labour's law No (48) in 1967.
 - * Minister of labour Powers' law No (55) in 1983.
 - * Minister of labour Powers' law No (116) in 1991.
- 6- The regulations issued by the Authority of Industrial Control on productive machines and equipment.

2. The regulations issued by Directorate of Labour Powers and Training about safety inside the industrial establishments.
3. The regulations issued by Administration of Fire and Civil Defense about protecting the industrial establishment against fire.

A lot of regulations and legislation dealt with the control of industrial pollution, and most of them are applied because they are followed up by various authorities. As a result, it was a must to form a legal framework to coordinate between all these regulations. The law No. (3) in 1994 declared that the EEAA- the highest national agency responsible for coordinating all what is related to environment protection in Egypt.

This law clarified that the duties of this agency are:

1. Setting the rules and regulations which must be followed by the owners of the projects and establishments before constructing and during operating the projects.
2. Conducting inspection to get certain that the establishments are restricted to rules and regulations, and apply sanctions mentioned in the law against those who violate rules.
3. Setting the rules and necessary criteria at the permitted rate of pollution and checking that these rules are applied.
4. Setting the principles and criteria of evaluating the environmental impacts of the projects.

The law No.(4) in 1994 was issued by a unanimous decision in the Parliament, and the executive declaration was issued in Feb., 1995.

4.2 Definitions

The following definitions and expressions shall be used when applying this law.

4.2.1. Environmental Pollution

Any change in environmental properties that may result directly or indirectly in any harm to living organisms or establishments or affect natural human life.

4.2.2. Environmental Deterioration:

Effect on the environment that reduces its quality or changes its nature or depletes its resources or harms living organisms or monuments.

4.2.3. Environmental Protection:

Protecting and promoting the environmental components, and preventing or reducing their deterioration or pollution. These components encompass air, seas, internal waters including the river Nile, lakes and subterranean waters, lands, natural protectorates, and other natural resources.

4.2.4. Air Pollution:

Any change in the properties or specifications of the natural air that causes hazards to human health or to the environment whether resulting from natural factors or human activities, including noise.

4.2.5. Water Pollution:

Introducing any substance or energy into the water environment intentionally or unintentionally, directly or indirectly, harming living or

non-living resources or threatening human health or hindering water activities including fishing and tourist activities, causing deterioration of the quality of sea water for use, or education of amenities, or changing its properties.

4.2.6. Polluting Substances and Factors:

Any solid, liquid or gaseous materials, noise, radiation, heat, or vibrations introduced by man that lead directly or indirectly to environmental pollution or deterioration.

4.2.7. Water Polluting Substances:

Any substance discharged into the water environment, intentionally or unintentionally, that contributes to changing its properties, directly or indirectly, to an extent that can harm man, natural resources, marine water, tourist areas, or that interferes with other legitimate uses of the sea.

4.2.8. Hazardous Materials:

Materials with dangerous properties that harm human health, or have a harmful effect on the environment such as contagious, toxic, explosive or flammable substances or those with ionizing radiation.

4.2.9. Hazardous Wastes:

Wastes of activities and processes or their ashes that maintain their harmful properties and have no subsequent original or substitutive uses, such as clinical wastes from medical treatment and wastes resulting from the manufacture of any pharmaceutical products, drugs, organic solvents, printing fluid, dyes and painting materials.

4.2.10. Material Handling:

Anything that leads to the movement of materials, with the intention of collecting, transporting, storing, treating, or using them.

4.2.11. Waste Management:

Collecting, transporting, recycling, and disposing of wastes.

4.2.12. Waste Disposal:

The processes that do not extract or recycle wastes such as composting, probing, discharge into surface water, biological treatment, physical-chemical treatment, permanent storage, or incineration.

4.2.13. Liquid Substances Harmful to the Water Environment:

Substances stated in the International Convention of 1973/1978.

4.2.14. Discharge:

Any leakage, pouring, emission, draining or disposal of any kind of pollutants into territorial seas or the exclusive economic zone or into the sea or the river Nile and waterways, taking into consideration the permissible levels of some substances stated in the Executive Regulations.

4.2.15. Establishments:

Establishments are defined as follows:

Industrial establishments that are under the provisions of Law Number 2 for 1958 and Law number 55 for 1977.

4.2.16. Environmental Impact Assessments:

Studying and analyzing the environmental feasibility of proposed projects, whose construction or activities might affect the safety of the environment, with the aim of protecting the environment.

