Supplemental road log 3: Cerrillos to I-25 via Waldo

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SUPPLEMENTAL ROAD LOG 3, CERRILLOS TO I-25 VIA WALDO

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SUMMARY

This supplemental log highlights Cretaceous stratigraphy and dikes related to the Cerrillos Hills magmatic center, and affords excellent overlooks of the eastern structural margin of the Santo Domingo Basin at several locations. The route ends at I-25 at the top of the La Bajada fault escarpment. The route is entirely contained on the geologic map of Bachman (1975). Note: Most of this route is on well-graded gravel road, easily passable for two-wheel-drive vehicles in *dry* weather. The road bed is, however, constructed on bentonitic Cretaceous shale and should not be attempted by any type of vehicle when wet.

Mileage

0.0 Intersection of NM-14 and Main St. (turn off for Cerrillos Business District). Drive west on Main St. into Cerrillos. **0.3**

0.3 Stop sign. Intersection of Main Street and First Street in the center of the village of Cerrillos; **turn right on First Street**. The village of Los Cerrillos got its start in 1879 when silver, gold and copper were "rediscovered" in the adjacent Cerrillos Hills where metal ore and turquoise had been mined in previous centuries by Pueblo Indians and Spaniards. The mining activity greatly decreased by the end of the 19th century. The rustic storefronts and dirt streets have served as the backdrop for many Hollywood movies produced both for television and the big screen. **0.1**

0.4 Cross Santa Fe Railroad tracks. Pavement ends. **Turn left on County Road 57. 0.1**

0.5 Cross San Marcos Arroyo. **0.2**

0.7 View to the south, across Galisteo Creek, of the Ortiz Mountains that, like the Cerrillos Hills to the immediate north, are late Eocene and Oligocene intrusions with associated precious-metal mineralization. **0.1**

0.8 View straight ahead of Devil's Throne (Fig. S-3.1), an irregular discordant intrusion of hornblende-latite porphyry into Cretaceous Mancos Shale. The Devil's Throne intrusion is part of the early calc-alkaline magmatic history of the Cerrillos Hills. **0.4**

1.2 Road climbs steep grade in a narrow belt of Mancos Shale flanked to both north and south by intrusive rock. Contact of contact-metamorphosed shale and Devil's Throne intrusive on left side of road. **0.3**

1.5 Columnar-jointed sill in Mancos Shale on left. **0.3**

1.8 Roadcut and borrow pit in Quaternary alluvium. **0.1**

1.9 Cattleguard. **0.2**

2.1 Cottonwood grove and foundation ruins on left mark the site of the town of Waldo. This small community was founded in the early 1880s but did not become economically viable until 1892, when it became the junction for the Santa Fe Railroad and a spur line to Madrid, about 12 mi to the south, where coal was mined for use by the railroad. At one time, coal was also mined in Waldo Gulch, the most significant tributary to Galisteo Creek which is visible almost directly to the south. For about 10 years this coal was coked in ovens built in Waldo. After these local mines were closed, Waldo continued to serve in a support role to the continually growing coal-mining community at Madrid. Most importantly, all of Madrid's water, 150,000 gallons per day, was hauled in large tank cars, four times daily, from wells at Waldo (Sherman and Sherman, 1975). When the Madrid coal mines closed in 1954, Waldo quickly slipped into obscurity as a ghost town. **0.6**

2.7 Roadcut in north-northeast trending dike intruded into Mancos Shale. More than a dozen such dikes radiate from a point in the northern Cerrillos Hills (Stearns, 1953a). **0.7**

3.4 Good view to right at top of grade into the Cerrillos Hills. The highest point is Cerro Bonanza (7088 ft). **0.2**

3.6 Roadcut on right through dike cutting Mancos Shale. **0.2**

3.8 Roadcut exposes ridge-forming dike and contact-metamorphosed shale. **0.1**

3.9 View to the south (left) of the eastward dip slope of the Sandia Mountains on the skyline. **0.6**

4.5 Cattleguard. **0.2**

4.7 Outcrops on both side of road of Niobrara Member of the Mancos Shale. This particular interval is a coarsening-upward sequence of silty shale to thin-bedded, very fine-grained sandstone that Bachman (1975) tentatively correlated to the El Vado Sandstone in the San Juan Basin. **0.3**

5.0 Ridge crossing from right to left beyond curve in road is held up by a dike intruded into the Mancos Shale. This dike is exposed at Stop 1. **0.3**

5.3 **STOP 1. Mancos Shale and dike; overview of margin of Santo Domingo basin.** Pull off onto right shoulder and

FIGURE S-3.1. Devil's Throne, located just to the right of this gallery near Cerrillos, is an Oligocene hornblende-latite porphyry emplaced in the Mancos Shale. Photo by P. Bauer.

