

REPORT

LAFARGE SURMA CEMENT

ENVIRONMENTAL AUDIT REPORT OF DHAKA TERMINAL AND MONGLA PLANT



PREPARED BY

REPORT

LAFARGE SURMA CEMENT

**ENVIRONMENTAL AUDIT REPORT OF DHAKA
TERMINAL AND MONGLA PLANT**

For and on behalf of
**Resources and Environmental
Management Services (REMS)**

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TABLE OF CONTENTS

	Page
EXECUTIVE SUMMARY	i
INTRODUCTION	1
 PART-I	
ENVIRONMENTAL AUDIT REPORT OF DHAKA TERMINAL	I-1
1. BACKGROUND	I-1
2. AUDIT METHODOLOGY	I-1
3. REVIEW OF THE ENVIRONMENTAL MANAGEMENT AND MITIGATION PLAN	I-2
3.1 Water Quality Management	I-2
3.2 Air Quality Management	I-2
3.3 Air Pollution Control	I-3
3.4 Occupational Health Management	I-3
3.5 Other Wastes	I-4
3.6 Sanitary Waste Management	I-4
3.7 Disaster Management	I-4
3.8 Environmental Aesthetics	I-4
3.9 Storage, Handling and transportation and Distribution	I-4
3.10 Control of Noise Emission	I-5
3.11 Energy Conservation	I-5
4. ENVIRONMENTAL PERFORMANCE AND COMPARISON OF AIR, WATER AND SOUND QUALITY WITH BASELINE/STANDARDS	I-5
5. AUDIT RESULTS	I-7
6. CONCLUSIONS AND RECOMMENDATIONS	I-9
 PART-II	
ENVIRONMENTAL AUDIT REPORT OF MONGLA PLANT	II-1
1. BACKGROUND	II-1
2. AUDIT METHODOLOGY	II-1
3. PROJECT DESCRIPTION	II-2
4. REVIEW OF THE ENVIRONMENTAL MANAGEMENT AND MITIGATION PLAN	II-3
4.1 Water Quality Management	II-3
4.2 Air Quality Management	II-3
4.3 Air Pollution Control	II-4

4.4	Occupational Health Management	II-4
4.5	Other Wastes	II-4
4.6	Sanitary Waste Management	II-4
4.7	Disaster Management	II-4
4.8	Storage, Handling and transportation and Distribution	II-5
4.9	Control of Noise Emission	II-5
4.10	Energy Conservation	II-5
5.	ENVIRONMENTAL PERFORMANCE AND COMPARISON OF AIR, WATER AND SOUND QUALITY WITH BASELINE/STANDARDS	II-5
6.	AUDIT RESULTS	II-7
7.	CONCLUSIONS AND RECOMMENDATIONS	II-10

ANNEXURES

Annex-I : Details of the Filter

Annex-II : Ventilation System

Annex-III: Photographic Record

EXECUTIVE SUMMARY

Lafarge Mongla Ltd. – a Bangladesh – France joint venture company has set up a fine a bulk cement terminal and a cement bagging plant in Mongla port area. In order to market bagged cement from Mongla to other parts of Bangladesh Lafarge Mongla Cement Ltd. has also constructed a Bagged cement terminal at Kutubpur in Narayanganj district.

The Projects fall under the Red category as per Environmental Conservation Rules 1997, thus both the projects require Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA) for obtaining Environmental Clearance from the Department of Environment prior for starting of physical construction work and operation. IEE & EIA reports were prepared for the projects in which potential environmental issues were raised and Environmental Management Plans (EMP) were prepared. DOE awarded Environmental Clearance for both the projects subject to compliance with the measures outlined in the EIA and EMP.

As a corporate requirement Lafarge requires an Environmental Audit to be carried out to assess whether the operations being carried by Lafarge at both the project sites are as per the EMP guidelines outlined in the EIA approved by DOE. Lafarge engaged Resources and Environment Management Services (REMS) to carry out the audits. REMS subsequently mobilized a team of experts for carrying out the task.

The Methodology adopted for this audit included, among others, reviewing the EIA, Environment Management Plan, making observations on environmental performance and health and safety aspects; meeting with the management and technical staff at both the project sites.

