

Research and development projects to meet injection demands at Hellisheidi and Nesjavellir

The results of research, development and implementation of projects 2015-2018 is that increasing volumes of geothermal water can be reinjected back into the geothermal reservoir. The projects will continue in 2019 with an emphasis on implementing improved techniques to further mitigate negative impacts. A special effort has been made in the injection at Nesjavellir and preliminary results are promising.

Hellisheidi

- Geothermal water has been injected into production wells that are not used for steam production in Sleggjubeinsdalur. In this manner reinjection is dispersed throughout the production fields of Hellisheidi Power Plant. In late 2016, three such wells were used for reinjection on mt. Skarðsmýrarfjall. That injection was ceased in the autumn of 2017 due to negative effects on the production fields. Instead two other wells were used for the reinjection and has so far been successful.
- In late 2016, injection started into wells in the CarbFix site, located outside of the plant's production fields.
- Stimulation of injection wells with alkali did not deliver desired results.
- By mixing condensate water, scaling in injection wells is minimised.
- Drilling additional reinjection wells is being considered, as well as channelling geothermal water to the ocean.
- Tracer tests are implemented to find out whether geothermal water injected into the reservoir is re-extracted in production wells. Results indicate that the reinjection helps to maintain pressures in the geothermal reservoir. Cooling in production wells as a result of reinjecting water is also a possibility.
- The mixing of gas saturated condensate water and separated water to prevent silica scaling has started and is promising.
- Injection utility pressure has been raised and the resulting higher reception of injection wells is on par with expectations. However, this has resulted in operational complications, for which solutions are currently being sought after.
- Well HE-55 has been temporarily connected to the reinjection utility. The injection in late 2018 was an initial success but had to be discontinued due to technical problems at the power plant. The injection is scheduled to restart in the spring of 2019.
- An effort to raise the operational pressure of the injection utility at Gráuhnúkar is ongoing. The project is expected to be implemented by spring 2019.
- Preparation for a temporary injection pipeline to wells HE-10 and HE-35 is currently underway with constructions planned for spring 2019 with injection operations commencing in late 2019.

Nesjavellir

- Geothermal water previously released on the surface is currently pumped through three injection wells.
- Experimental injection of excess volumes of heated groundwater through two 170 m deep wells in Mosfellsheidi and in 2016, through a single well in Kýrdalur by Nesjavellir that extends down to the geothermal reservoir. Measurements indicated that the injection in Kýrdalur adversely affected production wells and was therefore discontinued.

- A cooling tower was redesigned so that it could cool water from two engines instead of one. By doing so, the demand for cooling water from the water supply at Grámelur is lessened by a third, which should reduce the need for injecting heated groundwater in the summer.
- Tracer tests exploring whether geothermal water released through 300-600 m deep injection wells show that tracers resurface at springs in Lake Thingvallavatn.
- Injection in well NJ-18 started in November 2018. NJ-18 is a deep well that extends into the geothermal reservoir. This injection is for experimental purposes and results will be reviewed by the end of 2019.
- Comprehensive tracer tests via shallow injection wells were initiated in late 2018. These tests will result in further understanding of the flow paths of reinjected geothermal water. Results are expected in the second half of 2019.