

## **Mineralogy of Quaternary Sediments of the Kern River Alluvial Fan, Kern Water Bank, California**

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Drill chip samples were examined using petrography and x-ray diffraction as part of a larger project to characterize the sediments and sedimentary architecture of the Kern Water Bank and also to investigate the source of arsenic in groundwater produced from some wells. Samples were taken from two wells located about 1.1 km apart that produce water with significant differences in arsenic abundance. Samples were selected representing the entire range of sand, silt, and shale sizes encountered. These sands are unconsolidated, so textural analysis was not possible.

The samples are arkosic arenites and wackes with roughly equal amounts of quartz and feldspars and roughly equal amounts of plagioclase and K-feldspars. Rock fragments are dominated by granitic microphanerites, but minor amounts of metamorphic and sedimentary rocks are also present. Accessory minerals are mostly hornblende and biotite. All of these characteristics are consistent with source rocks in the southern Sierra Nevada. Rare examples of serpentine and hypersthene suggest sources in the Coast Ranges, possibly blown in during dust storms and then reworked by fluvial processes.

Clay minerals include kaolinite, mixed-layer illite/smectite, and minor chlorite. The origins of the clays are still under investigation. Preliminary results suggest that the I/S is detrital, while at least some kaolinite may be authigenic. Chlorite also appears to be authigenic, possibly as a result of biotite alteration, although some large chlorite grains may be detrital.

Plagioclase dissolution is the most obvious diagenetic alteration observed in these sediments and affects grains at all depths, beginning with the shallowest samples (0.65 m). The finest-grained samples contain small amounts of authigenic pyrite. This indicates reducing conditions within these sediments. The possible role of this material as a source of arsenic in groundwater is currently under investigation.