

Date: 23 July 2010

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**Subject: Comments to request for review**

Dear members,

With reference to the requests for review to the request for registration of the "Tiantie Metallurgy Group CDQ Project" (Ref. 3162), we wish to provide the joint response and clarification by the PP and the validating DOE as follows. 3 requests contained the same comments and our clarification is to all the 3 requests together.

### **Comment 1**

*1. The DOE is requested to further explain how it has validated the investment analysis to be in line with VVM v1 paragraph 111 guidance, in particular: (i) the appropriateness of the tariff (0.42 RMB/kWh) used in the investment analysis and whether this tariff is more conservative than the electricity tariff the PP was paying to the grid company before the implementation of the proposed project activity; (ii) the applicability of the grid connection charges when, as indicated by the DOE, this grid charge was being paid to the grid company in the baseline scenario; (iii) the suitability of the O&M (20% of total investment according to validation report) cost and the inclusion of energy cost as part of O&M cost when the PP indicates in PDD page 21 that "waste gas/heat –fired power plants have very low operational costs (waste energy does not come at a cost for the facility)"; and (iv) estimated annual power generation and the 80% factor used in year one.*

### **PP response**

- (i) The proposed project activity as well as the new coke oven (i.e. source of waste heat) are owned and operated by Jinniu Tiantie Coking Co. (i.e. Project Participant), which is a Joint Venture company formed by two investors. One of the investors is the owner and operator of the Tiantie Iron & Steel Facility to which the project exports power. As the PP can not consume all power generated by the project activity for the coking process, with regard to the sales of superfluous power the PP is therefore confronted with two choices: (a) supply power to the Tiantie Iron & Steel Facility (at 0.42 RMB/kWh as in contractual agreement for

both direction of power supply to Tiantie and power purchase from Tiantie); or (b) sell power to the public electricity grid. In the latter case a lower sales tariff would be received than can be obtained from the Tiantie Iron & Steel Facility and therefore the applied tariff is conservative. The facilities operated by the PP did not consume power from the grid but were dependent on power supply by Tiantie. The coke oven (owned by PP) that supplies waste heat to the project draws its power from the Tiantie Iron & Steel facility at the same rate as the proposed project activity supplies power to the Iron & Steel Facility according to the contractual arrangement. The commercial contractual price that has been agreed is therefore appropriate.

- (ii) The industrial facility was paying grid charges for existing captive power plants in the baseline scenario. These charges are based on the amount of power supply and will be maintained as existing power plants will continue operation. The inclusion of grid connection charges for the proposed project activity is applicable as additional charges need to be paid due to the additional captive power supply added by the project. Such charges are determined according to government regulations and apply to all captive power installations.
- (iii) The O&M costs amount to 20% of investment which is in line with similar projects. As the O&M cost are commonly linked to the amount of power generated or supplied, it is appropriate to look at the O&M cost / kWh ratio. There are currently 14 CDM registered CDQ projects in China of which 3 do not provide an investment analysis while 4 differ as they involve combined heat & power supply. The remaining 7 projects are indicated in the table below.

Project	Ref	O&M cost (excl auxiliary power consumption) (Unit: x1000 RMB)	Power generation (MWh)	Net Power supply (MWh)	O&M / Power generation (RMB/kWh)	O&M / power supply (RMB/kWh)
Baotou Iron & Steel Coke Dry Quenching and Waste Heat Utilization for Electricity Generation Project	1281	14,960.0	211,140.0	166,700.0	0.071	0.090
Coke Dry Quenching (CDQ) Waste Heat Recovery for Power Generation Project of Laiwu Iron & Steel Group Corp.	1656	57,443.7	360,000.0	316,800.0	0.160	0.181
Baotou Iron & Steel Coke Dry Quenching #3 and Waste Heat Utilization for Electricity Generation Project	1668	7,480.0	105,570.0	83,370.0	0.071	0.090
Ma Steel (new plant) CDQ and waste heat utilization project	1726	40,923.8 *	239,600.0	197,458.0	0.171	0.207
Ma Steel (old plant) CDQ and waste heat utilization project	1729	37,106.4 *	237,600.0	197,000.0	0.156	0.188
Zibo Hongda Coking Co. Ltd. Coke Dry Quenching and Waste Heat Utilization for Power Generation Project	2516	30,097.2 *	124,200.0	105,580.0	0.242	0.285
Angang Coke Dry Quenching Project	2703	41,071.3	210,661.0	195,915.0	0.195	0.210
Tiantie Metallurgy Group CDQ Project	3612	34,054.2 *	190,128	175,928	0.179	0.194
Note: '*' means that the original value in registered PDD included the cost of auxiliary electricity consumption. The value indicated in the table has deducted this cost of auxiliary electricity consumption for consistency. The registered PDD and IRR calculation sheet of the projects were checked, that projects with '*' used the amount of power generation instead of net power supply (i.e. the amount of power generation minus the amount of auxiliary power consumption) to calculate the revenues in IRR calculation sheet, therefore were identified.						

