INDORAMA CEMENT LTD

08-January-2007

Kind Attention
Chairman, Executive Board
UNFCCC

Subject: Clarification on request for review for "Switching fossil fuels in an industrial facility" by Indorama Cement Ltd; (Reference No 0737)

Dear Sir,

This is with reference to the request for review raised by Executive Board members for the project "Switching fossil fuels in an industrial facility" by Indorama Cement Ltd; (Reference No 0737). We are enclosing herewith our clarifications on the comments raised for your consideration.

Thanking you,

Yours sincerely,

B K Sharma
Vice President – Finance
Indorama Cement Ltd.
Mobile: 98190 19113
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Email: bsharma@indorama.co.in

Reasons for Request 1:

1. In justification of additionality PPs make focus on technological barriers. The technology is indigenous and is being broadly implemented by producers in many objects in India. PPs state that they still have problems with the technology and among them is the quality of BFG which is out of their control. The project started in 2000, but the starting date of fixed crediting period is 01.09.2006.

Therefore it is difficult to assess whether the CDM has been seriously taken into consideration while approving the project and relevantly no evidence is provided on this.

Reply from PP:
PP has envisaged the project activity with CDM consideration. Extract of board meeting referring to the project activity, problems anticipated and CDM benefits has been provided to DOE at the time of validation (attached *annex 1*). PP has been facing the difficulties due to gas fluctuations, low pressure and non-availability of BFG leading to production difficulties & interruptions unlike combustion of LDO in hot air generator in the baseline scenario (details are attached in *annex 5*).

2. In the calculation of the emissions reductions the PP uses formula based on the calorific values of the two types of fuels – LDO (which is displaced) and BFG (which is supplied from the steel plant and combusted in the cement plant). However, neither emissions factor, no content and characteristics of BFG are provided in the PDD, and no project emissions are estimated. Methodology AMS III.B. version 09 states " Project activity direct emissions consist of those emissions related with the use of fossil fuel after the fuel switch", but emissions reductions that are estimated by PPs are equal to the baseline emissions.

Reply from PP:
The composition of BFG (including its NCV) is provided to DOE at the time of validation (test report of BFG is attached as *annex 2*). BFG is a mixture of CO, CO2 and nitrogen with other trace gases. The fuel property comes due to the presence of CO in it. CO% in BFG gas may vary leading to variation in NCV of BFG and PP has included monitoring NCV of BFG in the project monitoring plan. Emission factor for BFG is taken as IPCC default value as suggested in the methodology.

BFG is a waste gas from blast furnace of the steel plant, which other wise is flared (due to the presence of CO in it) from the chimney of blast furnace without any useful purpose. Project emissions due to the burning of BFG are negated by emissions due to flaring of BFG in the baseline. Hence project emissions due to combustion of BFG are same as that of flaring of equivalent quantity of BFG in chimney of blast furnace of steel plant in the baseline. Due to this reason project emissions on account of BFG combustion have not been taken and emission reduction is equal to baseline emissions (due to use of LDO in Hot Air Generator at PP site).[1]

[1] This is akin to the biomass based energy generation projects. Biomass burning is not GHG free but GHG neutral. Similarly in the project activity, BFG use is GHG neutral as it is flared in the baseline at the blast furnace in the absence of its utilization as fuel in the project activity. (Refer http://cdm.unfccc.int/UserManagement/FileStorage/AOP0YL09AJQGT6TNOKUOPV6D4S98TB. This is a registered under Type III.B and entails switching from fossil fuel to biomass briquettes)

3. The methodology also says that "The emission baseline is the current emissions of the facility expressed as emissions per unit of output (e.g., kg CO2/kWh)". Output unit emission is not considered at all by the PPs.

Reply from PP:
PP uses BFG for generation of hot air, which is used to dry clinker and slag for production of Portland Slag Cement in the plant. Drying is required to bring the level of moisture in clinker and slag to the acceptable limit for grinding (below 0.5% in the final product). Thus, the output from the project activity is dried clinker and dried slag. The moisture level in Slag and clinker varies at different times (variations are more in case of slag). Due to this variation in moisture levels, LDO consumption per unit of dried slag and dried clinker also varies (unlike power generation or steam generation where it can be estimated very correctly for per unit of power or energy output). So, emission baseline in terms of per unit of output (i.e. dried clinker and dried slag) may not give the most appropriate and conservative estimation on emission reduction in the project activity. This may be also due to the fact that gaseous fuel combustion is more efficient compared to liquid fuel combustion (IPCC default values for oxidation factor for liquid fuels is 0.990 and for gaseous fuel is 0.995). PDD has been modified to include correct baseline description (PDD section B.5) and formulae to estimate baseline emissions based on unit output of dry slag and dry clinker in the project activity (method 1).

