Objective:
Evaluate the impact of potential REE wastewaters on the growth and function of WWT microbes.

Results to date:
- Exposed synthetic Eu and Y containing wastes (mimicking fluorescent lamp phosphor recycling) as well as complexant tributyl phosphate (TBP) to model nitrifying organisms:
  - Nitrosomonas europaea: \( \text{NH}_3 + 1.5\text{O}_2 \rightarrow \text{NO}_2^- + \text{H}^+ + \text{H}_2\text{O} \)
  - Nitrobacter winogradskyi: \( \text{NO}_2^- + 0.5\text{O}_2 \rightarrow \text{NO}_3^- \)
- Found that >10 ppm Y and Eu inhibits growth and activity of \textit{N. europaea}; TBP increases inhibition.
- \textit{N. winogradskyi} even more sensitive to these REE and TBP.
- The REEs appear to exert toxic effects even when most of the metals are insoluble.

Current and future work:
- Conducting exposure studies with activated sludge consortia from Idaho Falls WWT Plant.
- Assessing effects on anaerobic treatment.

- Local, State and Federal regulations drive the type and extent of required wastewater pretreatment.
- EPA has not yet established pretreatment guidelines for rare earth elements (REEs).