From the above table it is clear that the O&M cost of the Tiantie project is in line with similar registered projects. The item "energy cost" does not refer to a charge for the waste heat from the coke. Instead this item is a translation of a common Chinese term for utility deliveries to the project, and includes the following:

- Fresh water (make up)
- domestic water
- electricity (see explanation below)
- steam
- compressed air
- nitrogen
- demineralized water

The inclusion of the above items in the O&M cost is common practice and appropriate as these deliveries come at an expense to the provider. Note that electricity accounted under this item constitutes power supplied from the facility to the project for auxiliary consumption. This electricity delivery is not double counted as the power revenues in the financial model are based on gross generation and not net supply.

A review of actual O&M costs over the first few months of operation shows the following amounts.

Month	O&M (incl. aux. electricity) (Unit:x10000 RMB,excl. VAT)	O&M (excl. aux. electricity) (Unit:x10000 RMB excl. VAT)
Jan 2010	327.044	249.869
Feb 2010	310.741	231.401
Mar 2010	311.787	231.910
Apr 2010	315.970	245.696
May 2010	305.258	229.197
Jun 2010	303.238	256.473
Sum	1874.037	1444.546
Sum incl VAT	2192.624	1690.119
Total in year	4385.247	3380.238

The O&M costs excluding auxiliary power consumption in the PDD amounts to 34,054,200 RMB while the actual figures converted to annual values amounted to 33,802,380 RMB and the value used in the PDD is therefore in line with the actual value.

- (iv) The Project Participants further engaged an international and independent engineering firm, *Harworth Energy* (Chartered Engineers), to calculate the maximum theoretical power generation which indicated that average power generation year on year would be about 74% of power generation projected in the Feasibility Study. Therefore the power generation values used in the PDD are very conservative.

Power plants commonly have a lower operating load in the first year of operations due to the stability of plant operation; potential fluctuation of waste energy supply from coke ovens; and inexperience of operational staff. The design institute responsible for the feasibility study determined the rate of 80% on the basis of their experience and observations of other similar projects. In addition the government guidance on feasibility studies (Economic Evaluation Method and Parameters for Project Construction Version 3) confirms that a lower load should be applied in the first year of operation. An analysis of similar projects registered under CDM is provided below:

Project	Ref number	Load in 1st year
Ma Steel (new plant) CDQ and waste heat utilization project	1726	80%
Ma Steel (old plant) CDQ and waste heat utilization project	1729	80%
Zibo Hongda Coking Co. Ltd. Coke Dry Quenching and Waste Heat Utilization for Power Generation Project	2516	70%
Angang Coke Dry Quenching Project	2703	80%

Since the plant became operational in December 2009 we can further confirm the appropriateness through observing actual operation data. The table below shows the load rate for the first 6 months and shows an average load factor of 69%

Month	Power generation
Jan 2010	9162.5 MWh
Feb 2010	10522 MWh
March 2010	12653 MWh
April 2010	10865 MWh
May 2010	9881 MWh
June 2010	12472 MWh
Total power generation	65555.5 MWh
Projected power generation <sup>1</sup>	95,064 MWh
Ratio of actual generation to the estimation of annual generation	69%

## DOE clarification

For better clarity of the points raised in the above comment, LRQA wishes to provide additional clarification in the revised validation report as below.

### (i) Electricity tariff

<sup>1</sup> Projected power generation is 190,128 MWh per annum, which would correspond to 95,064 MWh for the first 6 months of operation.

The project activity is to recover waste heat energy from a new coke oven and produce power using the CDQ technology at Tiantie Iron and Steel Facility (hereinafter called as TISF). The facilities of TISF including the captive power plants are owned by Tiantie Metallurgy Group (hereinafter called as TMG).

As it is explained in the section B.4. of the PDD and confirmed in the section 4.3 of the validation report, the new coke oven, CDQ and the waste heat recovery power plant are owned and operated by Jinniu Tiantie Coking Co., Ltd. (hereinafter called as JTC). JTC is a separate entity from TMG formed by local companies and JTC is the investor and the project participant (PP) of the project activity.