However for the conservative and more appropriate estimation of savings in LDO due to project activity, energy values of both BFG and LDO are used as an alternative to above method 1. NCV and quantity of BFG used in the process are part of monitoring plan and are being directly monitored and equivalent amount of LDO displaced is being calculated based on these values and quantity of BFG consumed (method 2). The minimum of the two of method 1 and method 2 is taken as baseline emissions in the project activity (same has been included in revised PDD).

As a justification to above approach, estimation of baseline emissions have been estimated using both the methods separately –

An annual average figure on LDO combustion is taken based on past performance (prior to the start of project activity) for drying of slag and clinker.
As per the past performance data on LDO consumption prior to the project activity, specific LDO consumption per unit of clinker drying was 5.96 L/ MT of dried clinker (year April 1999-March 2000) and for slag it was 17.78 L/MT of dried slag (April 1999-March 2000) and 5.72 L/ MT of dried clinker (year April 2000-September 2000[2]) and 15.2 L/ MT of dried slag (year April 2000-September 2000). This difference in specific LDO consumption for clinker and slag is due to different levels of moisture in input clinker.

Based on this data (using average figure for the above period), estimated LDO saving for the sample year 2004-05 (Clinker production 280499 tonnes and slag production 345047 tonnes) comes out to be 1624 KL for clinker drying and 5462 KL for slag drying. Equivalent emissions from the equivalent LDO consumption are 17760 tCO2e (*annex 6*), which are more than those estimated based on energy value of BFG and LDO (i.e. 10600 tCO2e) in the PDD for the same year. So, to be conservative and also for more appropriate estimation of emission reduction due to project activity, energy values have been used.

It may be noted the cost of BFG to PP is much higher than the gains achieved through sale of CER on account of BFG use (*annex 4*). This suggests that the possibility of BFG overuse (over and above that is required for achieving required moisture levels in clinker and slag) in the project

[2] Period prior to the start of BFG based Hot Air Generator in the project activity.

activity is ruled out. This is also to show that the emission reduction in the project activity is conservative, transparent and real.

4. The methodology states that “The project boundary is the physical, geographical site where the fuel combustion affected by the fuel-switching measure occurs.” The steel factory, from which the BFG is supplied thus avoiding BFG emissions there, should be involved in the project boundary as far as its fuel combustion could be affected by fuel switching measures. In description of project boundary from PDD it is said that “the project boundary includes the production facility, hot air generator (HAG), auxiliary equipment & machinery, piping and allied systems”. In the allied systems could be implied the steel factory but nothing is monitored there (except of bills for BFG) and it is several times stated that the steel factory is out of PPs control and even the quality of BFG totally depends from steel factory owners.

Reply from PP:
The type of fuel use in the blast furnace in the steel plant would not affect the project activity in any way. The emission reduction will happen irrespective of the fact, whether or not steel plant uses solid, liquid or gas fuel. The emission reduction happens due to the avoidance of LDO use in the plant of PP in the baseline. The fate of BFG in the project activity is same as it was in the baseline (i.e. flaring before release into atmosphere). The steel plant is not included in the project boundary and metering of BFG is done at the PP site too.

5. According to the methodology “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”. Still, monitoring plan from the PDD doesn’t consider at all the fuel use (LDO) and the output for an appropriate period prior to the fuel switch being implemented as it is requested by the methodology. It doesn’t consider the fuel use and the output after the fuel switch has been implemented.

Reply from PP:
Data on LDO use in drying of clinker and slag is available prior to the project activity (for year April 1999 to March 2000 and April 2000 to September 2000). (Refer *annex 3)*.

The output from the project activity is dried clinker and dried slag. Input clinker and input slag have different levels of moisture at different times and hence result into varying specific LDO consumption for unit production of dried clinker and dried slag (unlike power generation or steam generation where it can be estimated very correctly for per unit of power or steam output).

Hence, estimation of emission reduction in the project activity based on unit production of dried clinker and dried slag may give incorrect figure. As described above, based on the unit output of dried clinker and dried slag, estimation of emission reduction comes out to be more than those estimated based on energy values of LDO and BFG. So, for conservative and more appropriate estimation of emission reduction in the project activity, energy values of BFG and LDO have been used. (Refer *annex 6*)

PPD has been modified to include monitoring of output i.e. dried slag and dried clinker in the project activity. Baseline emissions shall be estimated based on the two methods (one based on unit output and other based on energy values of BFG and LDO) and most conservative estimate shall be taken for emission reduction in the project activity.

