Rustler Park Quadrangle, Cochise County, Arizona—Analytic Data and Geologic Sample Catalog

U.S. GEOLOGICAL SURVEY BULLETIN 2021–B

Chapter B

Rustler Park Quadrangle, Cochise County, Arizona—Analytic Data and Geologic Sample Catalog

By EDWARD A. DU BRAY, DOUGLAS B. YAGER, and JOHN S. PALLISTER

Geochemical data for and availability of samples collected during geologic mapping of the quadrangle

U.S. GEOLOGICAL SURVEY BULLETIN 2021

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Rustler Park Quadrangle, Cochise County, Arizona—Analytic Data and Geologic Sample Catalog

By Edward A. du Bray, Douglas B. Yager, *and* John S. Pallister

Abstract

More than 220 rock samples were collected during geologic mapping of the Rustler Park 7½-minute quadrangle in southeastern Arizona. Energy-dispersive trace-element analyses were conducted for 128 samples, major-oxide abundances were determined for 82 samples, and instrumental neutron activation analyses were conducted for 46 samples. Miscellaneous wet chemical determinations (CO_2, FeO, F, and Cl) were made for a small number of samples. Determinations of Be, Cr, Ni, Pb, Sn, and Ag were made for 11 samples using a combination of spectrographic and wet chemical methods. Semiquantitative spectrographic analyses were obtained for seven mineralized or altered samples. Standard, and in some cases polished, thin sections were prepared for about half of the 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 the quadrangle is tabulated in this report. Information in this report supplements the geologic map of the Rustler Park quadrangle (U.S. Geological Survey Geologic Quadrangle Map GQ–1696) and supports ongoing investigations of the Turkey Creek caldera.

INTRODUCTION

The Rustler Park 7½-minute quadrangle is east-southeast of Tucson, Ariz., in the Chiricahua Mountains (fig. 1). The quadrangle includes part of Chiricahua National Monument and is located about 60 km southeast of Willcox, Arizona. The part of the Chiricahua Mountains within the Rustler Park quadrangle offers unusual ecologic diversity that ranges from Sonoran desert through subalpine environments. Altitudes in the quadrangle range from about 1,650 m (5,400 ft) at the mouth of Pinery Canyon (pl. 1) to 2,865 m (9,400 ft) at the crest of the range. There are no paved roads in the quadrangle, although several unpaved roads and a well- developed trail system provide reasonably good access to most of the area.

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This report supplements the geologic map of the Rustler Park quadrangle (Pallister and others, in press). It lists availability of chemical data, thin sections, and hand specimens for each of the samples collected in the quadrangle (table 1) and provides tabulations of chemical data (tables 2–7) for samples of Tertiary volcanic rocks that were collected during geologic mapping of the quadrangle. The mapping and data collection are both 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 here are the subject of a study concerning evolution of the Turkey Creek caldera (du Bray and Pallister, 1991) and ongoing topical studies.

GENERAL GEOLOGY

Erosion and basin-range faulting in the Chiricahua Mountains have exposed multiple levels through the 27-Ma (Pallister and du Bray, 1989) Turkey Creek caldera. Parts of the 20-km-diameter caldera underlie most of the Rustler Park quadrangle. Components of the caldera exposed in the quadrangle are all of Oligocene age and include, from oldest to youngest, intracaldera and outflow facies of the Rhyolite Canyon Tuff; dacite porphyry, which forms a resurgent core intrusion and a ring intrusion with associated lava flows; and rhyolite (mostly lava flows but including some tuff) that fills the caldera moat. Stratigraphic, structural, and geochronologic data indicate that the porphyry was emplaced soon after the Rhyolite Canyon Tuff erupted and that the evolution of the caldera, including deposition of the moat deposits, was completed in less than 1 million years.

In the Rustler Park quadrangle (Pallister and others, in press), the caldera system is surrounded by, and was partly emplaced into, slightly older Tertiary volcanic rocks, a small mid-Tertiary granite pluton, Tertiary(?) and Cretaceous(?) sedimentary and interbedded mafic volcanic rocks, Paleozoic carbonate sedimentary rocks, and Precambrian intrusive

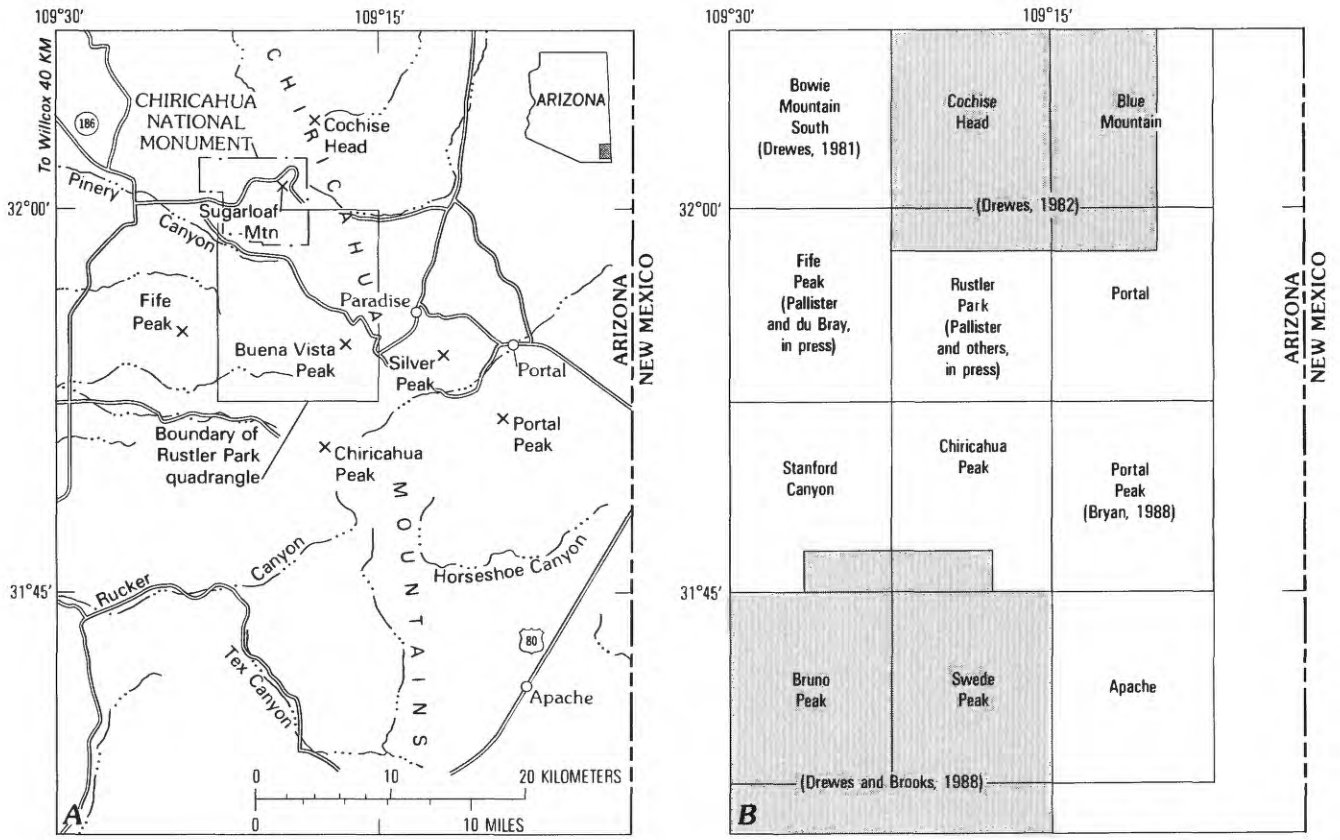


Figure 1. Location of the Rustler Park quadrangle and important geographic and geologic features in the Chiricahua Mountains area, Cochise County, Arizona.

A, Quadrangle location, roads, and important geographic features.
B, U.S. Geological Survey quadrangle names in the area and existing geological maps (cited in parentheses).
C (on facing page), Generalized geology (adapted from Marjaniemi, 1969).

EXPLANATION FOR GEOLOGIC MAP ON FACING PAGE

Quaternary surficial deposits

OLIGOCENE ROCKS ASSOCIATED WITH THE TURKEY CREEK CALDERA

Moat deposits—Mainly rhyolite lavas and pyroclastic rocks

Resurgent intrusion, ring dike, and extrusive equivalents—Dacite and monzonite porphyry

Rhyolite Canyon Tuff

ROCKS THAT PRE-DATE THE TURKEY CREEK CALDERA

Volcanic rocks—Mainly Oligocene rhyolite and dacite

Basement rocks—Mainly Mesozoic and Paleozoic sedimentary rocks; includes some Precambrian granite