The audit team found that there is compliance with all the requirements in both the projects as recommended in the Environmental Management Plan and the EIA approved by the DOE. The operation and maintenance was environment friendly. It was observed that good house keeping practice was in place in both the facilities.

In the Dhaka terminal efforts were made for raising plantation around the terminal building, but due to poor topsoil the growth of trees was not found to be good. In the Mongla plant site there is very little scope for plantation due to the lack of vacant land.

It is therefore certified that the Mongla Plant and the Dhaka Terminal of Lafarge Mongla Cement Ltd. are in full compliance with the guidelines set forth in the Environmental Management Plans incorporated in the EIAs of the projects. However, it did not carry out the environmental monitoring as suggested in the EIA reports, which needs to be done as documented as per the prescribed formats provided in the EIAs (see Annexes of the EIAs).

However, few observations were made on the environmental performance by the team and recommendations put forward for further improvement of the environmental performance.

INTRODUCTION

Lafarge Mongla Cement Ltd. – a Bangladesh – France joint venture company has set up a fine a **Bulk Cement Terminal and a Cement Bagging Plant** in the transit shed No.5 in the Mongla port area and a **Bagged Cement Terminal at Kutubpur** in Narayanganj district.

Construction and operation of both the facilities fall under the Red category as per Environmental Conservation Rules 1997, and as such they require conducting Initial Environmental Examination (IEE), Environmental Impact Assessment (EIA) studies and preparation of Environmental Management Plans (EMP) for obtaining Environmental Clearance from the Department of Environment. Lafarge Mongla Cement Ltd. prepared IEE & EIA reports and prepared Environmental Management Plans (EMP) for the both facilities, which identified potential environmental issues and suggested mitigation measures. DOE awarded Environmental Clearance for both the projects subject to compliance with the measures outlined in the EIA and EMP.

In order to fulfill the corporate requirement Lafarge Mongla Cement Ltd. requires an Environmental Audit to be carried out to assess whether the operations in both the facilities are being carried by Lafarge are as per the EMP guidelines outlined in the EIA approved by DOE. Lafarge engaged Resources and Environment Management Services (REMS) to carry out the audits. REMS subsequently mobilized a team of experts consisting of a Chemical Engineer, a Mechanical Engineer and an Environment Management Specialist for carrying out the task.

The following report presents the findings and recommendations of the audit team. The report consists of two parts. **Part-I deals with the Dhaka Terminal and Part-II deals with the Mongla Plant.** A scope of work was presented to the client, which included, among others, review of IEE, EIA and EMP, observation of environmental performance, visit to the plants and facilities and meeting with Lafarge management and technical staff.

A matrix has been presented in the report, which summarizes status of compliance with the prescribed guidelines incorporated in the EIA and EMP for activities involved in the operation and maintenance of the facilities. A set of recommendation has also been made.

PART-I

**ENVIRONMENTAL AUDIT REPORT OF
DHAKA TERMINAL**

PART-I

ENVIRONMENTAL AUDIT REPORT OF DHAKA TERMINAL

1. BACKGROUND

Lafarge Mongla Ltd. – a Bangladesh – France joint venture company has set up a fine a Bulk Cement Terminal and a Cement Bagging Plant in Mongla. In order to market bagged cement from Mongla to other parts of Bangladesh Lafarge Mongla Cement Ltd. have constructed a Bagged Cement Terminal at Kutubpur in Kanchpur area of Nareyanganj district. The total storage capacity is 6000 MT.

The Project falls under the Red category as per Environmental Conservation Rules 1997, thus it required both Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA) for obtaining Environmental Clearance from the Department of Environment prior to starting of physical construction work and operation. An EIA report was undertaken to identify the potential environmental issues and also outline abatement/mitigation plan, as necessary, to comply with the National Environmental Quality Standards as described in ECR 97. Additionally an Environment Management Plan (EMP) was provided in the EIA report.

As a corporate requirement an Environmental audit has to be carried out to assess whether the operations in the site are being carried by Lafarge Mongla Cement at Kutubput bagged cement terminal are as per the EMP outlined in the EIA and approved by DOE.

2. AUDIT METHODOLOGY

The Methodology adopted for this audit is to initially review the Environment Management Plan and list out the various activities being carried out at the terminal and to physically check whether Environmental performance and health and safety aspects etc. are in compliance with the guidelines provided in the EMP.

