nationalgridESO

Non-Dynamic FFR Excel Analysis Tool 2019
User Guide

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Introduction

This User Guide describes how to use the 'NGESO FFR Non-Dynamic Analysis Tool 2019' to assess pre-qualification test results as specified in the FFR Testing Guidance for Providers wishing to enter into a contract to provide Non-Dynamic Firm Frequency Response. The following sections are included:

- Prepare Test Data
- Populate Excel Analysis Tool
- Analyse Results against pass criteria
- Test Report

Step	Action	Description	Examples

Prepare Test Data
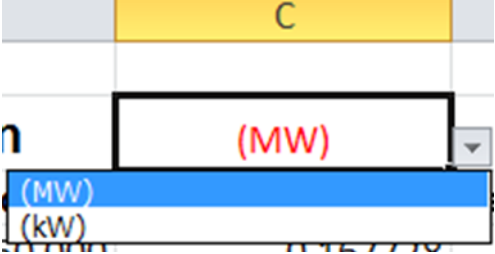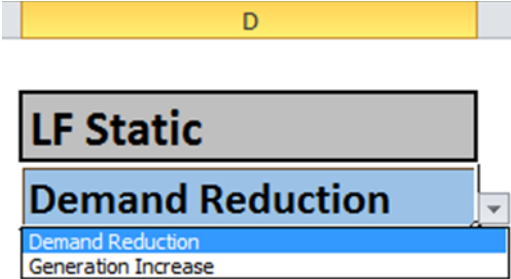
| 1 | Format test data to be pasted into Tool. | The data must be in the correct format, or the tool will be unable to capture the required data to perform the analysis.

Where applicable test data should be aggregated on a separate sheet to paste the total test volumes into the Tool.

The analysis tool will catch 2100s of data (in 1s intervals).

If the data submitted is not in the correct format (more than 2100s), it may be appropriate to remove some of the start of the test. In this case, there must be at least 30s of data prior to the operation of the relay.

If there is no relay present in the unit, the user can put a logic 1 in the relay column next to the first deviation outside of the trigger/target frequency. | (see table below) |

Site Name:	Sample Site	(kW)	
Time (s)	**Injected Frequency (Hz)**	**Power**	**Relay**
0.0	50.00	0.00	0
1.0	50.00	0.00	0
2.0	50.00	0.00	0
3.0	50.00	0.00	0
4.0	50.00	0.00	0
5.0	50.00	0.00	0
6.0	50.00	0.00	0
7.0	50.00	0.00	0

Populate Excel Analysis Tool

| 2 | 'Insert Data Here' tab, enter the Site/Unit name in cell B2. | This should update all graphs and titles throughout the workbook. | |

	A	B
1		
2	Site Name:	Example Site

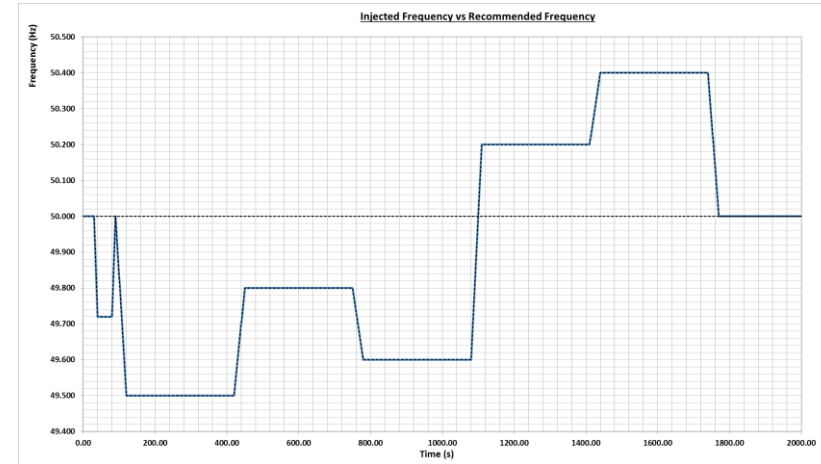| 3 | Clear previous test data | In the 'Insert Data Here' tab, delete the previous data from 'Injected Frequency', 'Active Power' and 'Relay' columns. | |

Step	Action	Description	Examples
4	Select the units of power, in the 'Insert Data Here' tab	Using the drop down box, choose either kW or MW. (Cell C2)	
5	Paste test data into 'Insert Data Here' tab		
6	In 'Response Details' tab, select response type.	Using the drop down box, choose either Generation Increase/Demand Decrease for Static Low (D4)	
7	In 'Response Details' tab, the cell E13 will automatically display the secondary start and end times.	Note these times for standard deviation calculation in next step.	
8	'Insert Data Here' tab, edit cell G5 to cover the secondary response time period to calculate Standard Deviation.	=STDEV.P(C143:C1912) SD% will be calculated automatically.	

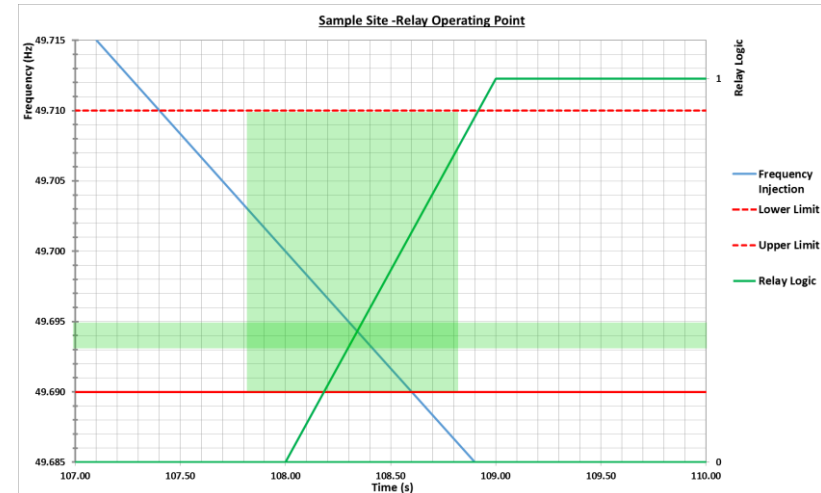| Step	Action	Description	Examples
Analyse Results against pass criteria.			
16	Check an acceptable frequency injection profile is used. See 'Inj vs Profile' tab	If the Injected frequency and profile align then this criterion has been satisfied.	
17	Check that the relay (or equivalent) operating point of the plant/unit(s) occurs at the correct contracted trigger frequency and within the permitted tolerance (±0.01Hz).	In the 'Relay' tab alter the shaded green area to align with the relay logic step from 0 to 1. This will show the frequency at which the relay operated. This should be ±0.01Hz of the required trigger frequency.	

Step	Action	Description	Examples
18	Check the response is sustained for 30 minutes.	Look at the 'secondary' tab and check response is maintained until after the 'secondary response end' line.	
19	In the 'Response' tab the total secondary response is displayed in kW and MW.	Response volume is assessed as the minimum response observed from 30 seconds to 30 minutes following relay trigger	
20	Check the standard deviation of active power error over a 30 minute period does not exceed 2.5% of the contracted active power change.	See cell G6 in 'Insert Data Here' tab.	SD 9.48802 SD% 0.947932

Step	Action	Description	Examples
Test Report			
26	Write report giving feedback on test results.	See report template	