Reasons for Request 2:

1. Monitoring plan from the PDD doesn't consider at all the fuel use and the output for an appropriate period prior to the fuel switch being implemented as it is requested by the methodology. It doesn't consider the fuel use and the output after the fuel switch has been implemented.

2. According to the definition from the methodology applied "the project boundary is the physical, geographical site where the fuel combustion affected by the fuel-switching measures occurs". Therefore, the steel factory should be included in the project boundary as far as its fuel combustion could be affected by fuel switching measures. In description of project boundary from PDD it is said that "the project boundary includes the production facility, hot air generator (HAG), auxiliary equipment & machinery, piping and allied systems". In the allied systems could be implied the steel factory but nothing is monitored there (except of bills for BFG) and it is several times stated that the steel factory is out of PPs control and even the quality of BFG totally depends from steel factory owners.

3. The methodology states that "The emission baseline is the current emissions of the facility expressed as emissions per unit of output (e.g., kg CO2/kWh)". Output unit emission is not considered at all by the PPs.

Reasons for Request 3:

(a) The project started in 2000, but the starting date of fixed crediting period is 01.09.2006. However, there are no
evidences that CDM has been seriously taken into consideration while approving the project.

(b) In the calculation of the emissions reductions the PP uses formula based on the calorific values of the two types of fuels – LDO (which is displaced) and BFG (which is supplied from the steel plant and combusted in the cement plant). However, neither emissions factor, no content and characteristics of BFG are provided in the PDD, and no project emissions are estimated. Methodology AMS III.B. version 09 states " Project activity direct emissions consist of those emissions related with the use of fossil fuel after the fuel switch", but emissions reductions that are estimated by PPs are equal to the baseline emissions.

(c) The methodology also says that "The emission baseline is the current emissions of the facility expressed as emissions per unit of output (e.g., kg CO2/kWh)". Output unit emission is not considered at all by the PPs.

(d) The methodology states that "The project boundary is the physical, geographical site where the fuel combustion affected by the fuel-switching measure occurs." The steel factory, from which the BFG is supplied thus avoiding BFG emissions there, should be involved in the project boundary as far as its fuel combustion could be affected by fuel switching measures. In description of project boundary from PDD it is said that "the project boundary includes the production facility, hot air generator (HAG), auxiliary equipment & machinery, piping and allied systems". In the allied systems could be implied the steel factory but nothing is monitored there (except of bills for BFG) and it is several times stated that the steel factory is out of PPs control and even the quality of BFG totally depends from steel factory owners.

(e) According to the methodology "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". Still, monitoring plan from the PDD doesn't consider at all the fuel use (LDO) and the output for an appropriate period prior to the fuel switch being implemented

as it is requested by the methodology. It doesn't consider the fuel use and the output after the fuel switch has been implemented.

Annex 1

Document proof for CDM consideration

INDORAMA

ISO 9001 : 2000 COMPANY

Extract of Minutes of the Meeting of the Board of Directors of Indorama Cement Limited held at 11.00 a.m. on Saturday, 12th February, 2000 at 207, Vardhaman Chambers, Sector 17, Vashi, Navi Mumbai – 400 705.

B F Gas project

Chairman informed the Board that they are working on the project of tapping Blast Furnace Gas from M/s Ispat Metallics India Ltd. (IMIL) for substitution in place of LDO for the operation of plant. The matter was discussed in the meeting and the Board is of the opinion that the use of BFG from IMIL would need investments in equipments/ piping etc at the site of Hot Air Generator (HAG). Also, HAG would need additional arrangements to use BFG along with LDO in dual mode. There are also some technological issues vis-à-vis BFG availability and quality, which is not under company's control. The project carries inherent investment risk due to these reasons. However, considering Clean Development Mechanism under Kyoto protocol backed revenue and its positive impact on the environment, the board decides to go ahead with the project of substituting BF Gas in place of LDO to the extent possible by setting up dual firing system. It was further decided that necessary actions should be taken in this regard by the Executive Director in consultation with company's technical people.

CERTIFIED TRUE COPY

For INDORAMA CEMENT LTD.

Company Secretary

Annex 2

Recent BFG TEST REPORT

SGS

TEST REPORT

Report No. : CA:GL:6120016267 **DATE 13.12.200**

JOE No: 612107597 Control No. 6125016377

SAMPLE DRAWN BY SGS INDIA PVT. LTD.