The terminal was visited and its operation was observed. Initially a meeting with the Lafarge management at the headquarters was held on the various aspects of the audit. Various documentations regarding operational aspects was checked.

The team members from REMS were as follows :

- (1) Dr. Moinul Islam Sharif, Chemical Engineer
- (2) Mr. Syed Iqbal Ali, Environmental Management Specialist
- (3) Mr. Mahinul Islam, Mechanical Engineer

The team met with Mr. Ashfaque Wahed and other technical and management staff at the Kutubpur site.

3. REVIEW OF THE ENVIRONMENTAL MANAGEMENT AND MITIGATION PLAN

The basic objectives of the EMP for the project were considered as-

- Mitigation measures to eliminate negative impacts.
- Enhancement measures to maximise positive impacts.
- Monitoring Requirements and
- Monitoring indicators.

The EMP prepared forms the basis of Health, and Safety and Environmental Management Plan to be taken and maintained by the management of the plant authority.

3.1 Water Quality Management

As the operation of the terminal will involve storage of bagged cement there is no process water. Water will only be used by a small number of resident operators at the terminal generating only a small amount of waste water, which should be disposed in an environmentally sound way.

3.2 Air Quality Management

A literature review of dust emission level has been carried out in terms of standards followed by different countries in the EIA. Within the wide range of cases the following table has been included in EMP as guidance as to the interval in which emission of dust are found in the atmosphere, or the content in extraction air, in proper managed installations.

Sl. No.	Operations	Dust Concentration Mg/Nm ³
1.	Emptying into hoppers form tracks or wagons	5 – 20
2.	Mechanical Sieves	5 – 20
3.	Spillage from Conveyor belts	5 – 20
4.	Packer	5 – 20
5.	Bag Cleaner	2 – 5

It has been highlighted in the EMP that as there is no stack at the Bagged Cement Terminal so there was no requirement of calculating the concentration of dust at different distances e.g. 500m, 200m and 100m from the terminal.

3.3 Air Pollution Control

The EMP suggests that the main dust emission points of the proposed cement terminal will be:

- a) Conveyor belt section for carrying bagged cement into storage shed
- b) Cement bag dumping within the storage shed
- c) Cement bag palletizing
- d) Cement bag loading and unloading points.

As per the EMP the plant should install dust proof machineries and mechanical devices should be completely dust proof. Any spillage due to breakage of bags should be collected and rebagged. Thus, the concentration of air borne cement dust as Suspended Particulate Matter (SPM) is expected to remain within tolerable limit.

3.4 Occupational Health Management

As per the EMS, Occupational health is a major consideration of Lafarge World Wide operation. Adequate Personal Protective Equipment (PPE) will be given to the workers. There will be provision of First Aid within the terminal building and training program on safety and health will be provided by the management to the operators.

3.5 Other Wastes

It is expected generation of solid waste such as waste papers, cuttings will be kept to a minimum through good housekeeping.

3.6 Sanitary Waste Management

As per the EMP the sanitary waste generated will be insignificant and will be disposed in to the sewerage system to be constructed.

3.7 Disaster Management

As per the EMP the likely disasters are accidental flood, fire and accidents from operations of machineries. It is expected that the terminal building will be above normal flooding level and that adequate fire fighting equipment are in place and the workers trained in safe handling of equipment and in general there is good housekeeping.

3.8 Environmental Aesthetics

The EMP suggests some plantation in a systematic way in the limited open space for beautification of the terminal.

3.9 Storage, Handling and transportation and Distribution

The EMP suggests that as the cement bags are mechanically handled the loss dust loss will be insignificant.

- **Noise and Vibration Management**

In the EMP the several sources of noise, each one with a different sound pressure are shown, which are as follows :

Conveyor drives	80 – 95 dBA
Vehicles for bagged cement loading	80 – 90 dBA

3.10 Control of Noise Emission

The following steps have been suggested to control noise emission in the EMP

- Keeping machinery away from foundations of the building
- The rotary parts should be properly balanced
- Use of silent bearings
- Preferential use of low RPM electric motors
- Not installing noisy machines or equipment against walls or columns.
- Closing in the motor and ventilator set in one box, with soundproofing on the walls, and mounting the items to reduce vibrations.

3.11 Energy Conservation

The EMP suggests good housekeeping in order to conserve energy.