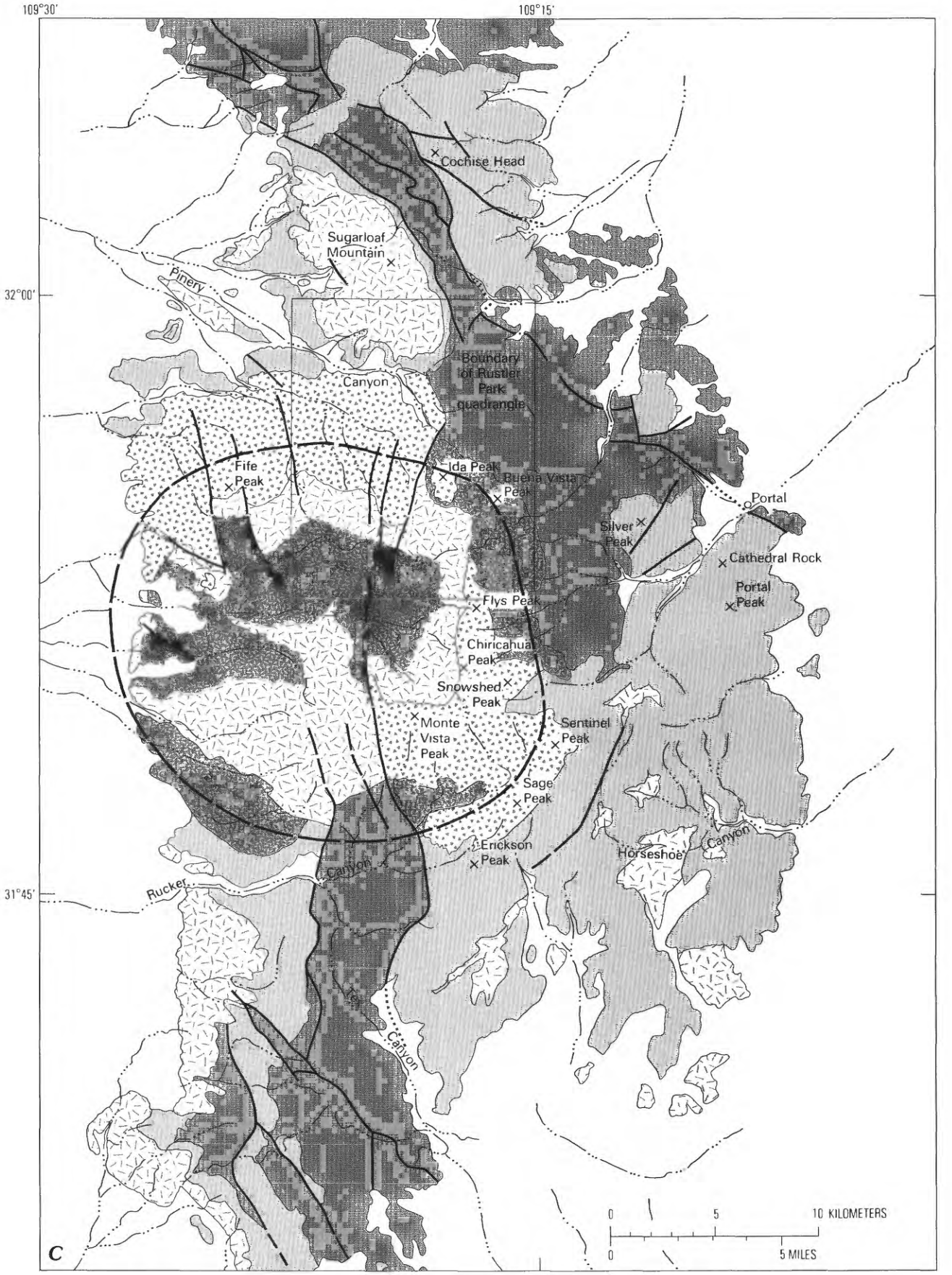
Contact

Structural margin of Turkey Creek caldera

Fault—Dashed where approximately located; dotted where concealed

Streams

rocks. Outflow tuff from the Turkey Creek caldera was deposited on a surface underlain by middle Tertiary volcanic rocks, including the Oligocene Jesse James Canyon Tuff, an ash-flow tuff with an unknown source, rhyolite lavas of the Oligocene Faraway Ranch Formation (which form a coalescing dome field), and intermediate to mafic lava flows (Pallister and others, in press). The topographic margin of the caldera, where exposed, is composed of interbedded Tertiary or Cretaceous siltstone, shale, graywacke, and fine-grained dark limestone. The sedimentary rocks are underlain by massive Tertiary or Cretaceous basalt flows and interbedded epiclastic deposits. The basalt is in turn underlain by Cretaceous(?) silty limestone and sandstone, which are intruded by a granite pluton exposed in Jhus Canyon (plate 1). It has not been possible to correlate these sedimentary rocks with well-known, areally extensive units of similar stratigraphic position; some of them may be part of the Bisbee Group and others may be part of early Tertiary sedimentary basin packages that are being studied in other nearby ranges. A thick section of Paleozoic carbonate sedimentary rocks crops out in the northeast corner of the quadrangle; these deposits rest unconformably atop Precambrian granite.


109°30'
109°15'
32°00'
31°45'
Cochise Head
Sugarloaf Mountain
Pinery
Canyon
Boundary of Rustler Park quadrangle
Fife Peak
Ida Peak
Buena Vista Peak
Portal
Silver Peak
Cathedral Rock
Portal Peak
Flys Peak
Chiricahua Peak
Snowshed Peak
Monte Vista Peak
Sentinel Peak
Sage Peak
Erickson Peak
Horseshoe
Canyon
Canyon
Rucker
Canyon
0 5 10 KILOMETERS
0 5 MILES
C

The principal structural features in the quadrangle all result from the evolution of the Turkey Creek caldera. These include inferred ring fracture faults, which have been intruded and obscured by dacite porphyry of the ring, and high-angle normal faults caused by central resurgent magmatism. The Paleozoic section is cut by a number of low-angle thrust(?) faults.

ANALYTIC DATA

More than 220 rock samples were collected during geologic mapping of the Rustler Park quadrangle. Energy-dispersive trace-element analyses were conducted for 128 samples. Major-oxide abundances were determined for 82 samples. Instrumental neutron activation analyses were conducted for 46 samples. Abundances of CO_2, FeO, F, and Cl were determined for a small number of samples using miscellaneous wet chemical methods. Abundances of Be, Cr, Ni, Pb, Sn, and Ag in 11 samples were determined using a combination of spectrographic and wet chemical methods. Semiquantitative spectrographic analyses were obtained for seven mineralized or altered samples. Most of the chemical data were used to aid map unit characterization.

Our sample collecting was designed to provide areal representation of the igneous rocks exposed in the quadrangle. By collecting and analyzing numerous samples from each map unit we have established the limits of chemical variability of these units. 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/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 (analysts, J.E. Taggart, A.J. Bartel, and D.F. Siems) using X-ray fluorescence techniques (Taggart and others, 1987) except FeO, CO_2, F, and Cl (table 5), which were determined (analysts, E.L. Brandt and J.D. Sharkey) by wet chemistry (Jackson and others, 1987). Fe^{2+}:total iron as Fe^{2+} ratios were adjusted to 0.8 and major oxide abundances recalculated to 100 percent, on an anhydrous basis. Abundances of selected trace elements (table 3) were determined (by E.A. du Bray and D.B. Yager) by energy-dispersive X-ray fluorescence spectroscopy (Elsass and du Bray, 1982) using ^{109}Cd and ^{241}Am radio-isotope excitation sources; the accuracy of this type of data is discussed by Sawyer and Sargent (1989). Abundances of selected trace elements presented in table 4 were determined (analysts, J.R. Budahn, R.J. Knight, and D.M. McKown) by instrumental neutron activation analysis (Baedecker and McKown, 1987). Abundances of additional trace elements (table 6) were determined (analysts, C.J. Skeen and W. Doughten) by a combination of spectroscopic and wet chemical methods. Semiquantitative spectrographic analyses (analysts, B.M. Adrian and M.J. Malcolm) were obtained using procedures outlined by Golightly and others (1987).

REFERENCES CITED

Baedecker, P.A, and McKown, D.M., 1987, Instrumental neutron activation analysis of geochemical samples, *in* Baedecker, P.A., ed., Methods for geochemical analysis: U.S. Geological Survey Bulletin 1770, p. H1–H14.

Bryan, C.R., 1988, Geology and geochemistry of mid-Tertiary volcanic rocks in the eastern Chiricahua Mountains, southeastern Arizona: Albuquerque, New Mexico, University of New Mexico, M.S. thesis, 137 p.

Drewes, Harald, 1981, Geologic map and sections of the Bowie Mountain South quadrangle, Cochise County, Arizona: U.S. Geological Survey Miscellaneous Investigations Series Map I–1363, scale 1:24,000.

_____1982, Geologic map of the Cochise Head quadrangle and adjacent areas, southeastern Arizona: U.S. Geological Survey Miscellaneous Investigations Series Map I–1312, scale 1:24,000.

Drewes, Harald, and Brooks, W.E., 1988, Geologic map and cross sections of the Pedregosa Mountains, Cochise County, Arizona: U.S. Geological Survey Miscellaneous Investigations Series Map I–1827, scale 1:48,000.

du Bray, E.A., and Pallister, J.S., 1991, An ash-flow caldera in cross section—Ongoing field and geochemical studies of the Turkey Creek caldera, Chiricahua Mountains, southeast Arizona: Journal of Geophysical Research, v. 96, p. 13435–13457.

Elsass, Francoise, and du Bray, E.A., 1982, Energy-dispersive X-ray fluorescence spectrometry with the Kevex 7000 system: Saudi Arabian Deputy Ministry Mineral Resources Open-File Report USGS–OF–02–52, 53 p.

Golightly, D.W., Dorrzapf, A.F., Mays, R.E., Fries, T.L., and Conklin, N.M., 1987, Analysis of geologic materials by direct-current arc emission spectrography and spectrometry, *in* Baedecker, P.A., ed., Methods for geochemical analysis: U.S. Geological Survey Bulletin 1770, p. A1–A13.

Hildreth, Wes, 1981, Gradients in silicic magma chambers—Implications for lithospheric magmatism: Journal of Geophysical Research, B, v. 86, p. 10153–10192.

Jackson, L.L., Brown, F.W, and Neil, S.T., 1987, Major and minor elements requiring individual determination, classical whole rock analysis, and rapid rock analysis, *in* Baedecker, P.A., ed., Methods for geochemical analysis: U.S. Geological Survey Bulletin 1770, p. G1–G23.

Marjaniemi, D.K., 1969, Geologic history of an ash-flow sequence and its source area in the Basin and Range Province of southeastern Arizona: Tucson, Ariz., University of Arizona, Ph.D. dissertation, 176 p.

Pallister, J.S., and du Bray, E.A., 1989, Field guide to volcanic and plutonic features of the Turkey Creek caldera, Chiricahua Mountains, southeast Arizona, *in* Chapin, C.E., and Zidek, Jiri, eds., Field excursions to volcanic terranes in the western United States, volume 1—Southern Rocky Mountain region: New Mexico Bureau of Mines and Mineral Resources Memoir 46, p. 138–152.

_____in press, Geologic map of the Fife Peak quadrangle, southeast Arizona: U.S. Geological Survey Geologic Quadrangle Map GQ–1708, scale 1:24,000.

