CLEAN DEVELOPMENT MECHANISM
PROJECT DESIGN DOCUMENT FORM (CDM-PDD)
Version 03 - in effect as of: 22 December 2006

CONTENTS

SECTION A. General description of small-scale project activity

A.1 Title of the small-scale project activity:

"**Switching of fossil fuel from Heavy Fuel Oil to Natural Gas by replacing Heavy Fuel Oil Engines (5.86 MW*4) with Gas Engine (16.4 MW) at Maple Leaf Cement Factory Limited, Iskanderabad, Pakistan"** Version: 01
Date: 23rd January 2008

A.2. Description of the small-scale project activity:

Introduction

Maple Leaf Cement Factory Limited (hereafter referred to as MLC) is the third largest cement producer in Pakistan. It currently has five plants in operation and is listed on three stock exchanges of the country. It was set up in 1956 as a joint collaboration between the West Pakistan Industrial Development Corporation and the Government of Canada. In 1992, Kohinoor Group acquired the ownership and management of MLC under the privatization policy of the government of Pakistan. Presently, Kohinoor MLC Group is the holding company for MLC.

MLC is strategically located at Iskanderabad, near the city of Daudkhel (District Mianwali, Northern Pakistan), an area which is rich in raw materials required for the production of cement. The company produces Ordinary Portland Cement (OPC), Sulphate Resistant Cement (SRC) and White Cement (WC), in both old and new kiln of the plant.

Purpose

Currently, power requirement of the MLC plant is met by four synchronised dual-fuel engines (5.86 MW each) of the type "Niigata". The engines consume Heavy Fuel Oil (HFO) and Natural Gas (NG), approximately in a 70:30 ratio. The total power generation capacity of these engines is 23.84 MW. The existing HFO engines, which used to combust only Heavy Fuel Oil for power generation, were retrofitted in 2005 to allow for combusting Natural Gas as well.

The main purpose of the project activity is to meet MLC's power requirement using a cleaner fuel; this involves switching from HFO to NG by replacing the four old Niigata engines by a new gas engine (16.4 MW) of the type "Wartsila", consuming HFO and NG, approximately in a 30:70 ratio. Thus the project activity would considerably reduce the consumption of HFO for power generation. In the absence of the project activity, MLC would continue to use a combination of HFO and NG in a 70:30 ratio during the crediting period (see Section B.5). The electricity deficit after project activity is covered by grid electricity.

From March to November in the project year, the new engine will consume mainly Natural Gas (99%) and only a meagre amount of Diesel (D) (1%). The Diesel is solely used as an auxiliary fuel for the purpose of starting and stable operation of the new gas engine. During the winters (December to February), gas supply is severely limited in Pakistan and depends fully on availability; during this season, MLC will combust HFO along with the Diesel in the new gas engine.

As the electricity output after project activity is less than in the pre-project situation, power will be drawn from the grid to cover the electricity deficit during the project activity.

The project shows evident contribution towards sustainable development. The continuous use of HFO would have lead to deterioration of the environment. In contrast, the measure of switching from HFO to NG would have a positive impact on the environment.

Sustainable development

The project activity also contributes to sustainable development for several reasons.

Environmental criteria

- The project reduces the local air pollutants (such as, nitrogen, sulphur oxides and volatile organic compounds) and environmental impacts due to increased use of Natural Gas for power generation. This, in turn, benefits the local community due to reduced costs for health care and climate change adaptation.
- The project minimizes consumption of HFO, a fuel source which is imported via sea and transported by road to the factory site, and replaces it with NG, a local fuel source which is transported via a pipeline. This significantly reduces the air pollution due to transportation.

Social criteria

- The project builds up a knowledge base about the operation of the Natural Gas based power generation and builds up a skill set for such kind of operation.
- The project improves the skill set for local inhabitants through training and capacity building in order to grow their technical skills.
- Project activities will enhance local employment opportunities by reducing poverty in an economically depressed region.

Economic criteria

- The project contributes to a diversified energy supply in the host country.
- The project replaces an imported fuel source (HFO), with a local fuel source (NG), reducing the unsustainable burden on the country foreign exchange reserves.
- It encourages the use of a new financial mechanism (CDM) to raise finance for energy projects for power generation through fuel switch project.
- It encourages other large facilities, irrespective of sector, to adopt small-scale energy efficiency measures.
- Replacement of HFO generators with energy efficient NG generator results in fuel savings for power generation.

Technological criteria

- The project demonstrates the use of a clean energy technology which utilizes Natural Gas for power generation.

- The project activity will bring new equipments/machinery i.e. Gas Generators, which will be imported, thus ensuring technology, transfer to the country for enhancement of energy efficiency development projects.
- The project activity is consistent with the national laws and sustainable development policies, strategies and plans, and does not result in any obligation towards the investor country other than the Certified Emission Reduction (CER) authorization.

A.3. Project participants:

The Table A.3.1 below lists the project participants involved in the project activity. Contact information is provided in Annex I.

Table A.3.1

Name of Party involved (*) ((host) indicates host Party)	Private and/or public entity(ies) project participants (*) (as applicable)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/No)
Pakistan (host)	MLC (private entity)	No
Switzerland	Factor Consulting + Management AG (private entity)	No
(*) In accordance with the CDM modalities and procedures, at the time of making the CDM-PDD public at the stage of validation, a Party involved may or may not have provided its approval. At the time of requesting registration, the approval by the Party(ies) involved is required.		

A.4. Technical description of the small-scale project activity:

A.4.1. Location of the small-scale project activity:

A.4.1.1. Host Party(ies):

Pakistan

A.4.1.2. Region/State/Province etc.:

Daudkhel (District Mianwali)

A.4.1.3. City/Town/Community etc:

Iskanderabad (Southern Side of Kundia-Attock Railway Line).

A.4.1.4. Details of physical location, including information allowing the unique identification of this small-scale project activity :

Project owner is located at:

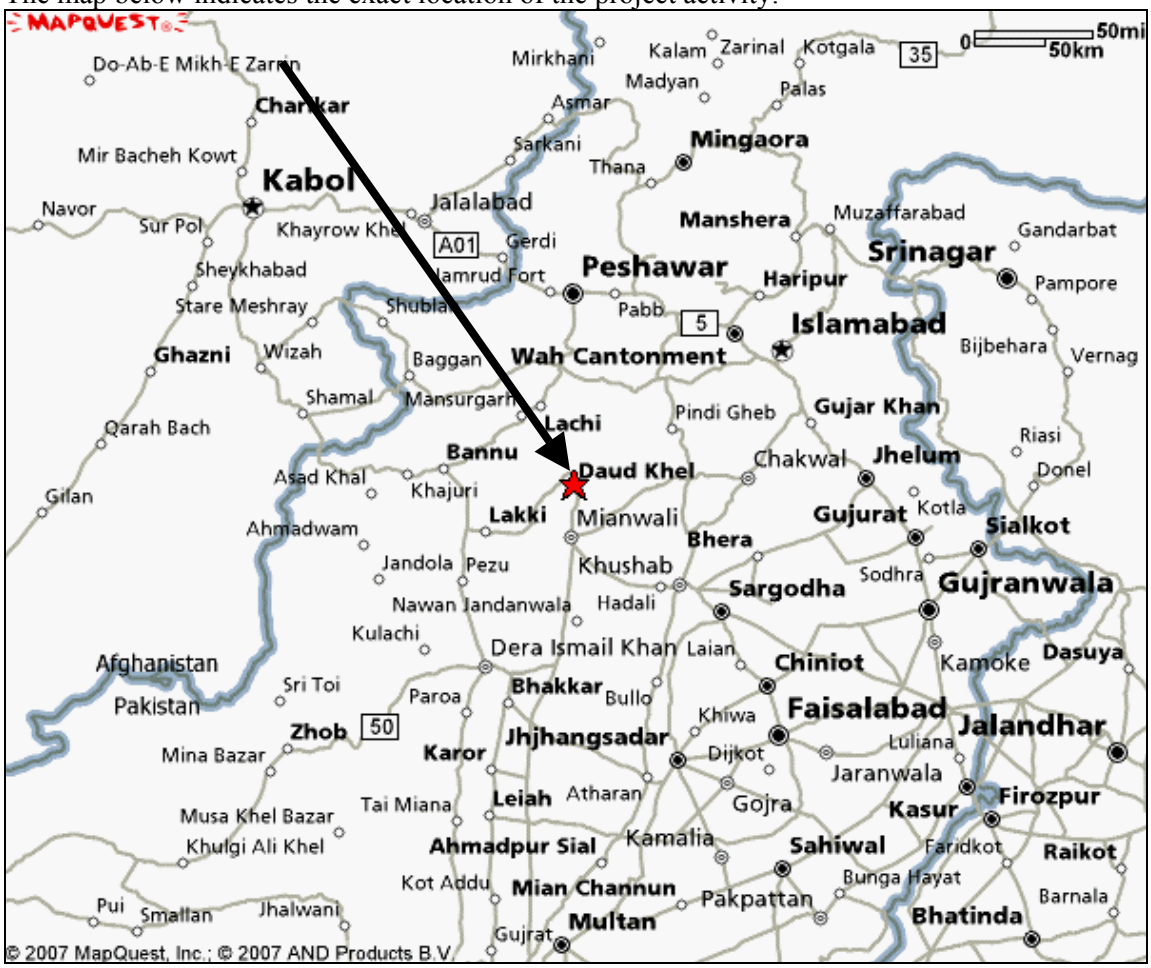
MLC
42-Lawrence Road
Lahore 54000
Punjab

Phone: 0092 6278904-5

The project plant is physically located in Iskanderabad (near Daud Khel).

