

PNNL-35673

# **Percheron Power Archimedes Screw Turbine Analysis (Abstract)**

**CRADA #364 (PNNL #68798)**

**February 2024**

*David R Geist*

**Percheron Power, LLC**

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Abstract

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David R Geist

Prepared for  
the U.S. Department of Energy  
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Pacific Northwest National Laboratory  
Richland, Washington 99354

## Abstract

**PROBLEM:** Recent research has shown that the conventional helicoid shape used for steel blades in Archimedes screw hydroelectric turbines are not optimum for hydraulic performance.

**PROPOSED SOLUTION:** Percheron will work with PNNL to analyze optimized turbine blade designs using advanced CFD (computational fluid dynamics) and FEA (finite element analysis) models to compare the performance of different turbine designs and predict the materials requirements for the future turbines.

**GOALS:** Percheron will develop and select up to six theoretically improved turbine designs that PNNL will simulate to generate CFD pressure loads and FEA stress analysis, and provide the analysis in a detailed technical report. Percheron will use the results to build prototype composite turbines and test them in a lab and in the field.

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