ABSTRACT

Long-term field manipulation experiments investigating the effects of subsurface redox conditions on the fate and transport of tetravalent U(VI) were conducted at the OR-IFRC over a 3-year period. In situ bioreduction of U(VI) by introduced reducing populations, such as denitrifying Betaproteobacteria, reduced bacterial communities coupled with the immobilization of uranium. The immobilization of U(VI) in the subsurface has also been shown to occur in areas of anaerobic conditions through the reduction of U(VI) to U(IV), but that under both aerobic and anaerobic conditions, U(IV) can be oxidized and immobilized (above). Prior work has demonstrated that U(VI) can be effectively removed from groundwater by reducing bacteria from the genera Desulfobacca, Desulfosporosinus, and Thiobacillus. However, the potential for the subsurface to serve as a sink for uranium has not been fully characterized. We have employed a suite of molecular techniques from cloning and sequencing to qPCR to profile the diversity of populations in samples collected from the subsurface of the Area 3 treatment zone at the OR-IFRC. We have also performed qPCR to profile the diversity of populations in samples collected from the subsurface of the Area 3 treatment zone at the OR-IFRC. We have also performed qPCR to profile the diversity of populations in samples collected from the subsurface of the Area 3 treatment zone at the OR-IFRC. We have also performed qPCR to profile the diversity of populations in samples collected from the subsurface of the Area 3 treatment zone at the OR-IFRC. We have also performed qPCR to profile the diversity of populations in samples collected from the subsurface of the Area 3 treatment zone at the OR-IFRC. We have also performed qPCR to profile the diversity of populations in samples collected from the subsurface of the Area 3 treatment zone at the OR-IFRC.