Contact person:
Mr. S. M. Imran
Tel.: +92-300 8440877
E-Mail: sm.imran@kmlg.com

The map below indicates the exact location of the project activity.



A.4.2. Type and category(ies) and technology/measure of the small-scale project activity:

According to Appendix B of the Simplified modalities and procedures for small-scale clean development mechanism project activities the project is under "Type (iii) – Other project activities" and "Category B – Switching fossil fuels."

The technology involves the replacement of the existing HFO engines with new gas engine. Before the project activity, the HFO engines mainly used a mixture of HFO and NG, approximately in a 70:30 ratio (simultaneously), for power generation. In addition, a small amount of Diesel was used as an auxiliary fuel for the purpose of starting and stable operation of the old engines. After the project implementation, the new gas engine will burn more NG so that the ratio of HFO to NG becomes about 30:70.

The new technology is provided by the Wartsila Corporation, which is based in Finland.[1] The Table A.4.2.1 below summarizes the characteristics of the old engines in the baseline year 2005-06 and the new engine.

Table A.4.2.1

Engine type:	Niigata HFO engine (2005-06)	Wartsila 18V50DF gas engine
Capacity	23.84 (4 x 5.96) MW	16.4 MW
Average Load	19.1 MW	15.8 MW
Estimated annual electricity production	128,247 MWh	122,760 MWh (difference will be imported from grid)
Estimated hours of Annua Operation	Around 7000 hours per year	7920 hours per year
Fuel type	HFO & NG mixed in average 70:30 ratio for 9 months (March-Nov) + 1% Diesel simultaneously burned; 100% HFO for 3 months (Dec-Feb, gas shedding period)	99% NG + about 1% Diesel for 9 months (March-Nov) 100% HFO for 3 months (Dec-Feb, gas shedding period)
Efficiency	40.5%	45.85%
Operational lifetime	20 years	20 years
Commissioning date	24.06.1996 (3 engines) 15.12.1997 (1 engines)	February 2007

As described in section B.5 and section D.1, the new technology will not have any negative impact on the environment.

[1] www.wartsila.com

A.4.3 Estimated amount of emission reductions over the chosen crediting period:

The Table A.4.3.1 below accounts for the estimated amount of emission reductions based on the forecasted Natural Gas consumption. The crediting period is 10 years, starting in 2008.

Table A.4.3.1

Years	Estimation of annual emission reductions [tCO_2]
2008	22'622
2009	22'622
2010	22'622
2011	22'622
2012	22'622
2013	22'622
2014	22'622
2015	22'622
2016	22'622
2017	22'622
Total estimated reductions	226'219
Total number of crediting years	10
Annual average of the estimated reductions over the crediting period	22'622

A.4.4. Public funding of the small-scale project activity:

There is no public funding involved in the project activity.

A.4.5. Confirmation that the small-scale project activity is not a debundled component of a large scale project activity:

Appendix C of the Simplified Modalities and Procedures for Small-Scale CDM Project Activities defines the following rules to determine whether the small-scale project activity is a debundled component of a large scale project activity or not:

"A proposed small-scale project activity shall be deemed to be a debundled component of a large project activity if there is a registered small-scale CDM project activity or an application to register another small-scale CDM project activity:

(1) With the same project participants;
(2) In the same project category and technology/measure;
(3) Registered within the previous 2 years; and
(4) Whose project boundary is within 1 km of the project boundary of the proposed small-scale activity at the closest point."

The project activity is not a debundled component of a large project activity as there is no small scale CDM project activity, or an application registered by MLC in the same project category in the last two years within 1 km of the project boundary of the proposed small-scale project activity.

SECTION B. Application of a baseline and monitoring methodology

B.1. Title and reference of the approved baseline and monitoring methodology applied to the small-scale project activity:

AMS.III-B – Switching fossil fuels, November 2, 2007, version 12.
Reference : Latest amended version 07 of Appendix B to the simplified modalities and procedures for small-scale CDM project activities.

B.2 Justification of the choice of the project category:

Category III.B comprises fossil fuel switching in existing industrial, residential, commercial, institutional, or electricity generation applications. This project activity is a fossil fuel switch (from HFO to NG) in an existing industrial facility (cement plant).

Fuel switching may change efficiency as well. If the project activity primarily aims at reducing emissions through fuel switching, it falls into this category. If fuel switching is part of a project activity focused primarily on energy efficiency, the project activity falls under category II.D or II.E. As this project activity brings about only a minor improvement in energy efficiency, it does not fall under the categories II.D or II.E.

AMS.III.B states that "project activities that propose switch from fossil fuel in the baseline to renewable biomass, biofuel or renewable energy in the project scenario" do not fall under this category. As this project activity involves a switch from heavy fuel oil to natural gas this limitation does not apply.

Finally, this category is applicable to project activities resulting in annual emission reductions lower than 60,000 tonnes CO_2e. As described in A.4.3, annual emission reductions of the project activity are significantly below 60,000 tonnes CO_2e.

B.3. Description of the project boundary:

The project boundary is "the physical, geographical site where the fuel combustion affected by the fuel switching measure occurs." The figures below show the baseline and project situations. The dash lines indicate the project boundaries.

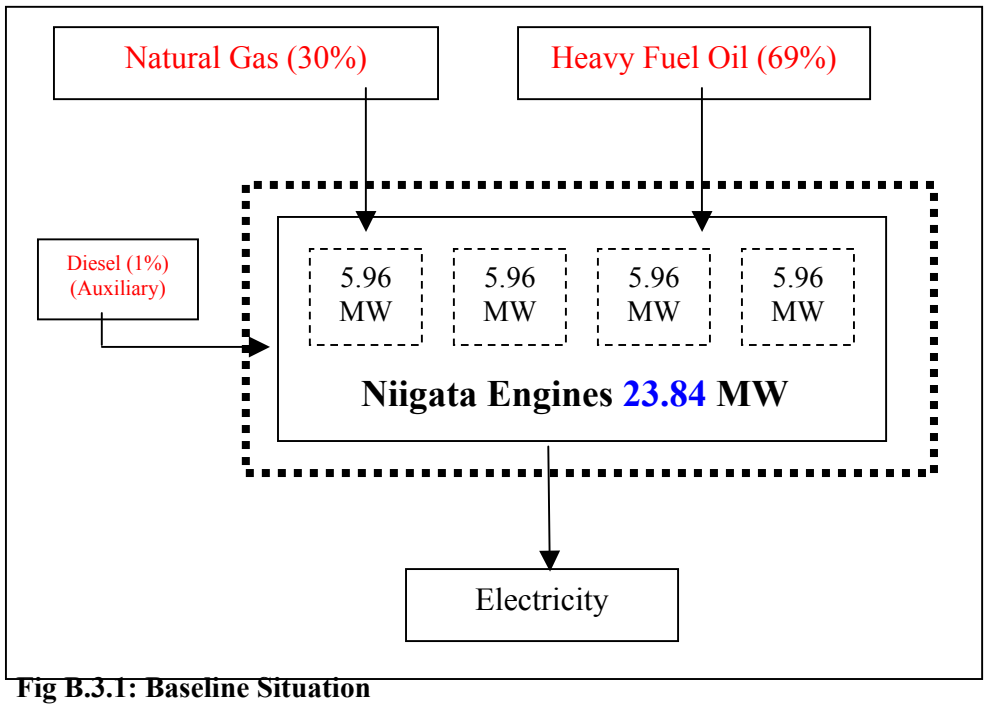


Fig B.3.1: Baseline Situation

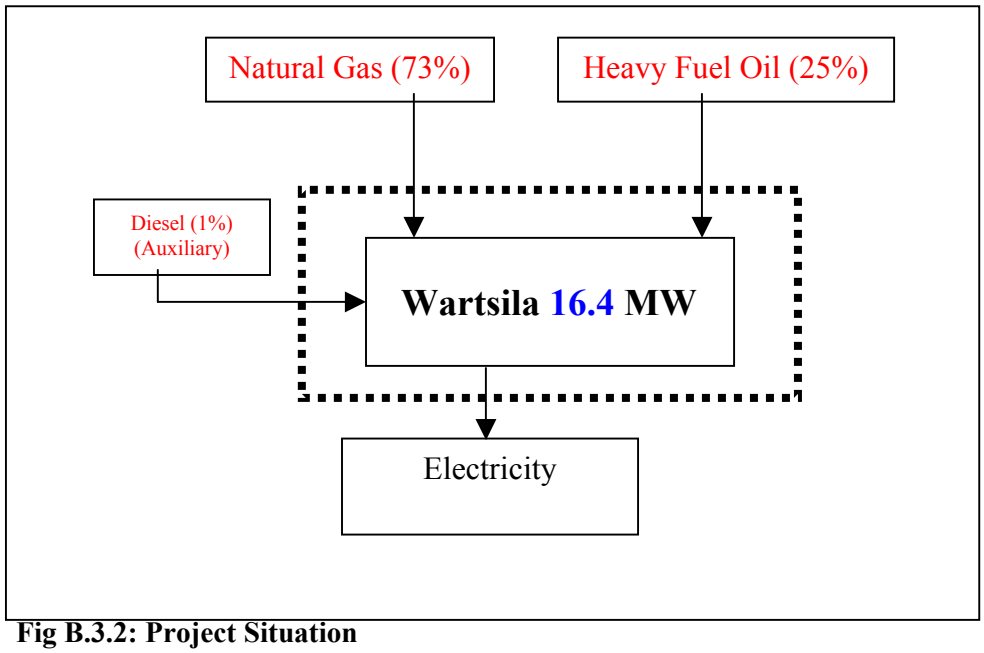


Fig B.3.2: Project Situation

As the emission reduction calculations are based on the electricity generated by the engines, for reasons of conservativeness (see section below), the project boundary encompasses the old engines in the baseline situation and the new engine in the project situation, respectively.

