

DIVISION OF MINES AND GEOLOGY

DIVISION HEADQUARTERS

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August 12, 1980

Bob Jackson, Chief
Geosciences Branch
Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Bob:

Following is the Division of Mines and Geology Position Statement on Trail 5 "offset feature", San Onofre Beach State Park.

An offset feature reported exposed in the wall of a deeply incised canyon at Trail 5 of the San Onofre State Beach Park was visited on June 10, 1980 by geologists S. Tan, M. Kennedy, and A. Barrows of the California Division of Mines and Geology. Barrows made an additional visit on June 24 to investigate several aspects of the surrounding geology.

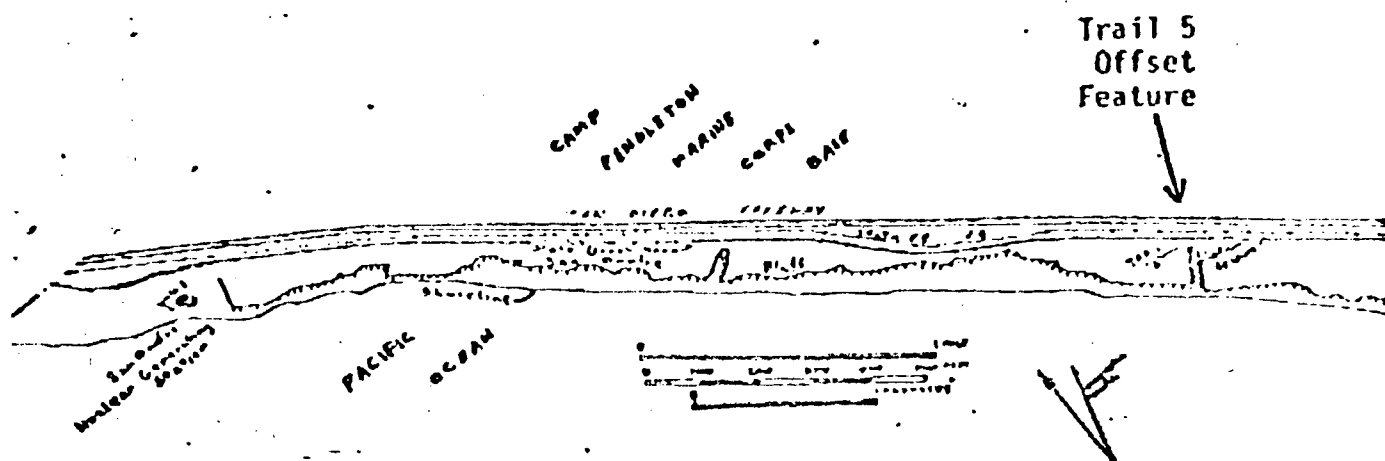


Figure 1. Index map of Trail 5 San Onofre Beach State Park

The offset feature is located along Trail 5 which is an access path to the beach from the parking and camping area of the State Park (figure 1). Trail 5 is about 18,000 feet (3 miles and 2,000 feet) south of Unit 1 of the San Onofre Nuclear Generating Station. The path follows the course of a deep arroyo with steep to nearly vertical banks that has been eroded into nonmarine older alluvium. The brown to red-brown alluvium varies from clay to coarse cobble gravel that consists mostly of clasts recycled from the Catalina Schist-bearing San Onofre Breccia derived from upslope to the northeast. The alluvium is stratified and reasonably well consolidated (witness the steep banks) but generally poorly sorted. As can be seen at the mouth of Trail 5 arroyo the nonmarine alluvium overlies a thin deposit of marine sand and cobble gravel (beach shingle) that was deposited upon the wave-cut platform of the (presumably) Nestor terrace.