Under the baseline scenario, JTC (PP) operates the coke oven applied CWQ system and electricity is purchased from TMG. TMG operates the internal power grid of TISF that the electricity is supplied by the captive power plants and the public electricity grid (NCPG). The electricity tariff for supply from TMG to JTC is RMB 0.42/kWh that is the same tariff applied to supply from JTC to TMG by the project activity. As it is explained in the section 4.3 of the validation report, the validation was made based on the agreement made between TMG and JTC on 02/12/2007 (ref. Item 15) of category A documents of Appendix B to the validation report) that were available at the investment decision by the PP made on 15/01/2008.

## (ii) Grid connection charges

The grid connection charges are applicable to the power generation by the captive power plants. The PP has no captive power plant in absence of the CDM project as clarified above. The grid charges are therefore applicable only to the incremental electricity generation by the project plant being implemented as a CDM project activity.

Under the baseline scenario, the PP purchases electricity from TMG. TMG has number of captive power plants connected to the internal electricity grid of TISF and has been applicable with the grid connection charges to the electricity generated by the captive power plants. The captive electricity generation of TISF met 37% of electricity consumption by TISF as average of 2005-2007 and the balance 63% was met by import from the public electricity grid as it is explained in the section B.4. of the PDD. The project activity supplies the incremental electricity to the internal grid of TISF that is to displace a part of electricity import from the public electricity grid.

Under the project scenario, the incremental electricity generation by the project activity is subject of the grid connection charges that are borne by the PP, accounted for investment analysis which is not applicable under the baseline scenario. As it is explained in the section 4.3 of the validation report, the

validation was made based on review of the applicable local regulations, confirmation of the actual application by checking the payment of the grid connection charges by TISF's captive power plants, review of the agreement between the PP and TMG, and reference to the similar project activities.

### (iii) O&M cost

Although the actual data of O&M cost was not available to the validation, LRQA used its local and sectoral expertise and reviewed the estimated costs and analysis of the FSR, interviewed the PP and its operational staff through the site visits, conducted background research of the applied technology and its operational aspects, and compared with the similar project activities of which comparable data is publicly available.

The page 21 of PDD refers to the operational costs of the captive plants of TISF. TISF has number of captive power plants owned by TMG mainly using BFG that is bi-product of TMG's steel production process and TMG does not pay fuel cost for it. TISF also has TRT power plants and number of WHR boilers.

The energy cost of the project activity is a requisite for operation of the project CDQ and power plant that consists of the below. The costs are fully consistent with the values in the FSR and the agreement signed by TMG and the PP that were considered for investment decision making.

Item	Quantity (p.a.)	Amount (RMB/year)
Electricity	14,200,000 MWh	5,964,000
Steam	80,976 ton	5,684,500
De-mineralized water	816,000 ton	5,298,700
Nitrogen	4,112,640 m3	962,400
Compressed air	3,672,000 m3	300,700
New water	112,608 ton	210,800
Domestic water	6,364.8 ton	11,900
COG	480,000 m3	179,000
<b>Total</b>		<b>18,612,000</b>

The electricity is purchased from TMG being supplied from NCPG. The other items are produced and supplied by TMG. TMG and the PP (JTC) are the separate entities and the energy supply from TMG to JTC is made on a commercial basis in accordance with the agreement (ref. Item 15 of category A documents of Appendix B to the validation report). Under the agreement, TMG is responsible to provide the materials and energy in the required quality and quantity of the PP and the PP is responsible to settle the costs.



O&M cost is often estimated based on the proportion to the investment cost but it is also appropriate to evaluate its ratio to the product output as the type of project activity requires considerable energy and raw material inputs throughout the operational period. Therefore, in addition to the ratio of the estimated annual O&M cost to the total investment cost, the specific O&M cost to the annual power generation is compared with the similar project activities as below.

**O&M cost including cost of auxiliary electricity consumption**

Project ref	Annual O&M cost (10 <sup>3</sup> RMB)	Gross power generation (MWh)	Net power generation (MWh)	Specific O&M cost to gross power generation (RMB/kWh)	Specific O&M cost to net power generation (RMB/kWh)
1281	14,960*	211,140	166,700	0.071	0.090*
1656	-	360,000	316,800	-	-
1668	7,480*	105,570	83,350	0.071	0.090*
1670	69,050	182,000	138,680	0.379	0.498
1671	86,724	-	133,212	-	0.651
1695	-	34,980	21,687	-	-
1726	61,990	239,600	197,458	0.259	0.314
1729	57,820	237,600	197,000	0.243	0.294
2506	70,710	195,840	155,614	0.361	0.454
2516	38,290	124,200	105,580	0.308	0.363
2703	-	210,661	195,915	-	-
Average				0.242	0.344
Average excl. co-generation project				0.190	0.230
Average excl. co-generation project and 1281/1668				0.270	0.323

We included the co-generation projects reference numbers 1670, 1671, 1695 and 2506 in the comparison. These projects show relatively high O&M cost and the PP did not consider in its comparison shown above as the nature of the project activity is different. We retained the data for the purpose of transparency and whether we include or exclude them does not affect the result of the analysis.