B.4. Description of baseline and its development:

As per the paragraph (4) of the methodology for project type III category B, "*the emission baseline is the current emissions of the facility expressed as emissions per unit of output (e.g. kgCO2-equiv/ kWh). Emission coefficients for the fuel used by the generation unit before and after fuel switch are also needed. IPCC default values of emission coefficients may be used.*"

The baseline is the combined use of the existing engines. In the absence of project activity, MLC would have continued using the existing engines with current fuel mix. This scenario is supported by the expected residual operational time of the existing engines and their design as follows:

- Due to the residual operational lifetime of the existing engines, which is at least 9 years, the continued use of the existing engines can be assumed for the baseline scenario.

- The design of the existing power generation unit supports the claimed baseline scenario. The existing power generation unit was originally designed for heavy fuel combustion. In 2005, MLC converted the engines to run on dual fuel. Considering the current design of the HFO engines, power cannot be generated using only NG. In 2005-06, the HFO – NG ratio was about 70:30. For the reasons mentioned in the preceding lines, fuel switch in the existing engines must be excluded as a possible baseline scenario.

The baseline emission factor of HFO and NG in the existing engines is the sum of the specific fuel consumptions multiplied with the specific NCVs and emission factors divided by the produced electricity. Annex 3 provides detailed information on the data and parameters used to determine the baseline.

Scenarios:

Since the onsite electricity produced in the project scenario (due to lower capacity of the new gas engine) is less than in the pre-project scenario, it is more conservative to adjust the quantities of fossil fuels consumed in the baseline scenario to yield same electricity output as in the project scenario.
The quantities of NG, HFO and Diesel used in the baseline scenario are, therefore, adjusted by taking into account the reduced electricity output and CO_2 emissions during project activity.

To be conservative, emissions from grid consumption should only be considered if the estimated CO_2 emission factor for grid electricity in Pakistan is above the CO_2 emission factor of the project emissions. As shown in Annex 3, specific project emissions are 0.496 tCO_2/MWh. The estimation of the combined CO_2 emission factor for grid electricity (combined margin) in Pakistan is 0.397 tCO_2/MWh for the years 2003 - 2007. As the difference of emission reductions remains almost unaltered in practice, the imported grid electricity is not considered in the calculation of the emission reductions.

The fiscal year 2005-06 (July-June) is selected as baseline period because MLC started to combust NG in the retrofitted HFO engines only in June 2005. Prior to taking this retrofit measure, MLC combusted only HFO, which has a higher emission factor than the combined emission factor of HFO and NG, in the existing power generation unit.

For a systematic and transparent illustration of the data used to determine the baseline emissions please refer to section B.6.2.

B.5. Description of how the anthropogenic emissions of GHG by sources are reduced below those that would have occurred in the absence of the registered small-scale CDM project activity:

The emission reductions of the project will be achieved through using NG, a fuel with lower carbon emission factor than the previously used HFO. Among all fossil fuels, Natural Gas is the least carbon intensive. As shown below, in the absence of the CDM incentives the project activity will not happen and the emissions would be larger than in the project scenario.

As per the decision 17/cp.7 paragraph 43, "a CDM project activity is additional if anthropogenic emissions of greenhouse gases by sources are reduced below those that would have occurred in the absence of the registered CDM project activity." As per the selected methodology AMS III.B, the project proponent is required to establish that the GHG reductions due to the project activity are additional to those that would have occurred in the absence of the project activity as per Attachment A to Appendix B of the simplified modalities and procedures for small scale CDM project activity categories.

According to Attachment A to Appendix B of the simplified modalities and procedures for small scale CDM project activity categories, the project participants are required to provide an explanation to show that the project activity would not have occurred anyway and **at least one** of the listed elements should be identified in concrete terms to show that the activity is either beyond the regulatory and policy requirement or improves compliance to the requirement by removing barrier(s).

Evidence as to why the proposed project is additional can be shown by conducting an analysis of any of the following: (a) investment barriers, (b) technological barriers, (c) prevailing practice and (d) other barriers. Evidence to why the Project is additional is offered under the following categories of barrier: (1) investment/financial barrier, and (2) technological barriers.

Investment barriers

Calculation and comparison of financial indicators:
The project activity is additional if investment barriers exist which could be overcome by the use of CDM. An investment barrier exists "if a financially more viable alternative to the project activity would have led to higher emissions."

From a technical point of view, the investment in the new Wartsila engine wouldn't happen anyway, since the old engines still have a technical lifetime of another 9 years.

The total investment needed for the implementation of the project measure is PKR 756'119'349.
MLC possesses only 7 % equity to finance the total investment cost; it had to take out a loan for the residual 93% of the necessary capital. The interest rate is 8.1 % per annum (Libor + 2.5%), and a loan period of eight years chosen by MLC.

To ensure conservativeness, instead of selecting the project's Internal Rate of Return (IRR), the Return on equity (ROE) for the 7% equity share provided by MLC is chosen as the comprehensive benchmark for the investment analysis.

The Table B.5.1 summarizes the basic data and assumptions for the investment analysis:

Table B.5.1

Input Parameters			**Data source**
Total investment	PKR	756'119'349	MLC
Opportunity cost of capital		20%	Assumption Factor
Number of certificates per year	t CO_2e/yr	22'622	Calculation Factor
Estimated CER-Price (US$ 12)	PKR	726	Assumption Factor
Brokerage Fee		12.5%	MLC
Share of equity		7%	MLC
Share of loan		93%	MLC
Loan interest rate (this is Libor + 2.5%)		8.1%	MLC
Loan period	years	8	MLC
Number of repayments		13	MLC
Validation costs	PKR	-605'000	Assumption Factor
Verification costs	PKR	-423'500	Assumption Factor
Project lifetime	years	10	MLC
After 10 years a major refurbishment can expand the technical lifetime for another 10 years. This causes a major investment			
Depreciation period	years	10	MLC

Detailed financial calculations including the underlying assumptions are made available to the DOE.

As the cash-flow analysis in Annex 5 reveals, the ROE for MLC's investment is 6.67% for the Base Case before taxes and without the revenues from the CERs. This is a very low percentage, which hampered MLC to take the investment decision. The expected ROE is even below the deposit rate of the State Bank of Pakistan which is around 6.8% per annum (State Bank of Pakistan, November 2007).

The ROE with the CER revenue is expected to be 13.94% for the Base Case, which is also a low percentage compared to an analysis of the development of the Pakistani Stock Market, which can serve as an alternative investment benchmark. If MLC had invested into a stock portfolio of the 100 largest Pakistani companies, weighted according to the Karachi Stock Exchange 100–Index (KSE 100), the annual return in the last ten years (May 1997-April 2007) would have been at 23%. The Table B.5.2 and formulae illustrate this in detail.

Table B.5.2

	KSE 100
May 1997	1507.96
April 2007[2]	12369.7
Difference	10861.74
Annual Return	23%

The formula for calculation of the annual Return is:

$$KSE100_{May97} * (1+\text{Annual Return})^{z} = KSE100_{April07}$$

Where:

$KSE100_{May97}$ is the value of the Karachi Stock Exchange Index in May 1997.

$KSE100_{April07}$ is the value of the Karachi Stock Exchange Index in April 2007.

z is the number of years of investment.

This becomes:

$$\text{Annual Return} = \sqrt[10]{\frac{KSE100_{May97}}{KSE100_{April07}}} - 1 = \sqrt[10]{\frac{12369.7}{1507.96}} - 1 = 0.23$$

Sensitivity analysis:

The sensitivity analysis compares three cases in terms of price development of fossil fuels and operation and maintenance costs. In the Base Case, a moderate price increase of fossil fuels by 5% per annum over the 10 years is assumed. Moreover, an increase of 2% is expected in the O&M-costs. The Base Case is compared with Scenario 1 (more significant price increase), and Scenario 2 (constant prices).

The Table B.5.3 shows the comparison of the different scenarios.

[2] Data provided by State Bank of Pakistan only until April 2007.

Table B.5.3

Sensitivity Analysis	Base Case (5% price increase)	Scenario 1 (10% price increase)	Scenario 2 (0% price increase)
Price Increase HFO	5%	10%	0%
Price Increase Diesel	5%	10%	0%
Price Increase NG	5%	10%	0%
Increase of price and effort of O&M	2%	5%	0%
ROE w/ loan, w/o CERs	6.67%	17.58%	-4.21%
ROE w/ loan and CERs	13.94%	24.79%	3.30%

Since the project's ROE is based on fuel savings, the ROE will increase with rising fuel prices. If the fuel prices stagnate, MLC incurs loss by investing into the project and even with the CERs they only gain 3.30%. In Scenario 1, a sharp increase of 10% per year for HFO, Diesel and NG leads to a ROE with CERs of 24.79%. Although a price development for the fuel price of 10% per year (236% in 10 years) seems to be rather unrealistic, the calculated earnings are only around MLC's expectations.

By the approval and registration of the project as a CDM activity, the attendant benefits and incentives will be derived from the project activity. This will help abolish investment barriers and thus enable the project to be undertaken. The financial benefit from the revenue obtained by selling the CO_2 emissions reductions is one of the principle incentives that encouraged the developer to invest in the proposed project activity. CDM has been considered from an early stage of the project cycle and is an integral part of the financial package of the proposed project activity.