4. ENVIRONMENTAL PERFORMANCE AND COMPARISON OF AIR, WATER AND SOUND QUALITY WITH BASELINE/ STANDARDS

The EIA report of the Dhaka terminal presented the air quality, water quality and sound levels baseline (where ever available) / Bangladesh standards (which ever available). During this audit air quality, water quality and sound levels were measured at different places. The Department of Environment, Government of Bangladesh, measured the air quality and sound levels. The results were compared to evaluate the environmental performance of the terminal. The following tables present the results of the measurement and compare the results with various reference.

Air Quality :

The Environmental Assessment of the Dhaka terminal identified air quality as the most important aspect of Significant Environmental Impacts analysis for the installation. For air quality the measured parameters were SO_x, NO_x and SPM.

The following tables show the measurements of the above-mentioned air quality parameters inside and outside the terminal. It may be mentioned that for SPM, Bangladesh does not have any location specific standards for cement terminal. For NO_x and SO_x no measurements were taken in side the terminal as there are no known sources of such emission inside.

60 FEET OUT SIDE THE TERMINAL BUILDING					
Sl. No.	Name of Parameter	DoE measurement Nov. 2001 $\mu\text{g}/\text{Nm}^3$	Benchmark (REMS measurement 2000, dry season) $\mu\text{g}/\text{Nm}^3$	Bangladesh Standards $\mu\text{g}/\text{Nm}^3$	Remarks
1	SPM	270.89	210	500	Acceptable
2	SO _x	12.36	16	100	Acceptable
	NO _x	21.36	25	100	Acceptable

INSIDE THE TERMINAL BUILDING				
Sl. No.	Name of Parameter	DoE measurement Nov. 2001 $\mu\text{g}/\text{Nm}^3$	Bangladesh Standard $\mu\text{g}/\text{m}^3$	Remarks
1	SPM	264.70	500	Acceptable as per DoE's report

Note: No NO_x and SO_x measurements were taken inside the terminal as there is no sources. There is no Bangladesh standard for SPM for location in side a cement terminal, as such result is compared with the ambient standard.

Sound Quality:

In the EIA study of Dhaka Terminal sound level was also considered as an important parameter for the assessment of Significant Impacts analysis of the cement terminal. Sound levels were measured inside and outside the terminal. The following table shows the results of the measurements and compares with standards.

Sl. No.	Name of Parameter	Locations	Result	Bangladesh Standards	Remarks
2	Sound Level	Inside the terminal, 18 feet from the conveyor	68 dB	75 dB (Ambient, there no Bangladesh standards for inside the terminal)	Acceptable as per DOE 's report
3	Sound Level	Outside the terminal, 150 feet from the terminal	61 dB	75 dB	Acceptable

Water Quality Measurements :

The EIA of the Dhaka terminal noted that the operation of the terminal will not make any significant impact on the surface water quality of the river. The following table shows the water quality of the Sitalakhaya river near the terminal site. The results of water analysis show s no significant variation from the Benchmark conditions.

Period	Temp	P ^H	EC	Chloride	TS	SS	BOD	DO
Benchmark November, 2000 show source: DOE	30	7.5	190	8	133	12	4.7	7
November, 2001, Source: REMS measurement	29	7	150	9.5	140	11	6.0	6.7

All measurements except are in mg/l. EC is in micromos.

5. AUDIT RESULTS

The audit result is presented in matrix form to check for compliance of each of the Environmental, Health and Safety measures suggested in the EMP.

Sl. No.	Environmental and other aspects	Compliance		Comments
		Yes	No	
1.	Water Quality Management	√		Amount of waste water insignificant
2.	Air Quality Management	√		Negligible amount of cement bag breakages. Some amount of cement set on the unloading barge but do not effect the air quality. Concentration of dust within the plant and the surrounding area within limits.
3.	Occupational Health Management	√		Lafarge Safety manual reviewed and found adequate. Compliance will depend on extent of training of the workers. PPE's like nose masks, gloves etc. are available but culturally the contracted workers do not like to use them.