The specific O&M cost of the project activity is RMB 0.210/kWh on gross power generation and RMB 0.227/kWh on net power generation basis. The project activity falls within the range and the cost level is considered reasonable.

The O&M costs above are inclusive of the cost of auxiliary electricity consumption. The same comparison was made to the O&M cost excluding the cost of auxiliary electricity consumption as it is conducted by the PP above. The specific O&M cost of the project activity is RMB 0.179/kWh on gross power generation and RMB 0.194/kWh on net power generation basis and the result



consistently supports that the O&M cost of the project activity is in a reasonable range.

**O&M cost excluding cost of auxiliary electricity consumption**

Project ref	Annual O&M cost (10 <sup>3</sup> RMB)	Gross power generation (MWh)	Net power generation (MWh)	Specific O&M cost to gross power generation (RMB/kWh)	Specific O&M cost to net power generation (RMB/kWh)
1281	14,960*	211,140	166,700	0.071*	0.090*
1656	57,443.7	360,000	316,800	0.160	0.181
1668	7,480*	105,570	83,350	0.071*	0.090*
1670	58,064.5	182,000	138,680	0.319	0.419
1671	74,397.7	-	133,212	-	0.558
1695	8,718.8	34,980	21,687	0.249	0.402
1726	40,918.5	239,600	197,458	0.171	0.207
1729	37,106.4	237,600	197,000	0.156	0.188
2506	59,406.6	195,840	155,614	0.303	0.382
2516	30,097.2	124,200	105,580	0.242	0.285
2703	41,070	210,661	195,915	0.195	0.210
Average				0.194	0.274
Average excl. co-generation project				0.152	0.179
Average excl. co-generation project and 1281/1668				0.185	0.214

There is no detailed information publicly available that enables us to compare the O&M cost including and excluding electricity consumption cost for the project reference numbers 1281 and 1668 (marked \* above), but we considered the same values in the both comparisons. The project reference numbers 1281 and 1668 show much lower O&M cost per power generation than the other similar project activities that the reason is unknown to us, but the information is retained herein for transparency.

As it is explained in the section 4.3 of the validation report, the validation was made based on review of the FSR and the agreement between the PP and TMG, and reference to the similar project activities.

**(iv) Annual power generation**

The Guidelines for the reporting and validation of plant load factors (EB48 Annex 11) requires that the plant load factor is to be defined ex-ante in the CDM-PDD according to the following options:

- (a) *The plant load factor provided to banks and/or equity financiers while applying the project activity for project financing, or to the government while applying the project*

*activity for implementation approval;*  
**(b) The plant load factor determined by a third party contracted by the project participants (e.g. an engineering company);**

The PLF of the project activity is accounted in the FSR completed by the third party design institute and the FSR was the base of the investment decision making by the PP, approval by the local government for the investment and the project financing by the bank. Therefore the annual power generation considered in the investment analysis is compliant with the guidelines of the CDM-EB.

As it is explained in the section 4.3 of the validation report, the estimated PLF of the project activity is relatively high at gross PLF of 93.15% and net PLF of 80.33%. 80% of the same accounted for the first operational year are 74.52% and 64.26% that are still in a reasonable range being compared with the average life long PLF of the similar project activities. The project activity has been operated approximately for 6 months and the current PLF is reported at around 60% on gross power generation basis that is 69% of the estimated annual power generation of the normal operating years only. This also supports that the estimate for the first operational year is realistic and credible.

Below table also shows the actual PLF of similar project activities that are under the process of verification for the initial monitoring reports. The data shows that the average PLF of initial operational period of the similar project activities is around 70-75% of the PLF expected during the normal operational period.

