

Area Adjacent to the Turkey Creek Caldera,  
Cochise County, Arizona—  
Analytic Data and Geologic Sample Catalog

U.S. GEOLOGICAL SURVEY BULLETIN 2021–E



Chapter E

# Area Adjacent to the Turkey Creek Caldera, Cochise County, Arizona— Analytic Data and Geologic Sample Catalog

By EDWARD A. DU BRAY and JOHN S. PALLISTER

Geochemical data for and availability of samples  
collected during geologic mapping of the  
area adjacent to the Turkey Creek caldera

U.S. GEOLOGICAL SURVEY BULLETIN 2021

GEOLOGIC SAMPLING OF THE CHIRICAHUA MOUNTAINS, ARIZONA

U.S. DEPARTMENT OF THE INTERIOR  
BRUCE BABBITT, Secretary



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[Plate is in pocket]

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# Area Adjacent to the Turkey Creek Caldera, Cochise County, Arizona— Analytic Data and Geologic Sample Catalog

By Edward A. du Bray and John S. Pallister

## Abstract

About 400 rock samples were collected during geologic mapping of the area adjacent to the Oligocene Turkey Creek caldera in southeastern Arizona. Energy-dispersive trace-element analyses were conducted for 296 samples, major-oxide abundances were determined for 150 samples, and instrumental neutron activation analyses were conducted for 56 samples. Miscellaneous wet-chemical determinations (FeO, CO<sub>2</sub>, F, and Cl) were made for 29 samples. Determinations of Be, Cr, Ni, Pb, Sn, and Ag were made for 13 samples using a combination of spectrographic and wet-chemical methods. Standard, and in some cases polished, thin sections were prepared for about 220 samples. All of these resources aided map-unit characterization. The availability of chemical data, thin sections, and hand specimens for each of the samples collected in this area is tabulated in this report. Information in this report supplements the geologic map of the Turkey Creek caldera (U.S. Geological Survey Miscellaneous Investigations Map I-2544) and supports ongoing investigations of that area.

## INTRODUCTION

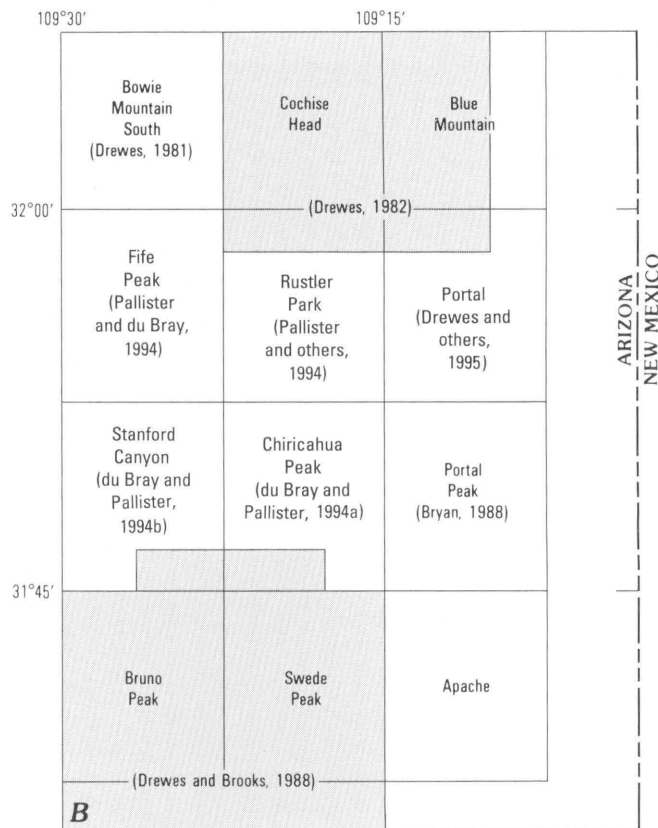
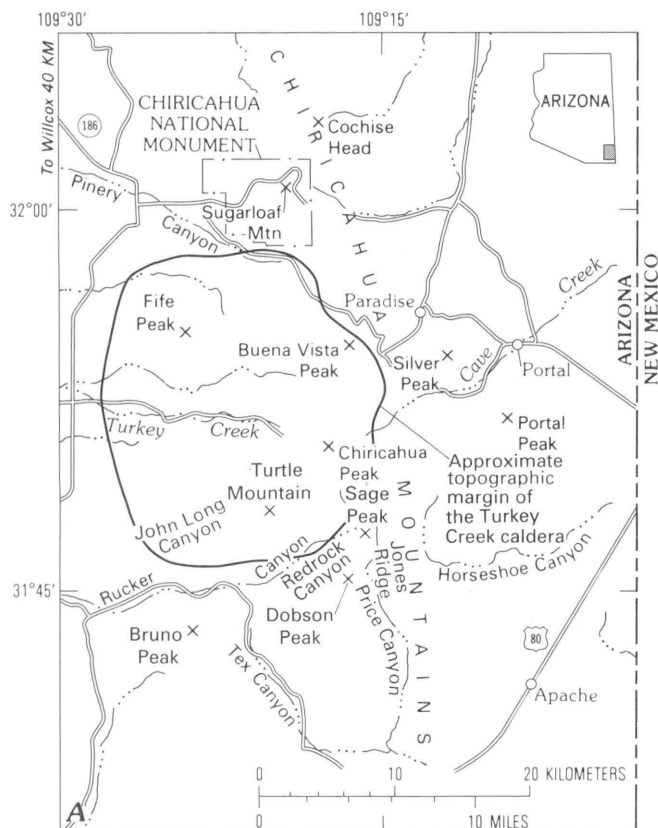
The Turkey Creek caldera (fig. 1) is east-southeast of Tucson, Ariz., in the Chiricahua Mountains, about 60 km southeast of Willcox, Ariz. The Chiricahua Mountains offer unusual ecologic diversity that ranges from Sonoran desert through subalpine environments. Elevations range from about 1,370 m (4,500 ft) on the pediment surface along both flanks of the range to 2,975 m (9,759 ft) at Chiricahua Peak. No paved roads cross the range, but well-maintained unpaved roads along Pinery Canyon, Turkey Creek, Rucker Canyon, and Cave Creek provide access to the central part of the range. Rough, unpaved roads provide access to additional parts of the range, and a well-developed trail system provides reasonably good access to the remainder of the area.

This report supplements similar reports prepared for the four 7.5-minute quadrangles that cover the Turkey Creek caldera and the geologic map of the caldera (du Bray and others, in press), catalogs the treatment of all samples collected in adjacent areas during the course of geologic mapping, lists the availability of chemical data, thin sections, and hand specimens for each of the samples collected in the area adjacent to the caldera (table 1), and provides tabulations of chemical data (tables 2–6) for samples, mostly Tertiary volcanic rocks, that were collected during geologic mapping of the area. The mapping and data collection are part of a continuing volcanologic study of the Chiricahua Mountains in general and of the Turkey Creek caldera in particular. The geology of the area has been summarized by Pallister and du Bray (1989) and by Pallister and others (1990). The data presented herein have contributed to a study concerning evolution of the Turkey Creek caldera (du Bray and Pallister, 1991) and to ongoing topical studies.

## GEOLOGIC OVERVIEW

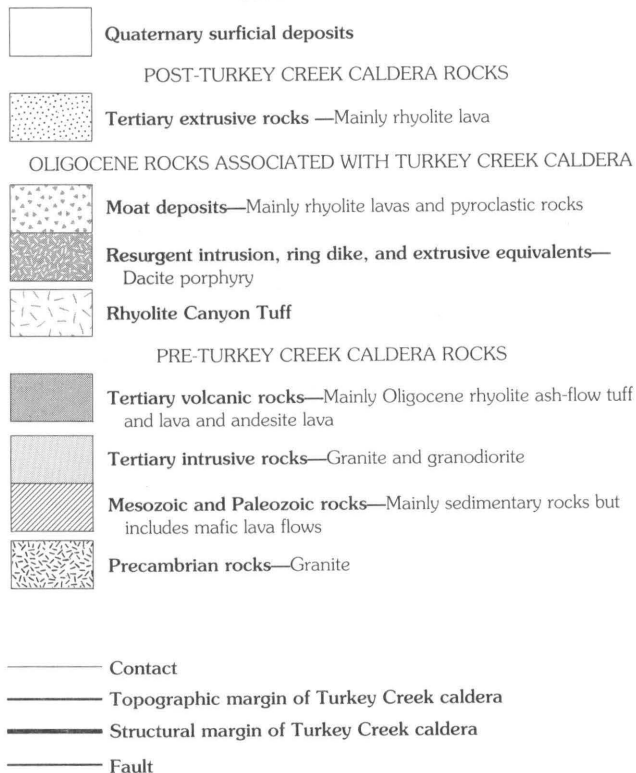
The Turkey Creek caldera is an Oligocene volcanic center that formed during eruption of the 26.9-Ma (du Bray and Pallister, 1991) Rhyolite Canyon Tuff and partial evacuation of an underlying rhyolitic to dacitic magma chamber (Marjaniemi, 1969; du Bray and Pallister, 1991). Caldera evolution involved three distinct phases: (1) eruption of 500–1,000 km<sup>3</sup> of Rhyolite Canyon Tuff and attendant caldera collapse, (2) emplacement of a dacite porphyry intrusion and lava flows, and (3) renewed eruption of high-silica rhyolite as lava flows. The caldera is deeply eroded; volcanic and shallow plutonic rocks are exposed.

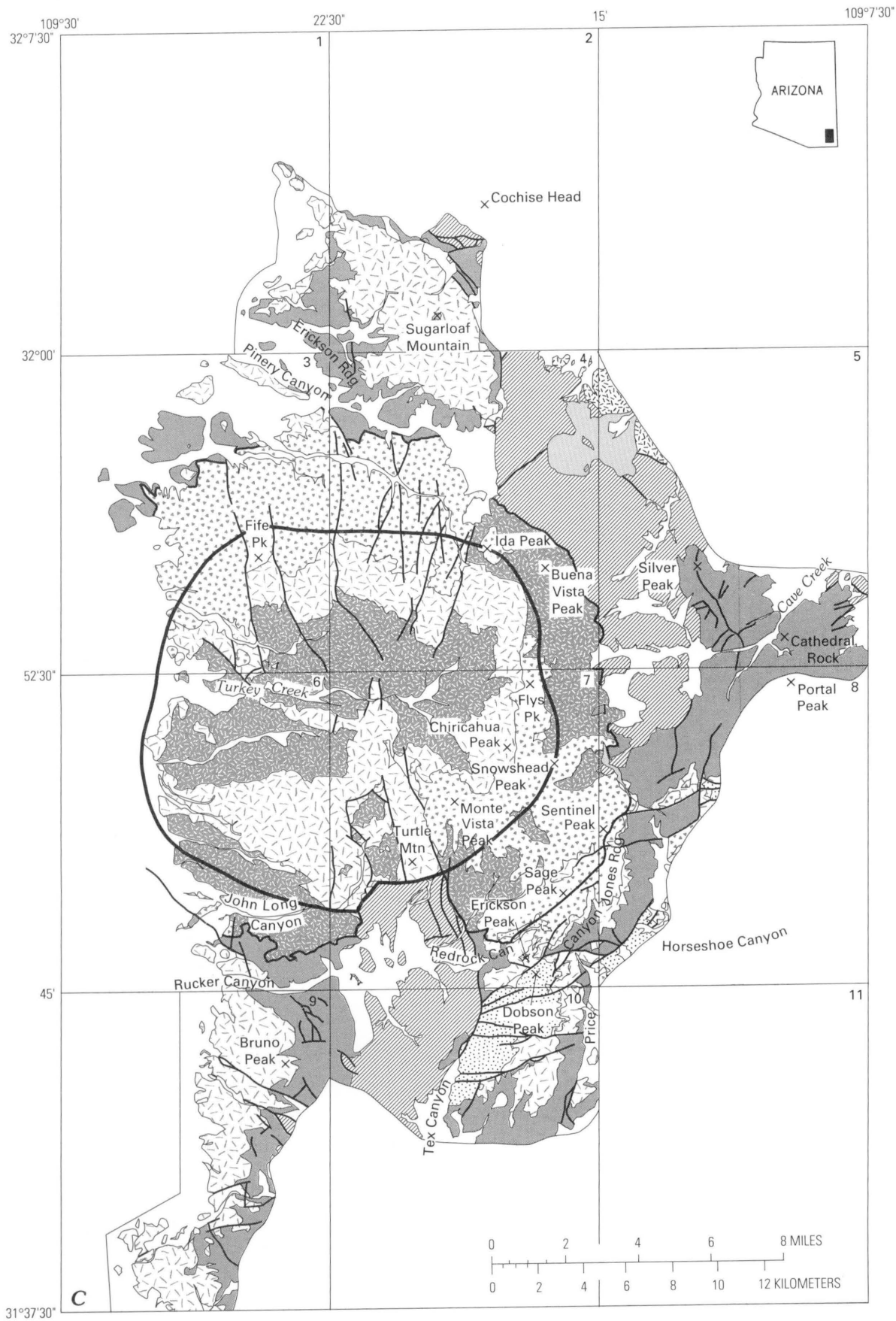
The majority of the rocks that form the topographic margin of the Turkey Creek caldera are older, middle Tertiary volcanic rocks, principally rhyolite ash-flow tuffs (fig. 1C). Sources for these pre-Rhyolite Canyon Tuff ash



**Figure 1 (above and facing page).** Location of the Turkey Creek caldera and important geographic and geologic features in the Chiricahua Mountains area, Cochise County, Arizona. *A*, Area location, roads, and important geographic features. *B*, U.S. Geological Survey quadrangle names in the area and existing geological maps (cited in parentheses). *C*, Generalized geology.

#### EXPLANATION FOR GEOLOGIC MAP ON FACING PAGE





flows, which crop out extensively in the Pedregosa Mountains 9–12 km south of the Turkey Creek caldera, are unknown. The northeast sector of the caldera's topographic margin and a small part of its southern margin are formed, however, by interlayered Mesozoic sedimentary and volcanic rocks. These Mesozoic rocks are underlain by Paleozoic marine sedimentary rocks that were deposited on basement composed of Proterozoic granitoid rocks; the geology of these pre-Cenozoic rocks is more fully described by Drewes (1982) and by Drewes and others (in press).

Andesite lava flows, present throughout the Chiricahua Mountains, signaled the onset of middle Tertiary volcanism in this area but became less abundant as ash flow eruptions became voluminous. The distribution of intermediate composition lavas, probably erupted from overlapping stratovolcanoes throughout the Chiricahua Mountains, is highly irregular and probably reflects eruption onto a dissected topographic surface. Two other areas, Cave Creek and the area east of the mouth of Tex Canyon (fig. 1C, plate 1), are dominated by voluminous, aphyric high-silica rhyolite lava flows that form pre-caldera, coalesced dome fields. A third dome field is indicated by thick accumulations of relatively crystal rich, low-silica rhyolite lava in the Erickson Ridge area (fig. 1C, plate 1).

Chiricahua National Monument, in the northern part of the Chiricahua Mountains (fig. 1A), contains one of the thickest and most complete sections of outflow facies Rhyolite Canyon Tuff; ash flows also ponded within the subsiding caldera to form a thick section of intracaldera facies Rhyolite Canyon Tuff. Thick accumulations of Rhyolite Canyon Tuff in the Monument and at Bruno Peak in the southern part of the map area probably represent filled paleovalleys.

The southwest sector of intracaldera facies Rhyolite Canyon Tuff, north of John Long Canyon, includes a large mass characterized by lava-flow-like textural features. The lava-flow-like phase (unit Trcf of du Bray and others, in press), which is younger than the remainder of intracaldera facies Rhyolite Canyon Tuff, locally appears to be rheomorphic tuff; however, many exposures are distinguished by the presence of flow laminations, unbroken sanidine phenocrysts, and few, if any, lithic fragments. The lava-flow-like phase is compositionally indistinguishable from the remainder of the intracaldera Rhyolite Canyon Tuff. These features suggest that the lava-flow-like phase was erupted by fire fountaining, following the explosive caldera-forming eruption, and formed lava flows within the intracaldera environment.

Shortly after eruption of the Rhyolite Canyon Tuff at 26.9 Ma, dacite porphyry (also 26.9 Ma, du Bray and Pallister, 1991) intruded the structural margin and central part of the caldera; the central area was domed by the dacite intrusion (unit Tdpl of du Bray and others, in

press). Dacite porphyry was erupted from a ring dike within the structural margin and accumulated as a series of thick lava flows (unit Tdpl of du Bray and others, in press) within the caldera moat (du Bray and Pallister, 1991). Rocks having compositions intermediate between those of dacite porphyry and intracaldera facies Rhyolite Canyon Tuff are rare in the Turkey Creek caldera (tables 2–6). Local interbedding of dacite porphyry lava with the lava-flow-like phase of intracaldera tuff suggests that the magmas represented by these rocks were present simultaneously in a magma reservoir beneath the Turkey Creek caldera and that eruption conduits alternately tapped different parts of a layered chamber characterized by a pronounced compositional interface (du Bray and Pallister, 1991).

Following eruption of dacite lava onto the floor of the developing caldera moat, a series of 26.9-Ma (du Bray and Pallister, 1991) rhyolite lava flows (units Tmr1, Tmr2, and Tmr3) small-volume tuffs (units Tmt1, Tmt2, and Tmt3), and sedimentary rocks (unit Tms) (all of du Bray and others, in press) were deposited during the final phase of magmatic activity associated with the Turkey Creek caldera. Subsequently, erosion modified the topographic expression of the caldera; the former topographic high of the caldera margin is in Pinery and Redrock Canyons (fig. 1C, plate 1), whereas erosion-resistant moat lavas and the ring intrusion now form topographic highlands throughout the Chiricahua Mountains.

The structural margin of the caldera, as defined here, consists of the ring-fault system along which the floor of the developing caldera collapsed during the eruption of Rhyolite Canyon Tuff. Caldera collapse caused development of a deep central depression in which intracaldera facies Rhyolite Canyon Tuff accumulated to a thickness of at least 1.5 km. The structural margin (ring fault system) is either concealed by younger deposits or has been intruded by dacite porphyry (unit Tdpl of du Bray and others, in press) along most of its extent; a west-trending segment of the structural margin is exposed about 1.5 km south of Turtle Mountain in the southwestern part of the map area, and the ring fault is partly coincident with the floor of John Long Canyon (fig. 1C, plate 1).

The topographic margin is denoted by the unconformity between caldera fill (intracaldera tuff, wall breccia, or moat deposits) and any older rock. The topographic rim retreated away from the structural margin by landsliding into the depression that developed during caldera collapse. In this process, large amounts of older rock exposed in the walls of the depression calved off and were redeposited as breccia beds on the caldera wall. Syneruptive landslides mixed with ash and pumice forming lithic-rich intracaldera tuff as well as meso- and mega-breccia at deeper levels within the caldera. As eruption and collapse waned, a thin (<1 km) accumulation

of intracaldera facies Rhyolite Canyon Tuff was deposited on older rock that formed the runout surfaces and head-wall scarps of the landslides. The headwall scarps represent the topographic margin of the caldera and are located outboard from the structural margin. Resurgent emplacement of dacite porphyry magma as a laccolith uplifted the center of the caldera and caused development of a caldera moat that was initially flooded with dacite porphyry lava flows and then filled with new high-silica rhyolite moat lavas.

In places, outflow facies Rhyolite Canyon Tuff preserved at the lip of the caldera forms the topographic margin. Moat lavas banked against this outflow tuff overfilled the moat and locally flowed out on top of outflow tuff. In particular, moat deposits (unit Tmr1 of du Bray and others, in press) along the northeast-trending ridge of Sage Peak, in the upper reaches of Price Canyon, on Jones Ridge, and on the east ridge of Dobson Peak, all in the southeastern part of the map area, are interpreted as moat deposits that flowed across the topographic margin after the moat depression in this area was filled by earlier moat deposits.

## ANALYTIC DATA

About 400 rock samples were collected during geologic mapping of the area adjacent to the Turkey Creek caldera. Energy-dispersive trace-element analyses were conducted for 296 samples. Major-oxide abundances were determined for 150 samples. Instrumental neutron activation analyses were conducted for 56 samples. Abundances of FeO, CO<sub>2</sub>, F, and Cl were determined for 29 samples using various wet-chemical methods. Abundances of Be, Cr, Ni, Pb, Sn, and Ag in 13 samples were determined using a combination of spectrographic and wet-chemical methods. Most of the chemical data were used to aid map-unit characterization and stratigraphic correlation.

Sample collection was designed to provide areal representation of rocks, principally Tertiary volcanic rocks, exposed throughout the region of the Turkey Creek caldera. By collecting and analyzing numerous samples from each map unit the limits of chemical variability of the units was established. This procedure is especially important in sampling ash-flow tuffs, many of which are derived from chemically zoned magma chambers (Hildreth, 1981). Chemical data also facilitated lithologic and stratigraphic distinctions that in several instances could not be made during field investigations.

All of the geochemical data presented here were determined in analytical laboratories of the U.S. Geological Survey in Denver, Colo. Major-oxide analyses (table 2) were performed using X-ray fluorescence techniques (analysts, J.E. Taggart, A.J. Bartel, J.S. Mee, and D.F. Siems) (Taggart and others, 1987). Ratios of

molar Fe<sup>2+</sup> versus total iron as Fe<sup>2+</sup> were adjusted to 0.8 and major-oxide abundances recalculated to 100 percent, volatile free. Abundances of selected trace elements (table 3) were determined by energy-dispersive X-ray fluorescence spectroscopy (analysts, E.A. du Bray and D.B. Yager) (Elsass and du Bray, 1982) using <sup>109</sup>Cd and <sup>241</sup>Am radioisotope excitation sources; the accuracy of this type of data is discussed by Sawyer and Sargent (1989). Abundances of selected trace elements (table 4) were determined by instrumental neutron activation analysis (analysts, J.R. Budahn, R.J. Knight, and D.M. McKown) (Baedecker and McKown, 1987). Abundances of FeO (as ferrous iron), CO<sub>2</sub>, F, and Cl (table 5) were determined by wet-chemical methods (analysts, E.L. Brandt and J.D. Sharkey) (Jackson and others, 1987). Abundances of additional trace elements (table 6) were determined by a combination of spectrographic and wet-chemical methods (analysts, C.J. Skeen and M.W. Doughten).

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**Table 1.** Status and treatment of samples collected in the area adjacent to the Turkey Creek caldera, Chiricahua Mountains, Cochise County, Arizona.