park (large groups may prefer to drive past the roadcuts and park along the wash). Views to the south include the Ortiz Mountains flanked by the type Ortiz erosional surface of Kirk Bryan (1938). This surface, which is approximately 3 Ma (Bachman and Mehnert, 1978), is generally regarded as the highest pediment in the Rio Grande valley, although correlation from its type area has been ambiguous in many cases (Bachman and Mehnert, 1978). As viewed here, the surface is defined by Bachman and Mehnert (1978) as being on *top* of the Tuerto Gravel of Stearns (1953b), which rests on a yet older erosion surface. To the right of the eroded margin of the Ortiz surface are notable east-dipping cuestas eroded from Cretaceous Menefee Formation sandstones and sills intruded into the Upper Cretaceous section. These eastward dips characterize the local structure in the footwall of the La Bajada fault, which trends northward from near the west base of the Ortiz Mountains and separates the dissected Mesozoic sedimentary and Eocene-Oligocene intrusive rocks, to the east, from the rolling, lower-relief hills underlain by Cenozoic basin fill to the west. The La Bajada fault marks the eastern margin of the Santo Domingo basin within the Rio Grande rift. It is the northernmost of a series of en echelon, right-stepping normal faults that form the eastern margin of the Rio Grande rift north of the Sandia Mountains.

Roadcuts at this site expose the Niobrara Member of the Mancos Shale. Limonitic, calcareous septarian concretions as large as 6 ft in diameter have weathered out of the shale to form numerous brown lumps on adjacent hillsides. The shale is a fissile siltstone containing numerous trace fossils, of which *Chrondrites* is most abundant, with thin, very-fine sandstone beds characterized by flat bases and undulating tops. These sandstone beds contain hummocky cross-laminae and abundant finely macerated terrestrial plant fragments that are conspicuously absent in the dark siltstone. The sandstone layers, therefore, are interpreted as distal storm beds (Fig. S-3.2). Bivalve shells (oysters and fragments of large Inoceramid shells with prismatic-calcite shell structure), molds and casts of high-spired gastropods, and rare ammonoids (coiled and straight varieties) are present as fossils in this roadcut and on the adjacent hillslopes.

FIGURE S-3.2. Storm-deposited sandstone lens within the Mancos Shale at Stop 1.

An approximately 15-ft-wide pyroxene-latite-porphyry dike cuts the shale at the west end of the roadcut (Fig. S-3.3). The composition of this dike is typical of the alkaline phase in the development of the Cerrillos Hills magmatic system. The dike rock is highly altered and the alteration emphasizes the zoning within the abundant plagioclase phenocrysts. Examination of the contact between the dike and adjacent shale in the roadcut, in the roadbed, and along the arroyo bottom along the south side of the road demonstrates that a short, approximately 100-ft-long, segment of the dike is displaced to the east from the dominant dike trend. There are no obvious faults to account for this displacement, suggesting that the discontinuity is related to the intrusion process.

Continue drive westward. **0.3**

5.6 View to west (left) of Pliocene Cuerbio basalt of Stearns (1953b), resting unconformably on Mesozoic sedimentary rocks adjacent to the La Bajada fault scarp. Southern part of the Jemez Mountains volcanic field forms the western skyline on the west side of the rift. Cerrillos Hills visible to the east. **0.4**

6.0 Dike exposed along wash on right. This basaltic dike is one of many such dikes in this area that trend north-south parallel to the La Bajada fault (Stearns, 1953b; Bachman, 1975) These dikes are unrelated to Cerrillos Hills magmatism, but may be related to the Pliocene basalts of

FIGURE S-3.3. Contact of Oligocene pyroxene-latite porphyry dike (left) with Mancos Shale (right) at Stop 1. Light-colored outcrop in roadside ditch in lower right is also dike rock.

Cerros del Rio, to the north, or to lower Miocene basalts that are also known in the region (Baldridge et al., 1980). **0.5**

6.5 Alluvial and eolian sediment of the Tuerto Gravel resting on pediment cut on Mancos Shale. **0.2**

6.7 Cattleguard; pavement resumes. Cuerbio basalt visible along streamcuts to left and right of the road. This alkali-olivine basalt is 2.7 ±0.1 Ma (K-Ar date reported by Bachman and Mehnert, 1978) and forms the Mesita de Juana Lopez, the southern edge of the Cerros del Rio volcanic field. **0.2**

6.9 View straight ahead of Tetilla Peak, a dacite dome surmounting an andesite shield within the Cerros del Rio volcanic field (Zimmerman and Kudo, 1979). An unnamed cinder cone can be seen adjacent to I-25. Jemez Mountains form the western skyline. Southern Sangre de Cristo Mountains visible to the north. **0.8**

7.7 A highway department borrow pit was reclaimed along the left side of the road at this site in fall 1993. **0.5**

8.2 Intersection with frontage road. **0.1**

8.3 Intersection with northbound I-25; then intersection with southbound I-25; end of County Road 57.

End of Supplemental Log 3.