Technological barriers

The project activity is technologically additional "if a less technologically advanced alternative to the project activity involves lower risks due to the performance uncertainty or low market share of the new technology adopted for the project activity and so would have led to higher emissions."

Compared with the baseline, the project activity involves higher technological risks as:

- The contingency factor for power is also affected with installation of only one engine. There is no grid backup. If the generator trips the cement plant shuts downs unless grid power is available.
- Reliance on (unreliable) Natural Gas and grid electricity after project activity is increased. Sui Northern Gas Pipeline only provides Natural Gas purely on "as and when available" basis, and in particular no gas may be supplied during the peak winter months of December – February each year." Compared with baseline scenario, import of grid electricity after project activity increases by more than six times and accounts for 5'488 MWh/year.

B.6. Emission reductions:

B.6.1. Explanation of methodological choices:

According to Methodology AMS III.B/Version11 the emission baseline is the current emission of the facility expressed as emissions per unit of output (e.g., kg CO_2e/kWh). The project activity emissions are related with the use of fossil fuel after the fuel switch. For the calculation of the emission factors, the methodology allows the use of IPCC default values. No leakage calculation is required unless the project activity is under a programme of activities.

The baseline and its development have already been described in section B.4. Default values for emission factors were used as no further information on the specific project emission factors was available. For HFO the default values of residual oil were assumed.

As described in section B.4, in the baseline scenario, the amount of electricity generated in the pre-project situation is adapted to the electricity generated in the project situation:

[1] $EG_{BL,y} = EG_{PJ,y}$

On the basis of this assumption, the annual emission reductions *ER* per output of project activity in year y of crediting period is expressed as

[2] $ER_y = EG_{PJ,y} * (EF_{BL} - EF_{PJ,y})$ [tCO_2/y]

Emission factor $EF_{PJ,y,}$ in project scenario PJ in each year y of the crediting period is expressed as

[3] $$EF_{PJ,y} = \frac{\sum FC_{i,PJ,y} * NCV_{i,y} * EF_{CO2,i}}{EG_{PJ,y}}$$ [tCO_2/MWh]

Where:

$FC_{i,PJ,y}$ is the quantity of each fuel used in the project scenario, in each year y of the crediting period, measured in m3/y (for NG), t/y (for HFO) and l/y (for Diesel oil).

$NCV_{i,y}$ is the net calorific value of the fuel i in year y of the crediting period.

$EF_{CO2,i}$ is the IPCC default CO_2 emission factor per unit of energy source i associated with fuel combustion, expressed in tCO_2/TJ.

$EG_{PJ,y}$ is the estimated electricity generated in the project scenario PJ in each year y of the crediting period, measured in MWh.

Leakage: Since the project activity is not under a programme of activities, no leakage calculation is required.

Emission Factor EF_{BL} in baseline scenario BL of the baseline period is expressed as:

[4] $$EF_{BL} = \frac{\sum FC_{i,0} * NCV_{i,0} * EF_{CO2,i}}{EG_o}$$ [tCO_2/MWh]

Where:

$FC_{i,0}$ is the quantity of fuel i used in the baseline period, measured m^3/y (for NG), t/y (for HFO) and l/y (for Diesel).

$NCV_{i,0}$ is the net calorific value of fuel i used in the baseline period, measured in MJ/m^3 (for NG) and GJ/t (for HFO).

EG_0 is the electricity generated in the baseline period, measured in MWh/y.

$EF_{CO2,i}$ is the IPCC default CO_2 emission factor per unit of energy source associated with fuel combustion, expressed in tCO_2/TJ.

B.6.2. Data and parameters that are available at validation:

Data / Parameter:	$FC_{NG,0}$
Data unit:	m3
Description:	Quantity of Natural Gas (NG) combusted in the project plant in the base period (2005-06).
Source of data used:	This is as per actual metered readings from generator records in m^3 and converted into MJ.
Value applied:	Refer to Annex 3 for details of quantity of Natural Gas (NG) combusted at project site from July 2005 to June 2006.
Justification of the choice of data or description of measurement methods and procedures actually applied :	This is per requirements of AMS-III-B. The value has been determined based on records from the generator.
Any comment:	-

Data / Parameter:	$FC_{HFO,0}$
Data unit:	t
Description:	Quantity of Heavy Fuel Oil (HFO) combusted in the project plant in the base period (2005-06).
Source of data used:	This is as per actual metered readings from generator records in tonnes and converted into MJ.
Value applied:	Refer to Annex 3 for details of quantity of Heavy Fuel Oil (HFO) combusted at project site from July 2005 to June 2006.
Justification of the choice of data or description of measurement methods and procedures actually applied :	This is per requirements of AMS-III-B. The value has been determined based on records from the generator.
Any comment:	-

Data / Parameter:	$FC_{D,0}$

Data unit:	L
Description:	Quantity of Diesel (D) combusted in the project plant in the base period (2005-06).
Source of data used:	This is as per actual metered readings from generator records in litres and converted into MJ.
Value applied:	Refer to Annex 3 for details of quantity of Diesel (D) combusted at project site from July 2005 to June 2006.
Justification of the choice of data or description of measurement methods and procedures actually applied :	This is per requirements of AMS-III-B. The value has been determined based on records from the generator.
Any comment:	-

Data / Parameter:	$NCV_{NG,0}$
Data unit:	MJ/m3
Description:	Net calorific value of Natural Gas (NG) combusted in the project plant in the base period (2005-06).
Source of data used:	As provided by the fuel supplier.
Value applied:	36.178
Justification of the choice of data or description of measurement methods and procedures actually applied :	This is per requirements of AMS-III-B.
Any comment:	-

Data / Parameter:	$NCV_{HFO,0}$
Data unit:	GJ/t
Description:	Net calorific value of Heavy Fuel Oil (HFO) combusted in the project plant in the base period (2005-06).
Source of data used:	As provided by the fuel supplier.
Value applied:	40.635
Justification of the choice of data or description of measurement methods and procedures actually applied :	This is per requirements of AMS-III-B.
Any comment:	-

Data / Parameter:	$NCV_{D,0}$
Data unit:	GJ/t
Description:	Net calorific value of Diesel (D) combusted in the project plant in the base period (2005-06).
Source of data used:	As provided by the fuel supplier.
Value applied:	43.0
Justification of the choice of data or description of measurement methods and procedures actually applied :	This is per requirements of AMS-III-B.
Any comment:	-

Data / Parameter:	$EF_{CO2,NG}$
Data unit:	t CO_2 / TJ
Description:	Emission factor for Natural Gas (NG) combusted in the project plant.
Source of data used:	The Carbon emission factor is taken as per "Table 2.3 Default Emission Factors for Stationary Combustion in Manufacturing Industries and Construction" Chapter 2: Stationary Combustion, 2006 IPCC Guidelines for National Greenhouse Gas Inventories and is available in kg CO_2 / TJ.
Value applied:	56.1
Justification of the choice of data or description of measurement methods and procedures actually applied :	This is per requirements of AMS-III-B.
Any comment:	-

Data / Parameter:	$EF_{CO2,HFO}$
Data unit:	t CO_2 / TJ
Description:	Emission factors for Heavy Fuel Oil (HFO) combusted in the project plant.
Source of data used:	The Carbon emission factor is taken as per "Table 2.3 Default Emission Factors for Stationary Combustion in Manufacturing Industries and Construction" Chapter 2: Stationary Combustion, 2006 IPCC Guidelines for National Greenhouse Gas Inventories and is available in kg CO_2 / TJ.
Value applied:	77.4 (Residual Fuel Oil)
Justification of the choice of data or description of measurement methods and procedures actually applied :	This is per requirements of AMS-III-B.
Any comment:	-

Data / Parameter:	$EF_{CO2,D}$

Data unit:	t CO_2 / TJ
Description:	Emission factors for Diesel (D) combusted in the project plant.
Source of data used:	The Carbon emission factor is taken as per "Table 2.3 Default Emission Factors for Stationary Combustion in Manufacturing Industries and Construction" Chapter 2: Stationary Combustion, 2006 IPCC Guidelines for National Greenhouse Gas Inventories and is available in kg CO_2 / TJ.
Value applied:	74.1
Justification of the choice of data or description of measurement methods and procedures actually applied :	This is per requirements of AMS-III-B.
Any comment:	-

Data / Parameter:	EG_0
Data unit:	MWh
Description:	Electricity generated in the project generator in the base period (2005-06).
Source of data used:	This is as per actual metered readings from generator and plant records.
Value applied:	122'760
Justification of the choice of data or description of measurement methods and procedures actually applied :	This is per requirements of AMS-III-B.
Any comment:	-

B.6.3 Ex-ante calculation of emission reductions:

Annual emission reductions *ER* per output of project activity in year y of crediting period are expressed as

[5] $ER_y = EG_{PJ,y} * [EF_{BL} – EF_{PJ,y}]$ [tCO_2/y]

As for the detailed description of the equations for calculating the emission reductions, please refer to section B.6.1. As for detailed calculation of the baseline and project emissions please refer to Annex III.

Project emissions:

The Table B.6.3.1 below presents the estimated fuel consumption, electricity generated and emissions related to project activity during crediting period.

