

Geo-Coat Project

Newsletter No. 1




The EU project GEO-COAT

GEO-COAT (development of novel and cost effective corrosion resistant coatings for high temperature geothermal applications) is a new three-year research project, funded by the European Union, whose aim is to support the development of the next generation renewable electricity and heating/cooling technologies.

The project aims at developing corrosion and erosion-resistant coatings to improve the lifetime of components within geothermal plants, such as:

- Liners
- Well casings
- Pipelines
- Heat exchangers
- Pumps
- Turbine components

Specialised coatings will be developed based on:

- High Entropy Alloys (HEA)
- Ceramic/metal mixtures (Cermets)
- Ni-P-PTFE

applied via thermal powder coating and plating techniques

- High Velocity Oxygen Fuel (HVOF)
- Laser Metal Deposition (LMD).
- Electroless plating

A decision-based approach will be implemented in the selection of the coatings, based on experimental results, computational modelling of the geothermal fluid and economic considerations.

Why are the Geo-Coat coatings important?

Geothermal sources are very aggressive natural environments: high temperature and pressure conditions, corrosive salts and gases (CO₂, H₂S, sulphates and chlorides), high geothermal fluid flow rates and the presence of solid particulates within the geothermal fluid represent a major threat to the integrity of the various components of geothermal power plants.

These factors, combined with temperature, pH and pressure changes, accentuate corrosion, erosion and scaling phenomena.



The GEO-COAT partners

- 1  TWI Ltd (coordinator)
- 2  WEIR Group
- 3  ON Power
- 4  University of Iceland
- 5  University Politehnica of Bucharest
- 6  Gerosion
- 7  Technovative Solutions
- 8  Tehnoid
- 9  Flowphys
- 10  METAV-CD
- 11  Innovation Centre Iceland





Project Kick-off meeting

(8-9/02/2018, TWI, Granta Park, Cambridge)

The Geo-Coat kick-off meeting was held at the TWI Ltd premises (Granta Park, Cambridge, UK) on the 8-9/02/2018.

The meeting has been very fruitful as each work package, together with finances and management details were discussed in detail and possible project challenges highlighted. The meeting also gave the chance for everyone to meet and getting to know each other.

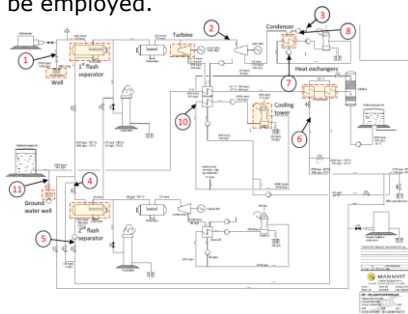
Hellisheiði geothermal fluid sampling

The chemical composition of the geothermal fluid, together with temperature, pressure and pH, have been measured at several locations within the Hellisheiði power plant.

Due to the multiphase nature of the geothermal fluid, which changes with (liquid, steam or 2-phase), significant challenges have been faced and different sampling techniques had to be employed.



The analysis has revealed a substantial concentration in CO₂ and H₂S, together with a high temperature of the geothermal fluid. Results from the analysis will help defining the experimental conditions for the lab-testing of the coatings in the project. Results will be made available to the public.



Upcoming events

19-21/09/2018 **Geo-Coat 1st bi-annual meeting** (Reykjavik, Iceland)

Acknowledgments

The Geo-Coat team wishes to thank everyone who has assisted the project up until now, specifically those who gave their time to provide information for the FMEA as their help has been invaluable.

Attended events

NACE Corrosion 2018 (15-19/04/2018, Phoenix, US).

Technical meeting held with advisory board members Keith Litchi, Helmuth Sarmiento-Klapper and Ralph Bäßler.

IGC 2018 - Iceland Geothermal Conference 2018 (Harpa, Reykjavik, 24-26/04/2018)

3rd workshop of H2020 Geothermal Research and Innovation projects (18/06/2018, Inea premises, Brussels, Belgium)

IRCSEEME 2018 - International research conference on sustainable energy engineering materials and environment (25-27/07/2018, Oveido, Spain)

