

**Hydrothermal Process Engineer**  
**Supercritical Water Oxidation (SCWO) Processing**  
**Department of Civil and Environmental Engineering**  
**Duke University, Durham, NC**  
Starting Jan. 1 – March 1, 2017

**Background Information:**

The project team of Dr. Marc Deshusses at Duke University has built a prototype supercritical water oxidation (SCWO) reactor in a 20' shipping container on the Duke campus in Durham, North Carolina. The system is designed to process fecal sludge and has been undergoing testing with fecal waste slurries since fall, 2015. The project receives funding from the Bill & Melinda Gates foundation as part of the Reinvent the Toilet Initiative aimed at improving sanitation in developing countries. The team is looking for an experienced hydrothermal process engineer to evaluate and enhance performance of the prototype reactor through plant operation, data and performance analysis and further system and process design.

The SCWO Process Engineer will be a key member of a small team that is rigorously and methodically testing and evolving the design of the reactor. The supercritical water oxidation reactor runs at temperatures up to 600 °C and pressure of 3400-3500 psi or 230-240 bar. The feedstock is a viscous slurry with a solids content between 5-20%. Value engineering and the optimization of process parameters will be employed to minimize energy requirements while enhancing system reliability and safety. System design and component selection will be reviewed to maximize the potential for low cost manufacturing and sustainability. The successful candidate is expected to have experience working with industrial processing equipment at high pressure and/or high temperature and be comfortable running, analyzing and troubleshooting technical-scale reactors, preferably thermochemical systems working with slurries. Experience working with a range of high pressure industrial equipment is a high priority. The work location is Duke University in Durham, NC.

**Basic Requirements:**

- Bachelor's degree in chemical, environmental or mechanical engineering; Master's degree preferred.
- A minimum of 5 years' experience designing, building and operating reactor systems, especially high temperature and/or high pressure systems
- Excellent hands on and problem solving skills; results oriented
- Ability to work effectively in a team and represent the project to external stakeholders
- Good English communication skills, both verbal and written
- Candidates are not required to be U.S. citizens

**Detailed Job Specific Skills Required:**

- Experience working with high temperature and/or pressure industrial processing equipment such as pumps, valves, pressure regulators, flow meters, piping, fittings and heat exchangers. Experience

should ideally include specifying, procuring, operating and maintaining such equipment for various applications under various conditions.

- Experience working with viscous slurries in industrial settings
- Fundamental understanding of thermochemical processes

**Detailed Hard Skills:**

- Ability to troubleshoot system level and equipment level failures and perform necessary data analysis
- Working knowledge of industrial control systems, how they work and how to use them
- Experience identifying and working with vendors of industrial process equipment

**Detailed Soft Skills:**

- Consistently demonstrates excellent team work, effective communication and collaboration
- Ability to understand the bigger picture, including the need for improved sanitation in the developing world as well as the need for greener ways to treat increasing volumes of waste streams that pose a threat to the environment
- Creative thinking, problem solving skills, and the ability and willingness to present your ideas and drive the decision making process

**If interested, please send your resume and cover letter to:**

**Kathy Jooss** - Project Manager, Pratt School of Engineering, Duke University

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