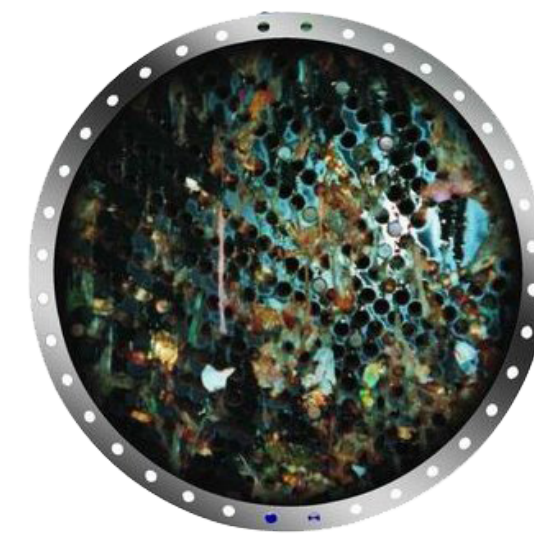


## The Problem

Industrial cooling systems such as power plant condensers suffer efficiency loss from organic and inorganic fouling, causing an increase in the plant heat rate. A 1% increase in heat rate can cost a 500 MW coal plant \$600,000 a year and increase CO<sub>2</sub> output by 40,000 tons (EPRI).

Fouled Condenser

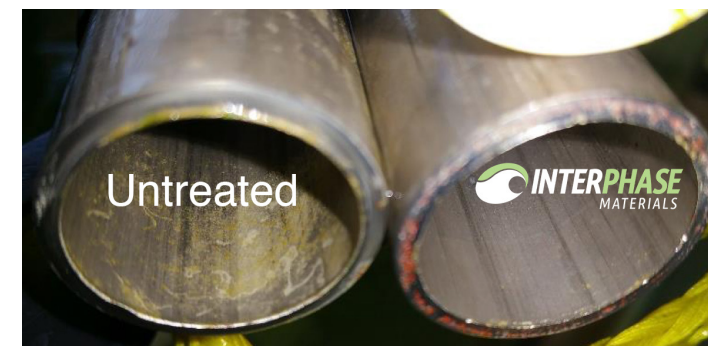


## Interphase Materials Overview

Interphase Materials has created a product, the HTE system, that:

- Improves heat transfer efficiency
- Reduces biofouling
- Reduces scale buildup
- Reduces the need for toxic water treatment chemicals
- Is environmentally friendly