SAMPLE IDENTIFIED	**B.F. GAS**
COMPANY NAME	**M/S. INDORAMA CEMENT LIMITED.**
ADDRESS	207, VARDHAMAN CHAMBER, SECTOR-17 VASHI, NAVI MUMBAI – 400 705
ON A/C OF	**ENVI, SGS – THANE.**
SAMPLING DESCRIPTION	SAMPLE RECEIVED IN A SEALED BLADDER
SAMPLING RECD ON	13.12.2006
TEST START DATE	13.12.2006
TEST END DATE	13.12.2006

SL.NO.	PARAMETERS	RESULTS
1.	CARBON MONOXIDE (CO)	29.4%
2.	CARBON DI OXIDE (CO_2)	<0.2%
3.	HIDROGEN (H_2)	0.8%
4.	OXYGEN (O_2)	19%
5	CALORIFIC VALUE	920.52 K cal/Nm^3

*****End of Report*****

A. Dutta
Checked by

A. K. Dutta
Chemist cum QAC

For and on behalf of
SGS India Private Ltd.

Dr. N. Ghosh
Asst. Manager - Laboratory

INDORAMA CEMENT LTD

Recent LDO TEST REPORT

SGS

TEST REPORT

Sample No. : TH:GL:6130002215 **DATE : 05/12/2006**

JOE No. : 613101076 Report No.:6135002228

SAMPLE NOT DRAWN BY SGS INDIA PRIVATE LTD.
SAMPLE SUBMITTED AND IDENTIFIED BY SUPPLIER AS : LIGHT DIESEL OIL

COMPANY NAME	**INDORAMA CEMENT LIMITED.**
ADDRESS	207, VARDHAMAN CHAMBERS,, SECTOR 17, VASHI,
CITY	NAVI MUMBAI-400705
SAMPLING METHOD	N.A.
SAMPLE DESCRIPTION	SAMPLE OF LDO
SAMPLE CONDITION	UNSEALED PLASTIC BOTTLE
SAMPLE QTY.	500 ML.
LETTER DATE	28-11-2006.
MARKS	UNMARKED
SAMPLE RECD ON	04-12-2006
TEST START DATE	05/12/2006
TEST END DATE	05/12/2006

TESTS	PROTOCOL	RESULT
GROSS CALORIFIC VALUE	IS 1448:PART 7 :2004	10830 Cal./g.

***** End of Report ****

This is a computer generated report hence signature is not available

SGS India Pvt. Ltd. Laboratory, A-77, SGS House,Wagle Ind. Area,Near Pipeline, Thane Phone : 5821335,0777,03667 Fax : 5823636
Regd & Corp. Off : SGS House, 4B, A.S. Marg, Vikhroli (West), Mumbai-400083. Tel : (022) 25798421 to 28 Fax : (022) 25798431 to 35 www.sgs.com
Member of the SGS Group

Annex 3

Plant production and LDO consumption in the baseline prior to the project activity

Fuel consumption in slag drying

Month-Year	Slag Production	LDO Consumed	
	MT	Litres	L/MT
Apr-99	0	0.0	0.00
May-99	0	0.0	0.00
Jun-99	0	0.0	0.00
Jul-99	84	1323.0	15.75
Aug-99	2407	78494.0	32.61
Sep-99	0	0.0	0.00
Oct-99	670	24360.0	36.36
Nov-99	1345	32432.0	24.11
Dec-99	1013	18139.0	17.91
Jan-00	2780	32305.0	11.62
Feb-00	2950	44178.0	14.98
Mar-00	4556	49739.0	10.92
Total	**15805**	**280970**	**17.78**

Month-Year	Slag Production	LDO Consumed	
	MT	Litres	L/MT
Apr-00	6234	77943	12.50
May-00	8699	97348	11.19
Jun-00	6715	91785	13.67
Jul-00	7467	133092	17.82
Aug-00	10548	177773	16.85
Sep-00	9349	167154	17.88
Total	**49012**	**745095**	**15.20**

INDORAMA CEMENT LTD

Fuel consumption in clinker grinding

Month-year	Clinker Production	LDO Consumed	
	MT	Litres	L/MT
Apr-99	0	0	0.00
May-99	0	0	0.00
Jun-99	7205	62733	8.71
Jul-99	7500	60084	8.01
Aug-99	12539	112316	8.96
Sep-99	10191	57644	5.66
Oct-99	22187	136322	6.14
Nov-99	24753	131279	5.30
Dec-99	24355	121214	4.98
Jan-00	22566	141067	6.25
Feb-00	21030	108221	5.15
Mar-00	23869	120007	5.03
Total	**176195**	**1050887**	**5.96**

