

17 January 2014

Melinda L. Ocampo
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Dear Ms Ocampo

Certification of the Market Metering Software

PA Consulting Group (PA) has been asked by the Philippine Electricity Market Corporation (PEMC) to act as an independent market auditor to perform certification testing of the market metering software to verify its compliance with the Wholesale Electricity Spot Market (WESM) Rules.

Certification

This certification is specific to the Excel spreadsheet programs listed below that are used by PEMC to verify and process metering data for the purpose of market settlements.

As a result of our examination of the WESM Rules, the Market Manuals, PEMC's internal procedure documentation and the market metering spreadsheet programs, we are able to provide the following certification with respect to the market metering software:

We certify that, when used correctly, the market metering spreadsheet programs listed below, as used by the PEMC in the 83rd Billing Period and provided to PA in July 2013, will perform substantially in compliance with the WESM Rules as amended by Department of Energy (DOE) Department Circulars up to and including DC2012-02-0001, together with the associated WESM Manuals with the exceptions noted below.

This certification relates solely to the calculations that are performed within the market metering spreadsheet programs and makes no comment on the general suitability of the programs in performing the required tasks. It covers only the automated processes within the programs and assumes that all associated manual tasks are performed as required and without error.

Scope of the review and certification

The scope of the review has included, at a minimum:

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1. Examination of the algorithms used in the market metering software to determine if the algorithms are mathematically equivalent to the prescriptions in the WESM Rules and associated Market Manuals;
2. Tests to determine whether the outputs of the market metering software are consistent with those which result from the application of the prescriptions in the WESM Rules and associated Market Manuals; and
3. Identification of inconsistencies and non-compliance of the market metering software with the WESM Rules and associated Market Manuals.

The independent audit does not include ensuring that the computational performance of the software is in accordance with any requirements of the WESM Rules.

List of software programs covered by this certification

This certification is limited to the following programs:

1. Daily MTR Programs
2. Monthly MTR Program
3. SSLA Program
4. Metering Conversion Program
5. Auto Email Program

Nature of the tests conducted and results obtained

In performing the review and certification of the market metering software, we have:

- Examined the WESM Rules and the Market Manuals to fully understand what functions the software is required to perform, what data it is required to use, what results the software is required to produce, and how it is to calculate them; and
- Conducted a series of tests on the software to determine whether the software properly performs these functions and correctly calculates the results required. In this respect, the software was tested for its accuracy in representing the requirements of WESM Rules and Market Manuals.

Provided the market metering software is used in the manner intended and according to the correct manual procedures, and with data that conforms to the requirements specified in the PEMC documents or, if not explicitly discussed therein, is within the expected range of values for data pertaining to the characteristics of the Philippine electricity system, we have found that the market metering spreadsheet programs perform all functions and correctly calculate the required results with the following exceptions:

- **Daily MTR Program:** Error in Daily MTR program may lead to incorrect MTRs being issued: The Daily MTR program incorrectly summarizes the list of trouble metering points in the MTR_YYYY-MM-DD_(1st issue) output file that is used as an input to generate the daily MTRs. Our analysis found 10 metering points that were missing in this output file. Such an error would mean that the MSP would not be notified of meter trouble when there was an issue with the daily meter data that they had submitted.

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- **Monthly MTR program:** Monthly MTR program may not report all missing data: If the MSP fails to submit CD data for a particular metering point, then the program will fail to report this as a missing data point (even if daily data were submitted for that metering point). This may result in the Market Operator not issuing an MTR for that point.
- **Monthly MTR program:** Monthly MTR program relies on accuracy of daily metering data: The monthly program relies on the accuracy of the daily data to detect errors, and there is no error checking capability if the daily data happens to be incorrect. This is problematic if a particular POMAX data point was incorrect (e.g. uncertain) and the MSP had not responded to the associated daily MTR. Alternatively, if the Market Operator fails to issue an MTR for the daily data (which is possible given our finding relating to the daily MTR tool) then an error in the monthly data will also not get picked up. In these instances, an incorrect value may get used in settlements.

Disclaimer of Liability

Despite the extensive testing of the software, this certification is not, and cannot be, in the form of an absolute guarantee.

Further, our certification is only valid if the software is used with care and for the purpose for which it was designed and tested.

In furnishing this certification, PA specifically limits its liability to the cost of repeating all and any certification evaluations, and any necessary re-certification in reliance on those evaluations. No person shall be entitled to claim against PA, any losses or damage whether direct, indirect, special or consequential, in excess of that limitation. PEMC shall ensure that all persons or parties who may rely on this certification are aware of this limitation of liability.

Yours sincerely



Steve Thornton
Member of PA's Management Group