NE-25-37560 – Candidate Materials Tribology Testing for Sodium Bearings in Sodium Fast Reactors (SFR)

Hayward Tyler, Inc., located in Colchester, VT, has been designing, manufacturing, testing, and supporting pumps in nuclear energy applications for over 50 years. Their mission is to participate in the development of critical reactor components, mainly pumps, and build a strong competency for engineering and manufacturing components based on strong research, analysis and operating experience.

Material corrosion in sodium is a complex challenge that impacts safety and longevity of SFRs. This work focuses on understanding what the optimal material candidates are for journal bearings, while ensuring compatibility with sodium and the structural materials (304 and 316 stainless steel) in reactor operating conditions. Cobalt, which is currently used, is expensive, scarce, and has activation concerns.

Hayward Tyler will partner with Argonne National Laboratory (ANL) to perform tribological (wear) testing of several candidate materials that offer superior wear resistance while reducing the radiological hazards of cobalt bearing materials. They also plan to test the bearings to ascertain surface wear mechanisms using the Mechanisms Engineering Test Loop (METL) facility. The benefits of this project will be to identify alternative bearing materials to decrease costs and enhance safety.