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How – and Why – Do Natural Microbes Remove Nitrate and Selenium from Mine-Affected Water

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Microbes living on the surface of mined rock have the capacity to transform soluble and toxic nitrate and selenium to non-soluble and non-toxic forms. They don't actually do it to help us, but rather to facilitate their own growth and well-being. These organisms live in diverse communities within microscopic ecosystems under chemical conditions that influence their ability to clean up nitrate and selenium. Using the tools of biotechnology to better understand the capacity of native microbes to stabilize mined rock and treat mine-affected water, and in collaboration with industrial research partners, we have successfully developed *in situ* biogeochemical methods for nitrate and selenium removal. Starting with proof-of-principle tests literally in test tubes, our team has scaled up the *in situ* bioremediation process to now treat more than a million gallons per day of mine water.