Sl. No.	Environmental and other aspects	Compliance		Comments
		Yes	No	
4.	Solid waste Management	√		Insignificant generation of solid waste. Waste lubricant is sold to outside reusing industry.
5.	Sanitary Waste Management	√		Insignificant quantity generated, which is disposed through Proper sanitation.
6.	Disaster Management	√		Factory situated well above normal flood level, the terminal is under local Fire Fighting and Civil Defense system. The terminal is equipped with adequate members of emergency Fire Fighting equipment and staff trained. Adequate fire spaces and given system exists.
7.	Risk Management	√		Good housekeeping. Not allowing workers to use loose clothing. Well guarded motors and other moving plants line the conveyor belt. No accidents reported.
8.	Environmental Aesthetics	√		Plantation initiated and intentions of continuing are prevalent. Full green belting may take time because of the nature of the top soil.
9.	Storage Handling Transportation and Distribution	√		Insignificant loss due to total mechanical handling
10.	Noise and Vibration	√		Within limits set out in the EMP near the conveyor drives and vehicles for loading.
11.	Odour Management	√		No noxious material handled
12.	Energy Conservation	√		Modern equipment installed and good housekeeping practices followed. New efficient generation. No direct measures for energy conservation
13.	Drainage	√		Run off from covered and uncovered area well served.
14.	Drinking Water Provision	√		Deep tubewell installed for drinking water and tasted as Arsenic free.

6. CONCLUSIONS AND RECOMMENDATIONS

- (1) The Environmental audit carried out for the Lafarge Mongla Cement Bagging Plant at Kutubpur, Narayanganj indicates that there is in general compliance with most of the measures recommended in the Environmental Management Plan of the EIA approved by the DoE for Environmental Clearance.**
- (2) The contracted labourers should be given proper nose masks and efforts should be undertaken in terms of awareness building so that these workers use masks for the full period of work.
- (3) The plant has been installed very recently and as such the machinery and equipment are in good condition. Improved operation and maintenance team should be formed for ensuring continued compliance.
- (4) **An Environment Management System (EMS)** should be in place. This will include the company's total commitment and publicly declared policy to maintain the highest order of performance in Health, Safety and Environment aspects in their operations. The company should periodically provide training to the workers on these aspects and will keep the associated documentation, which can be presented during annual auditing by auditors.
- (5) The LSC should engage audits and monitor the environmental performance of the plant/terminal operation on regular basis and demonstrate its commitments to implement the recommendations made.

PART-II

**ENVIRONMENTAL AUDIT REPORT OF
MONGLA PLANT**

PART-II

ENVIRONMENTAL AUDIT REPORT OF MONGLA PLANT

1. BACKGROUND

Lafarge Mongla Cement Ltd. has set up a Bulk Cement Import Terminal and a Cement Bagging Plant in the transit No. 5 of Mongla Port area.

Dedicated pneumatic self-unloading cement vessels will supply the terminal with bulk cement imported from abroad. Cement will subsequently be packed and shipped by river barges or trucks to the market. The terminal has a storage capacity of 12,000 t and a packing capacity of 2 x 60 t/h. The estimated throughput of the terminal is 300,000 t. per year.

The proponent of Lafarge Mongla Cement Ltd. has invested an amount of nearly Tk.11.3 core (LSS\$ 2.2 million) for establishing the bulk fine cement terminal including a packing plant.

The Project falls under the Red category as per Environmental Conservation Rules 1997, and it required both Initial Environmental Examination (IEE) and Environmental Impact Assessment (EIA) for obtaining Environmental Clearance from the Department of Environment prior to starting of physical construction work and operation. An EIA report was undertaken to identify the potential environmental issues and also outline abatement/mitigation plan, as necessary, to comply with the National Environmental Quality Standards as described in ECR 97. Additionally an Environment Management Plan (EMP) was provided in the EIA report.

As a corporate requirement an Environmental audit had to be carried out to assess whether the operations at the site at the Mongla Cement terminal and bagging plant are being carried by Lafarge Mongla Cement Ltd. are as per the EMP outlined in the EIA and approved by DOE.

2. AUDIT METHODOLOGY

The Methodology adopted for this audit is to initially review the Environment Management Plan and list out the various activities being carried out at the terminal and to physically check whether Environmental performance and health and safety aspects etc. are in compliance with the guidelines provided in the EMP.

The terminal was visited and its operation was observed. Initially a meeting with the Lafarge management at the headquarters was held on the various aspects of the audit. Various documentations regarding operational aspects were checked.