Table B.6.3.1

Year	$FC_{NG,PJ,y}$ [m3]	$FC_{HFO,PJ,y}$ [t]	$FC_{D,PJ,y}$ [l]	Project Emissions [tCO_2]	$EG_{PJ,y}$ [MWh]	$EF_{PJ,y}$ [tCO_2/MWh]
2008	20'301'435	6'138	150'905	60'896	122'760	0.496
2009	20'301'435	6'138	150'905	60'896	122'760	0.496
2010	20'301'435	6'138	150'905	60'896	122'760	0.496
2011	20'301'435	6'138	150'905	60'896	122'760	0.496
2012	20'301'435	6'138	150'905	60'896	122'760	0.496
2013	20'301'435	6'138	150'905	60'896	122'760	0.496
2014	20'301'435	6'138	150'905	60'896	122'760	0.496
2015	20'301'435	6'138	150'905	60'896	122'760	0.496
2016	20'301'435	6'138	150'905	60'896	122'760	0.496
2017	20'301'435	6'138	150'905	60'896	122'760	0.496
Total	203'014'350	61'380	1'509'050	608'960	1'227'600	0.496

Baseline emissions:

The Table B.6.3.2 below presents the estimated fuel consumption, electricity generated and emissions in the baseline scenario.

Table B.6.3.2

Year	$FC_{NG,0}$ [m3]	$FC_{HFO,0}$ [t]	$FC_{D,0}$ [l]	Baseline emissions [tCO_2]	EG_0 [MWh]	$EF_{CO2,i}$ [tCO_2/MWh]
2008	9'769'587	19'988	321'578	83'518	122'760	0.680
2009	9'769'587	19'988	321'578	83'518	122'760	0.680
2010	9'769'587	19'988	321'578	83'518	122'760	0.680
2011	9'769'587	19'988	321'578	83'518	122'760	0.680
2012	9'769'587	19'988	321'578	83'518	122'760	0.680
2013	9'769'587	19'988	321'578	83'518	122'760	0.680
2014	9'769'587	19'988	321'578	83'518	122'760	0.680
2015	9'769'587	19'988	321'578	83'518	122'760	0.680
2016	9'769'587	19'988	321'578	83'518	122'760	0.680
2017	9'769'587	19'988	321'578	83'518	122'760	0.680
Total	97'695'873	199'875	3'215'781	835'179	1'227'600	0.680

Deviations in the total values from the sum row values are due to truncation.

B.6.4 Summary of the ex-ante estimation of emission reductions:

The emission reductions achieved by the project activity are calculated below (Table B.6.4.1) as the difference between the baseline emissions and the project emissions.

Table B.6.4.1

Year	Estimation of emissions in project activity [tCO_2]	Estimation of baseline emissions [tCO_2]	Emission reductions [tCO_2]
2008	60'896	83'518	22'622
2009	60'896	83'518	22'622
2010	60'896	83'518	22'622
2011	60'896	83'518	22'622
2012	60'896	83'518	22'622
2013	60'896	83'518	22'622
2014	60'896	83'518	22'622
2015	60'896	83'518	22'622
2016	60'896	83'518	22'622
2017	60'896	83'518	22'622
Total	608'960	835'179	226'219

B.7 Application of a monitoring methodology and description of the monitoring plan:

B.7.1Data and parameters monitored:

The project has applied approved methodologies available for small-scale CDM project at United Nations Framework Convention on Climate Change (UNFCCC) website under Appendix B of the simplified modalities and procedures for small-scale CDM project activities. The methodology used for this project is the approved small-scale CDM baseline methodology AMS III.B (Version 11, August 10, 2007) "Switching Fossil Fuels." As per requirements of AMS III.B, the monitoring shall involve:

(a) Monitoring of the fuel use and output for an appropriate period (e.g., a few years, but records of fuel use may be used) prior to the fuel switch being implemented - e.g. coal use and heat output by a district heating plant, liquid fuel oil use and electricity generated by a generating unit (records of fuel used and output can be used in lieu of actual monitoring);

(b) Monitoring fuel use and output after the fuel switch has been implemented - e.g. gas use and heat output by a district heating plant, gas use and electricity generated by a generating unit.

As for a), please refer to Section B.6.2.

As for b), the data and parameters that will be monitored are as follows:

Data / Parameter:	$FC_{NG,PJ,y}$
Data unit:	m^3/yr
Description:	Quantity of Natural Gas (NG) combusted in the project plant after fuel switch in year y.
Source of data to be used:	This is as per actual metered readings from plant records.
Value of data	20'301'435
Description of measurement methods and procedures to be applied:	Measured continuously and reported monthly, data being stored electronically/paper for a minimum of two years after the last issuance of CERs for the project activity.
QA/QC procedures to be applied:	The total fuel consumption will be monitored and crosschecked with the invoices as provided by the supplier.
Any comment:	The gas meters separately meters the amount of gas utilized in power generation and in cement plant. This has been a recent installation in April 2007.

Data / Parameter:	$FC_{HFO,PJ,y}$
Data unit:	t/yr
Description:	Quantity of Heavy Fuel Oil (HFO) combusted in the project plant after fuel switch in year y.
Source of data to be used:	This is as per actual metered readings from plant records.
Value of data	6'138
Description of measurement methods and procedures to be applied:	Measured continuously and reported monthly, data being stored electronically/paper for a minimum of two years after the last issuance of CERs for the project activity.
QA/QC procedures to be applied:	The total fuel consumption will be monitored and crosschecked with the invoices as provided by the supplier.
Any comment:	Meters installed on the generators.

Data / Parameter:	$FC_{D,PJ,y}$
Data unit:	l/yr
Description:	Quantity of Diesel combusted in the project plant after fuel switch in year y. 2008-17
Source of data to be used:	This is as per actual metered readings from plant records.
Value of data	150'905
Description of measurement methods and procedures to be applied:	Measured continuously and reported monthly, data being stored electronically/paper for a minimum of two years after the last issuance of CERs for the project activity.
QA/QC procedures to be applied:	The total fuel consumption will be monitored and crosschecked with the invoices as provided by the supplier.
Any comment:	Meters are installed on the generators.

Data / Parameter:	$NCV_{NG,y}$
Data unit:	MJ/m^3
Description:	Net calorific value of NG combusted in the project plant in year y.
Source of data to be used:	This is as per actual measurements from plant records.
Value of data	36.178
Description of measurement methods and procedures to be applied:	This would be based on testing by external agencies (fuel supplier). The data will be stored electronically/paper for a minimum of two years after the last issuance of CERs for the project activity.
QA/QC procedures to be applied:	The consistency of the measurements will be checked by comparing the measurement results with measurements from previous years and default values by the IPCC. If the measurement results differ significantly from previous measurements or other relevant data sources, additional measurements will be conducted.
Any comment:	

Data / Parameter:	$NCV_{HFO,y}$
Data unit:	GJ/t
Description:	Net calorific value of Heavy Fuel Oil (HFO) combusted in the project plant in year y.
Source of data to be used:	40.635
Value of data	As per actual meter readings.
Description of measurement methods and procedures to be applied:	This would be based on testing by external agencies (fuel supplier). The data will be stored electronically/paper for a minimum of two years after the last issuance of CERs for the project activity.
QA/QC procedures to be applied:	The consistency of the measurements will be checked by comparing the measurement results with measurements from previous years and default values by the IPCC. If the measurement results differ significantly from previous measurements or other relevant data sources, additional measurements will be conducted.
Any comment:	

Data / Parameter:	$NCV_{D,y}$
Data unit:	GJ/t
Description:	Net calorific value of Diesel combusted in the project plant in year(s) 2008-17.
Source of data to be used:	This is as per actual measurements from plant records.
Value of data	43.0
Description of measurement methods and procedures to be applied:	This would be based on testing by external agencies (fuel supplier). The data will be stored electronically/paper for a minimum of two years after the last issuance of CERs for the project activity.
QA/QC procedures to be applied:	The consistency of the measurements will be checked by comparing the measurement results with measurements from previous years and default values by the IPCC. If the measurement results differ significantly from previous measurements or other relevant data sources, additional measurements will be conducted.
Any comment:	

Data / Parameter:	$EG_{PJ,y}$
Data unit:	MWh
Description:	Electricity generation in the project plant during the year y.
Source of data to be used:	From the meters installed on the generators and at the point of electricity dispatch to the cement factory kilns.
Value of data	122'760
Description of measurement methods and procedures to be applied:	Electronic meters. The data will be stored electronically/paper for a minimum of two years after the last issuance of CERs for the project activity.
QA/QC procedures to be applied:	The consistency of metered net electricity generation should be cross-checked with receipts from electricity sales and the quantity of fuels fired.
Any comment:	Sub-meter stations are also installed on the plant site to measure the electricity consumption for manufacturing lines (kilns and other equipment). Data would be monitored continuously, 100% of data will be measured and would be kept electronically for 2 years after the end of the crediting period.