Pallister, J.S., du Bray, E.A., and Latta, J.S., IV, in press, Geologic map of the Rustler Park quadrangle, southeast Arizona: U.S. Geological Survey Geologic Quadrangle Map GQ–1696, scale 1:24,000.

Pallister, J.S., du Bray, E.A., Rosenbaum, J.G., Snee, L.W., and Yager, D.B., 1990, Calderas in 3-D, Chiricahua Mountains, southeast Arizona, *in* Gehrels, G.E., and Spencer, J.E., eds., Geologic excursions through the Sonoran Desert region, Arizona and Sonora: Arizona Geological Survey Special Paper 7, p. 31–40.

Sawyer, D.A., and Sargent, K.A., 1989, Petrologic evolution of divergent peralkaline magmas from the Silent Canyon caldera complex, southwestern Nevada volcanic field: Journal of Geophysical Research, v. 94, p. 6021–6040.

Taggart, J.E., Jr., Lindsay, J.R., Scott, B.A., Vivit, D.V., Bartel, A.J., and Stewart, K.C., 1987, Analysis of geologic materials by X-ray fluorescence spectrometry, *in* Baedecker, P.A., ed., Methods for geochemical analysis: U.S. Geological Survey Bulletin 1770, p. E1–E19.

Table 1. Status and treatment of samples collected in the Rustler Park quadrangle, Chiricahua Mountains, Cochise County, Arizona

[X, data or sample type available, blank if unavailable. WRM, whole-rock major oxide analysis (table 2); NA, neutron activation analysis (table 4); 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) match those shown on Rustler Park geologic map (Pallister and others, in press)]

Sample number	WRM	NA	KEV	Other data*	TS	PTS	REF	COMMENTS
Aphyric rhyolite lava, unit 2 (Tmr2)								
201521	X	X	X			X		LOWER OF TWO RHYOLITE LAVA FLOWS ON IDA PEAK.
201568	X	X	X	1,2		X		
201569	X	X	X	1,2				GLASS.
201602	X	X	X	1,2	X			APHYRIC.
201774	X	X	X	3,5				T8-17†.
P070							X	IDA PEAK APHYRIC RHYOLITE.
P071	X	X	X			X		Do.
P110	X	X	X	1,2		X		ALTERED GREEN GLASS-GAINED RB AND SR.
Aphyric rhyolite tuff, unit 2 (Tmt2)								
201600	X	X	X		X			
201601	X	X	X		X			
Aphyric rhyolite lava, unit 1 (Tmr1)								
201562			X		X			POSSIBLE FEEDER FOR IDA PEAK RHYOLITE.
201579			X					FLOW BRECCIA OF P5 FLOW.
201580	X	X	X	1,2,4				GLASS.
201598			X					APHYRIC.
201599	X	X	X	1,2,3,5		X		APHYRIC GLASS.
201759						X		
201860			X					GLASS.
P069					X			IDA PEAK APHYRIC RHYOLITE.
P073	X	X	X	2		X		FLOW BRECCIA.
P074						X		GLASS.
P105	X		X		X			ALTERED GLASS; SECONDARY SiO_2.
Aphyric rhyolite tuff, unit 1 (Tmt1)								
201597			X		X			T8-12†.
201806							X	BLOCK IN PINERY CANYON LANDSLIDE.
201846	X	X	X					BASAL VITROPHYRE.
201903			X			X		
P112						X		
P455					X			PINK TUFF IN CENTELLA POINT REGION.
Biotite rhyolite lava (Tmrb)								
201548			X		X			CRYSTAL-RICH TUFF.
201550			X			X		

Table 1. Status and treatment of samples collected in the Rustler Park quadrangle, Chiricahua Mountains, Cochise County, Arizona—Continued

Sample number	WRM	NA	KEV	Other data*	TS	PTS	REF	COMMENTS
Biotite rhyolite lava (Tmrb)--Continued								
201603			X		X			
201632	X	X	X	1,2		X		GLASS.
201633					X			
201966			X					
P041A						X		BLACK GLASSY BLOCK FROM FLOW BRECCIA.
P041B					X			RED DEVITRIFIED BLOCK FROM FLOW BRECCIA.
P068					X			
P158						X		GLASS.
P162F	X	X	X		X			DEVITRIFIED, ALTERED GLASS; SECONDARY SiO_2.
P162G	X	X	X	1,2		X		GLASS.
Sedimentary rocks (Tms)								
201577					X			SILTSTONE.
201581					X			BASAL MOAT SEDIMENTS ON NE. FLANK OF IDA PEAK.
Dacite and monzonite porphyry, resurgent intrusion (Tdpi)								
201589					X			
201791			X					
P347	X		X					
P467					X			NEAR TRCI CONTACT.
P471A	X	X	X	3,5				HEMATITIC VEINS IN TDPI.
P471B	X	X	X	3,5				HOST TO P471A.
Dacite porphyry lava flows (Tdpl)								
201519				6				ALTERED.
201520			X			X		
201537	X	X	X	1,2		X		
201539			X		X			
201540			X					T8-22†.
201541			X					T8-23†.
201551			X					
201561A			X			X		
201561B			X			X		
201563B				6				GLASSY, CU-STAINED?
201564			X	6	X			DEVITRIFIED.
201566	X	X	X	1,2	X			ALTERED.
201567A					X			GLASS.
201567B					X			GLASS.
201567C					X			
201574A	X	X	X	1,2		X		
201574AA						X		
201574B	X	X	X	1		X		
201578	X	X	X	1	X			
201584			X					
201625			X					ALTERED GLASS.
201626					X			
201631					X			
201845	X		X					

Table 1. Status and treatment of samples collected in the Rustler Park quadrangle, Chiricahua Mountains, Cochise County, Arizona—Continued

Sample number	WRM	NA	KEV	Other data*	TS	PTS	REF	COMMENTS
Dacite porphyry lava flows (Tdpl)--Continued								
201847			X					
201848			X					
201849			X			X		GLASS.
P003	X	X	X	1,3,4,5		X		
P030					X			
P031	X	X	X	1,2		X		EAST RING GLASS.
P032					X			EAST RING.
P033					X			PLATEY PORPHYRY.
P034					X			EAST RING.
P035					X			Do.
P036A					X			EAST RING GLASS.
P036B					X			EAST RING, DEVITRIFIED.
P037					X			
P039	X	X	X	1,2		X		
P075					X			GLASS.
P101					X			
P104	X	X	X	1		X		ALTERED GLASS.
P106					X			GLASS.
P113							X	
P114					X			
P331					X			EAST RING, LAVA.
P333	X		X		X			EAST RING.
P335			X					Do.
P336							X	VESICULAR PORPHYRY FROM EAST RING.
P453A2	X		X					HOST TO FIAMME P453A1 (SEE "MISCELLANEOUS," BELOW).
P453B	X		X					QUARTZ-BEARING.
P453D					X		X	BANDED; REFERENCE SAMPLE IS A SLAB.
P453E					X			
P454	X		X					
P456							X	
P457					X			PORPHYRY LAVA NEAR BOOTLEGGER SADDLE.
P458					X			NEAR BOOTLEGGER SADDLE.
P480	X	X	X	3,5				
Rhyolite Canyon Tuff, aplite and rhyolite (Trca)								
201788	X		X		X			TDPI/TRCI CONTACT.
201790			X		X			PHANERITIC DIKE
P472	X	X	X	3,5		X		
Rhyolite Canyon Tuff, intracaldera facies (Trci)								
201549	X	X	X	1,2	X			
201563A			X					
201575	X	X	X	1		X		LOOKS LIKE DACITE PORPHYRY.
201576	X	X	X	1	X			Do.
201585	X	X	X	1	X			
201588							X	INCLUSION RICH.
201590			X		X			
201627A							X	TEXTURALLY TRANSITIONAL.
201627B						X		Do.
201628	X	X	X			X		Do.
201630	X	X	X		X			
201761	X		X		X			SILICIFIED.

Table 1. Status and treatment of samples collected in the Rustler Park quadrangle, Chiricahua Mountains, Cochise County, Arizona—Continued

Sample number	WRM	NA	KEV	Other data*	TS	PTS	REF	COMMENTS
Rhyolite Canyon Tuff, intracaldera facies (Trci)--Continued								
201762	X		X			X		UPPER(?) COOLING UNIT.
201773							X	0.5-CM WHITE FELDSPAR CRYSTALS, CLOTTY; T8-14†.
201789			X					
201843			X					LOWER(?) COOLING UNIT.
201844	X		X		X			UPPER(?) COOLING UNIT.
201850			X		X			Do.
P040	X	X	X			X		
P109					X			
P116A							X	
P116B							X	
P116C	X		X			X		
P116D							X	
P162A						X		
P162B						X		
P162H	X	X	X			X		
P330A					X			MATRIX TO SPATTER BRECCIA OF TRCI.
P330B						X		
P338B	X		X		X			BASAL GLASS, TRCI UPPER(?) COOLING UNIT, ALTERED.
P338C					X			DEVITRIFIED EQUIVALENT OF P338B.
P341							X	ASHY BEDS AT BASE OF UPPER(?) COOLING UNIT.
P342					X			UPPER(?) COOLING UNIT.
P343					X			Do.
P344					X			Do.
P356	X	X	X			X		UPPER(?) COOLING UNIT; T8-15†.
P357	X	X	X			X		UPPER(?) COOLING UNIT; UPPERMOST.
P447A	X		X		X			UPPER(?) COOLING UNIT.
P447B	X		X					FIAMME FROM P447A.
P449	X		X		X			
P451	X		X					UPPER(?) COOLING UNIT.
P452	X		X					Do.
P459A					X			TDP-TRCI FEEDER ZONE.
P459B					X			Do.
P459C					X			Do.
P459D	X		X		X			Do.
P459F							X	TDP-TRCI FEEDER ZONE; REFERENCE SAMPLE IS A SLAB.
P459G	X		X		X			TDP-TRC FEEDER ZONE; RESEMBLES LAVA.
P459H	X		X		X			Do.
P462	X		X		X			LOWER(?) COOLING UNIT.
P463							X	WHITE TUFF AT TRCI UPPER-LOWER CONTACT.
P468							X	2-PHASE GLASS AT TDPI/TRCI CONTACT.
Rhyolite Canyon Tuff, middle member outflow facies (Trcm)								
201741			X					
Rhyolite Canyon Tuff, lower member outflow facies (Trcl)								
201740			X					
201742			X					
201852			X					
201855			X					