The team members from REMS were as follows :

- (1) Dr. Moinul Islam Sharif, Chemical Engineer
- (2) Mr. Syed Iqbal Ali, Environmental Management Specialist
- (3) Mr. Mahinul Islam, Mechanical Engineer

The team met with Mr. Sean Patrick Flaherty, Terminal Manager and other technical and management staff at the Mongla Plant site.

3. PROJECT DESCRIPTION

The bulk cement will be supplied to the terminal by pneumatic self-unloading vessels. The vessel conveys the cement through steel pipelines directly into the storage. This fully enclosed vessel unloading and conveying system allows for uninterrupted operations under any weather conditions and is absolutely dust free. The cement is reclined in the flat storage through appropriate closing of all existing openings, sealing of all penetrations and a powerful filtering system. The bulk cement will be mechanically conveyed from the hopper to the two packing machines. The 50 kg bags are deposited on a belt conveyor for truck or barge loading. The cement bags will be loaded on the barges by a Bangladesh barges or cargo vessels at maximum loading rates. Bag loading takes place under any weather conditions. The project has been designed on the basis of modern technology and automatic machines have been selected for this plant. So manpower requirement for running the packing factory will be very low.

The proposed plant will use modern equipment, this its operation will ensure minimum level of dust emission. Some amount of the cement dust may escape during the normal operation of the plant. Very powerful filters will be used not to allow any dust to escape into the free atmosphere. Windows, doors and other openings will be sealed with steel plate and made dust proof. Any accumulated dust inside the process flow system will be collected and recycled in the bagging process. The flow diagram of the process is shown in **Figure-1**.

4. REVIEW OF THE ENVIRONMENTAL MANAGEMENT AND MITIGATION PLAN

The basic objectives of the EMP for the project were considered as-

- Mitigation measures to eliminate negative impacts.
- Enhancement measures to maximise positive impacts.
- Monitoring Requirements and
- Monitoring indicators.

The EMP prepared forms the basis of Health, and Safety and Environmental Management Plan to be taken and maintained by the management of the plant authority.

4.1 Water Quality Management

As the operation of the terminal and bagging plant will involve storage of bulk cement and its bagging there is no process water. Water will only be used by a small number of resident operators at the plant generating only a small amount of waste water which should be disposed in an environmentally sound way in the Mongla Port disposal system.

4.2 Air Quality Management

A literature review of dust emission level has been carried out in terms of standards followed by different countries in the EIA. Within the wide range of cases the following table has been included in EMP as guidance as to the interval in which emission of dust are found in the atmosphere, or the content in extraction air, in proper managed installations.

Sl. No.	Operations	Dust Concentration Mg/Nm ³
1.	Emptying into hoppers form tracks or wagons	5 – 20
2.	Mechanical Sieves	5 – 20
3.	Spillage from Conveyor belts	5 – 20
4.	Packer	5 – 20
5.	Bag Cleaner	2 – 5

It has been highlighted in the EMP that there is no stack emission at the Mongla Plant thus there will be no stack emission problem.

4.3 Air Pollution Control

The EMP suggests that the main dust emission points of the proposed cement terminal will be:

- a) Cement Vessels
- b) Conveyor belt section for carrying bulk cement into storage shed
- c) Flat storage
- d) Conduits
- e) Cement bagging and packing points.

As per the EMP the plant should install dust proof machineries and mechanical devices should be completely dust proof. Any spillage due to breakage of bags should be collected and rebagged. Thus, the concentration of air borne cement dust as Suspended Particulate Matter (SPM) is expected to remain within tolerable limit.

4.4 Occupational Health Management

As per the EMS, Occupational health is a major consideration of Lafarge World Wide operation. Adequate Personal Protective Equipment (PPE) will be given to the workers. There will be provision of First Aid within the terminal building and training program on safety and health will be provided by the management to the operators.

4.5 Other Wastes

It is expected generation of solid waste such as waste papers, cuttings will be kept to a minimum through good housekeeping.

4.6 Sanitary Waste Management

As per the EMP the sanitary waste generated will be insignificant and will be disposed in to the sewerage system at the Mongla Port.

4.7 Disaster Management

As per the EMP the likely disasters are cyclones, accidental flood, fire and accidents from operations of machineries. It is expected that the terminal building will be above normal flooding level and that adequate fire fighting equipment are in place and the workers trained in safe handling of equipment and in general there is good housekeeping.

