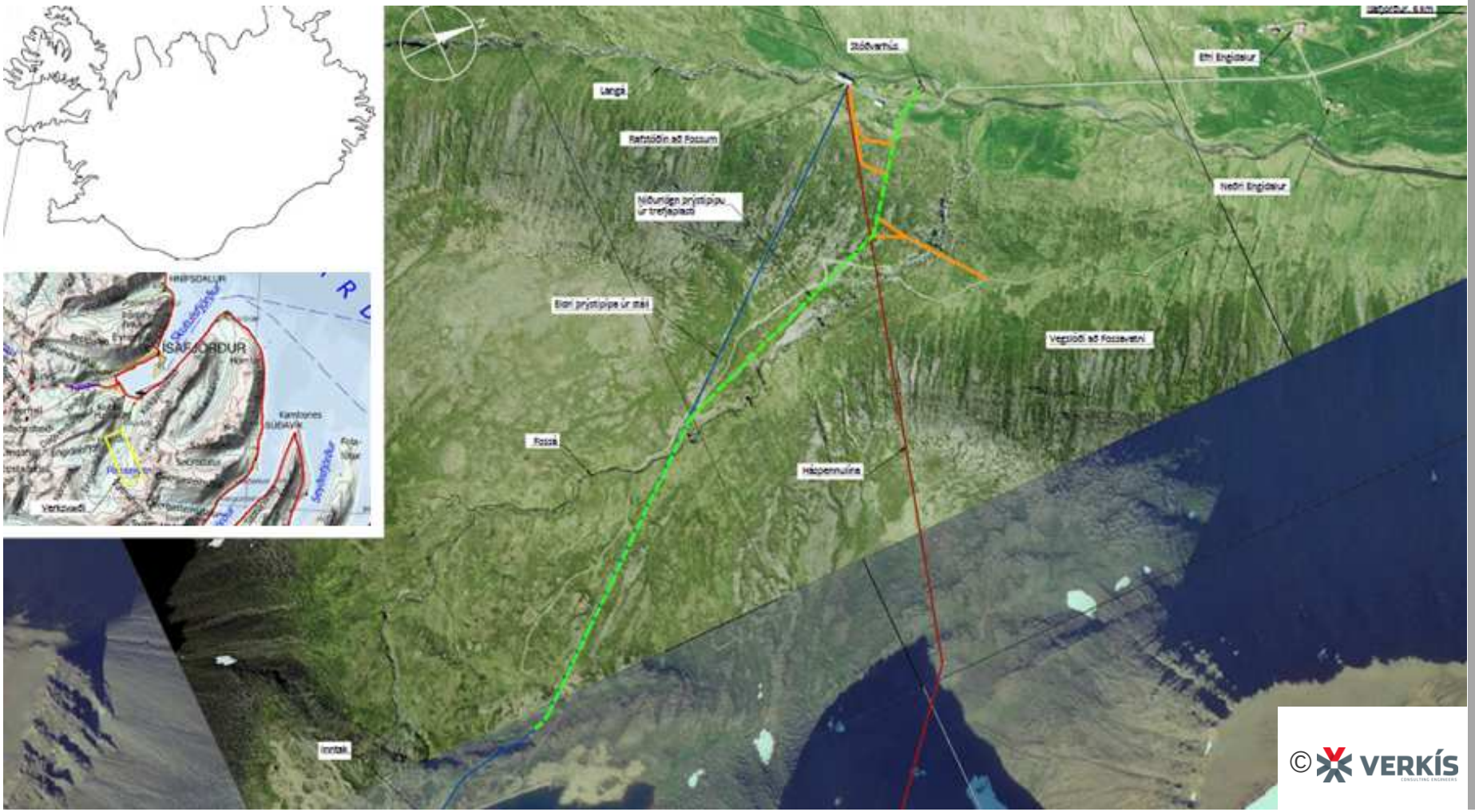
Fossarvirkjun HPP - Iceland

Glasgow, 2016-11-09

Geographical Location of Fossarvirkjun

- The project is located in the north-western part of Iceland, in Skutulsfjörður at the Westfjord peninsular. The distance by road to the town Ísafjörður is only 7 km.
- Fresh water river, fed by direct runoff and springs