[Entry in "Map" column indicates in which of the quadrangles associated sample was collected. BS, Bowie Mountain South; CH, Cochise Head; P, Portal; PP, Portal Peak; R, Rodeo; BP, Bruno Peak; SP, Swede Peak; A, Apache. X indicates data or sample type available, blank indicates data or sample type unavailable. WRM, whole-rock major-oxide analysis (table 2); INAA, neutron activation analysis (table 4); FEO, ferrous iron (table 5); F/CL, fluorine and chlorine (table 5); KEV, energy-dispersive trace-element analysis (table 3); TS, thin section and hand sample available; PTS, polished thin section and hand sample available; REF, reference hand sample available. Map-unit symbols (in parentheses) are as used on the geologic map of the Turkey Creek caldera (du Bray and others, in press)]

| Map                                                   | Sample number | WRM | INAA | FEO | F/CL | KEV | Other data* | TS | PTS | REF | Notes                                      |
|-------------------------------------------------------|---------------|-----|------|-----|------|-----|-------------|----|-----|-----|--------------------------------------------|
| <b>Rhyolite of Dobson Peak (Trdp)</b>                 |               |     |      |     |      |     |             |    |     |     |                                            |
| PP                                                    | 201930        |     |      |     |      | X   |             |    |     |     | Tuff                                       |
| PP                                                    | 201931        | X   |      |     |      | X   |             | X  |     |     | Lava                                       |
| PP                                                    | 201936        |     |      |     |      | X   |             |    |     |     | Tuff                                       |
| PP                                                    | 201937        |     |      |     |      | X   |             |    |     |     | Tuff                                       |
| PP                                                    | 202150        |     |      |     |      | X   |             | X  |     |     |                                            |
| PP                                                    | 202151        |     |      |     |      | X   | 3           | X  |     |     |                                            |
| PP                                                    | 202811        |     |      |     |      | X   |             |    |     |     |                                            |
| SP                                                    | 202920        |     |      |     |      | X   |             |    |     |     |                                            |
| SP                                                    | 202921        | X   |      |     |      | X   |             | X  |     |     |                                            |
| SP                                                    | 202922        |     |      |     |      | X   |             |    |     |     |                                            |
| <b>Swede Peak pyroclastic flows (Ts)</b>              |               |     |      |     |      |     |             |    |     |     |                                            |
| SP                                                    | 202005        |     |      |     |      | X   |             |    |     |     | Crystal-rich, sanidine-quartz lava         |
| PP                                                    | 202035        |     |      |     |      | X   |             | X  |     |     | Aphyric rhyolite lava                      |
| A                                                     | 202036        |     |      |     |      | X   |             | X  |     |     | Crystal-rich, sanidine-quartz-biotite lava |
| PP                                                    | 202149        |     |      |     |      | X   |             |    |     |     |                                            |
| PP                                                    | 202806        | X   |      |     |      | X   |             | X  |     |     |                                            |
| PP                                                    | 202807        | X   |      |     |      | X   |             |    |     |     |                                            |
| SP                                                    | 202909        | X   |      |     |      | X   |             | X  |     |     | Probably lava                              |
| SP                                                    | P726          |     |      |     |      |     |             |    |     | X   |                                            |
| SP                                                    | P728          |     |      |     |      |     |             |    |     | X   |                                            |
| <b>Sanidine porphyry (Tsp)</b>                        |               |     |      |     |      |     |             |    |     |     |                                            |
| SP                                                    | 202910        | X   |      |     |      | X   |             | X  |     |     |                                            |
| SP                                                    | 202911        | X   |      |     |      | X   |             | X  |     |     |                                            |
| SP                                                    | 202919        | X   |      |     |      | X   |             | X  |     |     |                                            |
| SP                                                    | P714          | X   |      |     |      | X   |             |    |     |     |                                            |
| <b>Aphyric rhyolite lava-unit 1 (Tmr1)</b>            |               |     |      |     |      |     |             |    |     |     |                                            |
| PP                                                    | 201744        |     |      |     |      |     |             |    |     |     | Lost                                       |
| A                                                     | 202003        | X   |      |     |      | X   |             |    |     |     | Devitrified version of 202004 glass        |
| A                                                     | 202004        |     |      |     |      | X   |             |    | X   |     | Glass                                      |
| PP                                                    | 202019        |     |      |     |      | X   |             |    |     |     |                                            |
| PP                                                    | 202148        |     |      |     |      | X   |             |    |     |     |                                            |
| PP                                                    | 202805        |     |      |     |      | X   |             |    |     |     |                                            |
| PP                                                    | 202808        |     |      |     |      | X   |             |    |     |     |                                            |
| PP                                                    | 202812        |     |      |     |      | X   |             |    |     |     |                                            |
| PP                                                    | 202814        |     |      |     |      | X   |             |    |     |     |                                            |
| PP                                                    | 202818        |     |      |     |      | X   |             |    |     |     |                                            |
| PP                                                    | 202819        |     |      |     |      | X   |             |    |     |     |                                            |
| PP                                                    | 202891        |     |      |     |      | X   |             |    |     |     |                                            |
| PP                                                    | 202894        |     |      |     |      | X   |             |    |     |     | Secondary silica along flow laminations    |
| SP                                                    | 202908        |     |      |     |      | X   |             |    |     |     | Overlies 5-m-thick black glass             |
| SP                                                    | 202912        |     |      |     |      | X   |             |    |     |     |                                            |
| PP                                                    | P606          |     |      |     |      | X   |             |    |     |     |                                            |
| PP                                                    | P607          |     |      |     |      | X   |             |    |     |     | Devitrified version of P607B glass         |
| PP                                                    | P607B         |     |      |     |      |     |             |    | X   |     | Glass with sanidine                        |
| PP                                                    | P735          |     |      |     |      | X   |             |    |     |     |                                            |
| <b>Aphyric rhyolite tuff-unit 1 (Tmt1)</b>            |               |     |      |     |      |     |             |    |     |     |                                            |
| PP                                                    | 202817        |     |      |     |      | X   |             |    |     |     |                                            |
| <b>Maroon sanidine porphyry lava flows (Ttp)</b>      |               |     |      |     |      |     |             |    |     |     |                                            |
| PP                                                    | 202809        |     |      |     |      | X   |             |    |     |     |                                            |
| <b>Dacite porphyry lava flows of east ring (Tdpl)</b> |               |     |      |     |      |     |             |    |     |     |                                            |
| CH                                                    | 201533        | X   | X    |     | X    | X   |             |    | X   |     | Glass atop Sugarloaf Mountain              |
| P                                                     | 201543        |     |      |     |      | X   |             |    | X   |     |                                            |
| PP                                                    | 201745        |     |      |     |      | X   |             |    |     |     | Extrusive?                                 |
| PP                                                    | 201747        |     |      |     |      | X   |             |    |     |     |                                            |

**Table 1.** Status and treatment of samples collected in the area adjacent to the Turkey Creek caldera, Chiricahua Mountains, Cochise County, Arizona—Continued.

| Map                                                              | Sample number | WRM | INAA | FEO | F/CL | KEV | Other data* | TS | PTS | REF | Notes                                    |
|------------------------------------------------------------------|---------------|-----|------|-----|------|-----|-------------|----|-----|-----|------------------------------------------|
| <b>Dacite porphyry lava flows of east ring (Tdpl)—Continued</b>  |               |     |      |     |      |     |             |    |     |     |                                          |
| PP                                                               | 201748        | X   |      |     |      | X   |             | X  |     |     | Contains quartz                          |
| PP                                                               | 201750        | X   |      |     |      | X   |             |    |     |     | Contains quartz                          |
| CH                                                               | P145          | X   | X    |     |      | X   |             | X  |     |     | Glass atop Sugarloaf Mountain            |
| CH                                                               | P146          | X   |      |     |      | X   |             | X  |     |     | Glass atop Sugarloaf Mountain            |
| <b>Rhyolite Canyon Tuff, upper member outflow facies (Trcu)</b>  |               |     |      |     |      |     |             |    |     |     |                                          |
| CH                                                               | 201534        | X   | X    |     | X    | X   |             |    | X   |     |                                          |
| CH                                                               | 201765        | X   | X    |     |      | X   | 2,3,4       |    | X   |     |                                          |
| CH                                                               | 201766        | X   | X    |     |      | X   |             |    | X   |     |                                          |
| CH                                                               | 201802        | X   |      |     |      | X   |             |    |     |     | Just below lava atop Sugarloaf Mountain  |
| PP                                                               | 201933        |     |      |     |      | X   |             | X  |     |     |                                          |
| BS                                                               | 202846        |     |      |     |      | X   |             | X  |     |     |                                          |
| BS                                                               | 202846B       |     |      |     |      |     |             | X  |     |     | Magma bleb                               |
| BS                                                               | 202846C       |     |      |     |      | X   |             |    |     |     | Pumice; atypical chemistry               |
| BS                                                               | 202847        | X   |      |     |      | X   |             | X  |     |     | Ashy; equivalent(?) of the undercut zone |
| SP                                                               | 202913        |     |      |     |      | X   |             |    |     |     | Just below 60 m of white lithic ash      |
| CH                                                               | P482          | X   | X    |     |      | X   | 2,4         |    | X   |     |                                          |
| SP                                                               | P713          | X   |      |     |      | X   |             |    |     |     | Uppermost; contains hornblende(?)        |
| SP                                                               | P723          |     |      |     |      | X   |             |    |     |     | Top of cliffs; hornblende(?) rich        |
| <b>Rhyolite Canyon Tuff, middle member outflow facies (Trcm)</b> |               |     |      |     |      |     |             |    |     |     |                                          |
| CH                                                               | 201535        | X   | X    |     | X    | X   |             |    | X   |     |                                          |
| CH                                                               | 201536        | X   | X    |     |      | X   |             |    | X   |     |                                          |
| CH                                                               | 201768        | X   | X    |     |      | X   |             |    |     |     | Single pumice from Trcm                  |
| CH                                                               | 201799        | X   |      |     |      | X   |             |    |     |     | Pumice                                   |
| CH                                                               | 201800        | X   |      |     |      | X   |             |    |     |     | Pumice; from undercut zone               |
| CH                                                               | 201801        | X   |      |     |      | X   |             |    |     |     | Whole rock at 201800, atypical chemistry |
| CH                                                               | 201815        |     |      |     |      | X   |             |    |     |     |                                          |
| CH                                                               | 201816        |     |      |     |      | X   |             |    |     |     |                                          |
| CH                                                               | 201817        |     |      |     |      | X   |             |    |     |     |                                          |
| CH                                                               | 201818        |     |      |     |      | X   |             |    |     |     |                                          |
| CH                                                               | 201819        |     |      |     |      | X   |             |    |     |     |                                          |
| CH                                                               | 201820        |     |      |     |      | X   |             |    |     |     |                                          |
| CH                                                               | 201821        |     |      |     |      | X   |             |    |     |     |                                          |
| CH                                                               | 201822        |     |      |     |      | X   |             |    |     |     |                                          |
| CH                                                               | 201823        |     |      |     |      | X   |             |    |     |     |                                          |
| CH                                                               | 201824        |     |      |     |      | X   |             |    |     |     |                                          |
| CH                                                               | 201825        |     |      |     |      | X   |             |    |     |     |                                          |
| CH                                                               | 201826        |     |      |     |      | X   |             |    |     |     |                                          |
| CH                                                               | 201827        |     |      |     |      | X   |             |    |     |     |                                          |
| CH                                                               | 201828        |     |      |     |      | X   |             |    |     |     |                                          |
| CH                                                               | 201829        |     |      |     |      | X   |             |    |     |     |                                          |
| CH                                                               | 201830        |     |      |     |      | X   |             |    |     |     |                                          |
| CH                                                               | 201831        |     |      |     |      | X   |             |    |     |     |                                          |
| CH                                                               | 201832        |     |      |     |      | X   |             |    |     |     |                                          |
| CH                                                               | 201833        |     |      |     |      | X   |             |    |     |     |                                          |
| CH                                                               | 201834        |     |      |     |      | X   |             |    |     |     |                                          |
| CH                                                               | 201835        |     |      |     |      | X   |             |    |     |     |                                          |
| CH                                                               | 201836        |     |      |     |      | X   |             |    |     |     |                                          |
| CH                                                               | 202826        |     |      |     |      | X   |             |    |     |     |                                          |
| CH                                                               | 202827        |     |      |     |      | X   |             |    |     |     |                                          |
| CH                                                               | 202828        |     |      |     |      | X   |             |    |     |     |                                          |
| BS                                                               | 202840        |     |      |     |      | X   |             |    |     | X   | Top                                      |
| BS                                                               | 202840.2      |     |      |     |      |     |             |    |     | X   | Below top; gray, punky                   |
| BS                                                               | 202840.4      |     |      |     |      |     |             |    |     | X   | Mid-level; gray, punky, crystal poor     |
| BS                                                               | 202840.6      |     |      |     |      |     |             |    |     | X   | Base; gray, punky, crystal poor          |
| CH                                                               | P053          | X   | X    |     | X    | X   |             |    | X   |     |                                          |
| CH                                                               | P054          | X   | X    |     | X    | X   |             |    | X   |     |                                          |
| CH                                                               | P055          | X   | X    |     | X    | X   |             |    | X   |     |                                          |
| CH                                                               | P056          | X   | X    |     | X    | X   |             |    | X   |     |                                          |
| CH                                                               | P057          | X   | X    |     | X    | X   |             |    | X   |     |                                          |
| CH                                                               | P058          | X   | X    |     | X    | X   |             |    | X   |     |                                          |
| CH                                                               | P059          | X   | X    |     | X    | X   |             |    | X   |     |                                          |
| CH                                                               | P060          | X   | X    |     | X    | X   |             |    | X   |     |                                          |

**Table 1.** Status and treatment of samples collected in the area adjacent to the Turkey Creek caldera, Chiricahua Mountains, Cochise County, Arizona—Continued.

| Map                                                                        | Sample number | WRM | INAA | FEO | F/CL | KEV | Other data* | TS | PTS | REF | Notes                                     |
|----------------------------------------------------------------------------|---------------|-----|------|-----|------|-----|-------------|----|-----|-----|-------------------------------------------|
| <b>Rhyolite Canyon Tuff, middle member outflow facies (Trcm)—Continued</b> |               |     |      |     |      |     |             |    |     |     |                                           |
| CH                                                                         | P061          | X   | X    |     | X    | X   |             |    |     | X   |                                           |
| CH                                                                         | P481          | X   | X    |     |      | X   | 2,4         |    |     | X   |                                           |
| CH                                                                         | P483          | X   | X    |     |      | X   | 2,4         |    |     | X   |                                           |
| <b>Rhyolite Canyon Tuff, lower member outflow facies (Trcl)</b>            |               |     |      |     |      |     |             |    |     |     |                                           |
| CH                                                                         | 201769        | X   | X    |     |      | X   | 2,3,4       | X  |     |     |                                           |
| CH                                                                         | 201770        | X   | X    |     |      | X   | 2,4         | X  |     |     |                                           |
| CH                                                                         | 201776        |     |      |     |      | X   |             |    |     |     | Pumice                                    |
| CH                                                                         | 201792        | X   |      |     |      | X   |             |    |     |     |                                           |
| CH                                                                         | 201793        | X   |      |     |      | X   |             |    |     |     |                                           |
| CH                                                                         | 201794        | X   |      |     |      | X   |             |    |     |     |                                           |
| CH                                                                         | 201795        | X   |      |     |      | X   |             |    |     |     | Pumice; atypical chemistry                |
| CH                                                                         | 201796        | X   |      |     |      | X   |             |    |     |     | Whole rock from site 201795               |
| CH                                                                         | 201797A       | X   |      |     |      | X   |             |    |     |     | Contains Faraway Ranch lava inclusions    |
| CH                                                                         | 201797B       | X   |      |     |      | X   |             |    |     |     | 201797A with inclusions removed           |
| CH                                                                         | 201797C       |     |      |     |      |     |             |    |     |     | Inclusions from 201797B                   |
| CH                                                                         | 201798        | X   |      |     |      | X   |             |    |     |     |                                           |
| CH                                                                         | 201813        |     |      |     |      | X   |             |    |     |     | Pumice from uppermost part of unit        |
| CH                                                                         | 201814        |     |      |     |      | X   |             |    |     |     | Host to 201813                            |
| CH                                                                         | 202825        |     |      |     |      | X   |             |    |     |     |                                           |
| CH                                                                         | 202829        |     |      |     |      | X   |             |    |     |     |                                           |
| BS                                                                         | 202841        |     |      |     |      | X   |             |    |     | X   |                                           |
| RP                                                                         | 202901        |     |      |     |      | X   |             |    |     |     |                                           |
| CH                                                                         | 202902        |     |      |     |      |     |             | X  |     |     | Lump pumice in white zone atop unit Trcl  |
| CH                                                                         | 202903A       |     |      |     |      |     |             | X  |     |     | Cloud deposit atop unit Trcl              |
| CH                                                                         | 202903B       |     |      |     |      |     |             | X  |     |     | Fused top, no distinct pumice             |
| CH                                                                         | 202903C       |     |      |     |      |     |             | X  |     |     | Cloud deposit just below unit Trcm        |
| CH                                                                         | 202903D       |     |      |     |      |     |             | X  |     |     | Pumice-rich lower part                    |
| CH                                                                         | 202903E       |     |      |     |      |     |             | X  |     |     | Dense zone, upper cloud deposit           |
| CH                                                                         | 202904        |     |      |     |      | X   |             |    |     |     |                                           |
| CH                                                                         | 202905        |     |      |     |      | X   |             | X  |     |     |                                           |
| CH                                                                         | P048          | X   | X    |     | X    | X   |             | X  |     |     |                                           |
| CH                                                                         | P050          | X   | X    |     | X    | X   |             |    |     | X   |                                           |
| CH                                                                         | P051          | X   | X    |     | X    | X   |             |    |     | X   |                                           |
| CH                                                                         | P052          | X   | X    |     | X    | X   |             |    |     | X   |                                           |
| <b>Rhyolite Canyon Tuff, outflow beneath Trcl (Trc0)</b>                   |               |     |      |     |      |     |             |    |     |     |                                           |
| SP                                                                         | 202006        | X   |      |     |      | X   |             | X  |     |     |                                           |
| SP                                                                         | 202804        |     |      |     |      | X   |             |    |     |     |                                           |
| SP                                                                         | P572          |     |      |     |      | X   |             | X  |     |     |                                           |
| SP                                                                         | P711          |     |      |     |      | X   |             | X  |     |     | Basal                                     |
| SP                                                                         | P712          |     |      |     |      | X   |             | X  |     |     | Mid-height                                |
| SP                                                                         | P721          |     |      |     |      | X   |             |    |     |     | Densely welded base                       |
| SP                                                                         | P722          |     |      |     |      | X   |             |    |     |     | Main, cliff-forming ash flow              |
| <b>Rhyolite Canyon Tuff—lower or middle member outflow facies (Trco)</b>   |               |     |      |     |      |     |             |    |     |     |                                           |
| PP                                                                         | 201932        |     |      |     |      | X   |             |    |     |     |                                           |
| PP                                                                         | 201935        |     |      |     |      | X   |             |    |     |     |                                           |
| PP                                                                         | 202034        |     |      |     |      | X   |             |    |     |     |                                           |
| PP                                                                         | 202147        |     |      |     |      | X   |             |    |     |     |                                           |
| SP                                                                         | 202800        |     |      |     |      | X   |             |    |     |     |                                           |
| PP                                                                         | 202813        |     |      |     |      | X   |             |    |     |     |                                           |
| CH                                                                         | 202821        |     |      |     |      | X   |             | X  |     |     |                                           |
| CH                                                                         | 202833        |     |      |     |      | X   |             |    |     |     | Basal glass; atypical chemistry (high Rb) |
| CH                                                                         | 202835        |     |      |     |      | X   |             |    |     |     |                                           |
| PP                                                                         | 202895        |     |      |     |      | X   |             |    |     |     |                                           |
| PP                                                                         | 202898        |     |      |     |      | X   |             |    |     |     |                                           |
| SP                                                                         | 202915        | X   |      |     |      | X   |             | X  |     |     | Contains oxidized hornblende(?)           |
| SP                                                                         | 202916        | X   |      |     |      | X   |             | X  |     |     | Single pumice from 202915                 |
| SP                                                                         | 202916B       |     |      |     |      |     |             |    |     | X   | Hornblende(?) pseudomorphs                |
| SP                                                                         | P724          |     |      |     |      |     |             |    |     | X   | Upper, unwelded part of unit Trco         |
| SP                                                                         | P725          | X   |      |     |      | X   |             |    |     |     |                                           |
| PP                                                                         | P732          |     |      |     |      | X   |             |    |     |     | Basal, white tuff                         |
| PP                                                                         | P733          |     |      |     |      | X   |             |    |     | X   | Densely welded                            |

**Table 1.** Status and treatment of samples collected in the area adjacent to the Turkey Creek caldera, Chiricahua Mountains, Cochise County, Arizona—Continued.

| Map                                                                                       | Sample number | WRM | INAA | FEO | F/CL | KEV | Other data* | TS | PTS | REF | Notes                                                             |
|-------------------------------------------------------------------------------------------|---------------|-----|------|-----|------|-----|-------------|----|-----|-----|-------------------------------------------------------------------|
| <b>Rhyolite Canyon Tuff, intracaldera facies (TrcI)</b>                                   |               |     |      |     |      |     |             |    |     |     |                                                                   |
| PP                                                                                        | P736          |     |      |     |      |     |             |    |     | X   | Ash                                                               |
| PP                                                                                        | P737          |     |      |     |      | X   |             |    |     |     | Partly welded                                                     |
| PP                                                                                        | 202068B       |     |      |     |      | X   |             | X  |     |     | Atypical chemistry; from topographic wall                         |
| PP                                                                                        | 202135        |     |      |     |      | X   |             | X  |     |     | Recrystallized                                                    |
| PP                                                                                        | P594          |     |      |     |      |     |             |    |     | X   | Quartz porphyry from Cave Creek                                   |
| <b>Jesse James Canyon Tuff (Tjj)</b>                                                      |               |     |      |     |      |     |             |    |     |     |                                                                   |
| CH                                                                                        | 201771        | X   | X    |     |      | X   | 2,4         |    | X   |     | Lump pumices                                                      |
| CH                                                                                        | 20177         | X   | X    |     |      | X   |             |    |     |     |                                                                   |
| CH                                                                                        | 202831        | X   |      |     |      | X   |             | X  |     |     |                                                                   |
| CH                                                                                        | 202834        |     |      |     |      |     |             | X  |     |     |                                                                   |
| RP                                                                                        | 202906        |     |      |     |      |     |             | X  |     |     | Sandstone at TrcI/Tjj contact                                     |
| RP                                                                                        | 202907        |     |      |     |      |     |             |    |     | X   | Lithic pyroclastic flow, top of unit Tjj                          |
| CH                                                                                        | P045          | X   | X    |     | X    | X   |             |    | X   |     |                                                                   |
| CH                                                                                        | P046          |     |      |     |      |     |             | X  |     |     |                                                                   |
| CH                                                                                        | P047          | X   | X    |     | X    | X   |             |    | X   |     |                                                                   |
| <b>Faraway Ranch Formation, rhyolite of Erickson Ridge (Tfre)</b>                         |               |     |      |     |      |     |             |    |     |     |                                                                   |
| BS                                                                                        | 201803        | X   |      |     |      | X   |             |    |     |     |                                                                   |
| BS                                                                                        | 201804        | X   |      |     |      | X   |             |    | X   |     |                                                                   |
| CH                                                                                        | 201859        | X   |      |     |      | X   |             |    |     |     |                                                                   |
| CH                                                                                        | 202836        | X   |      |     |      | X   |             |    |     |     | Single pumice from pyroclastic flow                               |
| CH                                                                                        | P044          | X   | X    |     | X    | X   |             |    | X   |     |                                                                   |
| CH                                                                                        | P122          | X   | X    | X   |      | X   | 4           |    | X   |     | Carapace breccia                                                  |
| CH                                                                                        | P139          |     |      |     |      |     |             |    |     | X   |                                                                   |
| CH                                                                                        | P140          |     |      |     |      |     |             |    |     | X   |                                                                   |
| CH                                                                                        | P141          |     |      |     |      |     |             |    |     | X   |                                                                   |
| CH                                                                                        | P475          |     |      |     |      |     | 2,4         | X  |     |     | Same location as P122                                             |
| <b>Faraway Ranch Formation, volcanic and volcanoclastic rocks, undifferentiated (Tim)</b> |               |     |      |     |      |     |             |    |     |     |                                                                   |
| <b>Tim2</b>                                                                               |               |     |      |     |      |     |             |    |     |     |                                                                   |
| PP                                                                                        | 201764        | X   |      |     |      | X   |             |    |     |     | Equivalent (?) to Silver Peak dacite lava                         |
| SP                                                                                        | 202056        | X   |      |     |      | X   |             | X  |     |     | Altered major-oxide composition; calcite                          |
| PP                                                                                        | 202082        |     |      |     |      | X   |             | X  |     |     |                                                                   |
| PP                                                                                        | 202136        | X   |      |     |      | X   |             | X  |     |     | Dacite lava below Cave Creek rhyolite                             |
| PP                                                                                        | 202228        |     |      |     |      | X   |             |    |     |     | Andesite lava                                                     |
| CH                                                                                        | 202822        |     |      |     |      | X   |             |    |     |     |                                                                   |
| CH                                                                                        | 202824        | X   |      |     |      | X   |             | X  |     |     |                                                                   |
| BS                                                                                        | 202844        | X   |      |     |      | X   |             | X  |     |     | Glass                                                             |
| <b>Tim4</b>                                                                               |               |     |      |     |      |     |             |    |     |     |                                                                   |
| BS                                                                                        | 202845        | X   |      |     |      | X   |             | X  |     |     |                                                                   |
| <b>Tim?</b>                                                                               |               |     |      |     |      |     |             |    |     |     |                                                                   |
| CH                                                                                        | 202823A       | X   |      |     |      | X   |             | X  |     |     | Andesite or basalt lava                                           |
| CH                                                                                        | 202823B       | X   |      |     |      | X   |             | X  |     |     | Andesite or basalt lava                                           |
| BS                                                                                        | 202843        |     |      |     |      |     |             | X  |     |     |                                                                   |
| <b>Granite porphyry of Jhus Canyon (Tg)</b>                                               |               |     |      |     |      |     |             |    |     |     |                                                                   |
| P                                                                                         | 201838        |     |      |     |      |     |             |    |     | X   | Aplite porphyry dikes above Paradise                              |
| P                                                                                         | P431          |     |      |     |      |     |             | X  |     |     | Porphyry                                                          |
| P                                                                                         | P433          |     |      |     |      |     |             |    |     | X   | Sills(?) of Jhus(?) system near Paradise                          |
| <b>Granodiorite of Mackey Canyon (Tgd)</b>                                                |               |     |      |     |      |     |             |    |     |     |                                                                   |
| P                                                                                         | 201570        | X   | X    | X   | X    | X   | 1,3         | X  |     |     | <sup>40</sup> Ar/ <sup>39</sup> Ar ages on biotite and hornblende |
| P                                                                                         | P430A         |     |      |     |      |     |             |    |     | X   | Altered margin of porphyry                                        |
| P                                                                                         | P430B         |     |      |     |      |     |             |    |     | X   | Altered granodiorite core                                         |
| P                                                                                         | P490          | X   | X    |     |      | X   | 2,4         | X  |     |     |                                                                   |
| <b>Rhyolite lava flows of Cave Creek (Tcc)</b>                                            |               |     |      |     |      |     |             |    |     |     |                                                                   |
| P                                                                                         | 201654A       |     |      |     |      | X   |             | X  |     |     | Glass; feeder(?) to Tcc rhyolite field                            |
| P                                                                                         | 201654B       |     |      |     |      | X   |             | X  |     |     |                                                                   |
| P                                                                                         | 201656        |     |      |     |      | X   |             | X  |     |     |                                                                   |
| P                                                                                         | 201659        |     |      |     |      | X   |             | X  |     |     |                                                                   |
| P                                                                                         | 201661        | X   | X    | X   | X    | X   |             |    | X   |     |                                                                   |
| P                                                                                         | 201922        |     |      |     |      | X   |             | X  |     |     |                                                                   |
| P                                                                                         | 201924        | X   |      |     |      | X   |             | X  |     |     |                                                                   |