Table 1. Status and treatment of samples collected in the Rustler Park quadrangle, Chiricahua Mountains, Cochise County, Arizona—Continued

Sample number	WRM	NA	KEV	Other data*	TS	PTS	REF	COMMENTS
Jesse James Canyon Tuff (Tjj)								
201772	X	X	X		X			T8-11†.
201853			X		X			
201854			X		X			
Faraway Ranch Formation, rhyolite of Hands Pass (Tfrh)								
201841	X		X		X			QUARTZ-BIOTITE RHYOLITE DOME; SOUTHWEST OF HANDS PASS.
201842			X					TUFF OF 201841.
201851			X		X			DOME LIKE 201841 N. OF HANDS PASS.
Faraway Ranch Formation, welded tuff of Riggs Spring (Tft)								
201861	X		X		X			
201862	X		X		X			
Faraway Ranch Formation, volcanic and volcaniclastic rocks (Tfv)								
201840			X					Tfv2:RED-BROWN BIOTITE-QUARTZ RHYOLITE LAVA AT HANDS PASS.
201856	X		X		X			Tfv2.
201858	X		X		X			Tfv2:BLACK GLASS FLOW BRECCIA.
P469A	X	X	X	3,5	X			Tfv2:GLASS BLOCK IN P469B.
P469B	X	X	X	3,5	X			Tfv2:GRANOPHYRE MATRIX TO P469A.
Granite porphyry of Jhus Canyon (Tg)								
201572A			X		X			JHUS CANYON GRANITE PORPHYRY.
201572B					X			Do.
201808							X	SILICIFIED, BLEACHED MARGIN(?) OF JHUS STOCK.
201809							X	CORE(?) OF JHUS CANYON STOCK.
Granodiorite of Mackey Canyon (Tgd)								
201807	X		X		X		X	REFERENCE SAMPLE IS A STAINED SLAB.
Sedimentary rocks of Pinery Canyon, shale facies (TKps)								
201582					X			GRAYWACKE.
201582A			X		X			SILTSTONE.
201582B					X			ARKOSE.
201583A							X	LIMESTONE WITH FOSSILS.
201583B							X	Do.
P465					X			ARKOSE.
P476A	X	X	X	3,5	X			Do.
P476B					X			CONGLOMERATE.

Table 1. Status and treatment of samples collected in the Rustler Park quadrangle, Chiricahua Mountains, Cochise County, Arizona—Continued

Sample number	WRM	NA	KEV	Other data*	TS	PTS	REF	COMMENTS
Volcanic rocks of Pinery Canyon, basalt and graywacke facies (TKpv)								
201805	X		X				X	ALTERED; SEEMS TO HAVE LOST SR, BA, K_2O.
201810							X	DIABASE OR BASALT.
201837					X			FINE-GRAINED DIORITIC ROCK FROM HORSEFALL CANYON.
P078	X	X	X	1,3,5	X			ONION SADDLE ROADCUT.
P412					X			HORNBLENDE-PYROXENE MICROGABBRO; DIABASE OF FEEDER(?).
P422A					X			DIABASE FROM HORSEFALL CANYON.
P422B					X			LAMINATED DIABASE OR GRAYWACKE FROM HORSEFALL CANYON.
P429					X			DIABASE.
P434					X			DIABASE OF HORSEFALL CANYON.
P438					X			LAMINATED BASALTIC ASH (?).
P440					X			DIABASE(?).
DY881	X		X					BASALT FROM ONION SADDLE ROAD ROADCUT.
DY882	X		X					Do.
DY886	X		X					Do.
Mineralized rocks and quartz veins								
201552				6				QUARTZ.
201553				6				Do.
201571				6				GOSSAN FROM ADIT IN JHUS CANYON.
201573				6				EL TIGRE QUARTZ.
Miscellaneous								
201522			X		X			ODD WELDED TUFF FROM NE. SIDE OF PINERY CANYON.
201559							X	CLASTS IN CONGLOMERATE NEAR EL TIGRE MINE ON RUSTLER RD.
201560			X		X			ASH IN DACITE PORPHYRY.
201565			X					ALTERED PORPHYRY.
201586	X	X	X	1,2	X			RHYOLITE FEEDER DIKE IN SEDIMENTARY ROCKS OF PINERY CANYON; SILICIFIED.
201629	X	X	X		X			MEGABRECCIA BLOCK?
201753	X		X		X			RHYOLITE LAVA FLOW BRECCIA ON TDPL.
P004A							X	AGGLUTINATE? FLOW BRECCIA?
P004B							X	Do.
P117							X	MOAT SEDIMENTARY BRECCIA.
P407				5				GALENA FROM MISFIRE MINE DUMP.
P450	X		X		LOST			AIRFALL TUFF BETWEEN UPPER AND LOWER TRCI.
P453A1	X		X					QUARTZ-RICH FIAMME IN P453A2 (TDPL).
P453C	X		X					QUARTZ-RICH BAND IN DACITE PORPHYRY LAVA

* Other geochemical data, identified by following codes:
1. Ferrous iron and carbon dioxide analyses (table 5).
2. Fluorine and chlorine analyses (table 5).
3. Miscellaneous trace element analyses (Be, Cr, Ni, Pb, Sn, and Ag; table 6).
4. $^{40}Ar/^{39}Ar$ isotope analyses, on sanidine, by L.W. Snee (U.S. Geological Survey, unpub. data).
5. Oxygen and lead isotope analyses (except samples numbered P469A, P469B, and P407, lead isotope analyses only) by R.A. Ayuso (U.S. Geological Survey, unpub. data).
6. Semiquantitative spectrographic analysis (table 7).

† Number of sample collected at same locality 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 Rustler Park quadrangle, Chiricahua Mountains, Cochise County, Arizona

[Data in weight percent. Fe^{2+}/total iron (as FeO) adjusted to 0.8 and abundances normalized to 100 weight percent, anhydrous. Map unit symbols above data columns match those shown on the Rustler Park geologic map (Pallister and others, in press) and are defined in table 1. LOI,loss on ignition; ND, not detected. Analyses by X-ray fluorescence spectroscopy; J.E. Taggart, A.J. Bartel, and D.F. Siems, analysts]

Map unit	Tmr2							Tmt2
Sample No.	201521	201568	201569	201602	201774	P071	P110	201600
SiO_2---	77.73	77.19	77.82	77.72	77.70	76.06	78.01	77.37
Al_2O_3--	12.72	12.71	12.49	12.33	12.26	13.37	12.57	12.49
Fe_2O_3--	.19	.23	.22	.21	.21	.22	.22	.23
FeO----	.69	.81	.78	.76	.76	.81	.78	.82
MgO----	ND	.11	.11	.14	.11	ND	.14	.17
CaO----	.06	.12	.56	.13	.13	.11	.59	.19
Na_2O---	3.82	3.35	4.84	3.40	3.53	3.76	3.78	3.44
K_2O----	4.63	5.26	2.95	5.10	5.10	5.46	3.69	5.07
TiO_2---	.07	.16	.16	.15	.15	.16	.16	.16
P_2O_5---	ND	ND	ND	ND	ND	ND	ND	ND
MnO----	.09	.06	.07	.05	.06	.04	.06	.06
LOI----	.49	.93	4.30	.47	.46	.50	6.33	.60

Map unit	Tmt2	Tmr1				Tmt1	Tmrb	
Sample No.	201601	201580	201599	P073	P105	201846	201632	P162F
SiO_2---	77.56	76.88	75.82	76.41	79.35	75.07	73.48	78.21
Al_2O_3--	12.34	12.94	12.97	12.98	11.59	12.97	14.05	11.62
Fe_2O_3--	.22	.27	.28	.27	.24	.36	.39	.33
FeO----	.80	.97	.99	.99	.86	1.29	1.40	1.18
MgO----	.15	.16	.21	.16	ND	.32	.47	.32
CaO----	.25	.87	.68	.64	.28	.89	1.56	1.06
Na_2O---	3.42	3.98	3.23	3.83	2.76	3.69	3.33	2.40
K_2O----	5.07	3.71	5.58	4.48	4.74	5.13	4.90	4.53
TiO_2---	.15	.18	.18	.18	.16	.22	.28	.24
P_2O_5---	ND	ND	ND	ND	ND	ND	.09	.07
MnO----	.04	.05	.06	.05	.03	.05	.04	.04
LOI----	.51	5.25	4.31	5.13	1.09	3.35	3.45	1.31

Map unit	Tmrb	Tdpi			Tdpl			
Sample No.	P162G	P347	P471A	P471B	201537	201566	201574A	201574B
SiO_2---	73.74	70.10	64.54	64.92	64.67	64.69	72.09	64.01
Al_2O_3--	14.16	14.47	15.47	15.39	15.65	15.74	13.91	16.05
Fe_2O_3--	.40	.62	1.21	.94	.98	1.02	.60	.98
FeO----	1.44	2.24	4.34	3.40	3.53	3.69	2.17	3.53
MgO----	.50	.75	1.25	1.75	1.76	1.56	.48	1.74
CaO----	1.62	1.79	2.82	3.38	2.84	2.99	.42	3.35
Na_2O---	3.92	3.52	3.95	4.03	3.97	4.15	2.36	3.96
K_2O----	3.79	5.71	4.89	4.74	5.18	4.72	7.29	4.97
TiO_2---	.29	.60	1.02	1.04	.94	.99	.48	.95
P_2O_5---	.09	.15	.41	.37	.36	.35	.15	.36
MnO----	.04	.06	.11	.04	.11	.10	.04	.10
LOI----	4.46	1.65	.92	1.26	2.71	1.14	1.45	2.58

Table 2. Major oxide analyses for selected samples collected in the Rustler Park quadrangle, Chiricahua Mountains, Cochise County, Arizona—Continued

