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GEOLOGIC MAP OF THE CENTRAL PART OF THE SAN FRANCISCO VOLCANIC FIELD, NORTH-CENTRAL ARIZONA

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INTRODUCTION

The geologic map of the central part of the San Francisco volcanic field (called the Central map area) is one of five adjoining geologic maps (fig. 1) prepared under the Geothermal Research Program of the U.S. Geological Survey as a basis for interpreting the history of magmatic activity in the volcanic field. The San Francisco field, which is largely Pliocene and Pleistocene in age, is in northern Arizona, just north of the broad transition zone between the Colorado Plateau and the Basin and Range province. It is one of several dominantly basaltic volcanic fields of late Cenozoic age situated near the southern margin of the Colorado Plateau. The Central map area encompasses approximately 1,600 km^2. It spans the middle part of the San Francisco volcanic field and includes some of the oldest and youngest volcanic units in the volcanic field.

The San Francisco volcanic field contains rocks ranging in composition from basalt to rhyolite--the products of eruption through Precambrian basement rocks and approximately a kilometer of overlying, nearly horizontal, Paleozoic and Mesozoic sedimentary rocks. About 500 km^3 of erupted rocks cover about 5,000 km^2 of predominantly Permian and locally preserved Triassic sedimentary rocks that form the erosionally stripped surface of the Colorado Plateau in northern Arizona.

In the Central map area, basalt, basaltic andesite, and benmoreite were extruded from more than 100 individual vents, each of which presumably erupted briefly and then became inactive. Such short-lived vents, mostly represented by cinder cones, are widely distributed over the map area, and their flows cover much of its surface. Although andesite, dacite, and rhyolite occur in some places as solitary domes and flows, such rocks in the Central map area are largely concentrated in three mountainous eruptive centers: Sitgreaves Mountain, Kendrick Peak, and San Francisco Mountain. At these centers, eruptions occurred repeatedly over an extended time period. Sitgreaves Mountain and Kendrick Peak are primarily clusters of extrusive domes and related flows, whereas San Francisco Mountain is a partly eroded stratovolcano.

A northeastward progression of volcanism during the past 15 m.y., from central Arizona into the San Francisco volcanic field, is shown by the compilation of Luedke and Smith (1978). Although complicated in detail, a general northeastward to eastward progression of volcanic activity is also apparent within the San Francisco volcanic field. In the Central map area, this general progression is most strikingly manifested by the high concentration of younger Pleistocene (Brunhes Chronozone) volcanic units within and around San Francisco Mountain. Although older units occur locally within the same region, they are widely exposed only in the southern and western parts of the map area.

Major structural features in the Central map area include the Mesa Butte fault system, trending northeast across the northwest quadrant of the mapped area (entirely buried by volcanic rocks), and the Oak Creek Canyon fault, trending north across the south-central part of the mapped area. Interpretation of similar structures exposed in the Grand Canyon indicates that such faults probably originated during Precambrian time and have been subsequently reactivated (Shoemaker and others, 1978). Late Cenozoic faulting continued until at least about 0.4 Ma within the volcanic field, but deformation of the flows and cones has been minimal.

MAPPING AND MAP CONVENTIONS

Boundaries of all rock units, including individually mapped lava flows and vent deposits, were traced in the field. Strict attention was paid to details of lithology as well as morphology in delimiting the units.

The geologic map (Map A) departs from conventional U.S. Geological Survey format in several ways in order to portray the extensive stratigraphic, chronologic, and lithologic information in a more readable manner. Individually mapped flows, vents, and intrusive

rocks of basalt, basaltic andesite, and benmoreite and related rocks are the products of brief local eruptions and intrusions; they have been grouped into map units delimited on the bases of magnetic polarity, radiometric age, and field relationships. These map units are chronostratigraphic or polarity-chronostratigraphic units as defined by the North American Commission on Stratigraphic Nomenclature (1983). Within these chronostratigraphic units, boundaries are shown between adjacent flows because their individual lithologic characteristics and stratigraphic relationships are important in interpreting the magmatic history of the individual vents and of the field as a whole. Except for these chronologically grouped flows and vent deposits, the map units are lithostratigraphic units.

Individual dacite and rhyolite units in the Kendrick Peak area, at Sitgreaves Mountain, and associated with benmoreite cones (Qmbn) of vents 0603, 1628, and 2506 are designated by letters--a through m--that occur as the final character of the map symbol. These letters, in combination with the preceding characters of the map symbol, serve only for unique identification of the individual units; they do not indicate age or stratigraphic sequence.

Map B shows the basalt types, magnetic-polarity designations and sample localities, and the localities for all analyzed rock samples listed in tables 1-5.

The "Correlation of Map Units" is constructed using an absolute time scale for the volcanic units that combines the radiometric and paleomagnetic age data with the stratigraphic relations. The extrusive and intrusive rocks exclusive of the three major eruptive centers are portrayed together in the left-hand part of the correlation diagram. These basalt, basaltic andesite, and benmoreite units, including dacite, rhyolite, and trachyte specifically associated with benmoreite, are described together in general order of increasing age. Extrusive and intrusive rock units of the three major eruptive centers, including outlying individual rhyolite and andesite domes and flows, are grouped by eruptive center and shown in the right-hand part of the correlation diagram. The descriptions of these map units in the "Description of Map Units" are also grouped by eruptive center.

Identification numbers assigned to vents (Map A) and to analyzed samples (Map B and tables 1-5) are based on the locations of vents and sample localities within the township and range system. The numbers consist of four digits that uniquely identify the section in which the sample or vent is located. If more than one sample or vent occurs within the section, the letters A, B, C, and so on are added as a suffix. The first digit of a sample or vent number designates the township by its second integer (that is, a sample or vent in Township 26 would have "6" as its first digit). The second digit designates the range. The third and fourth digits represent the section number, ranging from 01 to 36. Thus a vent or analyzed sample in T. 23 N., R. 6 E., sec. 1, would have an identification number of 3601. If two or more vents or samples occur in that same section, the second one in both cases is designated 3601A, the third 3601B, and so on.

AGE AND MAGNETIC-POLARITY DETERMINATIONS

The assignment of an age to an individual volcanic unit is commonly difficult in the San Francisco volcanic field because many of the flows are largely undissected, and their bases are not exposed. In addition, for all but the youngest flows, surface detail has been largely obliterated by weathering and by a mantle of pyroclastic, eolian, and alluvial debris. Consequently, the interpretation of relative ages between adjacent flows is often equivocal. Age assignments, therefore, have been based on a combination of stratigraphic relationships that range from definitive to interpretive, magnetic polarities, and K-Ar age determinations.

K-Ar ages were determined by P. E. Damon and associates (Laboratory of Isotope Geochemistry, University of Arizona) and E. H. McKee. Some of the ages shown on Map A were originally reported by Damon and others (1974). All ages have been corrected for the revised decay constants recommended by Steiger and Jäger (1977). In a few instances, a K-Ar age is inconsistent, within the range of one standard deviation, with accepted ages for other units in an established stratigraphic sequence; the inconsistent age is not shown on the geologic map.

Magnetic polarity was determined from core samples collected and analyzed by K. L. Tanaka and others (written commun., 1979). Cores were obtained from flows and from oxidized agglutinate on the cinder cones. In rare cases, the magnetic polarity of a unit, as compared with the geomagnetic polarity time scale of Mankinen and Dalrymple (1979), is inconsistent with the radiometric age, plus or minus one standard deviation, for the same unit. Comparable inconsistencies are found in a few of the ages cited by Mankinen and Dalrymple (1979). The reason for such apparent contradictions is uncertain, and we have, in these situations, taken the K-Ar age as the correct age unless other factors argue against that conclusion.

CLASSIFICATION OF BASALTS

The basalts of the San Francisco volcanic field have been divided according to a semiquantitative scheme, utilizing thin sections, hand specimens, and outcrop characteristics, into eleven petrographic types, ten of which occur in the Central map area. The

classification is based on mineralogy and abundance of phenocrysts (1 mm or more in maximum diameter) and, in part, on the dominant mineralogy of the groundmass. Porphyritic basalts have generally one or more volume percent phenocrysts. Those classed as slightly porphyritic have generally less than one volume percent phenocrysts. Aphyric basalts contain essentially no phenocrysts. The basalt types of the San Francisco field are chemically intergradational and include basanitoid, picritic basalt, alkali-olivine basalt, hawaiite, and rare mugearite.

In some instances, a single eruption produced more than one basalt type or produced both basalt and basaltic andesite. Commonly, in these cases, the multiple types are intergradational within a single flow and were not mapped separately. However, in a few cases, as for example in the flows from vents 3528A (Qbb and Qbab) and 1520 (Qbb), distinct petrographic boundaries were recognized in the field and were mapped within a single flow. We have attempted to document the lithologic variety of the basalts by using symbols on Map B for each basaltic map unit (multiple letters indicate composite units) and by showing locations of chemically analyzed samples; the analyses are listed in tables 1-5.

BASALT TYPES OF THE CENTRAL MAP AREA

The following descriptions refer to the basalt types found in the Central map area of the San Francisco volcanic field. Type k does not occur in this map area; it is reserved for use and described on the adjoining map of the southwest part of the volcanic field.

Picritic basalt (type a)--Basalt containing 12-22 percent subhedral to euhedral olivine phenocrysts. Clinopyroxene phenocrysts are common. Picritic basalt generally has a microcrystalline to intersertal groundmass of clinopyroxene, olivine, plagioclase, opaque oxides, and glass. Where associated with clinopyroxene-rich (type j) basalt, the picritic basalt has a mafic, pyroxene-rich groundmass. The group includes the most magnesian basalts of the San Francisco field. The average MgO content is 13.5 percent, and the average normative-olivine content is 24.3 percent.

Clinopyroxene-olivine-phyric basalt (type b)--Basalt containing about 1-35 percent phenocrysts of clinopyroxene and olivine. Pyroxene abundance is greater than or equal to olivine abundance. Plagioclase phenocrysts are normally absent or sparse, but a few basalts in this group contain common plagioclase phenocrysts. Groundmass is generally microcrystalline to intersertal in texture and contains plagioclase, clinopyroxene, olivine, opaque oxides, and glass. The clinopyroxene-olivine-phyric basalt is predominantly of alkali-olivine basalt composition.

Clinopyroxene-phyric basalt (type c)--Basalt containing about 1-20 percent clinopyroxene phenocrysts. Scattered olivine phenocrysts occur in some units. Plagioclase phenocrysts are normally rare or absent. Groundmass is microcrystalline, intersertal, or intergranular in texture and contains plagioclase, clinopyroxene, olivine, opaque oxides, and glass. Basalt with clinopyroxene phenocrysts is not included in this group when it has the distinctive granular, clinopyroxene-rich groundmass that distinguishes the clinopyroxene-rich basalt (type j). The clinopyroxene-phyric basalt is predominantly of alkali-olivine basalt composition.

Olivine-phyric basalt (type d)--Basalt containing about 1-12 percent subhedral to euhedral olivine phenocrysts. Scattered clinopyroxene phenocrysts are common. Plagioclase phenocrysts are normally rare although they are common in some olivine-phyric basalts. Groundmass contains variable amounts of plagioclase, clinopyroxene, olivine, opaque oxides, and glass; textures include microcrystalline, intersertal, intergranular, and subophitic. The olivine-phyric basalt is predominantly of alkali-olivine basalt composition.

Plagioclase-phyric basalt (type e)--Basalt containing about 1-25 percent plagioclase phenocrysts; groundmass and phenocryst plagioclase are commonly seriate. Scattered olivine and clinopyroxene phenocrysts may be present. Groundmass consists mostly of intersertal to intergranular aggregates of plagioclase, clinopyroxene, olivine, opaque oxides, and glass; plagioclase is commonly dominant. Range of compositions of the plagioclase-phyric basalt is similar to that of the aphyric (type h) basalt. The plagioclase-phyric basalt is predominantly of hawaiite composition.

Quartz basalt (type f)--Basalt containing ubiquitous (generally about 0.5 percent) quartz. Many basalts contain rare, commonly polycrystalline quartz grains, but those basalts are not included in this group. In quartz basalt, the quartz occurs as single crystals that range from spherical, rounded (detrital?) grains to irregular, angular fragments to nearly euhedral crystals. The quartz typically has a reaction rim composed of very fine grained clinopyroxene. Plagioclase phenocrysts are commonly intensely corroded or sieved. Otherwise the quartz basalt is similar to other basalt types and probably represents a contaminated counterpart of them. Quartz basalt is slightly enriched in SiO_2; normative quartz averages 0.5 percent and ranges to as much 3.3 percent.

Microporphyritic olivine basalt (type g)--Basalt containing about 1-10 percent olivine microphenocrysts (less than or equal to 1 mm) in an intersertal to intergranular groundmass of

plagioclase, clinopyroxene, olivine, opaque oxides, and glass. The composition coincides in part with the compositions of the mafic porphyritic basalt types (b, c, d); however, those types have slightly higher average values of CaO or MgO or both than does the microporphyritic olivine basalt. The microporphyritic olivine basalt is predominantly of alkali-olivine basalt composition.

Aphyric basalt (type h)--Intersertal to subophitic basalt composed of plagioclase, clinopyroxene, olivine, and opaque oxides, with or without glass; plagioclase is commonly dominant. Some of the most plagioclase-rich are trachytic in texture. Compositional range is nearly identical to that of the plagioclase-phyric basalt (type e). The aphyric basalt is predominantly of hawaiite composition.

Slightly porphyritic basalt (type i)--Basalt containing less than 1 percent phenocrysts of olivine, clinopyroxene, and (or) plagioclase in an intersertal to intergranular groundmass of plagioclase, clinopyroxene, olivine, and opaque oxides, with or without glass. Slightly porphyritic basalt includes both alkali-olivine basalt and hawaiite compositions.

Clinopyroxene-rich basalt (type j)--Basalt distinguished by a granular clinopyroxene-rich groundmass in which clinopyroxene greatly exceeds plagioclase in volume, opaque oxides and olivine are subordinate, and glass is minor. Texture ranges from aphyric to porphyritic; most of the clinopyroxene- rich basalts contain phenocrysts or microphenocrysts of clinopyroxene and olivine. Pyroxene phenocrysts are commonly green and arranged in distinctive crude rosette-like clusters. Clinopyroxene-rich basalts are low in Al_2O_3 (average is approximately 14.5 percent), and include the most SiO_2-poor (average approximately 46.4 percent) and the most CaO-rich (average approximately 12.8 percent) basalts in the San Francisco field. Many of these basalts are basanitoids. Average normative nepheline content is 5.5 percent; maximum value is 12.3 percent.

DESCRIPTION OF MAP UNITS

[Basalt types described in "Basalt Types" section. K-Ar ages have been corrected for the revised decay constants recommended by Steiger and Jäger (1977). Ma, mega-annum (10^6 years). Compositional analyses are given in tables 1-5, and all cited major-oxide values are from adjusted analyses (table 3)]

SURFICIAL DEPOSITS OF QUATERNARY AGE

Qal ALLUVIAL, COLLUVIAL, AND GLACIAL DEPOSITS (HOLOCENE AND PLEISTOCENE)--Silt, sand, pebbles, and boulders.

Alluvial deposits occur along drainages and in low-lying topographic basins. Rare excavations show that some smooth-surfaced deposits mapped as alluvium include buried deposits of airfall ash and lapilli.

Aprons and fans of colluvium and alluvium occur adjacent to the lower flanks of some cinder cones and domes and as thick deposits encircling Kendrick Peak and Sitgreaves and San Francisco Mountains. The deposits around San Francisco Mountain are largely equivalent to the Pleistocene Sinagua Formation of Updike and Péwé (1970). Thick dissected fans derived from the summit rhyolite of Sitgreaves Mountain (Qsr) partly surround Sitgreaves Mountain and are overlain west of the map area by basalt of Matuyama age (Qmb); therefore, these fan deposits are of early Pleistocene age.

Till and glacial outwash deposits occur in the Interior Valley and locally on the outer flanks of San Francisco Mountain (Updike, 1977; Péwé and Updike, 1976)

Ql LANDSLIDE DEPOSITS (PLEISTOCENE)--Blocks and chaotic debris in saddle between Elden and Little Elden Mountains and northeast of Maverick Butte along northern edge of map area. The latter deposit consists mainly of debris from the Basalt of Cedar Ranch Mesa (Tocb)

EXTRUSIVE AND INTRUSIVE ROCKS OF QUATERNARY AND TERTIARY AGE
EXCLUSIVE OF MAJOR ERUPTIVE CENTERS

BASALT OF YOUNGER PLEISTOCENE (YOUNGER BRUNHES) AGE

Basaltic rocks of Saddle Mountain (vent 4626)

Qbyb — Flows and cinder cone--Two aa flows, 2 and 0.9 km long, separated by airfall deposit (Qbybp). Thickness of longer younger flow is 1-4 m; surface is rough and fresh toward vent, has <1 m relief at distal end. Thickness of shorter older flow is 15 m; surface is subdued by airfall deposits. Cone is irregular in shape, about 2.7-1.9 km across, 240 m high. Basalt is dark gray, slightly porphyritic (type i), has scattered phenocrysts of clinopyroxene and olivine and abundant microphenocrysts of plagioclase set in a mostly glassy groundmass. For composition see analyses 4627 (younger flow) and 4626 (cone). C^{14} age less than approximately 17,000 years. Polarity normal

Qbybp — Pyroclastic sheet deposit--Airfall cinder and ash blanket overlying much of the area north and northwest of San Francisco Mountain. Thickness $\leq$5 m. Color is moderate brown to dark gray. Cinders contain abundant microlites and microphenocrysts of plagioclase and scattered phenocrysts of clinopyroxene and olivine set in a glassy, vesicular groundmass. Cinders and ash (see analysis 4634) are slightly more aluminous and sodic and less magnesian than the basalt of Saddle Mountain (Qbyb). Unit underlies younger flow from Saddle Mountain (Qbyb) and overlies the older flow as well as unmapped lake sediments in Walker Lake (vent 3611) that contain organic material having a C^{14} age of approximately 17,000 years (S. W. Robinson, written commun., 1983)

EXTRUSIVE AND INTRUSIVE ROCKS OF YOUNGER PLEISTOCENE (OLDER BRUNHES) AGE

Qbb — Basalt flows and cinder cones--Flows, medium- to dark-gray, locally grayish-red to red, yellowish- to dark-brown where weathered. Thickness of flows is normally 2-10 m, locally $\leq$50 m. Flow tops are weathered, partly mantled by weathered pyroclastic, eolian, alluvial, and colluvial materials. Cones are rounded, undissected, consist predominantly of cinders but commonly include bombs and agglutinated spatter; color is mostly dark gray to red where fresh, yellowish brown where weathered. The northeast flank of Wild Bill Hill (vent 3534) consists of intricately dissected, indurated, bedded, yellowish-brown cinders that apparently have been hydrothermally altered. Lithologic varieties include porphyritic, microporphyritic, and aphyric basalt types (b, c, d, e, g, h, i). Gabbroic and ultramafic xenoliths are present locally. The youngest mean K-Ar ages are about 0.35 Ma. Polarity normal

Qbbp — Basalt pyroclastic sheet deposits--Airfall deposits of ash and lapilli. Color is dark gray where fresh, yellowish brown where weathered. A widespread deposit overlies cinder cones and lava flows north of San Francisco Mountain; its probable source is one or more of the densely clustered cinder cones in this area; its thickness, unknown because the deposit is undissected, must be many meters in the western part of the deposit. A local deposit from vent 3521 mantles the westernmost exposure of vent 3523A. Unit is not mapped locally where character of underlying rocks is known

Basalt of vent 5733

Qbbt — Basaltic tuff--Yellow-brown, bedded, lapilli tuff in erosional exposure beneath cinders of vent. Tuff contains abundant oxidized vesicular basalt clasts, crystals of plagioclase, clinopyroxene, and olivine, and quartz fragments in an oxidized glassy groundmass. Xenoliths of benmoreite (analysis

5733B), gneiss, pyroxenite, noritic gabbro, and granulite containing green clinopyroxene are common

Qbbi — Basalt dike--Vertical dike intruding basaltic tuff (Qbbt). Width is about 15 cm to 1.5 m. Dike is vesicular at margins and contains, in center, cavities ≤30 cm long that are elongate parallel to strike of dike. Basalt is slightly porphyritic (type i) containing common phenocrysts of clinopyroxene and olivine 1-3 mm in diameter and rare plagioclase megacrysts. For composition see analysis 5733A

Qbab — Basaltic andesite flow and vent deposits of vent 3528A--Flow, 7 km long and ≤600 m wide, dark-gray. Near vent, flow is blocky, a few meters thick, contains abundant large plagioclase phenocrysts, and overlies microporphyritic olivine basalt (type g) of the 3521 flow. With increasing distance from the vent, the phenocrysts become progressively less abundant, the flow margins lose their topographic expression, and the contact with the adjacent 3521 flow is indistinct. Basaltic-andesite scoria deposits form a distinct low cone about 300 m wide at the south base of basalt vent 3521. Where the basaltic andesite is most porphyritic, it contains abundant plagioclase phenocrysts ≤1 cm in diameter, scattered millimeter-size phenocrysts of olivine, hypersthene, and clinopyroxene, and rare quartz and hornblende. Plagioclase phenocrysts are rounded and embayed, the cores are sieved, and the rims are intensely corroded. The groundmass contains plagioclase, olivine, clinopyroxene, hypersthene, and magnetite in a matrix of brown dusty glass. For composition see analysis 3528

$Qbbn_2$ — Benmoreite flow and cinder cone of vent 1602--Steep-sided, platy to massive, generally 30- to 90-m-thick, bulbous flow and steep-sided cinder cone about 1.5 km in diameter and 240 m high. Flow is medium gray to dark gray on fresh surface, weathers grayish orange. Rock is aphyric to slightly porphyritic, contains phenocrysts or microphenocrysts of partly corroded plagioclase smaller than or equal to about 2 mm long. Groundmass is trachytic and very plagioclase rich; some glass and granules of clinopyroxene(?) and magnetite occur between the abundant plagioclase microlites. Small (0.2 mm) subhedral to euhedral crystals of yellowish-brown pleochroic apatite are common; olivine and hypersthene are rare. Scattered quartz grains occur locally. Benmoreites are the most sodic of the intermediate rocks. For composition see analyses 1609, 1609A, -B, and 2635.

Xenoliths of gabbro and foliated metamorphic rock that includes pyroxene granulite occur together locally. The gabbro consists of plagioclase and varying amounts of olivine, clinopyroxene (including pigeonite), hypersthene, and magnetite.

The 1602 benmoreite flow contains local bodies of coeval porphyritic biotite dacite (Qbd).

K-Ar age 0.33±0.08 Ma. Polarity normal

Qbd — Dacite pods in 1602 flow--Local pods of dacite enclosed within the benmoreite flow (Qbbn) of vent 1602. Only the largest pods, 100-400 m across, are mapped; smaller unmapped ones occur near the large dacite bodies and elsewhere in the 1602 flow. Additional pods may exist in other parts of the benmoreite flow. At the contact, the dacite and the benmoreite host are intricately interlayered at a scale of millimeters to centimeters; except for local mechanical mixing, there is no lithologic gradation between the two rock types. Dacite is massive, light gray, porphyritic; abundant phenocrysts of plagioclase and biotite and scattered phenocrysts of hornblende are set in a glass-rich matrix with feldspar and hypersthene microlites. For composition see analysis 1611.

Dacite contains abundant xenoliths of gabbro (analyses 1611A-E) as well as amphibole- and pyroxene-bearing gneiss and granulite. Gabbro xenoliths contain plagioclase, hornblende, hypersthene, and magnetite. One (1611A) contains clinopyroxene; most (1611A, B, D, E) contain sparse to abundant biotite; accessory apatite is common in several (1611B, D, E). Some show cumulate texture, including 1611A, which is poikilitic with hornblende as the oikocryst phase

$Qbbn_1$ Benmoreite flow and cinder cones--Flow and cinder cone of vent 3522; cinder cone of vent 3630. Flow is steep sided, dense, massive, generally 20-60 m thick, medium gray to dark gray, weathers grayish orange; cone of vent 3522, composed of cinders and spatter, is about 600 m in diameter and 60 m high. Benmoreite of 3522 flow and cone is nearly aphyric to porphyritic, contains commonly corroded plagioclase phenocrysts $\leq$5 mm long. Scattered microphenocrysts of hypersthene and yellowish-brown pleochroic apatite and rare microphenocrysts of olivine occur in a very plagioclase rich, felty to trachytic groundmass in which glass and grains of clinopyroxene(?) and opaque oxide occur between the plagioclase microlites. For composition see analysis 3516. Xenoliths of gabbro are common. K-Ar age 0.56$\pm$0.08 Ma. Polarity normal.

Cone of vent 3630 is small, about 250 m in diameter; consists of oxidized, nearly aphyric cinders and spatter. For composition see analysis 3630. Hornblende-rich gabbro xenoliths are abundant. Polarity normal

Qbhb Basalt flows and cinder cones of Hart Prairie--Multiple flows surmounted by three cones of cinder and spatter. Unit forms a small asymmetrical shield volcano low on the west flank of San Francisco Mountain. Unit contains a lava tube that is open to the surface in the south-central part of sec. 26, T. 23 N., R. 5 E.; conical pits about 100 m across and 30 m deep at other localities may have formed from collapse of the roofs of other tubes. A small flat-floored pit crater is present between vents 3633 and 3634. The basalt is dark gray, aphyric, and rich in plagioclase. Textures seen in outcrop range from aphanitic to medium grained. Distal parts of the unit are diktytaxitic; contain abundant 1- to 3-mm-long plagioclase laths--a distinctive texture that makes the distal part an easily recognized stratigraphic marker. For composition see analyses 2520, 2616, 3633, 3634. Upper flows of unit overlie younger andesite of Agassiz Peak (Qaa_2). Eruptions of the basalt of Hart Prairie may have occurred sporadically over an extended period. K-Ar age in distal part 0.72$\pm$0.12 Ma. Polarity normal

BASALT OF PLEISTOCENE (OLDER BRUNHES OR MATUYAMA) AGE

Qbmb Basalt flows and cinder cones--Flows, medium- to dark-gray, yellowish- to dark-brown where weathered. Thickness is normally 2-15 m, locally $\leq$50 m. Cones are rounded, undissected, consist predominantly of cinders and lesser amounts of bombs and agglutinated spatter; color is mostly dark gray to red where fresh, yellowish brown where weathered. Unit occurs mainly north and northwest of San Francisco Mountain. Lithologic varieties include porphyritic, microporphyritic, and aphyric basalt types (b, e, g, h, i,). Gabbroic and ultramafic xenoliths are present locally. Polarity, where known, normal

EXTRUSIVE ROCKS OF PLEISTOCENE (MATUYAMA) AGE

Qmbt Basaltic tuff of vent 1625--Yellow-brown and dark-reddish-brown, oxidized, bedded tuff on western and northern rims of tuff and cinder ring encircling Dry Lake. Tuff contains vesicular basalt clasts with abundant phenocrysts of plagioclase, clinopyroxene, and olivine; it also contains xenoliths of baked sandstone, dolomite, chert, partly melted gabbro,

granulite, and ultramafic rocks. Unit overlies benmoreite flow of vent 1622 (Qmbn)

Qmb — Basalt flows and cinder cones--Flows, medium- to dark-gray, yellowish- to dark-brown where weathered, 5-30 m thick. Cones, rounded, somewhat subdued, undissected to superficially gullied, consist of bedded cinders, agglutinated spatter, bombs; color is mostly dark gray to red where fresh, yellow brown where weathered. Unit includes porphyritic, microporphyritic, and aphyric basalt types (e, g, h, i, j). K-Ar ages 0.69-1.41 Ma. Polarity reversed

Qmbn — Benmoreite flows and vent deposits--Flows, steep-sided domes, and cinder cones erupted from 17 separate vents. Flows and domes are light gray to dark gray, grayish orange where weathered, massive to platy. Flows are 30-100 m thick. Cones are undissected to partly dissected, rounded except where armored by agglutinated spatter. Rock is aphyric to slightly porphyritic, contains scattered plagioclase phenocrysts or microphenocrysts. Scattered, subhedral to euhedral, gray to brown, pleochroic apatite crystals $\leq$0.5 mm long are ubiquitous. Microphenocrysts of magnetite and subhedral olivine are common; phenocrysts or microphenocrysts of hornblende are generally rare, but opaque-oxide pseudomorphs after hornblende are common in small dome north of vent 3426 at Spring Valley Knolls. Brown amphibole needles are common in vugs. Groundmass is most commonly holocrystalline and contains abundant trachytic to felty plagioclase and subordinate magnetite, clinopyroxene, and olivine. In a few localities groundmass is glassy and contains feldspar microlites. Benmoreites are more sodic and less calcic and magnesian than other flows of comparable SiO_2 content in the San Francisco field.

Several benmoreite vents also erupted small dacite or rhyolite units, including two dacite domes and a dacite flow (Qmdj, Qmdm, Qmdk) related to vents 0603, 1628, and 2506, respectively, and two rhyolite domes (Qmrl, Qmrk) related to vents 0614 and 2506, respectively.

K-Ar ages 0.95$\pm$0.08 to 1.44$\pm$0.03 Ma. Polarity reversed

Qmrl — Rhyolite dome **l** of vent 0614--Small rhyolite dome, 250 m in diameter, erupted within the crater of the benmoreite cone (Qmbn). Rhyolite is nearly aphyric, light gray, contains scattered small phenocrysts of hornblende, biotite (largely altered to opaque oxide), plagioclase, magnetite, and apatite set in a felsic microcrystalline matrix. Locally, the rock is obsidian, having a very fine grained matrix of trachytic feldspar microlites, glass, and scattered magnetite grains. For composition see analysis 0614

Rhyolite and dacite of vent 2506

Qmrk — Rhyolite dome **k**--Small dome, 250-350 m in diameter, erupted within the crater of the benmoreite cone (Qmbn). Rhyolite is flow banded, light gray, contains large (as much as several meters) inclusions of benmoreite (Qmbn) and dacite (Qmdk). Rhyolite is slightly porphyritic, contains small phenocrysts and microphenocrysts of plagioclase as well as biotite and hornblende that are partly altered to opaque oxide. Groundmass is a microcrystalline aggregate of the same minerals plus alkali feldspar and apatite. For composition see analysis 3531A. K-Ar age 1.29$\pm$0.23 Ma

Qmdk — Dacite **k** flow and scoria--Flow (400-600 m across) and overlying scoria on south flank of the benmoreite cone (Qmbn). Flow is light gray, dense. Scoria is oxidized, similar in composition to the flow. Dacite is porphyritic, contains abundant phenocrysts of hornblende and partly resorbed plagioclase and scattered phenocrysts of biotite set in a feldspar-rich hyalocrystalline to microcrystalline matrix that includes magnetite grains and rare apatite and

hypersthene. For composition see analyses 2506A, -B, 3531. The dacite erupted after the benmoreite, but interfingered textures in bombs and xenoliths containing both rock types suggest that the two were molten simultaneously. K-Ar age 1.39±0.06 Ma, determined for a small unmapped outcrop of the dacite that may be a large inclusion at the edge of the related rhyolite dome (Qmrk)

Qmdj — Dacite dome **j** of vent 0603--Small dome, 200-300 m across, within the benmoreite cinder cone (Qmbn). Dacite is dense, light gray to dark gray, platy, locally flow banded or brecciated. Abundant phenocrysts of acicular hornblende are mostly ≤1 mm, but some are ≤3 mm. Groundmass is hyalopilitic to trachytic, contains plagioclase microlites, small magnetite grains, glass, and a few small apatite crystals. For composition see analysis 0603A. Dacite contains xenoliths of gabbro, benmoreite scoria, and olivine basalt (Tob). K-Ar age 1.61± 0.05 Ma

Qmdm — Dacite dome **m** of vent 1628--Small dome, 150-300 m across, on the flank of the benmoreite cinder cone (Qmbn). Dacite is massive, dense, readily distinguished from the related benmoreite by abundant phenocrysts in the dacite of acicular hornblende ≤3 mm long, but mostly ≤1 mm long. Groundmass is hyalopilitic to trachytic, contains plagioclase microlites, small magnetite grains, glass, and a few small apatite crystals. For composition see analysis 1628

Qmt — Trachyte flow of Bull Basin Mesa--Voluminous flow from an unmapped vent near the northwest flank of the Kendrick Peak eruptive center. Thickness is commonly about 100 m but locally ≤250 m. Trachyte is dense, light gray to medium gray, contains small (≤1 mm) phenocrysts of biotite and rare phenocrysts of plagioclase set in a matrix of aligned feldspar microlites, abundant magnetite grains, and scattered small (≤ 0.3 mm) gray to brown pleochroic apatite crystals. Trachyte closely resembles benmoreites ($Qbbn_2$, $Qbbn_1$, Qmbn, QTbn) except for its biotite content, and the trachyte (analysis 4528) is higher in SiO_2 (65 percent) and alkalis (10.7 percent). Flow encloses a small benmoreite dome (Qmbn) that erupted within the probable trachyte vent area (unmapped). K-Ar age 1.14±0.17 Ma. Polarity reversed

EXTRUSIVE ROCKS OF PLEISTOCENE OR LATEST PLIOCENE (MATUYAMA) AGE

QTmb — Basalt flows and cinder cones--Flows, medium- to dark-gray, yellowish- to dark-brown where weathered, 3-30 m thick. Most cones are rounded; slopes are smooth to partly gullied; some cones are irregularly shaped suggesting modification by erosion. Cones consist of cinders, agglutinated spatter, and bombs; black to red, yellowish brown where weathered. Unit includes all basalt types (a-j). Gabbroic and ultramafic xenoliths are present locally. Vents 2415, 2415A, 2416, and 2416A produced an intimately associated suite of picritic basalt, quartz basalt, clinopyroxene-rich basalt, and basaltic andesite in a cluster of cones and flows. Polarity of most cones and flows reversed

QTmbp — Basalt pyroclastic sheet--Airfall deposit adjacent to or underlying the 1625 flow west of the Northern Arizona University (Arizona State College on map) campus. Deposit consists of brown to dark-gray ash and lapilli

QTmab — Basaltic andesite flows and pyroclastic vent deposits--Flows, cinders, and spatter from seven vents near western border of map area. Flows, dark-gray, yellow-brown to brown where weathered, blocky in part, 3-10 m thick. Vent deposits include slightly gullied cones of cinder and spatter and an elongate low scoria ridge. Rock is porphyritic and locally glomeroporphyritic. Phenocrysts and microphenocrysts of clinopyroxene and plagioclase are ubiquitous. Plagioclase is typically intensely corroded, sieved, and embayed by the

groundmass. Scattered phenocrysts of hypersthene are common; phenocrysts of olivine or hornblende occur locally. Scattered rounded quartz grains with clinopyroxene reaction rims occur locally. The groundmass is mostly fine grained and glassy, ranging from hyalocrystalline to intersertal; it normally contains felty plagioclase microlites, magnetite, and small crystals of clinopyroxene or hypersthene or both. Unit, in general, is among the most CaO- and MgO-rich and Na_2O-poor of the andesitic rocks.