Apr-00	17038	80825	4.74
May-00	19136	96985	5.07
Jun-00	15107	84536	5.60
Jul-00	12546	85901	6.85
Aug-00	18410	110563	6.01
Sep-00	16673	107095	6.42
Total	**391678**	**2238580**	**5.72**

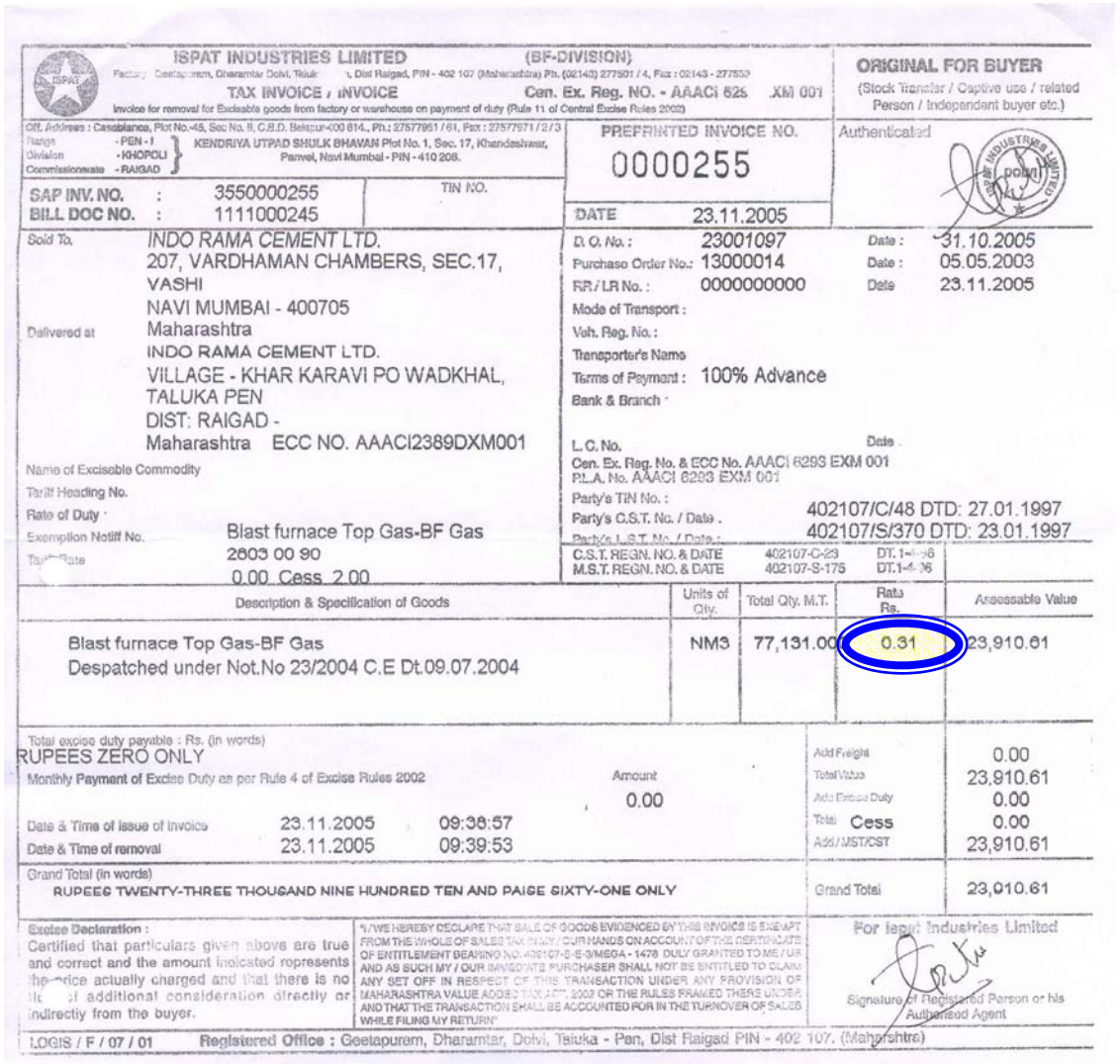
Annex 4

Comparison of BFG cost to PP and benefit accruing through equivalent CER sale

Parameter	Value	Source
Cost of BFG to PP	Rs. 0.31/ Nm3 of BFG	Gas Invoice from Steel Plant to PP; dated 23/11/2005 (attached)
Benefits from CER sale CER generation from BFG use NCV of BFG = 700 kcal/ Nm3 NCV of LDO = 9000 kcal/ L LDO saving = 700/ 9000 L/ Nm3 of BFG Emission Factor of LDO = 2.76# tCO2e/ KL Emission Reduction = 700/ 9000 * 2.76/ 1000 tCO2e/ Nm3 of BFG = 0.000215 tCO2e/ Nm3 Revenue from CER (@10 Euro at Rs. 56/ Euro) = 0.000215 *10 * 56 = Rs. 0.12/ Nm3 of BFG	Rs. 0.12/ Nm3 of BFG*	# Based on IPCC value on emission factor and oxidation factor of LDO.

*The revenue generation from the CER sale on account of BFG overuse (above that is required for useful purpose in drying of clinker and slag to the desired levels) is much below the cost of BFG to PP. Hence possibility of overuse (above that is adequately required) is ruled out.

INDORAMA CEMENT LTD



ISPAT INDUSTRIES LIMITED (BF-DIVISION)

Factory: Geetapuram, Dharamtar Dolvi, Taluk[illegible], Dist Raigad, PIN - 402 107 (Maharashtra) Ph. (02143) 277501 / 4, Fax : 02143 - 277553

TAX INVOICE / INVOICE — Cen. Ex. Reg. NO. - AAACI 625 XM 001

Invoice for removal for Excisable goods from factory or warehouse on payment of duty (Rule 11 of Central Excise Rules 2002)

ORIGINAL FOR BUYER

(Stock Transfer / Captive use / related Person / Independent buyer etc.)

Off. Address : Casablanca, Plot No.-45, Sec No. 9, C.B.D. Belapur-400 614., Ph.: 27577951 / 61, Fax : 27577971 / 2 / 3

Range - PEN - I
Division - KHOPOLI
Commissionerate - RAIGAD

KENDRIYA UTPAD SHULK BHAWAN Plot No. 1, Sec. 17, Khandeshwar, Panvel, Navi Mumbai - PIN - 410 206.

PREPRINTED INVOICE NO. 0000255

