**Objectives**

The overall goal of this project has been investigating the reactivity of potassium ferrioxalate (Fe(VII)) with Fe(II) forms in model natural and engineered systems, and with sediments from the Oak Ridge FRC and the Hanford site. Past project results have linked with Oak Ridge and Hanford sediments have been published in Fricker et al. (2004) and Kukkadapu et al. (2006). This paper focuses on the study of the biological and chemical reduction of Fe(VII) to Fe(III) with microorganisms or biogenic Fe(II). Fe(VII) was important in the reduction of Fe(VII) in anoxic environments of ferrihydrite. Microbially mediated MR-1, Fe(II), and electron donor. Fe(II) is used to stabilize a bioavailable Fe(VII) oxide present in small amounts at Oak Ridge and Hanford sediments.

In order to address the overall goal, Fe(VII) reduction rates and redox products were determined in various systems. Individual analyses and the results were analyzed for iron concentration. The specific objectives of the individual experiments were as follows:

1. Identify the rates and products of the reaction of Fe(VII) with aqueous Fe(II) in a simulated natural environment.
2. Identify the rates and products of the reaction of Fe(VII) with MR-1 in various aqueous systems and real environmental systems.
3. Use insights from the above experiments to determine which of the three above, parallel processes dominate the reaction of Fe(VII) with a mixture of Fe(II), Fe(III), and Tc(IV).

**Methods**

Under anaerobic conditions (e.g., <36.5% O2), potassium ferrioxalate (Fe(VII)) was reacted with aqueous Fe(II) at pH > 6. Microorganisms or biogenic Fe(II) were more important in the reduction of Fe(VII) in anoxic environments of ferrihydrite. Microbiologically mediated Fe(II), Fe(III), and electron donor. Fe(II) is used to stabilize a bioavailable Fe(VII) oxide present in small amounts at Oak Ridge and Hanford sediments.

**Results and Discussion**

**Nature of the Redox Products**

- The Fe(VII) products were ferrihydrite (Fe(VII)), and hematite were analyzed by X-ray diffraction. Fe(II)-rich ferrihydrite with minor magnetite. A heterogeneous reduction mechanism is implied.

**Conclusions**

- The Fe(VII) product was similar in the Fe(III)-rich and Fe(VII)-rich systems with Fe(VII) and Fe(III). The Fe(VII) product was similar in the Fe(III)-rich and Fe(VII)-rich systems with Fe(VII) and Fe(III). The Fe(VII) product was similar in the Fe(III)-rich and Fe(VII)-rich systems with Fe(VII) and Fe(III). The Fe(VII) product was similar in the Fe(III)-rich and Fe(VII)-rich systems with Fe(VII) and Fe(III). The Fe(VII) product was similar in the Fe(III)-rich and Fe(VII)-rich systems with Fe(VII) and Fe(III). The Fe(VII) product was similar in the Fe(III)-rich and Fe(VII)-rich systems with Fe(VII) and Fe(III). The Fe(VII) product was similar in the Fe(III)-rich and Fe(VII)-rich systems with Fe(VII) and Fe(III). The Fe(VII) product was similar in the Fe(III)-rich and Fe(VII)-rich systems with Fe(VII) and Fe(III). The Fe(VII) product was similar in the Fe(III)-rich and Fe(VII)-rich systems with Fe(VII) and Fe(III). The Fe(VII) product was similar in the Fe(III)-rich and Fe(VII)-rich systems with Fe(VII) and Fe(III).