B.7.2 Description of the monitoring plan:

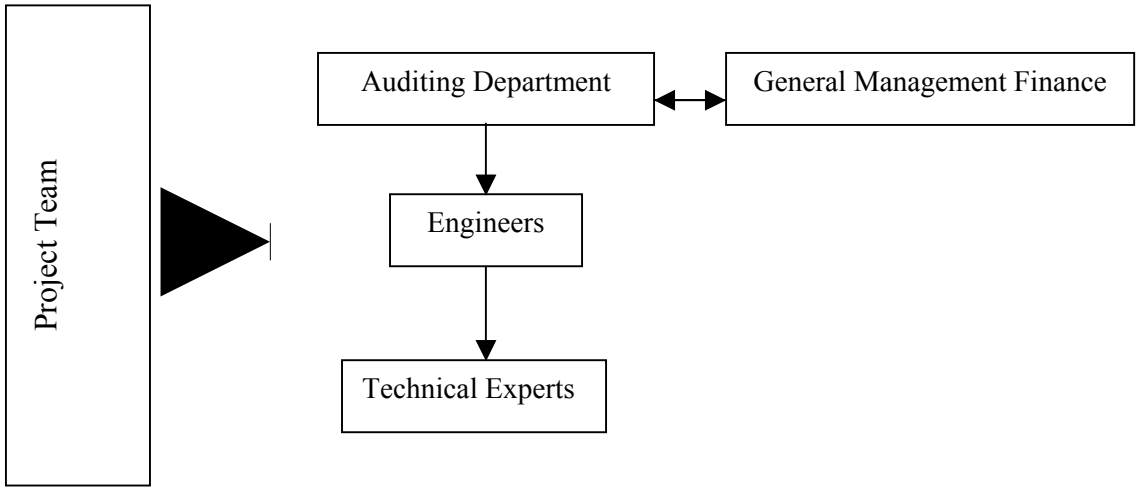
The team under General Management Finance monitors and collects the metering data. The periodic checking of the data is done by the auditing department. This unit has deputed technical experts to oversee the various activities that will be involved in conducting the CDM project activity.

The responsibilities will include:

- Overseeing the project performance
- Ensuring endowment of monitoring points with appropriate measuring devices as and when scheduled
- Being a one point contact for the monitoring and verification agency

- Training of the personnel by the technology and equipment suppliers.

Operational and Management Structure



Designation	Responsibilities
General Management Finance	Monitors and collects the metering data
Auditing department	Periodic checking
Engineers	Monitoring & Verification of data Operation, Power generation, Checking data accuracy, Mechanical Maintenance
Technical experts	Monitoring of data collection (once in every hour), Operation, Data collection, Checking data accuracy, Data recording

B.8 Date of completion of the application of the baseline and monitoring methodology and the name of the responsible person(s)/entity(ies)

- Date of completing the final draft of this baseline section (DD/MM/YYYY): 15/11/2007
- Name of person/entity determining the baseline: Factor Consulting + Management AG have assisted the project proponent in identifying the baseline methodology for the identified CDM. Factor Consulting + Management AG is a project participant.
- Contact information: see Annex 1.

SECTION C. Duration of the project activity / crediting period

C.1 Duration of the project activity:

C.1.1. Starting date of the project activity:

Starting date of the project activity: February 1st, 2007

C.1.2. Expected operational lifetime of the project activity:

Expected operational lifetime of the project activity is 20 years.

C.2 Choice of the crediting period and related information:

C.2.1. Renewable crediting period

C.2.1.1. Starting date of the first crediting period:

Not applicable.

C.2.1.2. Length of the first crediting period:

Not applicable.

C.2.2. Fixed crediting period:

C.2.2.1. Starting date:

Starting date of the crediting period: 01/01/2008

C.2.2.2. Length:

The length of the crediting period is 10 years.

SECTION D. Environmental impacts

D.1. If required by the host Party, documentation on the analysis of the environmental impacts of the project activity:

As per national operational strategy of the Pakistani DNA[3], the project proponent shall submit an Environmental Impact Assessment Report of the Project (if so required).

Due to the small size of the project plant, no Environmental Impact Assessment Report is required by Pakistani Law. For this reason, MLC received a No-Objection Certificate (NOC) (15/1/2007) from the Pakistani Environment Protection Department confirming the approval for construction phase of the project. The approval of the project is subject to several conditions as stated in the decision on initial environmental examination. The certificate is attached as Annex 7.

D.2. If environmental impacts are considered significant by the project participants or the host Party, please provide conclusions and all references to support documentation of an environmental impact assessment undertaken in accordance with the procedures as required by the host Party:

The project proponent does not expect any significant negative environmental impacts and no environmental impact assessment is required by host Party.

[3] Accessible at http://cdmpakistan.gov.pk/.

SECTION E. Stakeholders' comments

E.1. Brief description how comments by local stakeholders have been invited and compiled:

To receive comments by local stakeholders MLC placed two advertisements in local newspapers both on October 12th and October 19th, 2007. The advertisements informed about the replacement of the existing Nigatta engines with the Wartsila engine, and invited interested/affected persons and general public to send their comments in favour or opposition of the project until October 27, 2007. The contact person and a reference for further documentation was included, and copies of the project's documentation including PDD were made available at the project site for any Stakeholders interested in reviewing them. Copies of these Newspaper Advertisements are shown in Annex 6 of this document.

As the project only involves the switch to Natural Gas in the new engine, no stakeholders were negatively affected. All effects on the local environment are considered to be positive as the combustion of NG is cleaner than the combustion of HFO.

In fact, the main stakeholder of the project is the gas supplier, Sui Northern Gas Pipelines Limited, with whom MLC already possesses a contract. The contract allows for implementation of the project as maximum flow rate of the Natural Gas is 113'367 m^3/day and the Natural Gas provided after project activity is estimated to only 55'620 m^3/day.

E.2. Summary of the comments received:

No comments were received regarding the project activity.

E.3. Report on how due account was taken of any comments received:

No comments were received.

Annex 1

CONTACT INFORMATION ON PARTICIPANTS IN THE PROJECT ACTIVITY

Organization:	MLC Cement Factory Limited
Street/P.O.Box:	42-Lawrence Road
Building:	
City:	Lahore
State/Region:	Punjab
Postfix/ZIP:	54000
Country:	Pakistan
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FAX:	6363184
E-Mail:	sm.imran@kmlg.com
URL:	http://www.kmlg.com
Represented by:	
Title:	Chief Executive Officer
Salutation:	
Last Name:	Saigol
Middle Name:	Tariq
First Name:	Sayeed
Department:	
Mobile:	03008473800
Direct FAX:	6368721
Direct tel:	6304183-4
Personal E-Mail:	sayeed.saigol@kmlg.com

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City:	Zurich
State/Region:	Zurich
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E-Mail:	info@factorglobal.com
URL:	www.factorglobal.com
Represented by:	
Title:	Managing Partner
Salutation:	
Last Name:	Lüchinger
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Department:	
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Direct FAX:	+41 44-298 2899
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Organization:	Carbon Services (Private) Limited
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Postfix/ZIP:	54000
Country:	Pakistan
Telephone:	+92-42-6313235 / 6313236
FAX:	+92-42-6312959
E-Mail:	omar.malik@carbon.com.pk
URL:	www.carbon.com.pk
Represented by:	
Title:	Director
Salutation:	
Last Name:	Malik
Middle Name:	M
First Name:	Omar
Department:	
Mobile:	+92-300-8463743
Direct FAX:	
Direct tel:	
Personal E-Mail:	omar.malik@carbon.com.pk

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

There is no public funding involved in the project.

Annex 3

BASELINE INFORMATION

Baseline and Project Activity Data			
Assumptions			
NCV Natural Gas	MJ/m3	36.178	Supplier value
NCV Heavy Fuel Oil	GJ/t	40.635	Supplier value
NCV Diesel	GJ/t	43.0	Supplier value
Carbon emission factor NG	t CO2/TJ	56.1	IPCC 2006 guidelines
Carbon emission factor HFO	t CO2/TJ	77.4	IPCC 2006 guidelines; value for residual fuel oil
Carbon emission factor Diesel	t CO2/TJ	74.1	IPCC 2006 guidelines
Density of Diesel	kg/l	0.806	Test reports from Pakistan State Oil

Input Data		**Pre-Project (2005-2006)**	**Baseline**	**Project**
Capacity of Engines	**MW**	**23.8**	**23.8**	**16.4**
Electricity output for 12 months	MWh	128'248	122'760	122'760
Electricity output for 9 months	MWh	96'186	92'070	92'070
Plant efficiency	%	40.5%	40.5%	45.9%
Energy input for 12 months	GJ/yr	1'232'460	1'179'725	1'008'868
Energy input for 9 months	GJ/yr	924'345	884'794	756'651
HFO consumption	t/yr	20'881	19'988	6'138
Gas consumption	m3/yr	10'206'298	9'769'587	20'301'435
Diesel consumption	l/yr	335'953	321'578	150'905
Diesel consumption	t/yr	271	259	122
Grid electricity consumption	MWh/yr	854	817	5'488
Energy				
Gas energy consumption	GJ	369'243	353'444	734'465
HFO energy consumption	GJ	848'499	812'194	249'418
Diesel energy consumption	GJ	11'643	11'145	5'230
Grid electricity consumption	GJ	3'074	2'942	19'755
Total energy consumption	**GJ**	**1'232'460**	**1'179'725**	**1'008'868**
Fuel				
Electricity output	MWH/yr	128'248	122'760	122'760
Specific fuel consumption	**MJ/kWh**	**9.6**	**9.6**	**8.2**
ER calculation				
without consideration of grid electricity				
CO2 emissions NG	t CO2e/yr	20'715	19'828	41'204
CO2 emissions HFO	t CO2e/yr	65'674	62'864	19'305
CO2 emissions Diesel	t CO2e/yr	863	826	388
CO2 emissions total	**t CO2e/yr**	**87'251**	**83'518**	**60'896**
Specific CO2 emission	tCO2/MWh	0.680	0.680	0.496

2005-2006 Operational Data

MONTH	WAPDA (grid)	TOTAL	CONSUMPTION			REMARKS
	Received (kWh)	Generated (kWh)	Diesel Oil (litre)	GAS (m3)	Heavy Fuel Oil (tonnes)	
Jul-05	62'100	7'493'500	64'015	288'726	1'355.432	
Aug-05	17'200	12'600'600	20'400	494'244	2'293.994	
Sep-05	34'700	11'631'100	23'463	447'990	2'089.105	
Okt-05	5'100	9'108'200	64'900	684'691	1'363.663	
Nov-05	3'400	10'927'400	23'400	1'266'848	1'510.940	
Dez-05	41'000	12'358'400	15'900	827'165	2'248.471	
Jan-06	80'400	11'280'700	22'300	0	2'505.990	Gas load shedding
Feb-06	2'800	9'686'500	17'810	1'075'383	1'383.318	
Mrz-06	10'300	10'217'900	27'900	1'145'854	1'462.549	
Apr-06	55'400	10'284'400	19’890	1'239'719	1'425.469	
Mai-06	208'100	11'205'400	22’400	1'321'428	1'617.795	
Jun-06	333'300	11'453'400	13’575	1'414'250	1'624.325	
TOTAL	**853'800**	**128'247'500**	**335'953**	**10'206'298**	**20'881.054**	

Annex 4

MONITORING INFORMATION

All relevant monitoring information is provided in the text.