Authenticated

SAP INV. NO. : 3550000255
BILL DOC NO. : 1111000245

TIN NO.

DATE 23.11.2005

Sold To. INDO RAMA CEMENT LTD.
207, VARDHAMAN CHAMBERS, SEC.17,
VASHI
NAVI MUMBAI - 400705
Maharashtra

Delivered at INDO RAMA CEMENT LTD.
VILLAGE - KHAR KARAVI PO WADKHAL,
TALUKA PEN
DIST: RAIGAD -
Maharashtra ECC NO. AAACI2389DXM001

D. O. No.: 23001097 Date : 31.10.2005
Purchase Order No.: 13000014 Date : 05.05.2003
RR / LR No. : 0000000000 Date 23.11.2005
Mode of Transport :
Veh. Reg. No. :
Transporter's Name
Terms of Payment : 100% Advance
Bank & Branch :

L.C. No. Date
Cen. Ex. Reg. No. & ECC No. AAACI 6293 EXM 001
P.L.A. No. AAACI 6293 EXM 001
Party's TIN No. :
Party's C.S.T. No. / Date . 402107/C/48 DTD: 27.01.1997
Party's L.S.T. No. / Date : 402107/S/370 DTD: 23.01.1997
C.S.T. REGN. NO. & DATE 402107-C-23 DT. 1-[illegible]
M.S.T. REGN. NO. & DATE 402107-S-175 DT.1-[illegible]

Name of Excisable Commodity
Tariff Heading No.
Rate of Duty
Exemption Notiff No.
Tariff Rate

Blast furnace Top Gas-BF Gas
2803 00 90
0.00 Cess 2.00

Description & Specification of Goods	Units of Qty.	Total Qty. M.T.	Rate Rs.	Assessable Value
Blast furnace Top Gas-BF Gas Despatched under Not.No 23/2004 C.E Dt.09.07.2004	NM3	77,131.00	0.31	23,910.61

Total excise duty payable : Rs. (in words)
RUPEES ZERO ONLY

Monthly Payment of Excise Duty as per Rule 4 of Excise Rules 2002 — Amount 0.00

Date & Time of issue of invoice 23.11.2005 09:38:57
Date & Time of removal 23.11.2005 09:39:53

Add Freight	0.00
Total Value	23,910.61
Add Excise Duty	0.00
Total Cess	0.00
Add / MST/CST	23,910.61

Grand Total (in words)
RUPEES TWENTY-THREE THOUSAND NINE HUNDRED TEN AND PAISE SIXTY-ONE ONLY

Grand Total 23,910.61

Excise Declaration :
Certified that particulars given above are true and correct and the amount indicated represents the price actually charged and that there is no [illegible] of additional consideration directly or indirectly from the buyer.