Map unit	Tdpl							
Sample No.	201578	201845	P003	P031	P039	P104	P333	P453A2
SiO_2---	66.54	66.42	64.24	66.29	65.69	67.07	64.99	67.07
Al_2O_3--	15.32	14.90	15.85	15.45	15.75	15.09	15.39	15.23
Fe_2O_3--	.90	.99	.98	.93	.90	.97	.99	.96
FeO----	3.24	3.57	3.54	3.35	3.24	3.48	3.55	3.44
MgO----	1.47	1.11	1.57	1.57	1.40	1.29	1.59	.84
CaO----	2.44	2.45	3.40	3.52	2.73	3.01	3.31	1.92
Na_2O---	3.79	4.29	3.90	4.54	4.04	4.41	3.90	3.70
K_2O----	5.06	4.76	5.09	3.06	4.97	3.19	4.88	5.39
TiO_2---	.85	1.03	.94	.88	.89	1.04	.95	1.02
P_2O_5---	.31	.38	.37	.31	.34	.35	.34	.36
MnO----	.07	.10	.10	.10	.06	.11	.12	.06
LOI----	1.43	.85	2.44	3.43	1.54	5.28	2.42	1.44

Map unit	Tdpl			Trca		Trci		
Sample No.	P453B	P454	P480	201788	P472	201549	201575	201576
SiO_2---	69.27	67.41	64.46	71.06	78.31	76.35	78.02	77.53
Al_2O_3--	14.32	15.12	15.65	14.88	11.70	12.55	11.54	12.16
Fe_2O_3--	.79	.98	.98	.56	.30	.43	.31	.36
FeO----	2.84	3.54	3.54	2.02	1.09	1.54	1.12	1.28
MgO----	.76	.62	1.80	.42	ND	.17	.10	.29
CaO----	2.17	1.83	3.07	.82	.09	.29	.09	.10
Na_2O---	3.68	3.69	4.16	3.49	3.37	3.05	1.17	1.96
K_2O----	5.02	5.36	4.93	6.06	5.00	5.33	7.52	6.21
TiO_2---	.79	1.05	.93	.53	.14	.26	.12	.09
P_2O_5---	.28	.35	.38	.12	ND	ND	ND	ND
MnO----	.08	.06	.10	.05	ND	.03	ND	.03
LOI----	.92	1.17	2.93	1.11	.62	1.39	.83	1.41

Map unit	Trci							
Sample No.	201585	201628	201630	201761	201762	201844	P040	P116C
SiO_2---	76.35	75.34	75.66	83.41	77.60	78.66	75.07	76.77
Al_2O_3--	12.15	13.10	12.68	8.56	12.04	10.99	12.95	11.84
Fe_2O_3--	.39	.44	.42	.26	.34	.46	.44	.41
FeO----	1.39	1.59	1.52	.95	1.24	1.66	1.57	1.46
MgO----	.29	.15	.12	ND	.13	.13	.13	.46
CaO----	.12	.10	.12	.09	.19	.31	.18	.39
Na_2O---	1.41	3.52	3.97	2.03	3.25	2.39	3.21	1.12
K_2O----	7.68	5.44	5.22	4.53	5.01	5.15	6.14	7.26
TiO_2---	.21	.26	.23	.14	.20	.24	.26	.23
P_2O_5---	ND	ND	ND	ND	ND	ND	ND	ND
MnO----	.02	.04	.06	.03	ND	ND	.04	.06
LOI----	1.21	.74	.44	.81	2.00	.78	.86	2.63

Table 2. Major oxide analyses for selected samples collected in the Rustler Park quadrangle, Chiricahua Mountains, Cochise County, Arizona—Continued

Map unit	Trci							
Sample No.	P162H	P338B	P356	P357	P447A	P447B	P449	P451
SiO_2---	75.98	75.20	76.52	76.68	76.67	79.11	76.07	76.91
Al_2O_3--	12.83	12.90	12.21	12.54	12.23	11.13	12.46	12.22
Fe_2O_3--	.43	.49	.42	.35	.44	.34	.45	.39
FeO----	1.56	1.75	1.52	1.27	1.59	1.23	1.63	1.41
MgO----	.12	.29	.18	.28	.28	ND	.52	.16
CaO----	.23	1.25	.17	.32	.35	.14	.67	.17
Na_2O---	3.31	4.37	3.18	2.21	2.83	2.84	3.23	3.10
K_2O----	5.24	3.40	5.52	6.12	5.36	5.09	4.68	5.42
TiO_2---	.25	.26	.24	.25	.22	.12	.21	.21
P_2O_5---	ND	ND	ND	ND	ND	ND	ND	ND
MnO----	.03	.10	.03	ND	.02	ND	.07	ND
LOI----	1.14	4.75	.90	2.06	1.19	.71	1.35	.96

Map unit	Trci					Tjj	Tfrh	Tft
Sample No.	P452	P459D	P459G	P459H	P462	201772	201841	201861
SiO_2---	76.19	76.15	78.42	77.78	73.74	77.91	77.61	72.35
Al_2O_3--	12.60	12.45	11.41	11.76	13.87	12.08	11.55	14.53
Fe_2O_3--	.46	.37	.36	.37	.51	.20	.37	.45
FeO----	1.65	1.33	1.28	1.34	1.85	.71	1.33	1.62
MgO----	.19	.46	ND	ND	ND	.33	ND	.42
CaO----	.28	1.51	.04	.05	.05	.47	.26	.44
Na_2O---	3.31	1.39	3.41	3.58	4.16	3.36	3.59	2.55
K_2O----	5.07	6.10	4.95	4.92	5.51	4.77	5.14	7.20
TiO_2---	.24	.16	.14	.15	.27	.15	.08	.31
P_2O_5---	ND	ND	ND	ND	ND	ND	ND	.11
MnO----	ND	.09	ND	.04	.04	.03	.08	.02
LOI----	1.02	7.70	.23	.36	.82	1.65	.56	1.66

Map unit	Tft	Tfv				Tgd	TKps	TKpv
Sample No.	201862	201856	201858	P469A	P469B	201807	P476A	201805
SiO_2---	73.17	63.85	63.34	62.05	65.77	67.17	83.86	49.99
Al_2O_3--	13.88	17.15	16.50	17.22	16.24	15.86	9.36	17.05
Fe_2O_3--	.44	1.38	1.23	1.31	.93	.79	.21	2.01
FeO----	1.59	4.95	4.42	4.72	3.35	2.84	.76	7.24
MgO----	.34	2.87	1.90	1.42	1.89	1.68	.47	9.17
CaO----	.28	2.55	4.49	4.12	4.68	3.56	1.21	6.51
Na_2O---	2.15	3.36	3.53	3.11	3.03	3.82	3.85	4.95
K_2O----	7.76	2.70	3.37	4.84	3.30	3.55	.09	.47
TiO_2---	.30	.80	.88	.91	.61	.55	.19	1.95
P_2O_5---	.07	.29	.26	.24	.16	.15	ND	.49
MnO----	.02	.10	.07	.06	.04	.06	ND	.16
LOI----	1.06	4.79	1.34	1.21	1.60	.48	1.01	4.15

Table 2. Major oxide analyses for selected samples collected in the Rustler Park quadrangle, Chiricahua Mountains, Cochise County, Arizona—Continued

Map unit	TKpv				Miscellaneous			
Sample No.	P078	DY881	DY882	DY886	201586	201629	201753	P450
SiO_2---	50.14	46.89	50.38	51.53	80.39	67.34	81.16	73.36
Al_2O_3--	17.79	17.85	20.05	18.22	10.28	15.39	11.37	14.73
Fe_2O_3--	1.95	1.80	2.07	1.72	.16	.97	.17	.48
FeO----	7.03	6.50	7.44	6.17	.59	3.50	.62	1.72
MgO----	4.53	4.04	5.78	5.03	ND	1.00	.15	.39
CaO----	9.22	14.30	4.85	8.51	ND	3.74	.36	1.05
Na_2O---	3.66	3.53	5.40	3.39	ND	4.16	1.31	2.92
K_2O----	2.78	2.46	1.11	2.44	8.51	2.89	4.68	4.98
TiO_2---	1.97	1.92	2.13	2.06	.06	.71	.12	.28
P_2O_5---	.78	.52	.66	.80	ND	.25	ND	.09
MnO----	.16	.20	.14	.14	ND	.04	.04	ND
LOI----	2.73	8.93	4.90	2.81	.53	2.57	1.89	2.50

Map unit	Miscellaneous	
Sample No.	P453A1	P453C
SiO_2---	73.07	77.19
Al_2O_3--	13.61	12.07
Fe_2O_3--	.55	.37
FeO----	1.99	1.33
MgO----	.47	.24
CaO----	1.15	1.09
Na_2O---	2.76	2.77
K_2O----	5.73	4.61
TiO_2---	.46	.23
P_2O_5---	.15	.10
MnO----	.05	ND
LOI----	1.50	.76

Table 3. Trace-element data for selected samples collected in the Rustler Park quadrangle, Chiricahua Mountains, Cochise County, Arizona

[Data in parts per million. Map unit symbols above data columns match those shown on the Rustler Park geologic map (Pallister 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]

Map unit	Tmr2							Tmt2
Sample No.	201521	201568	201569	201602	201774	P071	P110	201600
Zn----	73	55	88	64	67	73	92	176
Rb----	646	382	518	390	396	403	719	374
Sr----	16	15	24	14	16	15	95	23
Y-----	46	36	66	53	43	43	80	55
Zr----	180	193	198	196	179	201	201	201
Nb----	83	53	50	52	46	49	46	52
Pb----	58	44	37	38	42	61	60	56
Th----	95	61	55	62	47	66	57	61
Ba----	6	16	6	13	15	6	6	45
La----	27	22	44	45	31	38	42	42
Ce----	88	95	102	83	89	78	101	96
Nd----	20	30	36	34	24	29	40	37

