

TÜV NORD CERT GmbH

Langemarckstrasse 20
45141 Essen
Germany

Phone: +49 201 825-0
Fax: +49 201 825-2517

Info.tncert@tuev-nord.de
www.tuev-nord-cert.com

TÜV®

CDM Executive Board

Our / Your Reference

Contact
Stefan Winter
E-Mail: swinter@tuev-nord.de

Direct Dial
Phone: -3329
Fax: -2139

Date
24/04/2020

Response to the Review of project "Landfill Gas Recovery and Flaring Project in the El Verde Landfill, León" (Ref. no. 3378)

Dear Honourable Members of the CDM Executive Board,

Please find attached the response of TÜV NORD to the review of the above mentioned project No. 3378.

The PP has authorized us to submit their review response in the attached consolidated document. The content of this response remains in the sole responsibility of the PP.

In so far as actions from the PP were to be taken the TÜV NORD response has taken those actions into account.

If you have any questions do not hesitate to contact us.

Yours sincerely,



Stefan Winter
Head TÜV NORD JI/CDM Certification Program

Review Issue # 1

Original text
of the issue
raised:

The DOE is requested to explain how it concluded that there is no delayed calibration for thermocouples at the exhaust of the flare for measurement of parameter TEG,m. As per the monitoring report and the verification report, the last calibration was on 24/02/2017 and it was valid until 21/11/2018, whereas the monitoring period is until 31/12/2018. Refer to paragraphs 365 to 368 of VVS-PA.
Please refer to paragraphs 365 to 368 of VVS-PA..

PP's Response

The thermocouples with serial number 139023-1,2,3 located at the exhaust of the flare for measurement of parameter TEG,m was calibrated by manufacturer on 24/02/2017 and installed by the PP on 22/05/2017 as evidenced in „Calibration Chronogram_LEON_6th MP“. Therefore, considering the thermocouple has 18 months of validity from the installation date (22/05/2017) its calibration is valid until 21/11/2018. Since the calibration of the thermocouples with serial number 139023-1,2,3 and 4 was not conducted for the period from 21/11/2018 to 31/12/2018 (end of the monitoring period), the PP has applied the maximum permissible error of the thermocouples (0.75% of reading) to the measured values of the parameter TEG,m taken during such period (both days included) as can be evidenced in Column J of Sheet „Error“ of the Raw Data_El Verde_6th MP_v7.xlsx. Such change has been included in row „QA/QC procedures“ of the table for the parameter in Section D.2 of the MR.

DOE's Response

A finding has been raised (CAR 16) to correct and clarify the calibration delay issue. The DOE assessment and conclusion is described below.

The calibration gap for the period 21/11/2018- 31/12/2018 of the thermocouples has been described in section D.2 of the MR the monitored data has properly been adjusted with the maximum permissible error (0.75% of reading) in column J of Sheet „Error“. As the thermocouples are not calibrated but instead, they are replaced, the comparison of an actual error form a posterior calibration is not applicable. The ER calculation is considered conservative and correct and in line with §365-371 of the VVS version 2.

The finding is closed.

Review Issue # 2

Original text
of the issue
raised:

The DOE is requested to explain how it has verified the emission reductions calculation in line with the applied tools, in particular:

(a) The application of Option A to determine the flow of LFG to flare: As per the tool “Tool to determine mass flow rate of greenhouse gas in a gaseous stream”, version 03.0, for application of Option A for flow measurement on a dry basis, it has to be demonstrated that temperature of the gaseous stream (Tt) is less than 60 degree C. The PP has applied Option A in the calculation when Tt is less than 60 degree C and considered the flow as zero when Tt is more than 60 degree C. However, it is observed that Option A for flow measurement was applied when Tt equals 60

degree C. The DOE is requested to explain how the determination of the flow using Option A is in accordance with the applied tool. Refer to paragraph 373 (c) of VVS-PA.

