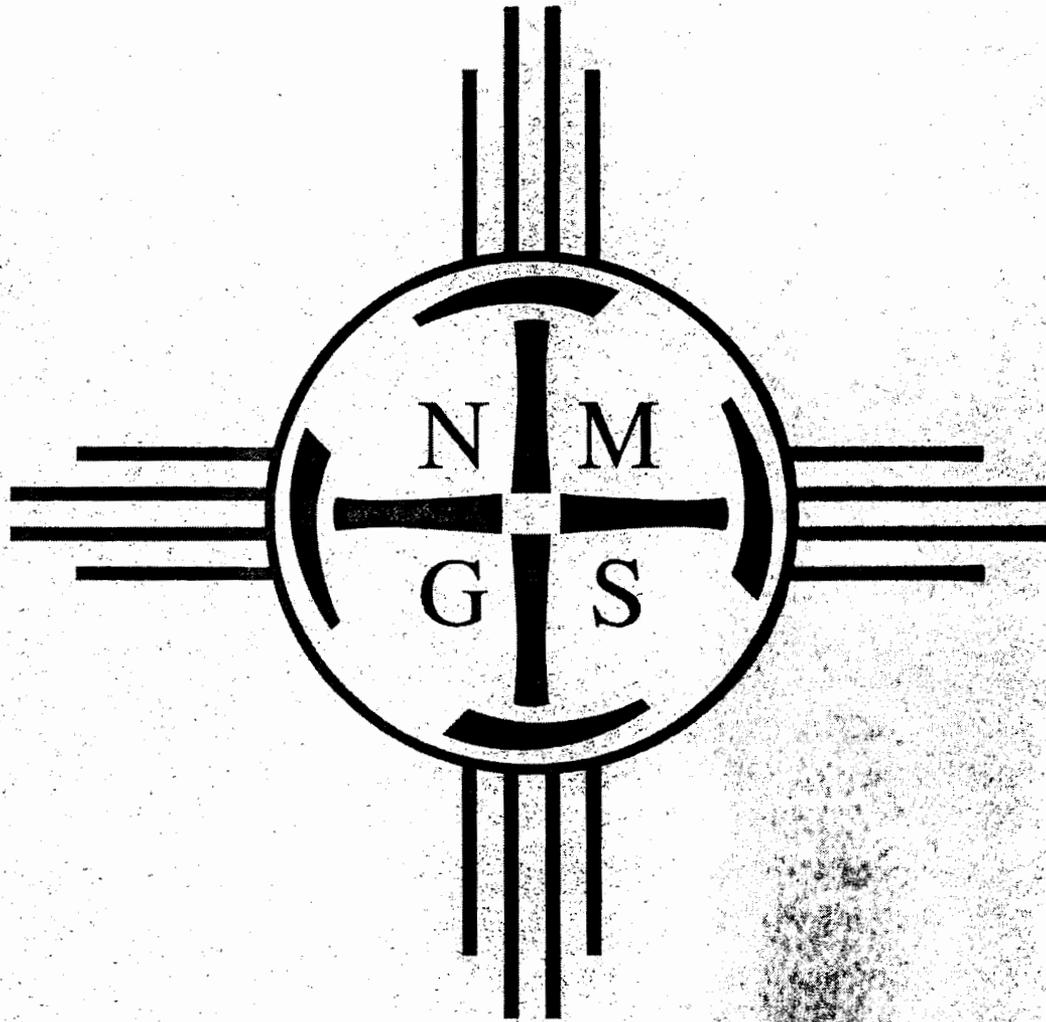


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## ASSESSING GROUND-WATER RECHARGE THROUGH THE PAJARITO FAULT ZONE, UPPER PAJARITO CANYON, LOS ALAMOS, NEW MEXICO

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Limited knowledge exists concerning the role of the Pajarito fault zone (PFZ) as a ground-water recharge mechanism (conduit and/or barrier) within the Los Alamos region. Consequently, the NMED DOE Oversight Bureau initiated a study to determine if surface water loss in upper Pajarito Canyon is occurring within the PFZ. General hydrologic conditions include a perennial surface-water reach flowing west to east for approximately 2.4 km upstream of the PFZ. This reach is supplied by seeps and springs at about 2,740 m. Approximately 1.9 km downstream of PA-10.6, three perennial springs discharge from horizontal fractures and/or surge beds at about 2,330 m. Recharge and discharge (water balance) measurements were nearly equivalent. From 1997 through 2003, hydrogeochemical parameters were obtained at PA-10.6 and the springs. Isotopic data suggest that two of the three aforementioned springs (Homestead and Starmer Springs) are chemically and isotopically similar to the PA-10.6 waters. The third spring (Bulldog Spring) contains elevated concentrations of  $^3\text{H}$  and major ions, and is slightly enriched in  $\delta\text{D}$  and  $\delta^{18}\text{O}$  compared to water at PA-10.6, suggesting a different recharge source. Solutes produced from the Cerro Grande fire (May 2000) introduced tracers that show direct links between water at PA-10.6 and the downgradient springs. Subsequent summer-monsoon flooding in the upper reach of Pajarito Canyon impacted water quality at PA-10.6. The combined data indicate that some springs are supplied by waters that percolate into the PFZ (Homestead and Starmer) while other nearby springs are recharged independent of the PFZ (Bulldog).