Regulation Signal Samples – descriptor document

Description:

The regulation sample data files contain samples of the aggregated frequency regulation data that was sent out by the IESO to Ancillary Service Providers during the second half of 2015, the full year of 2016, and the full year of 2017. They are provided by the IESO for the benefit of all interested parties wishing to better understand the nature of the IESO's regulation signal. The regulation sample data files provide interested parties with an opportunity to analyze various characteristics of the regulation signal such as upward/downward bias, volatility, correlations with other datasets, etc. The data can also be mathematically scaled to fit the range of a prospective facility for testing and evaluation purposes.

It should be noted that the actual format of the signal itself is different from this sample data. The signal itself is further described in *IESO Market Manual 6: Participant Technical Reference Manual*, section 4.2 ("AGC Operational RTU Specifications").

Filenames:	**Timespan:**
June24-Dec31_2015-IESO_regulation_data.xlsx	from 2015/06/24, 6:59:21 PM to 2015/12/31, 11:59:46 PM.
Jan1-June30_2016-IESO_regulation_data.xlsx	from 2016/01/01, 0:00:01 AM to 2016/06/30, 23:35 PM.
July1_2016-June30_2017-IESO_regulation_data.xlsx*	from 2016/07/01 12:00:00 AM to 2017/06/30 11:42:40 PM.
July1_2017-Dec31_2017-IESO_regulation_data.xlsx*	from 2017/07/01 12:00:00 AM to 2017/12/31 11:59:56 PM.

***Note: After August 3, 2016, there are roughly twice as many lines of data for the same length of time period compared to the previous files due to the introduction of the new AGC (Automatic Generation Control) tool and PI (Plant Information) interface which records signal data on a more frequent basis. The regulation data continues on Sheet2.**

Version 4 – March 28, 2018

Delivery format: Excel xlsx format

Scope: Covers the entire, aggregated regulation range for the IESO controlled grid. It should be noted that signals to individual facilities are scaled to fit the offered regulation range from each respective facility. As noted below, the IESO has typically scheduled ± 100 MW of regulation range over the course of second half of 2015 till the end of 2017.

Number of fields: Two – as described in Table 1 below

Table 1 – field description for regulation sample data files

Field Name	Type	Domain	Description
Time stamp	Time Stamp	Can be adjusted in Excel. Accuracy is to the nearest second.	The time (to the nearest second) at which the signal was issued
Total regulation	Floating point decimal	Can be adjusted in Excel. Accuracy is up to 9 decimal places.[1]	The total upward or downward regulation signal capacity (MW) for the associated Time stamp field. This value represents the distance ("mileage") between the signal setpoint and the zero basepoint. Typically in Ontario this signal ranges between + 100 MW to – 100 MW relative to the zero basepoint for the province. Basepoints for individual facilities providing regulation service may vary. Occasionally, the signal deviation outside the ± 100 MW range in the sample data. A further note regarding this matter is provided below.

Note regarding excursions outside of normally-scheduled regulation range

The AGC tool respects the upper and lower limits of plant operation to ensure that there is sufficient regulating room. Depending upon system conditions, there can be instances in which plants that are providing AGC are pinned at either the top or bottom end of their regulating range. In such scenario's, the AGC tool blocks sending set points to plants that would exacerbate the Area Control Error (ACE). A set point dispatch is only issued when it will help to alleviate the ACE excursion. As a consequence of the blocked set point dispatch, it may appear in the signal data that the plant is providing greater regulation range than it was contracted for. However in reality, the AGC tool has not dispatched the unit outside the parameters it was

[1] Please note that this accuracy is beyond IESO revenue metering accuracy requirements to the nearest kilowatt.

contracted for and instead, the blocked set point dispatch represents an opportunity cost of providing AGC. The example below will highlight this principle.