Vents 2416, 4301, and 4432 erupted both basalt and basaltic andesite, and the two rock types are locally intermixed. These particular basaltic andesites are characterized by the additional occurrence of abundant microphenocrysts of clinopyroxene arranged in clusters $\leq$1 mm across.

K-Ar age, 2416 flow, 2.14$\pm$0.07 Ma. Polarity reversed

QTmbn Benmoreite flow of Horse Hill--Flow, light-gray to black, weathers pale orange to grayish orange, $\leq$40 m thick. Source is west of map area at Horse Hill (vent 1407). Benmoreite is slightly porphyritic; it contains scattered 1- to 4-mm-long phenocrysts of plagioclase and microphenocrysts of magnetite set in a holocrystalline groundmass composed predominantly of trachytic plagioclase and tiny (10-50 μm) crystals of magnetite and clinopyroxene(?). It also contains scattered small (0.1- to 0.2-mm-long), subhedral, cloudy, light-brown, pleochroic apatite cystals. Benmoreite has about 60 percent SiO_2; it is a bit less Na_2O-rich (5.22 percent) and more CaO-rich (4.88 percent) than other benmoreites of similar SiO_2 content. Flow is overlain west of map area by basalt (Qmb) dated 1.41$\pm$0.13 Ma. Polarity reversed

EXTRUSIVE ROCKS OF PLEISTOCENE OR PLIOCENE (MATUYAMA OR OLDER) AGE

QTb Basalt flows and cinder cones--Flows, medium- to dark-gray, yellow-brown to brown where weathered, 5-30 m thick, partly dissected. Cones, composed of cinders and spatter, are dark gray to red where fresh, yellow brown, brown, reddish brown where weathered, partly gullied; some are eroded to irregular shapes. Unit includes porphyritic and microporphyritic basalts (types a, b, d, g, i, j). Flows and cones overlie basalt of Pliocene(?) and Miocene age (Tob) or the Lower Permian Kaibab Formation (Pk). Polarity reversed and normal

QTab Basaltic andesite flow of vent 4430--Flow, about 30 m thick, on west edge of map area. Basaltic andesite contains phenocrysts of clinopyroxene, olivine, plagioclase, quartz, and orthopyroxene(?) set in a groundmass of brown glass. For composition see analysis 4431 (Southwest map). Unit is overlain by basaltic andesite of vent 4429 (QTmab). Polarity normal

QTc Clay of Navajo Army Depot--Light-yellowish-gray bentonitic clay exposed about 2 km south of Bellemont. Clay represents weathered rhyolitic ash composed of quartz, plagioclase, alkali feldspar, and rhyolitic lithic fragments, including pumice. Source is unknown. Ash is overlain by basalt of older Brunhes age (Qbb) from vent 3534 and may overlie basalt of Volunteer Mountain (Tyvb)

BASALT OF PLIOCENE (GAUSS OR GILBERT) AGE

Tyb Basalt flows and cinder cones--Weathered, partly eroded flows and vent deposits in Brannigan Park, southern Garland Prairie, and Woody Ridge. Two cones and related flows (vents 0506 and 2519B) are clinopyroxene-rich basalt (type j) containing scattered large (1-2 cm) black clinopyroxene phenocrysts. For composition see analyses 0506, 2519. Remaining vent, 0616, is olivine-phyric basalt (type d). K-Ar age, 2519B flow, 4.12$\pm$0.20 Ma. Polarity normal and reversed

Tyvb Basalt flows and vent deposits of Volunteer Mountain--Lithologically similar basalt flows and eroded cones of cinder

and spatter clustered along a northwest trend in southwestern part of map area. Volunteer Mountain (vent 1508) is the largest and most prominent cinder cone. The basalt, which is dark gray where fresh, contains scattered phenocrysts of black clinopyroxene $\leq$1 cm; scattered phenocrysts of olivine occur locally. The basalt weathers to a distinctive grus-like accumulation of angular pebble-size fragments. Basalt ranges from clinopyroxene-rich basalt (type j) to slightly porphyritic and more plagioclase-rich basalt (type i). For range of compositions see analyses 1504, 1506, 1508, 2422A, 2435. The northernmost cinder cone (vent 2421A) is overlain by basalt and basaltic andesite from vent 2416 (QTmb, QTmab). In the southernmost exposures, west of vent 1520, unit overlies basalt of Pliocene(?) and Miocene age (Tob). Polarity reversed

Basalt fissure-vent deposits, related flows, and dikes

Tybf — Fissure-vent deposits--Northwest-trending ridge of basalt flows and spatter about 200-600 m wide, about 10-80 m high, and about 2.5 km long, in southwestern corner of map area. The ridge continues as a distinct topographic feature for another 6 km to the southeast. Basalt grades from clinopyroxene-rich (type j) to picritic (type a); rosettes of green clinopyroxene occur locally. For composition of picritic basalt see analysis 0414I. K-Ar age, Volunteer Canyon, 3.92$\pm$0.10 Ma

Tybff — Fissure-fed flows--Several undivided basalt flows, combined thickness 60 m, erupted from the northwest-trending fissure vent in southwestern corner of map area. Flows are mainly clinopyroxene-rich (type j) to picritic (type a) basalt; rosettes of green clinopyroxene are common. For composition see analyses 0414, 0414A, -B, -C. Unit overlies basaltic tuff (Tybt). K-Ar ages 4.04$\pm$0.10 Ma, 4.18$\pm$0.17 Ma

Tybi — Dikes--Vertical northwest-trending basalt dikes about 1-2 m wide in Sycamore and Volunteer Canyons and at the northwest base of Volunteer Mountain (vent 1508). Dikes in the canyon walls are feeders for the basalt fissure-vent deposits (Tybf) and fissure-fed basalt flows (Tybff); consist of clinopyroxene-rich and picritic basalts (types j and a, respectively). For composition see analysis 0414H

Tybt — Basaltic tuff--Yellowish-gray, bedded, basaltic tuff composed of ash, lapilli, fragments of clinopyroxene, olivine, and plagioclase, clasts of Paleozoic chert and limestone, and abundant angular quartz fragments of silt- to fine-sand-size; locally, matrix is predominantly calcite. Thickness is 0-50 m. Unit is a widespread blanket of tuff that pinches out in Sycamore Canyon about 5 km south of map area; can be traced about 5 km northwest from edge of map area in Big Spring Canyon, where it is buried under younger basalt. In Sycamore and Volunteer Canyons, tuff is overlain by fissure-fed basalt flows (Tybff) and underlain by basalt flows of Pliocene(?) and Miocene age (Tob). Tuff of similar lithology, with palagonitic matrix, is exposed about 12 km northeast of Sycamore and Volunteer Canyons at the base of Volunteer Mountain (vent 1508). Although included in the map unit, the tuff at Volunteer Mountain is not necessarily correlative with the tuff exposed in Sycamore and Volunteer Canyons

BASALT OF PLIOCENE(?) AND MIOCENE AGE

Tob — Basalt flows and vent deposits--Flows, smooth, relatively flat surfaced, extensively soil covered, exposed south and southwest of San Francisco Mountain; margins are dissected, and flows commonly cap mesas. Vents are generally not exposed, but one cinder cone near southern edge of map area is included in the unit. Unit is typically olivine-phyric basalt (type d); it contains abundant 1- to 3-mm phenocrysts of olivine, commonly altered to iddingsite, set in a

holocrystalline groundmass having intergranular to subophitic clinopyroxene and plagioclase. Locally the unit includes other porphyritic and aphyric basalt types not separately mapped. The typical olivine-phyric basalt exposed on and west of Switzer Mesa in Flagstaff (analysis 1715) is probably a single flow, 5-7 m thick, erupted from a vent now buried by volcanic rocks of the Dry Lake Hills or San Francisco Mountain. The unit has been cut by several normal faults. K-Ar ages are approximately 5.8-6.3 Ma in Flagstaff and Woody Mountain areas and 4.9-9.0 Ma in Volunteer Canyon

Tobi — Basalt dikes--Two vertical olivine-basalt (type d) dikes that intrude basalt of Miocene age (Tob) southeast of vent 0615

Tocb — Basalt flows and vent deposits of Cedar Ranch Mesa--Flow extruded from area of low dome (vent 4609). Unit is massive, caps dissected mesa largely buried by younger basalt flows and cones (Qbb). Basalt is dark gray, olivine-phyric (type d); abundant 1- to 3-mm subhedral to euhedral olivine phenocrysts rimmed with iddingsite are set in distinctive holocrystalline groundmass of intergranular to subophitic clinopyroxene and plagioclase. For composition see analysis 5621 (Northwest map). Basalt is strikingly similar in lithology and age to widespread olivine basalts, informally called "rim basalts," that are among the oldest flows (Tob) south and southwest of San Francisco Mountain. K-Ar age 5.62±0.19 Ma. Polarity reversed

EXTRUSIVE AND INTRUSIVE ROCKS OF QUATERNARY AND TERTIARY AGE OF MAJOR ERUPTIVE CENTERS

Sitgreaves Mountain and outlying rhyolite domes

RHYOLITE AND BRECCIA OF PLEISTOCENE (MATUYAMA) AGE

Qsr — Rhyolite summit dome--Large endogenous-dome complex approximately 4 km in diameter. Rhyolite is light gray to yellowish gray, nearly aphyric, and pervasively jointed. Rare plagioclase phenocrysts occur in a microcrystalline groundmass of plagioclase, alkali feldspar, quartz, magnetite, and rare oxidized biotite(?). For composition see analysis 3430 (Southwest map). Rhyolite is exposed mostly as surface debris of angular pebble- and cobble-size fragments that apparently broke off along the pervasive joints. The brittle rhyolite shed voluminous alluvial fan deposits preserved as intricately dissected alluvium (Qal) on the lower north and northeast flanks of Sitgreaves Mountain. Dome is partly surrounded by a breccia collar of volcanic and Paleozoic sedimentary rock fragments (Qsbc). K-Ar age 1.90±0.12 Ma. Polarity reversed

Qsbc — Breccia collar--Poorly exposed megabreccia partly encircling the rhyolite summit dome of Sitgreaves Mountain (Qsr). Unit consists of fragments, blocks, and slabs of rhyolite, dacite, volcanic ash, minor basalt, and sandstone and rare limestone or dolomite of the Supai Formation, Coconino Sandstone, and Kaibab(?) Formation

DACITE OF PLEISTOCENE OR PLIOCENE (MATUYAMA) AGE

QTsd — Dacite dome of southern Sitgreaves Mountain--Irregularly shaped 1-km-diameter dome on south flank of Sitgreaves Mountain. Dacite contains abundant large phenocrysts of plagioclase ($\leq$1 cm), conspicuous clear pale-pink quartz ($\leq$5 mm), moderately abundant small phenocrysts of hornblende and biotite ($\leq$1 mm) mostly altered to opaque oxide, and rare phenocrysts of apatite ($\leq$1 mm). The groundmass is hyalopilitic and contains the same minerals plus abundant tablets of alkali feldspar in a mesostasis of glass or, where the glass is devitrified, of a felsic cryptocrystalline aggregate. For composition see analysis 2405A. Locally, the dacite contains xenoliths of amphibolite.

Xenolith occurrences from west of map area indicate that rhyolite **c** of Sitgreaves Mountain (Tsrc) is older than this unit. Thus the unit may have intruded between rhyolite **c** and the rhyolite of Eagle Rock (Tsre), and the narrow easternmost part of the dacite body may be a dike.

Polarity normal

RHYOLITE AND PUMICE OF PLIOCENE (MATUYAMA) AGE

Tgmr — Rhyolite dome of Government Mountain--Isolated 1.5-km-diameter dome about 8 km east of Sitgreaves Mountain. Dome consists of light-gray, flow-banded, aphyric, pumiceous rhyolite and black obsidian; rhyolite and obsidian consist of glass containing microphenocrysts of alkali feldspar and rare biotite. Lithology closely resembles that of the rhyolite of RS Hill (Trsr), about 5 km to the west. For composition of obsidian see analysis 3425; for pumiceous glassy rhyolite, analysis 3425C. K-Ar age 2.10±0.03 Ma. Polarity reversed

Tsrc — Rhyolite dome **c** of Sitgreaves Mountain--Irregularly shaped 1- to 1.3-km-diameter dome at southern edge of eruptive center. Dome, light-gray, consists of flow-banded rhyolite and local vitrophyre; both contain abundant phenocrysts ($\leq$1 mm) of sanidine, plagioclase, and dark quartz, and rare phenocrysts of fayalitic olivine and biotite set in a groundmass of glass. For composition see analysis 2405. Unit is overlain by the deeply dissected basalt flow and cinder cone of vent 2405 (QTmb), for which K-Ar age is 2.46±0.11 Ma. K-Ar age of unit is 2.26±0.10 Ma. Polarity reversed

Tsre — Rhyolite dome and flows of Eagle Rock--Elongate dome on south and southeast flanks of Sitgreaves Mountain and flows extending onto southwest flank of RS Hill as well as west of map area. Rhyolite is largely flow banded, glassy, medium or dark gray to pale reddish brown. Where devitrified, it is light gray. Rhyolite contains abundant phenocrysts and microphenocrysts of sanidine and albite typically $\leq$3 mm, but some are $\leq$1 cm. Phenocrysts of pale-pink, vitreous quartz, about 3 mm in diameter, are widely scattered. Abundant biotite flakes $\leq$1.5 mm in diameter that are oriented with the basal cleavage parallel to the flow banding are particularly characteristic. Groundmass is usually clear glass but, where devitrified, it is a feldspar-rich microcrystalline aggregate. For composition see analysis 3432. K-Ar age for the associated ash (Tsp) west of map area is 2.30±0.87 Ma. Polarity reversed

Tsp — Pumice and ash--Light-gray, pumiceous ash and lapilli of biotite rhyolite and local, light-gray dacite pumice. Rhyolite ash is petrographically similar to rhyolite of Eagle Rock (Tsre). Ash contains ubiquitous accidental clasts of Precambrian chlorite schist, some with relict volcanic textures. Clasts are commonly 1-2 cm in diameter, but some are $\leq$15 cm; the larger clasts are well rounded. A thin basaltic tuff is locally included at the base of the rhyolite ash. Ash is overlain by rhyolite of Eagle Rock (Tsre), and it overlies rhyolite dome **a** (Tsra) and rhyolite flow **b** (Tsrb) of Sitgreaves Mountain. K-Ar age of a biotite-rhyolite fragment in the biotite-rhyolite ash west of map area is 2.30±0.87 Ma.

Dacitic pumice, which forms small conical hills in sec. 28, T. 23 N., R. 4 E., is included in the pumice and ash unit; this pumice contains accessory clasts of dense dacite that resemble the dacite of northern Sitgreaves Mountain (Tsd). Pumiceous dacite contains phenocrysts of plagioclase, quartz, biotite, and hornblende. For composition see analysis 3428A

DACITE OF PLIOCENE (MATUYAMA OR OLDER) AGE

Tsd — Dacite of northern Sitgreaves Mountain--Two small outcrops at northeast margin of Sitgreaves Mountain eruptive center. Dacite is light gray, porphyritic. Abundant phenocrysts of plagioclase ($\leq$1 cm), scattered phenocrysts of slightly pink

vitreous quartz (≤4 mm), and abundant small phenocrysts of hornblende and biotite (≤1 mm) occur in a groundmass that ranges from glass to a microcrystalline aggregate of plagioclase, alkali feldspar, and quartz(?)

RHYOLITE AND TUFF OF PLIOCENE (GAUSS) AGE

Tsrb — Rhyolite flow **b** of Sitgreaves Mountain--Discontinuous outcrops of a flow, or flows, on east flank of Sitgreaves Mountain eruptive center. Unit is flow-banded, glassy rhyolite that contains scattered phenocrysts of albite, sanidine, and resorbed quartz set in a matrix of pumiceous to dense glass (obsidian). For composition see analysis 3433B. Rhyolite flow **b** is overlain by pumice and ash (Tsp) and overlies the rhyolite vitrophyre flow (Tsrv). Polarity normal

Tsrv — Rhyolite vitrophyre flow--Flow on east flank of Sitgreaves Mountain eruptive center. Flow consists mainly of dense porphyritic obsidian containing abundant phenocrysts of plagioclase, sanidine, and strongly resorbed quartz, and scattered phenocrysts of largely oxidized biotite set in a glassy groundmass. Locally, where the rhyolite is devitrified, it has a felsic cryptocrystalline to glassy groundmass. For composition see analysis 3433A. K-Ar age 2.84±0.02 Ma. Polarity normal

Tsra — Rhyolite dome **a** of Sitgreaves Mountain--Irregularly shaped 0.5- to 1-km-diameter dome on east flank of Sitgreaves Mountain eruptive center. Dense, light-gray rhyolite contains scattered phenocrysts of plagioclase, sanidine, and pale-pink vitreous quartz set in a microcrystalline groundmass of alkali feldspar and quartz. For composition see analysis 3428. Dome is overlain by pumice and ash (Tsp). K-Ar age 2.85±0.06 Ma. Polarity normal

Tst — Tuff of Sitgreaves Mountain--Tuff adjacent to south end of rhyolite **a** of Sitgreaves Mountain (Tsra). Unit is massive, well indurated, light gray; it contains abundant clasts of rhyolite and dark, fine-grained, Precambrian metamorphic rock, abundant angular grains of quartz and feldspar, and a few biotite flakes set in a matrix of holohyaline ash

Tghr — Rhyolite dome of Government Hill--Dome, 2-km-diameter, on east side of Sitgreaves Mountain. Dome consists of light-gray, pumiceous rhyolite to denser, dark-gray to pink, glassy rhyolite; unit is commonly flow banded. Moderately abundant phenocrysts of sanidine (most ≤0.3 mm) and biotite (≤0.5 mm) and rare phenocrysts of plagioclase and pale-pink vitreous quartz are set in a groundmass of glass. Myrmekitic intergrowth with quartz occurs at the margins of a few feldspar crystals. Locally, the rhyolite displays lithophysae. For composition see analysis 3434. K-Ar age 2.74±0.16 Ma. Polarity reversed

Twhr — Rhyolite dome of Wright Hill--Isolated 800-m-diameter dome about 6 km southeast of Sitgreaves Mountain. Dome consists of light-gray, pumiceous rhyolite to denser, dark-gray to pink rhyolite; unit is flow banded. Abundant phenocrysts and microphenocrysts of sanidine and some albite (≤1 mm) and abundant phenocrysts of biotite (≤0.5 mm) are set in a groundmass of glass. Myrmekitic intergrowth with quartz is common at the rims of feldspar crystals. For composition see analysis 2410. K-Ar age 2.79±0.07 Ma. Polarity reversed

Trsr — Rhyolite dome of RS Hill--Dome, 1.5-km-diameter, and outliers northeast of Sitgreaves Mountain. Dome consists of nearly aphyric, flow-banded rhyolite and obsidian. Scattered microphenocrysts of sanidine and amphibole(?) are set in a groundmass of glass or, where the glass is devitrified, in a felsic cryptocrystalline groundmass. For composition see analysis 3422. West flank of dome is overlain by pumice and ash (Tsp), rhyolite of Eagle Rock (Tsre), and basalt of vent 3421 (QTmb). K-Ar age 2.88±0.09 Ma. Polarity normal

Kendrick Peak and outlying rhyolite and andesite domes and flows

EXTRUSIVE AND INTRUSIVE ROCKS OF PLEISTOCENE (MATUYAMA) AGE

Qka Andesite flows of Kendrick Peak--Flows that cap the summit and mantle the flanks of Kendrick Peak. Unit is medium gray to dark gray, porphyritic. Composition is variable; SiO_2 generally ranges from 55 to 63 percent; locally the unit includes dacite having 65 percent SiO_2 (analysis 4536). The more mafic flows (SiO_2 <58 percent) contain phenocrysts of plagioclase, clinopyroxene, and olivine set in an intersertal to hyalocrystalline groundmass of the same minerals, magnetite, and very dark glass. The less mafic flows (SiO_2 >58 percent) contain phenocrysts of plagioclase, hypersthene, and clinopyroxene set in a glass-rich to feldspar-rich microcrystalline matrix. Glass ranges in color from dark brown to light brown with increasing SiO_2. K-Ar ages (1.64±0.11 and 1.35±0.05 Ma) and stratigraphic relationships indicate that the andesite is younger than most of the dacites and rhyolites of Kendrick Peak. However, rhyolite dome **c** (Qkrc) postdates at least some of the andesite. Polarity reversed

Qkai Andesite dikes of Kendrick Peak--Numerous vertical dikes that are 0.5-6 m wide, medium gray to dark gray, porphyritic. Lithology is similar to that of andesite flows of Kendrick Peak (Qka). For composition see analysis 3503H

Qkdi Dacite dike of Kendrick Peak--Dike on east flank of Kendrick Peak. Dike is vertical to steeply dipping, about 5 m wide, 700 m long, light grayish brown, porphyritic. Phenocrysts of plagioclase, hypersthene, hornblende, and magnetite are set in a groundmass of glass and feldspar microlites. For composition see analysis 3502E. Dike intrudes andesite (Qka), dacite (Tkdd), and rhyolite (Tkrb) of Kendrick Peak

Qkdc Dacite flow **c** of Kendrick Peak--Lobate flow on east flank of Kendrick Peak. Dacite is medium to dark gray, porphyritic. Abundant phenocrysts of plagioclase and hypersthene and less abundant phenocrysts of hornblende and magnetite are set in a glass-rich matrix with scattered magnetite grains and microlites of feldspar and hypersthene. Xenoliths of granite, gabbro, and ultramafic rocks are common locally. For composition see analysis 3501. Unit is overlain by andesite flow (Qka) and underlain by rhyolite dome **b** (Tkrb) of Kendrick Peak

Qkrc Rhyolite dome **c** of Kendrick Peak--Prominent obsidian dome, 1.2-1.5 km in diameter, in the summit area of Kendrick Peak. Rhyolite is light gray to brownish gray, porphyritic. Moderately abundant microphenocrysts of sanidine and scattered phenocrysts of albite are set in a matrix of glass. For composition see analysis 4534D. Grayish-red xenoliths of microdiorite (analyses 3502A, 4534E) occur in the rhyolite.

The dome may have filled a crater in the summit of the Kendrick Peak eruptive center. Breccia (Qkbr) beneath the obsidian dome contains fragments of several Kendrick Peak units including andesite (Qka), and the breccia and the obsidian dome truncate andesite dikes (Qkai).

K-Ar age 1.90±0.25 Ma. Unit and underlying breccia (Qkbr) are younger than nearby andesite (Qka) flows that have K-Ar age of 1.64±0.11 Ma. Polarity reversed

Qkbr Breccia of Kendrick Peak--Unconsolidated pyroclastic breccia near summit of Kendrick Peak. Breccia contains fragments of other Kendrick Peak dacite and andesite units as well as light-gray pumice with phenocrysts of albite that resemble those in the overlying rhyolite dome **c** of Kendrick Peak (Qkrc)

Qkdg Dacite flow **g** of Kendrick Peak--Lobate flow on northwest flank of Kendrick Peak. Flow is light gray to medium gray, porphyritic. Abundant phenocrysts of plagioclase and

hornblende and less abundant phenocrysts of hypersthene and magnetite are set in a groundmass of light-colored glass with feldspar microlites. For composition see analysis 4533. Unit is overlain and underlain by andesite flows of Kendrick Peak (Qka). K-Ar age 1.79±0.03 Ma. Polarity reversed

Rhyolite of Slate Mountain

$Qslr_2$ Rhyolite dome complex--Cluster of domes, 1.5 km in diameter, on north margin of map area. Rock is uniformly aphanitic, light gray to very light gray. Rare pale-brown amphibole, biotite, and altered fayalite(?) occur in a felsic, cryptocrystalline groundmass in which needles and irregular patches of opaque oxide are common. For composition see analysis 4502. Uplifted sedimentary rocks of Paleozoic and Mesozoic age partly surround and rest on the dome complex. K-Ar age 1.54±0.02 Ma. Polarity reversed

$Qslr_1$ Older rhyolite dome--Small dome, approximately 0.5 km in diameter and 90 m high, on southwest flank of Slate Mountain. Rock is medium light gray to light brownish gray and distinctly flow banded due to flattening of microvesicles in the glassy groundmass. Microphenocrysts of biotite, tabular feldspar, and euhedral to anhedral opaque oxides are abundant and aligned with flow structure. For composition see analysis 4503. K-Ar age 1.90±0.35 Ma. Polarity reversed

DACITE AND RHYOLITE OF PLEISTOCENE OR PLIOCENE (MATUYAMA) AGE

QTkdf Dacite dome **f** of Kendrick Peak--Steep-sided, 800-m-diameter dome in west-central part of Kendrick Peak eruptive center. Pinkish-gray dacite contains abundant phenocrysts of plagioclase and hornblende and less abundant phenocrysts of hypersthene and magnetite set in a very fine trachytic groundmass of the same minerals plus glass and apatite. For composition see analysis 3504. Polarity reversed

QTkda Dacite dome **a** of Kendrick Peak--Small, 400- to 500-m-diameter dome north of Kendrick Peak eruptive center. Light-pinkish-gray dacite contains abundant phenocrysts of plagioclase and hornblende and less abundant phenocrysts of hypersthene, biotite, and magnetite set in a glassy groundmass containing abundant feldspar microlites. For composition see analysis 4522. Unit is overlain by basalt flow from vent 4527 (QTmb). Polarity reversed

QTkdb Dacite dome **b** of Kendrick Peak--Small, 200- to 500-m-diameter dome on northeast flank of Kendrick Peak. Dacite is light pinkish gray. Phenocrysts of plagioclase and hypersthene and scattered phenocrysts of hornblende and apatite occur in a felsic, microcrystalline groundmass having partly trachytic texture. For composition see analysis 4526A. Grayish-red microdiorite xenoliths consisting of a mesh of plagioclase laths and acicular hornblende with minor hypersthene are common in the dacite; xenoliths of granite occur rarely. Unit is overlain by basalt of vent 4535 (Qbmb). Polarity reversed

QTkra Rhyolite dome **a** of Kendrick Peak--Small dome, about 500 m in diameter, north of Kendrick Peak. Unit is exposed in two outcrops separated by the basalt cinder cone of vent 4522 (QTmb). Rhyolite is pinkish gray, glassy to microcrystalline, contains phenocrysts of cumulophyric plagioclase and microphenocrysts of fayalite, orthopyroxene, biotite, and opaque oxide. For composition see analysis 4522B. Unit is similar in lithology to part of rhyolite obsidian flow of Slate Mountain (QTslr). Unit is overlain by basalt flow from vent 4527 and cinder cone of vent 4522 (both QTmb). Polarity reversed

QTma Andesite domes and flows of Moritz Ridge--A dome south of Pumpkin Center and a dome southwest of V4435A (QTmb) that has flows to the north, south, and southeast. Andesite is light gray, locally altered red. Abundant phenocrysts and microphenocrysts of hornblende and scattered phenocrysts of

clinopyroxene, hypersthene, and plagioclase are set in a groundmass consisting mainly of plagioclase, magnetite, and glass. For composition see analysis 4435A. Unit, with almost 63 percent SiO_2, is at the SiO_2-rich end of the range represented by andesites of Kendrick Peak (Qka) and differs by having abundant hornblende phenocrysts and fewer plagioclase phenocrysts. Polarity reversed

QTslr — Rhyolite obsidian flow of Slate Mountain--Remnant exposed beneath margin of basalt flow (Qbmb) on southeast side of Slate Mountain, west of Wallace Tank. Flow is pinkish gray to light gray, includes nearly aphyric pumice, glassy to microcrystalline rhyolite, and obsidian-rich, flow-banded rhyolite containing 1- to 2-cm-diameter lithophysae and brown and black obsidian having perlitic cracks. Mafic microphenocrysts include fayalite, orthopyroxene, biotite, and opaque oxides. Embayed plagioclase phenocrysts are present locally.