Project Overview

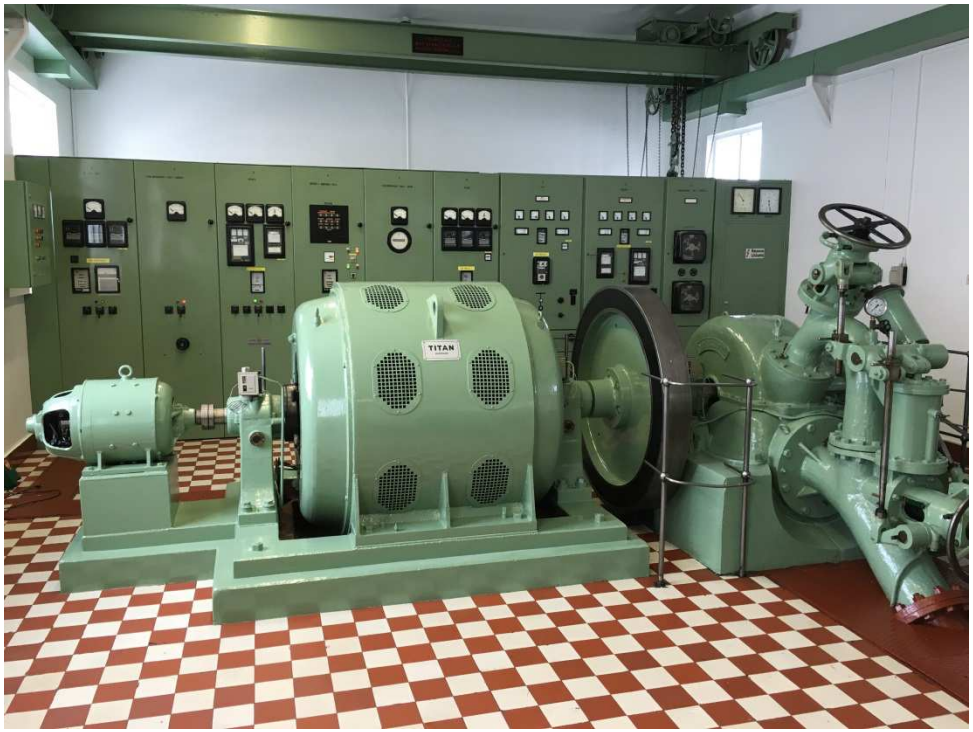


System Overview

The required scope for the new plant consists of:

- 2-nozzle Pelton turbine
- Penstock Y-pipe
- Penstock rupture valve
- Spherical inlet valve
- Hydraulic power unit
- Synchronous generator
- Separate flywheel system incl. el. coupling
- Lube oil unit
- Cooling water system
- Control and protection system
- Low voltage switchgear
- Direct current system
- Auxiliaries and spare parts
- Shipment
- Erection supervision
- Commissioning
- The old penstock has been used for leading the power and signal cables to the intake structure