(a) The determination of flare efficiency as per option B.2 of the tool “Project emissions from flaring” (Version 02.0.0):

- (i) As shown in the monthly emission reductions spreadsheet, the flare efficiency is determined/calculated every two minutes instead of each minute which is required by the monitoring plan and the applied tool. Furthermore, the required monitored parameters by the tool to determine the flare efficiency, i.e. Volumetric flow of the residual gas on a dry basis at reference conditions in the minute m, Mass flow of the residual gas on a dry basis at reference conditions in the minute m, Volumetric fraction of O₂ in the exhaust gas on a dry basis at reference conditions in the minute m, Concentration of methane in the exhaust gas of the flare on a dry basis at reference conditions in the minute m, Mass flow of methane in the residual gaseous stream in the minute m, Volumetric fraction of methane in the residual gas on a dry basis in the minute m, are also not averaged on a minute basis as required by the tool;
- (ii) In the corresponding cells in the monthly spreadsheet which calculate the flare efficiency (e.g. cells in column DR of sheet "ER calculation" for October 2017), the PP included a provision that if the calculated efficiency is less than 0.9, an efficiency of 0.9 will be used. This provision is not in line with equation (2) of the tool;
- (iii) It is not clear how parameter Flamem (Flame detection of flare in the minute m) has been determined as per the applied tool which requires the detection of flame. In the verification report, the DOE indicated that the parameter is linked with parameter Opflare,h which detects whether the flame is on or off (page 79). However, as shown in the emission reductions spreadsheets, the parameter Opflare,h is determined based on the temperature in the exhaust gas of the enclosed flare in minute m (TEG,m), i.e. when TEG,m is larger than 500 degree C, the flame is considered on.
- (c) The emission reduction spreadsheet for December 2018 has not been submitted and the emission reduction spreadsheet for November 2018 cannot be opened.
Please refer to paragraph 373 (c) of VVS-PA..

PP's Response

(a) The volumetric flow of landfill gas has been firstly monitored under operational conditions in conjunction with the temperature of the landfill gas (T_t). The reported value in the Monitoring Report, Verification report and Spreadsheets as VLFG,sent_flare,y,db (m³ dry gas/h) is determined once it has been confirmed that the temperature of the landfill gas (T_t) is less than 60°C at the flow measurement point. Therefore, the thermo-mass flowmeter measures the operational conditions and by comparison with the temperature of the landfill gas (T_t), the volumetric flow of landfill gas is considered as VLFG,sent_flare,y,db (m³ dry gas/h) or VLFG,sent_flare,y,wb (m³ wet gas/h) depending on whether the flow falls under Option A (T_t < 60°C), or Option B (T_t > 60°C) respectively, as can be evidenced in Column B of Sheet „Error“ of the Raw Data_El Verde_6th MP_v7.xlsx following the tool "Tool to determine mass flow rate of greenhouse gas in a gaseous stream", version 03.0. In the previous response, most of the time of the monitoring period (21,799 cases out of the 302,644 of the monitoring flow values) were considered in wet conditions (T_t more than 60°C) under Option B while in this new response, a more conservative approach (24,806 cases out of the 302,644 of the monitoring flow values) have been considered in wet conditions. As per previous approach, the PP has conservatively disregarded all the values for the parameter VLFG,sent_flare,y,wb (m³ wet gas/h) under Option B when temperature of the gaseous stream (T_t) was more or equal than 60°C at the flow measurement point. The PP has applied a temporary deviation from the registered monitoring plan in cases when T_t > 60°C (Option B), where the PP has decided to not consider the values of parameter VLFG,sent_flare,y,wb (m³ wet gas/h) in the ER calculation, being the most conservative approach referred to in the "CDM project standard for project activities" for the non-conforming monitoring period.

(a) The determination of flare efficiency as per option B.2 of the tool "Project emissions from flaring" (Version 02.0.0):

(i) The flare efficiency is determined/calculated every two minutes instead of each minute as required by the monitoring plan and as per option B.2 of the tool “Project emissions from flaring” (Version 02.0.0). Furthermore, the required monitored parameters by the tool to determine the flare efficiency have not been averaged on a minute basis as required by the tool neither. The PP has applied a temporary deviation from the registered monitoring plan considering that the monitoring system would need to be updated (inclusion of extra monitoring data from extra flowmeters, pressure meters amongst other technical updates such as the gathering frequency) once the Phase 2 finishes its commissioning stage.