**Table 1.** Status and treatment of samples collected in the area adjacent to the Turkey Creek caldera, Chiricahua Mountains, Cochise County, Arizona—Continued.

| Map                                                      | Sample number | WRM | INAA | FEO | F/CL | KEV | Other data* | TS | PTS | REF | Notes                                     |
|----------------------------------------------------------|---------------|-----|------|-----|------|-----|-------------|----|-----|-----|-------------------------------------------|
| <b>Rhyolite lava flows of Cave Creek (Tcc)—Continued</b> |               |     |      |     |      |     |             |    |     |     |                                           |
| P                                                        | 201925        | X   |      |     |      | X   |             | X  |     |     |                                           |
| PP                                                       | 202137        | X   |      |     |      | X   |             | X  |     |     | Altered major oxide composition           |
| P                                                        | P085C         |     |      |     |      |     |             | X  |     |     |                                           |
| P                                                        | P085D         | X   | X    |     |      | X   |             |    | X   |     |                                           |
| P                                                        | P124          |     |      |     |      |     |             |    |     | X   | Below Thc tuff                            |
| P                                                        | P153          | X   |      |     |      | X   |             | X  |     |     |                                           |
| P                                                        | P272A         | X   | X    | X   | X    | X   |             | X  |     |     | Cathedral Rock; devitrified rhyolite lava |
| P                                                        | P272B         | X   | X    | X   | X    | X   |             | X  |     |     | Cathedral Rock; green glass; altered      |
| P                                                        | P272C         |     |      |     |      |     | 3           |    |     | X   | Same as P272B                             |
| <b>Dacite lavas of Silver Peak (Tsd)</b>                 |               |     |      |     |      |     |             |    |     |     |                                           |
| P                                                        | 201653        |     |      |     |      | X   |             | X  |     |     |                                           |
| P                                                        | 201655        |     |      |     |      | X   |             | X  |     |     |                                           |
| P                                                        | 201662        | X   | X    | X   | X    | X   | 1           | X  |     |     |                                           |
| P                                                        | 201923        |     |      |     |      | X   |             | X  |     |     |                                           |
| P                                                        | P081          | X   | X    |     |      | X   |             |    | X   |     | Biotite-rich lava                         |
| P                                                        | P083          | X   | X    |     | X    | X   |             |    | X   |     |                                           |
| P                                                        | P085A         |     |      |     |      |     |             | X  |     |     | Dacite                                    |
| P                                                        | P085B         |     |      |     |      |     |             | X  |     |     | Dacite breccia                            |
| P                                                        | P086          |     |      |     |      |     |             | X  |     |     |                                           |
| P                                                        | P087          |     |      |     |      |     |             | X  |     |     | Rheomorphic welded tuff ?                 |
| P                                                        | P131          | X   | X    |     |      | X   |             | X  |     |     |                                           |
| P                                                        | P131B         |     |      |     |      |     |             | X  |     |     | Hornblende rich                           |
| P                                                        | P133          | X   | X    |     |      | X   |             | X  |     |     |                                           |
| P                                                        | P134          |     |      |     |      |     |             | X  |     |     |                                           |
| P                                                        | P135          |     |      |     |      |     |             | X  |     |     |                                           |
| P                                                        | P149          |     |      |     |      |     |             |    | X   |     |                                           |
| P                                                        | P151          |     |      |     |      |     |             |    | X   |     |                                           |
| <b>Pyroclastic rocks of Cave Creek (Tpf)</b>             |               |     |      |     |      |     |             |    |     |     |                                           |
| P                                                        | 201652        |     |      |     |      |     |             | X  |     |     | Ash-rich block and ash flow breccia       |
| P                                                        | 201658A       |     |      |     |      | X   |             | X  |     |     | Unwelded tuff                             |
| P                                                        | 201658B       |     |      |     |      |     |             | X  |     |     | Welded 201658A                            |
| P                                                        | P080          |     |      |     |      |     |             | X  |     |     |                                           |
| P                                                        | P084          | X   | X    | X   | X    | X   |             |    | X   |     | Orange-layered pyroclastic flows          |
| P                                                        | P085B         |     |      |     |      |     |             | X  |     |     | Tuff breccia                              |
| P                                                        | P085C         |     |      |     |      |     |             | X  |     |     | Tuff breccia                              |
| P                                                        | P136A         |     |      |     |      |     |             |    |     |     | Pumiceous block and ash flow breccia      |
| P                                                        | P136B         | X   | X    | X   |      | X   |             |    | X   |     | Vitrophyre                                |
| P                                                        | P136C         |     |      |     |      |     |             | X  |     |     | Devitrified P136B                         |
| P                                                        | P138          |     |      |     |      |     |             |    |     | X   | Orange-layered pyroclastic flows          |
| P                                                        | P147          |     |      |     |      |     |             |    |     | X   |                                           |
| P                                                        | P152          |     |      |     |      |     |             | X  |     |     | Upper orange pyroclastic flows            |
| P                                                        | P156A         |     |      |     |      |     |             |    | X   |     | Pyroclastic flow                          |
| P                                                        | P156B         |     |      |     |      |     |             | X  |     |     | Glass of P156A                            |
| P                                                        | P522          |     |      |     |      |     |             |    |     | X   |                                           |
| <b>Unit of Pothole Canyon-andesite lava (Tpca)</b>       |               |     |      |     |      |     |             |    |     |     |                                           |
| SP                                                       | 202007        |     |      |     |      | X   |             | X  |     |     |                                           |
| PP                                                       | 202810        | X   |      |     |      | X   |             | X  |     |     |                                           |
| PP                                                       | 202896        | X   |      |     |      | X   |             | X  |     |     | Abundant calcite-filled vesicles          |
| <b>Dacite sill of Darnell Peak (Tdp)</b>                 |               |     |      |     |      |     |             |    |     |     |                                           |
| R                                                        | 201527        | X   | X    |     |      | X   |             |    | X   |     |                                           |
| PP                                                       | 201528        | X   | X    |     |      | X   |             |    | X   |     |                                           |
| PP                                                       | 201532        | X   | X    |     |      | X   |             |    | X   |     |                                           |
| PP                                                       | 202154        | X   |      |     |      | X   | 3           |    | X   |     |                                           |
| PP                                                       | 202154B       |     |      |     |      |     |             |    |     | X   | Horizontally weathering vein in sill      |
| <b>Tuff of Horseshoe Canyon, high barium phase (Thc)</b> |               |     |      |     |      |     |             |    |     |     |                                           |
| PP                                                       | 201529        | X   | X    |     |      | X   |             |    | X   |     |                                           |
| PP                                                       | 201530        | X   | X    |     |      | X   |             |    | X   |     | Homogeneous zone in dacite                |
| PP                                                       | 201531        |     |      |     |      | X   |             |    | X   |     | Mixed lava or tuff                        |
| PP                                                       | 201546A       |     |      |     |      | X   |             |    | X   |     | White tuff                                |
| PP                                                       | 201546B       |     |      |     |      | X   |             | X  |     |     | Red tuff                                  |
| PP                                                       | 201547        |     |      |     |      | X   |             | X  |     |     |                                           |

**Table 1.** Status and treatment of samples collected in the area adjacent to the Turkey Creek caldera, Chiricahua Mountains, Cochise County, Arizona—Continued.

| Map                                                                | Sample number | WRM | INAA | FEO | F/CL | KEV | Other data* | TS | PTS | REF  | Notes                                    |
|--------------------------------------------------------------------|---------------|-----|------|-----|------|-----|-------------|----|-----|------|------------------------------------------|
| <b>Tuff of Horseshoe Canyon, high barium phase (Thc)—Continued</b> |               |     |      |     |      |     |             |    |     |      |                                          |
| PP                                                                 | 201928A       |     |      |     |      | X   |             |    |     |      | Dark clot in 201928                      |
| PP                                                                 | 201929        |     |      |     |      | X   |             |    |     | X    | Dark clot in Thc                         |
| PP                                                                 | 201934        |     |      |     |      | X   |             |    |     |      |                                          |
| PP                                                                 | 202018        | X   |      |     |      | X   |             | X  |     |      | Glass                                    |
| PP                                                                 | 202033        | X   |      |     |      | X   |             | X  |     |      |                                          |
| PP                                                                 | 202143        | X   |      |     |      | X   |             | X  |     |      | Base of high-barium phase                |
| PP                                                                 | 202144        | X   |      |     |      | X   |             | X  |     |      |                                          |
| PP                                                                 | 202145        | X   |      |     |      | X   |             | X  |     |      |                                          |
| PP                                                                 | 202156        | X   |      |     |      | X   | 3           | X  |     |      |                                          |
| SP                                                                 | 202803        | X   |      |     |      | X   |             | X  |     |      |                                          |
| PP                                                                 | 202888        |     |      |     |      | X   |             | X  |     |      |                                          |
| PP                                                                 | 202889        |     |      |     |      | X   |             |    |     |      | Black glass                              |
| PP                                                                 | 202892        |     |      |     |      | X   |             |    |     |      |                                          |
| PP                                                                 | 202893        |     |      |     |      | X   |             |    |     |      |                                          |
| PP                                                                 | 202899        | X   |      |     |      | X   |             | X  |     |      |                                          |
| PP                                                                 | 202900        |     |      |     |      | X   |             |    |     |      |                                          |
| SP                                                                 | 202914A       |     |      |     |      | X   |             |    |     |      | Devitrified rheomorphic tuff             |
| SP                                                                 | 202914B       |     |      |     |      |     |             | X  |     |      | Black glass equivalent of 202914A        |
| SP                                                                 | 202918        | X   |      |     |      | X   |             | X  |     |      | Contains Precambrian gneiss xenoliths    |
| R                                                                  | P126B         | X   | X    | X   |      | X   |             | X  |     |      | Mafic inclusion in P126A                 |
| PP                                                                 | P738          |     |      |     |      |     |             |    |     | X    | Biotite-rich, ashy                       |
| <b>Tuff of Horseshoe Canyon, low barium phase (Thc)</b>            |               |     |      |     |      |     |             |    |     |      |                                          |
| PP                                                                 | 201545        |     |      |     |      | X   |             |    | X   |      |                                          |
| P                                                                  | 201657        |     |      |     |      | X   |             | X  |     |      |                                          |
| P                                                                  | 201660        |     |      |     |      | X   |             | X  |     |      | Good sample from low on Silver Peak      |
| P                                                                  | 201663        |     |      |     |      | X   |             | X  |     |      | Good sample from low on Silver Peak      |
| P                                                                  | 201927        | X   |      |     |      | X   |             | X  |     |      |                                          |
| PP                                                                 | 201928        |     |      |     |      | X   |             | X  |     |      | Lower                                    |
| PP                                                                 | 202032        | X   |      |     |      | X   |             | X  |     |      |                                          |
| PP                                                                 | 202138        | X   |      |     |      | X   |             | X  |     |      | Base                                     |
| PP                                                                 | 202139        | X   |      |     |      | X   |             | X  |     |      |                                          |
| PP                                                                 | 202140        | X   |      |     |      | X   |             | X  |     |      |                                          |
| PP                                                                 | 202141        | X   |      |     |      | X   |             | X  |     |      |                                          |
| PP                                                                 | 202142        | X   |      |     |      | X   |             | X  |     |      | Top of low-barium phase                  |
| PP                                                                 | 202146        | X   |      |     |      | X   |             | X  |     |      | Lithic rich, unwelded, ashy              |
| PP                                                                 | 202152        |     |      |     |      | X   |             |    |     |      |                                          |
| PP                                                                 | 202153        | X   |      |     |      | X   |             |    |     | X    | Crystal-poor glass; atypical chemistry   |
| PP                                                                 | 202155        | X   |      |     |      | X   |             | X  |     |      | Crystal elutriated                       |
| SP                                                                 | 202801        |     |      |     |      | X   |             |    |     |      |                                          |
| SP                                                                 | 202802        |     |      |     |      | X   |             |    |     |      |                                          |
| PP                                                                 | 202887        |     |      |     |      | X   |             |    |     |      |                                          |
| PP                                                                 | 202890        |     |      |     |      | X   |             |    |     |      |                                          |
| P                                                                  | P478          | X   | X    |     |      | X   | 2,4         | X  |     |      |                                          |
| <b>Tuff of Horseshoe Canyon, phase unknown (Thc)</b>               |               |     |      |     |      |     |             |    |     |      |                                          |
| PP                                                                 | P015B         |     |      |     |      |     |             |    |     | Slab | Porphyry block (in tuff?)                |
| PP                                                                 | P015C         |     |      |     |      |     |             |    |     | Slab | Porphyry block (in tuff?)                |
| PP                                                                 | P016          |     |      |     |      |     |             |    | X   |      | Mixed matrix in tuff                     |
| R                                                                  | P125          |     |      |     |      |     |             |    | X   |      | North side of entrance, Horseshoe Canyon |
| R                                                                  | P126A         |     |      |     |      |     |             |    |     |      | Felsic block in gray welded tuff matrix  |
| R                                                                  | P126AM        | X   | X    |     |      | X   |             |    | X   |      | Matrix tuff                              |
| R                                                                  | P126AI        | X   | X    |     |      | X   |             |    | X   |      | Inclusion in tuff                        |
| R                                                                  | P127A         |     |      |     |      |     |             |    |     |      | Welded tuff; mixed rock                  |
| R                                                                  | P127B         |     |      |     |      |     |             | X  |     |      | Eutaxitic mixed welded tuff              |
| P                                                                  | P154          |     |      |     |      |     |             | X  |     |      |                                          |
| P                                                                  | P155          |     |      |     |      |     |             | X  |     |      |                                          |
| <b>Rhyolite lava of Krentz Ranch (Tkr)</b>                         |               |     |      |     |      |     |             |    |     |      |                                          |
| SP                                                                 | 202917        | X   |      |     |      | X   |             | X  |     |      |                                          |
| SP                                                                 | 202923        |     |      |     |      | X   |             |    |     |      |                                          |
| SP                                                                 | 202924        |     |      |     |      | X   |             |    |     |      |                                          |
| SP                                                                 | P720          |     |      |     |      |     |             | X  |     |      | Black glass                              |
| SP                                                                 | P730          |     |      |     |      |     |             |    |     | X    | Glassy, flow laminated                   |

**Table 1.** Status and treatment of samples collected in the area adjacent to the Turkey Creek caldera, Chiricahua Mountains, Cochise County, Arizona—Continued.

| Map                                                              | Sample number | WRM | INAA | FEO | F/CL | KEV | Other data* | TS | PTS | REF  | Notes                                                            |
|------------------------------------------------------------------|---------------|-----|------|-----|------|-----|-------------|----|-----|------|------------------------------------------------------------------|
| <b>Tuff of Joe Glen Ranch (Tjg)</b>                              |               |     |      |     |      |     |             |    |     |      |                                                                  |
| BP                                                               | 202059        | X   |      |     |      | X   |             | X  |     |      | Basal                                                            |
| BP                                                               | 202060        | X   |      |     |      | X   | 3,5         | X  |     |      | Above 202059                                                     |
| BP                                                               | 202061        | X   |      |     |      | X   |             | X  |     |      | Above 202060                                                     |
| BP                                                               | 202062        | X   |      |     |      | X   |             | X  |     |      | Above 202061                                                     |
| SP                                                               | 202925        |     |      |     |      | X   |             | X  |     |      |                                                                  |
| <b>Tuff of High Lonesome Canyon (Thl)</b>                        |               |     |      |     |      |     |             |    |     |      |                                                                  |
| SP                                                               | 202055        | X   |      |     |      | X   |             | X  |     |      | Basal                                                            |
| SP                                                               | 202057        | X   |      |     |      | X   | 3,5         | X  |     |      | Upper                                                            |
| SP                                                               | 202058        |     |      |     |      |     | 3,5         |    |     |      |                                                                  |
| <b>Sedimentary and volcanic rocks of the Bisbee Group (KJsv)</b> |               |     |      |     |      |     |             |    |     |      |                                                                  |
| P                                                                | 201542        |     |      |     |      | X   |             | X  |     |      | Dacite? in Bisbee?                                               |
| P                                                                | 201754        | X   |      |     |      | X   |             | X  |     |      | Andesite lava                                                    |
| P                                                                | 201812        |     |      |     |      |     |             |    |     | X    | Gabbro or diabase                                                |
| P                                                                | 202130        |     |      |     |      | X   |             | X  |     |      |                                                                  |
| P                                                                | 202131        |     |      |     |      | X   |             |    |     | X    |                                                                  |
| P                                                                | 202131A       |     |      |     |      |     |             |    | X   |      | Mantle xenolith                                                  |
| P                                                                | 202132        | X   |      |     |      | X   |             | X  |     |      | Plagioclase-pyroxene gabbro                                      |
| P                                                                | 202133        | X   |      |     |      | X   |             | X  |     |      | Microgabbro at Bear Spring                                       |
| P                                                                | 202223        | X   |      |     |      | X   |             | X  |     |      | Basalt                                                           |
| P                                                                | 202224        | X   |      |     |      | X   |             | X  |     |      | Microgabbro                                                      |
| P                                                                | 202225        |     |      |     |      | X   | 3           | X  |     |      | Porphyry dike; <sup>40</sup> Ar/ <sup>39</sup> Ar on plagioclase |
| P                                                                | 202226        | X   |      |     |      | X   |             |    |     |      | Vesicular basalt near P78                                        |
| P                                                                | P477          |     |      |     |      | X   | 2,4         |    |     |      | Limestone                                                        |
| P                                                                | P518          |     |      |     |      |     |             |    |     |      | Sulfide-bearing microdiorite                                     |
| P                                                                | P610          |     |      |     |      |     |             |    |     | X    | Vesicular basalt                                                 |
| P                                                                | P612          |     |      |     |      |     |             |    |     | X    | Olivine and pyroxene xenocrysts                                  |
| <b>Miscellaneous</b>                                             |               |     |      |     |      |     |             |    |     |      |                                                                  |
| P                                                                | 201544        |     |      |     |      |     |             | X  |     |      | Tuff breccia                                                     |
| PP                                                               | 201743        |     |      |     |      | X   |             | X  |     |      | Rhyolite dike, upper South Fork Cave Creek                       |
| PP                                                               | 201746        |     |      |     |      |     |             |    |     | Lost | Thc or Trc                                                       |
| PP                                                               | 201749        |     |      |     |      | X   |             |    |     |      | Unknown tuff; distinctive chemistry                              |
| PP                                                               | 201763        |     |      |     |      | X   |             | X  |     |      | Biotite-sanidine lava                                            |
| CH                                                               | 201767        |     |      |     |      | X   |             |    |     |      | Granitoid clast in Trcm                                          |
| P                                                                | 201811        | X   |      |     |      | X   |             | X  |     |      | Dacite porphyry dike cutting Bisbee                              |
| P                                                                | 201839        |     |      |     |      |     |             |    |     | X    | Rhyolite lava on ridge above Paradise                            |
| P                                                                | 201921        |     |      |     |      | X   |             | X  |     |      | Rhyolite lava beneath Cave Creek lava                            |
| BP                                                               | 201997        | X   |      |     |      | X   |             | X  |     |      | Basalt; northernmost San Bernardino field                        |
| A                                                                | 202002        |     |      |     |      | X   |             | X  |     |      | Trco? Atypical trace element chemistry                           |
| BP                                                               | 202063        | X   |      |     |      | X   |             | X  |     |      | nclusion in unit Tjg; odd chemistry                              |
| BP                                                               | 202064        | X   |      |     |      | X   |             | X  |     |      | Ashy, lithic-free welded tuff                                    |
| PP                                                               | 202068A       |     |      |     |      |     |             |    |     |      | Crystal-rich sandstone at caldera wall                           |
| P                                                                | 202131B       |     |      |     |      |     |             |    |     | X    | Hornblende or augite xenocryst; unit KJsv                        |
| PP                                                               | 202227        |     |      |     |      | X   |             |    |     |      | Biotite-rhyolite dike; unit TmrB feeder                          |
| PP                                                               | 202229        |     |      |     |      | X   |             | X  |     |      | Biotite-rhyolite dike; unit TmrB feeder                          |
| PP                                                               | 202815        | X   |      |     |      | X   |             | X  |     |      | Portal Peak latite lava                                          |
| PP                                                               | 202816        | X   |      |     |      | X   |             | X  |     |      | Quartz-sanidine dike; similar to Tdp                             |
| PP                                                               | 202820A       |     |      |     |      |     |             |    | X   |      | Quartz-sanidine dike; glass                                      |
| PP                                                               | 202820B       | X   |      |     |      | X   |             | X  |     | X    | Quartz-sanidine dike; similar to Tdp                             |
| CH                                                               | 202830        |     |      |     |      |     |             | X  |     |      | Bonita Park redbeds                                              |
| CH                                                               | 202832        | X   |      |     |      | X   |             | X  |     |      | Metamorphosed epiclastic sedimentary rock                        |
| CH                                                               | 202837        | X   |      |     |      | X   |             | X  |     |      | Metamorphosed epiclastic sedimentary rock                        |
| CH                                                               | 202838        | X   |      |     |      | X   |             | X  |     |      | Metamorphosed epiclastic sedimentary rock                        |
| BS                                                               | 202842        |     |      |     |      |     |             | X  |     |      | Bonita Park redbeds                                              |
| PP                                                               | 202897        | X   |      |     |      | X   |             | X  |     |      | Dike or texturally Odd unit Thc                                  |
| CH                                                               | P046          |     |      |     |      |     |             | X  |     |      | Pre-Jesse James Canyon Tuff                                      |
| CH                                                               | P066          |     |      |     |      |     |             | X  |     |      | Tuff breccia at Cochise Head                                     |
| CH                                                               | P067          |     |      |     |      |     |             | X  |     |      | Densely welded tuff at Cochise Head                              |