Historical Background

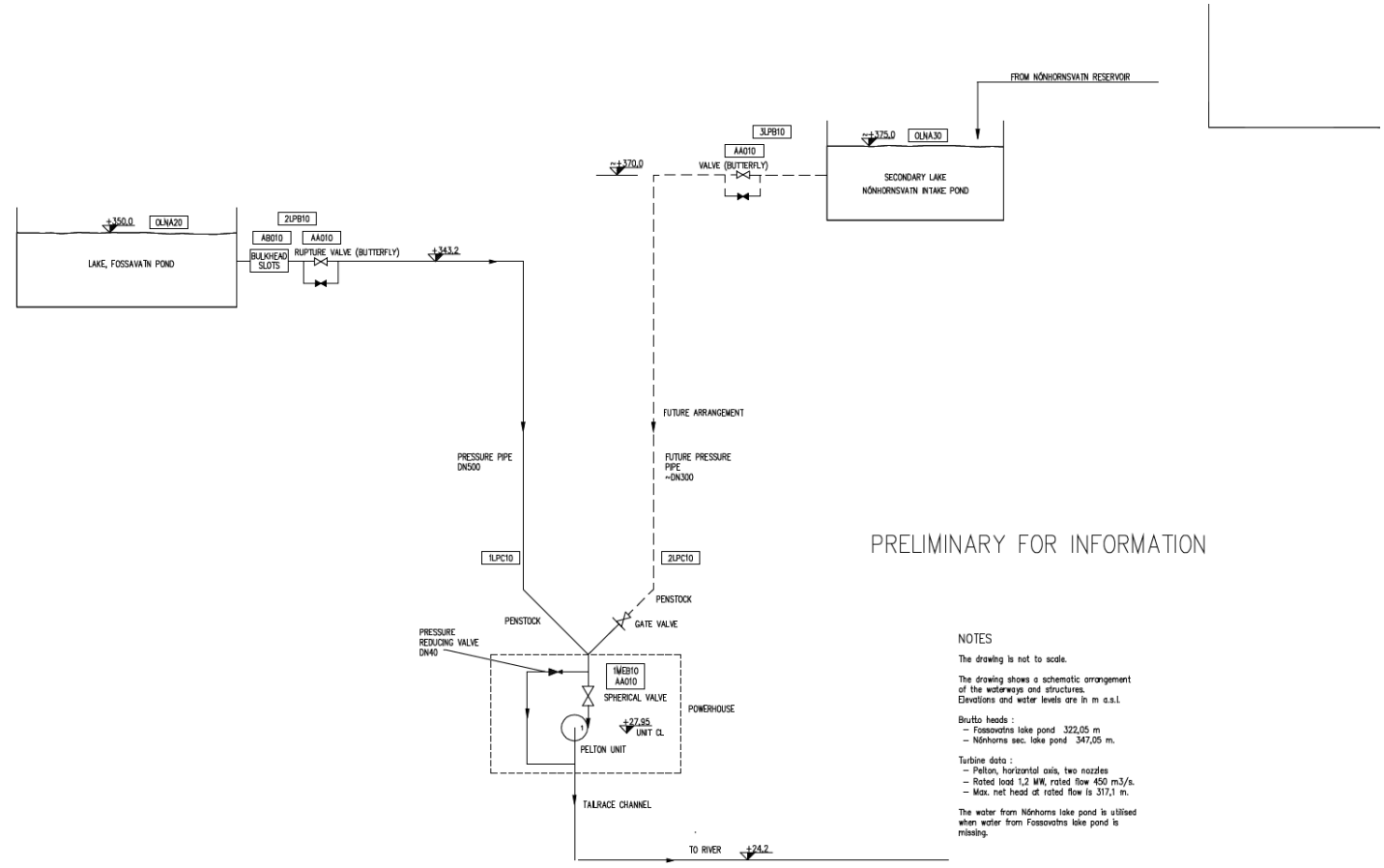


- The existing station, called Fossavatnvirkjun, was built by the village of Ísafjörður in 1937.
- Originally the power station at Fossavatnvirkjun was the basic power source for the Ísafjörður area. The output was just 600 kW.