(ii) The PP selected Option B to determine flare efficiency as required by the “Project emissions from flaring” (version 02.0.0) using equation (2) of the tool. Considering that when the enclosed flare is operated as per manufacturer specifications an efficiency of 0.9 is achieved, the PP included a provision in column DR of sheet “ER calculation” that if the calculated efficiency is less than 0.9, the value of 0.9 should apply because this is due a malfunction of the continuous gas analyser. This is in line with the registered PDD which, in page 24, considers the following: *“To determine the flare efficiency for minute m ex-post ($\eta_{flare,m}$) in the project activity, the project participant uses the case for enclosed flares (not defined as low height flares) choosing the “Option B: Measure the flare efficiency” under normal operational conditions. In case there is a malfunction or a delay in the installation of the measurement equipment to determine the flare efficiency, “Option A: Apply a default value for flare efficiency” for enclosed flares will be used by the project participant.”*

(iii) The parameter Flamem (Flame detection of flare in the minute m) is used to ensure that the equipment is in operation ($T_{EG,m}$ above 500 °C indicates that the flare is operating) since the control system of the equipment ensures that the enclosed flare will stop if no flame is detected. The PLC program installed at the flare stops if there is no flame and as such is considered appropriate by the PP taking into account that the hours of operation of the flare are determined and reported in the MR and the fact that the parameter is not directly used in the determination of ERs. Clarification ($T_{EG,m}$ above 500 °C indicates that the flare is operating) has been added to section „Calculation method“ of the table of the parameter in Section D.2.

DOE’s Response

Four findings were raised to correct and clarify the issues (CAR 17 to CAR 20). The DOE assessment and conclusions are described below.

(a) A more conservative approach was applied by the PP, considering the Option B ($T_t > 60^\circ\text{C}$) of the Tool to determine mass flow rate of greenhouse gas in a gaseous stream”, version 03.0, so the PP has disregarded all the values of parameter VLFG,sent_flare,y,wb (m^3 wet gas/h) when temperature of the gaseous stream (T_t) was more or equal than 60°C . The error spreadsheet Raw Data_El Verde_6th MP_v7.xlsx has been reviewed in conjunction with the monthly ER spreadsheets and the ER summary spreadsheet. All calculation are considered correct, conservative and in line with the calculation provisions of the PDD and applied methodology.

The finding is closed.

(a) The determination of flare efficiency as per option B.2 of the tool “Project emissions from flaring” (Version 02.0.0):

(i) When the project was originally registered, the methodological tool requested a continuous monitoring of the flare efficiency, but not specifically the determination/calculating every minute, so the project was designed with a data gathering system with two minutes determination/calculating frequency. When the CP was renewed the applicable tool “Project emissions from flaring” (Version 02.0.0) requests the determination/calculating specifically each minute. This change was not envised at renewal of the CP, furthermore such change requires new investment in equipment, so it is understandable that at this stage of the verification is not possible to upgrade the monitoring system to correct the deviation. The PP is contemplating the upgrade of the monitoring system when the electricity generation phase begins. A temporary deviation is reported in MR and this report, furthermore the PRC is assessed in a separate PRC

validation report.

The finding is closed

(ii) The clarification provided by the PP is in line with the provisions in the PDD. As the flare is of enclosed type, the default efficiency value of 90% is correctly applied and in line with the TOOL Project emissions from flaring" (version 02.0.0).

The finding is closed.

(iii) The flare is equipped with the flame detector IRIS Model S706-PF flame scanner UV detector, which detects when the flare is on or off. As per PDD page 25 the flare operation is determined by a flame detector plus additional requirements provided by the manufacturer. In this case the flare temperature is also a manufacturer monitoring parameter. As both instruments the flame detector and the thermocouples are programmed to control de ON and OFF of the biogas flow, the calculation of the Opflare,h is correct. If the $T_{EG,m}$ is below 500 °C the flare turn off and the flame scanner also will send the signal to stop. On the other hand, if the flame detects no flame, it sends the signal to stop the flow. As the monitored system is set to register the Opflare,h based on the $T_{EG,m}$ the Opflare,h monitored is correct.

The finding is closed.