Map unit	Tmt2	Tmr1						
Sample No.	201601	201562	201579	201580	201598	201599	201860	P073
Zn----	88	63	68	79	25	71	63	74
Rb----	397	539	284	430	295	383	460	422
Sr----	19	24	35	49	31	31	71	91
Y-----	45	47	33	63	45	68	66	68
Zr----	198	176	174	222	196	225	227	228
Nb----	54	70	32	44	35	42	37	40
Pb----	54	46	35	64	39	46	40	58
Th----	58	78	48	58	46	52	38	53
Ba----	16	69	68	72	72	74	81	82
La----	45	55	50	83	67	78	79	79
Ce----	85	78	108	158	122	158	164	160
Nd----	39	28	44	63	61	74	66	68

Map unit	Tmr1	Tmt1			Tmrb			
Sample No.	P105	201597	201846	201903	201548	201550	201603	201632
Zn----	59	88	78	85	64	25	69	25
Rb----	282	371	343	395	320	194	277	275
Sr----	29	30	53	50	59	71	77	173
Y-----	39	47	61	59	43	40	43	44
Zr----	205	192	250	207	188	144	207	191
Nb----	37	46	38	50	16	14	16	19
Pb----	36	15	44	47	15	48	15	40
Th----	66	51	44	55	52	41	39	41
Ba----	70	87	97	81	536	573	642	636
La----	73	45	82	53	55	43	52	58
Ce----	131	96	154	108	104	87	109	114
Nd----	60	38	66	47	52	47	52	43

Map unit	Tmrb			Tdpi				Tdpl
Sample No.	201966	P162F	P162G	201791	P347	P471A	P471B	201520
Zn----	78	25	53	78	71	87	109	115
Rb----	296	218	427	166	264	185	173	156
Sr----	211	120	239	254	130	233	235	205
Y-----	47	38	43	44	50	42	44	45
Zr----	215	164	198	448	497	471	482	547
Nb----	17	16	19	26	28	21	24	28
Pb----	36	37	49	15	37	41	40	38
Th----	35	45	43	33	45	21	7	21
Ba----	711	593	634	795	548	831	786	653
La----	71	55	63	81	102	80	94	85
Ce----	125	103	114	154	193	130	165	152
Nd----	55	54	57	66	78	60	75	76

Table 3. Trace-element data for selected samples collected in the Rustler Park quadrangle, Chiricahua Mountains, Cochise County, Arizona—Continued

Map unit	Tdpl							
Sample No.	201537	201539	201540	201541	201551	201561A	201561B	201564
Zn----	79	124	120	91	109	119	113	108
Rb----	165	201	224	174	297	211	181	204
Sr----	242	227	299	220	186	247	251	255
Y-----	50	42	46	51	47	57	56	49
Zr----	562	542	588	509	586	409	393	520
Nb----	26	27	26	26	26	29	27	27
Pb----	46	42	37	38	39	46	41	31
Th----	24	30	22	35	32	23	32	28
Ba----	667	778	661	707	647	842	860	783
La----	79	76	85	80	84	72	63	89
Ce----	152	138	148	153	160	120	123	168
Nd----	78	65	75	75	81	72	61	80

Map unit	Tdpl							
Sample No.	201566	201574A	201574B	201578	201584	201625	201845	201847
Zn----	111	87	99	108	93	101	112	81
Rb----	193	365	201	206	357	443	188	180
Sr----	248	70	238	212	182	249	237	204
Y-----	43	57	46	47	47	51	60	46
Zr----	506	441	585	501	601	511	394	496
Nb----	28	38	28	28	28	25	29	22
Pb----	48	41	36	56	43	51	43	45
Th----	41	48	21	45	34	39	9	27
Ba----	757	389	622	691	635	716	961	746
La----	78	82	83	91	85	87	74	80
Ce----	155	124	152	169	159	159	129	158
Nd----	80	78	78	77	74	72	58	67

Map unit	Tdpl							
Sample No.	201848	201849	P003	P031	P039	P104	P333	P335
Zn----	62	119	102	105	118	88	98	92
Rb----	182	398	168	189	196	514	179	193
Sr----	218	266	249	382	230	362	218	236
Y-----	46	62	43	45	52	60	52	48
Zr----	498	396	559	514	485	388	490	492
Nb----	26	24	25	25	27	22	24	23
Pb----	41	44	51	42	53	61	15	46
Th----	9	22	35	9	38	26	38	33
Ba----	735	966	742	727	703	907	760	788
La----	80	76	83	86	94	60	91	89
Ce----	162	137	156	168	157	124	150	161
Nd----	63	75	75	77	75	67	70	74

Map unit	Tdpl				Trca			Trci
Sample No.	P453A2	P453B	P454	P480	201788	201790	P472	201549
Zn----	92	96	96	77	93	70	56	68
Rb----	201	206	212	153	293	397	378	263
Sr----	266	222	243	210	91	24	21	36
Y-----	63	50	57	42	55	63	67	54
Zr----	399	343	414	556	564	241	237	460
Nb----	28	22	29	24	28	49	51	43
Pb----	50	240	36	33	43	15	18	15
Th----	22	23	21	7	52	45	44	58
Ba----	1034	823	940	641	466	50	39	56
La----	101	52	95	86	121	62	73	111
Ce----	139	109	130	165	227	130	128	193
Nd----	76	57	80	65	97	52	59	79

Table 3. Trace-element data for selected samples collected in the Rustler Park quadrangle, Chiricahua Mountains, Cochise County, Arizona—Continued

Map unit	Trci							
Sample No.	201563A	201575	201576	201585	201590	201628	201630	201761
Zn----	79	90	119	83	84	76	119	51
Rb----	292	481	536	516	250	264	270	193
Sr----	28	59	72	38	19	28	40	16
Y-----	61	53	38	63	55	60	69	46
Zr----	477	282	313	337	481	514	463	264
Nb----	43	50	74	41	36	46	45	33
Pb----	15	49	42	39	15	46	43	34
Th----	54	61	85	51	34	58	65	25
Ba----	61	87	99	86	50	59	40	26
La----	129	49	44	77	141	143	139	66
Ce----	230	136	97	142	246	268	267	131
Nd----	96	43	48	67	105	102	103	56

Map unit	Trci							
Sample No.	201762	201789	201843	201844	201850	P040	P116C	P162H
Zn----	64	73	60	75	88	96	64	74
Rb----	267	278	269	251	250	309	388	244
Sr----	25	40	35	74	48	52	41	26
Y-----	44	57	51	46	52	59	58	55
Zr----	349	364	428	356	368	475	439	480
Nb----	40	38	38	32	43	43	39	43
Pb----	ND	33	15	15	50	35	46	52
Th----	40	51	34	35	37	49	44	65
Ba----	41	78	49	143	97	77	213	57
La----	77	97	117	106	98	146	118	140
Ce----	152	190	212	203	205	265	201	225
Nd----	58	80	78	73	71	102	93	106

Map unit	Trci							
Sample No.	P338B	P356	P357	P447A	P447B	P449	P451	P452
Zn----	94	108	53	60	25	76	54	83
Rb----	309	285	285	291	322	283	276	272
Sr----	192	36	41	59	27	69	46	49
Y-----	63	49	54	46	45	117	49	58
Zr----	452	465	448	359	294	305	359	366
Nb----	39	42	41	39	51	42	39	43
Pb----	15	15	34	36	15	45	15	15
Th----	44	46	58	51	51	42	38	47
Ba----	96	50	67	133	46	128	85	87
La----	142	145	134	72	34	152	152	104
Ce----	259	276	245	196	84	168	156	203
Nd----	94	94	96	63	29	101	115	78

Map unit	Trci				Trcm	Trcl		
Sample No.	P459D	P459G	P459H	P462	201741	201740	201742	201852
Zn----	86	67	74	78	52	60	63	84
Rb----	279	366	365	255	409	393	463	466
Sr----	348	14	17	23	12	30	12	16
Y-----	55	66	73	57	50	62	45	32
Zr----	328	310	318	525	273	268	322	306
Nb----	42	50	54	49	57	58	68	68
Pb----	15	34	34	43	ND	33	50	42
Th----	42	50	48	51	54	54	59	57
Ba----	116	30	34	54	31	25	14	6
La----	61	70	78	164	36	62	22	30
Ce----	129	138	155	297	143	126	133	96
Nd----	51	61	66	103	27	44	17	20

Table 3. Trace-element data for selected samples collected in the Rustler Park quadrangle, Chiricahua Mountains, Cochise County, Arizona—Continued

Map unit	Trcl	Tjj			Tfrh			Tft
Sample No.	201855	201772	201853	201854	201841	201842	201851	201861
Zn----	25	25	25	74	89	110	92	25
Rb----	407	291	302	301	543	526	558	364
Sr----	18	36	20	16	15	24	41	128
Y-----	48	43	32	39	108	118	84	44
Zr----	292	165	166	165	331	317	342	191
Nb----	61	36	33	34	78	77	79	17
Pb----	32	15	46	15	74	50	53	15
Th----	65	37	36	41	72	61	71	29
Ba----	15	22	19	6	6	13	6	680
La----	21	41	35	38	64	72	38	53
Ce----	105	82	63	78	143	139	138	94
Nd----	18	32	24	21	53	66	36	34

Map unit	Tft	Tfv					Tg	Tgd
Sample No.	201862	201840	201856	201858	P469A	P469B	201572A	201807
Zn----	25	247	72	105	79	65	51	68
Rb----	389	121	73	147	188	132	147	157
Sr----	135	515	502	440	404	458	496	394
Y-----	44	31	52	19	29	25	20	21
Zr----	188	214	198	199	213	167	156	148
Nb----	16	10	10	12	9	10	9	10
Pb----	15	15	36	38	46	24	34	15
Th----	24	9	9	21	ND	7	31	9
Ba----	702	823	738	826	733	670	1648	646
La----	45	41	38	41	41	42	39	39
Ce----	91	84	95	75	68	76	69	74
Nd----	45	40	44	40	26	29	37	28