4.3. Environmental Law and Regulations**4.3.1. Environmental law No. 4 for 1994***Section One: Protection of the land environment from pollution*

Article 19 An assessment of the environmental impact of establishments requiring licenses shall be undertaken by the competent administrative authority or the licensing authority. The study shall include the elements, designs, specifications and the bases as determined by EEAA in agreement with the competent administrative authority. The Executive Regulations of this Law shall specify the establishments that should comply with the regulations of the Article.

Article 20 The competent administrative authorities, or the licensing authority shall send a copy of the environmental impact assessment study mentioned in the previous Article to EEAA in order to present its opinion. EEAA will submit suggestions required to be implemented in the field of preparations and systems necessary for treating negative environmental effects. Such authority will carry out and verify the implementation of EEAA's suggestions. EEAA is required to reply to the

competent administrative authority or the licensing authority stating its opinion within a maximum of 60 days of receipt of the study, otherwise, the evaluation is considered to be accepted by EEAA.

Article 21 The competent administrative authority shall inform the owner of the establishment of the result of the evaluation through a certified registered letter. The owner of the establishment may appeal such evaluation in writing within thirty days after receiving the evaluation results to a committee to be established by a decision from the Minister of Environmental Affairs. Representatives of EEAA, and the competent administrative authority or the licensing authority, and the owner of the establishment will be members of this committee. The Executive Regulations shall specify the assignments of this committee and its operating procedures as well as the complaint procedures.

Article 22 According to the provisions of this Law, owners of establishments shall keep written records of the environmental impact of their establishment's activities. The Executive Regulations will determine the standard form of the required written document as well as its time table to assure the compliance of establishments with such a record. EEAA is designated to review the data of these written records to ensure

that they are truthful, to take the required samples, to analyze them, and to measure the environmental impact of the norms established for the protection of the environment. In case of any violation, EEAA will notify the competent administrative authority to mandate the owner of the establishment to rapidly correct these violations. If the owner does not comply within 60 days from the date of the notification, EEAA in agreement with the competent administrative authority, will take the required legal and legislative procedures to shut down the activities of the establishment and will request adequate compensation to treat the harm resulting from these violations.

Article 23 Extensions and renovations of existing establishments shall be subject to the same rules mentioned in Articles 19, 20, 21 and 22 of this Law.

Section Two: Protection of the air environment from pollution

Article 34 It is a prerequisite for granting a permit for the establishment of a project that the site chosen should be appropriate for its activity to ensure compliance with the accepted limits of air pollutants. It should also be observed that the total pollution resulting from all the establishments in one area lies within the permissible limits.

The Executive Regulations of the Law shall determine the establishments subject to its provisions and the competent authority to approve sites and permissible limits of air pollutants and noise in areas where establishments shall be constructed.

Article 35 It is mandatory for establishments subject to this Law to ensure the while practicing their activities, no leaked or emitted air pollutants shall exceed that maximum permissible levels specified in laws and decrees that are in force and stated in the Executive Regulations of this Law.

Article 36 It is prohibited to use machines, engines or vehicles that emit exhaust fumes exceeding the limits set by the Executive Regulations of this Law.

Article 37 It is prohibited to burn, throw away or treat garbage and solid wastes except in areas designated for such purpose that are far from housing or industrial or agricultural areas as well as from waterways. The Executive Regulations of this Law shall determine the requisites and specifications and the minimal distances between areas designated for such purposes.

Local units shall be obliged to designate, in agreement with EEAA, special areas for burning, throwing away or treating

garbage and solid wastes according to the provisions of this Article.

Article 40 It shall be ascertained during burning of any fuel, whether for industrial, energy production, construction or any other commercial purpose, that the resulting smoke, gases, and harmful vapors are within the permissible limits. The person responsible for such activity shall take all precautions necessary to minimize the quantity of pollutants from burning. The Executive Regulations of this Law shall define these precautions and permissible limits as well as the specifications of chimneys and other means to control the emission of the resulting smoke, gases, and vapors resulting from the combustion process.

Article 42 All agencies and individuals, while performing production, service or other activities, particularly when using tools, equipment, horns or loudspeakers, shall abide by the permissible limits of sound intensity. Authorities issuing licenses shall ensure that the total sound produced from fixed sources within one area shall be within the permissible limits, and shall ensure that establishments select appropriate tools and equipment to guarantee this. The Executive Regulations of this Law shall define the permissible limits of sound intensity and the permissible time limits for exposure to said noise.