Unit is not clearly related to the other Slate Mountain rhyolites ($Qslr_1$, $Qslr_2$; it is separated from them by hogbacks of sedimentary rock on the southeast side of Slate Mountain, and it underlies undeformed basalt (Qbmb). Unit is similar in lithology to rhyolite **a** of Kendrick Peak (QTkra), a dome 5.3 km to the south-southwest; however, a driller's log of a well between these outcrops describes only basaltic rocks to a depth of 90 m, suggesting that the two rhyolites are not connected

DACITE AND RHYOLITE OF LATEST PLIOCENE (MATUYAMA) AGE

Tkde — Dacite dome **e** of Kendrick Peak--Steep-sided dome, at least 1.3 km in diameter, in the summit area and on the uppermost western flank of Kendrick Peak. Dacite is light bluish gray and contains abundant phenocrysts of plagioclase, hypersthene, and magnetite set in a groundmass of the same minerals plus glass. For composition see analysis 3503D. Unit is overlain by dacite dome **f** of Kendrick Peak (QTkdf) and basalt of vent 3509 (QTmb); it is overlain and intruded by andesites of Kendrick Peak (Qka, Qkai) and has a younger K-Ar age than dacite dome **g** of Kendrick Peak. K-Ar age 2.06±0.07 Ma. Polarity reversed

Tkdh — Dacite dome **h** of Kendrick Peak--Irregularly shaped, 1.7-km-diameter dome on north flank of Kendrick Peak. Unit is largely buried by alluvium. Pinkish-gray dacite contains abundant phenocrysts of plagioclase and biotite, moderately abundant phenocrysts of hornblende, and rare phenocrysts of hypersthene set in a locally flow-banded matrix of glass; contains lithophysae. For composition see analysis 4534. Unit is overlain by andesite flows of Kendrick Peak (Qka). K-Ar age is 2.09±0.13 Ma. Polarity reversed

Tkpr — Rhyolite dome of Kendrick Park--Small, 300- to 500-m-diameter dome at west edge of Kendrick Park, 7 km east of Kendrick Peak. Light-gray to pink rhyolite contains abundant phenocrysts of biotite ($\leq$1 mm) and scattered phenocrysts of alkali feldspar ($\leq$1 mm) set in a trachytic groundmass of plagioclase, alkali feldspar, biotite, and glass. For composition see analysis 3604. K-Ar age 2.15±0.13 Ma. Polarity reversed

Tkdd — Dacite dome **d** of Kendrick Peak--Elongate dome, maximum diameter 2.5 km, on the upper south and east flanks of Kendrick Peak. Dacite is generally medium gray but locally has been altered to light greenish gray or pinkish gray. Abundant phenocrysts of plagioclase, less abundant phenocrysts of hornblende and magnetite, scattered phenocrysts of hypersthene, and rare phenocrysts of clinopyroxene are set in a groundmass of microscopically banded glass having moderately abundant hypersthene microlites and scattered small crystals of plagioclase, hornblende, and magnetite. For composition see

analysis 3503I. Small grayish-red xenoliths of microdiorite are abundant. Unit is intruded by andesite and dacite dikes (Qkai, Qkdi) and is overlain by rhyolite domes **b** and **c** (Tkrb, Qkrc), breccia (Qkbr), dacite dome **e** (Tkde), and andesite flows (Qka) of Kendrick Peak. K-Ar age 2.37±0.21 Ma. Polarity reversed

Tkrb — Rhyolite dome **b** of Kendrick Peak--Steep-sided dome, at least 0.5-1.4 km in diameter, on lower southeast flank of Kendrick Peak. Dome consists of nearly aphyric, fresh, black obsidian containing scattered small (about 1 mm) phenocrysts of feldspar, microphenocrysts (0.2-0.3 mm) of fayalitic olivine and opaque oxide, and rare microphenocrysts of apatite set in a matrix of glass. For composition see analysis 3502D. Unit is overlain by dacite domes **c** and **d** (Qkdc, Tkdd) and andesite flows (Qka) and is intruded by andesite and dacite dikes (Qkai, Qkdi) of Kendrick Peak. Polarity reversed

RHYOLITE OF PLIOCENE (MATUYAMA OR GAUSS) AGE

Tkrd — Rhyolite dome **d** of Kendrick Peak--Irregularly shaped dome, maximum diameter 1 km, south of summit of Kendrick Peak. Light-gray rhyolite contains scattered 1-2 mm phenocrysts of plagioclase, sanidine, quartz, and oxidized biotite set in a microcrystalline felsic groundmass. For composition see analysis 3503G. Dome is intruded by an andesite dike (Qkai) and is overlain by andesite flows (Qka) of Kendrick Peak

RHYOLITE OF PLIOCENE (GAUSS) AGE

Tkre — Rhyolite dome **e** of Kendrick Peak--Irregularly shaped, 300-m-diameter exposure of rhyolite on northwest flank of Kendrick Peak. Dome consists of light- to dark-gray obsidian containing scattered phenocrysts (about 1 mm) of sanidine and albite and scattered microphenocrysts (≤0.5 mm) of fayalitic olivine and biotite set in a hyalophitic groundmass of alkali feldspar, biotite, fayalitic olivine, and glass. For composition see analysis 4533A. Unit is largely buried by younger andesite flows (Qka) and dacite flow **g** (Qkdg) of Kendrick Peak. K-Ar age 2.70±0.05 Ma

San Francisco Mountain and peripheral rhyolite domes

EXTRUSIVE AND INTRUSIVE ROCKS OF YOUNGER PLEISTOCENE (OLDER BRUNHES) AGE

Rhyolite of Sugarloaf

Qsgr — Dome--Endogenous dome, about 1 km in diameter, 270 m high, erupted within a tephra ring (Qsgp) at the mouth of the Interior Valley of San Francisco Mountain. Surface of the dome is mantled by a crumble breccia through which spines project near the top; flow structures in the spines dip steeply toward the center of the dome. Rhyolite contains phenocrysts of albite, sanidine, biotite, quartz, and rare fayalitic olivine set in a vesicular microvitrophyric matrix of alkali feldspar, quartz, fayalitic olivine, and glass. For composition see analysis 3723B. K-Ar age 0.22±0.02 Ma; dome is youngest volcanic unit of the San Francisco Mountain eruptive center

Qsgp — Pyroclastic deposits--Rhyolite-ash and -lapilli tephra ring consisting of crossbedded sand-wave beds, massive beds, and inversely graded planar beds deposited in a phreatomagmatic phase during the initial stages of the Sugarloaf eruption (Sheridan and Updike, 1975). Unit consists dominantly of juvenile ash and lapilli of vesicular to pumiceous rhyolite similar to the rhyolite dome (Qsgr), which was subsequently erupted within the tephra ring. For composition see analysis 3723. Accidental xenoliths representing andesite, dacite, and rhyolite units of San Francisco Mountain were derived from thick mudflow deposits through which the pyroclastic deposits erupted. Contains rare xenoliths of Paleozoic formations

Qlmd — Dacite flows of Lockett Meadow--Two blocky flows, one on top of the other, erupted from a vent on east flank of Reese Peak. Dacite contains scattered phenocrysts and microphenocrysts of plagioclase, hornblende, hypersthene, quartz, and magnetite set in an intersertal to trachytic matrix of plagioclase, hypersthene, tridymite, magnetite, and glass. For composition see analysis 3712.

K-Ar age 0.41±0.16 Ma. Unit overlies alluvial fan deposits (Qal) that include boulders of the younger andesite (Qa_2) and may record rapid transport of debris northeastward during formation of the Interior Valley. Similar fan deposits are interpreted as banked against the northeastern toe of the younger dacite flows of Doyle Peak (Qdd_3), suggesting that the latter flows predate formation of the Interior Valley and, thus, are older than the dacite flows of Lockett Meadow (Qlmd)

Dacite and andesite of Doyle Peak

Qdd_3 — Younger dacite flows--Thick block flows from two closely spaced vents high on east flank. Light- to medium-gray dacite contains sparse phenocrysts of plagioclase, biotite, and hypersthene and rare phenocrysts of quartz set in a fine-grained trachytic, feldspar-rich matrix. For composition see analysis 3831. K-Ar age 0.40±0.03 Ma

Qdd_2 — Middle dacite flows--One or more flows of medium-gray to black dacite extruded from a vent (or vents) on northeast slope. Flow interiors display closely spaced shear joints that give the rocks a slaty appearance. Dacite contains sparse phenocrysts of plagioclase, biotite, hypersthene, and quartz set in a trachytic to hyalopilitic matrix of plagioclase, hypersthene, silica mineral, opaque oxide, and glass. For composition see analysis 3819. Unit is overlain by the younger dacite of Doyle Peak (Qdd_3); it postdates the andesite of Doyle Peak (Qda) and the younger andesite of San Francisco Mountain (Qa_2)

Qda — Andesite flows--Erupted from a vent on lower northeast flank. Andesite is medium gray, contains sparse phenocrysts of hornblende and plagioclase and rare phenocrysts of hypersthene. For composition see analysis 3725. Vent area is buried by the middle dacite flows (Qdd_2); unit overlies younger andesite of San Francisco Mountain (Qa_2)

Qdd_1 — Older dacite flows--Thick blocky flows erupted from upper east flank. Dacite is light gray to dark gray; abundant phenocrysts of plagioclase, oxidized biotite and hornblende, hypersthene, and magnetite, and sparse phenocrysts of partly resorbed anorthoclase and quartz occur in a hyalopilitic to microcrystalline groundmass that contains plagioclase, alkali feldspar, hypersthene, silica mineral, opaque oxide, and glass. Abundant, dark-red, aphyric to porphyritic xenoliths contain scattered phenocrysts of plagioclase, olivine, and augite set in a felty matrix of plagioclase, hornblende, hypersthene, olivine, clinopyroxene, apatite, and opaque oxide. Unit is overlain by younger dacite of Doyle Peak (Qdd_3) and overlies younger andesite of San Francisco Mountain (Qa_2)

Qwhr — Rhyolite dome of White Horse Hills--Irregularly shaped endogenous dome, about 1 km in maximum diameter, within a 2.4-km-wide ring of upturned Paleozoic sedimentary rocks and Pleistocene volcanic rocks. Deformed rocks include basalt of vent 3601 (Qbb) and younger andesite of San Francisco Mountain (Qa_2). Rhyolite is very light gray to light-gray microcrystalline rock with abundant phenocrysts of biotite ($\leq$1 mm) and alkali feldspar (1-2 mm) and scattered phenocrysts of quartz (1-5 mm). Zoned plagioclase phenocrysts $\leq$2 cm in diameter occur in interior parts of dome. For composition see analysis 3612. Polarity normal.

A vitrophyric zone approximately 30 cm wide occurs near the top of the dome. Rock is medium bluish gray, has a glassy groundmass and perlitic cracks. It may represent a phase of the rhyolite that was quenched as it was intruded into the overlying Mississippian Redwall Limestone (MDrt) (Wenrich-Verbeek, 1972).

Several small, unmapped, nearly vertical, pipelike bodies of andesite occur outside the margin of the rhyolite dome and intrude the upturned rocks of the Supai Formation (P Ps). Maximum outcrop dimension is 7-45 m. The andesite is medium gray and weathers to shades of brown. It is porphyritic, containing abundant phenocrysts of plagioclase and hornblende $\leq$5 mm and scattered phenocrysts of biotite $\leq$1 mm. The groundmass consists of the same minerals plus hypersthene and opaque oxide. For composition see analyses 3612B, -C. The andesite may represent a late phase that followed emplacement of the rhyolite dome

Qhdi Dacite pluton of Humphreys Peak--Small, 200- to 400-m-diameter, dome-shaped pluton exposed on ridge northeast of Humphreys Peak. The feeder dike extends 1.6 km to the south, where it crosses Core Ridge. Dacite contains abundant phenocrysts and microphenocrysts of plagioclase, biotite, hornblende, and hypersthene set in a light-gray microcrystalline groundmass of plagioclase, alkali feldspar, tridymite, hypersthene, and opaque oxide. For composition see analysis 3729H. The pluton and its feeder intrude the older andesite (Qa_1) and the dacite (Qsfd) of San Francisco Mountain and cut a dike (Qai) that fed lavas of the younger andesite of San Francisco Mountain (Qa_2). The pluton and its feeder dike are not cut by any younger dikes

Qa_2 Younger andesite flows and flow breccias of San Francisco Mountain--Block flows and autoclastic flow breccias containing minor agglomerate, agglutinate, ash, and lapilli. Individual flows are 1-9 m thick; maximum aggregate thickness on Humphreys Peak is >135 m. Andesite is medium gray to dark gray or black, nearly aphyric to porphyritic; porphyritic rocks contain abundant phenocrysts of plagioclase and variable amounts of augite, hypersthene, and olivine. Unit is generally more mafic than the older andesite of San Francisco Mountain (Qa_1); SiO_2 content is typically 55-59 percent. K-Ar age 0.43$\pm$0.03 Ma, determined on the youngest flow on Humphreys Peak. Polarity normal

Qmi Quartz-monzodiorite dike of Core Ridge--Irregularly shaped dike, 5-250 m wide, about 1 km long, located approximately along crest of Core Ridge. Dike is phaneritic but has aphanitic margins. Phenocrysts of plagioclase, hypersthene, augite, and altered olivine mantled by pigeonite occur in a fine- to medium-grained matrix of plagioclase, augite, pigeonite, and opaque oxide; quartz, alkali feldspar, scattered green hornblende, and biotite occur interstitially in the matrix. For composition see analyses 3732E, 3733C. The dike is interpreted as a major feeder for the younger andesite of San Francisco Mountain (Qa_2). It is cut by other dikes including the feeder for the dacite pluton of Humphreys Peak (Qhdi), andesite dikes (Qai), and a few dacite dikes of San Francisco Mountain (Qdi)

Dacite of Elden Mountain

Qed_3 Autoclastic flow breccia--Erupted from a vent between Little Elden Mountain and Dry Lake Hills. Phenocrysts of plagioclase, hypersthene having olivine inclusions, hornblende, biotite, and magnetite occur in a hyalopilitic matrix of plagioclase, hypersthene, fayalitic olivine, and glass. For composition see analysis 2725. Flow was extruded onto dacite domes of Elden Mountain (Qed_2), dacite of Dry Lake

Hills (Qdld), and onto Paleozoic strata deformed in an early stage of the Elden Mountain eruption

Qed_2 Domes--Partly exogenous domes of Elden and Little Elden Mountains; massive, jointed flow lobes extend down flanks in most directions. Dacite is light gray to medium gray, porphyritic, contains abundant phenocrysts of plagioclase, hypersthene having olivine inclusions, magnetite, and scattered phenocrysts of augite and hornblende set in a microgranitic matrix of plagioclase, alkali feldspar, silica mineral, and fayalitic olivine. For composition see analyses 2736, 2736A, 2830. K-Ar ages of two different flow lobes on southeast flank of Elden Mountain are 0.49±0.06 and 0.57±0.03 Ma. Polarity normal

Qepb Pyroclastic flow breccia--Flat-surfaced deposit several meters thick. Angular blocks ≤2 m in diameter of very light gray dacite and pumiceous dacite occur in a matrix of unsorted, poorly consolidated, dacitic ash and lapilli. Unit is inversely graded in the basal part; maximum clast size in basal 20-30 cm is about 10 cm. Dacite is porphyritic, contains abundant phenocrysts of plagioclase and hypersthene, less abundant phenocrysts of magnetite, and scattered phenocrysts of hornblende and biotite set in a glassy to microcrystalline feldspar-rich matrix. Composition of blocks (analyses 1807, 1807A) is nearly identical to composition of dacite dike in unit Qedi. Polarity normal

Qed_1 Flow breccia--Crumble breccia of an endogenous dome. Breccia consists of angular blocks typically 2-30 cm in diameter, rarely ≤1 m. Abundant phenocrysts of plagioclase, hornblende, hypersthene, biotite, and magnetite occur in a microgranitic matrix of plagioclase, alkali feldspar, quartz, and opaque oxide. Unit is overlain by dacite domes of Elden Mountain (Qed_2) and overlies dacite of Dry Lake Hills (Qdld)

Qedi Dacite and tuffisite dikes--Intrusive rocks that cut Paleozoic sedimentary rocks between Elden and Little Elden Mountains. Unit includes light-gray, hornblende-hypersthene dacite plug that is the feeder for the oldest dacite of Elden Mountain (Qed_1); 12-m-wide dacite dike injected along a fault; dikes and pipes of tuffisite composed of comminuted biotite-hornblende-hypersthene dacite, basalt, and Paleozoic sedimentary rock; and hornblende-pyroxene dacite. For compositions see analyses 2725A, -B

Qsfd Dacite flows and autoclastic flow breccias of San Francisco Mountain--Hypersthene dacite that flowed, from a central vent or vents, down all flanks of San Francisco Mountain except on the southwest, where the flows were diverted by the high-standing flank of an earlier cone composed of older andesite of San Francisco Mountain (Qa_1). Base of unit includes local airfall pumice and welded tuff deposited in a structurally controlled paleovalley exposed in the north wall of the Inner Basin below Humphreys Peak. Immediately northeast of the paleovalley the aggregate thickness of dacite lava flows is about 325 m. The dacite contains abundant phenocrysts of plagioclase and hypersthene and sparse phenocrysts of augite and magnetite set in a microcrystalline to hyalopilitic matrix of plagioclase microlites, alkali feldspar, hypersthene, clinopyroxene, opaque oxide, silica mineral, and glass. K-Ar age 0.75±0.17 Ma; analytical error permits assignment of Brunhes age (≤0.73 Ma). Polarity normal

Dacite of Humphreys Peak

Qhdf Dacite block flows--On lower northwest flank of Humphreys Peak. Dacite contains phenocrysts of plagioclase, hornblende, hypersthene, and biotite set in a medium- to light-gray hyalopilitic matrix of plagioclase, hypersthene, fayalitic olivine, and glass. For composition see analysis 3614. Polarity normal

Qhd — Dacite dome--One or possibly two(?) coalesced domes nearly 3 km in maximum diameter, on north slope of Humphreys Peak. Unit is medium gray; dark-red mafic xenoliths are common. Dacite contains abundant phenocrysts of plagioclase, biotite, hornblende, and hypersthene set in a light-gray to pink microcrystalline matrix of plagioclase, alkali feldspar, hypersthene, opaque oxide, and tridymite. For composition see analysis 3720. Mafic xenoliths are mostly aphyric, but some have scattered phenocrysts of plagioclase and hornblende in felty matrix of plagioclase, hypersthene, acicular hornblende, apatite, and interstitial glass.

Occurrence of outcrops of older andesite of San Francisco Mountain (Qa_1) north of and directly downslope from unit suggests that unit is younger than the older andesite. The dacite dome(s) of the unit may have diverted flows of the dacite of San Francisco Mountain (Qsfd); unit is overlain by younger andesite of San Francisco Mountain (Qa_2). Polarity normal

Qapd — Dacite flow, welded tuff, and tuff breccia of Aubineau Peak--Sequence of three eruptive units exposed on north wall of Inner Basin below Aubineau Peak.

Dacite flow, at top of unit, is 53-70 m thick, massive, and contains phenocrysts of plagioclase and oxidized mafic minerals set in a pinkish-gray, vesicular matrix of plagioclase, alkali feldspar, opaque oxide, tridymite, and glass.

Welded tuff, in middle of unit, is 30-50 m thick, contains elongated, apparently flattened lapilli of dacite having phenocrysts of plagioclase, hornblende, hypersthene, and biotite set in a dense trachytic groundmass. Matrix contains broken phenocrysts, lithic fragments, opaque oxide, and fine ash.

Tuff breccia, at base of unit, is massive, 12-80 m thick, and consists mainly of lapilli and blocks $\leq$2.5 m in diameter of dense biotite-hypersthene-hornblende-plagioclase dacite; it also includes fragments of older andesite of San Francisco Mountain (Qa_1) and rhyolite of unknown source. Lapilli and blocks are enclosed in a matrix of dacite and andesite ash and broken crystals of plagioclase, hypersthene, hornblende, and biotite.

Unit is overlain by flows of upper part of older andesite of San Francisco Mountain (Qa_1); inclusions in tuff breccia indicate that unit is younger than a lower part of the older andesite of San Francisco Mountain (Qa_1)

Dacite of Reese Peak

Qrd_2 — Dome and flows--Dissected gray dacite dome and blocky flows on northeast flank of San Francisco Mountain. Dacite is porphyritic, contains abundant phenocrysts of plagioclase, hornblende, and hypersthene, sparse phenocrysts of augite, and rare phenocrysts of biotite set in a microcrystalline to hyalopilitic groundmass of plagioclase, alkali feldspar, hypersthene, opaque oxide, and glass. For composition see analysis 3727A. Partly melted xenoliths of Precambrian metamorphic rocks are common. The dome is overlain by the dacite of San Francisco Mountain (Qsfd), and it intrudes the older andesite of San Francisco Mountain (Qa_1) in the north wall of the Inner Basin. Polarity normal

Qrd_1 — Flow--On lower northeast flank of San Francisco Mountain. Thickness is >24 m at margin. Dacite is medium gray, contains phenocrysts of strongly resorbed plagioclase, hornblende, hypersthene, biotite, and magnetite set in a vesicular hyalopilitic matrix of plagioclase, alkali feldspar, pyroxene, fayalitic olivine, opaque oxide, and glass. For composition see analysis 3711. Unit is overlain by older andesite of San Francisco Mountain (Qa_1). Polarity normal

Andesite of Agassiz Peak

Qaa_2 Flows--Several blocky flows extruded from a vent high on west slope of Agassiz Peak. Combined thickness is ≤50 m. Phenocrysts of plagioclase, hornblende, hypersthene, and sparse augite occur in an aphanitic matrix of plagioclase, pyroxene, opaque oxide, and glass. For composition see analysis 2602. K-Ar age 0.60±0.08 Ma. Polarity normal

Qaa_1 Dome--Small, block-mantled, parasitic dome on upper southwest slope of Agassiz Peak. Phenocrysts of plagioclase, biotite, and hornblende occur in a groundmass of plagioclase, olivine, clinopyroxene, hypersthene, hornblende, magnetite, glass, and tridymite. Rocks of the dome are similar in lithology and composition (analysis 2705G) to rocks of the northeast-trending, 730-m-long dike (Qai) in and southwest of Core Ridge; the dome may have been fed by that dike. The older andesite flows of San Francisco Mountain (Qa_1) both underlie and overlie the unit

Qca Andesite flows and vent deposits of Core Ridge--Dissected cone consisting of andesite cinders, tuff, and tuff-breccia enclosing intrusive andesite and flat-lying andesite flows that were ponded in the crater of the cone. Andesite contains sparse phenocrysts of plagioclase, augite, and olivine set in a matrix of plagioclase, alkali feldspar, pigeonite, opaque oxide, and, locally, hornblende and biotite. K-Ar age 0.66± 0.03 Ma

Dacite of Fremont Peak

Qfdf Flows--Several flows of strongly foliated, highly vesicular dacite that were erupted during the final stage of emplacement of a lava dome (Qfd) in Fremont Saddle. Abundant phenocrysts of plagioclase, hornblende, biotite, hypersthene, and magnetite and rare phenocrysts of augite occur in a microcrystalline to hyalopilitic matrix of plagioclase, alkali feldspar, hypersthene, fayalitic olivine, silica mineral, opaque oxide, and glass. For composition see analysis 2704. Dark-red mafic xenoliths are abundant locally. Unit overlies rhyolite of Doyle Saddle (Qdr), which in turn overlies andesite flows (Qa_1) deformed by emplacement of older dacite of Schultz Peak (Qsd_1)

Qfpb Pyroclastic flow breccia--Avalanche deposits on south flank. Unit includes three, and possibly more, individual breccia flows. The breccia is unsorted and unconsolidated. It consists of round to angular, 0.1- to 7-m-diameter, dacite blocks enclosed in a light-gray matrix of dacite lapilli and ash, broken crystals, pumice, and glass shards. The dacite blocks are identical in lithology to the dacite dome (Qfd). For composition see analysis 2733. Pole positions in several blocks indicate that they were above the Curie point when the pyroclastic flows came to rest. Polarity normal

Qfd Dome--Endogenous dome in Fremont Saddle. Dome is dense to vesicular, with steeply dipping flow foliations. Dacite contains abundant phenocrysts of plagioclase, hornblende, biotite, hypersthene, and magnetite and rare phenocrysts of augite set in a groundmass of plagioclase, alkali feldspar, hypersthene, silica mineral, opaque oxide, scattered fayalitic olivine, and glass. For composition see analysis 2704C. Dome intrudes rhyolite of Doyle Spring (Qdsr). Polarity normal

Qdr Rhyolite flows of Doyle Saddle--Flows exposed at Doyle Saddle, on south wall of Inner Basin, and in Weatherford Canyon high on the south flank of San Francisco Mountain. Unit includes at least two flows. Individual flows are ≤85 m thick, consist of vesicular and spherulitic, flow-foliated rhyolite containing thin (≤1 cm) lenses of dense black obsidian. Rhyolite is porphyritic, typically contains phenocrysts of quartz and sanidine; locally, unit also contains phenocrysts of aegirine-augite or riebeckite; rarely the phenocrysts are

sanidine, anorthoclase, sodic clinopyroxene, and fayalitic olivine. Groundmass is a microgranitic to trachytic aggregate of alkali feldspar and quartz containing variable amounts of riebeckite, aegirine-augite, aenigmatite, glass, and devitrified glass. Zircon is a ubiquitous accessory mineral. Rhyolite is peralkaline; for composition see analyses 2705A, -B.

K-Ar age of flow exposed in Doyle Saddle is 0.70±0.10 Ma; of flow exposed in Weatherford Canyon, 0.87±0.15 Ma. The flow in Weatherford Canyon overlies andesite flows (Qa_1) that were deformed by emplacement of the dacite dome of Schultz Peak (Qsd_1) before the rhyolite flow was emplaced. Thus the Weatherford Canyon flow is considered younger than the dacite dome of Schultz Peak (Qsd_1), which has a K-Ar age of 0.75±0.04 Ma. Standard deviation of error of the 0.87-Ma age permits the assignment of early Brunhes age ($\leq$0.73 Ma) to the Weatherford Canyon flow, as well as to the Doyle Saddle flow. Polarity of the Doyle Saddle flow is normal

Qdsr Rhyolite dome of Doyle Spring--Eroded dome of dense rhyolite exposed on south wall of Inner Basin. Scattered phenocrysts of sanidine, rare phenocrysts of riebeckite, and microphenocrysts of quartz and sanidine occur in a microcrystalline groundmass of alkali feldspar and quartz containing dendritic crystals of aegirine-augite, riebeckite, and aenigmatite. Zircon is a common accessory mineral. Rhyolite is peralkaline; for composition see analysis 3733. Similarity in lithology and chemical composition suggest that the dome may represent the vent for the flows of Doyle Saddle (Qdr)

Dacite of Schultz Peak

Qsd_2 Block flow--Medium-gray dacite erupted from a dike on east side of Schultz Peak. Flow is $\geq$60 m thick and contains abundant phenocrysts of plagioclase, hornblende, olivine, and augite and sparse phenocrysts of hypersthene and magnetite set in a gray hyalopilitic matrix of plagioclase, pyroxene, opaque oxide, and glass. For composition see analysis 2818. Unit overlies older dacite of Schultz Peak (Qsd_1). Polarity normal

Qsd_1 Dome, block flows, and breccias--Exogenous dome, lobate blocky flows, and autoclastic flow breccias on southeast flank of San Francisco Mountain. Dacite contains phenocrysts of plagioclase and oxidized hornblende and biotite that are enclosed in a trachytic to microgranitic groundmass of plagioclase, alkali feldspar, silica mineral, pyroxene, and rare glass and cryptocrystalline material. Phenocrysts of olivine, augite, hypersthene, alkali feldspar, and a green clinopyroxene occur sporadically. For composition see analyses 2704D, 2712. Dark-red mafic xenoliths containing phenocrysts of plagioclase, olivine, augite, and, locally, hornblende set in a fine felty matrix of plagioclase, apatite, and acicular hornblende are conspicuous. Emplacement of the dome deformed the older andesite of San Francisco Mountain (Qa_1) in Weatherford Canyon. K-Ar age 0.75±0.04 Ma. Standard deviation of error permits assignment of unit to early Brunhes age ($\leq$0.73 Ma). Polarity normal

Qdld Dacite domes and flows of Dry Lake Hills--Eight or more(?) coalesced exogenous domes and some short block flows. Steeply dipping flow foliation is common at the dome summits. Dacite is medium gray, porphyritic, contains abundant phenocrysts of strongly resorbed plagioclase, hornblende, hypersthene, and magnetite; phenocrysts of hornblende rimmed with pyroxene occur locally. Matrix consists of microcrystalline plagioclase, alkali feldspar, pyroxene, opaque oxide, fayalitic olivine, silica mineral, and minor glass. For composition see analysis 2727. Emplacement of one dome tilted basalt of Miocene age (Tob) on Switzer Mesa; the dacite also

overlies the Miocene basalt locally. Unit is overlain by the pyroclastic breccia of Fremont Peak (Qfpb) and by dacite flows of Elden Mountain (Qed_1, Qed_3). Polarity normal

EXTRUSIVE AND INTRUSIVE ROCKS OF PLEISTOCENE (OLDER BRUHNES AND MATUYAMA) AGE

Qa_1 Older andesite flows, breccias, and tuffs of San Francisco Mountain--Interbedded, lithologically similar flows, autoclastic flow breccias, agglutinates, rootless flows, tuffs, and tuff breccias that dip outward from a center near southwest end of Inner Basin. Unit is exposed in walls of Inner Basin, on Agassiz Peak and southwest flank of San Francisco Mountain, and in scattered outcrops low on north and east flanks of mountain. Rocks of the unit exposed below Humphreys Peak on north wall of Inner Basin consist of 57 separate flows, breccias, and tuffs in a 525-m-thick stratigraphic interval.

Unit consists mostly of pyroxene or hornblende-pyroxene andesite that contains phenocrysts of plagioclase, augite, hornblende, hypersthene, magnetite, and, in some flows, olivine set in a glassy to microcrystalline matrix. Most of the unit is relatively silica-rich andesite averaging about 60.5 percent SiO2. However, local flows of dacite (analyses 2703, 3728B) and plagioclase-phyric basalt with high SiO_2, Al_2O_3, and Na_2O (analyses 3732J, -K, -Z) also occur in the sequence.

K-Ar age 0.76 ± 0.07 Ma, from near the base of the thick extrusive section exposed below Humphreys Peak, permits assignment to the Brunhes Chronozone ($\leq$0.73 Ma). However, a stratigraphically lower flow elsewhere within the unit is dated at 0.92 ± 0.03 Ma, indicating that the older andesite also includes Matuyama-age rocks. Polarity, where determined, including throughout the section exposed below Humphreys Peak, normal

Qc Central complex--Related flows, tuffs, tuff breccias, flow breccias, intrusion breccias, breccia pipes, agglomerates, agglutinates, and small plutons. Unit is dominantly andesitic but includes dacite and minor rhyolite. For composition of andesite see analyses 3732C, -D

Qsfp Dacite and rhyolite pumice--Unconsolidated airfall deposits of angular lapilli- to block-size fragments of white to light-gray pumice in small exposures north and east of Sugarloaf. The unit is at least 15 m thick where quarried from pits about 2 km east of Sugarloaf and consists of 3 parts (Dennis, 1981):

The upper beds consist of slightly porphyritic dacite pumice, 4-5 m thick, having phenocrysts of plagioclase, hornblende, biotite, hypersthene, and fayalitic olivine set in a pumiceous glass matrix. For composition see analysis 3819A. Accessory xenoliths of dacite are identical in lithology to the dacite dome of Fremont Peak (Qfd).

A wedge-shaped interbed of basaltic scoria, <1 m thick, separates the upper and lower beds.

