Appendix 6. Petrographic descriptions of hand samples from the eastern Socorro caldera. Hand samples are equivalent to samples dated using the $^{40}Ar/^{39}Ar$ method. Sample descriptions by R.M. Chamberlin. Sample numbers keyed to Table 1, Fig. 4 and Appendix 1.

Sample No.

1. **Phenocryst-rich rhyolite ignimbrite (hydrothermally altered):** Pinkish gray rhyolite with abundant (30-40%) fine- to medium-grained phenocrysts of chalky white plagioclase, clear sanidine, quartz and biotite. Sparse clasts (2-4%) of reddish brown andesites (and rare schist clasts, in outcrop) are indicative of pyroclastic origin. At top of caldera-wall facies of intracaldera Hells Mesa Tuff (Thw) near Chupadera Spring, LLZ-36.

2. **Phenocryst-rich, rhyolitic ignimbrite breccia (K-metasomatized)**: Light gray with clasts of pale red spherulitic rhyolite; contains abundant (40-50%) phenocrysts of fine-to coarse-grained (1/2-5 mm) plagioclase (altered to white clay), clear sanidine, large glassy quartz and biotite. Small clasts (0.5-4 cm) of spherulitic rhyolite help indicate pyroclastic origin, but pumice fiamme' are lacking. Bedded facies of uppermost intracaldera Hells Mesa Tuff at Black Canyon (Thuf), KMET-93-58.

3. **Phenocryst-rich spherulitic rhyolite (K-metasomatized?)**: Pale red rhyolite with very abundant (~55 %) fine- to coarse-grained phenocrysts (1-8 mm) of plagioclase (altered to white clay), sanidine, quartz and biotite in finely spherulitic matrix. Seriate texture of small to large phenocrysts; large tabular and zoned sanidines are mostly euhedral. Post-collapse ring-fracture lava dome (Tre) compositionally equivalent to the Hells Mesa Tuff, located 1 km east of Esperanza Mine, LLZ-41.

4. **Cobble of spherulitic rhyolite**: Dense pale red rhyolite with moderately abundant (7-10%) phenocrysts of fine- to medium-grained (1-2 mm) quartz, sanidine, plagioclase and biotite in microspherulitic groundmass. Lack of pumice or vitroclastic texture suggests cobble derived from a lava flow. Cobble from upper conglomerate bed in basal sedimentary member of Luis Lopez Fm (Tzs_1); 0.8 Km south of Nogal Canyon, NM1534B.

5. **Cobble of spherulitic rhyolite**: medium light gray, mottled with pinkish gray spherulites, contains moderately abundant (5-7%) fine- to medium-grained phenocrysts of quartz, sanidine, plagioclase and biotite. No indication of vitroclastic texture or pumice. Cobble from upper conglomerate bed in basal sedimentary member of the Luis Lopez Fm (Tzs_1); 0.8 Km south of Nogal Canyon, NM-1534A. Note: a few cobbles of spherulitic rhyolite at this locality are distinctly flow banded, which suggests their source was a lava flow.

6. **Olivine basalt**: dense, grayish black basalt with sparse (2-4%) fine-grained (1/2-1 mm) phenocrysts of yellowish-green olivine in a very fine to aphanitic matrix. Some olivines partially altered to reddish brown iddingsite. Exhibits hackly fracture of unknown significance. Lower basaltic member of Luis Lopez Fm., trachybasalt flow unit (Tzb) near Nogal Canyon, NM-1532.

7. **Pumiceous rhyolitic ignimbrite (propylitically altered)**: mottled, grayish yellow green with abundant (25-30%) light gray to light pinkish gray pumice lapilli; pumice is mostly aphyric, nonwelded, and altered to clays. Small reddish brown andesite lithic fragments are rare (~1%). Contains very sparse crystals of glassy sanidine (< 1/2%) and traces of biotite within tuffaceous matrix. Lower cooling unit of medial pumiceous tuff member of Luis Lopez Fm (Tzt_1); near east end of Black Canyon, LLZ-34.

8. **Pumiceous, moderately lithic-rich rhyolitic ignimbrite**: mottled, pale red with moderately abundant (10-15%) light pinkish gray pumice lapilli and reddish-brown andesitic lithic fragments (5-7%). Pumice is slightly compacted and tuff is partially welded. Matrix and some pumice contain rare, fine- to medium-grained phenocrysts of clear sanidine plagioclase quartz and trace of biotite. Upper cooling unit of medial pumiceous tuff member of Luis Lopez Fm (Tzt_2) near Nogal Canyon, LLZ-44.