Biofouling Reduction



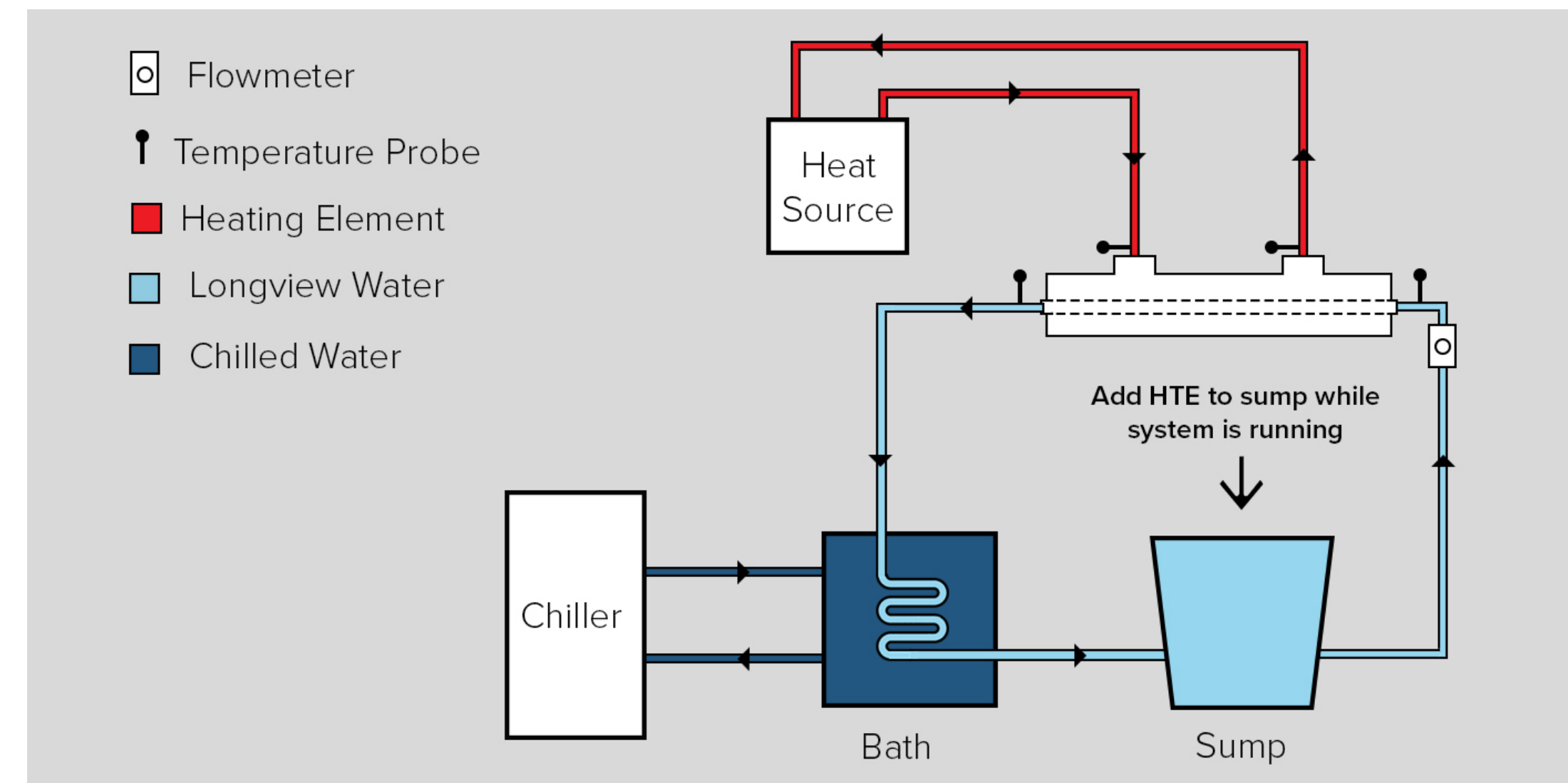
Scale Reduction



## Project Overview

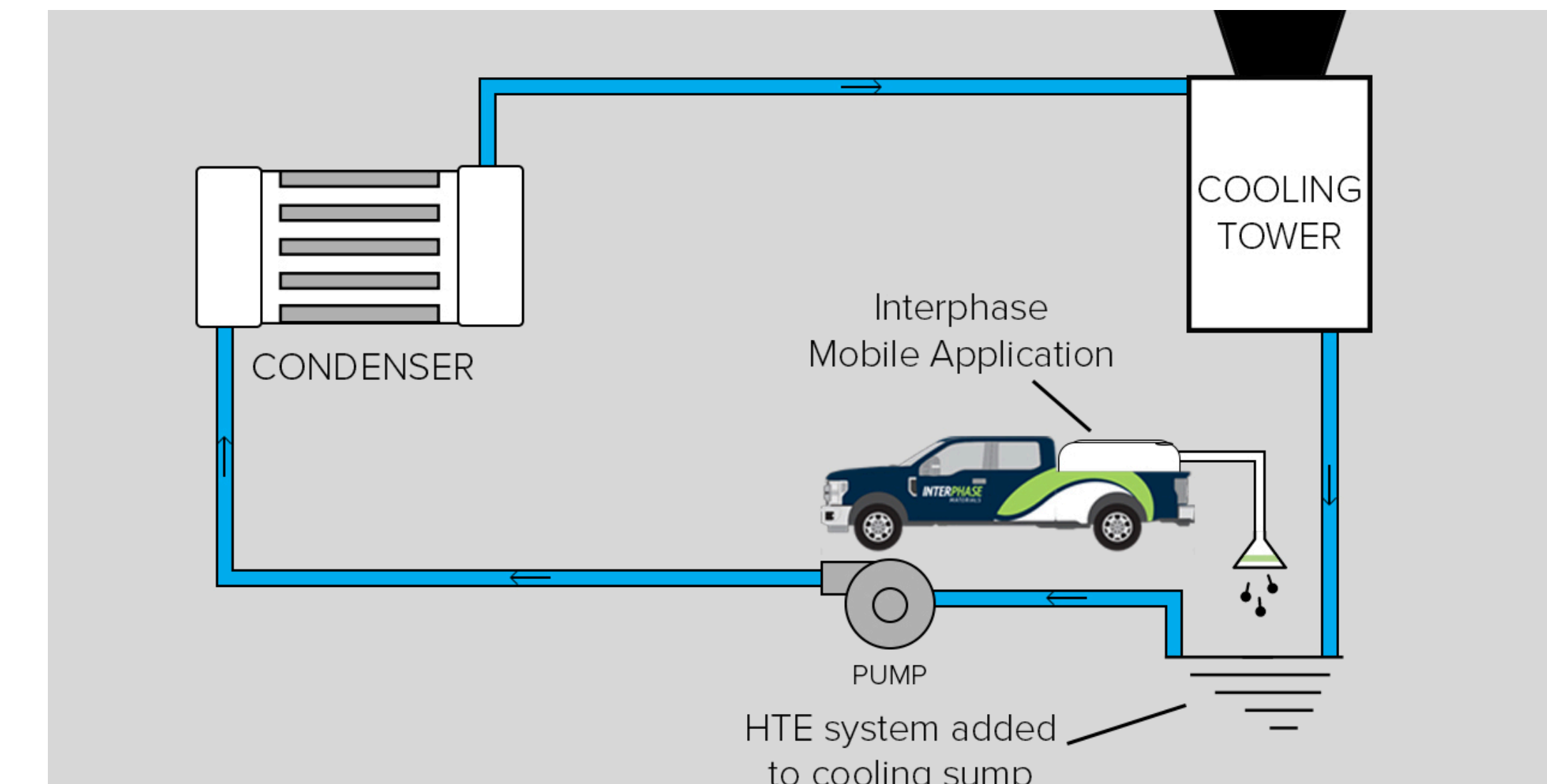
**Objective:** Quantify the efficiency improvements the Interphase HTE system can provide the Longview Power Plant condenser. This project will initially evaluate the impact of the HTE system utilizing Longview water on a low risk field deployed heat exchanger test rig. Additionally, the system will evaluate the ability to minimize water treatment chemistry through evaluation of water prior to chemical treatments. Pending evaluation on the small scale rig, the HTE system will be deployed on the Longview condenser and efficiency improvements will be evaluated utilizing Longview's current efficiency sensors.

### Application to Lab Scale Rig



Heat transfer improvements will be quantified on lab-scale test rig using Longview Power Plant water.