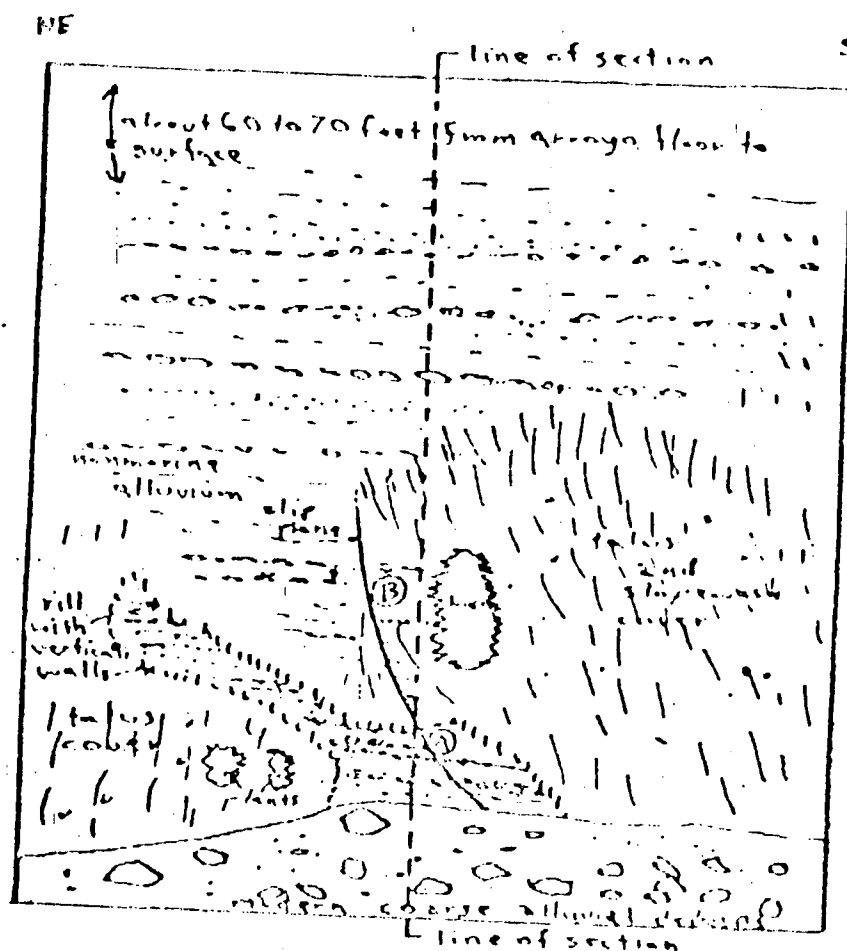


Figure 2a. Sketch of southeast wall of Trail 5 arroyo at "offset feature." "A" and "B" are location of attitudes mentioned in text. Scale approximately 1"=10'.

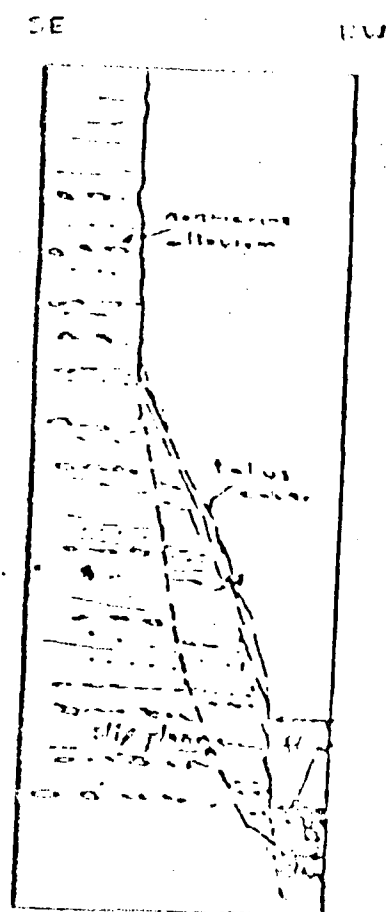


Figure 2b. Cross section of arroyo wall at "offset feature"

Near the base of the east wall of the arroyo and about 600 feet inland from the shoreline, where the walls of the arroyo are at least 60 feet high (estimated), a curvilinear surface intersects the stratified alluvium. This is the "offset feature" of Trail 5 (figure 2). A block of alluvium approximately 10 to 12 feet above the modern stream gravel on the arroyo floor has dropped down on the southeastern (seaward) side along a slip plane which can be followed for about 10 feet above the floor. In detail the plane is curving, slightly more moist (darker colored clay), locally contains rootlets in the upper part, and varies in attitude from N 10° W 32° SW about 3.5 feet above the floor of the arroyo (point A in figure 2) to N 30° W 60° SW about 8 feet above the

floor of the arroyo (point B in figure 2). The block of well-consolidated alluvium contains gravel beds that exhibit separation of about 16 inches (down on the southeast) compared with "in place" beds in the walls of the arroyo where they were traced across the slip plane. The surface of the block of alluvium is mostly covered with talus and slopewash debris so that individual beds of alluvium cannot be traced across the face of the block (figure 2).

Under certain lighting conditions, as viewed from the bottom, it appears as though a "crack" extends toward the surface beyond the actually dug out intersection of the slip plane with the wall of the arroyo (which makes a line). However, when viewed from the top of the northwestern bank of the arroyo directly opposite (with 8-power binoculars) in afternoon sun no such feature extends to the surface nor can offset layers be seen higher up in the section exposed in the walls of the arroyo.

In conclusion, it appears that the "offset feature" is the result of the intersection of a slip plane with the wall of the arroyo, and is not a fault feature of tectonic significance.

This intersection makes a line along which several layers can readily be seen to have been offset by the slumping of a block of the nonmarine alluvium. The slip plane behind this slump block probably "daylights" above the block (about 12 to 15 feet above the arroyo floor) although slopewash and talus obscures the relations at present. Slumps are common along the walls of this arroyo and large landslides are typical in the alluvium along the seacliffs nearby. Rapid runoff during storms must be very erosive to the base of the arroyo walls in the narrow confines of this gorge. Accordingly, high volume intermittent streams can create undercut banks which can slump under the force of gravity. Because of the coarse modern debris that chokes the floor of the Trail 5 arroyo the base of the slump bound by the slip plane described above cannot be seen. The shallower dip near the bottom of the exposure (point A in figure 2), however, permits the inference that the feature does not extend to any great depth beneath the present exposure. At the elevation of the present arroyo floor it is probably 20 to 25 feet down to the terrace (wave-cut) platform.

Sincerely,

J. F. Davis
James F. Davis
State Geologist

cc: Priscilla C. Grew