

Study visit to Stargard and Pyrzyce, June 2024

On June 11–12, 2024, representatives of MEERI PAS and ISOR conducted a joint visit to Stargard and Pyrzyce (West Pomeranian Voivodeship). The visit aimed to meet with the managements of G-Term Energy Sp. z o.o. (Geotermia Stargard) and Geotermia Pyrzyce Sp. z o.o. to obtain monitoring data from geothermal wells of both heating plants. Historical data from the operation of the wells are essential for testing the accuracy of the computational tools being developed as part of the GeoModel project. The meeting also provided an opportunity to discuss the difficulties and challenges faced by geothermal plants exploiting highly mineralized waters and what kind of support they can receive from the scientific community.

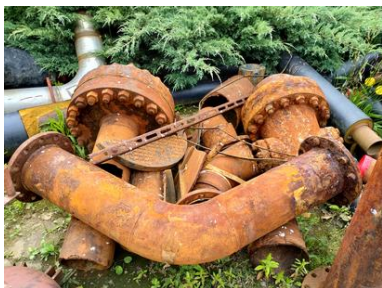
The first part of the visit included a meeting at the Kyriad Hotel in Stargard. The nearly 3-hour session served as an introduction of meeting participants. On one side, the main goals and tools being developed in the GeoModel project were presented, and on the other, representatives of geothermal heating plants presented their resources, exploitation methods, and the challenges caused by exploiting brine with mineralization levels of 120–140 g/dm³. For comparison, the average salinity of the Baltic Sea is about 7 g/dm³, and the world's oceans about 35 g/dm³.



Water at this temperature and salinity is highly corrosive, with a tendency to precipitate minerals in wells and transmission pipelines, as shown in the photos below. As a result, scaling and clogging occur in injection wells, causing the injectivity of individual wells to gradually decrease. This requires thorough filtration of the water before reinjection and the continuous application of soft acidizing. When these methods are insufficient, it becomes necessary to drill new injection wells or limit the extraction of thermal water. Limiting the extraction of thermal water is the least desirable and only a temporary solution, as it forces the company to rely more heavily on expensive peak sources, such as gas boilers in Pyrzyce, to ensure uninterrupted heat supply. It also needs to be emphasized that there is currently no other economically viable method of discharging of such brines other than injecting it back into the same reservoir level through an injection well. While it is possible to discharge cooled water from low-mineralized thermal waters to a surface receiver (e.g., a stream or river), it is excluded for waters with such high salinity. Therefore, most efforts in both heating plants are focused on maintaining the injectivity of the reservoir at an appropriate level. In Geotermia Stargard, there are currently 2 production wells and 5 injection wells. Before reinjection, the water is treated in a two-stage filtration process, followed by the addition of a small concentration of hydrochloric acid (in a process called soft acidizing). A similar situation exists in Pyrzyce, where there are currently 4 injection wells and 1 production well. The water is also filtered, and carbon dioxide is continuously added to lower the pH of the injected fluid.

Tools such as Lumpfit++ and the currently developed algorithm optimizing the location of new wells in the Waiwera reservoir simulator are of significant interest to both heating plants.

It is also worth emphasizing that thanks to the courtesy of Geotermia Stargard, we participated in a very interesting and humorous tour around the centre of Stargard, led by a professional guide. We learned, among other things, that the railway workers of Stargard, through which the 15°E meridian passes, were the initiators of the introduction of Central European Time in Poland.



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More about the GeoModel project:

<http://geomodel.pl>

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