Annex 5

CASH FLOW ANALYSIS

	Values in PKR												
1	**Project name**	**Investment Calculation for Maple Leaf**											
2	Exchange rate US $ --> PKR	60.5	oanda.com, 20.12.07										
3	Opportunity cost of capital	20%											
4	Price Increase HFO	2%											
5	Price Increase Diesel	2%	Assumption Factor										
6	Price Increase Natural Gas	1%	Assumption Factor										
7	Increase of price and effort of O&M	3%	Assumption Factor										
8	Discount Rate	10.00%	MapleLeaf Data										
9				Plant operational									
10	**Project analysis**	Year of operation	0	1	2	3	4	5	6	7	8	9	10
11	**Cash flow**												
12	**Total investment**		**756,119,349**										
13													
14	**HFO costs old plant**			299,669,160	305,662,543	311,775,794	318,011,310	324,371,536	330,858,967	337,476,146	344,225,669	351,110,183	358,132,386
15	**Diesel costs old plant**			6,895,935	7,033,854	7,174,531	7,318,022	7,464,382	7,613,670	7,765,943	7,921,262	8,079,688	8,241,281
16	**NG costs old plant**			115,678,537	116,835,322	118,003,675	119,183,712	120,375,549	121,579,304	122,795,098	124,023,049	125,263,279	126,515,912
17	**O&M old plant**			27,113,055	27,926,447	28,764,240	29,627,167	30,515,982	31,431,462	32,374,406	33,345,638	34,346,007	35,376,387
18	**Total**			449,356,687	457,458,166	465,718,241	474,140,211	482,727,450	491,483,403	500,411,593	509,515,618	518,799,156	528,265,967
19													
20	**HFO costs new plant**			165,777,022	169,092,562	172,474,413	175,923,902	179,442,380	183,031,227	186,691,852	190,425,689	194,234,203	198,118,887
21	**Diesel costs new plant**			11,186,100	11,409,822	11,638,019	11,870,779	12,108,195	12,350,359	12,597,366	12,849,313	13,106,299	13,368,425
22	**NG costs new plant**			166,152,377	167,813,900	169,492,039	171,186,960	172,898,829	174,627,818	176,374,096	178,137,837	179,919,215	181,718,407
23	**O&M new plant**			14,226,820	14,653,625	15,093,233	15,546,030	16,012,411	16,492,784	16,987,567	17,497,194	18,022,110	18,562,773
24	**Total**			357,342,319	362,969,909	368,697,705	374,527,671	380,461,815	386,502,187	392,650,880	398,910,033	405,281,827	411,768,493
25													
26	**Savings (EBITDA)**		-756,119,349	92,014,369	94,488,257	97,020,536	99,612,540	102,265,635	104,981,216	107,760,713	110,605,585	113,517,329	116,497,474
27	EBITDA cumulative		-756,119,349	-664,104,980	-569,616,723	-472,596,187	-372,983,647	-270,718,012	-165,736,796	-57,976,083	52,629,502	166,146,831	282,644,305
28													
29			0	1	2	3	4	5	6	7	8	9	10
30	**Cash flow with loan**												
31													
32	Share of equity	7%											
33	Share of loan	93%											
34	Loan interest rate	8.1%	This is Libor + 2.5%										
35	Loan period	8	year(s)										
36	Number of repayments	13											
37	Grace period	0	year(s)										
38													
39	EBITDA			92,014,369	94,488,257	97,020,536	99,612,540	102,265,635	104,981,216	107,760,713	110,605,585	113,517,329	116,497,474
40													
41	**Loan**		**-703,190,995**										
42	Interest payments			-56,958,471	-52,577,050	-43,814,208	-35,051,366	-26,288,525	-17,525,683	-8,762,842	0	0	0
43	Open loan sum		-703,190,995	-649,099,380	-540,916,150	-432,732,920	-324,549,690	-216,366,460	-108,183,230	0	0	0	0
44	Loan repayment			-54,091,615	-108,183,230	-108,183,230	-108,183,230	-108,183,230	-108,183,230	-108,183,230	0	0	0
45	**Project Cash flow with loan**		**-52,928,354**	**-19,035,717**	**-66,272,023**	**-54,976,902**	**-43,622,056**	**-32,206,120**	**-20,727,697**	**-9,185,359**	**110,605,585**	**113,517,329**	**116,497,474**
46	Cash flow cumulative		-52,928,354	-71,964,071	-138,236,094	-193,212,996	-236,835,052	-269,041,172	-289,768,869	-298,954,228	-188,348,643	-74,831,314	41,666,161
47	Discounted Cash Flow with Loan		-52,928,354	-17,305,197	-54,770,267	-41,304,960	-29,794,451	-19,997,466	-11,700,245	-4,713,542	51,598,322	48,142,429	44,914,819
48	Discounted Cash Flow Cumulative		-52,928,354	-71,964,071	-138,236,094	-193,212,996	-236,835,052	-269,041,172	-289,768,869	-298,954,228	-188,348,643	-74,831,314	41,666,161
49													
50	NPV of Investment	-87,858,912											
51	**IRR w/ loan, w/o CERs**	**2.1140%**											

53	**Calculation of CER-amount, value and transaction costs**		0	1	2	3	4	5	6	7	8	9	10
54	Number of certificates per year	22,622		22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622	22,622
55	Estimated CER-Price (US$ 12)	726											
56	Brokerage Fee	12.5%											
57	Expected revenues from CERs for Project Owner			14,370,626	14,370,626	14,370,626	14,370,626	14,370,626	14,370,626	14,370,626	14,370,626	14,370,626	14,370,626
58													
59	**Transaction Costs**												
60	Project development costs for Maple Leaf												
61	PIN	0		0	0	0	0	0	0	0	0	0	0
62	PDD	0		0	0	0	0	0	0	0	0	0	0
63	Registration fee / issuance	-1,829,762		-182,976	-182,976	-182,976	-182,976	-182,976	-182,976	-182,976	-182,976	-182,976	-182,976
64	Share of Proceeds	-2,874,125		-287,413	-287,413	-287,413	-287,413	-287,413	-287,413	-287,413	-287,413	-287,413	-287,413
65	Validation costs	-605,000		-605,000	0	0	0	0	0	0	0	0	0
66	Verification costs	-423,500		-423,500	-423,500	-423,500	-423,500	-423,500	-423,500	-423,500	-423,500	-423,500	-423,500
67	**Costs total**			**-1,498,889**	**-893,889**	**-893,889**	**-893,889**	**-893,889**	**-893,889**	**-893,889**	**-893,889**	**-893,889**	**-893,889**
68													
69	**Cash flow CERs only**		**0**	**12,871,737**	**13,476,737**	**13,476,737**	**13,476,737**	**13,476,737**	**13,476,737**	**13,476,737**	**13,476,737**	**13,476,737**	**13,476,737**
70													
71	**Project cash flow with loan and CERs**		**-52,928,354**	**-6,163,980**	**-52,795,286**	**-41,500,165**	**-30,145,319**	**-18,729,383**	**-7,250,960**	**4,291,378**	**124,082,322**	**126,994,066**	**129,974,211**
72	**IRR w/ loan and CERs**	**9.46%**											