The lower beds are aphyric rhyolite pumice, about 10 m thick. They contain distinctive accidental clasts of fine-grained metamorphic rocks and accessory clasts of blue-gray rhyolite (for composition of accessory rhyolite clasts see analysis 3819B). Dennis (1981) correlated the lower rhyolitic pumice with pumice having similar lithology and accessory clasts in the SP Mountain quadrangle (analysis 5828C on that map). Fission-track age on zircons from the pumice in the SP Mountain deposit is 0.80 ± 0.11 Ma (C. W. Naeser and G. A. Izett, written commun., 1975)

Qai Andesite dikes and sill of San Francisco Mountain--Vertical to steeply dipping dikes, typically about 3 m wide, but range is 0.3-20 m. Dikes in walls of Inner Basin are generally oriented radially with respect to Core Ridge. An andesite

sill is exposed on north wall of Inner Basin at east end of ridge south of Beard Canyon. Typical phenocryst assemblages are plagioclase-hypersthene-augite-opaque oxide and plagioclase-olivine-augite-opaque oxide. Groundmass textures range from glassy to microcrystalline. For composition see analyses 3728E, 3729K

Qdi — Dacite dikes of San Francisco Mountain--Vertical to steeply dipping dikes, typically about 8 m wide but range is 1-100 m. Most dikes are in Core Ridge and the north wall of Inner Basin, where they are approximately radial to the Core Ridge area. The most common phenocryst assemblage is plagioclase-hornblende-biotite-hypersthene-opaque oxide; some dikes contain augite and lack biotite. The groundmass is usually microcrystalline. For composition see analyses 3728D, 3729L, -M, 3733A, -B. K-Ar age for one dike 0.95±0.20 Ma

INTRUSIVE ROCK OF PLEISTOCENE (OLDER BRUNHES OR MATUYAMA AGE)

Qdii — Diorite plug of Core Ridge--Roughly elliptical, 300- to 500-m-diameter, phaneritic plug in southern part of Core Ridge. Major minerals are plagioclase, augite, hypersthene, pigeonite, olivine, and magnetite. For composition see analysis 3732R. Plug is intruded by dacite dikes (Qdi)

EXTRUSIVE AND INTRUSIVE ROCKS OF PLEISTOCENE (MATUYAMA) AGE

Qad — Dacite flows of Agassiz Peak--Dark-gray to yellowish-brown vesicular flows in a deep valley on south slope. Dacite contains abundant phenocrysts of plagioclase, hornblende, hypersthene, biotite, and magnetite set in a fine matrix of plagioclase, alkali feldspar, silica mineral, pyroxene, fayalitic olivine, and opaque oxide. Unit is overlain by the older andesite of San Francisco Mountain (Qa_1)

Rhyolite and microgranite of Core Ridge

Qcr — Rhyolite flow--Thick, vesicular alkali rhyolite flow at southwest end of Core Ridge. Flow typically contains red mafic xenoliths. Abundant phenocrysts of anorthoclase, sanidine, and aegirine-augite and scattered phenocrysts of quartz occur in a light-gray to tan microcrystalline to microgranitic groundmass of alkali feldspar, quartz, and Na-pyroxene. Xenocrysts of labradorite and andesine are mantled by alkali feldspar; cores of augite in the pyroxene phenocrysts may also be xenocrysts. For composition see analysis 3732P. Unit is overlain by andesite of Core Ridge (Qca). Small plug of alkali microgranite (Qgi) may be the feeder for the rhyolite flow based on similarity of petrographic and chemical characteristics and on proximity. K-Ar age 0.87±0.03 Ma

Qgi — Microgranite plug--Elongate body of medium- to pinkish-gray alkali microgranite in southern part of Core Ridge. Abundant phenocrysts of anorthoclase, sanidine, and ferrohedenbergite and scattered phenocrysts of quartz occur in a groundmass of alkali feldspar, quartz, green clinopyroxene, and magnetite. Accessory fluorite and deuterically altered minerals are conspicuous. Andesine, olivine, and hypersthene occur as xenocrysts. For composition see analysis 3733D. Similarity in lithology and chemical composition suggests that the plug was the feeder for the rhyolite of Core Ridge (Qcr)

Qri — Rhyolite dike--Rhyolite that forms a well-defined low ridge about 75 m wide and 260 m long at lower end of cirque between Agassiz and Fremont Peaks. Scattered phenocrysts of sanidine and aegirine-augite together with microphenocrysts of sanidine and quartz are set in a light-gray groundmass of microcrystalline alkali feldspar and quartz with dendritic crystals of aegirine-augite and aenigmatite; zircon is a conspicuous accessory mineral. Rhyolite is peralkaline; for composition see analysis 3732N. K-Ar age 0.95±0.08 Ma

Qhr — Rhyolite dome of Hochderffer Hills--Dome, 2-2.6 km across and 320 m high, on northwest side of San Francisco Mountain. Dome

is very light gray to light-brownish-gray, microcrystalline rhyolite containing scattered phenocrysts of sodic plagioclase, sanidine, and opaque crystals possibly pseudomorphic after amphibole or biotite. For composition see analysis 3616A. Two younger basalt vents (Qbmb, Qbb) have erupted on east and west flanks, respectively, of dome; a third basalt (QTb) appears to have been uplifted by the rhyolite. K-Ar age 1.64±0.11 Ma. Polarity reversed

Rhyolite of Raspberry Spring

Qrr_2 Rhyolite plug--Small, 150-m-diameter plug of vesicular rhyolite intruded into core of rhyolite dome (Qrr_1) in southern part of Inner Basin. Abundant phenocrysts of sanidine, anorthoclase, quartz, green clinopyroxene, and amphibole and a few scattered xenocrysts of hypersthene, andesine, and iddingsite-rimmed olivine are set in a microcrystalline matrix of alkali feldspar, quartz, aegirine-augite, and amphibole

Qrr_1 Rhyolite dome--Block-mantled dome of rhyolite in southern part of Inner Basin. Abundant phenocrysts of quartz, oligoclase, anorthoclase, sanidine, and oxidized biotite occur in a light-gray compact matrix of alkali feldspar and quartz. Zircon is a common accessory mineral. For composition see analysis 3734A. The rhyolite dome was overlain by andesite flows (Qa_1), now mostly eroded away, and is intruded by the more alkaline rhyolite plug (Qrr_2). K-Ar age 1.82±0.16 Ma

DACITE OF PLEISTOCENE OR PLIOCENE (MATUYAMA OR OLDER) AGE

QThpd Dacite block flow of Hart Prairie--Isolated dark-gray to brown, nearly aphyric dacite in Hart Prairie. Sparse phenocrysts of plagioclase, fayalitic olivine, and magnetite are contained in a trachytic matrix of plagioclase, alkali feldspar, pyroxene, opaque oxide, and glass. For composition see analysis 2602A. Unit is surrounded by alluvium

QThd Hornblende dacite block flow--Medium-gray dacite in isolated outcrops east of Sugarloaf. Scattered phenocrysts of plagioclase, hornblende, and magnetite are set in an intersertal groundmass of plagioclase, alkali feldspar, orthopyroxene, biotite, and glass. Dacite was presumably erupted from the San Francisco Mountain volcano. Unit is overlain by airfall dacite and rhyolite pumice

DACITE OF PLIOCENE (GAUSS) AGE

Tnsd Dacite dome of North Sugarloaf--Dome, 1.2- to 1.7-km-diameter, at northeast base of San Francisco Mountain. Phenocrysts of biotite, scattered phenocrysts of plagioclase, and microphenocrysts of plagioclase and alkali feldspar are set in a light-gray to tan microcrystalline matrix of alkali feldspar, quartz, and oxidized mafic minerals. For composition see analysis 3713A. Unit is overlain by rhyolite pyroclastic deposits of Sugarloaf (Qsgp). K-Ar age 2.78±0.13 Ma

SEDIMENTARY ROCKS OF MESOZOIC AND PALEOZOIC AGE

Pkm MOENKOPI FORMATION (MIDDLE? AND LOWER TRIASSIC)--Reddish-brown, well-bedded mudstone, siltstone, silty sandstone, and sandstone. Formation occurs as erosional remnants above the Kaibab Formation (Pk). Greatest exposed thickness, approximately 40 m, is at Switzer Mesa in Flagstaff, where a cap of Miocene basalt (Tob) has protected the relatively soft strata from erosion

Pk KAIBAB FORMATION (LOWER PERMIAN)--Yellowish- to light-gray, well-bedded, silty dolomite, dolomitic sandstone, and dolomitic limestone that is commonly cherty. Exposed thickness in southwestern corner of map area, in walls of Sycamore Canyon, is approximately 140 m. Eroded top of formation forms most of the surface now buried by the volcanic rocks

Ptc TOROWEAP FORMATION AND COCONINO SANDSTONE, UNDIVIDED (LOWER PERMIAN)--Light-colored, cross-stratified, well-sorted, fine- to medium-grained sandstone. Siltstone, sandstone, and dolomite facies occur in the Toroweap Formation in Sycamore Canyon, where only the upper few meters of unit are exposed. Elsewhere, unit is exposed only where uplifted by dacite and rhyolite domes of Elden Mountain, Slate Mountain, and White Horse Hills

P Ptcs TOROWEAP FORMATION, COCONINO SANDSTONE, AND SUPAI FORMATION, UNDIVIDED (LOWER PERMIAN AND PENNSYLVANIAN)--Uplifted by the rhyolite dome complex at Slate Mountain (north edge of map area)

P Ps SUPAI FORMATION (LOWER PERMIAN AND PENNSYLVANIAN)--Red shale, siltstone, and crossbedded sandstone exposed where uplifted by dacite and rhyolite domes of Elden Mountain, Slate Mountain, and White Horse Hills

MDrt REDWALL LIMESTONE AND TEMPLE BUTTE FORMATION, UNDIVIDED (MISSISSIPPIAN AND UPPER? DEVONIAN)--Massive, light-gray, crystalline limestone (Redwall) and well-bedded, largely aphanitic, gray dolomite (Temple Butte) exposed where uplifted by dacite and rhyolite domes of Elden Mountain, Slate Mountain, and White Horse Hills

Ct TAPEATS SANDSTONE (MIDDLE AND LOWER CAMBRIAN)--Arkosic, crossbedded sandstone and pebbly sandstone exposed where uplifted during emplacement of the rhyolite dome complex of Slate Mountain

ANALYTICAL DATA

Tables 1-5 present chemical data for rocks in the Central map area.

Table 1 lists general information about each analyzed rock.

Table 2 lists the complete analyses of major oxides in weight percent, the laboratory numbers, and the analysts.

Table 3 lists the major oxides normalized to 100 percent after subtraction of all analyzed water and CO_2, subtraction of sufficient CaO to combine with CO_2 in normative calcite, and adjustment of the FeO/Fe_2O_3 ratio. Values for oxides cited in the "Description of Map Units" are all taken from these adjusted analyses and are given in weight percent.

The normative mineralogy of the volcanic rocks is sensitive to the proportions of FeO and Fe_2O_3. Therefore, the FeO/Fe_2O_3 ratio was adjusted in order to minimize the effect of oxidation of iron due to weathering or to other alteration and presumably brings the adjusted FeO/Fe_2O_3 value for most rocks closer to the original magmatic value. The adjusted iron ratio was computed from an equation for the least-squares fit through 15 points representing the least-oxidized 15 of 599 rocks from the entire volcanic field in an FeO/Fe_2O_3 versus SiO_2 diagram (fig. 2; an additional two points representing unusually high analyzed FeO/Fe_2O_3 were not included in controlling the line). The equation for the line, which gives adjusted FeO/Fe_2O_3 of approximately 5 in basalts and 2.5 in rhyolites, is:

$$FeO/Fe_2O_3 = 9.627 - 0.0921 \times SiO_2 \quad .$$

Table 4 lists the CIPW normative minerals calculated for each of the analyses in table 3.

Table 5 lists the trace-element analyses for the map area.

The major oxides for most of the rocks were determined in U.S. Geological Survey laboratories in Menlo Park, Calif., Denver, Colo., Washington, D.C., Reston, Va., and Flagstaff, Ariz. The analyses done at Menlo Park and Denver (lab. nos. with prefixes M and D, respectively) were performed primarily by X-ray fluorescence spectroscopy. Analyses done at Washington or Reston that have laboratory numbers smaller than W179000 and at Flagstaff (lab. nos. without prefix) were performed by the rapid-rock procedure described by Shapiro and Brannock (1962) supplemented by atomic absorption. Analyses done at Washington that have laboratory numbers greater than W179000 were performed by the rapid-rock procedures of Shapiro (1967, 1975). Analyses of samples with laboratory numbers R1 to R19 were reported by Robinson (1913). Trace-element analyses were conducted by quantitative X-ray spectroscopy, emission spectroscopy, and neutron-activation methods.

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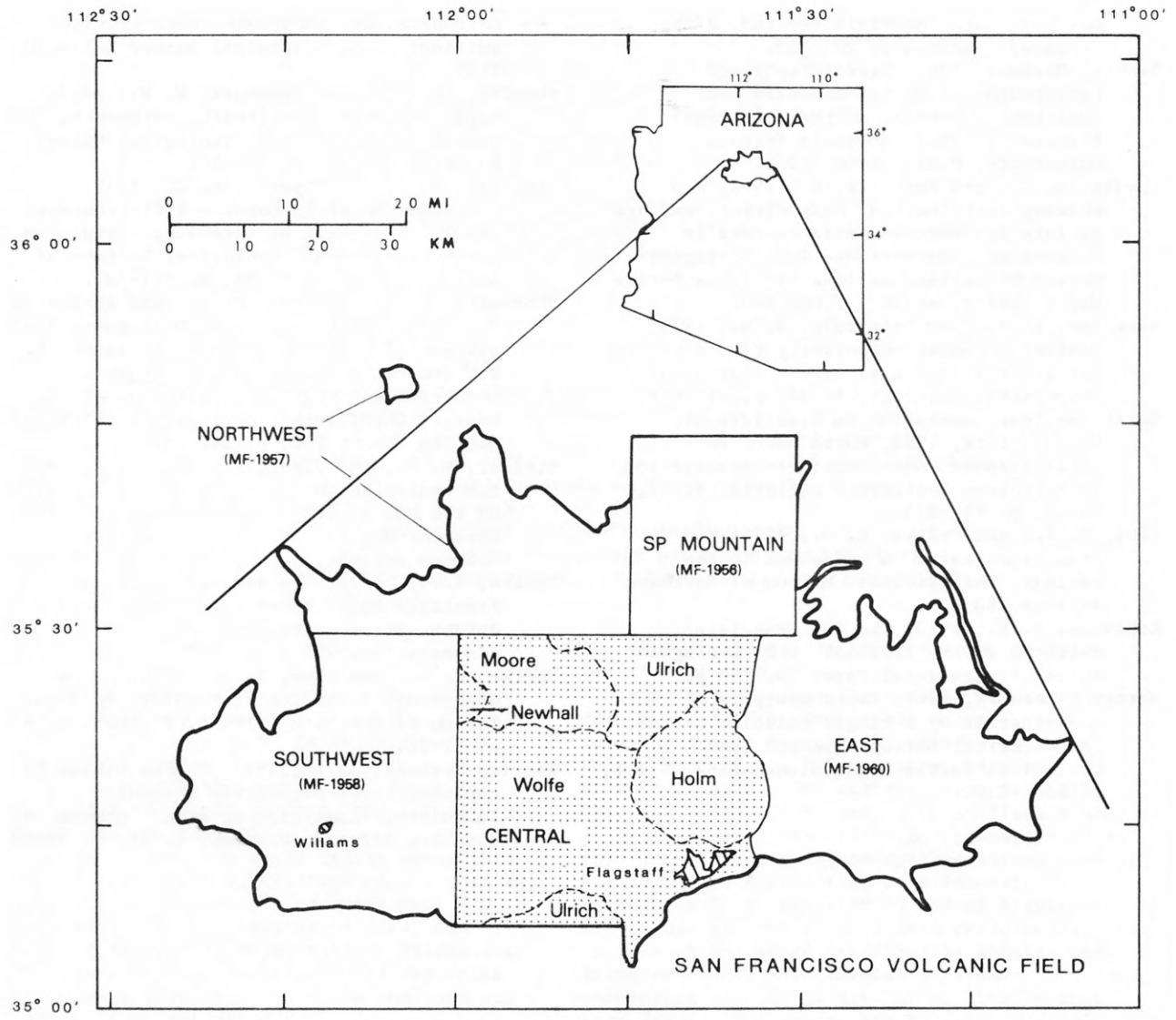

FIGURE 1. Index map showing (1) location of the Central part of the San Francisco volcanic field, Arizona, (2) mapping responsibility in the Central map area, and (3) relation of the map of the Central part to other maps in this series that cover other parts of the volcanic field.

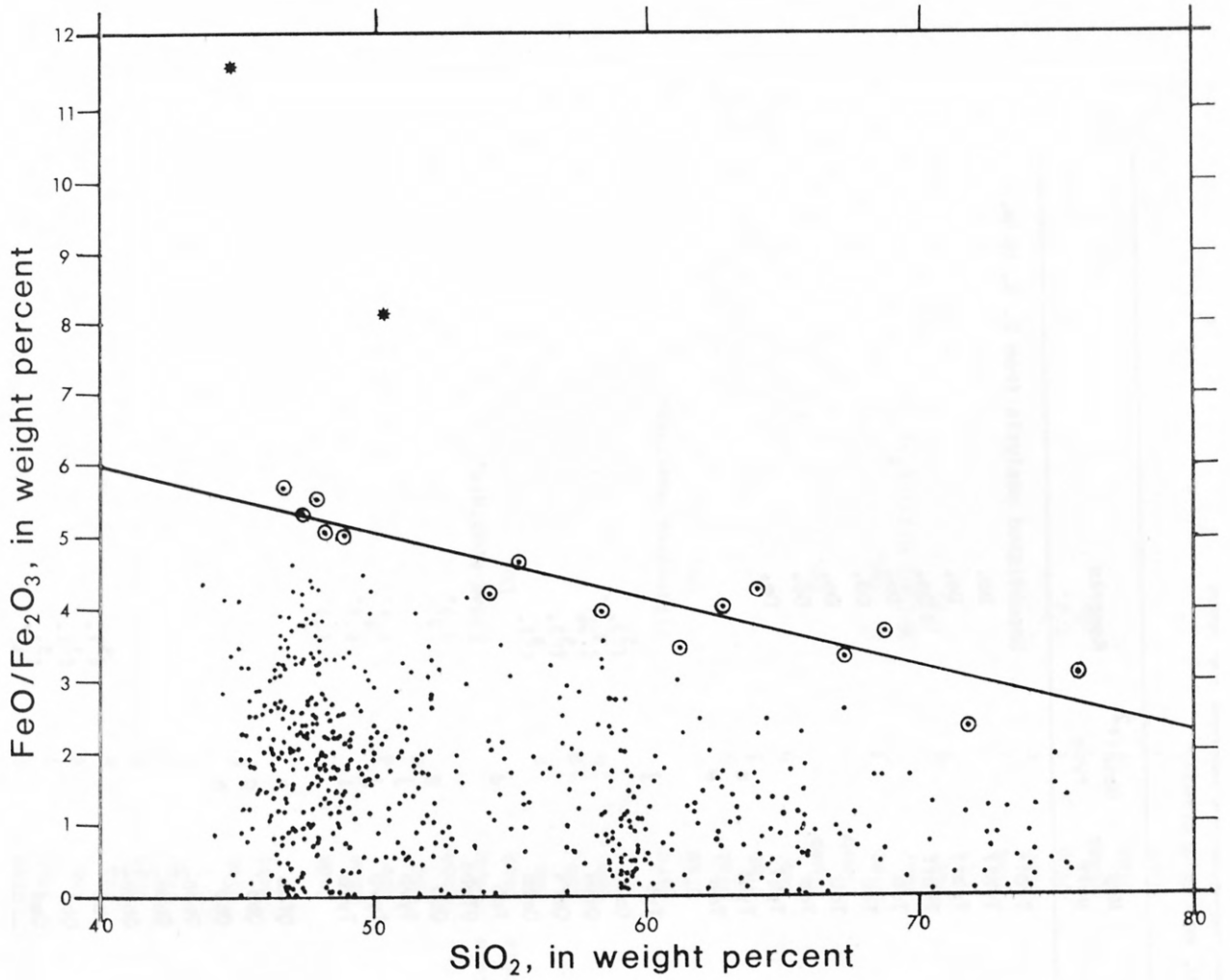

FIGURE 2. Diagram showing variation of FeO/Fe_2O_3 versus SiO_2 for 601 volcanic rocks for which both FeO and Fe_2O_3 were analyzed. Line, described by the equation $FeO/Fe_2O_3=9.627-0.0921xSiO_2$, is a least-squares fit through 15 points (circled) that represent the highest values for FeO/Fe_2O_3 throughout the range of SiO_2 values. Note that two analyses (asterisks) with unusually high FeO/Fe_2O_3 were not included in controlling the position of the line.

TABLE 1. ANALYZED ROCKS IN THE CENTRAL MAP AREA
[ND, not determined]

Sample No.	Rock type	Vent[1] No.	Feature	Map unit	Basalt[2] type	Remarks
0414	BASALT	ND	Flow	Tybff		Unpublished analysis from E. A. Holm.
0414A	BASALT	ND	--do--	Tybff		Do.
0414B	BASALT	ND	--do--	Tybff		Do.
0414C	BASALT	ND	--do--	Tybff		Do.
0414D	BASALT	ND	--do--	Tob		Do.
0414E	BASALT	ND	--do--	Tob		Do.
0414F	BASALT	ND	--do--	Tob		Do.
0414G	BASALT	ND	--do--	Tob		Do.
0414H	BASALT	ND	Dike	Tybl		Do.
0414I	BASALT	ND	Fissure deposits	Tybf	a	
0501	BASALT	ND	Flow	Tob	e	
0506	BASALT	0506	--do--	Tyb	j	
0603A	DACITE	0603	Dome	Qmdj		(3).
0603B	BENMOREITE	0603	Vent	Qmbn		(3).
0614	RHYOLITE	0614	Dome	Qmrl		(3).
0626	BENMOREITE	0614	Flow	Qmbn		(3).
0626A	BASALT	ND	--do--	Tob	d	
1408	BENMOREITE	1407	--do--	QTmbn		
1436	BASALT	1520	--do--	Qbb	g	
1504	BASALT	1505	--do--	Tyvb	j	
1506	BASALT	1505	--do--	Tyvb	j	
1508	BASALT	1508	--do--	Tyvb	i	
1509	BASALT	1505A	--do--	QTmb	h	
1517	BASALT	1520	--do--	Qbb	g	
1519	BASALT	1520	--do--	Qbb	h	
1609	BENMOREITE	1602	--do--	$Qbbn_2$		
1609A	BENMOREITE	1602	--do--	$Qbbn_2$		
1609B	BENMOREITE	1602	--do--	$Qbbn_2$		
1611	DACITE	1602	--do--	Qbd		(3).
1611A	GABBRO	1602	Xenolith	Qbd		(3).
1611B	GABBRO	1602	--do--	Qbd		(3).
1611C	GABBRO	1602	--do--	Qbd		(3).
1611D	GABBRO	1602	--do--	Qbd		(3).

1611E	GABBRO	1602	--do--	Qbd		(3).
1615	BASALT	1615	Flow	QTmb	g	
1615A	BASALT	1615	--do--	QTmb	g	
1616	BASALT	ND	--do--	Tob	d	
1617	BASALT	ND	Flow	Tob	a	
1618	BASALT	1617	--do--	QTmb	h	
1619	BASALT	1618	--do--	QTmb	g	
1620	BASALT	1629	--do--	QTb	i	
1621	BASALT	1621	--do--	QTmb	g	
1623	BENMOREITE	1622	--do--	Qmbn		
1628	DACITE	1628	Dome	Qmdm		(3).
1629	BENMOREITE	1628	Flow	Qmbn		(3).
1715	BASALT	ND	--do--	Tob	d	(3).
1722	BASALT	1625	--do--	Qmb	e	
1731	BENMOREITE	0603	--do--	Qmbn		(3).
1807	DACITE		Pyroclastic breccia	Qepb		Elden Mountain.
1807A	DACITE		Pyroclastic breccia	Qepb		Do.
1808	BASALT	1805	Flow	Qbb	b	
2401	BASALT	3521	--do--	Qbb	g	
2403	BASALT	3433	--do--	Qmb	h	(3).
2405	RHYOLITE		Dome	Tsrc		Sitgreaves Mountain.
2405A	DACITE		--do--	QTsd		Do.
2405B	BASALT	2405	Flow	QTmb	g	
2408	BASALT	2408	Vent	QTmb	f	
2409	BASALT	3433	Flow	Qmb	h	
2409A	BASALTIC ANDESITE	2416	--do--	QTmab		Do.
2409B	BASALTIC ANDESITE	2416	--do--	QTmab		
2409C	BASALT	2416A	--do--	QTmb	j	Do.
2410	RHYOLITE		Dome	Twhr		Wright Hill; (3).
2413	BASALT	3521	Flow	Qbb	g	(3).
2415	BASALT	2415	Vent	QTmb	j	
2415A	BASALT	2415A	Flow	QTmb	c	
2416	BASALT	2416	--do--	QTmb	f	(3).
2416A	BASALT	2416	Vent	QTmab	f	(3).
2416B	BASALT	2416	Flow	QTmb	f	
2417	BASALT	2407	--do--	QTmb	i	
2421	BASALT	2421	--do--	QTmb	h	
2422	BASALT	2415	Vent	QTmb	j	
2422A	BASALT	2421A	--do--	Tyvb	j	

TABLE 1. ANALYZED ROCKS IN THE CENTRAL MAP AREA--Continued

Sample No.	Rock type	Vent[1] No.	Feature	Map unit	Basalt[2] type	Remarks
2425	BASALT	2519	Flow	Qmb	h	
2425A	BASALT	2530	Vent	QTmb	i	
2426	BASALT	2423	Flow	QTmb	i	
2426A	BASALT	2424	--do--	QTmb	i	
2429	BASALT	2420	Flow	Qmb	g	
2432	BASALT	2429	--do--	QTmb	b	
2432A	BASALT	2429	Vent	QTmb	j	
2435	BASALT	2436	Flow	Tyvb	j	
2501	BASALT	3621	--do--	Qbb	h	
2506	BENMOREITE	2506	Vent	Qmbn		
2506A	DACITE	2506	Scoria	Qmdk		
2506B	DACITE	2506	Flow	Qmdk		
2514	BASALT	3534	--do--	Qbb	h	
2517	BASALT	2517	Vent	QTmb	g	
2517A	BASALT	2517A	--do--	QTmb	e	
2517B	BASALT	2517?	Flow	QTmb	g	
2519	BASALT	2519B	--do--	Tyb	j	
2520	BASALT	2603?	--do--	Qbhb	h	([3]).
2525	BASALT	2620	--do--	Qbb	i	
2525A	BASALT	2630A	--do--	QTb	d	
2527	BENMOREITE	2522	--do--	Qmbn		
2529	BASALT	2530A	Vent	QTmb	g	
2530	BASALT	2519A	Flow	QTb	h	
2530A	BASALT	2530	Vent	QTb	b	
2532	BENMOREITE		Dome	Qmbn		49 Hill.
2532A	BASALT	3534	Flow	Qbb	h	
2532B	BASALT	2531	--do--	QTmb	i	
2533	BASALT	2533	Vent	QTmb	g	
2602	ANDESITE		Flow	Qaa_2		San Francisco Mountain.
2602A	DACITE		--do--	QThpd		Do.
2604	BASALT	2604	Vent	QTmb	h	
2613	ANDESITE		Flow	Qa_1		Do.
2616	BASALT	2603?	--do--	Qbhb	h	([3]).
2626	BASALT	ND	--do--	Tob	h	

2630	BASALT	2630	Vent	QTmb	g	
2633	BENMOREITE		Flow	Qmbn		Vent buried, near Wing Mountain.
2635	BENMOREITE	1602	--do--	$Qbbn_2$		[3].
2703	DACITE		--do--	Qa_1		San Francisco Mountain.
2704	DACITE		--do--	Qfdf		Do.
2704A	DACITE		--do--	Qsfd		Do.
2704B	ANDESITE		--do--	Qa_2		Do.
2704C	DACITE		Dome	Qfd		Do.
2704D	DACITE		--do--	Qsd_1		Do.
2705	RHYOLITE		Flow	Qdr		San Francisco Mountain; [4].
2705A	RHYOLITE		--do--	Qdr		San Francisco Mountain.
2705B	RHYOLITE		--do--	Qdr		Do.
2705D	ANDESITE		--do--	Qa_1		San Francisco Mountain.
2705E	ANDESITE		Flow	Qa_1		Do.
2705F	ANDESITE		--do--	Qa_1		Do.
2705G	ANDESITE		Dome	Qaa_1		Do.
2706	ANDESITE		pumice	Qa_1		Do.
2712	DACITE		Dome	Qsd_1		Do.
2722	DACITE		Pyroclastic breccia	Qfpb		Do.
2724	BASALT	ND	Flow	Qbmb	h	
2725	DACITE		--do--	Qed_3		Elden Mountain.
2725A	DACITE		Intrusive breccia	Qedi		Do.
2725B	DACITE		--do--	Qedi		Do.
2727	DACITE		Dome	Qdld		Dry Lake Hills.
2733	DACITE		Pyroclastic breccia	Qfpb		San Francisco Mountain.
2733A	BASALT	ND	Flow	Tob	e	
2733B	BASALT	ND	--do--	Tob	h	
2736	DACITE		Dome	Qed_2		Elden Mountain, [3].
2736A	DACITE		--do--	Qed_2		Elden Mountain.
2818	DACITE		Flow	Qsd_2		San Francisco Mountain.
2829	BASALT	ND	--do--	Qbmb	h	
2830	DACITE		--do--	Qed_2		Elden Mountain.
3401	BASALT	3401	Vent	QTmb	i	
3404	BASALT	3404	--do--	QTmb	g	
3411	BASALT	3518	Flow	QTmb	e	
3416	BASALT	3416	Vent	QTmb	e	
3417	BASALT	3420	Flow	Qbmb	h	
3417A	BASALT	3417	--do--	QTmb	h	
3421	RHYOLITE		Dome	Trsr		RS Hill.

TABLE 1. ANALYZED ROCKS IN THE CENTRAL MAP AREA--Continued

Sample No.	Rock type	Vent[1] No.	Feature	Map unit	Basalt[2] type	Remarks
3422	RHYOLITE OBSIDIAN		--do--	Trsr		RS Hill.
3423	BASALT	3529	Flow	Qbmb	g	
3423A	BASALT	3423	--do--	QTmb	e	
3424	BASALT	3424	--do--	QTmb	b	
3425	RHYOLITE OBSIDIAN		Dome	Tgmr		Government Mountain.
3425A	BASALT	3521	Flow	Qbb	h	
3425C	RHYOLITE		Dome	Tgmr		Do.
3426	BASALT	3426	Flow	Qbmb	h	(3).
3426A	BASALT	3424	Vent	QTmb	d	
3426B	BENMOREITE		Dome	Qmbn		Spring Valley Knolls.
3428	RHYOLITE		--do--	Tsra		Sitgreaves Mountain.
3428A	DACITE		Essential clast	Tsp		Do.
3432	RHYOLITE		Dome	Tsre		Sitgreaves Mountain, (3).
3433A	RHYOLITE		Flow	Tsrv		Sitgreaves Mountain.
3433B	RHYOLITE		--do--	Tsrb		Sitgreaves Mountain.
3434	RHYOLITE		Dome	Tghr		Government Hill, (3).
3435	BENMOREITE		--do--	Qmbn		Government Prairie, northwest part.
3501	DACITE		Flow	Qkdc		Kendrick Peak.
3501A	BASALT	3501	Vent	Qbmb	h	
3502	ANDESITE		Flow	Qka		Kendrick Peak, (4).
3502A	MICRODIORITE		Xenolith	Qkrc		Kendrick Peak.
3502C	ANDESITE		Flow	Qka		Do.
3502D	RHYOLITE		Dome	Tkrb		Do.
3502E	DACITE		Dike	Qkdi		Do.
3503	ANDESITE		Flow	Qka		Kendrick Peak, (3).
3503A	DACITE		Dome	Tkdd		Kendrick Peak, (4).
3503B	ANDESITE		Flow	Qka		Kendrick Peak.
3503C	ANDESITE		--do--	Qka		Do.
3503D	DACITE		Dome	Tkde		Do.
3503E	ANDESITE		Dike	Qka		Do.
3503F	ANDESITE		Flow	Qka		Do.
3503G	RHYOLITE		Dome	Tkrd		Kendrick Peak, (3).
3503H	ANDESITE		Dike	Qkai		Kendrick Peak.
3503I	DACITE		Dome	Tkdd		Do.