Project ref	Estimated gross PLF in the PDD	Estimated net PLF in the PDD	Gross PLF in initial MRs	Net PLF in initial MRs
909	-	96.45%	-	-
1281	80.34%	63.43%	57.68%	53.82%
1656	82.19%	72.33%	50.96%	48.51%
1668	80.34%	63.43%	-	65.83%
1670	86.57%	65.96%	-	21.23%
1671	-	50.69%	-	-
1686	87.05%	80.90%	60.05%	50.88%
1695	66.55%	41.26%	-	-
1726	75.98%	62.61%	-	44.44%
1728	-	62.46%	-	-
1729	90.41%	74.96%	69.01%	49.99%
2506	74.52%	59.21%	-	-
2516	94.52%	80.35%	-	-
2703	78.85%	73.33%	-	-
Average	81.58%	67.67%	59.43%	47.81%

As it is explained in the section 4.3 of the validation report, the validation was made based on review of the FSR, the Economic Evaluation Method and Parameters for Project Construction, clarification made by the third party design institute, the application and approval documents of the local government and reference to the similar project activities.

## Comment 2

*2. The DOE is requested to substantiate how it has validated the elimination of alternative P11 (existing power generating equipment is maintained and additional electricity generated by grid connected power plants) when this is a realistic baseline scenario as described in PDD.*

## PP response

The baseline option “P11: existing power generating equipment is maintained and additional electricity generated by grid connected power plants” has been interpreted as referring to “existing power generating equipment **(used previously to implementation of project activity for captive electricity generation from a captured portion of waste gas)**” as this baseline option was added to the methodology at Meth Panel Meeting 33 together with options P9 and P10 and substituting the previous option P11 which also referred to a scenario involving the capture of a portion of waste gas. Interpreted as such, this baseline scenario is not applicable to the project activity as no portion of the waste energy is captured prior to the implementation of the project scenario.

Alternatively, if option P11 is to be interpreted as referring to other existing power generating equipment, such as the captive power plants at the Tiantie Iron & Steel Facility, the scenario can be considered identical to option P6 (sourced grid-connected power plants) as it does not exclude the continued operation of currently existing captive power plants and which is clearly described in the PDD. As option P6 has been selected as the baseline scenario the project proponents fully agree that the scenario of *continued operation of on-site power generation equipment and additional electricity from grid connected power plants*, is completely realistic and we confirm that this scenario is selected as the baseline scenario through application of option P6.

## DOE clarification

Alternative P11 was introduced in the revision of ACM0012 to be Version 03 at 41<sup>st</sup> meeting of the CDM-EB as one of the alternative scenarios where a part of waste energy was recovered in the baseline (ref. history of the document of ACM00012). The PP of the project activity is JTC and JTC has no captive power plant in absence of the CDM project activity. Therefore alternative P11 is not applicable as it is explained in the PDD and validation report.

There are number of captive power plants in TISF that are owned by TMG, a separate entity from the PP. The captive power plants are using the waste gases and waste pressure from the steel making processes of TISF. There are also some waste heat recovery boilers but those are using waste heat from steel making process and there

is no plant recovering and utilizing the waste heat from red hot coke that is the subject waste energy recoverable by introduction of CDQ technology of the CDM project activity.

PDD refers to continuation of captive power plants of TISF in the same way as the other power plants being connected to the public electricity grid. However, the situation is different from that of the alternative scenario P11 as above clarified.

For better clarity of the point raised in the comment, LRQA wishes to provide additional clarification as above in the revised validation report.

### **Comment 3**

*3. The DOE should provide all the spreadsheets used for baseline calculation and emission reduction calculations.*

### **PP response**

No response is required from the PP to this comment.

### **DOE clarification**

The calculation spreadsheet of baseline emissions and emission reductions were assessed and validated by LRQA. The final version of the calculation spreadsheet is provided as Attachment 1.

LRQA wishes to provide this clarification in the revised validation report.

We sincerely hope the above clarification will sufficiently justify the validation and request for registration of the project activity for acceptance by the Executive Board.

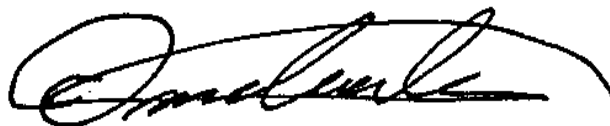
Michiaki Chiba is the contact person for the review process and will address question from the Executive Board if any. His telephone number is +818013799355 and e-mail address is [michiaki.chiba@lrqa.com](mailto:michiaki.chiba@lrqa.com).

Very truly yours,

For Lloyd's Register Quality Assurance Ltd.



Prabodha C. Acharya  
Technical reviewer



Michiaki CHIBA  
Leader of the validation team

Attachment 1: Calculation spreadsheet for baseline emissions and emission reductions