4.8 Storage, Handling and transportation and Distribution

The EMP suggests that as the bulk cement and cement bags are mechanically handled the dust loss will be insignificant.

- **Noise and Vibration Management**

In the EMP the several sources of noise, each one with a different sound pressure are shown, which are as follows :

Rotary piston blowers	100-120 dBA
Alternating piston compressors	95-110 dBA
Rotary or screw compressors	100-120 dBA
Conveyor drives	80-95 dBA
Vehicles for loose handling	80-90 dBA

4.9 Control of Noise Emission

The following steps have been suggested to control noise emission in the EMP

- Keeping machinery away from foundations of the building
- The rotary parts should be properly balanced
- Use of silent bearings
- Preferential use of low RPM electric motors
- Not installing noisy machines or equipment against walls or coloumns.
- Closing in the motor and ventilator set in one box, with soundproofing on the walls, and mounting the items to reduce vibrations.

4.10 Energy Conservation

The design of the equipment for the plant will be such that they consume minimum amount of energy. The EMP suggests good housekeeping in order to conserve energy.

5. ENVIRONMENTAL PERFORMANCE AND COMPARISON OF AIR, WATER AND SOUND QUALITY WITH BASELINE/ STANDARDS

The EIA report of the Mongla plant presented the air quality, water quality and sound levels baseline (where ever available) / Bangladesh standards (which ever available). During this audit air quality, water quality and sound levels were measured at different places. The air

quality and sound levels were measured by the Department of Environment, Government of Bangladesh and water quality management were carried out in REMS's laboratory. The results were compared to evaluate the environmental performance of the plant. The following tables present the results of the measurement and compare with various references.

Air Quality:

The Environmental Assessment of the Mongla Plant identified air quality as the most important aspect of Significant Environmental Impacts analysis for the installation. For air quality the measured parameters were SO_x, NO_x and SPM.

The following table shows the measurements of the above-mentioned air quality parameters inside the and outside the plant. It may be mentioned that for SPM Bangladesh does not have any location specific standards for cement bagging plant. For NO_x and SO_x, no measurements were taken inside the plant as there are no known sources of such emission inside. The analysis of the results shows that the Mongla Plant is complying with the required Bangladesh Air Quality Standards in terms of SPM, SO_x and NO_x.

<u>150 FEET OUT SIDE THE PLANT</u>				
Sl. No.	Name of Parameter	DoE measurement Nov. 2001 µg/Nm³	Bangladesh Standards µg/Nm³	Remarks
1	SPM	428.85	500	Acceptable
2	SO _x	32.74	100	Acceptable
	NO _x	48.73	80	Acceptable

Note: NO_x and SO_x in this table gives the ambient condition. The source is not the plant; the only probable source in the packing plant is the power generation, which is done occasionally.

<u>INSIDE THE PLANT</u>				
Sl. No.	Name of Parameter	DoE measurement Nov. 2001 µg/Nm³	Bangladesh Standard µg/m³	Remarks
1	SPM	480.92	500	Acceptable as per DoE's report

Note: No NO_x and SO_x measurements were taken inside the terminal as there are no such sources. There is no Bangladeshi standard for SPM for location inside a cement bagging plant, as such result is compared with the ambient standard.

Sound Quality:

Sound quality was also considered as an important parameter for the Assessment of Significant Impacts. Sound levels were measured inside and out side the plant. The following table shows the results of the measurements:

Sl. No.	Name of Parameter	Locations	Result	Bangladesh Standards	Remarks
2	Sound Level	Inside plant, 18 feet from the packer	73 dB	75 dB (Ambient, there no Bangladesh standards for inside the plant)	Acceptable as per DOE 's report
3	Sound Level	Outside plant, 150 feet from the plant	65 dB	75 dB	Acceptable

Water Quality:

The EIA of the Mongla plant noted that the operation of the terminal will not make any significant impact on the surface water quality of the river. The following table shows the water quality of the Pusur River near the plant site. The results of water analysis show no significant variation from the Benchmark conditions.