"I/WE HEREBY DECLARE THAT SALE OF GOODS EVIDENCED BY THIS INVOICE IS EXEMPT FROM THE WHOLE OF SALES TAX PAYABLE / OUR HANDS ON ACCOUNT OF THE CERTIFICATE OF ENTITLEMENT BEARING NO. 402107-S-E-3/MEGA - 1478 DULY GRANTED TO ME / US AND AS SUCH MY / OUR IMMEDIATE PURCHASER SHALL NOT BE ENTITLED TO CLAIM ANY SET OFF IN RESPECT OF THIS TRANSACTION UNDER ANY PROVISION OF MAHARASHTRA VALUE ADDED TAX ACT, 2002 OR THE RULES FRAMED THERE UNDER AND THAT THE TRANSACTION SHALL BE ACCOUNTED FOR IN THE TURNOVER OF SALES WHILE FILING MY RETURN"

For Ispat Industries Limited

Signature of Registered Person or his Authorised Agent

LOGIS / F / 07 / 01 Registered Office : Geetapuram, Dharamtar, Dolvi, Taluka - Pen, Dist Raigad PIN - 402 107. (Maharashtra)

Annex 5

Problems faced with BFG use

Details of problems faced in using of B.F.Gas during 2001-2002

Month	B.F.Gas fluctuation		Low pressure		Non availability		Poor burning	
	Freq	Hrs.	Freq	Hrs.	Freq	Hrs.	Freq	Hrs.
Apr. 2001	--	--	1	0.20	1	14.62	--	--
May. 2001	--	--	1	0.08	--	--	--	--
June 2001	--	--	1	0.08	--	--	--	--
July 2000	--	--	--	--	2	21.92	--	--
Aug. 2001	--	--	6	0.60	1	7.53	--	--
Sep. 2001	--	--	5	0.57	1	10.55	--	--
Oct. 2001	1	0.17	--	--	--	--	--	--
Nov. 2001	--	--	--	--	3	14.50	--	--
Dec. 2001	1	0.43	--	--	3	17.72	--	--
Jan. 2002	1	0.17	--	--	--	--	--	--
Feb. 2002	--	--	--	--	--	--	--	--
Mar. 2002	16	0.9	--	--	--	--	--	--
Total	19	1.67	14	1.53	11	**86.84**	--	--

Details of problems faced in using of B.F.Gas during 2002-2003

Month	B.F.Gas fluctuation		Low pressure		Non availability		Poor burning	
	Freq	Hrs.	Freq	Hrs.	Freq	Hrs.	Freq	Hrs.
Apr. 2002	17	1.27	-	-	1	8.38	-	-
May. 2002	22	1.92	-	-	1	4.08	-	-
June 2002	11	0.78	-	-	-	-	-	-
July 2002	14	1.27	-	-	-	-	-	-
Aug. 2002	5	0.25	-	-	4	47.96	-	-
Sep. 2002	20	2.85	-	-	3	34.8	-	-
Oct. 2002	37	3.33	-	-	3	29.45	-	-
Nov. 2002	19	1.92	-	-	1	0.83	-	-
Dec. 2002	7	0.42	-	-	1	28.48	-	-
Jan. 2003	43	3.46	-	-	1	9.47	-	-
Feb. 2003	118	9.65	-	-	-	-	-	-
Mar. 2003	71	6.05	-	-	1	11.0	-	-
Total	384	33.17	-	-	16	**174.45**	-	-

INDORAMA CEMENT LTD

Details of problems faced in using of B.F.Gas during 2003-2004

Month	B.F.Gas fluctuation		Low pressure		Non availability		Poor burning	
	Freq	Hrs.	Freq	Hrs.	Freq	Hrs.	Freq	Hrs.
Apr. 2003	5	0.78	-	-	-	-	-	-
May. 2003	-	-	-	-	-	-	-	-
June 2003	2	0.46	-	-	6	107.27	-	-
July 2003	1	0.15	-	-	4	51.2	-	-
Aug. 2003	3	0.36	-	-	2	13.67	-	-
Sep. 2003	2	0.22	-	-	6	21.1	-	-
Oct. 2003	10	1.24	3	0.47	1	6.22	-	-
Nov. 2003	19	2.4	2	0.37	3	24.05	16	2.27
Dec. 2003	50	6.57	3	0.38	6	43.75	-	-
Jan. 2004	15	1.65	19	2.32	-	-	-	-
Feb. 2004	20	3.15	1	0.11	-	-	-	-
Mar. 2004	18	2.71	2	0.43	-	-	-	-
Total	145	19.69	30	4.08	28	**267.26**	16	2.27