9. **Phenocryst poor rhyolite tuff**: pale red to pale reddish brown, finely banded (streaky), fused (?) tuff, with 2-3% phenocrysts of fine-grained biotite, plagioclase and trace of sanidine (?). Thin dense bed occurs immediately under lava flow, which suggests it was fused from heat of overlying flow. Vitroclastic texture well defined in thin section (77-5-2). Lower tuff unit of Rhyolite of Cook Spring member of Luis Lopez Fm (Tzct), SOC-99-1.

10. **Phenocryst-poor, flow-banded rhyolite lava**: light gray with bands of pinkish gray, 2-4% fine- to-medium-grained phenocrysts of oxidized biotite, sanidine, quartz and cloudy (slightly altered,?) plagioclase. Minor drusy quartz in vugs suggests vapor phase alteration. Lower lava flow in Rhyolite of Bianchi Ranch member of Luis Lopez Fm ($Tzbr_1$), LLZ-99-5F.

11. **Phenocryst-poor rhyolite lava**: light brownish gray, massive to slightly flow banded with 2-3% phenocrysts of fine- to-medium grained biotite (variably oxidized), fresh plagioclase, fine sanidine and trace of quartz. From crystalline interior of large ring-fracture lava dome at Nogal Canyon box. Lower flow unit in Rhyolite of Bianchi Ranch member of Luis Lopez Fm ($Tzbr_1$) in Nogal Canyon, LLZ-99-4

12. **Phenocryst-poor rhyolite lava:** light gray rhyolite, contains sparse phenocrysts of plagioclase, sanidine, and biotite. Upper flow unit in Rhyolite of Bianchi Ranch ($Tzbr_2$) near Nogal Canyon, NM-449. (Note: Sample not available, general description from Eggleston, 1982)

13. **Phenocryst-poor rhyolite dike (K-metasomatized)**: Pale red, mottled with light gray streaks (discontinuous bands) of vapor-phase (?) silica. Sparse (2-3%) fine-to medium-grained (1/2-2mm) phenocrysts of chalky altered plagioclase, clear sanidine and biotite are present. Dike (Tirz) cuts upper Hells Mesa Tuff on south side of Black Canyon at crest of "section 8 ridge," NM-1337.

14. **Densely welded, phenocryst-poor, "flow -banded" rhyolite ignimbrite**: light brownish gray streaked with light gray, highly flattened and stretched pumice. Approx. 1% fine- to medium-grained phenocrysts of clear sanidine, quartz, plagioclase (?) and very fine-grained oxidized biotite. Pumice streaks form 5-10% of rock; fine- grained andesitic lithic fragments

are small (<1 cm) and rare. Pumice lineated when viewed in foliation plane. La Jencia Tuff (Tj) near Nogal Canyon, LLZ-43.

15. **Moderately phenocryst-rich rhyolite dike (K-metasomatized)**: Dark red, massive rhyolite with 10-12% fine to coarse grained phenocrysts of clear sanidine, smaller quartz, minor chalky plagioclase and trace of biotite. Part of composite dike, older andesitic dike and this rhyolite dike (Tirx) cut upper Hells Mesa Tuff just north of Black Canyon, LLZ-9.

16. **Densely welded phenocryst-rich rhyolite ignimbrite (K-metasomatized and hydrothermally altered)**: pale red to grayish red, 35-40% medium-grained (1-3mm) phenocrysts of sanidine, altered vuggy plagioclase, quartz and coppery biotite. Plagioclase replaced by patchwork of adularia; sanidine looks unaltered, clear and glassy. Massive looking, densely (?) welded, trace of red streaks maybe pumice or mafic magma clots; recrystallized groundmass, vitroclastic texture not evident. Trace MnO in veinlets. Upper Lemitar Tuff (Tlu) collected 10 m east of Tower Mine cut, KMET-93-56.

17. **Moderately phenocryst-rich rhyolite intrusion (K-metasomatized)**: Light gray, massive rhyolite with 15-20% fine- to coarse-grained (1-7 mm) phenocrysts of chalky plagioclase, clear tabular sanidine, biotite and trace of quartz. Dike and small plug (Tirs) cut lower Hells Mesa Tuff at west entrance to Red Canyon, LLZ-35.