Article 43 The owner of an establishment is required to take all precautions and procedures necessary to prevent the leakage or emission of air pollutants inside the work premises except within the permissible limits as defined by the Executive Regulations to this Law, whether they result from the nature of the establishment's performance of its activities or from malfunctioning equipment.

Article 46 The director in charge of an establishment must take adequate measures to prevent smoking in closed public places except within the permissible limits specified in the license issued for such establishments. In this case a special zone shall be reserved for smokers in such a way as not to affect the air in other areas.

4.3.2. Executive regulations of law No. 4/1994

Section Two: Protection of the air environment from pollution

Article 34 Subject to the provisions of Articles 10 and 11 of these Executive Regulations, it is mandatory that sites where projects are to be set up shall be suitable for establishment activities so as to fit in with the nature of the area, and with the plan set up for using the land, as determined by the Ministry of New Urban Communities. The overall pollution resulting from the total installation in a given area shall be within permissible limits as indicated in Annex 5 of these Executive Regulations.

In all cases, due consideration shall be given to determining the suitability of the site, to its distance from urban residential areas, whether in the project's area or the surrounding areas, and the prevalent wind direction.

Article 35 All establishments indicated in Annex 2 of these Executive Regulations for which an environmental impact assessment is required prior to issuing permits to exercise their activities, shall be subject to the provision of the foregoing Article. Permits confirming the suitability of sites shall be issued by the body competent for assessing environmental impact from activities, after referring to the EEAA on this regard.

Article 36 Establishments that are subject to the provisions of this law in exercising their activities shall be committed towards avoiding emissions or leakage of air pollutants at or above the maximum limits allowed by current laws and decrees, and not exceeding the limits determined in Annex 6 of these Executive Regulations. Nor shall they cause any changes in the composition and characteristics of natural air to such a degree that results in danger to human health and to the environment.

Article 45 Establishment owners shall take the necessary precautions and arrangements, as set by the Ministry of Manpower and Employment, to ensure that there is no leakage or emission of air pollutants inside work premises except within the limits

indicated in Annex 8 of these Executive Regulations, whether resulting from the nature of establishment activities or from equipment malfunction. They shall provide the necessary means for protecting workers by implementing health and safety measures in the work place, including the choice of machines, equipment, substances, and types of fuel, as necessary. Periods of exposure to these pollutants shall also be taken into consideration. Adequate ventilation of places and the installation of chimneys and other air cleaning methods shall also be implemented.

Article 46 Establishment owners shall take necessary procedures to maintain temperature and humidity levels inside work premises within and not exceeding the maximum/minimum permissible limits. In case of work that requires operation beyond these limits of temperature or humidity they shall ensure the provision of suitable protective means for workers such as special clothing and other protective means. Annex 9 of these Executive Regulations gives the maximum and minimum limits of temperature and humidity levels, the period of exposure thereto, and means of protection thereof.

Article 47 Closed and semi-closed public places shall have adequate ventilation systems appropriate to their sizes and their capacities, as well as to the type of activities exercised therein,

to ensure the renewal of air, its cleanness and the maintenance of a suitable level of temperature.

4.4 other Laws and Regulations

The following is a list of rules and regulations engaged with protection of the environment issued before 1994. It was categorized into chapters for treatment of liquid waste disposal, occupational health and safety and air pollution.

4.4.1. Disposal of liquid wastes

Law 93/1962 for sewage drainage

- **Chapter 1:** General drains.

- **Chapter 2:** Surface water.

Decision of housing minister No. 643/1962 for execution the law No. 93/1962.

- **Chapter 6:** Standards and specifications of the procedure shall be taken into consideration.

For drainage solid wastes in the general drains.

- **Chapter 7:** Method and repetition of sample collection for analysis of liquid wastes and selection of central laboratories for public health by the water agency.

Decision of minister No. 8/1983 for execution the law No. 48/1982.

- **Chapter 6:** Regulations, standards and specifications engaged with the treated liquid wastes before its drainage in the surface water.

4.4.2. Occupational health and safety

Law 137/1981 (Worker)

- **Chapter 5:** The required standards for occupational health and safety.

Decision of the manpower minister No. 55/1983.

- **Chapter 3:** Safety standards from exposure to chemical materials used in the work place.