Example

At 17:00:02, facility A which is providing 50 MW of AGC receives a new economic dispatch, changing its base-point from 160 MW to 220 MW (see Figure 1). Prior to this update, Facility A is pinned to its prevailing low limit of 110 MW. The change in base-point corresponds to new high and low limits of 270 MW and 170 MW respectively. However, ACE was over 100 MW in the positive direction (which represents over-generation) at the time and the AGC tool determined that re-dispatching would exacerbate the ACE excursion, resulting in further over generation. Once ACE was back within the acceptable threshold, facility A was dispatched to its new minimum of 170 MW at 17:23:16. When facility A is pinned at 110 MW, it is held stationary and is not being forced to actively respond to variations in ACE. Once ACE returns to a permissible control zone, the resource is released to follow the appropriate economic dispatch.

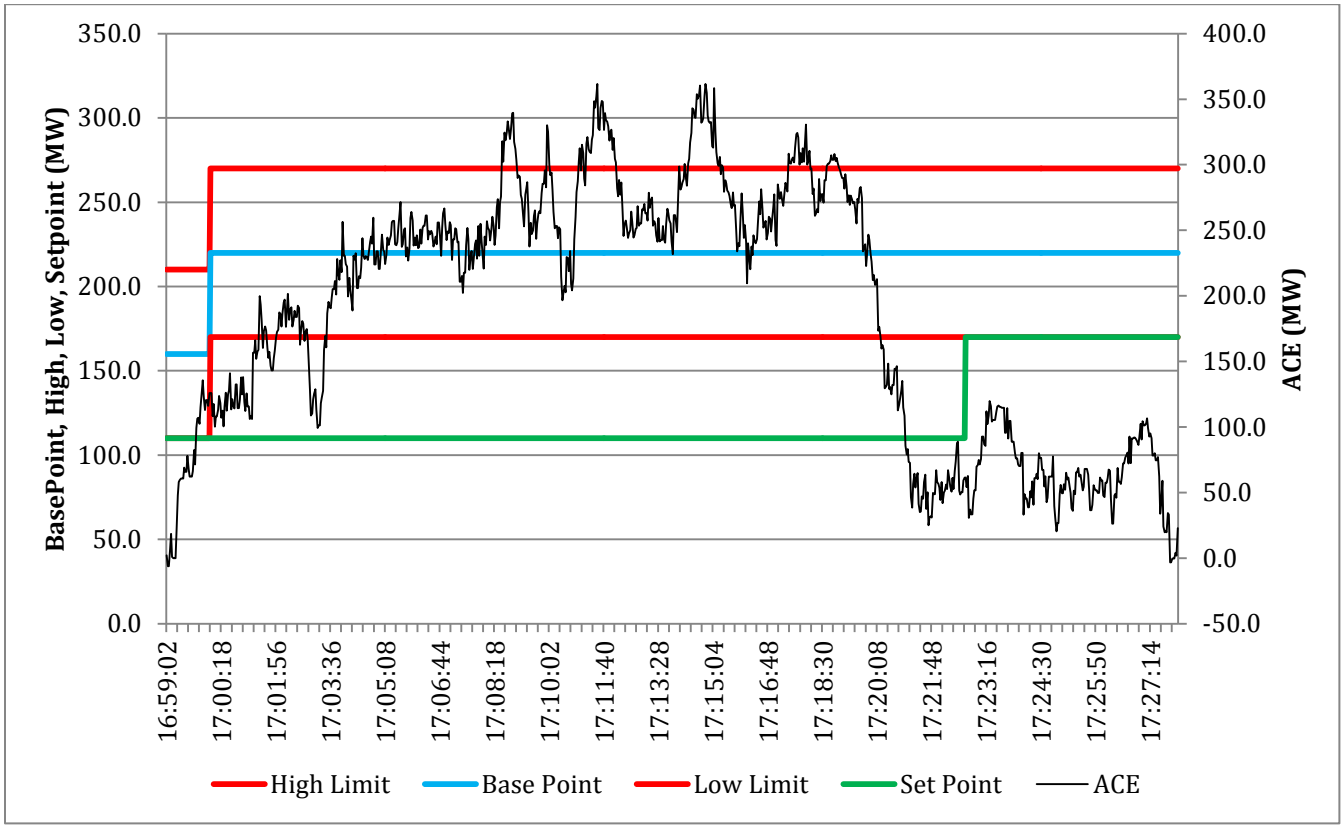

Figure 1: Facility A: Basepoint, Setpoint, High and Low Regulating Range