CLAIMS

1. A system for treating water comprising:

a primary actinic radiation reactor;

a source of a persulfate precursor compound disposed to introduce at least one persulfate precursor compound into the primary actinic radiation reactor;

a total organic carbon (TOC) concentration sensor located upstream of the primary actinic radiation reactor;

a persulfate concentration sensor located downstream of the primary actinic radiation reactor;

a controller operatively coupled to receive at least one input signal from at least one of the TOC concentration sensor and the persulfate concentration sensor, and generate a control signal that regulates a continuously variable intensity of the actinic radiation in the primary actinic radiation reactor based at least in part on the at least one input signal; and

an ultrafiltration apparatus located downstream of from the primary actinic radiation reactor.