NATURALLY OCCURRING, ACIDIC, METAL-RICH SPRINGS IN THE UPPER ALAMOSA RIVER BASIN, COLORADO

by

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Compelling evidence of natural water-quality degradation was discovered in the Upper Alamosa River basin during an abandoned mine inventory of the Rio Grande National Forest conducted in 1993 and 1994. Dozens of naturally occurring, acidic, metal-rich springs (NOAMS) were observed during the inventory. They ranged from tiny individual seeps to prominent springs which have formed impressive and sometimes spectacular mounds of ferrisinter. NOAMS were found in hydrothermally altered areas near Iron, Alum, Bitter, and Burnt Creeks, and also along the mainstem of the Alamosa River. NOAMS typically have pH values in the 2 to 5 range, but a few were below pH 2. They frequently had high concentrations of dissolved iron, aluminum, and manganese and elevated levels of zinc, copper, arsenic, cobalt.

Terraces of ferriconglomerate up to about 10 meters above stream level, presence of "fossil" or dry NOAMS, and extensive exposures of deeply eroded, strongly hydrothermally altered rock suggest the natural degradation has been an ongoing process at least for thousands of years and perhaps much longer. Comparisons between metal loadings from natural and mining sources in the segment of the Alamosa River above its confluence with Wightman Fork indicate mining sources are responsible for only a very minor amount of the dissolved metals in the river above the confluence with Wightman Fork. A realistic assessment of the remediation goals at the Summitville Superfund site should consider the natural degradation.

Based on analyses of ferrisinter and water collected from several NOAMS, the concentrations of iron, aluminum, arsenic, and copper in the precipitate correlates with that in the NOAMS. This suggests the trace element geochemistry of old ferro-deposits may be somewhat useful in predicting the chemistry of the water from which it was precipitated.

REFERENCES

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