### Application to Longview Condenser

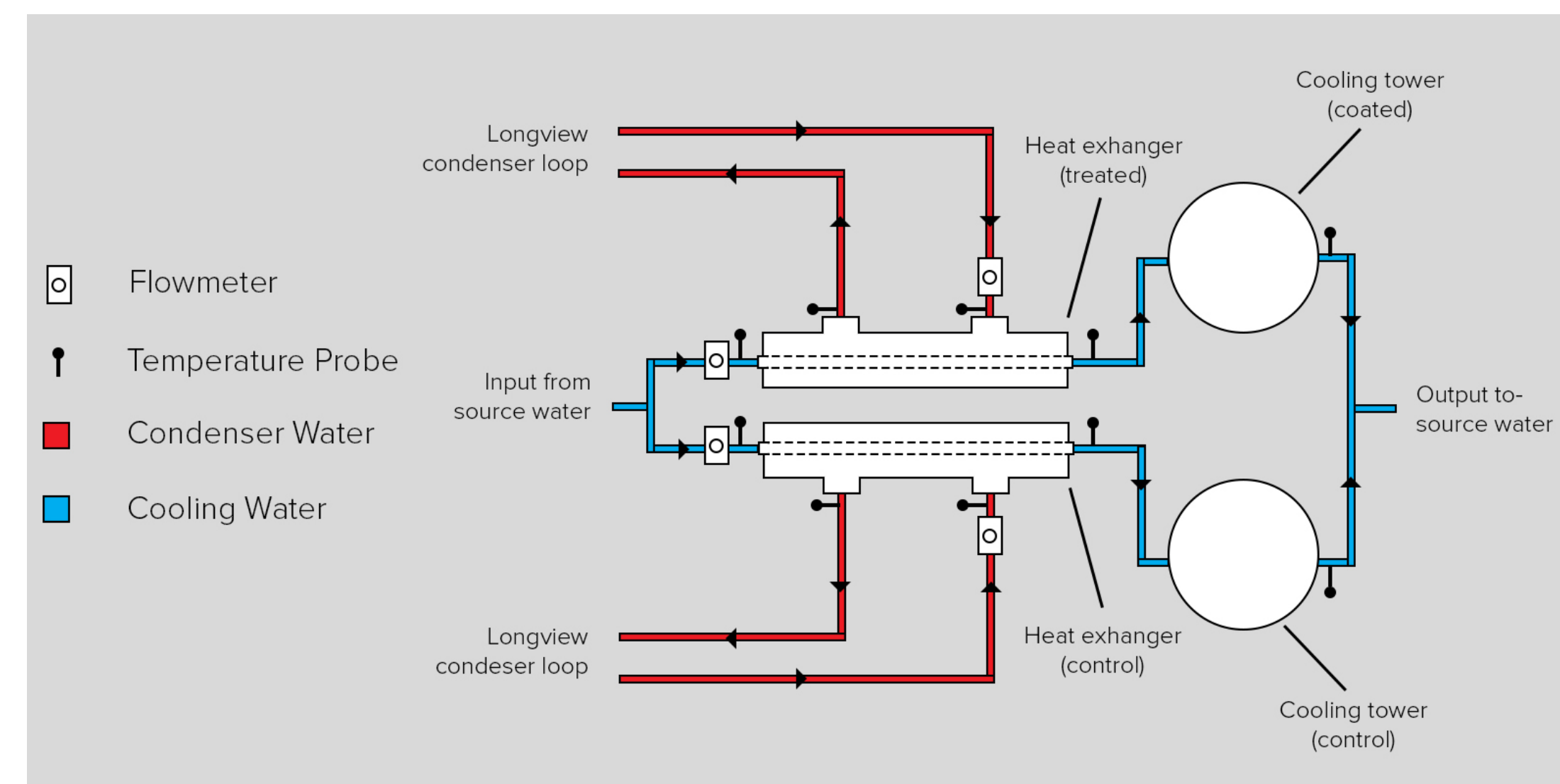


Interphase will add HTE to the Longview sump during operation to treat the condenser tube inner diameter. Following application, heat transfer of the condenser, heat rate of the plant, and impact to the plant's bottom line will be measured over time.

### Anticipated Benefits

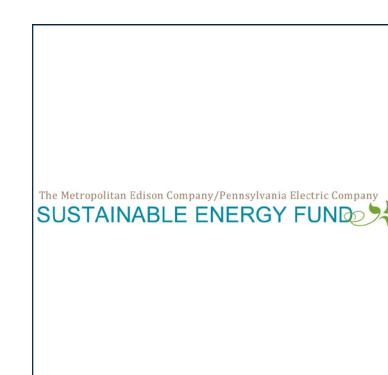
Interphase Materials and Longview seek to gain quantitative field data on heat transfer efficiency improvements of condenser cooling systems in Coal-Fired Power Plants (CFPs) following application of the HTE system. It is anticipated that an application of the Interphase HTE system on condensers could help CFPs reduce plant heat rate, which could significantly reduce CO<sub>2</sub> output and improve CFP performance. Additionally, the anti-fouling properties of the HTE system could potentially reduce the amount of chlorine and other water treatment chemicals CFPs apply to their cooling systems, which would not only assist power plants in meeting the requirements of the EPA Clean Water Act, but also decrease cleaning frequency, lower maintenance costs, increase hardware lifecycles, and help plants maintain long-term high efficiency operation.

### Application to Field Test Rig



Two rigs will be deployed allowing evaluation of treated water, utilized in the Longview condenser, as well as water prior to chemical treatment. Heat Transfer and fouling will be evaluated on both heat exchanger and cooling tower.

## Awards & Recognition



## Longview Power

- Located in Madsville, WV
- Most efficient coal plant in U.S.
- 8,809 Btu/kwh heat rate
- 3 million gallon condenser loop
- Test site of Interphase Materials HTE system application