Map unit	TKps		TKpv					Misc.
Sample No.	201582A	P476A	201805	P078	DY881	DY882	DY886	201522
Zn----	57	ND	83	139	121	108	94	ND
Rb----	59	ND	25	69	74	28	27	4
Sr----	226	264	397	1087	570	943	975	587
Y-----	25	13	27	29	28	26	30	17
Zr----	206	92	181	221	164	203	220	174
Nb----	9	9	27	29	28	36	42	14
Pb----	31	ND	15	59	30	15	15	15
Th----	9	ND	ND	ND	ND	ND	ND	21
Ba----	529	28	77	843	464	584	887	339
La----	19	26	18	40	20	25	38	73
Ce----	39	46	48	69	47	58	78	157
Nd----	23	17	20	40	23	27	39	84

Map unit	Miscellaneous							
Sample No.	201560	201565	201586	201629	201753	P450	P453A1	P453C
Zn----	ND	25	55	86	25	59	61	25
Rb----	74	133	596	100	271	192	246	226
Sr----	64	85	102	474	37	273	150	127
Y-----	27	17	31	21	45	28	49	33
Zr----	117	94	158	175	141	175	222	149
Nb----	9	8	65	11	30	9	17	13
Pb----	15	15	32	15	ND	36	35	32
Th----	20	20	70	23	44	31	38	39
Ba----	166	203	298	653	6	1075	852	564
La----	113	19	19	35	37	69	73	51
Ce----	118	39	59	67	69	110	136	93
Nd----	98	24	8	37	18	42	58	42

Table 4. Instrumental neutron activation data for selected samples collected in the Rustler Park quadrangle, Chiricahua Mountains, Cochise County, Arizona

[Data in parts per million. Map unit symbols above data columns match those shown on the Rustler Park geologic map (Pallister and others, in press) and are defined in table 1. ND, not detected. J.R. Budahn, R.J. Knight, and D.M. McKown, analysts]

Map unit	Tmr2							Tmt2
Sample No.	201521	201568	201569	201602	201774	P071	P110	201600
Ba----	52.5	24.9	19.2	13	5.00	22.8	20.2	42
Sr----	11	9.5	6.4	ND	ND	3.9	53	ND
Co----	.2	1.3	.114	.243	.324	.168	.214	.354
Ni----	61	4.5	3.2	2.6	ND	1.4	11	ND
Cr----	1.4	.31	1.3	ND	ND	1.1	1.2	.78
Cs----	25.3	7.95	18	8.1	5.41	6.3	39.2	8.83
Hf----	11.1	8.79	8.03	7.89	7.79	7.7	8.21	7.6
Rb----	655	402	488	384	389	386	743	371
Sb----	.23	.201	.356	.168	.279	.252	.384	.188
Ta----	6.6	4.77	4.34	4.46	4.69	4.35	4.62	4.29
Th----	79.5	50.5	44.5	43.4	46.5	44.3	44	43.4
U-----	16.3	11.3	11.4	8.69	9.46	10.4	12.9	9.63
Zn----	75	52.9	72.5	58.5	44.7	53.3	65.8	171
Zr----	150	229	224	193	182	200	222	208
Sc----	3.23	2.32	2.06	2.07	2.18	1.99	2.13	2.17
La----	44.7	40.8	44.1	27	38.2	32.3	47.1	40.5
Ce----	99.9	105	94.7	63.8	136	72.5	104	96.2
Nd----	16	33	34.3	17.7	28.2	21.6	39.7	29.1
Sm----	2.3	7.17	7.44	3.89	5.89	4.15	8.47	6.07
Eu----	.0877	.246	.21	.181	.204	.188	.227	.218
Gd----	ND	7.26	7.33	4.13	6.63	4.09	8.75	5.65
Tb----	.39	1.28	1.31	.753	.980	.723	1.38	1
Tm----	ND	1.35	1.21	.844	.915	.801	1.25	1.12
Yb----	6.85	8.76	8.01	5.62	6.48	5.3	8.31	6.88
Lu----	1.2	1.27	1.18	.802	.960	.771	1.22	.987

Map unit	Tmt2	Tmr1			Tmt1	Tmrb		
Sample No.	201601	201580	201599	P073	201846	201632	P162F	P162G
Ba----	40	84.7	95.7	52.4	123	662	625	679
Sr----	ND	69.3	ND	56.6	32	167	109	203
Co----	.193	.497	.417	.363	1.39	2.19	2.28	2.41
Ni----	ND	9	1.5	3.5	ND	7.97	7.7	6.11
Cr----	ND	1.1	ND	.7	11.4	2.03	2.19	2.09
Cs----	6.82	64.7	15.7	17.1	14.5	4.71	2.56	9.75
Hf----	7.95	8.07	7.75	7.91	8.39	5.81	5.57	6.18
Rb----	382	462	378	418	337	270	230	438
Sb----	.261	.328	.233	.226	.237	.0976	.0642	.109
Ta----	4.43	3.83	3.49	3.59	3.57	1.51	1.35	1.59
Th----	43.8	40.6	38.3	42.4	39.4	28.2	26.1	31.6
U-----	9.95	10.8	9.49	8.96	9.68	3.73	2.94	4.34
Zn----	54.6	62.2	53.7	59.5	60.0	42.6	40.1	46.4
Zr----	200	261	241	258	268	214	210	217
Sc----	2.16	2.65	2.59	2.64	3.27	3.8	3.59	4.16
La----	41.7	75.8	71.8	75.6	79.2	54.3	50.9	53.9
Ce----	85.1	173	161	165	172	118	107	124
Nd----	31.1	69	62.1	64.8	67.5	49.1	45.6	51
Sm----	6.19	12.8	11.8	11.3	12.9	8.57	8.87	9.2
Eu----	.21	.507	.471	.472	.529	1.04	.958	1.09
Gd----	5.9	11.1	10.4	10.2	10.7	8.5	7.53	8.32
Tb----	1.01	1.69	1.64	1.68	1.71	1.16	1.1	1.21
Tm----	1.01	1.15	1.14	1.15	1.14	.654	.602	.671
Yb----	6.66	7.45	7.15	7.55	7.33	3.95	3.61	4.15
Lu----	.953	1.15	1.01	1.07	1.05	.561	.51	.595

Table 4. Instrumental neutron activation data for selected samples collected in the Rustler Park quadrangle, Chiricahua Mountains, Cochise County, Arizona—Continued

Map unit	Tdpi		Tdpl					
Sample No.	P471A	P471B	201537	201566	201574A	201574B	201578	P003
Ba----	767	736	742	870	424	695	706	807
Sr----	224	207	263	213	70.3	212	173	251
Co----	8.57	10.2	8.01	10.5	2.88	8.01	7.53	8.4
Ni----	ND	11.7	21.5	28.8	7.5	23	20.6	23.6
Cr----	10.8	10.9	12.6	15.3	5.37	18.2	13	13.8
Cs----	4.27	3.70	4.16	10.8	4.08	4.87	4.03	3.34
Hf----	11.9	11.6	13	12.3	12.5	12.6	12.1	13.1
Rb----	176	165	166	183	368	173	190	167
Sb----	.280	.114	.328	.205	.796	.595	.142	.238
Ta----	2.14	2.12	2.02	2.1	3.27	1.91	2.2	2.03
Th----	24.6	24.3	21.3	24.3	32.6	19.3	27.1	21.8
U-----	4.81	4.54	4.17	6.46	7.44	3.84	5.66	4.34
Zn----	74.5	83.8	87.2	92.3	78.4	74.8	78.6	79.1
Zr----	512	497	581	483	479	561	513	562
Sc----	9.32	9.87	9.94	10.1	5.75	10.2	8.97	10.3
La----	81.6	83.3	85.3	82.4	74.7	79.8	92.7	87.4
Ce----	175	176	188	188	158	178	204	195
Nd----	67.2	71.3	78.4	75.5	70.7	75.4	82	79.1
Sm----	11.0	11.8	12.2	13.5	13.2	12.7	13.8	14
Eu----	1.94	1.91	2.19	2.07	1.06	2.35	1.89	2.24
Gd----	9.70	10.6	10.1	11.2	10.6	10.5	11.9	11.5
Tb----	1.40	1.47	1.52	1.46	1.66	1.43	1.56	1.55
Tm----	.725	.757	.805	.749	1.02	.722	.794	.816
Yb----	4.66	4.78	4.93	4.72	6.59	4.54	4.98	4.84
Lu----	.676	.703	.745	.701	.942	.657	.732	.737

Map unit	Tdpl				Trca	Trci		
Sample No.	P031	P039	P104	P480	P472	201549	201575	201576
Ba----	736	776	966	606	69.6	91.6	101	103
Sr----	334	211	306	159	ND	28.4	30	68.2
Co----	7.95	8.58	4.82	7.74	.405	.272	.204	.283
Ni----	18.5	17.1	12	18.5	2.82	2.4	1.2	4.3
Cr----	11.1	13.7	1.11	12.0	ND	1.3	1.2	.724
Cs----	74	5.17	27.7	3.61	6.50	4.1	5.5	14.7
Hf----	11.7	12.4	9.98	12.0	11.1	13.7	10.5	14.2
Rb----	180	189	501	157	366	254	484	551
Sb----	.167	.178	.187	.318	.422	.993	.407	.589
Ta----	2.01	2.15	2.26	1.86	4.57	3.1	4.4	7.54
Th----	25.3	26.5	18.8	20.4	43.7	43.3	44.5	61.4
U-----	4.51	5.48	4.66	3.90	10.2	6.85	9.26	14.7
Zn----	72.7	77.3	78.2	77.7	59.4	57	59.7	89.6
Zr----	461	536	403	531	315	503	278	319
Sc----	8.75	9.72	9.74	9.09	1.94	3.95	2.18	1.93
La----	83.2	87.6	62	81.9	71.2	104	40.1	20.4
Ce----	181	189	136	180	131	224	95.9	58.7
Nd----	72.8	79.5	62.9	75.1	63.0	82.6	40.7	14.6
Sm----	10.9	12.6	13.1	12.5	13.3	13.3	8.17	3.47
Eu----	1.75	1.98	2.46	2.09	.184	.286	.0963	.0287
Gd----	9.02	10.3	11.9	10.2	13.1	11.2	7.09	5.17
Tb----	1.4	1.53	1.65	1.41	2.01	1.58	1.06	.553
Tm----	.8	.808	.948	.696	1.27	.982	1.18	.9
Yb----	4.77	5.12	5.88	4.36	7.93	6.28	7.5	5.59
Lu----	.669	.758	.864	.636	1.11	.888	1.06	.819