**Table 1.** Status and treatment of samples collected in the area adjacent to the Turkey Creek caldera, Chiricahua Mountains, Cochise County, Arizona—Continued.

| Map                            | Sample number | WRM | INAA | FEO | F/CL | KEV | Other data* | TS | PTS | REF | Notes                                     |
|--------------------------------|---------------|-----|------|-----|------|-----|-------------|----|-----|-----|-------------------------------------------|
| <b>Miscellaneous—Continued</b> |               |     |      |     |      |     |             |    |     |     |                                           |
| CH                             | P143          |     |      |     |      |     |             | X  |     |     | Ashy lahar near Faraway Ranch             |
| P                              | P273          |     |      |     |      |     |             | X  |     |     | Hornblende-feldspar porphyry              |
| P                              | P488          | X   | X    |     |      | X   | 2,4         | X  |     |     | Precambrian granite                       |
| P                              | P489          | X   | X    |     |      | X   | 2,4         | X  |     |     | Precambrian granite                       |
| SP                             | P729          |     |      |     |      |     |             | X  |     |     | Precambrian gneissic xenolith in unit The |
| CH                             | TC1           |     |      |     |      |     | 4           |    |     |     | Galena, King of Lead mine                 |

\*Other data: 1, carbon dioxide analyses (table 5); 2, miscellaneous trace element analyses (Be, Cr, Ni, Pb, Sn, Ag; table 6); 3,  $^{40}\text{Ar}/^{39}\text{Ar}$  isotope analyses on sanidine, unless otherwise noted, (U.S. Geological Survey, unpub. data); 4, oxygen and lead isotope analyses by R.A. Ayuso (U.S. Geological Survey, unpub. data); 5, sample collected for paleomagnetic studies. (See Pallister and du Bray [1989] for discussion of paleomagnetic data [J.G. Rosenbaum, U.S. Geological Survey, unpub. data])

**Table 2.** Major-oxide analyses for selected samples collected in the area adjacent to the Turkey Creek caldera, Chiricahua Mountains, Cochise County, Arizona.

[Data in weight percent.  $\text{Fe}^{2+}$ /total iron (as FeO) adjusted to 0.8 and abundances normalized to 100 weight percent, anhydrous. Map-unit symbols above data columns are shown on the geologic map of the Turkey Creek caldera (du Bray and others, in press) and are defined in table 1. LOI, loss on ignition; ND, not detected. X-ray fluorescence spectroscopy, J.E. Taggart, A.J. Bartel, J.S. Mee, D.F. Siems, analysts]

| Sample No.                     | Trdp   |        | Ts     |        |        | Tsp    |        |        | P714  | Tmr1  | Tdpl   |        |
|--------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|-------|-------|--------|--------|
|                                | 201931 | 202921 | 202806 | 201807 | 202909 | 202910 | 202911 | 202919 |       |       | 202003 | 201533 |
| SiO <sub>2</sub>               | 77.08  | 76.96  | 77.49  | 67.17  | 77.30  | 75.42  | 73.54  | 73.14  | 71.72 | 75.90 | 65.21  | 63.52  |
| Al <sub>2</sub> O <sub>3</sub> | 12.63  | 12.74  | 12.46  | 15.86  | 12.26  | 13.17  | 13.47  | 13.69  | 14.51 | 13.21 | 15.72  | 15.98  |
| Fe <sub>2</sub> O <sub>3</sub> | 0.23   | 0.13   | 0.33   | 0.79   | 0.12   | 0.20   | 0.23   | 0.24   | 0.24  | 0.32  | 0.98   | 1.01   |
| FeO                            | 0.84   | 1.02   | 1.19   | 2.84   | 0.98   | 1.61   | 1.90   | 1.95   | 1.95  | 1.17  | 3.53   | 3.62   |
| MgO                            | ND     | ND     | 0.15   | 1.68   | ND     | 0.24   | 0.41   | 0.25   | 0.36  | 0.16  | 1.90   | 1.25   |
| CaO                            | 0.30   | 0.22   | 0.31   | 3.56   | 0.28   | 0.46   | 0.99   | 0.67   | 0.92  | 0.34  | 3.76   | 4.13   |
| Na <sub>2</sub> O              | 4.05   | 3.95   | 2.75   | 3.82   | 3.03   | 2.49   | 3.60   | 2.81   | 3.75  | 3.17  | 3.37   | 3.94   |
| K <sub>2</sub> O               | 4.72   | 4.79   | 5.13   | 3.55   | 5.83   | 5.90   | 5.23   | 6.60   | 5.90  | 5.50  | 4.40   | 5.10   |
| TiO <sub>2</sub>               | 0.10   | 0.10   | 0.16   | 0.55   | 0.16   | 0.37   | 0.43   | 0.46   | 0.46  | 0.18  | 0.77   | 0.98   |
| P <sub>2</sub> O <sub>5</sub>  | ND     | ND     | ND     | 0.15   | ND     | 0.09   | 0.13   | 0.13   | 0.13  | ND    | 0.30   | 0.38   |
| MnO                            | 0.04   | 0.09   | 0.04   | 0.06   | 0.04   | 0.05   | 0.07   | 0.05   | 0.06  | 0.04  | 0.08   | 0.09   |
| LOI                            | 0.20   | 0.31   | 1.21   | 0.48   | 0.54   | 1.18   | 0.45   | 0.54   | 0.51  | 1.19  | 1.79   | 2.71   |

| Sample No.                     | Tdpl   |       |       | Treu   |        |        |        |        |       | Trem  |        |        |
|--------------------------------|--------|-------|-------|--------|--------|--------|--------|--------|-------|-------|--------|--------|
|                                | 201750 | P145  | P146  | 201534 | 201765 | 201766 | 201802 | 202847 | P482  | P713  | 201535 | 201536 |
| SiO <sub>2</sub>               | 65.44  | 65.32 | 66.97 | 75.96  | 75.75  | 76.27  | 75.44  | 77.64  | 76.17 | 76.10 | 77.76  | 77.87  |
| Al <sub>2</sub> O <sub>3</sub> | 15.40  | 15.64 | 15.38 | 12.49  | 12.47  | 12.44  | 12.51  | 12.10  | 12.36 | 12.92 | 12.03  | 11.93  |
| Fe <sub>2</sub> O <sub>3</sub> | 0.91   | 0.96  | 0.86  | 0.40   | 0.41   | 0.41   | 0.43   | 0.48   | 0.38  | 0.20  | 0.28   | 0.31   |
| FeO                            | 3.29   | 3.46  | 3.08  | 1.45   | 1.49   | 1.47   | 1.54   | 1.71   | 1.39  | 1.63  | 1.00   | 1.12   |
| MgO                            | 1.41   | 1.86  | 1.23  | 0.17   | 0.14   | 0.59   | 0.24   | 0.29   | 0.17  | 0.11  | 0.15   | 0.19   |
| CaO                            | 2.88   | 3.66  | 2.98  | 0.22   | 0.26   | 0.42   | 0.29   | 0.40   | 0.24  | 0.23  | 0.28   | 0.32   |
| Na <sub>2</sub> O              | 3.17   | 3.51  | 3.91  | 3.71   | 3.74   | 3.00   | 3.79   | 1.63   | 3.82  | 3.37  | 3.30   | 3.20   |
| K <sub>2</sub> O               | 6.27   | 4.46  | 4.49  | 5.33   | 5.43   | 5.13   | 5.43   | 5.47   | 5.22  | 5.07  | 5.05   | 4.88   |
| TiO <sub>2</sub>               | 0.84   | 0.75  | 0.73  | 0.20   | 0.22   | 0.22   | 0.22   | 0.22   | 0.20  | 0.23  | 0.12   | 0.11   |
| P <sub>2</sub> O <sub>5</sub>  | 0.29   | 0.31  | 0.27  | ND     | ND     | ND     | ND     | ND     | ND    | 0.06  | ND     | ND     |
| MnO                            | 0.09   | 0.09  | 0.09  | 0.06   | 0.08   | 0.06   | 0.10   | 0.06   | 0.05  | 0.07  | 0.03   | 0.06   |
| LOI                            | 2.56   | 1.66  | 0.67  | 0.49   | 0.41   | 2.05   | 0.37   | 2.22   | 0.41  | 0.79  | 0.80   | 1.25   |

| Sample No.                     | Trem   |        |        |        |       |       |       |       |       |       |       |       |
|--------------------------------|--------|--------|--------|--------|-------|-------|-------|-------|-------|-------|-------|-------|
|                                | 201768 | 201799 | 201800 | 201801 | P53   | P54   | P55   | P56   | P57   | P58   | P59   | P60   |
| SiO <sub>2</sub>               | 77.70  | 77.36  | 76.94  | 75.41  | 77.60 | 77.50 | 77.75 | 77.67 | 77.55 | 77.62 | 77.53 | 77.23 |
| Al <sub>2</sub> O <sub>3</sub> | 12.02  | 12.25  | 11.96  | 15.23  | 11.97 | 12.04 | 12.13 | 12.10 | 12.13 | 12.19 | 12.31 | 12.18 |
| Fe <sub>2</sub> O <sub>3</sub> | 0.26   | 0.27   | 0.30   | 0.44   | 0.31  | 0.30  | 0.30  | 0.30  | 0.30  | 0.30  | 0.30  | 0.33  |
| FeO                            | 0.93   | 0.96   | 1.07   | 1.57   | 1.12  | 1.08  | 1.07  | 1.08  | 1.06  | 1.08  | 1.09  | 1.19  |
| MgO                            | ND     | 0.13   | 0.17   | 1.13   | ND    | ND    | ND    | ND    | ND    | ND    | ND    | 0.20  |
| CaO                            | 0.20   | 0.20   | 0.23   | 0.52   | 0.30  | 0.35  | 0.09  | 0.22  | 0.27  | 0.23  | 0.18  | 0.24  |
| Na <sub>2</sub> O              | 3.59   | 3.84   | 2.93   | 3.02   | 3.64  | 3.67  | 3.51  | 3.55  | 3.55  | 3.46  | 3.37  | 3.41  |
| K <sub>2</sub> O               | 5.14   | 4.83   | 6.25   | 4.77   | 4.89  | 4.90  | 4.95  | 4.92  | 4.94  | 4.97  | 5.03  | 4.95  |
| TiO <sub>2</sub>               | 0.11   | 0.11   | 0.11   | 0.24   | 0.11  | 0.11  | 0.10  | 0.11  | 0.11  | 0.10  | 0.11  | 0.15  |
| P <sub>2</sub> O <sub>5</sub>  | ND     | ND     | ND     | 0.05   | ND    | ND    | ND    | ND    | ND    | ND    | ND    | ND    |
| MnO                            | 0.04   | 0.04   | 0.03   | 0.06   | 0.05  | 0.05  | 0.09  | 0.05  | 0.08  | 0.05  | 0.08  | 0.11  |
| LOI                            | 0.30   | 0.44   | 0.68   | 2.37   | 0.51  | 0.51  | 0.59  | 0.65  | 0.65  | 0.93  | 0.64  | 1.08  |

**Table 2.** Major-oxide analyses for selected samples collected in the area adjacent to the Turkey Creek caldera, Chiricahua Mountains, Cochise County, Arizona—Continued.

| Sample No.                     | Tcrn   |        |         | Trel    |        |        |        |        |        |        |         |        |
|--------------------------------|--------|--------|---------|---------|--------|--------|--------|--------|--------|--------|---------|--------|
|                                | P61    | P481   | P483    | 201769  | 201770 | 201792 | 201793 | 201794 | 201795 | 201796 | 201797A | 201798 |
| SiO <sub>2</sub>               | 77.16  | 77.10  | 77.62   | 77.35   | 76.97  | 77.07  | 76.96  | 77.52  | 75.40  | 77.58  | 77.52   | 78.08  |
| Al <sub>2</sub> O <sub>3</sub> | 12.15  | 12.31  | 11.96   | 12.03   | 12.00  | 12.08  | 12.17  | 11.89  | 12.97  | 11.90  | 11.90   | 11.69  |
| Fe <sub>2</sub> O <sub>3</sub> | 0.35   | 0.34   | 0.32    | 0.32    | 0.32   | 0.33   | 0.34   | 0.31   | 0.33   | 0.32   | 0.33    | 0.33   |
| FeO                            | 1.26   | 1.21   | 1.14    | 1.15    | 1.15   | 1.18   | 1.22   | 1.13   | 1.17   | 1.13   | 1.17    | 1.17   |
| MgO                            | 0.20   | 0.17   | 0.18    | 0.21    | 0.11   | 0.25   | 0.20   | 0.33   | 0.15   | 0.27   | 0.27    | 0.26   |
| CaO                            | 0.30   | 0.24   | 0.19    | 0.37    | 0.48   | 0.34   | 0.15   | 0.16   | 0.28   | 0.33   | 0.43    | 0.24   |
| Na <sub>2</sub> O              | 3.42   | 3.50   | 3.50    | 3.46    | 3.88   | 3.60   | 3.77   | 3.63   | 3.98   | 3.47   | 3.28    | 3.18   |
| K <sub>2</sub> O               | 4.91   | 4.91   | 4.92    | 4.94    | 4.90   | 4.95   | 4.98   | 4.87   | 5.51   | 4.82   | 4.92    | 4.88   |
| TiO <sub>2</sub>               | 0.17   | 0.15   | 0.11    | 0.11    | 0.11   | 0.12   | 0.13   | 0.11   | 0.12   | 0.11   | 0.12    | 0.12   |
| P <sub>2</sub> O <sub>5</sub>  | ND     | ND     | ND      | ND      | ND     | ND     | ND     | ND     | ND     | ND     | ND      | ND     |
| MnO                            | 0.06   | 0.07   | 0.06    | 0.05    | 0.07   | 0.07   | 0.08   | 0.06   | 0.07   | 0.07   | 0.05    | 0.04   |
| LOI                            | 0.43   | 0.79   | 0.80    | 1.20    | 0.46   | 0.85   | 0.53   | 1.09   | 0.52   | 1.04   | 1.09    | 1.00   |
| Sample No.                     | Trel   |        |         | Tcr0    |        |        | Tcr0   |        |        | Tji    |         |        |
|                                | 201798 | P48    | P50     | P51     | P52    | 202006 | 202915 | 202916 | P725   | 201771 | 201775  | 202831 |
| SiO <sub>2</sub>               | 77.47  | 77.68  | 77.32   | 77.49   | 77.49  | 77.20  | 77.66  | 76.20  | 78.14  | 77.43  | 77.44   | 77.39  |
| Al <sub>2</sub> O <sub>3</sub> | 11.93  | 11.97  | 12.04   | 12.15   | 12.16  | 11.92  | 11.95  | 13.00  | 11.66  | 12.41  | 12.43   | 12.61  |
| Fe <sub>2</sub> O <sub>3</sub> | 0.32   | 0.31   | 0.31    | 0.33    | 0.33   | 0.35   | 0.17   | 0.16   | 0.18   | 0.18   | 0.24    | 0.28   |
| FeO                            | 1.16   | 1.13   | 1.13    | 1.20    | 1.18   | 1.26   | 1.39   | 1.33   | 1.49   | 0.64   | 0.85    | 1.03   |
| MgO                            | 0.31   | 0.13   | ND      | ND      | ND     | ND     | 0.15   | ND     | 0.19   | 0.35   | 0.19    | 0.24   |
| CaO                            | 0.49   | 0.24   | 0.34    | ND      | 0.03   | 0.18   | 0.16   | 0.12   | 0.50   | 0.43   | 0.19    | 0.26   |
| Na <sub>2</sub> O              | 3.30   | 3.53   | 3.75    | 3.71    | 3.70   | 2.72   | 3.38   | 3.43   | 2.72   | 3.47   | 3.48    | 1.86   |
| K <sub>2</sub> O               | 4.86   | 4.84   | 4.92    | 4.94    | 4.92   | 6.20   | 4.92   | 5.47   | 4.79   | 4.90   | 4.97    | 6.06   |
| TiO <sub>2</sub>               | 0.11   | 0.11   | 0.11    | 0.11    | 0.11   | 0.10   | 0.15   | 0.14   | 0.18   | 0.12   | 0.14    | 0.22   |
| P <sub>2</sub> O <sub>5</sub>  | ND     | ND     | ND      | ND      | ND     | ND     | ND     | 0.07   | 0.05   | ND     | ND      | ND     |
| MnO                            | 0.05   | 0.06   | 0.07    | 0.07    | 0.08   | 0.06   | 0.06   | 0.06   | 0.08   | 0.07   | 0.05    | 0.07   |
| LOI                            | 1.08   | 0.46   | 0.50    | 0.42    | 0.51   | 0.51   | 0.52   | 0.66   | 1.49   | 1.43   | 0.96    | 1.74   |
| Sample No.                     | Tji    |        | Tfre    |         |        |        | P44    |        | Tim2   |        |         |        |
|                                | P45    | P47    | 201803  | 201804  | 201859 | 202836 | P44    | P122   | 201764 | 202056 | 202136  | 202824 |
| SiO <sub>2</sub>               | 77.46  | 77.76  | 73.44   | 73.47   | 73.74  | 72.21  | 73.43  | 73.34  | 62.55  | 57.19  | 64.32   | 59.80  |
| Al <sub>2</sub> O <sub>3</sub> | 12.60  | 12.29  | 14.65   | 14.82   | 14.73  | 15.35  | 15.02  | 14.88  | 17.33  | 18.30  | 16.73   | 17.55  |
| Fe <sub>2</sub> O <sub>3</sub> | 0.22   | 0.19   | 0.25    | 0.25    | 0.27   | 0.29   | 0.25   | 0.25   | 1.24   | 1.43   | 0.99    | 1.17   |
| FeO                            | 0.77   | 0.69   | 0.91    | 0.91    | 0.97   | 1.06   | 0.89   | 0.90   | 4.47   | 5.16   | 3.57    | 4.22   |
| MgO                            | 0.41   | 0.34   | 0.34    | 0.35    | 0.24   | 0.86   | 0.27   | 0.25   | 1.39   | 2.32   | 2.64    | 2.56   |
| CaO                            | 0.36   | 0.50   | 1.12    | 1.08    | 0.96   | 1.62   | 1.26   | 1.19   | 3.11   | 8.47   | 2.49    | 3.17   |
| Na <sub>2</sub> O              | 3.07   | 3.19   | 4.26    | 4.21    | 4.12   | 3.59   | 3.86   | 3.98   | 3.52   | 3.59   | 4.74    | 3.75   |
| K <sub>2</sub> O               | 4.91   | 4.85   | 4.83    | 4.71    | 4.74   | 4.73   | 4.80   | 4.97   | 5.09   | 2.27   | 3.64    | 6.41   |
| TiO <sub>2</sub>               | 0.15   | 0.13   | 0.18    | 0.18    | 0.18   | 0.21   | 0.18   | 0.19   | 0.96   | 0.93   | 0.61    | 0.90   |
| P <sub>2</sub> O <sub>5</sub>  | ND     | ND     | ND      | ND      | ND     | ND     | ND     | ND     | 0.28   | 0.29   | 0.19    | 0.38   |
| MnO                            | 0.04   | 0.05   | 0.02    | 0.03    | 0.04   | 0.07   | 0.05   | 0.05   | 0.05   | 0.06   | 0.08    | 0.09   |
| LOI                            | 1.90   | 1.84   | 0.66    | 0.78    | 0.72   | 4.80   | 3.62   | 3.19   | 3.51   | 3.65   | 2.53    | 2.49   |
| Sample No.                     | Tim2   |        | Tim4    |         | Tim?   |        | Tgd    |        | Tcc    |        |         |        |
|                                | 202844 | 202845 | 202823A | 202823B | 201570 | P490   | 201661 | 201924 | 201925 | 202137 | P85D    | P153   |
| SiO <sub>2</sub>               | 59.29  | 67.54  | 56.34   | 53.97   | 67.71  | 67.29  | 76.72  | 77.92  | 75.58  | 79.83  | 77.92   | 76.52  |
| Al <sub>2</sub> O <sub>3</sub> | 17.71  | 15.87  | 16.83   | 16.79   | 15.99  | 15.86  | 12.84  | 12.14  | 12.65  | 10.19  | 12.04   | 12.11  |
| Fe <sub>2</sub> O <sub>3</sub> | 1.35   | 0.73   | 1.71    | 2.00    | 0.71   | 0.75   | 0.23   | 0.24   | 0.21   | 0.27   | 0.22    | 0.12   |
| FeO                            | 4.85   | 2.64   | 6.17    | 7.21    | 2.56   | 2.68   | 0.82   | 0.88   | 0.76   | 0.96   | 0.79    | 0.44   |
| MgO                            | 3.41   | 1.34   | 5.28    | 4.88    | 1.45   | 1.66   | 0.18   | 0.17   | ND     | ND     | 0.13    | 0.12   |
| CaO                            | 6.29   | 3.35   | 5.55    | 7.94    | 3.52   | 3.56   | 0.58   | 0.29   | 0.03   | 0.05   | 0.25    | 0.21   |
| Na <sub>2</sub> O              | 3.73   | 3.37   | 3.88    | 3.55    | 3.88   | 3.94   | 4.33   | 2.95   | 0.71   | 0.22   | 3.46    | 0.87   |
| K <sub>2</sub> O               | 2.09   | 4.40   | 2.59    | 1.17    | 3.51   | 3.56   | 4.04   | 5.16   | 9.91   | 8.29   | 4.93    | 9.48   |
| TiO <sub>2</sub>               | 0.95   | 0.52   | 1.17    | 1.61    | 0.48   | 0.52   | 0.21   | 0.19   | 0.13   | 0.15   | 0.20    | 0.12   |
| P <sub>2</sub> O <sub>5</sub>  | 0.25   | 0.17   | 0.38    | 0.72    | 0.14   | 0.15   | ND     | ND     | ND     | ND     | ND      | ND     |
| MnO                            | 0.09   | 0.07   | 0.09    | 0.17    | 0.04   | 0.04   | 0.06   | 0.06   | 0.03   | 0.04   | 0.05    | ND     |
| LOI                            | 2.12   | 2.66   | 3.48    | 4.05    | 0.50   | 0.37   | 4.44   | 0.84   | 0.60   | 0.54   | 0.55    | 0.49   |

