



## 2019 WERC Design Contest FAQ

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### Track 4: Environmental Public Health

- **Task 5: Removal and Reuse of Phosphorus as Fertilizer from CAFO Runoff**

**Q1:** The design conditions for the task state that we will need to "treat 20 Liters (5.28gal) of synthetic water that has an orthophosphate concentration of 20ppm." We would like to know what else, if anything, will be in the synthetic water?

**A:** Nothing else, only DI water and orthophosphate. We are looking for the recovery of phosphorus as fertilizer.

**Q2:** Why was the concentration of 20 ppm orthophosphate selected? All the literature they have found uses something closer to 200 ppm as being representative of CAFO waste. Related to this, the task statement makes it seem as if the solid recovery will be collected and tested by WERC. At 20 ppm and a 20 L sample, if all the orthophosphate was recovered this would be less than a gram of solids. Is it WERC's intention to collect and test this small amount for mass and moisture content?

There are also implications in when we would turn in a sample to WERC. If we did it on Monday, no sample would be left to demonstrate for the judges. More solution could be made for demo if necessary, but we were just trying to understand how this is all going to work during the competition.

**A:** We are looking for phosphate recovery from water and not wet manure waste. The 200 ppm number is from a liquid slurry waste. Natural wastewaters will have a chemical makeup that limits dissolved phosphate to somewhere around 25-30 ppm (solubility of  $\text{Ca}_2\text{PO}_4$  is 20 ppm). Thus the water we are using is at the upper limit of  $\text{PO}_4$  solubility in natural systems. Technology to remove the particulate  $\text{PO}_4$  is readily available, the innovation will be removal of the dissolved  $\text{PO}_4$ .