3503J	RHYOLITE		Accessory clast?	Qkbr		Do.
3503K	ANDESITE		Flow	Qka		Do.
3504	DACITE		Dome	QTkdf		Kendrick Peak, [3].
3504A	BASALT	3509	Vent	Qmb	g	
3504B	ANDESITE		Flow	Qka		Kendrick Peak.
3505	BASALT	3505B	Vent	Qbmb	h	
3505A	BASALT	3504	Flow	Qbmb	i	
3505B	BASALT	3505A	Vent	Qmb	i	
3508	BASALT	3505	--do--	Qmb	e	
3508A	BENMOREITE	3509A	Flow	Qmbn		
3508B	BASALT	3508A	Vent	Qmb	d	
3508C	BASALT	3508	--do--	Qmb	i	
3509	BENMOREITE	3509A	--do--	Qmbn		
3509A	BASALT	3509	--do--	Qmb	d	
3509B	BASALT	3509	--do--	Qmb	g	
3510	ANDESITE		Flow	Qka		Kendrick Peak.
3511	BASALT	3511	Vent	Qmb	g	
3511A	BASALT	3511	--do--	Qmb	g	
3512	BASALT	3512	--do--	Qbb	g	
3515	BASALT	ND	Flow	QTmb	i	
3516	BENMOREITE	3522	--do--	$Qbbn_1$		
3517	BASALT	3517	Vent	QTmb	i	
3518	BASALT	3523	Flow	Qbb	h	
3518A	BASALT	3507	Vent	QTmb	i	
3522	BASALT	3521	--do--	Qbb	g	
3523	BASALT	3608	Flow	Qbb	h	
3523A	BASALT	3523A	Vent	Qbb	d	
3527	BASALT	3521	Flow	Qbb	g	
3528	BASALTIC ANDESITE	3528A	--do--	Qbab		[3].
3528A	BASALT	3528	Vent	QTmb	b	
3531	DACITE	2506	Inclusion? of Qmdk	Qmrk		[3].
3531A	RHYOLITE	2506	Dome	Qmrk		
3531B	BENMOREITE	2506	Vent	Qmbn		[4].
3531C	RHYOLITE	2506	Dome	Qmrk		[4].
3601	BASALT	3601	Vent	Qbb	g	
3601A	BASALT	3601A	--do--	Qbb	c	
3604	RHYOLITE		Dome	Tkpr		Kendrick Park.
3606	BASALT	3606	Vent	Qbb	h	
3609	BASALT	3616	Flow	Qbb	g	

TABLE 1. ANALYZED ROCKS IN THE CENTRAL MAP AREA--Continued

Sample No.	Rock type	Vent[1] No.	Feature	Map unit	Basalt[2] type	Remarks
3610	BASALT	3610	Vent	Qmb	e	
3610A	BASALT	3615	Flow	Qbmb	h	
3611	BASALT	3611	Vent	QTmb	i	
3612	RHYOLITE		Dome	Qwhr		White Horse Hills.
3612B	ANDESITE		Pipe (not mapped)	P Ps		White Horse Hills; intrudes Supai Group.
3612C	ANDESITE		--do--	P Ps		Do.
3614	DACITE		Flow	Qhdf		San Francisco Mountain.
3614A	DACITE		--do--	Qhdf		Do.
3615	BASALT	3615	Vent	Qbmb	h	
3616	BASALT	3616A	--do--	QTb	i	
3616A	RHYOLITE		Dome	Qhr		Hochderffer Hills.
3617	BASALT	3608	Vent	Qbb	g	
3621	BASALT	3621?	Flow	Qbb	h	
3621A	BASALT	3621A	Vent	Qbb	h	
3622	DACITE		Flow	Qsfd		San Francisco Mountain.
3622A	BASALT	3621	Vent	Qbb	h	
3627	BASALT	3627	Flow	Qbb	h	
3630	BENMOREITE	3630	Vent	$Qbbn_1$		
3633	BASALT	2603	Flow	Qbhb	h	
3634	BASALT	3634	--do--	Qbhb	h	[3].
3705	BASALT	3705	Vent	Qbb	h	[3].
3707	ANDESITE		Flow	Qa_2		San Francisco Mountain.
3707A	ANDESITE		--do--	Qa_1		Do.
3710	DACITE		--do--	Qsfd		San Francisco Mountain.
3711	DACITE		Flow	Qrd_1		Do.
3712	DACITE		Flow	Qlmd		Do.
3713	DACITE		Dome	Tnsd		North Sugarloaf, [4].
3713A	DACITE		--do--	Tnsd		North Sugarloaf.
3719	ANDESITE		Flow	Qa_2		San Francisco Mountain.
3720	DACITE		Dome	Qhd		Do.
3721	ANDESITE		Flow	Qa_2		Do.
3723	RHYOLITE		Ash	Qsgp		Sugarloaf, [3].
3723A	RHYOLITE		Dome	Qsgr		Sugarloaf, [4].
3723B	RHYOLITE		--do--	Qsgr		Sugarloaf.

3725	ANDESITE	Flow	Qda	San Francisco Mountain.
3727	DACITE	--do--	Qsfd	Do.
3727A	DACITE	Dome	Qrd_2	Do.
3728	ANDESITE	Flow	Qa_1	Do.
3728A	ANDESITE	--do--	Qa_1	Do.
3728B	DACITE	--do--	Qa_1	Do.
3728C	ANDESITE	Flow	Qa_1	Do.
3728D	DACITE	Dike	Qdi	Do.
3728E	ANDESITE	--do--	Qai	Do.
3729	DACITE	Flow	Qsfd	San Francisco Mountain, ([3]).
3729A	ANDESITE	--do--	Qa_2	Do.
3729B	DACITE	Pluton	Qhdi	San Francisco Mountain; ([4]).
3729C	ANDESITE	Dike	Qai	San Francisco Mountain.
3729D	ANDESITE	Flow	Qa_1	Do.
3729E	ANDESITE	--do--	Qa_2	Do.
3729G	DACITE	--do--	Qsfd	Do.
3729H	DACITE	Pluton	Qhdi	Do.
3729I	ANDESITE	Flow	Qa_1	Do.
3729J	ANDESITE	--do--	Qa_1	Do.
3729K	ANDESITE	Dike	Qai	Do.
3729L	DACITE	--do--	Qdi	Do.
3729M	DACITE	--do--	Qdi	Do.
3729Q	ANDESITE	Flow	Qa_2	Do.
3732	ANDESITE	--do--	Qa_1	San Francisco Mountain; ([3]).
3732%	ANDESITE	--do--	Qa_2	San Francisco Mountain.
3732+	ANDESITE	--do--	Qa_1	Do.
3732A	ANDESITE	--do--	Qca	San Francisco Mountain, ([3]).
3732B	RHYOLITE	--do--	Qcr	San Francisco Mountain, ([4]).
3732C	ANDESITE	Vent	Qc	San Francisco Mountain.
3732D	ANDESITE	--do--	Qc	Do.
3732E	MONZODIORITE	Dike	Qmi	San Francisco Mountain.
3732F	DACITE	Dike	Qhdi	Do.
3732G	ANDESITE	Flow	Qa_1	Do.
3732H	ANDESITE	--do--	Qa_1	Do.
3732I	ANDESITE	--do--	Qa_1	Do.
3732J	BASALT	--do--	In Qa_1 e	Do.
3732K	BASALT	--do--	In Qa_1 e	Do.
3732L	ANDESITE	--do--	Qa_1	Do.
3732M	ANDESITE	--do--	Qa_1	Do.

TABLE 1. ANALYZED ROCKS IN THE CENTRAL MAP AREA--Continued

Sample No.	Rock type	Vent[1] No.	Feature	Map unit	Basalt[2] type	Remarks
3732N	RHYOLITE		Dike	Qri		San Francisco Mountain.
37320	ANDESITE		Flow	Qca		Do.
3732P	RHYOLITE		Dome	Qcr		Do.
3732Q	ANDESITE		Dike	Qai		Do.
3732R	ANDESITE		Plug	Qdli		Do.
3732S	ANDESITE		Dike	Qai		Do.
3732T	ANDESITE		Flow	Qca		Do.
3732U	ANDESITE		Pluton	Qca		Do.
3732V	ANDESITE		Dike	Qca		Do.
3732W	ANDESITE		Flow	Qca		Do.
3732X	ANDESITE		--do--	Qca		Do.
3732Y	BASALT		Dike (not mapped)	In Qcr	e	Do.
3732Z	BASALT		Flow	In Qa_1	e	Do.
3733	RHYOLITE		Dome	Qdsr		Do.
3733A	DACITE		Dike	Qdi		Do.
3733B	DACITE		Dike	Qdi		Do.
3733C	MONZODIORITE		--do--	Qmi		Do.
3733D	MICROGRANITE		Plug	Qgi		Do.
3733E	ANDESITE		Flow	Qa_1		Do.
3734A	RHYOLITE		Dome	Qrr_1		Do.
3819	DACITE		Flow	Qdd_2		Do.
3819A	DACITE		Sheet	Qsfp		Do.
3819B	RHYOLITE		Accessory clast	Qsfp		Do.
3831	DACITE		Flow	Qdd_3		San Francisco Mountain, [3].
3831A	ANDESITE		--do--	Qa_2		San Francisco Mountain.
4401	BASALT	ND	--do--	Qbmb	g	
4402	BASALT	4402	Vent	Qbb	g	
4405	BASALT	4405	--do--	QTmb	d	
4405A	BASALT	5432A	Flow	QTmb	l	[3].
4407	BASALT	4408	Vent	Qbmb	b	
4409	BASALT	4409	--do--	QTmb	h	
4410	BASALT	4435A	Flow	QTmb	l	
4413	BASALT	4413	Vent	QTmb	g	
4414	BASALT	4414	--do--	Qbmb	g	

4416	BASALT	4416	Vent	QTmb	e	
4416A	BASALT	4416	Dike	QTmb	d	
4417	BASALT	4417	Vent	QTmb	l	
4417A	BASALTIC ANDESITE	4417A	--do--	QTmab		
4417B	BASALTIC ANDESITE	4417A	--do--	QTmab		
4424	TRACHYTE		Flow	Qmt		Bull Basin Mesa; ([4]).
4425	BASALT	4425	Vent	Qbmb	g	
4427	BASALT	4427	--do--	QTmb	l	
4427A	BASALT	4427A	--do--	QTmb	l	
4428	BASALTIC ANDESITE	4432	Flow	QTmab		
4428A	BASALTIC ANDESITE	4432	--do--	QTmab		
4429	BASALTIC ANDESITE	4429	Vent	QTmab		
4429A	BASALT	4429A	--do--	QTmb	a	
4432	BASALTIC ANDESITE	4432	Flow	QTmab		
4432A	BASALT	4432	--do--	QTmb	l	
4432B	BASALT	4432A	Vent	QTmb	l	
4435	BASALT	4435	--do--	QTmb	l	
4435A	ANDESITE		Dome	QTma		Moritz Ridge.
4436	BASALT	4425	Vent	Qbmb	g	
4436A	BASALT	4435A	Flow	QTmb	e	
4436B	BASALT	4436	Vent	QTmb	h	
4502	RHYOLITE		Dome	$Qslr_2$		Slate Mountain.
4503	RHYOLITE		--do--	$Qslr_1$		South Slate Mountain.
4505	BASALT	ND	Flow	Qbmb	h	
4506	BASALT	4506	Vent	QTmb	h	
4507	BASALT	4507	--do--	Qmb	j	
4508	BASALT	4508	--do--	Qmb	l	
4517	BASALT	4508	--do--	Qmb	l	
4517A	BASALT	4517	--do--	Qmb	l	
4521	BASALT	4521	--do--	Qbmb	h	
4522	DACITE		Dome	QTkda		Kendrick Peak.
4522A	BASALT	4522	Vent	QTmb	e	
4522B	RHYOLITE		Dome	QTkra		Do.
4525	BASALT	4535	Flow	Qbmb	e	
4526	BASALT	4527	Vent	QTmb	l	
4526A	DACITE		Dome	QTkdb		Do.
4526B	BASALT	4526	Vent	QTmb	e	
4527	BASALT	4527	--do--	QTmb	l	
4528	TRACHYTE		Flow	Qmt		Bull Basin Mesa.

TABLE 1. ANALYZED ROCKS IN THE CENTRAL MAP AREA--Continued

Sample No.	Rock type	Vent[1] No.	Feature	Map unit	Basalt[2] type	Remarks
4528A	BASALT	4521	--do--	Qbmb	e	
4532	BENMOREITE		Dome	Qmbn		Associated with trachyte (Qmt).
4533	DACITE		Flow	Qkdg		Kendrick Peak.
4533A	RHYOLITE		Dome	Tkre		Do.
4534	DACITE		--do--	Tkdh		Kendrick Peak; ([3]).
4534A	ANDESITE		Flow	Qka		Kendrick Peak.
4534B	ANDESITE		--do--	Qka		Do.
4534D	RHYOLITE OBSIDIAN		--do--	Qkrc		Do.
4534E	MICRODIORITE		Xenolith	Qkrc		Do.
4534F	DACITE		Dome	Tkdh		Do.
4535	ANDESITE		Flow	Qka		Do.
4535A	ANDESITE		--do--	Qka		Do.
4535B	ANDESITE		--do--	Qka		Do.
4536	DACITE		--do--	Qka		Do.
4536A	BASALT	4535	--do--	Qbmb	e	
4603	BASALT	4603	Vent	Qbb	h	
4607	BASALT	ND	Flow	Qbmb	h	
4614	BASALT	4614	Vent	Qbb	h	
4619	BASALT	ND	Flow	Qbmb	e	
4619A	BASALT	ND	--do--	Qbmb	h	
4622	BASALT	4622?	Flow	Qbmb	e	
4624	BASALT	4624	Vent	Qbb	l	
4625	BASALT	4625	--do--	Qbb	l	
4626	BASALT	4626	--do--	Qbyb	l	
4627	BASALT	4626	Flow	Qbyb	l	
4629	BASALT	4629	Vent	Qbb	e	
4631	BASALT	4536	Flow	Qbb	h	
4631A	BASALT	4631	Vent	Qbb	l	
4634	BASALT	4626	Airfall deposit	Qbybp		
4635	BASALT	4635	Vent	Qbb	h	
4636	BASALT	4636	--do--	Qbb	l	
4701	BASALT	5733	Flow	Qbb	l	
4703	BASALT	4703	Vent	Qbb	l	
4704	BASALT	4704	--do--	Qbb	h	

4707	BASALT	4707	--do--	Qbb	i	
4708	BASALT	4708	--do--	Qbb	i	
4710	BASALT	4715A	Flow	Qbb	i	
4711	BASALT	4711	Vent	Qbb	i	
4712	BASALT	4711	Flow	Qbb	i	
4715	BASALT	4715C	Vent	Qbb	i	
4717	BASALT	4708A	--do--	Qbb	i	
4717A	BASALT	4717	--do--	Qbb	h	
4717B	BASALT	4720	Flow	Qbb	i	
4718	BASALT	4613	Flow	Qbb	i	
4718A	BASALT	ND	--do--	Qbb	i	
4719	BASALT	4719	Vent	Qbb	h	
4723	ANDESITE		Flow	Qa_2		San Francisco Mountain.
4723A	BASALT	3705?	--do--	Qbb	h	
4723B	BASALT	4625?	--do--	Qbb	i	
4726	BASALT	4726	Vent	Qbb	d	
4729A	BASALT	4729	--do--	Qbb	e	
4729B	BASALT	4728	--do--	Qbb	i	
4730	BASALT	4625	Flow	Qbb	i	
4735	DACITE		--do--	Qrd_2		San Francisco Mountain.
4818	ANDESITE		--do--	Qa_2		Do.
4819	BASALT	4819	Vent	Qbb	g	
5536	BASALT	4606	--do--	Qbmb	h	
5732	BASALT	5732	--do--	Qbb	h	([3]).
5733A	BASALT	5733	Dike	Qbbl	i	
5733B	BENMOREITE	5733	Xenolith	Qbbt		
5734	BASALT	5734G	Vent	Qbmb	e	
DC03A[5]	RHYOLITE		Accessory clast	Qa_1		In tuff, San Francisco Mountain.
DC03B	DACITE		--do--	Qa_1		Do.
DC03C	ANDESITE		--do--	Qa_1		Do.
DC04A	ANDESITE		--do--	Qa_1		In tuff breccia, San Francisco Mountain.
DC04B	BASALT		--do--	Qa_1	e	Do.
DC04C	ANDESITE		--do--	Qa_1		Do.
DC05	ANDESITE		Flow	Qa_1		San Francisco Mountain; ([3]).
DC07	ANDESITE		--do--	Qa_1		San Francisco Mountain.
DC08	ANDESITE		--do--	Qa_1		Do.
DC09	ANDESITE		--do--	Qa_1		Do.
DC10	ANDESITE		--do--	Qa_1		Do.
DC11	ANDESITE		--do--	Qa_1		Do.

TABLE 1. ANALYZED ROCKS IN THE CENTRAL MAP AREA--Continued

Sample No.	Rock type	Vent[1] No.	Feature	Map unit	Basalt[2] type	Remarks
DC12	ANDESITE		--do--	Qa_1		San Francisco Mountain.
DC13A	ANDESITE		--do--	Qa_1		Do.
DC13B	ANDESITE		--do--	Qa_1		Do.
DC14	ANDESITE		--do--	Qa_1		Do.
DC15	ANDESITE		--do--	Qa_1		Do.
DC16	ANDESITE		--do--	Qa_1		Do.
DC17	ANDESITE		--do--	Qa_1		Do.
DC18	ANDESITE		--do--	Qa_1		Do.
DC19	ANDESITE		--do--	Qa_1		Do.
DC20	ANDESITE		Essential(?) clast	Qa_1		In tuff breccia, San Francisco Mountain.
DC22	ANDESITE		Flow	Qa_1		San Francisco Mountain.
DC23	ANDESITE		--do--	Qa_1		Do.
DC24	ANDESITE		Flow	Qa_1		Do.
DC25A	ANDESITE		Essential(?) clast	Qa_1		In tuff breccia, San Francisco Mountain.
DC25B	ANDESITE		--do--	Qa_1		Do.
DC26	ANDESITE		Flow	Qa_1		San Francisco Mountain.
DC30	ANDESITE		--do--	Qa_1		Do.
DC32	ANDESITE		--do--	Qa_1		San Francisco Mountain; ([3]).
DC35	ANDESITE		--do--	Qa_1		San Francisco Mountain.
DC36	ANDESITE		--do--	Qa_1		San Francisco Mountain; ([3]).
DC38	ANDESITE		--do--	Qa_1		San Francisco Mountain.
DC40	ANDESITE		--do--	Qa_1		Do.
DC42	ANDESITE		--do--	Qa_1		Do.
DC43	ANDESITE		--do--	Qa_1		Do.
DC47	ANDESITE		--do--	Qa_1		Do.
DC49	ANDESITE		--do--	Qa_1		Do.
DC57	ANDESITE		--do--	Qa_1		San Francisco Mountain; ([3]).
DC58	DACITE		--do--	Qsfd		Do.
DC65	ANDESITE		--do--	Qa_2		Do.

[1]Blank entry indicates isolated domes or other volcanic units originating at nonbasaltic volcanic centers to which vent numbers were not assigned. Such volcanic loci are normally indicated under "Remarks."

[2]Blank entry indicates rock type other than basalt.

[3]For trace-element analyses see table 5.

[4]Only trace elements analyzed, table 5.

[5]Samples DC03A through DC65 represent a sequence of extrusive units exposed in a continuous stratigraphic section in the north wall of the Inner Basin of San Francisco Mountain. Numbers 03 through 65 refer to individual eruptive units numbered in order of decreasing age within the sequence. Letter suffixes, A, B, etc., identify multiple samples within a single extrusive unit.

TABLE 2. COMPLETE ANALYSES OF OXIDES IN WEIGHT PERCENT, CENTRAL MAP AREA

Sample No.	SiO_2	Al_2O_3	Fe_2O_3	FeO[1]	MgO	CaO	Na_2O	K_2O	H_2O[2]	TiO_2	P_2O_5[3]	MnO[2]	CO_2[2]	Total	Lab. No.	Analysts[4]
0414	46.20	14.30	2.60	7.88	7.60	13.50	3.60	0.90	0.74	1.98	0.41	0.18	0.13	100.02	2954	TD,SV,RS
0414A	46.20	13.50	7.90	3.02	8.00	13.80	3.10	1.10	0.93	2.06	0.83	0.18	0.06	100.68	2955	TD,SV,RS
0414B	44.60	10.90	6.50	4.82	13.80	12.10	2.80	1.10	0.71	1.98	0.77	0.18	0.00	100.26	2956	TD,SV,RS
0414C	45.60	11.60	4.30	4.86	13.30	14.10	2.60	0.90	0.38	1.19	0.89	0.18	0.00	99.90	2957	TD,SV,RS
0414D	49.20	16.80	3.20	7.29	6.60	9.70	3.90	1.10	0.30	1.94	0.53	0.17	0.07	100.80	2963	TD,SV,RS
0414E	47.60	14.10	4.70	6.39	9.70	10.70	2.90	0.90	1.04	1.59	0.46	0.19	0.29	100.56	2964	TD,SV,RS
0414F	46.10	14.70	5.60	5.76	9.70	10.90	2.50	0.50	2.47	1.11	0.41	0.19	0.10	100.04	2966	TD,SV,RS
0414G	46.50	14.60	3.40	8.01	10.20	11.30	3.20	0.50	0.57	1.04	0.40	0.20	0.39	100.31	2967	TD,SV,RS
0414H	44.50	11.90	4.60	5.76	11.50	13.90	2.20	0.90	1.34	1.78	0.67	0.18	0.63	99.86	2968	TD,SV,RS
0414I	45.27	11.61	3.27	7.34	13.72	11.76	2.38	0.76	0.69	1.58	0.54	0.17	0.14	99.23	M129265	HE,LE,JT
0501	48.90	16.10	12.20	0.00	6.73	10.30	2.70	0.78	0.00	1.62	0.30	0.18	0.00	99.81	M141514	JW,JB,JTG
0506	43.50	13.56	12.03	0.00	9.11	13.16	3.04	0.59	0.00	1.68	1.03	0.17	0.00	97.87	M136988	LE
0603A	68.62	14.58	2.22	1.02	0.61	1.98	5.04	3.71	1.28	0.50	0.35	0.07	0.04	100ns	M133192	LE,MC
0603B	54.06	16.79	9.42	0.41	1.69	4.47	5.36	2.45	0.82	1.70	1.25	0.17	0.11	98.70	M133193	LE,MC
0614	71.69	14.51	0.89	1.01	0.35	1.35	5.08	4.00	0.26	0.25	0.16	0.09	0.04	99.68	M133191	LE,MC
0626	55.12	17.48	3.28	5.58	2.36	5.04	5.74	2.04	0.34	1.57	0.95	0.16	0.05	99.71	M133190	LE,MC
0626A	46.81	15.39	10.96	0.00	8.26	10.66	3.17	0.73	0.00	1.26	0.33	0.17	0.00	97.74	M133138	LE
1408	59.20	16.80	4.40	2.20	1.60	4.80	5.10	2.20	1.10	0.94	0.63	0.13	0.03	99.13	W188073	LA
1436	46.44	15.57	12.33	0.00	9.34	9.69	3.16	0.99	0.00	2.10	0.40	0.18	0.00	100.20	M136995	LE
1504	45.44	14.35	11.25	0.00	8.35	12.00	2.87	1.24	0.00	1.77	0.91	0.18	0.00	98.36	M133146	LE
1506	47.42	15.68	10.94	0.00	7.59	10.46	3.07	1.76	0.00	1.82	0.93	0.17	0.00	99.84	M136992	LE
1508	51.33	17.31	10.03	0.00	4.88	7.48	3.59	1.58	0.00	1.53	0.34	0.14	0.00	98.21	M133145	LE
1509	51.73	17.52	11.41	0.00	3.37	5.46	5.32	1.80	0.00	2.17	0.77	0.16	0.00	99.71	M133144	LE
1517	46.62	15.99	12.70	0.00	8.90	9.38	3.25	0.99	0.00	2.20	0.41	0.18	0.00	100.62	M136993	LE
1519	47.23	17.42	13.72	0.00	6.45	8.03	3.57	1.10	0.00	2.63	0.47	0.18	0.00	100.80	M136994	LE
1609	55.53	17.03	9.29	0.00	2.43	5.15	4.97	2.10	0.00	1.47	0.95	0.16	0.00	99.08	M139280	GK
1609A	55.30	18.20	9.32	0.00	2.28	5.05	5.41	2.04	0.31	1.46	1.01	0.18	0.00	100.56	D235641	JW,JTG,JB
1609B	60.20	17.30	7.36	0.00	1.75	4.01	5.54	2.58	0.00	1.09	0.73	0.15	0.00	100.71	D235642	JW,JTG,JB
1611	65.03	16.01	2.01	2.24	0.74	2.29	5.31	3.39	0.66	0.50	0.24	0.12	0.03	98.57	M131428	MV,BK,PK
1611A	44.52	19.19	5.82	6.66	5.51	9.93	3.77	0.34	0.47	2.88	0.25	0.13	0.05	99.52	M131429	MV,BK,PK
1611B	44.77	16.43	6.33	8.32	4.88	9.42	4.20	0.51	0.73	2.73	1.03	0.23	0.04	99.62	M131430	MV,BK,PK
1611C	45.76	15.25	7.92	6.78	6.76	9.73	3.36	0.72	0.78	2.54	0.11	0.16	0.05	99.92	M131431	MV,BK,PK
1611D	48.65	17.84	4.31	8.19	3.51	7.58	4.56	0.94	0.57	1.92	1.07	0.22	0.04	99.40	M131432	MV,BK,PK
1611E	41.19	14.58	7.45	7.95	7.54	11.05	3.11	0.41	0.47	3.43	2.66	0.19	0.08	100.11	M131433	MV,BK,PK

1615	45.56	16.42	11.56	0.00	9.72	11.13	3.16	0.66	0.00	1.44	0.85	0.00	0.00	100.50	M131423	LE
1615A	45.33	16.29	11.76	0.00	9.56	11.06	2.97	0.71	0.00	1.48	0.93	0.18	0.00	100.27	M136991	LE
1616	48.43	16.27	11.44	0.00	6.31	9.42	3.36	1.08	0.00	1.59	0.33	0.16	0.00	98.39	M133134	LE
1617	43.77	11.52	12.57	0.00	11.17	10.78	2.83	1.27	0.00	2.36	0.58	0.17	0.00	97.02	M133140	LE
1618	48.27	17.21	12.89	0.00	4.26	6.18	5.10	1.56	0.00	2.73	0.71	0.16	0.00	99.07	M133141	LE
1619	44.69	15.06	12.34	0.00	9.52	10.67	2.69	0.72	0.00	1.85	0.62	0.18	0.00	98.34	M133143	LE
1620	45.51	15.57	12.78	0.00	8.81	9.58	3.17	0.68	0.00	1.97	0.59	0.18	0.00	98.84	M133142	LE
1621	46.70	15.05	11.82	0.00	10.53	10.06	2.99	0.96	0.00	1.89	0.44	0.18	0.00	100.62	M136990	LE
1623	57.08	16.66	8.18	0.00	1.99	4.27	5.84	2.26	0.00	1.24	0.88	0.16	0.00	98.56	M133139	LE
1628	63.09	15.63	2.49	2.49	1.24	2.77	5.24	3.44	1.29	0.82	0.58	0.13	0.06	99.27	M133194	LE,MC
1629	54.86	16.85	3.01	5.68	2.46	4.56	5.94	2.41	0.27	1.57	1.19	0.18	0.04	99.02	M133195	LE,MC
1715	50.00	15.60	2.10	8.91	9.00	9.60	2.90	0.50	0.43	1.27	0.22	0.20	0.05	100.78	3074	DE
1722	49.00	16.11	12.66	0.00	4.43	6.88	4.41	1.45	0.00	1.87	1.04	0.22	0.00	98.07	M133137	LE
1731	53.75	16.79	5.78	3.95	2.28	4.82	5.83	2.28	0.58	1.70	1.34	0.19	0.03	99.32	M133189	LE,MC
1807	65.81	15.80	4.90	0.00	0.74	2.46	5.35	3.11	0.00	0.50	0.21	0.10	0.00	98.98	M133135	LE
1807A	64.44	15.81	4.93	0.00	0.72	2.58	5.21	3.14	0.00	0.53	0.21	0.11	0.00	97.68	M133136	LE
1808	47.90	16.50	3.80	6.93	7.60	9.40	3.50	0.90	0.10	1.86	0.62	0.20	0.05	99.36	3004	DE
2401	47.16	16.11	2.08	8.80	8.66	10.73	2.85	0.78	0.69	1.71	0.38	0.18	0.05	100.18	M126470	HE,LE,MC,GA,JT
2403	51.20	16.70	3.40	7.90	4.00	6.00	5.20	1.60	0.43	2.50	0.68	0.13	0.02	99.76	W188070	LA
2405	73.56	13.11	0.64	0.34	0.09	0.20	4.97	4.49	2.16	0.04	0.02	0.06	0.03	99.71	M129339	HE,LE,JT
2405A	69.57	15.04	2.26	0.54	0.55	2.53	4.60	3.07	1.02	0.29	0.13	0.06	0.41	100.07	M129349	HE,LE,JT
2405B	47.84	16.16	4.13	6.48	7.08	11.67	3.01	0.71	0.62	1.45	0.34	0.16	0.33	99.98	M129344	HE,LE,JT
2408	52.90	16.60	5.10	4.00	4.80	8.20	3.20	1.40	1.22	1.40	0.36	0.11	0.01	99.30	W188052	LA
2409	50.00	18.14	3.65	8.04	4.01	6.18	5.08	1.54	0.23	2.58	0.69	0.17	0.04	100.35	M126469	HE,LE,MC,GA,JT
2409A	61.28	14.12	1.13	3.89	5.12	6.01	3.32	2.76	1.11	0.57	0.23	0.10	0.04	99.68	M126471	HE,LE,MC,GA,JT
2409B	61.20	14.50	1.40	4.20	6.10	6.50	3.20	2.60	0.79	0.63	0.23	0.09	0.02	101.46	W188040	LA
2409C	47.98	15.19	10.75	0.00	9.30	11.02	2.86	0.79	0.00	1.52	0.39	0.17	0.00	99.97	M137016	LE
2410	72.80	13.90	0.57	0.48	0.12	0.87	4.40	4.10	2.62	0.04	0.05	0.04	0.01	100.00	W188067	LA
2413	48.30	15.50	2.90	8.00	8.40	10.40	3.10	0.81	1.02	1.80	0.38	0.15	0.02	100.78	W188064	LA
2415	48.95	14.13	9.92	0.00	10.89	11.61	2.48	0.73	0.00	1.09	0.31	0.00	0.00	100.11	M131398	LE
2415A	48.20	17.27	11.49	0.00	6.22	9.55	3.65	1.14	0.00	1.77	1.02	0.00	0.00	100.31	M131397	LE
2416	49.94	14.84	1.92	7.55	8.42	10.90	2.93	1.00	0.23	1.38	0.31	0.16	0.22	99.80	M126467	HE,LE,MC,GA,JT
2416A	53.50	13.80	1.90	5.60	10.80	7.80	2.70	1.40	0.84	0.93	0.30	0.11	0.02	99.70	W188048	LA
2416B	50.60	13.80	4.00	4.80	13.30	8.70	2.60	0.88	0.91	1.00	0.32	0.12	0.02	101.05	W188055	LA
2417	50.11	18.47	11.32	0.00	5.26	7.60	3.89	1.43	0.00	2.27	0.40	0.16	0.00	100.91	M137006	LE
2421	51.83	18.63	10.80	0.00	3.87	6.81	4.43	1.43	0.00	1.89	0.43	0.00	0.00	100.12	M131401	LE
2422	48.76	15.36	10.76	0.00	8.93	11.30	2.98	0.80	0.00	1.50	0.35	0.00	0.00	100.74	M131399	LE
2422A	43.80	15.73	12.04	0.00	8.18	12.60	3.48	0.52	0.00	2.10	1.05	0.00	0.00	99.50	M131400	LE
2425	47.27	17.45	12.98	0.00	6.20	8.33	3.79	1.09	0.00	2.77	0.51	0.00	0.00	100.39	M131407	LE