Details of problems faced in using of B.F.Gas during 2004-2005

Month	B.F.Gas fluctuation		Low pressure		Non availability		Poor burning	
	Freq	Hrs.	Freq	Hrs.	Freq	Hrs.	Freq	Hrs.
Apr. 2004	6	0.97	-	-	-	-	-	-
May. 2004	5	0.53	1	0.25	-	-	-	-
June 2004	-	-	-	-	2	11.93	-	-
July 2004	6	1.41	-	-	2	19.47	-	-
Aug. 2004	1	0.10	-	-	1	11.52	-	-
Sep. 2004	2	0.17	-	-	-	-	-	-
Oct. 2004	4	0.33	-	-	-	-	-	-
Nov. 2004	6	1.10	-	-	-	-	-	-
Dec. 2004	2	0.45	-	-	-	-	-	-
Jan. 2005	1	0.07	1	0.12	-	-	-	-
Feb. 2005	-	-	2	0.18	-	-	-	-
Mar. 2005	-	-	-	-	-	-	-	-
Total	33	5.13	4	0.55	5	**42.92**		

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Details of problems faced in using B.F. Gas during 2005-2006

Month	B.F. Gas fluctuation		Low pressure		Non availability		Poor burning	
	Freq	Hrs.	Freq	Hrs.	Freq	Hrs.	Freq	Hrs.
Apr. 2005	1	0.17	-	-	1	2.10	-	-
May. 2005	-	-	-	-	-	-	-	-
June 2005	-	-	-	-	-	-	-	-
July 2005	2	0.37	-	-	10	84.44	-	-
Aug. 2005	-	-	-	-	1	14.50	-	-
Sep. 2005	-	-	-	-	7	277.11	-	-
Oct. 2005	-	-	1	3.33	9	57.65	-	-
Nov. 2005	-	-	-	-	3	22.25	-	-
Dec. 2005	2	0.59			6	31.72	-	-
Total	5	1.13	1	3.33	37	**489.77**	-	-

Annex 6

Estimation of Emission Reduction based on AMS-III.B

The emission reduction achieved by the project activity will be calculated as the difference between the baseline emissions and the project emissions.

Based on the past performance of Hot Air Generator in the baseline for slag and clinker drying, following is the rate of LDO consumption –

Output – Raw Material	**Specific LDO consumption**		**Average Value taken for estimation of baseline emissions**
Month-Year --->	April 1999-March 2000	April 2000-September 2000	April 1999- September 2000
Slag	17.78 L/ tonne	15.20 L/ tonne	15.83 L/ tonne
Clinker	5.96 L/ tonne	5.72 L/ tonne	5.79 L/ tonne

Estimation for baseline emissions –

Parameter	**Value**	**Source**
Emission Factor – LDO	20.2 tC/ TJ	IPCC default for LDO
NCV – LDO	9000 kcal/ L	Lab test value
Oxidation Factor	0.99	IPCC default for LDO
Coefficient of Emission - LDO	2.764 tCO2e/ KL	Calculated

Raw Material	**Value**	**LDO consumption – Baseline**	**Baseline Emissions**
Quantity of Clinker produced (2004-05)	280499 tonne	280499 *5.79/ 1000 = 1624 KL	1624* 2.764 = 4489 tCO2e
Quantity of Slag produced (2004-05)	345047 tonne	345047 * 15.83/ 1000 =5462 KL	5462*2.764 = 15099 tCO2e
Quantity of LDO consumed (for both clinker and slag drying) in project year (2004-05)	662.37 KL	662.37 KL	- 662.37 *2.764 = - 1831 tCO2e
Baseline Emissions			17760 tCO2e/ annum*

*The emission reduction estimated based on specific fuel consumption in the baseline for unit output (dry slag and dry clinker) is more than that estimated based on energy values of LDO and BFG and quantity of BFG used (10600 tCO2e). Hence estimation of emission reduction using the energy values is more appropriate and more conservative.