

ANTELOPE DAM, INDIAN CREEK FAULT INVESTIGATION,
PLUMAS COUNTY, CALIFORNIA, PHASE I FINDINGS

Don F. Hoirup Jr.
Sean Dunbar
Chris Hitchcock
Rob Barry

State of California
Department of Water Resources
Division of Engineering, Project Geology Section

ABSTRACT

The California Department of Water Resources (DWR) owns and operates Antelope Dam, located in Plumas County, California. The Indian Creek fault (ICF) is projected to be within one kilometer of Antelope Dam and is considered “inactive” by the Division of Safety of Dams (DSOD); however, DSOD recognizes the need for a comprehensive review of the seismotectonic setting of the Mohawk-Honey Lake Shear Zone that includes the ICF.

The ICF is a well-defined linear geomorphic structure optimally oriented to accommodate slip within the northern Walker Lane Shear Zone. Indian Creek generally defines the location of the ICF; however, large deep-seated landslides along the eastern side of the canyon appear to deflect the creek channel towards the west initiating active shallow surficial landslides along the west bank of the creek. The toes of the large landslides east of Indian Creek cover the projected trace of the ICF in some locations. These landslide-covered fault areas are expressed at the surface, in some locations, with linear closed depressions orientated in the direction of fault strike and other anomalous geomorphic features. These closed depressions and other anomalous geomorphic features may be the result of landslide deposits deformed by recent faulting along the ICF.

The area along and around Indian Creek in northern Plumas County has not been geologically studied in detail. No published or unpublished information specifically addressing the ICF has been found during research efforts. Discussions with geo-science professionals familiar with the regional have not reveal significant insight on the ICF. Historical seismic records going back to 1984 indicate that the area around Antelope Dam is seismically quiet, except for the Honey Lake fault zone and Mohawk Valley fault zone.

In September 2012, the DWR Director’s (Dam) Safety Review Board (Board) completed their inspections of three DWR Upper Feather River dams, including Antelope Dam. In January 2013, the Board prepared recommendations based on their review of literature and field inspections. The Board recommended that

DWR assess the past activity of the ICF and include the fault in future seismic hazard analyses, if appropriate.

During the summer/fall of 2014 DWR Project Geology Section (Project Geology) contracted with Chris Hitchcock of InfraTerra to assist with geomorphic field interpretations of possible fault related features along Indian Creek. In total, Project Geology spent about three and one-half days in the field investigating the geology along Indian Creek from the north end of Antelope Lake to the northwest past Red Rock Peak, a distance of about 18 kilometers. This effort was phase I or a proposed multiphase investigation.