TABLE 2. COMPLETE ANALYSES OF OXIDES IN WEIGHT PERCENT, CENTRAL MAP AREA--Continued

Sample No.	SiO_2	Al_2O_3	Fe_2O_3	FeO[1]	MgO	CaO	Na_2O	K_2O	H_2O[2]	TiO_2	P_2O_5[3]	MnO[2]	CO_2[2]	Total	Lab. No.	Analysts[4]
2425A	48.86	16.08	9.98	0.00	8.52	10.98	2.77	0.83	0.00	1.07	0.45	0.16	0.00	99.70	M137013	LE
2426	49.17	17.81	11.54	0.00	5.72	8.66	3.94	1.04	0.00	2.03	0.49	0.00	0.00	100.40	M131405	LE
2426A	49.09	17.63	11.53	0.00	4.82	8.66	3.93	1.40	0.00	1.75	1.45	0.00	0.00	100.26	M131406	LE
2429	48.84	16.15	10.42	0.00	8.27	10.29	3.21	1.03	0.00	1.69	0.37	0.00	0.00	100.27	M131402	LE
2432	47.90	14.16	10.69	0.00	8.76	10.49	3.04	1.70	0.00	2.13	0.67	0.00	0.00	99.54	M131403	LE
2432A	43.91	13.64	11.96	0.00	8.45	13.00	3.55	0.84	0.00	2.67	0.89	0.00	0.00	98.91	M131404	LE
2435	44.21	15.96	12.18	0.00	7.60	12.41	3.39	0.78	0.00	2.22	1.19	0.19	0.00	100.13	M136996	LE
2501	51.26	18.39	11.84	0.00	3.89	6.14	4.60	1.66	0.00	2.25	0.72	0.00	0.00	100.75	M131415	LE
2506	59.30	16.60	6.50	0.56	1.50	4.40	5.70	2.30	0.75	1.20	0.84	0.11	0.02	99.78	W188045	LA
2506A	66.20	15.90	1.70	1.50	0.87	2.10	5.20	3.60	1.62	0.44	0.32	0.09	0.01	99.55	W188051	LA
2506B	65.90	16.50	3.20	0.04	0.69	1.70	5.70	3.50	0.75	0.40	0.29	0.10	0.01	98.78	W188050	LA
2514	47.30	17.63	14.86	0.00	5.13	6.82	4.38	1.25	0.00	3.01	0.53	0.00	0.00	100.91	M131416	LE
2517	47.29	16.85	13.09	0.00	7.34	8.53	3.69	1.11	0.00	2.57	0.43	0.00	0.00	100.90	M131414	LE
2517A	48.14	17.28	12.92	0.00	6.04	8.01	4.03	1.21	0.00	2.62	0.63	0.00	0.00	100.88	M131412	LE
2517B	47.16	17.01	12.91	0.00	6.95	8.18	3.55	1.08	0.00	2.66	0.46	0.17	0.00	100.13	M137015	LE
2519	47.57	16.73	10.23	0.00	7.74	11.71	2.92	0.96	0.00	1.53	0.39	0.00	0.00	99.78	M131411	LE
2520	48.54	17.51	12.31	0.00	7.32	8.88	3.53	0.78	0.00	1.91	0.32	0.00	0.00	101.10	M131413	LE
2525	46.96	16.98	11.58	0.00	7.33	9.60	3.71	1.06	0.00	1.95	0.69	0.00	0.00	99.86	M131419	LE
2525A	46.69	17.19	11.74	0.00	7.10	9.74	3.33	1.06	0.00	2.04	0.65	0.18	0.00	99.72	M137024	LE
2527	57.37	17.26	7.56	0.00	1.99	4.62	5.80	2.40	0.00	1.22	0.91	0.00	0.00	99.13	M131417	LE
2529	49.27	15.64	10.06	0.00	8.16	10.58	2.88	0.94	0.00	1.30	0.37	0.16	0.00	99.36	M137014	LE
2530	48.54	18.28	12.19	0.00	5.27	7.98	4.37	0.86	0.00	2.18	0.61	0.00	0.00	100.28	M131408	LE
2530A	48.46	13.99	10.10	0.00	11.42	9.64	2.44	0.93	0.00	0.97	0.37	0.17	0.00	98.49	M137012	LE
2532	59.32	17.36	7.04	0.00	1.37	2.84	6.51	2.90	0.00	0.89	0.66	0.00	0.00	98.89	M131409	LE
2532A	47.47	17.41	14.50	0.00	4.54	6.35	4.68	1.27	0.00	3.12	0.60	0.00	0.00	99.94	M131410	LE
2532B	46.14	15.02	11.57	0.00	7.55	11.33	3.02	1.29	0.00	1.81	0.90	0.18	0.00	98.81	M133147	LE
2533	45.95	17.49	11.84	0.00	7.72	9.73	3.26	0.87	0.00	1.22	1.04	0.18	0.00	99.30	M136989	LE
2602	59.14	17.02	5.44	1.66	1.62	3.96	4.66	3.01	0.69	0.99	0.50	0.15	0.24	99.08	M124520	BK,BF,JT,SN
2602A	65.52	16.23	4.62	0.00	0.42	1.99	5.52	3.66	0.00	0.40	0.13	0.00	0.00	98.49	M131421	LE
2604	50.94	17.91	12.19	0.00	3.36	5.92	4.73	1.81	0.00	2.46	0.73	0.17	0.00	100.22	M137023	LE
2613	59.86	18.21	2.85	2.93	1.22	4.52	5.42	2.39	1.10	0.98	0.41	0.11	0.08	100.08	M129279	HE,LE,JT
2616	49.59	17.90	13.04	0.00	4.56	6.50	4.78	1.39	0.00	2.72	0.61	0.00	0.00	101.09	M131420	LE
2626	52.54	18.30	10.91	0.00	3.19	5.57	5.16	1.74	0.00	2.02	0.82	0.18	0.00	100.43	M137026	LE
2630	46.17	15.92	12.82	0.00	9.58	10.25	3.17	0.55	0.00	1.74	0.50	0.00	0.00	100.70	M131418	LE

2633	60.18	17.55	5.91	0.00	1.63	3.38	6.41	2.88	0.00	0.87	0.61	0.00	0.00	99.42	M131424	LE
2635	62.77	16.56	2.17	3.24	1.16	3.05	5.63	2.92	1.15	0.69	0.40	0.14	0.04	99.92	M131427	MV,BK,PK
2703	61.78	16.59	2.86	3.26	1.62	3.92	4.90	2.95	0.46	1.07	0.36	0.10	0.06	99.93	M129276	HE,LE,JT
2704	65.72	15.99	3.13	1.78	0.73	2.34	5.30	3.17	0.18	0.60	0.23	0.11	0.25	99.53	M124507	BK,BF,JT,SN
2704A	63.38	16.48	2.63	2.77	1.17	2.97	5.13	2.97	0.11	0.81	0.32	0.12	0.28	99.14	M124523	BK,BF,JT,SN
2704B	58.08	16.78	3.30	4.59	2.48	5.09	4.75	2.22	0.37	1.57	0.52	0.14	0.15	100.04	M124524	BK,BF,JT,SN
2704C	65.56	15.75	2.53	2.12	0.71	2.24	5.21	3.34	0.41	0.50	0.24	0.11	0.42	99.14	M124527	BK,BF,JT,SN
2704D	63.74	16.71	4.50	0.47	0.82	2.36	5.85	3.58	0.28	0.58	0.24	0.13	0.26	99.52	M124529	BK,BF,JT,SN
2705A	74.01	13.08	1.38	1.21	0.00	0.13	5.78	4.31	0.26	0.11	0.00	0.00	0.00	100.27	R4	HR
2705B	73.45	12.71	2.23	0.09	0.02	0.05	5.43	4.28	0.20	0.14	0.04	0.06	0.36	99.06	M124513	BK,BF,JT,SN
2705D	54.87	16.95	10.01	0.00	3.74	6.77	4.37	1.71	0.00	1.60	0.38	0.00	0.00	100.40	M133814	DH
2705E	59.66	18.64	5.97	0.00	1.46	4.87	5.13	2.29	0.00	0.98	0.40	0.00	0.00	99.40	M133816	DH
2705F	59.62	18.35	6.05	0.00	1.57	4.83	5.12	2.29	0.00	0.99	0.40	0.00	0.00	99.22	M133817	DH
2705G	57.93	16.33	8.51	0.00	2.03	4.00	4.87	2.48	0.00	1.49	0.47	0.00	0.00	98.11	M133819	DH
2706	58.21	18.31	5.54	0.00	1.37	3.43	4.33	2.61	0.00	0.91	0.31	0.00	0.00	95.02	M133818	DH
2712	65.66	16.25	4.38	0.26	0.71	2.14	5.64	3.72	0.26	0.50	0.19	0.12	0.14	99.97	M129274	HE,LE,JT
2722	64.87	16.70	3.02	0.73	0.51	2.13	4.75	3.45	2.98	0.39	0.18	0.07	0.41	100.19	M129281	HE,LE,JT
2724	49.03	18.01	6.86	5.04	3.86	6.48	5.03	1.41	0.52	2.64	0.70	0.16	0.30	100.04	M129275	HE,LE,JT
2725	64.61	17.15	5.04	0.00	0.88	2.57	5.07	3.14	0.00	0.54	0.24	0.00	0.00	99.24	M133809	DH
2725A	65.61	16.43	4.20	0.00	0.76	2.61	5.47	3.15	0.00	0.61	0.25	0.00	0.00	99.09	M133811	DH
2725B	64.86	16.12	4.86	0.00	0.64	2.43	5.28	3.23	0.00	0.54	0.23	0.00	0.00	98.19	M133812	DH
2727	61.45	16.75	5.06	1.37	1.47	3.61	5.34	2.77	0.20	0.89	0.45	0.13	0.11	99.60	M124457	BF,BK,JT,SN
2733	65.78	15.74	2.50	2.35	0.85	2.54	5.40	3.26	0.67	0.52	0.23	0.11	0.01	99.96	M129280	HE,LE,JT
2733A	51.48	17.97	2.76	7.17	4.54	8.10	3.99	1.25	0.36	1.64	0.30	0.15	0.04	99.75	M129262	HE,LE,JT
2733B	48.33	17.31	3.91	7.60	5.66	7.98	4.06	1.23	0.47	2.59	0.41	0.16	0.11	99.82	M129264	HE,LE,JT
2736	65.60	16.40	3.50	1.45	0.80	2.70	5.30	3.20	0.19	0.50	0.60	0.16	0.05	100.45	2591	RS
2736A	65.92	17.12	4.68	0.15	0.86	2.59	4.49	3.10	0.36	0.51	0.25	0.00	0.00	100.03	R10	HR
2818	62.66	16.37	2.00	3.21	1.13	3.03	5.42	3.46	1.26	0.70	0.28	0.14	0.26	99.92	M129277	HE,LE,JT
2829	48.06	18.12	12.61	0.00	4.50	6.61	4.79	1.32	0.00	2.69	0.69	0.00	0.00	99.39	M133825	DH
2830	64.59	16.23	5.29	0.00	0.92	2.72	5.48	3.11	0.00	0.63	0.26	0.00	0.00	99.23	M133810	DH
3401	48.28	17.20	11.06	0.00	6.07	9.56	3.40	1.16	0.00	1.78	0.38	0.17	0.00	99.06	M137035	LE
3404	44.75	17.66	13.06	0.00	6.67	11.98	3.01	0.69	0.00	1.97	0.47	0.00	0.00	100.26	M131448	LE
3411	48.70	18.36	12.70	0.00	5.95	8.35	3.78	0.99	0.00	1.86	0.51	0.00	0.00	101.20	M131391	LE
3416	48.45	18.34	11.45	0.00	5.96	9.18	3.58	0.91	0.00	1.48	0.54	0.17	0.00	100.06	M137017	LE
3417	51.82	17.58	6.64	2.84	4.08	7.78	4.39	1.61	0.49	1.72	0.40	0.14	0.34	99.83	M129343	HE,LE,JT
3417A	48.74	17.81	5.31	5.36	6.09	9.57	3.62	0.92	0.20	1.67	0.36	0.16	0.06	99.87	M129345	HE,LE,JT
3421	74.93	13.11	0.51	0.77	0.23	0.30	5.64	4.28	0.32	0.07	0.00	0.00	0.00	100.16	R3	HR
3422	75.40	13.40	0.44	0.60	0.05	0.35	5.00	4.30	0.59	0.04	0.02	0.05	0.02	100.26	W188043	LA
3423	48.10	15.70	2.50	8.50	8.40	10.40	3.20	0.88	0.52	1.80	0.41	0.14	0.05	100.60	W188069	LA

TABLE 2. COMPLETE ANALYSES OF OXIDES IN WEIGHT PERCENT, CENTRAL MAP AREA--Continued

Sample No.	SiO_2	Al_2O_3	Fe_2O_3	FeO[1]	MgO	CaO	Na_2O	K_2O	H_2O[2]	TiO_2	P_2O_5[3]	MnO[2]	CO_2[2]	Total	Lab. No.	Analysts[4]
3423A	50.72	17.10	10.35	0.00	6.35	7.60	3.71	1.64	0.00	1.76	0.43	0.15	0.00	99.81	M137018	LE
3424	45.94	12.56	2.56	7.35	13.39	12.73	2.19	0.48	0.53	1.54	0.28	0.17	0.04	99.76	M129333	HE,LE,JT
3425	75.80	14.20	0.22	0.68	0.19	0.70	4.70	4.30	0.45	0.04	0.04	0.06	0.01	101.39	W188049	LA
3425A	50.50	16.00	1.10	8.90	7.20	8.20	3.50	0.82	0.66	2.00	0.42	0.13	0.02	99.45	W188058	LA
3425C	72.50	13.33	0.44	0.54	0.10	0.78	4.28	4.44	3.10	0.05	0.02	0.08	0.02	99.68	M126475	HE,LE,MC,GA,JT
3426	52.78	16.86	6.08	5.79	1.82	4.66	5.24	2.44	0.76	1.40	1.22	0.22	0.06	99.33	M126474	HE,LE,MC,GA,JT
3426A	49.38	15.93	4.68	5.06	7.28	8.34	3.88	1.60	0.47	1.58	0.48	0.17	0.08	98.93	M126479	HE,LE,MC,GA,JT
3426B	61.10	16.70	5.20	0.08	1.40	2.90	5.80	2.90	0.95	0.79	0.58	0.13	0.03	98.56	W188053	LA
3428	75.39	13.28	1.06	0.00	0.00	0.13	5.19	4.22	0.00	0.05	0.02	0.00	0.00	99.34	M131387	LE
3428A	70.15	14.45	2.32	0.00	0.46	1.75	4.34	3.77	0.00	0.29	0.10	0.00	0.00	97.63	M131388	LE
3432	72.37	13.77	0.94	0.28	0.23	1.03	4.48	4.07	2.39	0.07	0.03	0.06	0.05	99.77	M129341	HE,LE,JT
3433A	74.07	12.60	1.13	0.00	0.00	0.45	4.28	4.40	0.00	0.08	0.02	0.00	0.00	97.03	M131389	LE
3433B	74.47	13.44	1.11	0.00	0.00	0.39	5.26	4.24	0.00	0.05	0.02	0.00	0.00	98.98	M131390	LE
3434	72.60	13.50	0.61	0.40	0.04	0.60	4.00	4.70	3.46	0.04	0.03	0.06	0.01	100.05	W188063	LA
3435	57.14	17.32	7.98	0.35	1.45	3.96	6.25	2.48	0.47	1.19	0.84	0.18	0.07	99.68	M126468	HE,LE,MC,GA,JT
3501	65.01	16.16	4.82	0.00	1.97	3.85	4.29	3.26	0.00	0.81	0.18	0.00	0.00	100.35	M131476	LE
3501A	51.44	18.03	12.08	0.00	4.03	6.76	4.00	1.42	0.00	2.40	0.49	0.16	0.00	100.81	M138242	SK
3502A	58.39	17.64	3.17	3.45	2.25	5.14	4.98	2.10	0.78	1.22	0.38	0.11	0.11	99.72	M124474	BF,BK,JT,SN
3502C	58.44	16.06	1.69	5.36	4.03	6.25	3.72	2.44	0.86	1.16	0.27	0.12	0.19	100.59	M124487	BF,BK,JT,SN
3502D	74.98	13.17	0.46	0.89	0.15	0.69	4.27	4.80	0.25	0.09	0.03	0.07	0.01	99.86	M129312	HE,LE,JT
3502E	68.42	15.04	1.11	1.84	1.03	2.58	4.29	3.84	0.69	0.47	0.13	0.06	0.05	99.55	M129314	HE,LE,JT
3503	56.57	16.44	1.87	5.99	4.30	6.59	3.95	2.10	0.37	1.33	0.33	0.13	0.13	100.10	M124491	BF,BK,JT,SN
3503B	54.31	16.62	1.62	6.80	4.95	7.33	3.77	1.81	0.69	1.42	0.34	0.14	0.19	99.99	M124499	BF,BK,JT,SN
3503C	57.61	16.24	2.62	5.14	4.00	6.36	3.91	2.22	0.78	1.31	0.32	0.12	0.12	100.75	M124495	BF,BK,JT,SN
3503D	65.83	15.63	1.47	2.65	1.37	2.92	4.18	3.96	1.36	0.72	0.24	0.08	0.12	100.53	M124500	BF,BK,JT,SN
3503E	55.40	16.27	1.46	6.73	4.79	7.03	3.77	2.01	0.69	1.32	0.34	0.14	0.12	100.07	M124501	BF,BK,JT,SN
3503F	60.98	16.70	3.23	2.71	2.00	4.16	4.78	2.80	0.87	1.12	0.37	0.10	0.32	100.14	M124476	BF,BK,JT,SN
3503G	75.51	13.39	0.96	0.29	0.07	0.64	4.09	4.65	0.37	0.10	0.03	0.06	0.13	100.29	M124492	BF,BK,JT,SN
3503H	57.57	16.88	2.11	4.69	3.86	6.33	3.77	2.29	0.80	1.17	0.28	0.11	0.16	100.02	M124471	BF,BK,JT,SN
3503I	67.75	14.85	1.91	1.28	0.99	2.09	3.98	4.55	1.21	0.45	0.21	0.09	0.11	99.47	M124477	BF,BK,JT,SN
3503J	70.39	14.26	0.78	0.57	0.26	0.49	4.22	4.45	3.79	0.06	0.03	0.08	0.15	99.53	M124478	BF,BK,JT,SN
3503K	56.51	16.28	2.93	5.13	4.12	6.10	3.94	2.18	0.50	1.50	0.30	0.08	0.00	99.57	R19	HR
3504	63.58	16.54	2.93	2.03	1.45	3.45	4.54	3.46	0.49	0.78	0.39	0.12	0.11	99.87	M124473	BF,BK,JT,SN
3504A	47.67	16.50	3.51	7.82	7.51	9.76	3.36	0.82	0.30	2.17	0.54	0.16	0.30	100.42	M124496	BF,BK,JT,SN

3504B	59.28	16.15	2.30	4.55	3.70	5.75	4.10	2.38	0.50	1.18	0.28	0.11	0.22	100.50	M124497	BF,BK,JT,SN
3505	47.74	16.48	11.55	0.00	7.38	9.15	3.51	1.19	0.00	2.01	0.38	0.00	0.00	99.39	M131455	LE
3505A	48.26	16.53	11.73	0.00	7.34	9.25	3.75	1.22	0.00	2.01	0.38	0.00	0.00	100.47	M131456	LE
3505B	47.16	17.20	12.29	0.00	5.98	9.14	3.22	0.94	0.00	2.35	0.51	0.16	0.00	98.95	M138295	LE
3508	47.15	17.33	11.77	0.00	7.09	9.93	3.50	0.87	0.00	2.22	0.40	0.00	0.00	100.26	M131450	LE
3508A	57.81	16.94	7.68	0.00	1.83	4.08	6.08	2.60	0.00	1.29	0.82	0.00	0.00	99.13	M131454	LE
3508B	45.42	14.90	11.34	0.00	10.91	11.40	2.84	0.95	0.00	1.87	0.39	0.00	0.00	100.02	M131453	LE
3508C	47.41	17.00	12.17	0.00	6.60	9.14	3.38	0.94	0.00	2.33	0.47	0.17	0.00	99.61	M138294	LE
3509	58.47	16.62	7.65	0.00	2.10	4.17	5.64	2.67	0.00	1.36	0.83	0.00	0.00	99.51	M131449	LE
3509A	46.29	14.67	11.52	0.00	11.31	10.69	2.73	0.62	0.00	1.61	0.44	0.00	0.00	99.88	M131451	LE
3509B	47.15	16.18	11.61	0.00	8.97	10.64	3.10	0.69	0.00	1.79	0.46	0.00	0.00	100.59	M131452	LE
3510	59.74	16.27	2.73	4.06	3.20	5.46	4.06	2.54	0.53	1.23	0.29	0.10	0.25	100.46	M124486	BF,BK,JT,SN
3511	46.33	15.72	3.83	7.84	8.08	10.26	3.23	0.79	0.07	2.12	0.65	0.17	0.15	99.24	M124479	BF,BK,JT,SN
3511A	46.80	15.96	3.24	8.44	7.74	10.10	2.89	0.84	0.46	2.13	0.63	0.18	0.11	99.52	M124482	BF,BK,JT,SN
3512	46.91	16.00	11.62	0.00	8.96	11.10	3.03	1.02	0.00	1.87	0.41	0.00	0.00	100.92	M131475	LE
3515	48.34	17.30	12.91	0.00	5.74	7.77	2.42	1.00	0.00	2.73	0.50	0.18	0.00	98.89	M137025	LE
3516	59.40	17.43	7.55	0.00	1.59	3.89	5.87	2.22	0.00	0.97	0.65	0.00	0.00	99.57	M131396	LE
3517	47.91	17.09	11.50	0.00	6.82	8.54	3.52	1.36	0.00	2.29	0.44	0.17	0.00	99.64	M137019	LE
3518	53.42	17.72	11.13	0.00	3.36	5.67	4.89	1.93	0.00	2.08	0.51	0.00	0.00	100.71	M131392	LE
3518A	46.32	16.84	13.66	0.00	6.92	8.95	3.80	0.99	0.00	2.64	0.37	0.00	0.00	100.49	M131457	LE
3522	47.01	15.81	11.79	0.00	7.75	10.01	2.42	0.73	0.00	1.80	0.38	0.17	0.00	97.87	M138218	SK
3523	50.17	17.73	12.96	0.00	4.59	6.64	4.55	1.62	0.00	2.65	0.47	0.00	0.00	101.38	M131393	LE
3523A	46.07	16.19	11.03	0.00	10.07	10.70	2.87	0.67	0.00	1.59	0.64	0.18	0.00	100.01	M137020	LE
3527	48.76	16.02	11.35	0.00	8.46	10.13	3.31	1.01	0.00	1.65	0.35	0.00	0.00	101.04	M131394	LE
3528	59.10	15.33	7.33	0.00	3.82	5.43	4.13	2.50	0.00	1.04	0.24	0.00	0.00	98.92	M131395	LE
3528A	45.25	14.91	11.10	0.00	10.68	12.04	2.62	0.63	0.00	1.41	0.84	0.19	0.00	99.67	M137021	LE
3531	66.70	16.10	2.30	0.56	0.41	1.80	5.80	3.50	1.06	0.37	0.25	0.10	0.01	98.96	W188068	LA
3531A	73.20	15.00	1.40	0.04	0.16	0.85	5.00	4.30	0.41	0.12	0.08	0.07	0.01	100.64	W188044	LA
3601	47.13	16.49	12.83	0.00	7.54	8.48	2.90	1.10	0.00	2.58	0.38	0.17	0.00	99.60	M137095	GK
3601A	45.64	16.83	12.22	0.00	7.31	10.07	2.88	0.75	0.00	2.22	0.50	0.18	0.00	98.60	M137094	GK
3604	72.21	14.16	1.49	0.00	0.11	1.03	4.46	4.03	0.00	0.08	0.05	0.00	0.00	97.62	M131473	LE
3606	50.25	17.95	12.19	0.00	3.96	6.99	4.32	1.41	0.00	2.36	0.49	0.00	0.00	99.92	M131465	LE
3609	48.30	15.90	3.90	6.80	8.40	10.30	3.30	1.00	0.36	2.00	0.46	0.14	0.01	100.87	W188079	LA
3610	51.10	15.80	7.50	4.40	3.90	6.70	4.30	1.30	0.44	2.50	0.44	0.14	0.01	98.53	W188083	LA
3610A	52.20	16.40	2.80	7.70	3.70	5.90	4.60	1.70	0.40	2.30	0.73	0.14	0.01	98.58	W188077	LA
3611	51.28	15.61	8.93	0.00	7.49	9.60	3.18	1.26	0.00	1.09	0.60	0.16	0.00	99.20	M137079	LE
3612	74.23	13.65	0.84	1.04	0.23	0.75	4.87	3.96	0.19	0.08	0.00	0.00	0.00	99.84	R2	HR
3612B	57.63	16.95	6.51	0.00	1.07	4.58	4.80	2.63	0.00	1.33	0.48	0.12	0.00	96.10	M137097	GK
3612C	58.20	16.37	6.70	0.00	1.79	4.00	4.07	3.30	0.00	1.12	0.47	0.13	0.00	96.15	M137096	GK

TABLE 2. COMPLETE ANALYSES OF OXIDES IN WEIGHT PERCENT, CENTRAL MAP AREA--Continued

Sample No.	SiO_2	Al_2O_3	Fe_2O_3	FeO[1]	MgO	CaO	Na_2O	K_2O	H_2O[2]	TiO_2	P_2O_5[3]	MnO[2]	CO_2[2]	Total	Lab. No.	Analysts[4]
3614	60.17	17.28	2.71	3.27	1.58	4.40	4.66	2.79	1.45	0.97	0.37	0.10	0.20	99.95	M129273	HE,LE,JT
3614A	61.80	16.60	2.50	3.20	1.50	3.90	4.70	2.60	0.76	0.94	0.38	0.08	0.01	98.97	W188082	LA
3615	51.20	15.90	7.60	3.80	4.00	6.90	4.10	1.30	0.63	2.30	0.51	0.13	0.08	98.45	W188092	LA
3616	49.00	16.00	4.70	6.80	6.50	8.80	3.60	1.10	0.41	2.30	0.50	0.13	0.07	99.91	W188085	LA
3616A	72.00	14.90	1.60	0.16	0.03	0.33	5.20	4.50	0.56	0.07	0.03	0.05	0.01	99.44	W188074	LA
3617	46.42	16.33	11.59	0.00	8.38	10.35	3.21	1.03	0.00	1.97	0.41	0.00	0.00	99.69	M131467	LE
3621	52.00	16.70	5.30	5.90	3.70	6.00	4.30	1.80	0.90	2.40	0.73	0.13	0.05	99.91	W188089	LA
3621A	51.30	16.50	7.30	3.80	2.80	6.10	4.30	1.80	2.07	2.20	0.72	0.12	0.03	99.04	W188090	LA
3622	64.10	15.50	2.00	3.10	1.00	2.70	5.10	3.20	1.02	0.66	0.30	0.10	0.02	98.80	W188099	LA
3622A	52.20	16.70	2.80	7.80	3.70	6.00	4.80	1.80	0.28	2.30	0.73	0.14	0.02	99.27	W188080	LA
3627	49.82	17.55	13.60	0.00	4.10	5.91	5.13	1.67	0.00	2.76	0.66	0.00	0.00	101.20	M131422	LE
3630	55.77	17.88	9.03	0.00	1.64	5.07	5.01	1.83	0.00	1.34	0.79	0.15	0.00	98.51	M137022	LE
3633	50.77	17.27	12.38	0.00	3.82	6.30	4.45	1.55	0.00	2.66	0.66	0.18	0.00	100.04	M138219	SK
3634	50.80	16.70	7.50	4.00	3.60	6.00	5.00	1.50	0.65	2.40	0.73	0.15	0.01	99.04	W188086	LA
3705	47.50	16.60	11.70	0.88	4.90	7.20	4.40	1.30	0.49	2.60	0.64	0.14	0.08	98.43	W188084	LA
3707	55.27	17.11	9.38	0.00	3.02	5.98	3.99	1.83	0.00	1.64	0.32	0.14	0.00	98.68	M137110	GK
3707A	59.96	17.09	7.30	0.00	1.99	4.30	4.68	2.79	0.00	1.32	0.39	0.11	0.00	99.93	M137075	LE
3710	64.24	16.05	2.94	2.34	1.03	2.83	5.48	3.04	0.22	0.71	0.32	0.12	0.21	99.53	M124515	BK,BF,JT,SN
3711	61.19	16.78	6.84	0.00	1.64	3.79	4.92	2.70	0.00	0.97	0.41	0.00	0.00	99.24	M133823	DH
3712	62.60	17.70	2.10	3.40	1.00	3.50	5.00	2.10	0.86	0.71	0.43	0.08	0.04	99.52	W179985	HS
3713A	68.10	16.60	2.70	0.05	0.50	1.50	5.40	4.10	0.48	0.31	0.16	0.15	0.05	100.10	3127	DE
3719	54.76	17.19	1.95	6.79	3.46	6.10	4.06	1.87	0.64	1.66	0.39	0.14	0.18	99.19	M124519	BK,BF,JT,SN
3720	63.47	16.49	4.34	0.90	1.23	3.39	5.04	2.91	0.36	0.77	0.28	0.10	0.18	99.46	M129271	HE,LE,JT
3721	57.64	17.07	3.07	5.15	2.80	5.55	4.20	2.14	0.14	1.57	0.37	0.08	0.00	99.78	R18	HR
3723	73.20	14.40	0.37	0.44	0.16	0.41	4.90	4.10	2.04	0.00	0.01	0.06	0.03	100.12	W179978	HS
3723B	74.02	13.20	0.75	0.29	0.06	0.56	4.18	4.82	1.86	0.02	0.00	0.00	0.00	99.76	R1	SC
3725	55.33	16.91	10.43	0.00	2.85	4.79	4.99	2.21	0.00	1.86	0.58	0.00	0.00	99.95	M133808	DH
3727	63.48	16.62	2.05	3.43	1.31	3.14	5.28	2.95	0.25	0.89	0.38	0.13	0.10	100.01	M124509	BK,BF,JT,SN
3727A	62.65	16.65	2.99	2.57	1.52	3.77	5.04	2.97	0.28	0.95	0.29	0.09	0.13	99.90	M129272	HE,LE,JT
3728	59.73	17.77	3.15	3.30	1.78	4.54	5.05	2.47	0.65	1.13	0.53	0.12	0.09	100.31	M124514	BK,BF,JT,SN
3728A	58.21	17.51	3.77	3.07	1.89	4.59	5.02	2.39	0.93	1.16	0.52	0.13	0.36	99.55	M124516	BK,BF,JT,SN
3728B	64.25	15.96	3.88	0.85	0.80	2.59	5.88	3.24	1.10	0.64	0.21	0.17	0.05	99.62	M129346	HE,LE,JT
3728C	58.75	17.02	2.62	4.09	2.58	5.74	4.27	2.18	1.14	1.24	0.29	0.10	0.03	100.05	M129347	HE,LE,JT
3728D	65.58	16.28	2.70	1.72	0.68	2.48	5.53	3.33	1.16	0.48	0.21	0.06	0.06	100.27	M129350	HE,LE,JT