**Table 2.** Major-oxide analyses for selected samples collected in the area adjacent to the Turkey Creek caldera, Chiricahua Mountains, Cochise County, Arizona—Continued.

| Sample No.                     | Tcc                    |        | 201662             | P81    | Tsd    |        |        | Tpf    |        | Tpc    |        | 201527 |
|--------------------------------|------------------------|--------|--------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
|                                | P272A                  | P272B  |                    |        | P83    | P131   | P133   | P84    | P136B  | 202810 | 202896 |        |
| SiO <sub>2</sub>               | 77.33                  | 77.95  | 67.83              | 61.73  | 69.86  | 66.96  | 68.28  | 68.41  | 68.59  | 56.10  | 57.69  | 68.74  |
| Al <sub>2</sub> O <sub>3</sub> | 11.86                  | 12.52  | 15.97              | 17.19  | 14.78  | 16.59  | 16.12  | 16.00  | 15.95  | 14.60  | 18.32  | 15.94  |
| Fe <sub>2</sub> O <sub>3</sub> | 0.18                   | 0.21   | 0.76               | 1.15   | 0.64   | 0.73   | 0.75   | 0.70   | 0.76   | 1.77   | 0.74   | 0.50   |
| FeO                            | 0.65                   | 0.77   | 2.73               | 4.15   | 2.31   | 2.62   | 2.69   | 2.53   | 2.73   | 6.38   | 6.02   | 1.79   |
| MgO                            | ND                     | 0.25   | 1.03               | 2.68   | 0.97   | 1.23   | 0.72   | 1.27   | 1.46   | 3.21   | 1.16   | 0.32   |
| CaO                            | 0.04                   | 2.20   | 3.10               | 4.74   | 2.49   | 2.81   | 2.80   | 3.33   | 3.72   | 10.21  | 6.55   | 0.66   |
| Na <sub>2</sub> O              | 1.08                   | 2.72   | 4.00               | 3.92   | 3.25   | 4.19   | 3.83   | 4.28   | 4.39   | 3.29   | 4.42   | 3.57   |
| K <sub>2</sub> O               | 8.69                   | 3.14   | 3.82               | 3.27   | 5.05   | 4.07   | 4.02   | 2.75   | 1.63   | 2.43   | 3.54   | 7.73   |
| TiO <sub>2</sub>               | 0.13                   | 0.20   | 0.54               | 0.84   | 0.46   | 0.57   | 0.55   | 0.52   | 0.54   | 1.42   | 1.12   | 0.58   |
| P <sub>2</sub> O <sub>5</sub>  | ND                     | ND     | 0.18               | 0.23   | 0.15   | 0.19   | 0.18   | 0.17   | 0.18   | 0.40   | 0.38   | 0.10   |
| MnO                            | 0.04                   | 0.04   | 0.04               | 0.09   | 0.03   | 0.04   | 0.05   | 0.05   | 0.05   | 0.19   | 0.06   | 0.06   |
| LOI                            | 0.55                   | 7.52   | 1.00               | 2.29   | 0.66   | 1.54   | 1.57   | 4.22   | 4.88   | 7.23   | 3.75   | 0.49   |
| Thc, high barium phase         |                        |        |                    |        |        |        |        |        |        |        |        |        |
| Sample No.                     | Tdp                    |        | 201514             | 201529 | 201530 | 202018 | 202033 | 202143 | 202144 | 202145 | 202156 | 202803 |
|                                | 201528                 | 201532 |                    |        |        |        |        |        |        |        |        |        |
| SiO <sub>2</sub>               | 68.32                  | 68.15  | 69.01              | 67.54  | 66.70  | 68.31  | 71.49  | 73.37  | 70.85  | 71.78  | 70.09  | 70.01  |
| Al <sub>2</sub> O <sub>3</sub> | 16.19                  | 16.20  | 16.12              | 16.38  | 16.93  | 16.24  | 16.06  | 13.94  | 15.42  | 14.48  | 14.97  | 15.23  |
| Fe <sub>2</sub> O <sub>3</sub> | 0.52                   | 0.53   | 0.52               | 0.54   | 0.58   | 0.53   | 0.52   | 0.43   | 0.51   | 0.48   | 0.52   | 0.56   |
| FeO                            | 1.86                   | 1.91   | 1.87               | 1.96   | 2.10   | 1.91   | 1.86   | 1.53   | 1.82   | 1.71   | 1.88   | 2.01   |
| MgO                            | 0.39                   | 0.22   | 0.43               | 0.59   | 0.53   | 0.63   | 0.49   | 0.21   | 0.38   | 0.32   | 0.28   | 0.38   |
| CaO                            | 0.98                   | 0.65   | 0.74               | 1.38   | 1.56   | 2.72   | 0.33   | 0.42   | 0.61   | 1.01   | 0.67   | 0.66   |
| Na <sub>2</sub> O              | 4.33                   | 3.40   | 3.96               | 4.11   | 3.91   | 3.82   | 2.11   | 3.79   | 3.56   | 3.92   | 3.36   | 3.05   |
| K <sub>2</sub> O               | 6.57                   | 8.10   | 6.51               | 6.59   | 6.71   | 5.00   | 6.44   | 5.80   | 6.15   | 5.66   | 7.48   | 7.43   |
| TiO <sub>2</sub>               | 0.64                   | 0.65   | 0.62               | 0.69   | 0.73   | 0.63   | 0.56   | 0.38   | 0.57   | 0.47   | 0.55   | 0.53   |
| P <sub>2</sub> O <sub>5</sub>  | 0.13                   | 0.14   | 0.14               | 0.15   | 0.19   | 0.14   | 0.09   | 0.07   | 0.07   | 0.13   | 0.13   | 0.11   |
| MnO                            | 0.07                   | 0.03   | 0.07               | 0.06   | 0.05   | 0.05   | 0.04   | 0.06   | 0.07   | 0.06   | 0.07   | 0.03   |
| LOI                            | 0.36                   | 0.58   | 1.35               | 0.52   | 0.68   | 6.12   | 2.71   | 0.56   | 1.34   | 0.71   | 0.24   | 1.16   |
| Thc, low barium phase          |                        |        |                    |        |        |        |        |        |        |        |        |        |
| Sample No.                     | Thc, high barium phase |        | P126B              | 201927 | 202032 | 202138 | 202139 | 202140 | 202141 | 202142 | 202146 | 202153 |
|                                | 202899                 | 202918 |                    |        |        |        |        |        |        |        |        |        |
| SiO <sub>2</sub>               | 69.39                  | 69.55  | 67.93              | 77.07  | 75.93  | 80.33  | 75.31  | 75.25  | 74.40  | 74.48  | 78.70  | 78.34  |
| Al <sub>2</sub> O <sub>3</sub> | 15.35                  | 16.11  | 16.60              | 12.44  | 12.44  | 9.99   | 12.38  | 12.32  | 13.27  | 13.31  | 11.48  | 11.45  |
| Fe <sub>2</sub> O <sub>3</sub> | 0.25                   | 0.21   | 0.52               | 0.26   | 0.27   | 0.20   | 0.34   | 0.33   | 0.36   | 0.29   | 0.32   | 0.28   |
| FeO                            | 2.06                   | 1.69   | 1.87               | 0.95   | 0.98   | 0.72   | 1.22   | 1.19   | 1.29   | 1.05   | 1.15   | 1.02   |
| MgO                            | 0.49                   | 0.29   | 0.40               | 0.16   | 0.12   | ND     | 0.11   | 0.13   | 0.12   | 0.16   | 0.22   | ND     |
| CaO                            | 0.41                   | 0.46   | 0.70               | 0.32   | 0.07   | 0.03   | 0.12   | 0.42   | 0.22   | 0.04   | 0.57   | 0.08   |
| Na <sub>2</sub> O              | 1.49                   | 3.75   | 3.27               | 3.28   | 1.17   | 0.53   | 1.25   | 2.15   | 2.15   | 2.98   | 3.02   | 2.10   |
| K <sub>2</sub> O               | 9.79                   | 7.21   | 7.89               | 5.32   | 8.83   | 8.03   | 8.97   | 7.89   | 7.70   | 7.31   | 4.28   | 6.54   |
| TiO <sub>2</sub>               | 0.59                   | 0.55   | 0.66               | 0.20   | 0.19   | 0.14   | 0.26   | 0.26   | 0.39   | 0.36   | 0.18   | 0.17   |
| P <sub>2</sub> O <sub>5</sub>  | 0.12                   | 0.13   | 0.12               | ND     | ND     | ND     | ND     | ND     | 0.07   | ND     | ND     | ND     |
| MnO                            | 0.04                   | 0.04   | 0.06               | ND     | ND     | 0.02   | 0.03   | 0.05   | 0.02   | 0.02   | 0.07   | 0.02   |
| LOI                            | 1.39                   | 0.94   | 1.03               | 0.52   | 1.28   | 0.30   | 0.45   | 0.05   | 0.46   | 0.38   | 1.69   | 0.42   |
| Thc, low barium phase          |                        |        |                    |        |        |        |        |        |        |        |        |        |
| Sample No.                     | Thc, low barium phase  |        | Thc, unknown phase |        | TKr    | 202059 | Tig    |        | 202062 | Thl    |        | KJsv   |
|                                | 202155                 | P478   | P126AM             | P126AI |        |        | 202060 | 202061 |        | 202055 | 202057 |        |
| SiO <sub>2</sub>               | 75.60                  | 77.21  | 70.96              | 70.35  | 81.01  | 73.55  | 72.71  | 73.60  | 71.70  | 76.67  | 80.63  | 50.81  |
| Al <sub>2</sub> O <sub>3</sub> | 13.14                  | 11.89  | 14.88              | 15.23  | 10.56  | 13.87  | 14.52  | 14.66  | 15.89  | 13.12  | 10.92  | 18.03  |
| Fe <sub>2</sub> O <sub>3</sub> | 0.32                   | 0.21   | 0.37               | 0.46   | 0.10   | 0.50   | 0.60   | 0.51   | 0.50   | 0.22   | 0.15   | 1.87   |
| FeO                            | 1.17                   | 0.76   | 1.33               | 1.64   | 0.80   | 1.79   | 2.16   | 1.82   | 1.81   | 0.80   | 0.56   | 6.74   |
| MgO                            | 0.15                   | 0.22   | 0.30               | 0.41   | 0.14   | 0.43   | 0.50   | 0.36   | 0.42   | 0.51   | 0.21   | 4.70   |
| CaO                            | 0.36                   | 0.12   | 0.43               | 0.53   | 0.10   | 0.22   | 0.49   | 0.64   | 0.88   | 0.31   | 0.25   | 9.09   |
| Na <sub>2</sub> O              | 3.69                   | 1.15   | 2.77               | 3.10   | 0.35   | 1.56   | 3.63   | 3.08   | 3.18   | 1.41   | 0.96   | 3.36   |
| K <sub>2</sub> O               | 5.24                   | 8.27   | 8.44               | 7.59   | 6.73   | 7.80   | 4.90   | 4.93   | 5.18   | 6.82   | 6.19   | 2.74   |
| TiO <sub>2</sub>               | 0.26                   | 0.17   | 0.42               | 0.50   | 0.15   | 0.27   | 0.34   | 0.31   | 0.34   | 0.14   | 0.12   | 1.89   |
| P <sub>2</sub> O <sub>5</sub>  | ND                     | ND     | 0.08               | 0.15   | ND     | ND     | 0.09   | 0.07   | 0.08   | ND     | ND     | 0.65   |
| MnO                            | 0.07                   | ND     | 0.02               | 0.05   | 0.06   | 0.02   | 0.04   | 0.02   | 0.02   | ND     | 0.02   | 0.12   |
| LOI                            | 0.87                   | 0.87   | 0.41               | 0.67   | 1.40   | 1.41   | 1.48   | 2.40   | 2.43   | 2.20   | 2.03   | 4.95   |

**Table 2. Major-oxide analyses for selected samples collected in the area adjacent to the Turkey Creek caldera, Chiricahua Mountains, Cochise County, Arizona—Continued.**

| Sample No.                     | KJsv   |        |        |        |        | Miscellaneous |        |        |        |        |        |         |
|--------------------------------|--------|--------|--------|--------|--------|---------------|--------|--------|--------|--------|--------|---------|
|                                | 202132 | 202133 | 202223 | 202224 | 202226 | 201811        | 201997 | 202063 | 202064 | 202815 | 202816 | 202820B |
| SiO <sub>2</sub>               | 49.82  | 50.13  | 53.55  | 49.80  | 49.73  | 63.49         | 47.03  | 38.57  | 74.95  | 76.66  | 73.68  | 73.75   |
| Al <sub>2</sub> O <sub>3</sub> | 16.82  | 17.61  | 17.75  | 17.78  | 18.25  | 16.34         | 15.61  | 11.60  | 13.82  | 12.09  | 13.80  | 13.53   |
| Fe <sub>2</sub> O <sub>3</sub> | 2.12   | 1.85   | 1.66   | 1.87   | 1.79   | 1.05          | 2.33   | 0.45   | 0.31   | 0.27   | 0.49   | 0.51    |
| FeO                            | 7.63   | 6.66   | 5.96   | 6.72   | 6.43   | 3.79          | 8.39   | 1.61   | 1.11   | 0.97   | 1.75   | 1.82    |
| MgO                            | 5.68   | 7.33   | 3.53   | 6.95   | 7.55   | 2.41          | 9.19   | 0.87   | 0.29   | 0.15   | 0.37   | 0.40    |
| CaO                            | 10.97  | 9.36   | 8.99   | 8.06   | 9.46   | 3.42          | 10.13  | 40.41  | 1.00   | 0.87   | 0.77   | 1.02    |
| Na <sub>2</sub> O              | 3.75   | 3.02   | 3.89   | 4.01   | 2.59   | 4.64          | 3.11   | 2.22   | 3.05   | 1.31   | 3.39   | 3.37    |
| K <sub>2</sub> O               | 1.03   | 1.54   | 1.69   | 2.07   | 1.49   | 3.78          | 1.24   | 3.70   | 5.21   | 7.48   | 5.21   | 5.07    |
| TiO <sub>2</sub>               | 1.74   | 1.83   | 2.04   | 1.95   | 2.02   | 0.78          | 2.27   | 0.30   | 0.20   | 0.16   | 0.38   | 0.38    |
| P <sub>2</sub> O <sub>5</sub>  | 0.30   | 0.52   | 0.84   | 0.63   | 0.50   | 0.23          | 0.53   | 0.11   | ND     | ND     | 0.08   | 0.09    |
| MnO                            | 0.15   | 0.15   | 0.10   | 0.16   | 0.17   | 0.07          | 0.17   | 0.16   | 0.04   | 0.02   | 0.09   | 0.07    |
| LOI                            | 4.85   | 2.99   | 2.25   | 5.84   | 3.48   | 2.37          | 0.94   | 24.20  | 1.38   | 1.78   | 1.00   | 0.85    |

| Sample No.                     | Miscellaneous |        |        |        |       |       |
|--------------------------------|---------------|--------|--------|--------|-------|-------|
|                                | 202832        | 202837 | 202838 | 202897 | P488  | P489  |
| SiO <sub>2</sub>               | 61.63         | 57.78  | 69.18  | 71.39  | 68.40 | 68.92 |
| Al <sub>2</sub> O <sub>3</sub> | 17.36         | 19.09  | 15.81  | 15.13  | 15.14 | 14.51 |
| Fe <sub>2</sub> O <sub>3</sub> | 1.24          | 1.97   | 0.91   | 0.21   | 0.82  | 0.81  |
| FeO                            | 4.47          | 7.10   | 3.26   | 1.69   | 2.96  | 2.92  |
| MgO                            | 2.93          | 1.70   | 1.76   | 0.24   | 0.77  | 0.78  |
| CaO                            | 4.47          | 6.81   | 4.06   | 0.32   | 3.19  | 2.19  |
| Na <sub>2</sub> O              | 4.60          | 2.82   | 2.66   | 4.04   | 3.00  | 3.15  |
| K <sub>2</sub> O               | 2.16          | 0.86   | 1.39   | 6.37   | 4.74  | 5.79  |
| TiO <sub>2</sub>               | 0.74          | 1.33   | 0.80   | 0.50   | 0.70  | 0.70  |
| P <sub>2</sub> O <sub>5</sub>  | 0.29          | 0.41   | 0.11   | 0.07   | 0.21  | 0.20  |
| MnO                            | 0.10          | 0.12   | 0.05   | 0.03   | 0.05  | 0.03  |
| LOI                            | 2.61          | 1.88   | 3.02   | 0.61   | 0.96  | 0.46  |

**Table 3. Trace-element data for selected samples collected in the area adjacent to the Turkey Creek caldera, Chiricahua Mountains, Cochise County, Arizona.**

[Data in parts per million. Map-unit symbols are those shown on the geologic map of the Turkey Creek caldera (du Bray and others, in press) and are defined in table 1. ND, not detected. Energy-dispersive X-ray fluorescence; E.A. du Bray and D.B. Yager, analysts]

| Sample No. | Trdp   |        |        |        |        |        |        |        |        |        | Ts     |        |
|------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
|            | 201930 | 201931 | 201936 | 201937 | 202150 | 202151 | 202811 | 202920 | 202921 | 202922 | 202005 | 202035 |
| Zn         | 68     | 48     | 68     | 64     | 66     | 69     | 39     | 50     | 49     | 40     | 78     | 48     |
| Rb         | 531    | 603    | 486    | 522    | 554    | 427    | 581    | 560    | 595    | 518    | 387    | 465    |
| Sr         | 19     | 16     | 21     | 17     | 20     | 22     | 16     | 14     | 16     | 16     | 26     | 18     |
| Y          | 73     | 68     | 61     | 56     | 115    | 40     | 102    | 32     | 64     | 21     | 90     | 37     |
| Zr         | 157    | 157    | 164    | 125    | 150    | 140    | 163    | 141    | 136    | 138    | 131    | 157    |
| Nb         | 63     | 71     | 65     | 30     | 73     | 34     | 74     | 63     | 75     | 59     | 42     | 50     |
| Pb         | 57     | 73     | 59     | 38     | 69     | 37     | 49     | 16     | 57     | 61     | 40     | 48     |
| Th         | 70     | 97     | 83     | 61     | 82     | 46     | 77     | 51     | 77     | 88     | 59     | 76     |
| Ba         | 34     | 6      | 29     | 34     | 8      | 44     | 5      | 5      | 33     | 12     | 41     | 40     |
| La         | 60     | 45     | 46     | 40     | 54     | 42     | 61     | 34     | 24     | 25     | 64     | 29     |
| Ce         | 105    | 96     | 89     | 100    | 98     | 119    | 104    | 68     | 79     | 144    | 140    | 118    |
| Nd         | 44     | 44     | 32     | 41     | 31     | 45     | 75     | 10     | 19     | 10     | 51     | 42     |

| Sample No. | Ts     |        |        |        |        | Tsp    |        |        | Tmr1 |        |        |        |
|------------|--------|--------|--------|--------|--------|--------|--------|--------|------|--------|--------|--------|
|            | 202036 | 202149 | 202806 | 202807 | 202909 | 202910 | 202911 | 202919 | P714 | 202003 | 202204 | 202019 |
| Zn         | 75     | 111    | 56     | 56     | 41     | 50     | 61     | 61     | 66   | 61     | 66     | 83     |
| Rb         | 322    | 432    | 425    | 411    | 445    | 299    | 259    | 292    | 283  | 348    | 160    | 256    |
| Sr         | 77     | 28     | 25     | 28     | 27     | 69     | 100    | 90     | 108  | 39     | 132    | 22     |
| Y          | 61     | 58     | 52     | 57     | 43     | 80     | 64     | 59     | 60   | 82     | 48     | 56     |
| Zr         | 234    | 126    | 165    | 150    | 145    | 250    | 299    | 318    | 322  | 246    | 380    | 189    |
| Nb         | 32     | 34     | 45     | 42     | 46     | 35     | 33     | 33     | 33   | 44     | 21     | 34     |
| Pb         | 25     | 38     | 36     | 52     | 64     | 60     | 21     | 50     | 49   | 54     | 15     | 75     |
| Th         | 46     | 58     | 56     | 61     | 76     | 64     | 25     | 33     | 27   | 57     | 14     | 48     |
| Ba         | 366    | 31     | 33     | 53     | 57     | 417    | 532    | 599    | 589  | 105    | 758    | 58     |
| La         | 70     | 48     | 68     | 48     | 58     | 131    | 80     | 69     | 94   | 97     | 101    | 63     |
| Ce         | 139    | 86     | 92     | 111    | 92     | 223    | 177    | 184    | 190  | 207    | 201    | 135    |
| Nd         | 45     | 35     | 53     | 29     | 37     | 106    | 62     | 53     | 65   | 85     | 93     | 51     |

**Table 3.** Trace-element data for selected samples collected in the area adjacent to the Turkey Creek caldera, Chiricahua Mountains, Cochise County, Arizona—Continued.

