
**Assessment Opinion
on Post-registration Changes Request:
Correction and Temporary deviation from
the registered monitoring plan**

**Daegu Bangcheon-Ri Landfill Gas CDM
Project (0851)**

**Report No. CDM00449PRC
Version No. 02**

1 INTRODUCTION

Deloitte-TECO has been performing the fourth verification of “Daegu Bangcheon-Ri Landfill Gas CDM Project (0851)” (the monitoring period: 01 April 2010 ~ 18 August 2014). During the verification, Deloitte-TECO found out that temporary deviations from the registered monitoring plan and the equipment technical specifications, one of monitoring point and PP information described in the registered PDD need to be corrected based on the actual implementation. The details of the temporary deviations from the registered monitoring plan and corrections are in the following section.

Deloitte-TECO assessed the post-registration change after the on-site assessment and prepared this assessment opinion for the approval of post-registration changes based on “CDM Validation and Verification Standard (CDM-VVS: Version 09.0)” and relevant documents.

2 TYPES OF CHANGES

2.1 Temporary deviations from the registered monitoring plan

- The periods without instrument in place for the monitoring of the parameter LFGflare,y
The FIQ-301 was not used in place due to meter calibrations for the period from 7 August 2010 to 6 September 2010 and from 6 August 2012 to 2 September 2012.
- Monitoring flare efficiency without flame detector
Flame detector was not installed as a parameter of “Flame Detector”, which was demonstrated in the registered PDD.

2.2 Correction

- Correction of technical specifications of installed equipment
There are some technical specifications of installed equipment described in the registered PDD was not in accordance with the specification of installed equipment.
- Correction of one of monitoring point
There is one monitoring point was not in accordance with the registered PDD
- Correction of PP information in the registered PDD
One of the PP name changed during the monitoring period and the staffs described in the B.7.2 were changed.

3 ASSESSMENT OPINION

3.1 Temporary deviations from the registered monitoring plan

- The periods without instrument in place for the monitoring of the parameter $LFG_{flare,y}$

The FIQ-301 was used to determine $LFG_{flare,y}$ and the FIQ-301 was not used in place due to meter calibrations for the period from 7 August 2010 to 6 September 2010 and from 6 August 2012 to 2 September 2012. During the periods without FIQ-301 in place (07 August 2010 – 6 September 2010 and 06 August 2012 – 02 September 2012), $LFG_{flare,y}$ was recorded as “0” in the MDflared sheet of ER calculation sheet.

The verification team confirmed by the PPs that PLC system was recorded as “0” even though the instrument was not used in place.

The verification team verified the hourly monitored values of PI-301 during the periods without instrument in place. (Appendix 2)

The PPs explained that the measured values of PI-301 were recorded as “0” in the operation, if there was no LFG flow through FIQ-301. The verification team confirmed by the record of “Pressure daily reports” that the measured values of PI-301 were recorded as “0” during the period without FIQ-301 in place. The verification team found out some figures on the Pressure daily reports once per couple of days during the period, but the PP explained that the data were recorded as error due to floating of flow meter even though there was no flow of LFG. On the other hand, the measured data of PI-301 were averagely recorded between 200 and 400 mmH₂O, up to more than 600 mmH₂O, when the flaring was implemented.

For the cross-check, the verification team also verified the daily operation reports.

If the flaring is implemented, the PP, Daesung Eco-Energy Co.,Ltd. recorded the starting and ending time of flaring in the reports. For example, from 27 May 2013 to 31 May 2013, the daily operation reports have the record of flaring starting and ending time. (Appendix 3)

For daily operation records during the period without instrument in place as above, the verification team could not find out any record for flaring but all other events were recorded. (Appendix 4)

With the above evidences, the verification team concluded that there was no flaring, therefore, $LFG_{flare,y}$ value were as “0” during the periods. Monitoring without instrument in place was considered as “Temporary deviations from the registered monitoring plan, applied

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methodology or applied standardized baseline” and, the verification team concluded that this deviation does not require prior approval by the executive board of the CDM based on para. 2 of Appendix 1, PS ver. 09.0.

➤ Monitoring flare efficiency without flame detector

According to the registered PDD and applied tool, in case of open flare, if the flare is detected for more than 20 minutes during the hour h, the flare efficiency in the hour h is claimed 50%. Also, it was stated in the registered PDD that Flame detector is installed in flare stack and the PPs can monitor by CCTV whether the flare stack is operated or not and can apply suitable flare efficiency with operation temperature in flare stack.

However, the verification team confirmed that flame detector was not installed in this monitoring period. Therefore, the PPs decided to apply the flare efficiency as 0% during the whole monitoring period without flame detector for conservative method. The verification team confirmed that MR and ER calculation sheet were properly revised. The verification team considered this case as “Temporary deviations from the registered monitoring plan, applied methodology or applied standardized baseline” and concluded that this deviation does not require prior approval by the executive board of the CDM based on para. 2 of Appendix 1, PS ver. 09.0.