3728E	57.14	16.34	4.83	3.08	2.33	5.10	4.64	2.43	1.99	1.56	0.34	0.10	0.05	99.93	M129351	HE,LE,JT
3729	64.10	16.50	2.10	2.79	1.30	3.10	5.80	3.20	0.46	0.66	0.29	0.13	0.05	100.48	3138	DE
3729A	58.70	15.60	2.10	5.76	3.10	5.20	4.90	2.40	0.84	1.56	0.35	0.15	0.05	100.71	3140	DE
3729C	54.30	16.60	3.90	4.40	3.20	5.80	4.50	1.80	2.50	1.60	0.53	0.09	0.06	99.28	W188054	LA
3729D	59.10	17.00	6.20	0.81	2.00	4.30	5.60	2.70	0.66	1.15	0.50	0.13	0.05	100.20	3137	DE
3729E	57.00	17.00	2.50	5.22	2.80	5.30	5.10	2.30	0.40	1.57	0.47	0.17	0.05	99.88	3139	DE
3729G	64.60	16.60	2.62	2.38	0.93	3.06	5.12	3.43	0.28	0.80	0.18	0.06	0.00	100.06	R9	HR
3729H	65.76	16.18	1.76	2.53	0.89	2.76	5.04	3.17	0.25	0.60	0.24	0.10	0.15	99.43	M124508	BK,BF,JT,SN
3729I	59.12	17.30	4.66	2.10	1.86	4.15	4.91	2.57	1.31	1.11	0.51	0.12	0.10	99.82	M124512	BK,BF,JT,SN
3729J	59.47	17.01	4.45	2.11	1.89	4.35	5.25	2.60	1.66	1.09	0.49	0.12	0.26	100.75	M124528	BK,BF,JT,SN
3729K	55.77	16.91	3.58	4.63	3.02	5.71	4.55	1.95	1.51	1.56	0.47	0.12	0.09	99.87	M129348	HE,LE,JT
3729L	60.34	16.46	2.34	3.69	1.77	4.16	4.88	3.03	1.54	1.12	0.35	0.10	0.05	99.83	M129349	HE,LE,JT
3729M	60.17	16.34	4.60	1.92	1.57	3.96	5.25	2.74	1.70	0.99	0.55	0.11	0.03	99.93	M129352	HE,LE,JT
3729Q	55.01	17.20	9.27	0.00	3.35	6.31	4.23	1.72	0.00	1.62	0.39	0.00	0.00	99.10	M133815	DH
3732	59.25	18.16	3.66	2.01	1.66	4.90	5.25	2.23	1.29	1.02	0.44	0.08	0.05	100.00	M126434	HE,LE,MC,GA,JT
3732%	57.22	16.92	8.68	0.00	2.55	5.40	4.56	2.01	0.00	1.58	0.50	0.00	0.00	99.42	M133813	DH
3732+	56.63	17.25	8.17	0.00	3.39	6.36	4.17	1.64	0.00	1.55	0.25	0.00	0.00	99.41	M133822	DH
3732A	58.52	16.60	3.69	3.08	1.97	4.78	5.13	2.44	1.65	1.28	0.51	0.13	0.08	99.86	M129310	HE,LE,JT
3732C	59.10	17.80	3.40	3.15	2.30	5.10	5.10	2.20	0.36	1.17	0.41	0.12	0.05	100.26	3129	DE
3732D	59.40	15.90	3.40	3.42	2.10	4.50	4.80	2.70	1.32	1.41	0.30	0.10	0.05	99.40	3130	DE
3732E	57.30	16.20	2.60	5.22	2.80	5.40	5.10	2.20	0.63	1.53	0.35	0.15	0.05	99.53	3131	DE
3732F	65.80	15.80	2.10	2.25	1.00	3.00	5.50	3.10	0.30	0.59	0.22	0.10	0.05	99.81	3132	DE
3732G	59.20	16.90	3.20	3.51	2.20	4.40	5.50	2.50	0.67	1.05	0.47	0.14	0.05	99.79	3136	DE
3732H	58.80	16.60	2.10	4.68	3.10	5.30	4.70	2.40	0.40	0.94	0.27	0.11	0.05	99.45	3141	DE
3732I	58.80	17.90	2.10	3.60	2.00	5.10	5.50	2.40	0.38	1.04	0.42	0.13	0.05	99.42	3142	DE
3732J	51.80	18.20	5.80	3.69	4.20	8.10	4.30	1.50	1.04	1.62	0.34	0.16	0.05	100.80	3143	DE
3732K	52.70	18.80	5.50	3.80	3.60	7.80	4.00	1.20	1.10	1.50	0.19	0.11	0.02	100.32	W179980	HS
3732L	59.76	17.03	5.99	0.90	2.11	4.06	4.50	2.94	1.07	1.07	0.35	0.00	0.00	99.78	R17	HR
3732M	59.74	18.74	3.40	2.31	1.51	4.66	5.10	2.41	0.83	0.98	0.43	0.11	0.21	100.43	M124510	BK,BF,JT,SN
3732N	73.19	12.62	2.14	0.21	0.03	0.23	5.63	4.30	0.19	0.14	0.03	0.06	0.26	99.03	M124511	BK,BF,JT,SN
3732O	58.67	16.82	4.46	2.09	2.03	4.27	4.94	2.60	1.15	1.23	0.53	0.12	0.23	99.14	M124517	BK,BF,JT,SN
3732P	66.68	14.91	3.89	0.14	0.40	0.90	5.86	4.83	0.60	0.36	0.07	0.14	1.35	100.13	M124521	BK,BF,JT,SN
3732Q	57.39	16.73	5.00	3.02	1.35	4.04	5.18	2.60	1.31	1.50	0.53	0.13	0.43	99.21	M124522	BK,BF,JT,SN
3732R	54.51	17.05	9.31	0.39	3.27	6.33	4.32	2.02	0.40	1.70	0.39	0.12	0.20	100.01	M124526	BK,BF,JT,SN
3732S	59.27	15.96	2.41	5.48	2.12	4.74	4.86	2.65	0.18	1.52	0.43	0.13	0.06	99.81	M129315	HE,LE,JT
3732T	58.67	16.63	1.99	4.60	2.08	4.61	5.35	2.49	1.22	1.27	0.53	0.16	0.07	99.67	M129316	HE,LE,JT
3732U	59.56	16.76	2.85	3.84	1.94	4.48	5.37	2.49	0.38	1.25	0.48	0.15	0.07	99.62	M129317	HE,LE,JT
3732V	59.03	16.67	4.03	2.79	1.85	4.50	5.40	2.50	1.19	1.28	0.51	0.17	0.09	100.01	M129318	HE,LE,JT
3732W	59.81	16.84	7.04	0.00	1.31	4.40	5.42	2.60	0.33	1.25	0.50	0.15	0.10	99.75	M129319	HE,LE,JT

TABLE 2. COMPLETE ANALYSES OF OXIDES IN WEIGHT PERCENT, CENTRAL MAP AREA--Continued

Sample No.	SiO_2	Al_2O_3	Fe_2O_3	FeO[1]	MgO	CaO	Na_2O	K_2O	H_2O[2]	TiO_2	P_2O_5[3]	MnO[2]	CO_2[2]	Total	Lab. No.	Analysts[4]
3732X	59.54	16.70	6.98	0.00	1.66	4.60	5.42	2.52	0.48	1.24	0.54	0.16	0.12	99.96	M129320	HE,LE,JT
3732Y	52.20	16.86	6.19	3.43	3.77	7.44	4.09	1.55	2.11	1.63	0.36	0.14	0.07	99.84	M129321	HE,LE,JT
3732Z	53.06	16.65	6.39	3.79	3.93	7.15	4.35	1.73	0.27	1.72	0.42	0.15	0.06	99.67	M131425	MV,BK,PK
3733	74.19	12.85	1.60	0.98	0.11	0.12	5.86	3.98	0.26	0.09	0.00	0.00	0.00	100.04	R5	HR
3733A	62.59	17.23	2.63	1.99	1.10	3.50	4.81	3.03	0.89	0.95	0.28	0.07	0.36	99.43	M124506	BK,BF,JT,SN
3733B	65.13	16.10	1.78	2.35	0.68	2.38	5.53	3.33	1.30	0.50	0.22	0.08	0.46	99.84	M124530	BK,BF,JT,SN
3733C	57.21	16.58	3.30	4.83	2.94	5.68	4.55	2.15	0.76	1.63	0.36	0.13	0.20	100.32	M124531	BK,BF,JT,SN
3733D	67.12	14.84	2.03	1.66	0.35	1.17	5.86	4.74	0.44	0.37	0.07	0.14	0.18	98.97	M124532	BK,BF,JT,SN
3733E	58.11	16.90	2.58	4.51	2.74	6.00	4.23	1.90	1.00	1.26	0.27	0.11	0.27	99.88	M129278	HE,LE,JT
3734A	75.49	13.03	1.50	0.00	0.10	0.58	4.34	4.13	0.00	0.15	0.05	0.00	0.00	99.37	M133824	DH
3819	61.90	17.34	6.15	0.00	1.50	3.28	5.36	2.70	0.00	0.84	0.50	0.00	0.00	99.57	M133807	DH
3819A	62.98	15.79	5.05	0.00	0.80	2.42	4.66	3.30	0.00	0.53	0.23	0.00	0.00	95.76	M133820	DH
3819B	75.20	13.33	1.15	0.00	1.00	0.11	5.15	4.15	0.00	0.08	0.03	0.00	0.00	100.20	M133821	DH
3831	65.20	17.20	4.40	0.20	0.65	1.90	5.70	3.30	0.58	0.52	0.35	0.10	0.02	100.12	W179974	HS
3831A	54.48	17.33	4.54	4.61	3.58	6.44	4.06	1.66	0.76	1.70	0.38	0.13	0.30	99.97	M124525	BK,BF,JT,SN
4401	47.92	16.70	13.62	0.00	6.04	8.47	3.60	1.09	0.00	2.66	0.46	0.18	0.00	100.74	M138221	SK
4402	49.21	18.41	10.70	0.00	5.42	8.27	3.69	1.20	0.00	1.76	0.51	0.16	0.00	99.33	M137031	LE
4405	52.25	15.13	9.38	0.00	7.63	7.12	3.36	1.74	0.00	1.39	0.27	0.15	0.00	98.42	M137029	LE
4405A	47.45	16.80	11.10	0.00	6.88	10.04	2.92	0.74	0.00	1.77	0.37	0.16	0.00	98.23	M138204	SK
4407	47.20	15.66	11.20	0.00	8.55	10.84	2.98	1.02	0.00	1.83	0.35	0.17	0.00	99.80	M137030	LE
4409	46.14	19.16	11.94	0.00	6.24	10.34	3.01	0.60	0.00	1.84	0.28	0.18	0.00	99.73	M137033	LE
4410	46.72	17.10	2.46	9.60	7.12	9.08	3.48	0.89	0.42	2.25	0.40	0.17	0.03	99.72	M129304	HE,LE,JT
4413	46.54	16.49	13.98	0.00	6.59	8.65	3.82	1.10	0.00	2.66	0.47	0.00	0.00	100.30	M131461	LE
4414	46.64	16.72	13.89	0.00	6.65	8.69	3.90	1.04	0.00	2.67	0.44	0.00	0.00	100.64	M131462	LE
4416	52.24	16.01	4.77	4.81	5.86	7.63	3.39	1.49	1.04	1.59	0.39	0.14	0.50	99.86	M129305	HE,LE,JT
4416A	49.67	16.32	11.64	0.00	7.96	8.40	3.56	1.07	0.00	1.74	0.30	0.00	0.00	100.66	M131440	LE
4417	47.11	19.19	11.52	0.00	6.33	9.77	3.15	0.72	0.00	1.80	0.33	0.17	0.00	100.09	M137032	LE
4417A	56.71	16.97	7.71	0.00	3.46	5.70	3.88	2.02	0.00	1.44	0.28	0.14	0.00	98.31	M137034	LE
4417B	53.57	16.21	9.31	0.00	5.54	7.60	3.52	1.56	0.00	1.66	0.31	0.14	0.00	99.42	M139277	GK
4425	47.92	16.04	11.76	0.00	8.40	9.70	3.29	0.92	0.00	1.93	0.36	0.00	0.00	100.32	M131513	LE
4427	46.82	16.26	3.71	6.97	8.10	11.46	3.09	0.50	0.53	1.67	0.28	0.17	0.34	99.90	M129322	HE,LE,JT
4427A	49.20	17.04	3.51	7.62	5.17	8.50	4.21	1.32	0.19	2.13	0.51	0.19	0.02	99.61	M129323	HE,LE,JT
4428	58.42	14.86	1.55	5.07	4.63	6.87	3.73	2.72	0.53	1.03	0.42	0.12	0.06	100.01	M129303	HE,LE,JT
4428A	59.37	14.66	2.31	3.93	3.90	6.22	3.90	3.01	0.90	0.95	0.39	0.12	0.10	99.76	M129326	HE,LE,JT

4429	56.37	17.39	8.52	0.00	4.00	6.21	4.18	1.93	0.00	1.08	0.35	0.00	0.00	100.03	M131441	LE
4429A	46.86	12.83	12.34	0.00	14.26	9.33	2.35	0.59	0.00	1.66	0.22	0.00	0.00	100.44	M131442	LE
4432	58.17	14.67	6.85	0.00	4.44	6.36	3.58	2.89	0.00	0.98	0.42	0.12	0.00	98.48	M136963	LE
4432A	47.06	17.09	11.82	0.00	5.82	9.55	3.46	1.67	0.00	1.98	0.97	0.18	0.00	99.60	M136964	LE
4432B	47.13	16.77	11.38	0.00	6.19	9.84	3.32	1.66	0.00	1.87	0.89	0.18	0.00	99.23	M137036	LE
4435	46.16	17.34	12.44	0.00	5.06	10.13	3.83	1.34	0.22	2.35	0.57	0.18	0.15	99.77	M129325	HE,LE,JT
4435A	62.76	16.79	5.36	0.00	2.89	5.55	4.44	1.67	0.00	0.61	0.19	0.00	0.00	100.26	M131446	LE
4436	48.29	16.40	2.93	7.99	6.97	9.28	3.69	1.21	0.30	2.03	0.37	0.17	0.11	99.74	M129324	HE,LE,JT
4436A	48.38	18.92	12.06	0.00	5.82	8.56	3.99	1.05	0.00	2.21	0.50	0.00	0.00	101.49	M131447	LE
4436B	46.60	16.81	12.68	0.00	7.12	9.19	3.46	0.87	0.00	2.08	0.41	0.17	0.00	99.39	M138296	LE
4502	73.60	14.18	1.61	0.07	0.12	0.79	4.62	4.42	0.36	0.08	0.03	0.09	0.13	100.10	M124459	JT,SN,BK,BF
4503	72.78	13.66	1.06	0.00	0.00	0.82	4.28	4.42	0.00	0.04	0.00	0.08	0.00	97.14	M137028	LE
4505	47.19	17.72	12.31	0.00	6.40	8.99	3.73	0.99	0.00	2.21	0.50	0.00	0.00	100.04	M131463	LE
4506	48.01	17.66	12.02	0.00	5.97	8.51	3.61	1.07	0.00	2.16	0.59	0.18	0.00	99.78	M138220	SK
4507	46.14	14.49	12.49	0.00	11.11	10.79	2.80	0.32	0.00	1.94	0.29	0.00	0.00	100.37	M131460	LE
4508	47.09	14.66	2.46	9.08	9.94	10.75	2.86	0.41	0.34	2.07	0.32	0.17	0.01	100.16	M124483	BF,BK,JT,SN
4517	46.40	15.68	4.39	7.69	7.88	9.57	3.26	0.87	0.37	2.41	0.38	0.17	0.13	99.20	M124480	BF,BK,JT,SN
4517A	47.20	16.89	13.30	0.00	6.98	8.63	3.01	0.78	0.00	2.54	0.38	0.00	0.00	99.71	M131459	LE
4521	46.80	16.80	13.57	0.00	6.35	8.62	3.45	1.06	0.00	2.71	0.48	0.20	0.00	100.04	M137027	LE
4522	67.37	15.15	3.42	0.00	0.91	2.29	4.27	4.41	0.00	0.55	0.17	0.00	0.00	98.54	M131474	LE
4522A	47.95	19.17	11.70	0.00	5.62	9.70	3.54	0.65	0.00	1.53	0.45	0.00	0.00	100.31	M131478	LE
4522B	71.02	14.14	1.78	0.00	0.17	0.98	4.23	4.53	0.00	0.17	0.05	0.00	0.00	97.07	M131479	LE
4525	47.85	17.37	14.07	0.00	4.47	6.67	4.35	1.51	0.00	3.08	0.58	0.00	0.00	99.95	M131472	LE
4526	49.18	16.05	6.92	4.60	6.32	8.63	3.67	1.41	0.36	1.73	0.65	0.20	0.44	100.16	M124493	BF,BK,JT,SN
4526A	65.92	15.99	2.72	1.55	0.91	2.75	4.85	3.38	0.51	0.59	0.24	0.10	0.12	99.63	M129313	HE,LE,JT
4526B	48.25	18.27	11.68	0.00	6.18	9.19	3.64	0.82	0.00	1.56	0.42	0.00	0.00	100.01	M131471	LE
4527	51.52	15.91	4.84	6.61	4.01	6.71	4.32	2.02	0.54	1.62	0.84	0.24	0.28	99.46	M124505	BF,BK,JT,SN
4528	63.87	17.36	3.49	0.08	0.94	1.72	6.44	4.10	0.49	0.53	0.36	0.16	0.24	99.78	M124475	BF,BK,JT,SN
4528A	46.77	16.85	14.02	0.00	6.47	8.60	3.70	1.08	0.00	2.67	0.46	0.00	0.00	100.62	M131458	LE
4532	57.14	17.50	3.78	3.61	2.13	4.53	5.33	2.84	0.60	1.26	0.89	0.16	0.12	99.89	M124484	BF,BK,JT,SN
4533	68.18	15.12	1.53	1.43	0.93	2.40	3.87	4.31	1.22	0.46	0.12	0.06	0.04	99.67	M124485	BF,BK,JT,SN
4533A	71.76	14.70	0.61	1.42	0.13	0.82	5.16	4.57	0.33	0.08	0.03	0.08	0.02	99.71	M129311	HE,LE,JT
4534	68.64	15.11	0.97	1.61	0.58	1.81	4.29	3.78	1.54	0.32	0.11	0.08	0.08	98.92	M124472	BF,BK,JT,SN
4534A	61.43	15.90	1.59	3.59	2.50	4.46	3.70	3.45	1.41	0.94	0.24	0.09	0.04	99.34	M124490	BF,BK,JT,SN
4534B	62.09	16.06	2.36	3.43	2.78	4.82	4.13	2.83	0.42	1.02	0.24	0.10	0.11	100.39	M124502	BF,BK,JT,SN
4534D	74.82	13.15	1.47	0.71	0.01	0.49	4.65	4.31	0.29	0.06	0.02	0.07	0.07	100.12	M124494	BF,BK,JT,SN
4534E	57.81	18.20	4.76	2.03	2.10	4.88	4.94	2.07	1.85	1.22	0.35	0.17	0.46	100.84	M124481	BF,BK,JT,SN
4534F	68.76	15.22	2.72	1.74	0.72	1.68	4.42	3.73	0.82	0.31	0.15	0.00	0.00	100.27	R6	HR
4535	62.02	15.84	1.61	3.91	2.71	4.67	3.80	3.20	1.11	1.01	0.23	0.09	0.10	100.30	M124488	BF,BK,JT,SN

TABLE 2. COMPLETE ANALYSES OF OXIDES IN WEIGHT PERCENT, CENTRAL MAP AREA--Continued

Sample No.	SiO_2	Al_2O_3	Fe_2O_3	FeO[1]	MgO	CaO	Na_2O	K_2O	H_2O[2]	TiO_2	P_2O_5[3]	MnO[2]	CO_2[2]	Total	Lab. No.	Analysts[4]
4535A	59.48	16.38	2.33	3.82	3.21	5.50	3.97	2.51	0.57	1.18	0.23	0.10	0.23	99.51	M124504	BF,BK,JT,SN
4535B	60.40	17.01	2.05	3.92	2.97	4.45	3.85	2.97	0.81	1.00	0.22	0.00	0.00	99.65	R14	HR
4536	64.47	15.62	1.25	3.03	2.00	3.68	4.13	3.42	1.09	0.80	0.18	0.07	0.16	99.90	M124503	BF,BK,JT,SN
4536A	50.06	17.86	13.58	0.00	4.28	6.33	4.64	1.56	0.00	2.88	0.54	0.00	0.00	101.73	M131477	LE
4603	48.85	18.47	12.70	0.00	4.57	7.02	4.40	1.27	0.00	2.73	0.55	0.17	0.00	100.73	M137085	LE
4607	50.54	18.18	12.09	0.00	4.22	6.84	4.15	1.39	0.00	2.41	0.48	0.16	0.00	100.46	M137084	LE
4614	52.55	17.76	10.84	0.00	3.01	5.98	4.88	1.99	0.00	2.00	1.09	0.17	0.00	100.27	M137072	LE
4619	47.76	17.79	13.30	0.00	4.89	7.71	3.35	1.09	0.00	2.66	0.56	0.00	0.00	99.11	M131469	LE
4619A	48.58	16.64	14.00	0.00	3.76	6.01	4.88	1.79	0.00	2.31	1.52	0.00	0.00	99.49	M131470	LE
4622	47.67	18.19	11.33	0.00	5.64	8.58	3.85	0.69	0.00	1.68	0.72	0.16	0.00	98.51	M133133	LE
4624	46.59	17.40	11.73	0.00	7.47	9.95	3.34	1.01	0.00	1.94	0.79	0.18	0.00	100.40	M137086	LE
4625	46.00	17.45	11.82	0.00	7.62	9.99	3.21	0.93	0.00	1.94	0.82	0.18	0.00	99.96	M137091	LE
4626	46.11	16.65	11.66	0.00	9.23	10.53	2.61	0.77	0.00	1.56	0.57	0.18	0.00	99.87	M137088	LE
4627	46.33	16.78	11.86	0.00	9.07	10.25	2.93	0.67	0.00	1.57	0.54	0.18	0.00	100.18	M137087	LE
4629	48.66	17.29	13.79	0.00	4.42	6.66	4.54	1.54	0.00	2.95	0.56	0.00	0.00	100.41	M131468	LE
4631	47.82	17.10	13.73	0.00	4.33	6.59	4.59	1.54	0.00	2.39	1.19	0.00	0.00	99.28	M131464	LE
4631A	46.90	17.58	13.55	0.00	6.01	8.15	4.00	1.03	0.00	2.38	0.55	0.00	0.00	100.15	M131466	LE
4634	46.60	17.76	12.35	0.00	7.78	9.36	3.33	0.74	0.00	1.72	0.69	0.18	0.00	100.51	M137089	LE
4635	51.64	17.29	10.96	0.00	2.74	5.74	4.83	1.95	0.00	2.09	0.83	0.17	0.00	98.24	M137093	GK
4636	47.61	17.86	12.78	0.00	5.55	8.43	3.12	1.01	0.00	2.36	0.57	0.17	0.00	99.46	M137092	GK
4701	45.42	15.05	11.58	0.00	9.54	11.39	2.25	0.82	0.00	2.01	0.51	0.18	0.00	98.75	M137101	GK
4703	46.63	14.81	11.57	0.00	9.20	10.81	2.56	0.71	0.00	1.80	0.49	0.17	0.00	98.75	M138258	JC
4704	48.67	18.19	12.19	0.00	5.42	8.37	3.57	0.94	0.00	2.28	0.40	0.18	0.00	100.21	M138266	JC
4707	45.60	15.30	11.99	0.00	9.27	11.11	2.49	0.89	0.00	2.10	0.57	0.18	0.00	99.50	M138269	JC
4708	46.41	16.35	3.65	7.89	7.49	10.15	3.51	0.82	0.32	2.19	0.90	0.18	0.04	99.90	M129282	HE,LE,JT
4710	48.71	16.93	10.42	0.00	6.83	10.86	2.96	0.77	0.00	1.36	0.83	0.19	0.00	99.86	M138259	JC
4711	47.12	17.64	11.97	0.00	7.06	10.14	3.01	0.49	0.00	1.74	0.63	0.17	0.00	99.97	M138257	JC
4712	46.28	16.90	11.69	0.00	8.02	11.09	2.85	0.44	0.00	1.64	0.52	0.17	0.00	99.60	M138256	JC
4715	47.17	17.44	12.12	0.00	7.29	10.09	2.98	0.49	0.00	1.75	0.64	0.17	0.00	100.14	M138262	JC
4717	45.45	15.68	12.25	0.00	8.77	11.24	2.64	0.82	0.00	2.15	0.63	0.18	0.00	99.81	M137077	LE
4717A	48.01	17.38	11.73	0.00	6.87	9.54	3.05	0.96	0.00	1.82	0.77	0.17	0.00	100.30	M138270	JC
4717B	47.29	17.49	11.90	0.00	6.75	9.61	3.24	0.94	0.00	1.87	0.71	0.17	0.00	99.97	M138271	JC
4718	46.58	15.72	12.05	0.00	10.04	10.08	2.69	0.92	0.00	2.00	0.51	0.18	0.00	100.77	M137073	LE
4718A	46.35	16.79	11.62	0.00	8.46	9.54	2.95	0.92	0.00	1.93	0.52	0.18	0.00	99.26	M138268	JC

4719	50.07	18.83	12.80	0.00	3.55	5.71	4.63	1.46	0.00	3.01	0.41	0.16	0.00	100.63	M137074	LE
4723	56.04	17.37	8.75	0.00	2.41	4.94	4.83	2.22	0.00	1.43	0.77	0.16	0.00	98.92	M137099	GK
4723A	52.36	17.48	11.23	0.00	3.21	5.81	4.72	1.88	0.00	2.14	0.88	0.17	0.00	99.88	M138260	JC
4723B	47.51	17.52	11.96	0.00	7.29	10.19	3.05	0.52	0.00	1.71	0.63	0.17	0.00	100.55	M138261	JC
4726	45.10	14.66	12.04	0.00	10.58	10.61	2.33	0.96	0.00	2.23	0.47	0.18	0.00	99.16	M137098	GK
4729A	48.57	17.78	12.17	0.00	4.71	8.01	3.91	1.27	0.00	2.35	0.91	0.19	0.00	99.87	M137078	LE
4729B	49.50	13.90	9.24	0.00	8.63	11.47	2.96	1.41	0.00	1.29	0.85	0.16	0.00	99.41	M138272	JC
4730	46.89	17.10	11.77	0.00	7.20	10.16	3.08	0.97	0.00	1.93	0.73	0.17	0.00	100.00	M138273	JC
4735	60.97	16.57	3.74	2.28	1.77	4.05	4.70	2.97	0.35	1.02	0.37	0.10	0.24	99.13	M124518	BK,BF,JT,SN
4818	56.13	17.33	8.80	0.00	2.37	4.83	5.12	2.36	0.00	1.47	0.84	0.16	0.00	99.41	M137076	LE
4819	48.60	16.98	10.24	0.00	5.98	9.41	3.43	1.28	0.00	1.78	0.63	0.17	0.00	98.50	M137100	GK
5536	47.56	17.12	12.87	0.00	4.87	7.46	4.03	1.10	0.00	2.25	0.46	0.16	0.00	97.88	M133129	LE
5732	51.06	18.00	12.36	0.00	3.46	6.36	4.64	1.34	0.00	2.63	0.72	0.16	0.00	100.73	M138267	JC
5733A	47.22	16.40	11.44	0.00	8.65	10.07	2.84	0.81	0.00	1.76	0.39	0.16	0.00	99.74	M138264	JC
5733B	59.71	18.14	5.15	0.00	1.37	3.21	6.11	2.99	0.00	0.75	0.51	0.17	0.00	98.11	M138265	JC
5734	48.26	18.28	11.38	0.00	5.87	9.06	3.53	0.80	0.00	1.60	0.48	0.17	0.00	99.43	M138263	JC
DC03A	74.03	12.78	2.30	0.24	0.14	0.06	5.48	4.32	0.21	0.14	0.03	0.05	0.05	99.83	M126465	HE,LE,MC,GA,JT
DC03B	62.80	15.90	2.00	3.40	1.60	3.20	5.00	2.80	1.80	0.77	0.35	0.10	0.02	99.74	W188056	LA
DC03C	59.30	16.30	3.00	3.40	2.50	5.20	4.10	2.20	1.65	1.20	0.31	0.11	0.01	99.28	W188059	LA
DC04A	55.00	15.90	6.60	2.60	3.30	6.60	4.20	1.60	1.97	1.50	0.38	0.12	0.01	99.78	W188066	LA
DC04B	51.86	17.18	4.81	4.91	4.33	7.80	4.00	1.44	1.50	1.58	0.35	0.15	0.15	100.06	M126466	HE,LE,MC,GA,JT
DC04C	59.39	16.70	2.61	3.72	2.02	4.24	4.62	2.10	3.22	0.99	0.44	0.15	0.05	100.25	M126464	HE,LE,MC,GA,JT
DC05	61.90	16.40	3.00	2.90	1.60	3.80	5.00	2.70	1.20	0.94	0.42	0.11	0.04	100.01	W188047	LA
DC07	59.30	16.30	5.10	1.50	1.80	4.20	4.60	2.70	2.38	1.00	0.46	0.12	0.03	99.49	W188071	LA
DC08	59.59	16.80	4.85	1.60	1.76	4.22	5.06	2.56	1.52	1.04	0.47	0.12	0.04	99.63	M126472	HE,LE,MC,GA,JT
DC09	59.68	17.02	5.07	1.78	1.82	4.32	4.80	2.58	1.39	1.06	0.48	0.14	0.04	100.18	M126481	HE,LE,MC,GA,JT
DC10	59.70	16.30	4.10	2.30	2.10	4.10	5.10	2.50	1.56	1.10	0.48	0.09	0.03	99.46	W188065	LA
DC11	60.10	16.20	4.10	2.30	1.80	4.10	5.20	2.60	1.26	1.00	0.48	0.11	0.01	99.26	W188060	LA
DC12	59.18	16.88	6.52	0.47	1.54	4.44	5.11	2.52	1.12	1.07	0.50	0.13	0.06	99.54	M126480	HE,LE,MC,GA,JT
DC13A	59.30	16.71	6.12	1.09	1.84	4.29	5.17	2.50	0.92	1.10	0.50	0.14	0.04	99.72	M126482	HE,LE,MC,GA,JT
DC13B	62.30	16.20	6.20	0.56	1.90	4.10	5.10	2.50	0.94	1.10	0.48	0.11	0.02	101.51	W188046	LA
DC14	59.10	16.50	6.40	0.48	1.60	4.40	4.90	2.40	1.28	1.10	0.57	0.07	0.03	98.83	W188072	LA
DC15	59.70	16.40	4.00	2.60	1.90	4.20	5.00	2.50	1.20	1.10	0.49	0.12	0.01	99.22	W188057	LA
DC16	60.30	16.30	5.90	0.84	1.70	4.10	5.20	2.50	0.86	1.00	0.48	0.09	0.01	99.28	W188061	LA
DC17	59.06	16.62	4.65	2.37	1.88	4.45	4.78	2.56	1.59	1.10	0.50	0.14	0.04	99.74	M126478	HE,LE,MC,GA,JT
DC18	59.77	16.95	4.35	2.63	1.84	4.33	5.08	2.46	1.08	1.08	0.49	0.14	0.04	100.24	M126476	HE,LE,MC,GA,JT
DC19	59.10	16.50	4.60	2.10	1.90	4.40	5.10	2.30	1.13	1.10	0.47	0.10	0.02	98.82	W188062	LA
DC20	59.46	17.59	3.46	3.18	1.73	4.64	5.14	2.26	0.89	1.06	0.49	0.13	0.09	100.12	M126477	HE,LE,MC,GA,JT
DC22	59.10	16.40	5.30	1.30	1.90	4.30	4.80	2.30	1.58	1.10	0.49	0.08	0.01	98.66	W188096	LA

TABLE 2. COMPLETE ANALYSES OF OXIDES IN WEIGHT PERCENT, CENTRAL MAP AREA--Continued

Sample No.	SiO_2	Al_2O_3	Fe_2O_3	FeO[1]	MgO	CaO	Na_2O	K_2O	H_2O[2]	TiO_2	P_2O_5[3]	MnO[2]	CO_2[2]	Total	Lab. No.	Analysts[4]
DC23	58.80	16.30	4.00	2.40	2.00	4.50	4.70	2.30	1.94	1.10	0.49	0.08	0.03	98.64	W188031	LA
DC24	58.70	16.40	4.60	2.00	2.00	4.40	4.90	2.40	1.53	1.10	0.50	0.11	0.03	98.67	W188026	LA
DC25A	59.10	16.30	3.10	3.20	1.90	4.40	4.90	2.30	1.48	1.10	0.49	0.10	0.02	98.39	W188020	LA
DC25B	59.40	16.60	6.60	0.44	1.80	4.50	4.70	2.30	0.71	1.10	0.51	0.12	0.01	98.79	W188032	LA
DC26	59.40	16.50	6.40	0.44	1.70	4.50	5.00	2.50	0.70	1.10	0.50	0.11	0.02	98.87	W188025	LA
DC30	59.10	16.60	5.10	1.70	1.90	4.50	5.10	2.30	1.03	1.10	0.49	0.10	0.01	99.03	W188028	LA
DC32	58.50	16.40	3.00	3.40	1.80	4.50	4.70	2.30	2.26	1.10	0.49	0.10	0.02	98.57	W188022	LA
DC35	58.80	16.60	3.50	3.00	1.90	4.50	4.80	2.10	1.65	1.10	0.46	0.10	0.02	98.53	W188024	LA
DC36	58.80	16.50	5.10	1.30	1.80	4.70	4.90	2.20	1.61	1.10	0.43	0.08	0.01	98.53	W188030	LA
DC38	58.80	16.70	3.60	2.70	1.90	4.70	4.80	2.10	1.32	1.10	0.45	0.11	0.02	98.30	W180097	LA
DC40	58.70	16.90	4.60	1.50	1.90	4.70	4.90	2.30	1.91	1.10	0.45	0.08	0.02	99.06	W188021	LA
DC42	58.60	16.80	3.50	2.60	1.70	4.70	4.70	2.40	1.87	1.00	0.47	0.11	0.01	98.46	W188098	LA
DC43	59.60	16.60	3.90	1.90	1.70	4.70	4.90	2.20	1.47	0.97	0.44	0.10	0.01	98.49	W188029	LA
DC47	59.60	16.70	3.10	2.70	1.60	4.90	5.10	2.30	1.24	0.97	0.42	0.09	0.01	98.73	W188023	LA
DC49	60.00	16.90	3.80	1.80	1.50	4.60	5.20	2.30	1.01	0.93	0.38	0.10	0.03	98.55	W188027	LA
DC57	59.28	18.17	3.90	2.03	1.56	5.04	5.40	2.30	0.60	1.01	0.41	0.12	0.03	99.85	M129337	HE,LE,JT
DC58	64.14	16.13	1.64	3.62	1.07	2.97	5.59	3.02	0.46	0.75	0.29	0.13	0.07	99.88	M129336	HE,LE,JT
DC65	57.13	17.67	1.94	5.69	2.38	5.89	4.88	2.01	0.04	1.47	0.65	0.14	0.02	99.91	M129335	HE,LE,JT

[1] 0.00, total iron was determined by X-ray fluorescence and reported as Fe_2O_3.