|            | Tmr1   |        |        |        |        |        |        |        |        |        |        |      |
|------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|------|
| Sample No. | 202148 | 202805 | 202808 | 202812 | 202814 | 202818 | 202819 | 202891 | 202894 | 202908 | 202912 | P606 |
| Zn         | 71     | 66     | 19     | 93     | 75     | 77     | 65     | 65     | 42     | 41     | 90     | 67   |
| Rb         | 232    | 341    | 291    | 445    | 336    | 393    | 297    | 327    | 322    | 292    | 331    | 360  |
| Sr         | 22     | 36     | 20     | 35     | 32     | 32     | 30     | 31     | 23     | 30     | 32     | 32   |
| Y          | 47     | 79     | 69     | 65     | 81     | 45     | 43     | 53     | 56     | 60     | 43     | 61   |
| Zr         | 130    | 248    | 212    | 220    | 233    | 201    | 214    | 217    | 193    | 196    | 204    | 244  |
| Nb         | 28     | 44     | 40     | 44     | 41     | 34     | 35     | 44     | 34     | 32     | 39     | 40   |
| Pb         | 39     | 63     | 62     | 38     | 55     | 58     | 47     | 36     | 15     | 49     | 36     | 77   |
| Th         | 38     | 43     | 37     | 48     | 40     | 36     | 38     | 47     | 27     | 49     | 50     | 45   |
| Ba         | 48     | 91     | 28     | 92     | 102    | 77     | 83     | 94     | 74     | 78     | 85     | 96   |
| La         | 51     | 92     | 82     | 79     | 75     | 45     | 76     | 90     | 68     | 83     | 69     | 64   |
| Ce         | 109    | 222    | 138    | 140    | 172    | 124    | 154    | 174    | 169    | 179    | 175    | 194  |
| Nd         | 49     | 79     | 65     | 83     | 58     | 49     | 58     | 79     | 51     | 75     | 62     | 50   |

|            | Tmr1 |      | Tmt1   | Ttp    | Tdpl   |        |        |        |        |        |      |      |
|------------|------|------|--------|--------|--------|--------|--------|--------|--------|--------|------|------|
| Sample No. | P607 | P735 | 202817 | 202809 | 201533 | 201543 | 201745 | 201747 | 201748 | 201750 | P145 | P146 |
| Zn         | 66   | 83   | 166    | 77     | 107    | 111    | 95     | 120    | 78     | 113    | 121  | 100  |
| Rb         | 356  | 334  | 420    | 235    | 174    | 195    | 169    | 190    | 140    | 272    | 168  | 198  |
| Sr         | 27   | 24   | 53     | 72     | 381    | 230    | 219    | 213    | 271    | 193    | 363  | 322  |
| Y          | 56   | 40   | 76     | 61     | 39     | 45     | 48     | 38     | 42     | 51     | 41   | 51   |
| Zr         | 215  | 218  | 265    | 839    | 335    | 600    | 496    | 568    | 572    | 538    | 361  | 352  |
| Nb         | 41   | 33   | 43     | 38     | 21     | 27     | 25     | 22     | 24     | 26     | 21   | 24   |
| Pb         | 61   | 26   | 15     | 15     | 47     | 42     | 34     | 15     | 40     | 44     | 43   | 60   |
| Th         | 64   | 23   | 33     | 14     | 22     | 34     | 23     | 19     | 20     | 23     | 26   | 30   |
| Ba         | 92   | 79   | 83     | 107    | 856    | 686    | 745    | 682    | 697    | 608    | 844  | 869  |
| La         | 75   | 63   | 49     | 102    | 60     | 80     | 92     | 90     | 84     | 77     | 61   | 84   |
| Ce         | 125  | 205  | 137    | 144    | 114    | 152    | 155    | 152    | 136    | 150    | 112  | 122  |
| Nd         | 49   | 57   | 41     | 82     | 57     | 64     | 73     | 70     | 64     | 66     | 53   | 72   |

|            | Trcu   |        |        |        |        |        |         |        |        |      |      |      |
|------------|--------|--------|--------|--------|--------|--------|---------|--------|--------|------|------|------|
| Sample No. | 201534 | 201765 | 201766 | 201802 | 201933 | 202846 | 202846C | 202847 | 202913 | P482 | P713 | P723 |
| Zn         | 81     | 79     | 60     | 67     | 64     | 134    | 38      | 92     | 79     | 59   | 83   | 121  |
| Rb         | 297    | 292    | 296    | 290    | 301    | 316    | 328     | 298    | 274    | 280  | 249  | 275  |
| Sr         | 31     | 32     | 45     | 35     | 32     | 39     | 21      | 46     | 48     | 28   | 31   | 28   |
| Y          | 66     | 67     | 65     | 65     | 61     | 71     | 53      | 79     | 77     | 63   | 62   | 61   |
| Zr         | 385    | 411    | 319    | 408    | 373    | 392    | 290     | 347    | 332    | 361  | 345  | 401  |
| Nb         | 47     | 44     | 45     | 46     | 47     | 46     | 54      | 42     | 41     | 44   | 34   | 35   |
| Pb         | 45     | 15     | 33     | 39     | 58     | 31     | 40      | 15     | 34     | 55   | 27   | 30   |
| Th         | 55     | 49     | 35     | 34     | 66     | 14     | 36      | 25     | 25     | 43   | 30   | 14   |
| Ba         | 56     | 65     | 72     | 77     | 50     | 43     | 25      | 49     | 97     | 50   | 60   | 72   |
| La         | 103    | 118    | 95     | 108    | 113    | 129    | 67      | 79     | 110    | 109  | 112  | 118  |
| Ce         | 198    | 225    | 174    | 226    | 207    | 212    | 124     | 144    | 218    | 205  | 226  | 243  |
| Nd         | 77     | 79     | 66     | 86     | 91     | 88     | 43      | 52     | 69     | 73   | 77   | 107  |

|            | Trcm   |        |        |        |        |        |        |        |        |        |        |        |
|------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Sample No. | 201535 | 201536 | 201768 | 201799 | 201800 | 201801 | 201815 | 201816 | 201817 | 201818 | 201819 | 201820 |
| Zn         | 67     | 72     | 56     | 25     | 65     | 58     | 79     | 74     | 77     | 69     | 25     | 66     |
| Rb         | 330    | 404    | 358    | 338    | 384    | 273    | 435    | 413    | 403    | 396    | 410    | 419    |
| Sr         | 22     | 23     | 19     | 14     | 23     | 87     | 17     | 20     | 20     | 20     | 18     | 15     |
| Y          | 57     | 65     | 68     | 57     | 57     | 56     | 88     | 92     | 71     | 85     | 70     | 74     |
| Zr         | 260    | 282    | 284    | 291    | 271    | 289    | 299    | 286    | 283    | 274    | 281    | 289    |
| Nb         | 48     | 62     | 60     | 55     | 55     | 42     | 66     | 60     | 60     | 60     | 60     | 60     |
| Pb         | 49     | 49     | 15     | 46     | 15     | 33     | 33     | 15     | 15     | 15     | 31     | 15     |
| Th         | 61     | 64     | 52     | 46     | 54     | 30     | 62     | 55     | 48     | 52     | 54     | 53     |
| Ba         | 19     | 25     | 19     | 6      | 18     | 146    | 17     | 22     | 21     | 6      | 13     | 6      |
| La         | 59     | 49     | 53     | 62     | 24     | 76     | 54     | 59     | 50     | 50     | 29     | 38     |
| Ce         | 134    | 134    | 131    | 135    | 102    | 153    | 128    | 145    | 113    | 122    | 111    | 123    |
| Nd         | 59     | 47     | 46     | 55     | 30     | 52     | 36     | 43     | 44     | 46     | 29     | 39     |

**Table 3.** Trace-element data for selected samples collected in the area adjacent to the Turkey Creek caldera, Chiricahua Mountains, Cochise County, Arizona—Continued.

| Sample No. | Trem   |        |        |        |        |        |        |        |        |        |        |        |
|------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
|            | 201821 | 201822 | 201823 | 201824 | 201825 | 201826 | 201827 | 201828 | 201829 | 201830 | 201831 | 201832 |
| Zn         | 52     | 69     | 64     | 66     | 71     | 62     | 70     | 53     | 25     | 25     | 73     | 51     |
| Rb         | 398    | 404    | 401    | 398    | 404    | 415    | 403    | 405    | 399    | 413    | 408    | 392    |
| Sr         | 57     | 17     | 18     | 18     | 25     | 17     | 17     | 17     | 16     | 19     | 16     | 27     |
| Y          | 59     | 66     | 62     | 57     | 115    | 93     | 65     | 62     | 58     | 50     | 72     | 100    |
| Zr         | 265    | 284    | 286    | 280    | 262    | 283    | 268    | 281    | 273    | 290    | 287    | 266    |
| Nb         | 56     | 56     | 61     | 59     | 61     | 62     | 59     | 55     | 59     | 60     | 58     | 56     |
| Pb         | 15     | 15     | 34     | 40     | 15     | 40     | 36     | 34     | 45     | 36     | 39     | 37     |
| Th         | 52     | 53     | 58     | 57     | 51     | 61     | 57     | 56     | 55     | 51     | 53     | 36     |
| Ba         | 53     | 6      | 6      | 19     | 62     | 19     | 14     | 15     | 17     | 12     | 15     | 81     |
| La         | 36     | 44     | 34     | 19     | 76     | 62     | 36     | 29     | 38     | 30     | 53     | 60     |
| Ce         | 109    | 123    | 111    | 113    | 114    | 128    | 105    | 108    | 166    | 110    | 111    | 100    |
| Nd         | 32     | 31     | 32     | 19     | 65     | 60     | 33     | 33     | 36     | 30     | 37     | 51     |

| Sample No. | Trem   |        |        |        |        |        |        |        |     |     |     |     |
|------------|--------|--------|--------|--------|--------|--------|--------|--------|-----|-----|-----|-----|
|            | 201833 | 201834 | 201835 | 201836 | 202826 | 202827 | 202828 | 202840 | P53 | P54 | P55 | P56 |
| Zn         | 65     | 59     | 66     | 53     | 85     | 121    | 77     | 92     | 96  | 89  | 78  | 108 |
| Rb         | 406    | 396    | 407    | 400    | 398    | 394    | 378    | 378    | 414 | 394 | 404 | 402 |
| Sr         | 17     | 15     | 15     | 15     | 30     | 34     | 38     | 30     | 23  | 22  | 20  | 20  |
| Y          | 51     | 46     | 85     | 82     | 91     | 86     | 83     | 58     | 80  | 83  | 49  | 83  |
| Zr         | 276    | 273    | 287    | 274    | 263    | 277    | 269    | 270    | 285 | 279 | 278 | 284 |
| Nb         | 61     | 58     | 59     | 58     | 53     | 52     | 56     | 51     | 59  | 56  | 58  | 61  |
| Pb         | 35     | 41     | 15     | 15     | 40     | 60     | 42     | 19     | 47  | 51  | 48  | 55  |
| Th         | 48     | 54     | 55     | 60     | 14     | 46     | 38     | 30     | 74  | 67  | 66  | 66  |
| Ba         | 17     | 12     | 17     | 6      | 23     | 10     | 41     | 18     | 16  | 19  | 27  | 18  |
| La         | 47     | 42     | 62     | 57     | 76     | 75     | 61     | 47     | 55  | 47  | 47  | 69  |
| Ce         | 103    | 95     | 178    | 128    | 114    | 115    | 126    | 106    | 115 | 124 | 130 | 148 |
| Nd         | 36     | 42     | 48     | 46     | 78     | 51     | 52     | 24     | 51  | 46  | 48  | 66  |

| Sample No. | Trem |     |     |     |     |      |      |        | Trel   |        |        |        |
|------------|------|-----|-----|-----|-----|------|------|--------|--------|--------|--------|--------|
|            | P57  | P58 | P59 | P60 | P61 | P481 | P483 | 201769 | 201770 | 201776 | 201792 | 201793 |
| Zn         | 107  | 103 | 82  | 95  | 58  | 75   | 57   | 105    | 113    | 77     | 75     | 141    |
| Rb         | 395  | 415 | 410 | 345 | 314 | 353  | 399  | 420    | 431    | 411    | 438    | 429    |
| Sr         | 19   | 31  | 18  | 36  | 37  | 34   | 17   | 22     | 15     | 13     | 18     | 15     |
| Y          | 114  | 107 | 94  | 76  | 62  | 91   | 48   | 75     | 95     | 53     | 86     | 69     |
| Zr         | 266  | 278 | 273 | 287 | 286 | 298  | 285  | 290    | 313    | 284    | 300    | 294    |
| Nb         | 64   | 61  | 61  | 50  | 48  | 51   | 59   | 62     | 67     | 65     | 66     | 60     |
| Pb         | 61   | 46  | 46  | 46  | 42  | 42   | 22   | 48     | 59     | 15     | 39     | 34     |
| Th         | 63   | 62  | 69  | 61  | 58  | 35   | 52   | 49     | 51     | 51     | 49     | 58     |
| Ba         | 18   | 73  | 29  | 52  | 53  | 58   | 22   | 15     | 12     | 12     | 30     | 21     |
| La         | 85   | 97  | 91  | 74  | 70  | 90   | 49   | 50     | 67     | 45     | 83     | 62     |
| Ce         | 146  | 139 | 135 | 144 | 177 | 157  | 138  | 131    | 149    | 116    | 141    | 155    |
| Nd         | 71   | 90  | 86  | 57  | 61  | 73   | 40   | 47     | 59     | 38     | 66     | 49     |

| Sample No. | Trel   |        |        |         |         |        |        |        |        |        |        |        |
|------------|--------|--------|--------|---------|---------|--------|--------|--------|--------|--------|--------|--------|
|            | 201794 | 201795 | 201796 | 201797A | 201797B | 201798 | 201813 | 201814 | 202825 | 202829 | 202841 | 202901 |
| Zn         | 62     | 79     | 71     | 64      | 70      | 79     | 74     | 63     | 89     | 68     | 97     | 94     |
| Rb         | 414    | 495    | 412    | 423     | 425     | 423    | 499    | 429    | 420    | 435    | 434    | 413    |
| Sr         | 24     | 17     | 18     | 25      | 25      | 20     | 24     | 31     | 39     | 28     | 27     | 19     |
| Y          | 80     | 117    | 97     | 75      | 60      | 84     | 86     | 102    | 76     | 100    | 47     | 31     |
| Zr         | 294    | 259    | 278    | 286     | 290     | 289    | 272    | 291    | 273    | 299    | 311    | 293    |
| Nb         | 62     | 69     | 65     | 65      | 64      | 61     | 61     | 66     | 52     | 63     | 50     | 54     |
| Pb         | 51     | 51     | 15     | 51      | 42      | 50     | 35     | 34     | 35     | 36     | 38     | 57     |
| Th         | 44     | 59     | 55     | 49      | 51      | 46     | 63     | 57     | 42     | 31     | 45     | 40     |
| Ba         | 6      | 13     | 6      | 48      | 37      | 15     | 15     | 17     | 49     | 12     | 31     | 5      |
| La         | 72     | 104    | 67     | 57      | 44      | 68     | 65     | 73     | 47     | 74     | 60     | 38     |
| Ce         | 131    | 161    | 137    | 133     | 125     | 136    | 149    | 147    | 123    | 137    | 123    | 98     |
| Nd         | 58     | 90     | 65     | 32      | 33      | 57     | 56     | 56     | 53     | 58     | 49     | 35     |

**Table 3.** Trace-element data for selected samples collected in the area adjacent to the Turkey Creek caldera, Chiricahua Mountains, Cochise County, Arizona—Continued.

| Sample No. | Trel   |        |     |     |     |     | Treo   |        |      |      |      |      |
|------------|--------|--------|-----|-----|-----|-----|--------|--------|------|------|------|------|
|            | 202904 | 202905 | P48 | P50 | P51 | P52 | 202006 | 202804 | P572 | P711 | P712 | P721 |
| Zn         | 111    | 105    | 103 | 81  | 101 | 110 | 75     | 76     | 87   | 61   | 73   | 88   |
| Rb         | 428    | 438    | 437 | 428 | 446 | 439 | 510    | 570    | 513  | 465  | 480  | 500  |
| Sr         | 23     | 22     | 22  | 19  | 19  | 15  | 23     | 28     | 28   | 24   | 20   | 24   |
| Y          | 109    | 57     | 95  | 83  | 32  | 33  | 84     | 103    | 77   | 58   | 68   | 96   |
| Zr         | 300    | 306    | 303 | 297 | 288 | 295 | 273    | 303    | 254  | 283  | 275  | 298  |
| Nb         | 58     | 60     | 63  | 64  | 61  | 66  | 61     | 62     | 56   | 56   | 59   | 65   |
| Pb         | 51     | 43     | 46  | 42  | 43  | 37  | 30     | 57     | 45   | 22   | 63   | 72   |
| Th         | 60     | 68     | 67  | 73  | 60  | 68  | 63     | 37     | 56   | 50   | 46   | 54   |
| Ba         | 14     | 5      | 6   | 22  | 14  | 14  | 36     | 40     | 60   | 44   | 28   | 28   |
| La         | 92     | 58     | 66  | 61  | 28  | 32  | 51     | 92     | 78   | 46   | 35   | 68   |
| Ce         | 175    | 221    | 144 | 151 | 81  | 106 | 139    | 168    | 139  | 127  | 194  | 150  |
| Nd         | 62     | 22     | 59  | 58  | 30  | 33  | 46     | 62     | 60   | 40   | 17   | 45   |

| Sample No. | Treo |        |        |        |        |        | Trei   |        |        |        |        |        |
|------------|------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
|            | P722 | 201932 | 201935 | 202034 | 202147 | 202800 | 202813 | 202821 | 202833 | 202835 | 202895 | 202898 |
| Zn         | 68   | 86     | 114    | 97     | 84     | 74     | 62     | 83     | 143    | 78     | 79     | 87     |
| Rb         | 507  | 342    | 405    | 379    | 386    | 360    | 396    | 401    | 539    | 411    | 389    | 377    |
| Sr         | 31   | 34     | 19     | 52     | 23     | 30     | 19     | 25     | 25     | 40     | 22     | 30     |
| Y          | 73   | 54     | 66     | 81     | 73     | 98     | 67     | 89     | 95     | 71     | 79     | 63     |
| Zr         | 276  | 279    | 295    | 276    | 262    | 268    | 280    | 259    | 287    | 290    | 258    | 278    |
| Nb         | 56   | 51     | 63     | 58     | 56     | 49     | 53     | 52     | 58     | 56     | 54     | 54     |
| Pb         | 41   | 30     | 48     | 51     | 42     | 16     | 17     | 35     | 77     | 51     | 46     | 27     |
| Th         | 48   | 59     | 64     | 64     | 39     | 25     | 37     | 33     | 58     | 44     | 38     | 25     |
| Ba         | 31   | 65     | 6      | 59     | 12     | 41     | 23     | 8      | 5      | 42     | 69     | 44     |
| La         | 26   | 55     | 31     | 57     | 69     | 99     | 43     | 89     | 78     | 62     | 50     | 41     |
| Ce         | 133  | 164    | 137    | 142    | 153    | 155    | 135    | 109    | 131    | 97     | 121    | 126    |
| Nd         | 27   | 57     | 28     | 41     | 37     | 89     | 36     | 71     | 53     | 47     | 43     | 11     |

| Sample No. | Treo   |        |      |      |      |      | Trei    |        | Tii    |        |        |     |
|------------|--------|--------|------|------|------|------|---------|--------|--------|--------|--------|-----|
|            | 202915 | 202916 | P725 | P732 | P733 | P737 | 202068B | 202135 | 201771 | 201775 | 202831 | P45 |
| Zn         | 72     | 84     | 60   | 81   | 73   | 71   | 89      | 75     | 25     | 65     | 54     | 84  |
| Rb         | 348    | 453    | 284  | 422  | 405  | 381  | 103     | 378    | 317    | 299    | 310    | 310 |
| Sr         | 26     | 38     | 37   | 31   | 40   | 17   | 307     | 63     | 24     | 21     | 32     | 29  |
| Y          | 68     | 69     | 65   | 73   | 78   | 109  | 59      | 59     | 41     | 43     | 47     | 38  |
| Zr         | 263    | 269    | 264  | 293  | 265  | 265  | 449     | 341    | 162    | 165    | 237    | 172 |
| Nb         | 45     | 58     | 36   | 57   | 56   | 52   | 43      | 47     | 31     | 32     | 29     | 40  |
| Pb         | 37     | 15     | 39   | 40   | 46   | 15   | 38      | 42     | 35     | 35     | 39     | 45  |
| Th         | 37     | 51     | 14   | 40   | 53   | 57   | 47      | 28     | 47     | 41     | 14     | 61  |
| Ba         | 36     | 43     | 77   | 35   | 24   | 11   | 224     | 134    | 6      | 28     | 133    | 27  |
| La         | 52     | 108    | 69   | 61   | 61   | 74   | 139     | 99     | 50     | 39     | 47     | 36  |
| Ce         | 159    | 169    | 157  | 139  | 129  | 137  | 263     | 136    | 68     | 95     | 92     | 73  |
| Nd         | 31     | 66     | 62   | 74   | 41   | 86   | 100     | 83     | 33     | 25     | 36     | 31  |

| Sample No. | Tfre |        |        |        |        |     | Tim2 |        |        |        |        |        |
|------------|------|--------|--------|--------|--------|-----|------|--------|--------|--------|--------|--------|
|            | P47  | 201803 | 201804 | 201859 | 202836 | P44 | P122 | 201764 | 202056 | 202082 | 202136 | 202228 |
| Zn         | 65   | 25     | 65     | 25     | 84     | 54  | 70   | 90     | 62     | 88     | 81     | 103    |
| Rb         | 303  | 179    | 163    | 174    | 159    | 189 | 171  | 214    | 70     | 84     | 165    | 94     |
| Sr         | 29   | 236    | 235    | 225    | 270    | 282 | 248  | 281    | 706    | 465    | 593    | 527    |
| Y          | 49   | 23     | 23     | 31     | 40     | 28  | 28   | 28     | 24     | 23     | 37     | 28     |
| Zr         | 164  | 163    | 159    | 166    | 165    | 167 | 159  | 225    | 178    | 204    | 172    | 196    |
| Nb         | 34   | 12     | 14     | 14     | 15     | 18  | 15   | 10     | 15     | 11     | 14     | 10     |
| Pb         | 41   | 38     | 15     | 15     | 41     | 32  | 39   | 44     | 18     | 19     | 42     | 15     |
| Th         | 54   | 19     | 18     | 20     | 14     | 35  | 31   | ND     | 29     | 14     | 14     | 14     |
| Ba         | 24   | 859    | 850    | 873    | 733    | 858 | 798  | 1269   | 705    | 1,240  | 631    | 1,489  |
| La         | 34   | 50     | 55     | 63     | 62     | 50  | 49   | 35     | 36     | 58     | 30     | 65     |
| Ce         | 75   | 84     | 98     | 94     | 108    | 91  | 92   | 65     | 60     | 100    | 67     | 91     |
| Nd         | 26   | 29     | 41     | 54     | 60     | 43  | 47   | 38     | 33     | 43     | 18     | 50     |

**Table 3.** Trace-element data for selected samples collected in the area adjacent to the Turkey Creek caldera, Chiricahua Mountains, Cochise County, Arizona—Continued.