3.2 Correction

➤ Correction of technical specifications of installed equipment

The verification team confirmed that the difference specification of the equipment due to PDD author’s mistake to confuse between specifications of basic design in the feasibility study and actual adjustment during installation. Identified the difference is as following,

Item	Description of PDD	Actual implantation (after correction)
Blower	Capacity : 75 Nm ³ /min for 1 unit Inlet pressure : -1,253 mm AqG Outlet pressure : + 3,892mmAqG Type : Root Noise: less than 90dB	Capacity : 75Nm ³ /min Pressure: 3,800 mmAq (-2,300/+1,500) Type : turbo Noise : less than 90dB
Filter	- No-1 Filter (before a blower) : smaller than 5μ m-particles are able to pass. - No-2 Filter (before gas engine) : smaller than 3 μ m-particles are able to pass.	- No-1 Filter (before a blower) : smaller than 5μ m-particles are able to pass. - No-2 Filter (before gas engine) : smaller than 0.3 μ m-particles are able to pass.
Scrubber	capacity : 75 Nm ³ /min * 2sets - type : Packed Tower Scrubber (attach Demister) - inlet density : H ₂ S – 50 → 5 ppm (removal efficiency 90%)	Capacity : 99 m ³ /min (75Nm ³ /min) H ₂ S:60→5ppm NH ₃ :50→5ppm

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	NH ₃ – 60 → 5 ppm (removal efficiency 91.7%)	
Cooler	Capacity : 75Nm ³ * 2sets Type : Pin Tube Cooler Inlet/outlet temperature : 25.5°C→5°C Moisture content : 4%→0.65% Cooling medium : Chilled water	Capacity : 75Nm ³ * 2sets Type : Fin Tube Cooler Inlet/outlet temperature : 40°C→5°C Cooling medium : Chilled water
Chiller	Circulation flow : 55m ³ /hr Thermal Capacity : 85RT Inlet/outlet temperature : 8/3°C	Capacity : 147RT Circulation flow : 108m ³ /hr Inlet/outlet temperature : 8/3°C
Gas Engine	Rating Speed : 1,200rpm Voltage : 3.3 kV Required inlet LFG pressure : 0.3~0.35 kg/cm ² G	Capacity : 1,500 kW (2 x 750 kW) Voltage : 3.3 kV
Flare Stack	Candle Type	Cylindrical type

The verification team confirmed by interview with the PP and documentary evidence that there was no installed equipment change after starting operation in year 2006 before registration of PDD.

The verification team also confirmed that those difference between the values of the data and/or variables presented in the MR and the stated data in the registered PDD is not significant and the value difference does not lead to a substantial increment of the ER.

➤ Correction of one of monitoring point

The verification team confirmed that the actual implementation of measuring methane density of LFG for flaring in the actual operation since 1st monitoring period was not measured by AT-201 but by AT-101. Identified the difference is as following,

Description of PDD	Actual implantation (after correction)
Gas analysers are installed at three points. - in front of the buffer tank - behind the buffer tank : The data measured by this gas analyser will be used to calculate MD _{flared,y} . - behind the gas storage tank (right before supplying gas to user) : The data measured by this gas analyser will be used to calculate MD _{thermal,y} and MD _{electricity,y}	Gas analysers are installed at three points. - behind the buffer tank - in front of the buffer tank: The data measured by this gas analyser will be used to calculate MD _{flared,y} . - behind the gas storage tank (right before supplying gas to user) : The data measured by this gas analyser will be used to calculate MD _{thermal,y} and MD _{electricity,y}

The difference was confirmed due to the PDD author's mistake for the location of analyzer for MD_{flared,y}. The verification team confirmed that methane density of LFG monitored by AT101 is more reliable to measure methane density of LFG for flaring in the actual operation because when flaring is occurred, the valve of LNG and valve between buffer tank

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and storage tank are closed. It is meant that AT-201 cannot be measured the methane density of LFG for flaring. AT-201 was not used to calculate ER or mass balance check.

The verification team also confirmed accuracy of AT-101 is Linearity 1% and repeatability 0.5%, which are the same as AT-201, which is in accordance with the registered PDD. The verification concluded that using AT-101 to analyse methane density of FIQ-301 for flaring is reliable to measure $MD_{\text{flared},y}$ under the actual operation.

➤ Correction of PP information in the registered PDD

Taegu Energy & Environmental Co.,Ltd. changed thier entity name to Daesung Eco-Energy Co.,Ltd. and two PPs withdrew during the monitoring period. Therefore, the PP entity name was changed in the revised PDD accordingly. Also, person names described in the registered PDD were deleted because the person in charge often changed in this project.

Differ from the corrections as above, there is difference between the form of registered PDD and the revised PDD such as monitoring frequency at table of B.7.1, the new LoA, etc. The PP described the relevant monitoring information for the items in the revised PDD in accordance with the actual monitoring procedure.

The verification team concluded that the PPs reported the parameter, $MD_{\text{flare},y}$, as zero for temporary deviations from the registered monitoring plan and corrections do not affect the design of the project activity, therefore, the post-registration change for temporary deviations from the registered monitoring plan and correction are conducted with the request of issuance without prior approval by the board based on Appendix 1 of CDM PS.

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Relevant Documents

Appendix 1: Evidence document of installed equipment specification

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Appendix 2: Sample of Pressure daily report with/without flare

Appendix 3: Sample of Daily Operation reports with flare

Appendix 4: Sample of Daily Operation reports without flare