Article 6: "Inspectors of the industrial security have the right to inspect types and components of used chemical substances".

Decision of the industry minister No. 91/1985 for execution law No. 21/1985.

- Rules of production, handling and importing of hazardous chemicals, in addition to production and storage sites specifications.

4.4.3. Air pollution control

The republic decision 364/1969

- Establishing of the upper committee for protection the air from pollution, the chairman is the health minister. Duties of this committee were:
 1. Studying sources of air pollution.

2. Establishing a general policy for prevention of air pollution.
3. Establishing air quality standards.
4. Preparations air quality laws and regulations.

Decision of the health minister No. 470/1971

"Standard allowable pollution limits in air emissions".

Decision of the housing minister No. 380/1975

- Specifications and prerequisites of industrial and commercial buildings.

- Ventilation rules.

Decision of the housing minister No. 600/1982 fore execution the law No. 3/1982 for urban planning: Specifications of the new industrial areas.

Decision of the industry minister No. 380/1982 for execution the law No. 3/1982 for the urban planning: Prevention of pollution should be considered inside the new industrial establishments.

Chapter (5)

POTENTIAL ENVIRONMENTAL IMPACT OF THE ESTABLISHMENT

5.1. Work opportunities and Development

The suggested expansion represents investments with self found from Alexandria Company for Portland Cement which help in supporting the national economy and social life by existing new work chances inside the establishment in addition to saving indirect work chances outside it such as working in the service fields and transportation of products.

Also, establishing of this expansion will lead to training of workers and increasing their skillful and efficiencies towards the advanced technology used in manufacturing system. No doubt, this will develop the accompanying social life.

Today, markets suffer from severe deficiency in cement amounts as compared with the exceeding request for cement for construction purposes and establishing new urban communities. This will lead to importing cement by the hard currency. So, establishing the new expansion with production rate of 1.5 million ton/year will solve a considerable part of this problem.

5.2. Drainage of sewage water

As mentioned before, the water amount required is 3584000 m³/year. As for sewage water, it is collected in a treatment station in the old factory where it is treated and used for cultivation of trees around the old and new factories.

5.3. Noise

control measures for reducing noise to the permissible levels according to national and international standards are considered in the new expansion design.

Inside the establishment, occupational hazards from exposure to noise are prevented by different methods such as wearing of ear muffs by workers who work in or near high noise area, as well as reducing the staying period of workers in these area. Noise is high in the limestone crushers area and raw mills. The worker operates these locations from the control room.

According to the technical studies in industries like this industry, the equivalent noise levels ranged between 60 and 70 decibel (db).

5.4. Transportation

Alexandria Cement Portland Company is located in Al-Max, near from the international coastal road leading to north coast and Mersa Matrouh governorate.

It is also near from Alexandria – Cairo desert road, so the present road net is enough for moving trucks towards all governorates in Egypt.

5.5. Industrial hazards

5.5.1. Firing

Since there are Fuel Stores and machines running with electrical current, firing accidents are probable to occur. The design used in construction of the establishment includes all precautions to prevent the firing causes such as using early warning instruments for instantanuous discovering of any firing causes. All rooms of electricity and electrical instruments are connected with electrical insulation keys and ground, and are provided by firing – control systems such as dry powders which liberates automatically in case of firing. The empty cement bags room is provided with the same technique.

Inside the establishment itself, there are firing water taps distributed everywhere. The water is provided for these taps from the main water net in the factory.

5.5.2. Pouring

There is possibility of pouring from filling machines or cutting bags filled with cement. This is controlled by ventilation systems for suction of dust from the filling room and using of good quality bags.

5.5.3. Gases Leakage

By using natural gas for firing processes in the kiln, a series of safety valves is used to prevent any gas leakage in the outdoor air.

5.5.4. Explosions

Explosions may arise from exceeding levels of carbon monoxide (CO) in the firing gases. It is controlled by adjusting all firing conditions to obtain percentages of CO less than 0.3% and providing the electrostatic precipitator with warning system.

5.6. Emissions in Air

Cement dust is considered the major air pollutant emitted from cement manufacturing. Most of recent techniques are interesting with reducing dust emission levels to the lowest extent by using different types of filters. The Egypt's Environmental Law numbers 4 for 1994 defined 500 mg/m³ as maximum level for dust emissions in air.