Period	Temp	P ^H	EC	Chloride	TS	SS	BOD	DO
Benchmark November, 1996, source: DOE	29	7.1	1000	190	1200	800	.6	5.2
November, 2001, Source: REMS measurement	29	7	950	170	1100	800	.7	6.0

All measurements except EC are in mg/l, EC is in micromos.

6. AUDIT RESULTS

The audit result is presented in matrix form to check for compliance of each of the environmental, health and safety measures suggested in the EIA.

Sl. No.	Environmental and other aspects	Compliance		Comments
		Yes	No	
1.	Water Quality Management	√		Amount of waste water insignificant
2.	Air Quality Management	√		<p>Practically no cement dust is emitted from both the fine cement storage and the bagging plant. All the windows have not been steel plated as recommended in the EIA, however since the whole storage area is under negative pressure compared to ambient there is no dust leakage. The bag filters installed (CD Alematic. Insatable Dust Filter, Series DLMUV) is operating at its full efficiency. The details of the filters is attached as Annex-I. Annex-II shows the ventilation system de-dusting air flow diagram.</p> <p>Dust Generated in the bagging plant section is collected and pneumatically conveyed to the storage area. Some dust is generated within the fine cement storage during loading of fine cement in to hopper for conveying to the bagging plant. Efforts should be made to reduce dust generation in the storage area.</p>
3.	Occupational Health Management	√		<p>Lafarge Safety manual reviewed and found adequate. Compliance will depend on extent of training of the workers. PPE's like nose masks, gloves etc. are available but culturally the workers do not like to use them. It was also noted that the contracted labourers are not provided with PPE's.</p> <p>Adequate step should be taken in terms of reducing dust during bagging in the fine cement storage area and also make sure that the workers use PPE.</p>

Sl. No.	Environmental and other aspects	Compliance		Comments
		Yes	No	
4.	Solid Waste Management	√		Insignificant generation of solid waste. Waste lubricant is sold to outside reusing industry.
5.	Sanitary Waste Management	√		Insignificant quantity generated which is disposed through proper sanitation in to the Mongla Port disposal system.
6.	Disaster Management	√		Factory situated well above normal flood level the terminal is under local Fire Fighting and civil Defence system. The terminal is equipped with adequate members of emergency fire fighting equipment and staff trained. Adequate fire spaces and given system exists.
7.	Risk Management	√		Factory situated well above normal flood level the terminal is under local Fire Fighting and civil Defence system. The terminal is equipped with adequate members of emergency fire fighting equipment and staff trained. Adequate fire escapes exists.
8.	Environment Aesthetics (green seeking)		√	No plantation has been initiated as there is no excess land for this.
9.	Storage Handling transported and Distribution.	√		Insignificant loss due to recycling and total mechanical and pneumatic handling of cement.
10.	Noise and Vibration	√		Noise and vibration are within the permissible limits. The machinery layout has been done as per recommendations in the EIA.
11.	Odour Management	√		No noxious material handled.
12.	Energy Conservation	√		A new 360 kw DG set is operational which is in good working conditions. All other machineries are newly installed. No direct energy conservation.
13.	Drainage	√		Run off from covered and uncovered area well served.
14.	Drinking Water Provision			Provisions adequate and is supplied from Mongla Port sources.

7. CONCLUSIONS AND RECOMMENDATIONS

- (1) **The Environmental audit carried out in the Lafarge Mongla Cement bulk cement insort terminal and bagging plant at transit No. 5 of Mongla Port indicates that there is in general compliance with most of the measures recommended in the Environmental Management Plan (EMP) of the EIA of the facility as approved by the DoE for Environmental Clearance.**
- (2) As mentioned in the audit results, there is some generation of dust in the fine cement storage area while loading into hopper. It is suggested that some corrective measures are taken. It will be virtually impossible to eliminate dust generation completely in this area, however from the occupational health point view the management must ensure that the workers in this area use those adequate masks.
- (3) The plant has been installed very recently and as such the machinery and equipment are in good condition. Improved operation and maintenance team should be formed for ensuring continued compliance.
- (4) An Environment Management System (EMS) should be in place. This will include the company's total commitment and publicly declared policy to maintain the highest order of performance in Health, Safety and Environment aspects in their operation. The company should periodically provide training to the workers on these aspects and will keep the associated documentation which can be presented during annual auditing by auditors.
- (5) The company should conduct to audit and monitor the performance of the company on regular basis.