| Sample No. | Tim2   |        |        | Tim4<br>202845 | Tim?    |         | Tgd    |      | Tcc     |         |        |        |
|------------|--------|--------|--------|----------------|---------|---------|--------|------|---------|---------|--------|--------|
|            | 202822 | 202824 | 202844 |                | 202823A | 202823B | 201570 | P490 | 201654A | 201654B | 201656 | 201659 |
| Zn         | 75     | 115    | 96     | 37             | 108     | 94      | 75     | 46   | 66      | 159     | 54     | 115    |
| Rb         | 48     | 238    | 106    | 203            | 94      | 69      | 152    | 159  | 486     | 296     | 321    | 644    |
| Sr         | 655    | 342    | 579    | 360            | 453     | 678     | 386    | 390  | 79      | 18      | 20     | 25     |
| Y          | 19     | 44     | 31     | 26             | 30      | 39      | 26     | 18   | 55      | 34      | 42     | 49     |
| Zr         | 94     | 373    | 174    | 184            | 267     | 361     | 134    | 145  | 200     | 189     | 165    | 169    |
| Nb         | 10     | 21     | 8      | 13             | 17      | 21      | 13     | 11   | 29      | 28      | 33     | 35     |
| Pb         | 15     | 52     | 15     | 15             | 15      | 15      | 37     | 29   | 47      | 495     | 36     | 50     |
| Th         | 14     | 14     | 14     | 14             | 14      | 14      | 34     | 22   | 43      | 45      | 55     | 58     |
| Ba         | 922    | 1,047  | 585    | 788            | 481     | 769     | 659    | 708  | 33      | 22      | 6      | 37     |
| La         | 22     | 55     | 43     | 49             | 61      | 68      | 38     | 38   | 52      | 36      | 31     | 31     |
| Ce         | 43     | 128    | 56     | 69             | 91      | 97      | 79     | 64   | 120     | 97      | 76     | 71     |
| Nd         | 32     | 71     | 46     | 42             | 59      | 66      | 39     | 25   | 54      | 35      | 25     | 27     |

| Sample No. | Tcc    |        |        |        |        |      | Tsd  |       |       |        |        |        |
|------------|--------|--------|--------|--------|--------|------|------|-------|-------|--------|--------|--------|
|            | 201661 | 201922 | 201924 | 201925 | 202137 | P85D | P153 | P272A | P272B | 201653 | 201655 | 201662 |
| Zn         | 64     | 64     | 56     | 81     | 97     | 72   | 104  | 74    | 76    | 75     | 93     | 74     |
| Rb         | 433    | 516    | 302    | 744    | 512    | 261  | 665  | 611   | 224   | 152    | 152    | 148    |
| Sr         | 41     | 31     | 31     | 19     | 21     | 21   | 28   | 20    | 270   | 361    | 371    | 394    |
| Y          | 58     | 66     | 52     | 54     | 37     | 52   | 66   | 53    | 47    | 25     | 24     | 25     |
| Zr         | 205    | 188    | 202    | 173    | 133    | 213  | 166  | 158   | 199   | 232    | 234    | 243    |
| Nb         | 31     | 29     | 36     | 31     | 31     | 33   | 32   | 33    | 33    | 16     | 14     | 15     |
| Pb         | 15     | 39     | 32     | 53     | 35     | 32   | 40   | 41    | 40    | 33     | 35     | 15     |
| Th         | 44     | 29     | 42     | 45     | 41     | 43   | 42   | 52    | 44    | 29     | 27     | 33     |
| Ba         | 40     | 40     | 44     | 106    | 63     | 38   | 19   | 41    | 37    | 916    | 918    | 893    |
| La         | 54     | 57     | 51     | 32     | 16     | 52   | 52   | 32    | 49    | 46     | 49     | 50     |
| Ce         | 125    | 114    | 114    | 81     | 49     | 107  | 80   | 71    | 156   | 92     | 91     | 90     |
| Nd         | 52     | 46     | 51     | 30     | 27     | 50   | 38   | 25    | 45    | 39     | 42     | 45     |

| Sample No. | Tsd    |     |     |       | Tpf  |         |     | TpcA  |        |        | Tdp    |        |
|------------|--------|-----|-----|-------|------|---------|-----|-------|--------|--------|--------|--------|
|            | 201923 | P81 | P83 | P131  | P133 | 201658A | P84 | P136B | 202007 | 202810 | 202896 | 201527 |
| Zn         | 78     | 105 | 84  | 119   | 105  | 59      | 87  | 97    | 140    | 113    | 103    | 90     |
| Rb         | 126    | 133 | 164 | 171   | 157  | 220     | 229 | 449   | 101    | 44     | 165    | 316    |
| Sr         | 560    | 418 | 325 | 411   | 476  | 63      | 381 | 505   | 537    | 605    | 492    | 96     |
| Y          | 20     | 25  | 24  | 25    | 27   | 40      | 24  | 31    | 50     | 39     | 29     | 69     |
| Zr         | 246    | 204 | 180 | 285   | 241  | 104     | 252 | 219   | 296    | 236    | 302    | 548    |
| Nb         | 10     | 12  | 16  | 14    | 16   | 18      | 16  | 9     | 18     | 17     | 13     | 23     |
| Pb         | 30     | 31  | 38  | 39    | 47   | 15      | 49  | 35    | 28     | 15     | 15     | 46     |
| Th         | 16     | 18  | 40  | 41    | 29   | 40      | 38  | 34    | 14     | 14     | 14     | 30     |
| Ba         | 1,001  | 656 | 712 | 1,035 | 921  | 185     | 847 | 769   | 1,171  | 691    | 958    | 587    |
| La         | 49     | 37  | 42  | 66    | 50   | 32      | 49  | 53    | 79     | 57     | 73     | 127    |
| Ce         | 89     | 67  | 78  | 111   | 89   | 57      | 93  | 181   | 113    | 76     | 126    | 230    |
| Nd         | 47     | 38  | 38  | 55    | 50   | 27      | 49  | 31    | 79     | 62     | 94     | 118    |

| Sample No. | Tdp    |        |        | The, high barium phase |        |        |         |         |        |         |        |        |
|------------|--------|--------|--------|------------------------|--------|--------|---------|---------|--------|---------|--------|--------|
|            | 201528 | 201532 | 202154 | 201529                 | 201530 | 201531 | 201546A | 201546B | 201547 | 201928A | 201929 | 201934 |
| Zn         | 90     | 75     | 90     | 95                     | 62     | 88     | 113     | 92      | 113    | 164     | 109    | 58     |
| Rb         | 195    | 320    | 190    | 188                    | 188    | 270    | 217     | 213     | 232    | 256     | 167    | 269    |
| Sr         | 127    | 109    | 102    | 165                    | 251    | 143    | 102     | 83      | 68     | 137     | 259    | 61     |
| Y          | 62     | 59     | 50     | 46                     | 46     | 54     | 57      | 55      | 66     | 85      | 48     | 43     |
| Zr         | 609    | 619    | 650    | 742                    | 833    | 640    | 705     | 720     | 661    | 931     | 1,096  | 401    |
| Nb         | 21     | 18     | 22     | 19                     | 18     | 24     | 27      | 25      | 26     | 21      | 14     | 33     |
| Pb         | 43     | 39     | 15     | 40                     | 53     | 48     | 44      | 43      | 46     | 51      | 50     | 36     |
| Th         | 27     | 25     | 14     | 9                      | 9      | 36     | 27      | 31      | 32     | ND      | ND     | 36     |
| Ba         | 971    | 1,209  | 934    | 1,480                  | 2,648  | 1497   | 1,080   | 869     | 1,059  | 1,127   | 2,988  | 758    |
| La         | 116    | 102    | 126    | 82                     | 71     | 68     | 77      | 87      | 88     | 77      | 86     | 54     |
| Ce         | 215    | 208    | 200    | 143                    | 127    | 118    | 143     | 145     | 160    | 137     | 118    | 99     |
| Nd         | 108    | 104    | 119    | 81                     | 75     | 71     | 72      | 76      | 90     | 58      | 66     | 41     |

**Table 3.** Trace-element data for selected samples collected in the area adjacent to the Turkey Creek caldera, Chiricahua Mountains, Cochise County, Arizona—Continued.

| Sample No. | Thc, high barium phase |        |        |        |        |        |        |        |        |        |        |
|------------|------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
|            | 202018                 | 202033 | 202143 | 202144 | 202145 | 202156 | 202803 | 202888 | 202889 | 202892 | 202893 |
| Zn         | 103                    | 95     | 69     | 80     | 97     | 66     | 89     | 59     | 56     | 96     | 70     |
| Rb         | 206                    | 247    | 270    | 217    | 142    | 236    | 412    | 246    | 242    | 284    | 472    |
| Sr         | 438                    | 99     | 73     | 104    | 69     | 98     | 122    | 120    | 160    | 195    | 88     |
| Y          | 60                     | 54     | 47     | 43     | 34     | 28     | 62     | 52     | 52     | 43     | 84     |
| Zr         | 682                    | 616    | 411    | 609    | 319    | 380    | 464    | 522    | 597    | 827    | 608    |
| Nb         | 20                     | 25     | 25     | 28     | 18     | 12     | 28     | 27     | 22     | 23     | 22     |
| Pb         | 38                     | 29     | 57     | 52     | 38     | 15     | 38     | 44     | 47     | 15     | 50     |
| Th         | 14                     | 14     | 14     | 14     | 27     | 14     | 14     | 14     | 14     | 14     | 14     |
| Ba         | 1,712                  | 1,406  | 714    | 1,243  | 1,115  | 1,931  | 1,005  | 1,373  | 1,560  | 2,483  | 1,051  |
| La         | 75                     | 81     | 60     | 67     | 70     | 49     | 81     | 73     | 79     | 88     | 96     |
| Ce         | 122                    | 123    | 124    | 107    | 117    | 101    | 149    | 123    | 131    | 119    | 153    |
| Nd         | 82                     | 43     | 48     | 46     | 61     | 65     | 65     | 63     | 63     | 82     | 64     |

| Sample No. | Thc, high barium phase |         |        |       | Thc, low barium phase |        |        |        |        |        |        |        |
|------------|------------------------|---------|--------|-------|-----------------------|--------|--------|--------|--------|--------|--------|--------|
|            | 202900                 | 202914A | 202918 | P126B | 201545                | 201657 | 201660 | 201663 | 201927 | 201928 | 202032 | 202138 |
| Zn         | 78                     | 31      | 47     | 103   | 80                    | 92     | 69     | 62     | 86     | 74     | 37     | 48     |
| Rb         | 217                    | 316     | 254    | 336   | 592                   | 309    | 674    | 566    | 301    | 295    | 582    | 269    |
| Sr         | 195                    | 121     | 75     | 169   | 29                    | 24     | 30     | 29     | 34     | 41     | 28     | 14     |
| Y          | 66                     | 63      | 85     | 52    | 44                    | 42     | 54     | 47     | 55     | 58     | 46     | 17     |
| Zr         | 732                    | 465     | 522    | 756   | 161                   | 183    | 303    | 171    | 210    | 287    | 238    | 73     |
| Nb         | 22                     | 30      | 26     | 21    | 35                    | 39     | 35     | 34     | 35     | 38     | 28     | 14     |
| Pb         | 15                     | 41      | 38     | 56    | 34                    | 46     | 53     | 39     | 36     | 56     | 24     | 18     |
| Th         | 14                     | 14      | 14     | 28    | 50                    | 46     | 41     | 49     | 44     | 42     | 29     | 27     |
| Ba         | 2,611                  | 982     | 704    | 1,923 | 63                    | 25     | 203    | 72     | 55     | 304    | 157    | 51     |
| La         | 97                     | 81      | 102    | 74    | 36                    | 35     | 49     | 26     | 61     | 68     | 50     | 29     |
| Ce         | 151                    | 158     | 212    | 134   | 60                    | 81     | 98     | 61     | 87     | 120    | 85     | 37     |
| Nd         | 116                    | 62      | 99     | 78    | 27                    | 28     | 40     | 22     | 51     | 70     | 28     | 22     |

| Sample No. | Thc, low barium phase |        |        |        |        |        |        |        |        |        |        |
|------------|-----------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
|            | 202139                | 202140 | 202141 | 202142 | 202146 | 202152 | 202153 | 202155 | 202801 | 202802 | 202887 |
| Zn         | 74                    | 85     | 75     | 55     | 64     | 73     | 33     | 68     | 108    | 71     | 91     |
| Rb         | 571                   | 465    | 393    | 362    | 258    | 529    | 271    | 282    | 475    | 471    | 385    |
| Sr         | 54                    | 58     | 99     | 32     | 58     | 43     | 35     | 44     | 41     | 66     | 19     |
| Y          | 50                    | 34     | 49     | 74     | 40     | 60     | 32     | 51     | 47     | 50     | 70     |
| Zr         | 262                   | 256    | 467    | 403    | 159    | 235    | 116    | 289    | 262    | 420    | 261    |
| Nb         | 31                    | 24     | 24     | 28     | 29     | 22     | 20     | 31     | 29     | 27     | 52     |
| Pb         | 56                    | 52     | 30     | 21     | 44     | 44     | 50     | 32     | 38     | 40     | 21     |
| Th         | 34                    | 23     | 14     | 14     | 26     | 34     | 14     | 14     | 14     | 14     | 57     |
| Ba         | 210                   | 368    | 647    | 287    | 154    | 299    | 46     | 260    | 191    | 497    | 12     |
| La         | 75                    | 69     | 64     | 47     | 59     | 76     | 52     | 51     | 58     | 78     | 69     |
| Ce         | 101                   | 69     | 108    | 97     | 79     | 113    | 53     | 108    | 119    | 130    | 137    |
| Nd         | 37                    | 27     | 37     | 28     | 44     | 61     | 36     | 33     | 44     | 43     | 53     |

| Sample No. | Thc, low Ba |        | Thc, unknown |        | Tkr    |        |        | Tig    |        |        | Thl    |
|------------|-------------|--------|--------------|--------|--------|--------|--------|--------|--------|--------|--------|
|            | P478        | P126AM | P126AI       | 202917 | 202923 | 202924 | 202059 | 202060 | 202061 | 202062 | 202925 |
| Zn         | 93          | 51     | 57           | 58     | 63     | 36     | 38     | 65     | 49     | 74     | 52     |
| Rb         | 533         | 354    | 385          | 415    | 396    | 445    | 381    | 212    | 227    | 229    | 243    |
| Sr         | 24          | 112    | 40           | 26     | 21     | 31     | 101    | 176    | 146    | 130    | 74     |
| Y          | 43          | 59     | 46           | 43     | 43     | 42     | 17     | 34     | 30     | 50     | 27     |
| Zr         | 202         | 573    | 420          | 141    | 153    | 137    | 144    | 171    | 156    | 216    | 124    |
| Nb         | 29          | 26     | 26           | 25     | 32     | 24     | 13     | 9      | 17     | 21     | 11     |
| Pb         | 42          | 46     | 33           | 28     | 29     | 47     | 51     | 21     | 29     | 28     | 57     |
| Th         | 36          | 33     | 42           | 30     | 55     | 30     | 36     | 14     | 34     | 25     | 34     |
| Ba         | 114         | 1,122  | 195          | 61     | 41     | 60     | 994    | 1,027  | 817    | 802    | 490    |
| La         | 41          | 92     | 53           | 12     | 46     | 35     | 43     | 47     | 51     | 68     | 39     |
| Ce         | 85          | 150    | 145          | 85     | 92     | 91     | 78     | 82     | 90     | 118    | 70     |
| Nd         | 32          | 78     | 39           | 10     | 31     | 38     | 28     | 36     | 39     | 54     | 39     |

**Table 3.** Trace-element data for selected samples collected in the area adjacent to the Turkey Creek caldera, Chiricahua Mountains, Cochise County, Arizona—Continued.

| Sample No. | Thl    | KJsv   |        |        |        |        |        |        |        |        |        | P477 |
|------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|------|
|            | 202057 | 201542 | 201754 | 202130 | 202131 | 202132 | 202133 | 202223 | 202224 | 202225 | 202226 |      |
| Zn         | 59     | 117    | 103    | 82     | 103    | 91     | 57     | 106    | 83     | 109    | 62     | 15   |
| Rb         | 318    | 107    | 51     | 56     | 41     | 26     | 24     | 18     | 36     | 36     | 15     | 46   |
| Sr         | 61     | 281    | 809    | 1337   | 693    | 405    | 970    | 614    | 1,098  | 1,152  | 618    | 462  |
| Y          | 37     | 24     | 23     | 30     | 46     | 34     | 26     | 42     | 27     | 32     | 33     | 9    |
| Zr         | 95     | 175    | 189    | 172    | 257    | 115    | 156    | 247    | 186    | 158    | 167    | 33   |
| Nb         | 12     | 10     | 31     | 22     | 25     | 21     | 33     | 33     | 27     | 22     | 26     | 1    |
| Pb         | 36     | 15     | 32     | 15     | 15     | 15     | 15     | 33     | 24     | 15     | 15     | ND   |
| Th         | 37     | 9      | ND     | 25     | 14     | 14     | 14     | 14     | 14     | 14     | 14     | ND   |
| Ba         | 587    | 513    | 681    | 258    | 464    | 183    | 421    | 461    | 718    | 562    | 558    | 138  |
| La         | 22     | 28     | 28     | 29     | 42     | 23     | 21     | 29     | 31     | 31     | 25     | 5    |
| Ce         | 60     | 61     | 62     | 50     | 81     | 23     | 62     | 62     | 51     | 49     | 69     | 16   |
| Nd         | 34     | 30     | 33     | 34     | 27     | 24     | 26     | 40     | 29     | 13     | 25     | ND   |

| Miscellaneous |        |        |        |        |        |        |        |        |        |        |        |        |
|---------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Sample No.    | 201743 | 201749 | 201763 | 201811 | 201921 | 201997 | 202002 | 202063 | 202064 | 202227 | 202229 | 202815 |
| Zn            | 56     | 90     | 74     | 74     | 91     | 120    | 129    | 76     | 70     | 81     | 56     | 28     |
| Rb            | 164    | 253    | 380    | 107    | 163    | 33     | 287    | 135    | 192    | 168    | 215    | 149    |
| Sr            | 442    | 124    | 129    | 330    | 32     | 605    | 32     | 227    | 94     | 170    | 237    | 176    |
| Y             | 21     | 48     | 47     | 22     | 46     | 34     | 75     | 54     | 28     | 18     | 28     | 19     |
| Zr            | 170    | 445    | 398    | 187    | 600    | 212    | 452    | 166    | 143    | 161    | 164    | 121    |
| Nb            | 8      | 43     | 15     | 7      | 27     | 49     | 50     | 9      | 16     | 9      | 12     | 9      |
| Pb            | ND     | 15     | 39     | 15     | 35     | 46     | 36     | 45     | 58     | 49     | 40     | 32     |
| Th            | 9      | 56     | 22     | 9      | 8      | 9      | 53     | 14     | 42     | 14     | 14     | 14     |
| Ba            | 1,009  | 85     | 1403   | 702    | 56     | 313    | 102    | 546    | 544    | 946    | 1,150  | 212    |
| La            | 44     | 96     | 80     | 31     | 152    | 28     | 160    | 40     | 58     | 42     | 42     | 57     |
| Ce            | 81     | 198    | 157    | 67     | 326    | 59     | 277    | 49     | 80     | 79     | 97     | 100    |
| Nd            | 34     | 79     | 65     | 35     | 116    | 27     | 106    | 46     | 39     | 41     | 32     | 14     |

| Miscellaneous |        |         |        |        |        |        |       |       |
|---------------|--------|---------|--------|--------|--------|--------|-------|-------|
| Sample No.    | 202816 | 202820B | 202832 | 202837 | 202838 | 202897 | P488  | P489  |
| Zn            | 103    | 44      | 95     | 156    | 81     | 40     | 70    | 37    |
| Rb            | 307    | 298     | 45     | 43     | 58     | 221    | 184   | 245   |
| Sr            | 117    | 127     | 722    | 607    | 599    | 44     | 224   | 235   |
| Y             | 53     | 58      | 16     | 41     | 27     | 59     | 51    | 51    |
| Zr            | 267    | 275     | 93     | 221    | 120    | 453    | 289   | 332   |
| Nb            | 33     | 29      | 9      | 13     | 15     | 29     | 13    | 15    |
| Pb            | 34     | 20      | 40     | 15     | 30     | 15     | 48    | 38    |
| Th            | 14     | 14      | 14     | 14     | 14     | 14     | 22    | 7     |
| Ba            | 542    | 503     | 961    | 363    | 396    | 213    | 1,126 | 1,135 |
| La            | 84     | 72      | 37     | 23     | 29     | 123    | 54    | 56    |
| Ce            | 150    | 128     | 36     | 64     | 64     | 212    | 127   | 112   |
| Nd            | 28     | 40      | 24     | 41     | 30     | 100    | 58    | 57    |

**Table 4.** Instrumental neutron activation data for selected samples collected in the area adjacent to the Turkey Creek caldera, Chiricahua Mountains, Cochise County, Arizona.  
 [Data in parts per million. Map-unit symbols are those shown on the geologic map of the Turkey Creek caldera (du Bray and others, in press) and are defined in table 1. ND, not detected. J.R. Budahn, R.J. Knight, and D.M. McKown, analysts]

| Sample No. | Tdpl   |       | Treu   |        |        |       | Trem   |        |        |       |
|------------|--------|-------|--------|--------|--------|-------|--------|--------|--------|-------|
|            | 201533 | P145  | 201534 | 201765 | 201766 | P482  | 201535 | 201536 | 201768 | P53   |
| Ba         | 923    | 927   | 79.5   | 83.7   | 83.8   | 63.3  | 22.8   | 35.6   | ND     | 20.1  |
| Sr         | 389    | 374   | ND     | ND     | 37.8   | ND    | 6.30   | 13.0   | ND     | 16.0  |
| Co         | 11.1   | 10.6  | 0.705  | 0.884  | 1.25   | 0.640 | 0.560  | 0.260  | 0.576  | 0.201 |
| Ni         | 25.1   | 25.5  | 4.80   | ND     | ND     | ND    | 2.60   | 6.90   | ND     | 2.50  |
| Cr         | 29.1   | 26.0  | 1.91   | ND     | 1.85   | 1.36  | 1.02   | ND     | ND     | 0.666 |
| Cs         | 3.74   | 3.74  | 4.51   | 4.72   | 5.43   | 4.15  | 5.18   | 7.01   | 6.83   | 6.45  |
| Hf         | 8.74   | 8.37  | 12.1   | 13.3   | 11.4   | 11.6  | 10.8   | 12.3   | 12.6   | 11.2  |
| Rb         | 172    | 174   | 289    | 289    | 300    | 273   | 328    | 434    | 368    | 406   |
| Sb         | 0.132  | 0.135 | 0.297  | 0.169  | 0.170  | 0.276 | 0.169  | 0.383  | 0.150  | 0.170 |
| Ta         | 1.48   | 1.48  | 3.76   | 3.83   | 3.81   | 3.53  | 4.64   | 5.47   | 5.64   | 5.17  |
| Th         | 19.8   | 19.4  | 41.6   | 43.7   | 41.4   | 40.0  | 45.3   | 52.1   | 50.9   | 50.5  |
| U          | 3.74   | 3.83  | 7.55   | 9.13   | 8.86   | 8.43  | 8.09   | 10.3   | 11.9   | 11.4  |
| Zn         | 70.9   | 67.9  | 68.6   | 68.4   | 45.3   | 64.4  | 36     | 77.9   | 45.2   | 62.6  |
| Zr         | 352    | 336   | 386    | 443    | 346    | 383   | 318    | 318    | 328    | 288   |
| Sc         | 9.03   | 8.94  | 3.40   | 3.85   | 3.49   | 3.25  | 1.90   | 2.16   | 1.82   | 1.93  |
| La         | 60.6   | 59.6  | 96.5   | 109    | 81.5   | 99.1  | 59.8   | 52.9   | 50.4   | 54.2  |
| Ce         | 127    | 124   | 216    | 262    | 198    | 221   | 139    | 145    | 136    | 123   |
| Nd         | 53.9   | 51.3  | 83.5   | 94.9   | 73.5   | 83.1  | 51.5   | 44.5   | 44.1   | 49.7  |
| Sm         | 8.96   | 9.33  | 13.4   | 18.3   | 14.6   | 14.6  | 10.1   | 10.6   | 11.4   | 11.1  |
| Eu         | 1.75   | 1.73  | 0.234  | 0.272  | 0.316  | 0.234 | 0.151  | 0.123  | 0.120  | 0.107 |
| Gd         | 8.16   | 7.80  | 12.3   | 14.5   | 11.3   | 12.5  | 9.12   | ND     | 11.1   | 10.4  |
| Tb         | 1.13   | 1.16  | 1.88   | 2.22   | 1.87   | 1.83  | 1.61   | 1.71   | 2.00   | 1.82  |
| Tm         | 0.594  | 0.618 | 1.14   | 1.37   | 1.023  | 1.14  | 1.18   | ND     | 1.52   | 1.38  |
| Yb         | 3.65   | 3.99  | 7.14   | 7.99   | 7.41   | 6.99  | 7.13   | 8.13   | 9.40   | 8.84  |
| Lu         | 0.512  | 0.547 | 1.00   | 1.15   | 1.09   | 1.01  | 1.01   | 1.17   | 1.30   | 1.24  |

| Sample No. | Trem  |       |       |       |       |       |       |       |       |       |
|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|            | P54   | P55   | P56   | P57   | P58   | P59   | P60   | P61   | P481  | P483  |
| Ba         | 24.3  | 11.4  | 19.3  | 28.7  | 62.8  | 36    | 60.8  | 59.7  | 78.6  | ND    |
| Sr         | 11.0  | 3.60  | 16.0  | 12.0  | 12.0  | 7.80  | 27.4  | 22.0  | ND    | ND    |
| Co         | 0.250 | 0.335 | 0.118 | 0.149 | 0.138 | 0.341 | 0.937 | 1.09  | 0.820 | 0.193 |
| Ni         | 1.00  | 0.920 | 3.00  | 3.20  | 2.20  | 1.80  | 1.30  | 9.54  | ND    | ND    |
| Cr         | 1.80  | ND    | ND    | ND    | ND    | 0.900 | 1.00  | 2.38  | 1.49  | 0.440 |
| Cs         | 6.61  | 6.35  | 6.52  | 6.12  | 5.22  | 6.31  | 6.62  | 6.51  | 7.15  | 6.40  |
| Hf         | 10.4  | 10.6  | 10.9  | 10.5  | 10.9  | 11.1  | 10.1  | 10.3  | 10.9  | 11.5  |
| Rb         | 377   | 388   | 399   | 383   | 400   | 395   | 330   | 307   | 345   | 399   |
| Sb         | 0.229 | 0.244 | 0.282 | 0.249 | 0.219 | 0.167 | 0.158 | 0.211 | 0.157 | 0.361 |
| Ta         | 4.74  | 4.86  | 4.97  | 4.87  | 5.10  | 5.13  | 4.18  | 3.96  | 4.38  | 5.27  |
| Th         | 47.2  | 48.7  | 51.4  | 48.4  | 49.4  | 49.5  | 43.7  | 43.4  | 43.9  | 48.7  |
| U          | 10.3  | 8.47  | 7.61  | 7.68  | 8.09  | 9.52  | 7.75  | 9.30  | 10.4  | 9.28  |
| Zn         | 61.4  | 61.1  | 67.2  | 75    | 76.9  | 76.5  | 80.1  | 50.1  | 68.9  | 50.1  |
| Zr         | 287   | 281   | 321   | 326   | 361   | 344   | 320   | 305   | 339   | 287   |
| Sc         | 1.86  | 1.89  | 1.97  | 1.89  | 1.92  | 1.92  | 2.36  | 2.78  | 2.86  | 1.96  |
| La         | 45.2  | 42.7  | 67.9  | 73.6  | 91.2  | 88.7  | 68.5  | 65    | 85.4  | 43.8  |
| Ce         | 122   | 137   | 158   | 147   | 153   | 142   | 139   | 203   | 164   | 136   |
| Nd         | 42    | 38.8  | 64.6  | 68.8  | 92.9  | 87.3  | 59.4  | 58.1  | 85.1  | 37.2  |
| Sm         | 10.2  | 9.27  | 15.2  | 16.6  | 22.8  | 18.6  | 11.6  | 11.3  | 18.8  | 8.32  |
| Eu         | 0.112 | 0.101 | 0.109 | 0.118 | 0.160 | 0.189 | 0.175 | 0.226 | 0.256 | 0.101 |
| Gd         | 10.7  | 8.40  | 14.2  | 18.3  | 22.5  | 18.2  | 11.8  | 11.1  | 17.3  | 10.6  |
| Tb         | 1.89  | 1.32  | 2.30  | 2.97  | 3.74  | 3.06  | 2.00  | 1.75  | 2.84  | 1.31  |
| Tm         | 1.40  | 1.04  | 1.59  | 2.10  | 2.22  | 1.87  | 1.35  | 1.21  | 1.89  | 1.08  |
| Yb         | 9.05  | 6.79  | 10.0  | 13.1  | 14.0  | 12.1  | 8.72  | 7.61  | 11.7  | 6.90  |
| Lu         | 1.25  | 0.983 | 1.37  | 1.78  | 1.89  | 1.63  | 1.26  | 1.07  | 1.64  | 0.987 |