Cement dust can be categorized into 3 types

5.6.1. Dust emitted during preparation of raw materials

It includes limestone and clay dust which has the same chemical composition of these materials.

5.6.2. Cement Dust

This type of dust is present in two locations; filling department and clinker milling. As the filling section is provided by air filters, no dust emission is expected in the outdoor air.

5.6.3. Clinker Dust

It has particle size larger than cement dust and is participated during clinker cooling process.

Several control measures were tested for reducing dust emissions from all sections in the suggested establishment. They include:

1. Adjusting firing operation in the kiln to reduce co-emission to less than 300 mg/m^3 .
2. Using of bag-house filters in cement mills and final packing machines.
3. Using of electrostatic precipitators in the By-Pass.
4. Using of dust-suction systems in the filling section.
5. Storage of raw materials in closed places.

As issued in the Law 4/1994, the maximum concentrations for dust emissions from new and old cement companies are 200 and 500 mg/m^3 respectively. By using filters, dust emissions from the new suggested cement plant will not exceed 100 mg/m^3 . The following table indicates amount of dust emitted daily per 1000 tons clinker in different countries of the world. It is based on each 1 Kgm of clinker requires filtration of $2-3 \text{ m}^3$ of air.

5.7. Solid Wastes

Cement dust is considered the principle source of solid wastes. Although dust is collected in filling sites and recycled, cement dust which is collected from kilns through the By-Pass can not be recycled.

This type of dust is mixed with water, transformed to grains then it disposed off or used in road pavements.

Country	Maximum level for dust emission (mg/m^3)	Maximum level for emitted dust in air (Kgm/day)
USA	70	140-210
Italy	300	600-900
Espania	150	300-450
Denmark	150	300-450
Belgium	150	300-450
Switzerland	150	300-450
England	100	200-300
Netherlands	100	200-300
Canada	150	300-450
Sweden	150	300-450
France	150	300-450
Australia	250	500-750
Serya	250	500-750
Saudi Arabia	150	300-450
Jermany	50	100-150

Chapter (6)

OPTIONS OF THE SUGGESTED PROJECT

6.1. Activity

It is urgent to establish new cement industries for production of national construction materials and overcome problems of continuous raising in cement price and expensive importing of cement. Establishing the new expansion is encouraged by self funds from Alexandria company for portland cement itself without addition any duties on the government or taking loans from any abroad agencies.

6.2. Location

Location of the new expansion is very suitable from different faces:

1. It is near from raw material sites.
2. It is near from main transportation roads.
3. It is near from water and power sources.

6.3. Raw materials

Using of limestone (calcium carbonate) and clay cannot be replaced by using other materials for cement production and hence, there is no any regional or quality options for these materials. The suggested area can be currently used before searching and using of the neighboring areas.

6.4. Fuels

Although diesel or natural gas can be used in firing processes in the kiln, it is recommended to use natural gas only because its exhausted gases are nearly free from air pollutants such as carbon monoxide, sulfur oxides, nitrogen oxides and air borne carbonaceous materials as compared with diesel fuel.

6.5. Designs and technology selection

Advanced technology was selected in design, execution, operating and maintenance by consultation of professional foreign companies.

6.6. Water resources

The new expansion will take water for human and industrial proposes from the net which already present in Alexandria company for portland cement.

Chapter (7)

MONITORING PLANE & REDUCING THE ADVERSE EFFECTS

7.1. Emission - monitoring plane

1. Periodical inspection for insurance that all laws engaged by occupational safety and environmental protection and all permissible limits are applied.
2. Conducting periodical measurements for assessment of gaseous emissions such as carbon oxides, sulfur oxides and nitrogen oxides.
3. Conducting measurements on firing exhaust of the kiln to assess levels of emitted gases including carbon oxides, sulfur oxides and nitrogen oxides.
4. Using of opacity monitors for assessment of dust concentrations emitted from stacks and from each department in the plant.
5. Measuring and recording noise levels in the workplace and connecting the results with technical and administrative procedures such as engineering control measures to reduce or prevent noise or reducing the exposure periods inside the noisy places.
6. Purchasing most or all instruments required for the environmental assessment procedures.

7. Preparation special records for recording results of the periodical monitoring program according to a prepared plane.
8. Measuring quality and components of the treated sewage water for testing accordance of results with standards and if it can be used for lands or not.