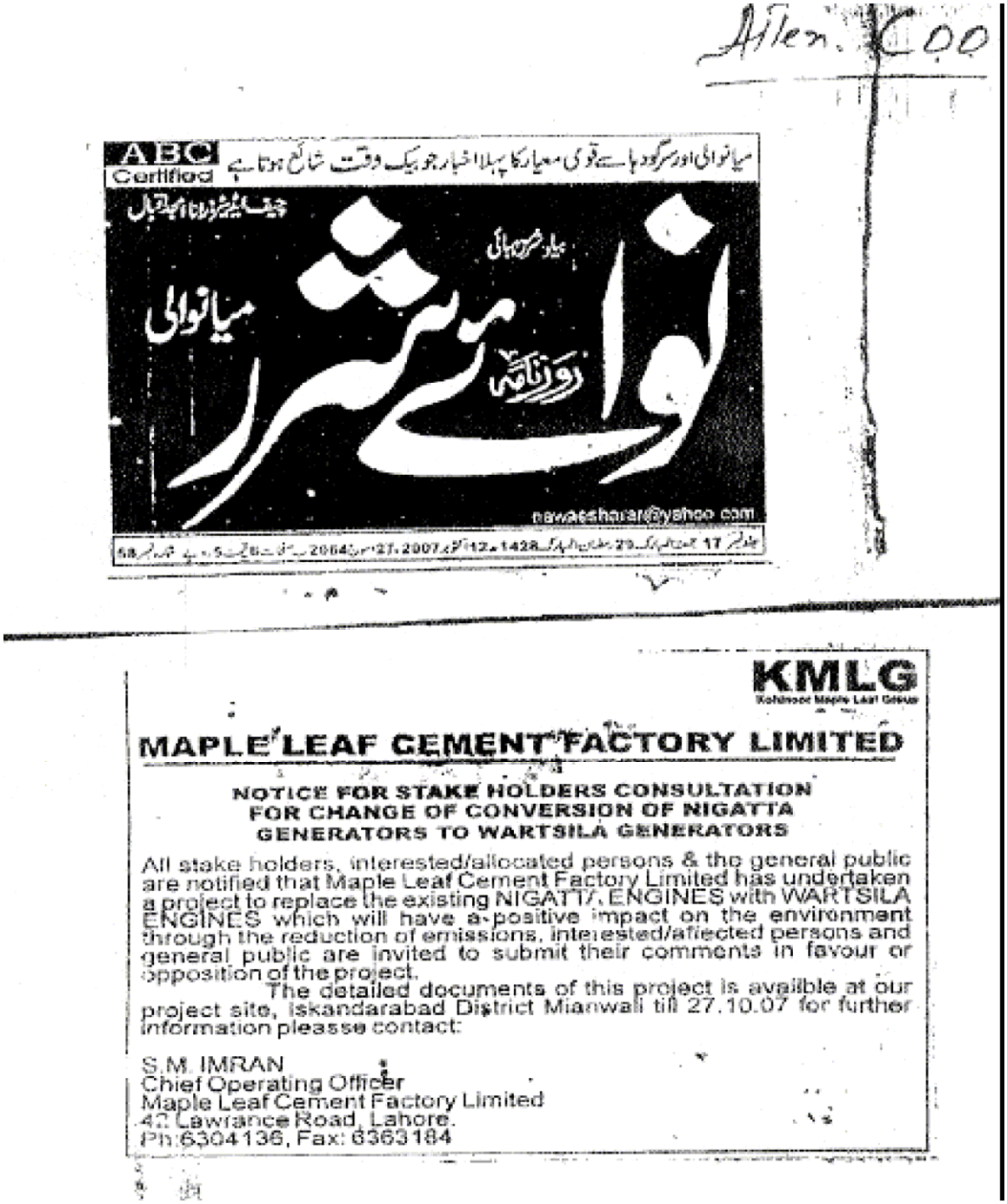
Details of Total Project Cost	
	TOTAL (PKR)
Civil works building	
Civil works building PGP expansion	38,064,621.00
Civil works - RCC tunnel	21,811,944.00
Civil work-gas pipe line	9,637,754.49
Civil work plant & machinery	
Consultancy for grid station	1,048,857.00
Piling works grid station	206,530.00
Mechanical works	
Mechanical works-PGP expansion	34,023,540.50
Geo technical investigation	340,980.00
Electrical works	
Electrical works-PGP expansion	89,101,983.00
Letter of credit-PGP expansion	
L/C 05060750 WHB 229 IMP/PG/8092	520,441,927.99
L/C 1398/01/58/366/0142	1,699,552.00
	716,377,689.98
Unallocated expenditures-PGP expansion	
Traveling expenses	290,659.00
Insurance expenses	361,307.00
Legal and professional charges	30,000.00
Financial exp	38,233,851.00
Bank charges	29,386.05
Miscellaneous expenses	796,456.00
	39,741,659.05
Total Cost	**756,119,349.03**

Annex 6

Stakeholder Consultation

The newspaper articles asking for Stakeholder's comments are shown below

October 12th 2007



ABC Certified

میانوالی اور سرگودھا سے قومی معیار کا پہلا اخبار جو بیک وقت شائع ہوتا ہے

چیف ایڈیٹر ذوالفقار احمد اقبال

بیاد حمزہ بابی

روزنامہ

نوائے سرحد

میانوالی

nawaesharar@yahoo.com

KMLG

Kohinoor Maple Leaf Group

MAPLE LEAF CEMENT FACTORY LIMITED

NOTICE FOR STAKE HOLDERS CONSULTATION FOR CHANGE OF CONVERSION OF NIGATTA GENERATORS TO WARTSILA GENERATORS

All stake holders, interested/allocated persons & the general public are notified that Maple Leaf Cement Factory Limited has undertaken a project to replace the existing NIGATTI. ENGINES with WARTSILA ENGINES which will have a positive impact on the environment through the reduction of emissions, interested/affected persons and general public are invited to submit their comments in favour or opposition of the project.

The detailed documents of this project is availble at our project site, Iskandarabad District Mianwali till 27.10.07 for further information pleasse contact:

S.M. IMRAN
Chief Operating Officer
Maple Leaf Cement Factory Limited
42 Lawrance Road, Lahore.
Ph:6304136, Fax: 6363184

October 19th 2007

Attach. C.D.C


فاران کی کرنوں سے منور ہے زمانہ

روزنامہ

نوائے فاران

میانوالی پاکستان

چیف ایڈیٹر حفیظ الرحمن

بانی مدیر حبیب الرحمن

جلد نمبر 2 ... جمعہ 6 شوال 1428ھ بمطابق 19 اکتوبر 2007ء 3 کاتک 2004ب ... نمبر 20

KMLG

Kohinoor Maple Leaf Group

MAPLE LEAF CEMENT FACTORY LIMITED

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S.M. IMRAN
Chief Operating Officer
Maple Leaf Cement Factory Limited
[illegible] Lawrance Road, Lahore.
Ph:8304136, Fax: 6363184

Annex 7

Environmental Impact Assessment: No-Objection Certificate

ENVIRONMENT PROTECTION DEPARTMENT
Government of the Punjab
4 - Lytton Road, Lahore

REGISTERED

NO. 182 /F-651/2912/EIA

Dated Lahore the 15 /01/ 2007

To

Mr. S.M. Imran
Chief Operating Officer
Maple Leaf Cement Factory,
42-Lawrance Road,
Lahore.

Subject: **DECISION ON INITIAL ENVIRONMENTAL EXAMINATION (IEE)**

1. **Description of Project:** Installation of Fifth unit of Thermal Power 16.4 MW (Gas Fired) Extension Plant by M/s Maple Leaf Cement Factory. It is an extension project that will minimize the liquidated damages, reduce the load on present engines. Natural gas 99% will be used as fuel source and High Speed Diesel 1% will be used.
2. **Location of Project:** The project site is located Near Iskandarabad, District Mianwali on Southern side of Kundia-Attock Railway Line.

3. After review of the Initial Environmental Examination (IEE) Report, the Environmental Protection Agency, Punjab has decided to accord its approval for construction phase of the project subject to the following conditions.

i) Hazard of soil erosion will be minimized with proper provision for resurfacing of exposed areas.
ii) Monitoring shall be carried out during the entire period of the project activities. Monitoring reports of the whole operation should be submitted to EPA, Punjab on monthly basis.
iii) Camping sites should be located at least 500 meters away from any settlement to avoid disturbance to the local people. Sewage generated from camping sites should be treated in septic tanks and soak pits. These should be constructed at a minimum distance of 300 meter from any permanent or seasonal water source. Septic tank and soak pits should not be located in the areas where high ground water table exists.
iv) Mitigation measures suggested in the IEE Report and Environmental Management Plan (EMP) should be strictly adhered to minimize any negative impacts on soil, ground water, air and biological resources of the project area. The proponent will depute staff to monitor compliance of EMP.
v) The proponent will not discharge untreated or treated wastewater in a surface or sub-surface water body that may be used for drinking or agriculture purpose.
vi) The proponent shall ensure that strict and efficient health and safety measures are in place for protection of workers backed by a comprehensive emergency response system.
vii) The proponent will plant trees inside / outside the premises of the plant on available space with the consultation of District Officer (Forest), Mianwali within six months.

P.T.O

4. The proponent shall be liable for correctness and validity of the information supplied by the environmental consultant.
5. The proponent shall be liable for compliance of sections 13, 14, 17 and 18 of IEE/EIA Regulations, 2000, regarding approval, confirmation of compliance, entry, inspections and monitoring.
6. This approval is accorded only for the installation / construction phase of the project. The proponent will obtain approval for operation of the Power Plant in accordance with Section 13(2)(b) and Section 18 of the IEE/EIA Regulations, 2000.
7. Any change in the approved project shall be communicated to EPA, Punjab and shall be commenced after obtaining the approval.
8. This approval shall be treated as null and void if all or any of the conditions mentioned above, is/are not complied with. This approval does not absolve the proponent of the duty to obtain any other approval or consent that may be required under any law in force.

ASSISSTANT DIRECTOR (EIA)
for Director General, EPA, Punjab

Endst. No._____/F-651/2912/EIA Dated / 01/ 2007

A copy is forwarded for information to:
1. The Director, Industries Department, Government of the Punjab, Lahore.
2. The Director (ML&I), EPA, Punjab, Lahore.
3. The Director (EIA), EPA, Punjab, Lahore.
4. P.S. to Secretary, EPD, Punjab, Lahore.
5. P.A. to D.G. EPA, Punjab, Lahore.
6. The District Officer (Environment), Sargodha. He is requested to ensure compliance of measures mentioned above and to furnish compliance status report accordingly.

ASSISSTANT DIRECTOR (EIA)
for Director General, EPA, Punjab