Table 4. Instrumental neutron activation data for selected samples collected in the Rustler Park quadrangle, Chiricahua Mountains, Cochise County, Arizona—Continued

Map unit	Trci							Tjj
Sample No.	201585	201628	201630	P040	P162H	P356	P357	201772
Ba----	93.3	59.9	50.8	101	57.8	57.0	77.4	35.2
Sr----	42	ND	ND	44.4	ND	26	ND	ND
Co----	.432	.441	.342	.419	.539	.367	.149	.327
Ni----	11.5	ND	ND	3.43	6.41	ND	ND	ND
Cr----	1.4	ND	1.11	ND	ND	1.5	ND	2.53
Cs----	13.5	3.54	3.93	4.35	3.52	4.12	4.83	7.23
Hf----	11.9	13.9	12.8	13.9	14.4	13.9	13.7	7.36
Rb----	548	263	266	304	262	283	291	305
Sb----	1.68	.21	.162	1.48	.186	.399	1.52	.164
Ta----	4.24	3.2	3.3	3.13	3.32	3.36	3.19	2.92
Th----	42.5	42.3	38.9	40.3	45.1	42.2	41.0	32.7
U-----	9.48	5.02	5.28	7.16	7.85	6.84	7.59	7.45
Zn----	70.7	70.6	74	76	54.7	81	39.2	51.5
Zr----	390	538	474	496	508	497	497	177
Sc----	3.35	4.22	3.5	4.34	4.96	4.09	4.21	2.37
La----	74	133	116	131	136	132	124	37.9
Ce----	167	283	247	287	280	312	273	75.7
Nd----	66.1	109	95.1	102	114	99.5	101	25.3
Sm----	13.6	16.2	14.4	16.3	17.3	14.8	16.1	5.54
Eu----	.352	.323	.294	.321	.338	.284	.298	.149
Gd----	11.5	13.8	14.6	12.6	12.7	11.0	11.3	5.04
Tb----	1.81	1.94	1.95	1.91	1.81	1.68	1.77	.865
Tm----	1.22	1.09	1.11	1.06	1.04	1.05	1.02	.834
Yb----	7.8	6.44	6.78	6.58	6.56	6.63	6.37	5.43
Lu----	1.18	.921	.9	.947	.965	.960	.936	.785

Map unit	Tfv		TKpa	TKpv	Miscellaneous	
Sample No.	P469A	P469B	P476A	P078	201586	201629
Ba----	761	637	ND	994	349	682
Sr----	419	424	263	1130	72.6	461
Co----	16.0	13.3	1.95	28.8	.227	11.5
Ni----	10.8	17.6	5.94	41.6	7.3	21.4
Cr----	13.7	23.4	5.75	44.2	1.42	22.7
Cs----	11.1	8.95	.319	2.01	6.29	3.32
Hf----	5.67	4.97	2.51	4.62	8.38	4.76
Rb----	183	122	4.22	63.8	602	90.6
Sb----	.370	.318	.538	.224	.71	.226
Ta----	.877	1.15	.564	2.14	5.23	.803
Th----	13.0	19.1	5.10	2.33	55.6	12.6
U-----	3.96	4.17	4.52	.586	8.96	3.29
Zn----	54.8	58.8	11.1	67.6	32.8	54.3
Zr----	206	174	93.5	222	156	171
Sc----	11.6	8.44	2.40	21.7	2.39	6.7
La----	38.4	38.1	21.2	39.2	20.9	35.5
Ce----	78.7	70.7	44.3	81.7	43.8	67.3
Nd----	37.3	29.1	17.6	38.5	11.4	29.6
Sm----	7.21	5.57	3.28	7	1.43	5.31
Eu----	1.54	1.10	.769	2.15	.08	1.26
Gd----	5.82	5.04	2.28	6.46	.78	4.65
Tb----	.877	.692	.344	.853	.246	.589
Tm----	.433	.395	.219	.429	.624	.276
Yb----	2.74	2.58	1.40	2.56	5.29	1.55
Lu----	.404	.402	.205	.371	.95	.222

Table 5. Abundances of FeO, CO_2, F, and Cl in selected samples collected in the Rustler Park quadrangle, Chiricahua Mountains, Cochise County, Arizona

[Data in weight percent. ND, not detected; NA, not determined. Map unit symbols above data columns match those shown on the Rustler Park geologic map (Pallister and others, in press) and are defined in table 1. Wet chemical analyses; E.L. Brandt and J.D. Sharkey, analysts]

Map unit	Tmr2				Tmr1			Tmrb
Sample No.	201568	201569	201602	P110	201580	201599	P073	201632
FeO---	0.05	0.14	0.03	0.20	0.35	0.41	NA	0.51
CO_2---	ND	.04	ND	ND	ND	ND	NA	ND
F----	ND	.04	.02	.04	.06	.03	.03	.01
Cl----	.01	.11	ND	.68	.37	.09	.08	0.06

Map unit	Tmrb	Tdpl						
Sample No.	P162G	201537	201566	201574A	201574B	201578	P003	P031
FeO---	0.50	1.81	0.68	0.14	1.27	1.08	1.16	2.28
CO_2---	ND	1.03	.04	ND	.97	.02	1.14	ND
F----	ND	.06	.04	.07	NA	NA	NA	.07
Cl----	.07	ND	ND	.12	NA	NA	NA	0.02

Map unit	Tdpl		Trci				TKpv	Tmrd
Sample No.	P039	P104	201549	201575	201576	201585	P078	201586
FeO---	0.76	1.59	0.12	0.08	0.27	0.04	3.13	0.05
CO_2---	.12	ND	.06	ND	ND	ND	.96	ND
F----	.06	NA	ND	NA	NA	NA	NA	ND
Cl----	.01	NA	ND	NA	NA	NA	NA	0.08

Table 6. Abundances of Be, Cr, Ni, Pb, Sn, and Ag in selected samples collected in the Rustler Park quadrangle, Chiricahua Mountains, Cochise County, Arizona

[Data in parts per million. ND, not detected. Map unit symbols match those shown on the Rustler Park geologic map (Pallister and others, in press) and are defined in table 1. Spectroscopic and wet chemical determinations by C.J. Skeen and M.W. Doughten]

Map unit	Tmr2	Tmr1	Tdpi		Tdpl		Trca	Tfv
Sample No.	201774	201599	P471A	P471B	P003	P480	P472	P469A
Be----	8.2	5.8	2.4	2.7	3.6	4.1	6.0	1.9
Cr----	4.7	4.9	17	18	16	16	7.2	16
Ni----	4.3	1.9	26	17	17	14	ND	15
Pb----	14.0	8.9	10	12	8.9	8.5	8.6	8.9
Sn----	3.4	3.6	3.2	2.6	2.3	2.4	3.8	1.7
Ag----	.03	.044	.033	.049	.034	.042	.031	.051

Map unit	Tfv	TKpa	TKpv
Sample No.	P469B	P476A	P078
Be----	2.2	ND	1.3
Cr----	19	11	32
Ni----	18	7.4	34
Pb----	5.5	11	4
Sn----	1.2	1.2	1.7
Ag----	.038	.029	.014

Table 7. Semiquantitative spectrographic data for mineralized or altered rock samples collected in the Rustler Park quadrangle, Chiricahua Mountains, Cochise County, Arizona

[Numbers in parentheses following elements indicate lower limits of determination. N, not detected at limit of detection. B.M. Adrian and M.J. Malcolm, analysts]

Rock type	Altered dacite porphyry lava flows (Tdpl)			Quartz veins		Gossan	Gossany quartz vein
Sample No.	201519	201563B	201564	201552	201553	201571	201573
			Data in weight percent				
Fe (0.001)---	3	7	7	0.07	0.3	10	0.3
Mg (0.002)---	.05	.3	.7	<0.02	.07	1.5	.05
Ca (0.0002)--	.15	1	1.5	.07	.07	10	.1
Na (0.05)----	3	3	3	<0.02	<0.2	N	<0.2
Ti (0.002)---	.5	.7	.3	.002	.02	.15	.02
P (0.2) ----	N	N	N	N	N	N	N
			Data in parts per million				
Ag (0.5)-----	N	N	N	200	5	2	2
As (200)-----	N	N	N	N	N	N	N
Au (10)------	N	N	N	N	N	N	N
B (10)------	<10	<10	<10	N	N	100	N
Ba (2)-------	2	1	15	5	1	<20	70
Be (1)-------	1.5	N	2	2	1.5	5	1.5
Bi (10)------	N	N	N	N	N	N	N
Cd (20)------	N	N	N	N	N	N	N
Co (5)-------	30	<5	15	30	<5	<5	70
Cr (10)------	<10	<10	15	<10	<10	20	<10
Cu (1)-------	15	15	15	70	30	300	70
La (20)------	150	150	150	150	N	150	N
Mo (5)-------	20	N	N	N	N	7	N
Mn (1)-------	1	7	7	3	2000	2	2
Nb (20)------	<20	<20	<20	N	N	<20	N
Ni (3)-------	5	10	10	<5	<5	50	10
Pb (10)------	30	30	30	15	N	1500	20
Sb (100)-----	N	N	N	N	N	N	N
Sc (5)-------	15	15	15	N	N	5	N
Sn (10)------	N	N	N	N	N	N	N
Sr (100)-----	300	300	500	N	N	100	N
V (10)------	70	70	100	N	<10	30	<10
W (20)------	N	N	N	20	20	N	<20
Y (10)------	30	50	50	<10	<10	50	<10
Zn (200)-----	N	N	N	N	N	2000	200
Zr (10)------	700	700	700	N	15	100	15
Ga (5)-------	20	30	20	N	<5	10	N
Ge (10)------	N	N	N	N	N	N	N
Th (100)-----	N	7	N	N	N	N	N

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