7.2. Occupational safety plane

1. Periodical medical examinations for workers.
2. Training of worker on methods and equipments of protection from the work hazards.
3. Protecting workers from inhalation of cement dust.
4. Protecting workers from exposure to high levels of noise for a long times.
5. Protecting workers from exposure to high degrees of temperature for a long times.
6. Protecting the establishment from the firing accidents by using early warning systems and manual and automatic fire extinguishers.
7. Protecting the establishment from the electrical accidents by using electrical isolation keys, land columns and extinguishers for electrical fires.
8. Using enough and good lighting to enable workers to work safely.
9. Preparation of indoor paved roads.
10. Conducting periodical maintenance for all machines and instruments.

Chapter (8)

ADVANTAGES AND COMMITMENTS OF THE PROJECTS.

8.1. Advantages of the project

1. Lack of effect on the level or quality of ground water because the establishment is supplied by water from Alexandria Water Authority.
2. Draining a little amount of industrial liquid waste and sewage which will be used , after treatment, in growing plants and trees.
3. Setting up the establishments will contribute in supporting the economical, industrial and social development of the area.
4. Using modern and sanitary technology in production and taking the full precautions to prevent any emissions of harmful dust.
5. Saving the fuel by using the dry method in production.
6. Producing great amount of cement (1.5 million tons a year) will assist in developing the basic structure and constructing new societies.
7. Employing and training new labours will help in solving the problem of unemployment.

8.2. The Employer Commitments

The owner of a project is committed to apply the regulations of law No. (4) for 1994 and its executive declaration issued by the Prime Minister's decision No. (338) in 1995 about environmental protection, and all the legislation of environmental protection.

The employers, also should follow the below:

1. Taking all the necessary precautions to prevent any bad effect on environment by checking the liquid, solid and gaseous release and getting certain all the safety regulations are applied.
2. Having registers to write down all the changes and environmental phenomena.
3. Not using machines or motors which badly affect the permitted rate of pollution mentioned in the executive declaration.
4. Not burning, treating or throwing away the rubbish or the solid waste except in the defined places and in accordance with the legal restrictions.
5. Not burning any type of fuel, which leads to releasing harmful smoke, gases or vapors beyond the limited borders.
6. Not using tools and machines which produce noise beyond the authorized.
7. Providing all labours by the industrial safety and protection.
8. Saving enough ventilation systems and using air filters to lessen the scattered items in the air to the lowest and authorized extent.
9. Not draining any liquid or solid waste before treating and getting certain that it is authorized.
10. Assisting the legal authorities in the periodical analysis of the waste and other releases to get certain that they are not illegal.

11. Following the modern ways of cleaning the establishment to keep the labours healthy.
12. Keeping the raw materials and products in a ventilated area and by a safe way.
13. Not exposing the labours to high temperature degrees for a long time.
14. Not exposing the labours to dust or noise higher than the permissible levels..
15. Connecting all the electrical equipment by a sufficient net of light posts which can resist 2 ohms.
16. Supplying the fuel tanks with auto-fir extinguishers.
17. Connecting al the electrical equipment by insulated switches.
18. Forcing the labours to wear the helmets, safety shoes, glasses, masks and ear plugs in the required area.
19. Placing guiding signs in the work area.
20. Saving a medical clinic for first aid and periodical checks.
21. Coordinating with other institutions and sharing the public and the non-governmental organizations in evaluating the environmental effects.

SUMMARY

In accordance with :

- a- The present and expected environmental states after constructing the new expansion in Alexandria Company for Portland Cement.
- b- The subjective finance to the whole project with no need to the government finance or any foreign or national loans.
- c- The approval of the Prime Minister to exclude this project from the decree of the deputy of Military Ruler No2 in 1996 as the company had contracted the expansion project on 25/2/1995 for the benefit of the company and the whole country.

In accordance with the above:

- 1. The project was studied thoroughly from the technical and environmental aspects.
- 2. The company will use modern technology in producing cement.
- 3. The company had a full and detailed study about every stage of production for not causing any environmental pollution.
- 4. The company is committed to apply all regulations requirements of the current local environment.

Undoubtedly, the social and economical advantages of the project highly exceed the bad effects.