**Table 4.** Instrumental neutron activation data for selected samples collected in the area adjacent to the Turkey Creek caldera, Chiricahua Mountains, Cochise County, Arizona—Continued.

| Sample No. | Trel   |        |       |       |       |       | Tij    |        |       |       |
|------------|--------|--------|-------|-------|-------|-------|--------|--------|-------|-------|
|            | 201769 | 201770 | P48   | P50   | P51   | P52   | 201771 | 201775 | P45   | P47   |
| Ba         | 55.2   | 50.1   | 10.9  | 60.2  | 57.3  | 18.5  | 26.2   | 44.9   | 24.1  | 40.3  |
| Sr         | ND     | ND     | 3.40  | 30.0  | 30.0  | 11.0  | ND     | ND     | 16.1  | 23.5  |
| Co         | 0.128  | 0.202  | 0.138 | 0.149 | 0.341 | 0.344 | 0.274  | 0.169  | 0.422 | 0.245 |
| Ni         | ND     | ND     | 12.0  | ND    | 1.40  | 1.60  | ND     | ND     | 8.78  | 1.60  |
| Cr         | 0.860  | ND     | ND    | ND    | ND    | 0.990 | 0.710  | 1.60   | 1.40  | 0.510 |
| Cs         | 11.0   | 10.7   | 8.08  | 6.83  | 7.98  | 8.89  | 7.72   | 11     | 6.97  | 9.22  |
| Hf         | 11.9   | 12.3   | 11.4  | 11.5  | 11.8  | 11.3  | 7.39   | 7.18   | 7.10  | 6.75  |
| Rb         | 416    | 435    | 414   | 410   | 435   | 421   | 326    | 317    | 303   | 299   |
| Sb         | 0.363  | 0.261  | 0.243 | 0.279 | 0.203 | 0.211 | 0.636  | 0.445  | 0.146 | 1.26  |
| Ta         | 5.48   | 5.66   | 5.37  | 5.37  | 5.68  | 5.50  | 3.05   | 2.88   | 2.85  | 2.69  |
| Th         | 49.8   | 51.7   | 52.3  | 49.6  | 39.7  | 46.6  | 35.7   | 35.2   | 34.6  | 31.6  |
| U          | 12.3   | 12.4   | 9.14  | 11.0  | 11.6  | 11.2  | 6.18   | 7.72   | 6.04  | 6.04  |
| Zn         | 100    | 90.3   | 76.8  | 63.5  | 78.6  | 82.4  | 48.1   | 80.6   | 61.2  | 39.8  |
| Zr         | 312    | 340    | 346   | 319   | 282   | 279   | 170    | 178    | 172   | 162   |
| Sc         | 1.94   | 2.11   | 1.94  | 1.92  | 1.97  | 1.84  | 2.40   | 2.22   | 2.43  | 2.15  |
| La         | 46.2   | 65.8   | 64.0  | 59.1  | 30    | 31.9  | 50.7   | 38.3   | 35.3  | 33.7  |
| Ce         | 145    | 157    | 146   | 159   | 79.4  | 105   | 67.8   | 87.2   | 71.0  | 69.1  |
| Nd         | 45.6   | 62.2   | 60.4  | 51.8  | 23.1  | 23.6  | 32.7   | 27.9   | 23.0  | 22.4  |
| Sm         | 11.4   | 15.0   | 13.0  | 11.9  | 4.28  | 4.87  | 7.16   | 5.98   | 4.81  | 4.23  |
| Eu         | 0.093  | 0.106  | 0.099 | 0.095 | 0.068 | 0.064 | 0.159  | 0.186  | 0.148 | 0.137 |
| Gd         | 10.5   | 13.2   | 13.7  | 11.6  | 4.13  | 4.64  | 5.58   | 6.32   | 4.47  | 4.51  |
| Tb         | 1.94   | 2.44   | 2.33  | 2.08  | 0.693 | 0.803 | 0.859  | 0.939  | 0.727 | 0.806 |
| Tm         | 1.44   | 1.73   | 1.63  | 1.48  | 0.667 | 0.729 | 0.772  | 0.904  | 0.756 | 0.777 |
| Yb         | 9.61   | 11.1   | 10.7  | 9.63  | 4.41  | 5.03  | 4.93   | 5.75   | 4.86  | 5.39  |
| Lu         | 1.36   | 1.56   | 1.51  | 1.35  | 0.639 | 0.780 | 0.739  | 0.822  | 0.717 | 0.785 |

| Sample No. | Tfre  |       | Tgd    |       | Tcc    |       |       |       | Tsd    |       |
|------------|-------|-------|--------|-------|--------|-------|-------|-------|--------|-------|
|            | P44   | P122  | 201570 | P490  | 201661 | P85D  | P272A | P272B | 201662 | P81   |
| Ba         | 826   | 839   | 685    | 691   | 70.0   | 67.5  | 52.4  | 59    | 956    | 735   |
| Sr         | 286   | 235   | 377    | 405   | ND     | 16.1  | ND    | 272   | 397    | 439   |
| Co         | 0.811 | 1.01  | 8.65   | 9.42  | 0.164  | 0.236 | 0.097 | 0.126 | 8.87   | 18.9  |
| Ni         | 4.60  | 12.0  | 23.6   | 12.6  | ND     | 12.0  | ND    | ND    | 23.5   | 37.1  |
| Cr         | 1.23  | 0.849 | 11.9   | 13.0  | ND     | ND    | 1.70  | ND    | 7.97   | 41.2  |
| Cs         | 8.13  | 4.91  | 3.91   | 3.97  | 146    | 4.58  | 16.4  | 607   | 9.79   | 6.19  |
| Hf         | 5.11  | 5.58  | 5.03   | 4.49  | 7.74   | 8.10  | 6.95  | 6.84  | 6.59   | 5.38  |
| Rb         | 178   | 181   | 148    | 151   | 427    | 268   | 700   | 212   | 147    | 137   |
| Sb         | 0.148 | 0.118 | 0.073  | 0.097 | 0.229  | 0.132 | 4.25  | 0.208 | 0.424  | 0.353 |
| Ta         | 1.19  | 1.28  | 0.968  | 0.921 | 2.60   | 2.56  | 2.95  | 2.38  | 1.10   | 0.805 |
| Th         | 16.6  | 17.8  | 19.3   | 18.2  | 28.3   | 29.6  | 30.8  | 25.7  | 16.6   | 14.1  |
| U          | 3.67  | 4.08  | 4.25   | 4.05  | 7.92   | 7.18  | 6.84  | 6.94  | 3.93   | 3.15  |
| Zn         | 35.9  | 37.2  | 27.4   | 34.8  | 63.9   | 65.9  | 51.3  | 66.7  | 61.6   | 83.8  |
| Zr         | 158   | 178   | 185    | 162   | 226    | 229   | 145   | 214   | 231    | 242   |
| Sc         | 2.86  | 3.04  | 5.75   | 5.86  | 3.03   | 3.18  | 2.13  | 2.76  | 6.33   | 10.3  |
| La         | 44.7  | 48.8  | 33.8   | 33.4  | 49.9   | 51.3  | 35.4  | 43.1  | 46.1   | 38.8  |
| Ce         | 85.0  | 98.0  | 67.9   | 67    | 117    | 109   | 73.6  | 96.5  | 101    | 72.2  |
| Nd         | 30.1  | 35.1  | 26.1   | 25.8  | 48.1   | 44.1  | 24.1  | 42.1  | 42.1   | 39.4  |
| Sm         | 5.02  | 5.76  | 4.88   | 4.67  | 10.5   | 9.96  | 4.86  | 9.26  | 7.70   | 8.02  |
| Eu         | 0.735 | 0.800 | 0.991  | 0.965 | 0.543  | 0.517 | 0.119 | 0.519 | 1.41   | 1.72  |
| Gd         | 3.67  | 4.95  | 3.89   | 3.95  | 8.82   | NA    | ND    | 7.62  | 5.76   | ND    |
| Tb         | 0.573 | 0.646 | 0.504  | 0.498 | 1.40   | 1.37  | 0.831 | 1.15  | 0.735  | 0.848 |
| Tm         | 0.395 | 0.418 | 0.269  | 0.271 | 0.874  | NA    | ND    | 0.760 | 0.311  | ND    |
| Yb         | 2.46  | 2.65  | 1.69   | 1.63  | 5.37   | 5.41  | 5.27  | 4.82  | 1.81   | 2.20  |
| Lu         | 0.340 | 0.396 | 0.256  | 0.246 | 0.762  | 0.798 | 0.771 | 0.688 | 0.254  | 0.319 |

**Table 4.** Instrumental neutron activation data for selected samples collected in the area adjacent to the Turkey Creek caldera, Chiricahua Mountains, Cochise County, Arizona—Continued.

| Sample No. | Tsd   |       |       | Tpf   |       | Tdp    |        |        | The-high barium phase |        |
|------------|-------|-------|-------|-------|-------|--------|--------|--------|-----------------------|--------|
|            | P83   | P131  | P133  | P84   | P136B | 201527 | 201528 | 201532 | 201529                | 201530 |
| Ba         | 731   | 1140  | 1050  | 827   | 738   | 662    | 1,150  | 1,380  | 1,700                 | 3,170  |
| Sr         | 313   | 386   | 520   | 366   | 516   | 75     | 80.4   | 104    | 133                   | 253    |
| Co         | 7.05  | 9.39  | 8.83  | 7.08  | 8.38  | 1.24   | 1.60   | 1.87   | 2.20                  | 2.60   |
| Ni         | 10.5  | 18.9  | 21.9  | 13.0  | 30.9  | 23.0   | 8.80   | 18.0   | 14.0                  | 17.8   |
| Cr         | 8.67  | 14.6  | 8.96  | 5.30  | 8.24  | ND     | ND     | ND     | ND                    | ND     |
| Cs         | 2.48  | 5.18  | 6.52  | 29.3  | 1280  | 8.44   | 3.79   | 6.42   | 3.98                  | 3.72   |
| Hf         | 5.02  | 7.41  | 6.28  | 5.99  | 5.64  | 16.7   | 17.5   | 17.6   | 17.3                  | 18.3   |
| Rb         | 163   | 175   | 163   | 216   | 434   | 311    | 190    | 332    | 184                   | 185    |
| Sb         | 0.221 | 0.159 | 0.256 | 0.159 | 0.237 | 0.439  | 0.192  | 3.86   | 0.161                 | 0.264  |
| Ta         | 0.978 | 1.07  | 1.18  | 0.954 | 1.15  | 1.85   | 1.86   | 1.67   | 1.46                  | 1.30   |
| Th         | 17.7  | 22.5  | 17.4  | 15.4  | 17.4  | 20.9   | 20.7   | 18.0   | 16.7                  | 14.8   |
| U          | 3.90  | 2.84  | 4.18  | 3.37  | 4.10  | 3.21   | 3.51   | 2.94   | 2.69                  | 2.53   |
| Zn         | 50.1  | 67.5  | 63.8  | 55.3  | 60.8  | 79.5   | 73.9   | 67.2   | 60.7                  | 60.2   |
| Zr         | 185   | 266   | 243   | 216   | 198   | 716    | 773    | 731    | 750                   | 784    |
| Sc         | 4.65  | 6.06  | 6.74  | 5.21  | 6.08  | 6.39   | 6.75   | 6.68   | 6.43                  | 6.50   |
| La         | 38.3  | 61.2  | 56.9  | 45.6  | 43.5  | 129    | 120    | 100    | 71.7                  | 63.4   |
| Ce         | 75.4  | 130   | 115   | 87.7  | 86.4  | 264    | 260    | 233    | 158                   | 136    |
| Nd         | 31.8  | 54    | 49.8  | 39.3  | 33.8  | 116    | 106    | 93.1   | 60.8                  | 55.2   |
| Sm         | 5.42  | 8.37  | 9.18  | 6.63  | 7.02  | 21.3   | 19.9   | 17.7   | 11.8                  | 10.8   |
| Eu         | 1.12  | 1.43  | 1.67  | 1.36  | 1.52  | 2.26   | 2.48   | 2.73   | 3.08                  | 3.51   |
| Gd         | 4.18  | 5.86  | 7.07  | 5.35  | 5.96  | ND     | ND     | ND     | ND                    | ND     |
| Tb         | 0.555 | 0.696 | 0.853 | 0.701 | 0.735 | 2.38   | 2.46   | 2.10   | 1.41                  | 1.26   |
| Tm         | 0.242 | 0.263 | 0.340 | 0.297 | ND    | ND     | ND     | ND     | ND                    | ND     |
| Yb         | 1.48  | 1.50  | 1.99  | 1.77  | 1.98  | 6.39   | 6.85   | 5.82   | 4.54                  | 4.38   |
| Lu         | 0.215 | 0.214 | 0.287 | 0.252 | 0.290 | 0.902  | 1.00   | 0.802  | 0.645                 | 0.663  |

| Sample No. | The-high Ba | The-low Ba | The-unknown |        | Yg    |       |
|------------|-------------|------------|-------------|--------|-------|-------|
|            | P126B       | P478       | P126AM      | P126AI | P488  | P489  |
| Ba         | 2,030       | 111        | 1,140       | 189    | 1,120 | 1,160 |
| Sr         | 125         | ND         | 89.3        | ND     | 212   | 232   |
| Co         | 1.80        | 0.211      | 1.54        | 0.657  | 7.66  | 5.68  |
| Ni         | 19.9        | ND         | 13.8        | 8.10   | ND    | 13.0  |
| Cr         | 3.23        | 1.65       | ND          | 1.57   | 3.68  | 3.78  |
| Cs         | 9.82        | 14.9       | 8.14        | 6.45   | 4.06  | 4.02  |
| Hf         | 16.2        | 7.44       | 14.7        | 13.7   | 9.14  | 10.6  |
| Rb         | 296         | 535        | 355         | 396    | 185   | 231   |
| Sb         | 0.405       | 2.74       | 0.584       | 0.500  | 0.412 | 0.285 |
| Ta         | 1.45        | 2.56       | 2.05        | 2.32   | 1.22  | 1.31  |
| Th         | 15.4        | 29.0       | 22.4        | 27.7   | 19.1  | 17.9  |
| U          | 2.94        | 8.12       | 4.15        | 3.67   | 2.82  | 2.90  |
| Zn         | 78.8        | 87.5       | 59.3        | 46.2   | 55.2  | 23.3  |
| Zr         | 766         | 200        | 619         | 505    | 340   | 406   |
| Sc         | 5.63        | 2.41       | 5.19        | 4.52   | 8.11  | 8.45  |
| La         | 66.2        | 40.2       | 93.5        | 50.8   | 61.6  | 56.3  |
| Ce         | 127         | 82.0       | 178         | 166    | 135   | 129   |
| Nd         | 59.0        | 28.8       | 86.0        | 45.2   | 57.9  | 57.9  |
| Sm         | 10.5        | 5.65       | 15.5        | 7.74   | 11.8  | 12.2  |
| Eu         | 2.96        | 0.393      | 2.28        | 1.26   | 2.98  | 2.77  |
| Gd         | 8.91        | 5.31       | 12.5        | 6.31   | 11.0  | 11.5  |
| Tb         | 1.26        | 0.801      | 1.79        | 0.936  | 1.61  | 1.73  |
| Tm         | 0.696       | 0.748      | 0.984       | 0.815  | 0.956 | 1.03  |
| Yb         | 4.29        | 4.79       | 5.87        | 5.49   | 5.95  | 6.36  |
| Lu         | 0.630       | 0.719      | 0.821       | 0.813  | 0.858 | 0.919 |

**Table 5.** Abundances of FeO, CO<sub>2</sub>, F, and Cl in selected samples collected in the area adjacent to the Turkey Creek caldera, Chiricahua Mountains, Cochise County, Arizona.

[Data in weight percent. ND, not detected; NA, not analyzed. Map-unit symbols are those shown on the geologic map of the Turkey Creek caldera (du Bray and others, in press) and are defined in table 1. Wet-chemical determinations; E.L. Brandt and J.D. Sharkey, analysts]

| Sample No.      | Tdpl   | Trel |      |      |      | Tcrm   |      |      |      |      |
|-----------------|--------|------|------|------|------|--------|------|------|------|------|
|                 | 201533 | P048 | P050 | P051 | P052 | 201535 | P053 | P054 | P055 | P056 |
| FeO             | NA     | NA   | NA   | NA   | NA   | NA     | NA   | NA   | NA   | NA   |
| CO <sub>2</sub> | NA     | NA   | NA   | NA   | NA   | NA     | NA   | NA   | NA   | NA   |
| F               | 0.03   | ND   | 0.10 | 0.01 | ND   | 0.02   | 0.13 | 0.14 | 0.04 | 0.10 |
| Cl              | 0.05   | 0.01 | 0.01 | 0.02 | 0.01 | 0.01   | ND   | ND   | ND   | 0.01 |

| Sample No.      | Tcrm |      |      |      |      | Treu   | Tij  |      | Tfre |      |
|-----------------|------|------|------|------|------|--------|------|------|------|------|
|                 | P057 | P058 | P059 | P060 | P061 | 201534 | P045 | P047 | P044 | P122 |
| FeO             | NA   | NA   | NA   | NA   | NA   | NA     | NA   | NA   | NA   | 0.32 |
| CO <sub>2</sub> | NA   | NA   | NA   | NA   | NA   | NA     | NA   | NA   | NA   | ND   |
| F               | 0.12 | 0.10 | 0.10 | 0.04 | 0.03 | 0.02   | 0.10 | 0.13 | 0.01 | NA   |
| Cl              | ND   | ND   | ND   | 0.01 | 0.01 | ND     | 0.02 | 0.01 | 0.04 | NA   |

| Sample No.      | Tgd    | Tpf  |       | Tcc    |       | Thc, high Ba |       | Tsd    |      |
|-----------------|--------|------|-------|--------|-------|--------------|-------|--------|------|
|                 | 201570 | P084 | P136B | 201661 | P272A | P272B        | P126B | 201662 | P083 |
| FeO             | 1.58   | 1.00 | 0.82  | 0.28   | ND    | 0.06         | 0.27  | 0.22   | NA   |
| CO <sub>2</sub> | 0.02   | ND   | ND    | ND     | ND    | ND           | ND    | 0.01   | NA   |
| F               | 0.02   | 0.02 | NA    | 0.07   | ND    | 0.03         | NA    | 0.03   | 0.02 |
| Cl              | 0.23   | 0.03 | NA    | 0.07   | ND    | ND           | NA    | ND     | ND   |

**Table 6.** Abundances of Be, Cr, Ni, Pb, Sn, and Ag in selected samples collected in the area adjacent to the Turkey Creek caldera, Chiricahua Mountains, Cochise County, Arizona.

[Data in parts per million. ND, not detected. Map-unit symbols are those shown on the geologic map of the Turkey Creek caldera (du Bray and others, in press) and are defined in table 1. Wet chemical and spectroscopic determinations; C.J. Skeen and M.W. Doughten, analysts]

| Sample No. | Treu   |       | Tcrm  |       | Trel   |        | Tij    |
|------------|--------|-------|-------|-------|--------|--------|--------|
|            | 201765 | P482  | P481  | P483  | 201769 | 201770 | 201771 |
| Be         | 5.1    | 5.4   | 7.5   | 7.9   | 7.7    | 8.4    | 5.2    |
| Cr         | 6.8    | 6.2   | 5.6   | 8     | 5.3    | 9.6    | 8      |
| Ni         | 4.6    | 3.5   | 4.7   | 2.7   | 11     | 4.3    | 2.7    |
| Pb         | 6.6    | 16    | 17    | 10    | 6.6    | 7.4    | 4.7    |
| Sn         | 2.3    | 2.6   | 2.8   | 2.8   | 5.6    | 3      | 2.1    |
| Ag         | 0.02   | 0.031 | 0.018 | 0.051 | 0.11   | 0.043  | 0.063  |

| Sample No. | Thc  | Tfre  | Tgd   | KJsv  | Yg    |       |
|------------|------|-------|-------|-------|-------|-------|
|            | P478 | P475  | P490  | P477  | P488  | P489  |
| Be         | 3.9  | 2.5   | 1.8   | ND    | 2.8   | 2.5   |
| Cr         | 6.4  | 11    | 13    | 11    | 11    | 7.6   |
| Ni         | 3.1  | 3.9   | 12    | 5     | 7.3   | 7.3   |
| Pb         | 10   | 5.1   | 4.7   | ND    | 12    | 12    |
| Sn         | 1.9  | 1.7   | 1.8   | 1.4   | 1.5   | 2     |
| Ag         | 0.06 | 0.037 | 0.051 | 0.014 | 0.033 | 0.033 |