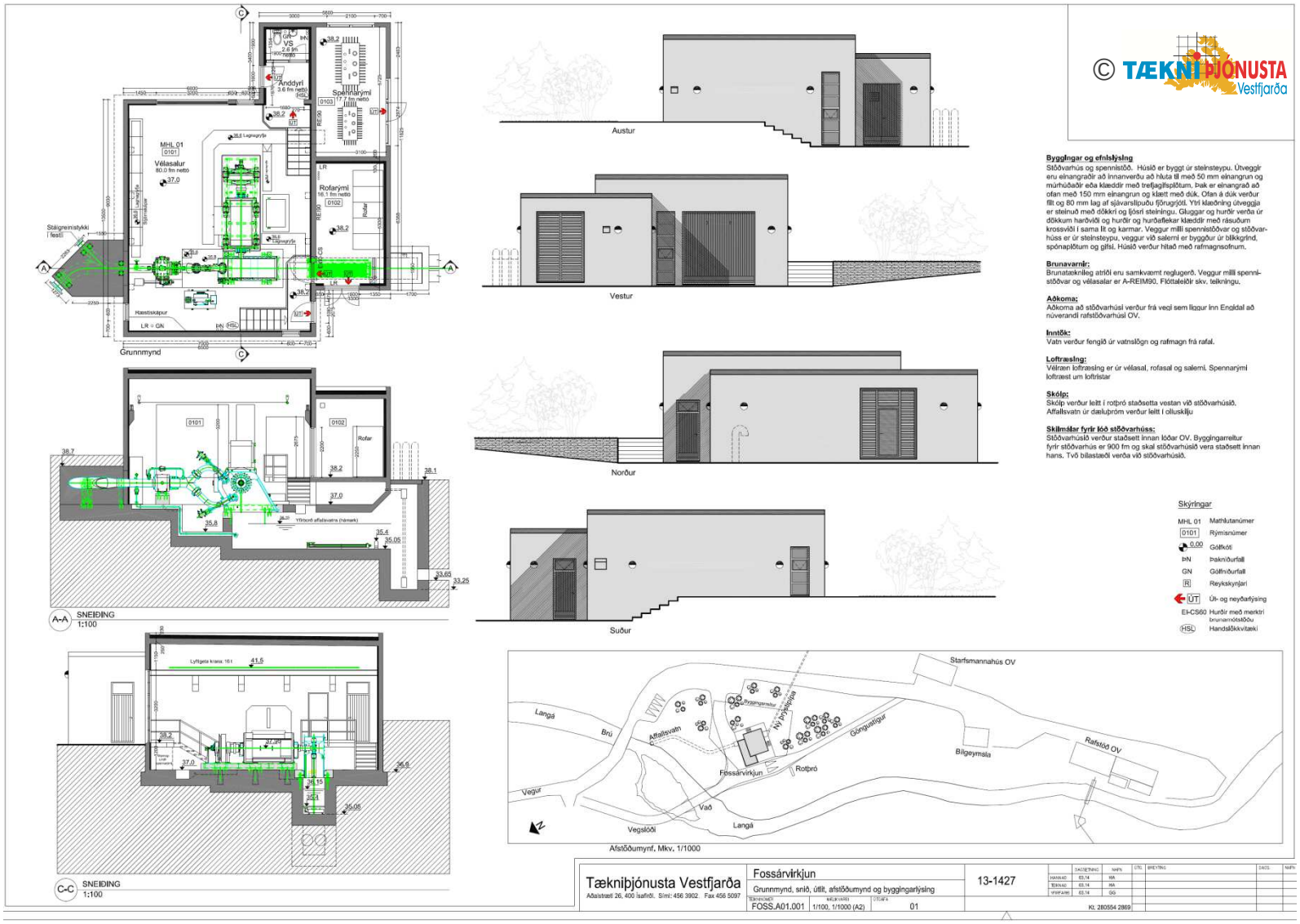
Technical Data

Fossarvirkjun HPP	
Turbine type	PH2c710/200
Number of turbines	1
Gross head	323 m
Net head	308 m
Discharge	450 l/s
Output	1221 kW
Speed	1000 rpm
Runaway speed	1804 rpm
Distance runner center over tail water level	1,80 m
tail water level	40 m.a.s.l.