Annexes

Annex (1)

**ASSESSMENT OF TOTAL SUSPENDED PARTICULATE AND
RESPIRABLE DUST CONCENTRATIONS AND NOISE LEVELS IN THE
SURROUNDING AND NEIGHBORING AREA FOR THE EXPANSION
PROJECT IN ALEXANDRIA COMPANY FOR PORTLAND CEMENT AS
A PART OF THE ENVIRONMENTAL IMPACT ASSESSMENT
FOR THE PROJECT
MAY - JUNE 2000**

The director of the fifth expansion project in Alexandria company for portland cement agreed to make assessment for concentrations of respirable and total suspended particulates (TSP) and to measure noise levels in the surrounding and neighboring area for the project of construction the fifth cement kiln in the company location in El- Max. A team work from the Occupational Health and Air Pollution Center - Alexandria University, visited the project location four sampling sites representing the main four directions. High volume and PM10 samplers were fastened at the selected sites for sampling TSP and respirable dust for 24 hours daily and for two days per week. The studying period was four weeks. Also noise levels were measured in different time intervals during the day (at morning, afternoon, and at night) by using a sound level meter calibrated at 114 decibel (db).

The following are results of this study:

(1) Concentrations of TSP in $\mu\text{g}/\text{m}^3$

No. & direction of station	Concentrations of TSP ($\mu\text{g} / \text{m}^3$)								Daily average concentration
	15/5	16/5	22/5	23/5	29/5	30/5	4/6	5/6	
(1) North west	153.6	211.3	203.5	190.6	173.2	165.4	164.7	159.6	177.7
(2) South west	237.1	240.3	220.7	183.4	191	171.2	176.2	171.2	198.9
(3) South east	243.2	271.2	211.6	196.4	218.2	159.7	194.8	189.9	209.8
(4) North east	192.7	228.6	181.5	166.7	189.4	121.5	171.3	166.2	177.2

The pervious table indicates levels of TSP during period of the study. According to Law No. 4 and its executive regulation No. 5, the maximum permissible limit for 24 hours exposure to TSP in the outdoor air is $230 \mu\text{g}/\text{m}^3$. By comparing, levels of TSP were lower than this limit at all station except at stations 2 and 3 during the first two days. The two stations are near from limestone storage sites and the first two days were characterized by the high speed south west wind which caused excitation of dust in the air.

(2) Concentrations of respirable particulate in $\mu\text{g}/\text{m}^3$

No. & direction of station	Concentrations of respirable particulate ($\mu\text{g} / \text{m}^3$)								Daily average concentration
	15/5	16/5	22/5	23/5	29/5	30/5	4/6	5/6	
(1) North west	54.6	72.4	64.7	61.2	59.3	57.7	56.2	49.3	59.4
(2) South west	74.6	77.2	69.1	64.1	61.7	59.2	58.7	54.2	64.9
(3) South east	73.9	80.1	69.9	65.8	64.2	63	60.4	58.2	66.9
(4) North east	61.3	69.7	63.9	62.6	57.7	59.2	58.1	50.1	60.3

The maximum exposure limit for respirable particulate in Law No. 4 is $70 \mu\text{g} / \text{m}^3$ as yearly average concentration. Although no daily standard has been issued, it is known that the daily standards are much higher than the annual limits. This means that levels of respirable dust at all stations were lower than the recommended value.

For preventing any increase in TSP or respirable dust in the future, it is recommended to construct a closed area for receiving and operating the raw materials (limestone and clay).

(3) Average noise levels in decibel (db)

Measuring locations	Noise levels (db)		
	Morning	Afternoon	Night
(1) North west	57.5 – 69	53.2 – 64	51.2 – 58.7
(2) South west	58.2 – 69.3	54 – 64.2	53 – 59
(3) South east	56.9 – 68.7	52.9 – 64	51 – 57.9
(4) North east	57.1 – 68.7	52.7 – 63.8	50.9 – 57.2
Maximum allowable limit of noise exposure in Law No. 4 / 1994	60 - 70	55 - 65	50 - 60

According to the executive regulation No. 7 (table 2) for Law No. 4, all measured levels of noise during period of the study were within the permissible limits.

Report preparation

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*Annex (3)***GEOLOGY AND EARTHQUAKES HISTORY OF THE AREA**

Geological studies refer that Alexandria and the round area, as well as the suggested area for the new expansion, are beyond the earthquake belt which includes; the area of Aqaba gulf, the zone of (Suez gulf-Cairo-Alexandria) and the zone in (the east of the Mediterranean - Fayoom).

The attached chart shows that there were no strong or mid earthquakes in this area either in the ancient or recent time.