Technical Requirements



Constructional Realization

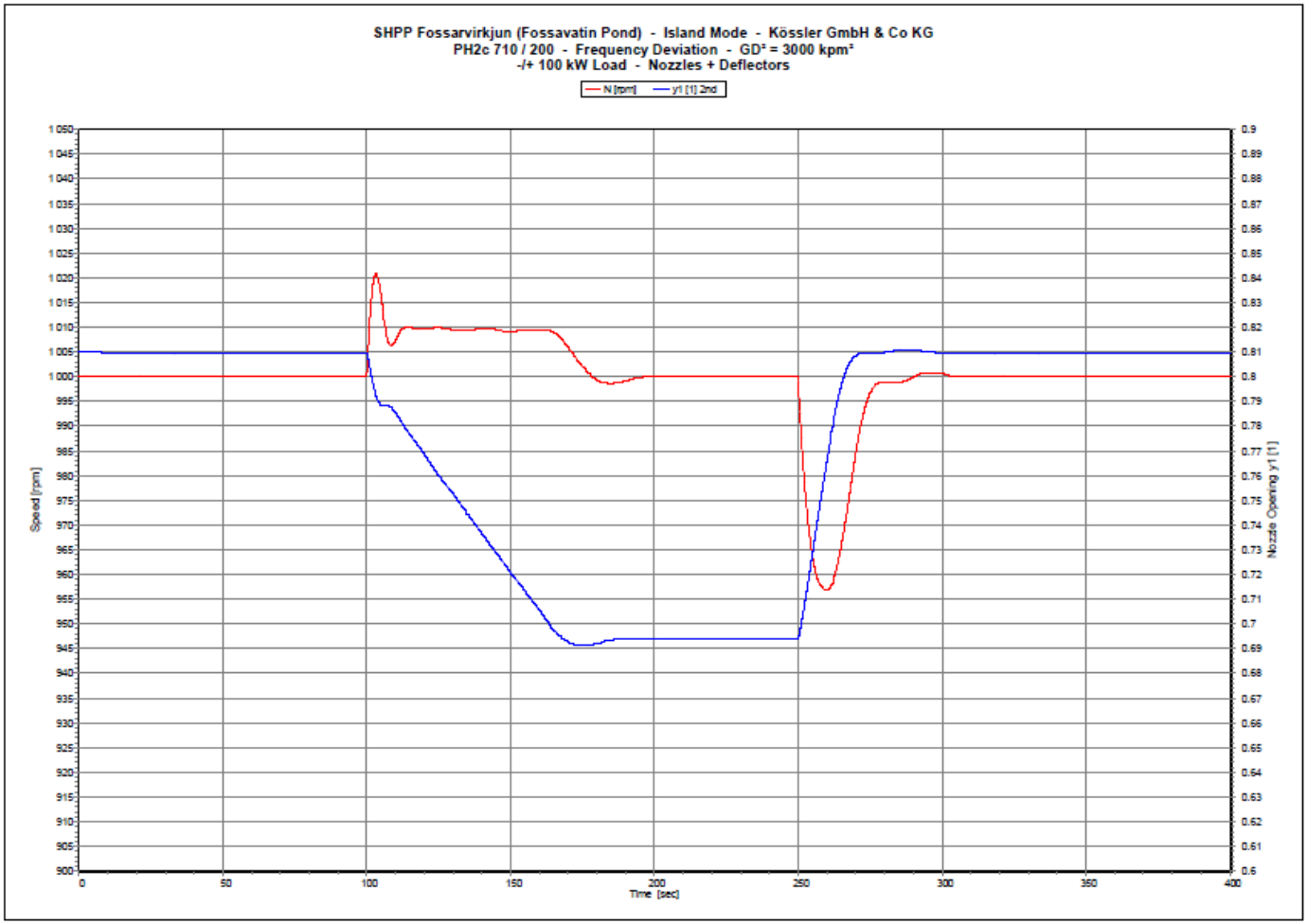


Transient Conditions and Solutions

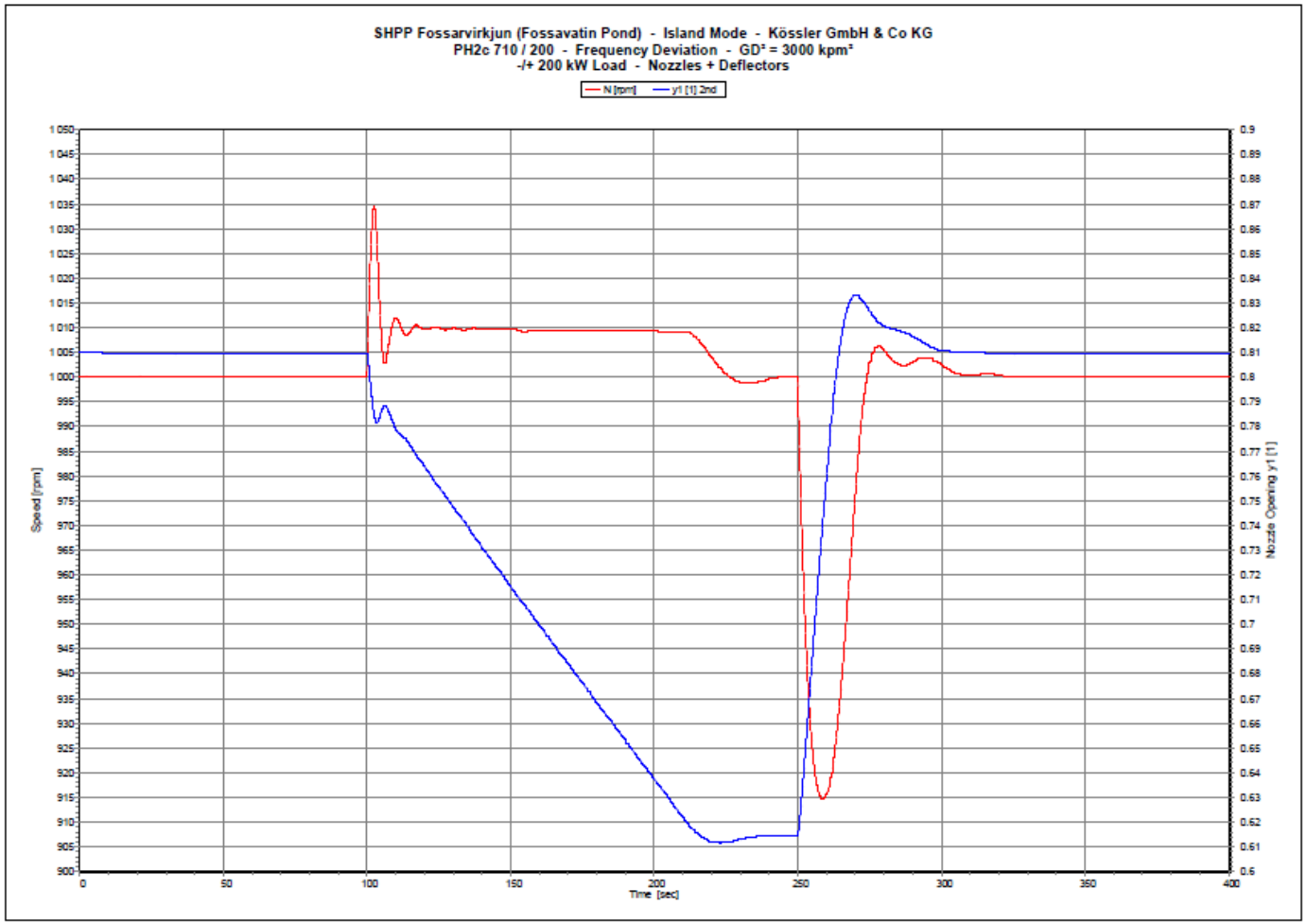
The main criteria's have been:

- Max. pressure rise at total load rejection ≤ 15% considering the 2 penstock branches with different length and diameter
- Accuracy in power control ± 1%
- Max. frequency deviation 49,0 – 51,0 Hz
- Max. load step of 300 kW
- No by-pass system, only mechanical solution required
- Conclusion
- Link Video

Transient Conditions and Solutions



Transient Conditions and Solutions



Assembly and Weather Conditions

Comissioning

Comissioning

Mode of Operation incl. Blackstart

The unit is working in an “isolated grid” serving the towns of Sudavik and partly also Isafjördur due to the bad connection to the main grid. The plant is used also for stabilization of the week grid conditions where the strong operating conditions are coming from. The produced energy (double of the old plant) will be used not only for the electrical supply of the towns; it will be also used for district heating.

Sustainability

- So far part of the energy needed in the area was generated by diesel units.
- Thanks to the HPP Fossarvirkjun the amount of diesel per year could be drastically reduced.
- Due to the rising demand for electrical power the HPP Fossarvirkjun contributes to a sustainable reduction in total CO2 emissions.

Companies Involved

- Orkubú Vestfjarða ohf: Client
- Verkis: Consulting Engineers
- Technical Service Westfjord: Architectural Design
- Schubert: Electrical Equipment and Control and Protection System
- Kössler: Electromechanical Equipment incl. Erection Supervision and Commissioning

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