[2] 0.00, not determined.

[3] 0.00, value below limit of detection.

[4] Analysts:

BK = Bi-Shia King
BF = B. P. Fabbi
DH = D. Hopping
DE = D. J. Emmons
GA = Gil Ambats
GC = G. Chloe
GK = G. M. Kawakita
HE = H. Neil Elsheimer
HR = H. H. Robinson (1913)
HS = Hezekiah Smith
JB = J. W. Baker
JC = J. F. Carr
JT = J. Tillman
JTG = J. E. Taggart, Jr.
JW = J. S. Wahlberg
LA = L. Artis
LE = L. Espos
MC = Marcelyn Cremer
ML = Michael Leong
MV = M. Villarreal
PK = Paul Klock
RS = R. L. Swenson
SC = S. H. Clapp (Robinson, 1913)
SK = S. Kramer
SN = Sarah Neil
SV = S. Vendela
TD = T. DeRosa

TABLE 3. ADJUSTED ANALYSES OF MAJOR OXIDES IN WEIGHT PERCENT, CENTRAL MAP AREA

Sample No.	SiO_2	Al_2O_3	Fe_2O_3	FeO	MgO[1]	CaO[2]	Na_2O	K_2O	TiO_2	P_2O_5[1]	MnO[3]
0414	46.73	14.46	1.64	8.85	7.69	13.49	3.64	0.91	2.00	0.41	0.18
0414A	46.68	13.64	1.63	8.76	8.08	13.87	3.13	1.11	2.08	0.84	0.18
0414B	45.02	11.00	1.68	9.26	13.93	12.21	2.83	1.11	2.00	0.78	0.18
0414C	45.96	11.69	1.38	7.54	13.41	14.21	2.62	0.91	1.20	0.90	0.18
0414D	49.11	16.77	1.69	8.62	6.59	9.59	3.89	1.09	1.94	0.53	0.17
0414E	48.30	14.31	1.75	9.19	9.84	10.48	2.94	0.91	1.61	0.47	0.19
0414F	47.55	15.16	1.76	9.54	10.01	11.11	2.58	0.52	1.15	0.42	0.20
0414G	47.12	14.79	1.79	9.60	10.34	10.95	3.24	0.51	1.05	0.41	0.20
0414H	45.99	12.30	1.58	8.79	11.88	13.53	2.27	0.93	1.84	0.69	0.19
0414I	46.17	11.84	1.64	9.00	13.99	11.81	2.43	0.78	1.61	0.54	0.17
0501	49.51	16.30	1.84	9.45	6.81	10.43	2.73	0.79	1.64	0.30	0.18
0506	44.92	14.00	1.71	9.64	9.41	13.59	3.14	0.61	1.73	1.06	0.18
0603A	69.67	14.80	0.72	2.41	0.61	1.96	5.12	3.77	0.51	0.36	0.07
0603B	55.82	17.33	1.65	7.68	1.75	4.47	5.53	2.53	1.76	1.29	0.18
0614	72.21	14.62	0.46	1.40	0.35	1.31	5.12	4.02	0.25	0.16	0.09
0626	55.63	17.64	1.57	7.19	2.38	5.02	5.79	2.06	1.58	0.96	0.16
0626A	48.36	15.90	1.63	8.71	8.53	11.01	3.28	0.75	1.30	0.34	0.18
1408	60.64	17.21	1.23	5.18	1.64	4.88	5.22	2.25	0.96	0.65	0.13
1436	46.85	15.71	1.79	9.57	9.41	9.78	3.19	1.00	2.12	0.40	0.18
1504	46.66	14.74	1.63	8.91	8.57	12.32	2.95	1.27	1.82	0.93	0.18
1506	47.95	15.86	1.61	8.49	7.68	10.58	3.10	1.78	1.84	0.94	0.17
1508	52.73	17.78	1.59	7.83	5.01	7.68	3.69	1.62	1.57	0.35	0.14
1509	52.39	17.74	1.80	8.77	3.41	5.53	5.39	1.82	2.19	0.78	0.16
1517	46.84	16.07	1.84	9.82	8.94	9.42	3.27	0.99	2.21	0.41	0.18
1519	47.41	17.49	2.00	10.58	6.48	8.05	3.58	1.09	2.64	0.47	0.18
1609	56.50	17.33	1.57	7.08	2.47	5.24	5.06	2.13	1.50	0.97	0.16
1609A	55.60	18.30	1.55	7.03	2.29	5.08	5.44	2.05	1.47	1.02	0.18
1609B	60.15	17.28	1.32	5.42	1.75	4.01	5.54	2.58	1.09	0.73	0.15
1611	66.55	16.38	0.91	3.32	0.76	2.30	5.43	3.47	0.51	0.25	0.12
1611A	45.18	19.48	1.88	10.38	5.59	10.01	3.83	0.35	2.92	0.25	0.13
1611B	45.51	16.70	2.22	12.24	4.95	9.52	4.27	0.52	2.78	1.05	0.23
1611C	46.48	15.49	2.22	12.11	6.87	9.82	3.41	0.73	2.58	0.11	0.16
1611D	49.39	18.10	2.02	10.43	3.56	7.64	4.63	0.95	1.95	1.09	0.22

TABLE 3. ADJUSTED ANALYSES OF MAJOR OXIDES IN WEIGHT PERCENT, CENTRAL MAP AREA--Continued

Sample No.	SiO_2	Al_2O_3	Fe_2O_3	FeO	MgO[1]	CaO[2]	Na_2O	K_2O	TiO_2	P_2O_5[1]	MnO[3]
1611E	41.64	14.74	2.19	12.83	7.62	11.07	3.14	0.41	3.47	2.69	0.19
1615	45.79	16.50	1.65	8.96	9.77	11.19	3.18	0.66	1.45	0.85	0.00
1615A	45.67	16.41	1.67	9.15	9.63	11.14	2.99	0.72	1.49	0.94	0.18
1616	49.72	16.70	1.74	8.99	6.48	9.66	3.45	1.11	1.63	0.34	0.16
1617	45.63	12.01	1.81	10.15	11.64	11.24	2.95	1.32	2.46	0.60	0.18
1618	49.28	17.57	1.94	10.09	4.35	6.31	5.21	1.59	2.79	0.72	0.16
1619	45.94	15.48	1.78	9.80	9.79	10.97	2.77	0.74	1.90	0.64	0.19
1620	46.57	15.93	1.85	10.09	9.01	9.79	3.24	0.70	2.02	0.60	0.18
1621	46.89	15.11	1.71	9.13	10.57	10.10	3.00	0.96	1.90	0.44	0.18
1623	58.32	17.02	1.42	6.23	2.03	4.36	5.97	2.31	1.27	0.90	0.16
1628	64.59	16.00	1.02	3.91	1.27	2.76	5.36	3.52	0.84	0.59	0.13
1629	55.70	17.10	1.55	7.11	2.50	4.58	6.03	2.44	1.59	1.20	0.18
1715	49.90	15.57	1.82	9.13	8.98	9.52	2.89	0.50	1.27	0.22	0.20
1722	50.53	16.60	1.95	9.98	4.57	7.09	4.55	1.50	1.93	1.06	0.23
1731	54.71	17.08	1.67	7.81	2.32	4.87	5.93	2.32	1.73	1.36	0.19
1807	66.76	16.03	0.99	3.57	0.75	2.50	5.43	3.15	0.51	0.21	0.10
1807A	66.25	16.26	0.99	3.66	0.74	2.65	5.36	3.23	0.54	0.22	0.11
1808	48.42	16.68	1.71	8.91	7.68	9.44	3.54	0.91	1.88	0.63	0.20
2401	47.48	16.22	1.73	9.16	8.72	10.74	2.87	0.79	1.72	0.38	0.18
2403	51.65	16.84	1.90	9.34	4.04	6.03	5.25	1.61	2.52	0.69	0.13
2405	75.50	13.46	0.25	0.71	0.09	0.17	5.10	4.61	0.04	0.02	0.06
2405A	71.03	15.36	0.63	2.05	0.56	2.05	4.70	3.13	0.30	0.13	0.06
2405B	48.64	16.43	1.69	8.84	7.20	11.44	3.06	0.72	1.47	0.35	0.16
2408	54.15	16.99	1.55	7.39	4.91	8.38	3.28	1.43	1.43	0.37	0.11
2409	50.08	18.17	1.91	9.61	4.02	6.14	5.08	1.54	2.58	0.69	0.17
2409A	62.24	14.34	1.02	4.06	5.20	6.05	3.37	2.80	0.58	0.23	0.10
2409B	60.84	14.42	1.09	4.42	6.06	6.44	3.18	2.58	0.63	0.23	0.09
2409C	48.45	15.34	1.60	8.32	9.39	11.13	2.89	0.80	1.53	0.39	0.17
2410	74.81	14.28	0.26	0.77	0.12	0.88	4.52	4.20	0.04	0.05	0.04
2413	48.50	15.56	1.75	9.07	8.44	10.42	3.11	0.81	1.81	0.38	0.15
2415	49.31	14.24	1.49	7.65	10.97	11.70	2.50	0.74	1.09	0.30	0.00
2415A	48.53	17.39	1.70	8.87	6.26	9.62	3.67	1.15	1.78	1.03	0.00
2416	50.43	14.99	1.58	7.94	8.50	10.72	2.96	1.01	1.39	0.30	0.16

2416A	54.18	13.98	1.32	6.21	10.94	7.87	2.73	1.42	0.94	0.30	0.11
2416B	50.68	13.82	1.43	7.12	13.32	8.69	2.60	0.88	1.00	0.32	0.12
2417	50.14	18.48	1.72	8.64	5.26	7.60	3.89	1.43	2.27	0.40	0.16
2421	52.25	18.78	1.69	8.26	3.90	6.87	4.47	1.44	1.91	0.43	0.00
2422	48.85	15.39	1.60	8.25	8.95	11.32	2.99	0.80	1.50	0.35	0.00
2422A	44.49	15.98	1.69	9.48	8.30	12.80	3.53	0.53	2.13	1.06	0.00
2425	47.62	17.58	1.90	10.04	6.25	8.39	3.82	1.09	2.79	0.51	0.00
2425A	49.43	16.27	1.51	7.72	8.62	11.11	2.80	0.84	1.08	0.46	0.16
2426	49.46	17.92	1.74	8.87	5.75	8.71	3.96	1.05	2.04	0.49	0.00
2426A	49.45	17.76	1.73	8.88	4.86	8.72	3.96	1.41	1.76	1.46	0.00
2429	49.15	16.25	1.56	8.02	8.32	10.36	3.23	1.04	1.70	0.37	0.00
2432	48.57	14.36	1.59	8.30	8.88	10.64	3.08	1.72	2.16	0.68	0.00
2432A	44.87	13.94	1.70	9.46	8.63	13.28	3.63	0.86	2.73	0.91	0.00
2435	44.63	16.10	1.71	9.52	7.67	12.53	3.42	0.79	2.24	1.20	0.19
2501	51.39	18.44	1.83	9.02	3.90	6.16	4.61	1.66	2.26	0.72	0.00
2506	60.23	16.85	1.28	5.35	1.52	4.44	5.79	2.34	1.22	0.85	0.11
2506A	67.68	16.26	0.70	2.46	0.89	2.13	5.32	3.68	0.45	0.33	0.09
2506B	67.42	16.88	0.67	2.38	0.71	1.73	5.83	3.58	0.41	0.30	0.10
2514	47.48	17.70	2.16	11.46	5.15	6.85	4.39	1.25	3.02	0.53	0.00
2517	47.40	16.89	1.90	10.08	7.36	8.54	3.70	1.11	2.58	0.43	0.00
2517A	48.26	17.32	1.90	9.91	6.05	8.03	4.04	1.20	2.63	0.63	0.00
2517B	47.63	17.18	1.89	10.02	7.02	8.26	3.59	1.09	2.69	0.46	0.17
2519	48.10	16.92	1.51	7.94	7.83	11.84	2.95	0.97	1.55	0.39	0.00
2520	48.52	17.50	1.82	9.42	7.32	8.88	3.53	0.78	1.91	0.32	0.00
2525	47.50	17.18	1.70	9.00	7.41	9.71	3.75	1.06	1.97	0.70	0.00
2525A	47.30	17.42	1.71	9.15	7.19	9.87	3.37	1.06	2.07	0.66	0.18
2527	58.25	17.52	1.31	5.72	2.02	4.69	5.89	2.44	1.23	0.92	0.00
2529	50.02	15.88	1.53	7.81	8.28	10.74	2.92	0.95	1.32	0.38	0.16
2530	48.92	18.42	1.82	9.40	5.31	8.04	4.39	0.87	2.19	0.61	0.00
2530A	49.65	14.33	1.53	7.92	11.70	9.88	2.50	0.95	0.99	0.38	0.17
2532	60.35	17.66	1.27	5.29	1.39	2.89	6.62	2.95	0.91	0.67	0.00
2532A	48.10	17.64	2.13	11.28	4.60	6.43	4.74	1.29	3.16	0.61	0.00
2532B	47.18	15.36	1.69	9.11	7.72	11.58	3.09	1.32	1.85	0.92	0.18
2533	46.75	17.80	1.72	9.29	7.86	9.90	3.32	0.89	1.23	1.06	0.18
2602	60.70	17.47	1.32	5.53	1.66	3.75	4.77	3.09	1.02	0.51	0.15
2602A	66.78	16.54	0.94	3.38	0.43	2.03	5.63	3.73	0.41	0.13	0.00
2604	51.37	18.06	1.89	9.35	3.39	5.97	4.77	1.83	2.47	0.74	0.17
2613	60.70	18.47	1.11	4.56	1.23	4.48	5.50	2.41	0.99	0.42	0.11
2616	49.60	17.91	1.96	9.96	4.56	6.50	4.77	1.39	2.72	0.61	0.00

TABLE 3. ADJUSTED ANALYSES OF MAJOR OXIDES IN WEIGHT PERCENT, CENTRAL MAP AREA--Continued

Sample No.	SiO_2	Al_2O_3	Fe_2O_3	FeO	MgO[1]	CaO[2]	Na_2O	K_2O	TiO_2	P_2O_5[1]	MnO[3]
2626	52.80	18.39	1.73	8.29	3.21	5.60	5.19	1.75	2.03	0.82	0.18
2630	46.36	15.99	1.84	9.91	9.62	10.29	3.18	0.54	1.75	0.50	0.00
2633	60.84	17.74	1.06	4.39	1.65	3.42	6.48	2.91	0.88	0.61	0.00
2635	63.69	16.80	1.11	4.26	1.18	3.04	5.71	2.96	0.70	0.41	0.14
2703	62.31	16.73	1.20	4.77	1.63	3.88	4.94	2.98	1.08	0.36	0.10
2704	66.68	16.22	1.03	3.72	0.74	2.05	5.38	3.22	0.61	0.23	0.11
2704A	64.52	16.78	1.11	4.22	1.19	2.66	5.22	3.02	0.82	0.33	0.12
2704B	58.59	16.93	1.46	6.29	2.50	4.94	4.79	2.24	1.58	0.52	0.14
2704C	67.17	16.14	0.99	3.60	0.73	1.75	5.34	3.42	0.51	0.25	0.11
2704D	64.85	17.00	0.99	3.70	0.83	2.06	5.95	3.64	0.59	0.24	0.13
2705A	74.06	13.09	0.66	1.85	0.00	0.13	5.78	4.31	0.11	0.00	0.00
2705B	75.06	12.99	0.56	1.62	0.02	-0.42	5.55	4.37	0.14	0.04	0.06
2705D	55.12	17.03	1.65	7.55	3.76	6.80	4.39	1.72	1.61	0.38	0.00
2705E	60.32	18.84	1.06	4.45	1.48	4.92	5.19	2.32	0.99	0.40	0.00
2705F	60.39	18.58	1.09	4.52	1.59	4.89	5.19	2.32	1.00	0.41	0.00
2705G	59.48	16.77	1.51	6.50	2.08	4.11	5.00	2.55	1.53	0.48	0.00
2706	61.57	19.36	1.02	4.35	1.45	3.63	4.58	2.76	0.96	0.33	0.00
2712	66.30	16.41	0.94	3.38	0.72	1.98	5.70	3.76	0.50	0.19	0.12
2722	67.55	17.39	0.78	2.87	0.53	1.67	4.95	3.59	0.41	0.19	0.07
2724	49.86	18.32	1.89	9.69	3.93	6.20	5.12	1.43	2.68	0.71	0.16
2725	65.37	17.34	1.00	3.68	0.89	2.60	5.13	3.18	0.54	0.24	0.00
2725A	66.43	16.64	0.85	3.06	0.77	2.64	5.54	3.19	0.61	0.25	0.00
2725B	66.32	16.49	0.98	3.58	0.65	2.49	5.40	3.30	0.54	0.24	0.00
2727	62.23	16.96	1.23	4.88	1.49	3.51	5.41	2.81	0.90	0.46	0.13
2733	66.37	15.88	1.03	3.70	0.86	2.55	5.45	3.29	0.52	0.23	0.11
2733A	51.91	18.11	1.67	8.22	4.58	8.12	4.02	1.26	1.65	0.30	0.15
2733B	48.88	17.51	1.84	9.58	5.72	7.93	4.11	1.23	2.62	0.41	0.16
2736	65.67	16.42	1.02	3.67	0.80	2.64	5.31	3.20	0.50	0.60	0.16
2736A	66.39	17.24	0.98	3.50	0.87	2.61	4.52	3.12	0.51	0.25	0.00
2818	63.96	16.71	1.06	4.14	1.15	2.75	5.53	3.53	0.71	0.29	0.14
2829	48.89	18.43	1.88	9.84	4.58	6.72	4.87	1.34	2.74	0.70	0.00
2830	65.38	16.43	1.04	3.87	0.93	2.75	5.55	3.15	0.64	0.26	0.00
3401	49.22	17.53	1.66	8.63	6.19	9.75	3.47	1.18	1.81	0.39	0.17

3404	45.14	17.81	1.85	10.19	6.73	12.09	3.04	0.70	1.99	0.47	0.00
3411	48.65	18.33	1.89	9.71	5.94	8.34	3.78	0.99	1.86	0.51	0.00
3416	48.90	18.51	1.71	8.85	6.02	9.27	3.61	0.92	1.49	0.54	0.17
3417	52.85	17.93	1.56	7.58	4.16	7.49	4.48	1.64	1.75	0.41	0.14
3417A	49.16	17.96	1.68	8.69	6.14	9.57	3.65	0.93	1.68	0.36	0.16
3421	75.07	13.13	0.33	0.92	0.23	0.30	5.65	4.29	0.07	0.00	0.00
3422	75.70	13.46	0.27	0.74	0.05	0.33	5.02	4.32	0.04	0.02	0.05
3423	48.15	15.72	1.76	9.16	8.41	10.35	3.20	0.88	1.80	0.41	0.14
3423A	51.27	17.28	1.61	7.97	6.42	7.68	3.75	1.66	1.78	0.43	0.15
3424	46.39	12.68	1.55	8.35	13.52	12.80	2.21	0.48	1.56	0.28	0.17
3425	75.12	14.07	0.24	0.64	0.19	0.68	4.66	4.26	0.04	0.04	0.06
3425A	51.12	16.20	1.70	8.47	7.29	8.27	3.54	0.83	2.02	0.43	0.13
3425C	75.13	13.81	0.25	0.74	0.10	0.78	4.44	4.60	0.05	0.02	0.08
3426	53.85	17.20	2.02	9.66	1.86	4.68	5.35	2.49	1.43	1.23	0.22
3426A	50.41	16.26	1.58	8.03	7.43	8.41	3.96	1.63	1.61	0.49	0.17
3426B	62.92	17.20	1.00	4.00	1.44	2.95	5.97	2.99	0.81	0.60	0.13
3428	75.96	13.38	0.26	0.72	0.00	0.13	5.23	4.25	0.05	0.02	0.00
3428A	71.99	14.83	0.52	1.66	0.47	1.80	4.45	3.87	0.30	0.10	0.00
3432	74.46	14.17	0.30	0.88	0.24	0.99	4.61	4.19	0.07	0.03	0.06
3433A	76.42	13.00	0.28	0.78	0.00	0.46	4.42	4.54	0.08	0.02	0.00
3433B	75.31	13.59	0.27	0.76	0.00	0.39	5.32	4.29	0.05	0.02	0.00
3434	75.22	13.99	0.25	0.75	0.04	0.61	4.14	4.87	0.04	0.03	0.06
3435	58.07	17.59	1.45	6.34	1.47	3.93	6.35	2.52	1.20	0.85	0.18
3501	65.04	16.17	0.95	3.47	1.97	3.85	4.29	3.26	0.81	0.18	0.00
3501A	51.55	18.07	1.87	9.20	4.04	6.77	4.01	1.42	2.41	0.49	0.16
3502A	59.29	17.91	1.23	5.28	2.28	5.08	5.06	2.13	1.23	0.39	0.11
3502C	58.88	16.18	1.34	5.71	4.06	6.05	3.75	2.46	1.17	0.27	0.12
3502D	75.30	13.23	0.36	0.97	0.15	0.68	4.29	4.82	0.09	0.03	0.07
3502E	69.32	15.24	0.68	2.26	1.04	2.55	4.35	3.89	0.48	0.13	0.06
3503	56.92	16.54	1.45	6.41	4.33	6.46	3.97	2.11	1.34	0.33	0.13
3503B	54.94	16.81	1.51	6.99	5.01	7.17	3.81	1.83	1.44	0.34	0.14
3503C	57.86	16.31	1.44	6.23	4.02	6.23	3.93	2.22	1.32	0.32	0.12
3503D	66.60	15.82	0.89	3.21	1.39	2.80	4.23	4.01	0.73	0.24	0.08
3503E	55.90	16.42	1.49	6.76	4.83	6.94	3.80	2.03	1.33	0.34	0.14
3503F	62.02	16.98	1.16	4.66	2.03	3.82	4.86	2.85	1.14	0.38	0.10
3503G	75.85	13.45	0.32	0.86	0.07	0.48	4.11	4.67	0.10	0.03	0.06
3503H	58.29	17.08	1.28	5.52	3.91	6.20	3.82	2.32	1.18	0.28	0.11
3503I	69.22	15.17	0.71	2.41	1.01	1.99	4.07	4.64	0.46	0.21	0.09
3503J	73.83	14.96	0.33	1.03	0.27	0.30	4.43	4.67	0.06	0.03	0.08

TABLE 3. ADJUSTED ANALYSES OF MAJOR OXIDES IN WEIGHT PERCENT, CENTRAL MAP AREA--Continued

Sample No.	SiO_2	Al_2O_3	Fe_2O_3	FeO	MgO[1]	CaO[2]	Na_2O	K_2O	TiO_2	P_2O_5[1]	MnO[3]
3503K	57.13	16.46	1.47	6.52	4.17	6.17	3.98	2.19	1.52	0.30	0.08
3504	64.27	16.72	1.00	3.80	1.47	3.35	4.58	3.50	0.79	0.39	0.12
3504A	48.03	16.63	1.79	9.42	7.57	9.45	3.39	0.83	2.19	0.54	0.16
3504B	59.64	16.25	1.31	5.47	3.72	5.50	4.13	2.38	1.19	0.28	0.11
3505	48.52	16.75	1.72	9.00	7.50	9.29	3.57	1.20	2.04	0.39	0.00
3505A	48.52	16.61	1.74	9.04	7.38	9.29	3.77	1.23	2.02	0.38	0.00
3505B	48.18	17.57	1.82	9.64	6.11	9.34	3.29	0.96	2.40	0.52	0.16
3508	47.51	17.46	1.72	9.11	7.14	10.01	3.53	0.88	2.24	0.40	0.00
3508A	58.70	17.20	1.34	5.80	1.86	4.14	6.17	2.64	1.31	0.83	0.00
3508B	45.86	15.05	1.62	8.84	11.02	11.51	2.87	0.96	1.89	0.39	0.00
3508C	48.10	17.25	1.80	9.49	6.70	9.27	3.43	0.95	2.36	0.48	0.17
3509	59.14	16.81	1.35	5.74	2.12	4.22	5.71	2.70	1.38	0.84	0.00
3509A	46.81	14.84	1.67	8.97	11.44	10.81	2.76	0.63	1.63	0.44	0.00
3509B	47.35	16.25	1.69	8.96	9.01	10.68	3.11	0.69	1.80	0.46	0.00
3510	60.22	16.40	1.30	5.38	3.23	5.18	4.08	2.56	1.23	0.29	0.10
3511	46.98	15.94	1.83	9.79	8.19	10.21	3.28	0.80	2.15	0.66	0.17
3511A	47.44	16.18	1.84	9.84	7.85	10.10	2.93	0.85	2.16	0.64	0.18
3512	46.95	16.01	1.68	8.94	8.97	11.11	3.03	1.02	1.87	0.41	0.00
3515	49.44	17.69	1.95	10.11	5.87	7.95	2.47	1.02	2.79	0.51	0.18
3516	60.04	17.61	1.35	5.64	1.61	3.93	5.93	2.24	0.98	0.66	0.00
3517	48.57	17.32	1.71	8.94	6.91	8.66	3.57	1.38	2.32	0.45	0.17
3518	53.55	17.76	1.78	8.41	3.37	5.68	4.89	1.93	2.09	0.51	0.00
3518A	46.64	16.96	1.97	10.59	6.97	9.01	3.83	1.00	2.66	0.37	0.00
3522	48.54	16.32	1.77	9.35	8.00	10.34	2.50	0.75	1.86	0.39	0.18
3523	50.03	17.68	1.96	9.85	4.58	6.62	4.54	1.62	2.64	0.47	0.00
3523A	46.51	16.34	1.59	8.58	10.16	10.80	2.90	0.68	1.61	0.65	0.18
3527	48.73	16.01	1.69	8.67	8.45	10.12	3.31	1.01	1.65	0.35	0.00
3528	60.12	15.60	1.31	5.51	3.89	5.52	4.20	2.54	1.06	0.24	0.00
3528A	45.84	15.10	1.59	8.67	10.82	12.20	2.65	0.64	1.43	0.85	0.19
3531	68.28	16.48	0.60	2.13	0.42	1.83	5.94	3.58	0.38	0.26	0.10
3531A	73.13	14.99	0.34	0.99	0.16	0.84	5.00	4.30	0.12	0.08	0.07
3601	47.85	16.74	1.89	10.01	7.66	8.61	2.94	1.12	2.62	0.39	0.17
3601A	46.79	17.25	1.77	9.66	7.49	10.32	2.95	0.77	2.28	0.51	0.18

3604	74.07	14.52	0.35	1.05	0.11	1.06	4.57	4.13	0.08	0.05	0.00
3606	50.82	18.16	1.87	9.40	4.01	7.07	4.37	1.43	2.38	0.50	0.00
3609	48.18	15.86	1.69	8.76	8.38	10.26	3.29	1.00	1.99	0.46	0.14
3610	52.41	16.21	1.96	9.66	4.00	6.86	4.41	1.33	2.56	0.45	0.14
3610A	53.24	16.73	1.82	8.78	3.77	6.00	4.69	1.73	2.35	0.74	0.14
3611	52.10	15.86	1.40	6.89	7.61	9.75	3.23	1.28	1.11	0.61	0.16
3612	74.53	13.71	0.48	1.36	0.23	0.75	4.89	3.98	0.08	0.00	0.00
3612B	60.31	17.74	1.17	5.07	1.12	4.79	5.02	2.75	1.39	0.50	0.13
3612C	60.89	17.13	1.20	5.20	1.87	4.18	4.26	3.45	1.17	0.49	0.14
3614	61.48	17.66	1.16	4.77	1.61	4.24	4.76	2.85	0.99	0.38	0.10
3614A	63.04	16.93	1.14	4.52	1.53	3.97	4.79	2.65	0.96	0.39	0.08
3615	52.75	16.38	1.89	9.26	4.12	7.00	4.22	1.34	2.37	0.53	0.13
3616	49.47	16.15	1.85	9.46	6.56	8.79	3.63	1.11	2.32	0.50	0.13
3616A	72.92	15.09	0.42	1.25	0.03	0.32	5.27	4.56	0.07	0.03	0.05
3617	47.04	16.55	1.68	9.04	8.49	10.49	3.25	1.04	2.00	0.42	0.00
3621	52.77	16.95	1.88	9.12	3.75	6.02	4.36	1.83	2.44	0.74	0.13
3621A	53.25	17.13	1.85	9.09	2.91	6.29	4.45	1.87	2.28	0.75	0.12
3622	65.66	15.88	1.08	4.04	1.02	2.74	5.22	3.28	0.68	0.30	0.10
3622A	52.82	16.90	1.82	8.79	3.74	6.04	4.86	1.82	2.33	0.74	0.14
3627	49.80	17.54	2.06	10.38	4.10	5.91	5.13	1.67	2.76	0.66	0.00
3630	57.06	18.29	1.53	6.92	1.68	5.19	5.13	1.87	1.37	0.81	0.15
3633	51.29	17.45	1.92	9.52	3.86	6.36	4.50	1.57	2.69	0.67	0.18
3634	51.95	17.08	1.87	9.29	3.68	6.12	5.11	1.53	2.44	0.75	0.15
3705	49.09	17.16	1.91	10.05	5.06	7.34	4.55	1.34	2.69	0.66	0.14
3707	56.46	17.48	1.58	7.19	3.09	6.11	4.08	1.87	1.68	0.33	0.14
3707A	60.37	17.21	1.32	5.42	2.00	4.33	4.70	2.81	1.33	0.39	0.11
3710	65.12	16.27	1.09	4.07	1.04	2.60	5.56	3.08	0.72	0.32	0.12
3711	62.01	17.01	1.27	5.08	1.66	3.84	4.99	2.74	0.98	0.42	0.00
3712	63.58	17.98	1.13	4.35	1.02	3.50	5.08	2.13	0.72	0.44	0.08
3713A	68.59	16.72	0.58	1.96	0.50	1.45	5.44	4.13	0.30	0.16	0.15
3719	55.83	17.52	1.58	7.28	3.53	5.98	4.14	1.91	1.69	0.40	0.14
3720	64.53	16.77	1.04	3.95	1.25	3.21	5.12	2.96	0.78	0.28	0.10
3721	57.95	17.16	1.52	6.57	2.81	5.58	4.22	2.15	1.58	0.37	0.08
3723	74.71	14.70	0.20	0.59	0.16	0.38	5.00	4.18	0.00	0.01	0.06
3723B	75.64	13.49	0.27	0.75	0.06	0.57	4.27	4.93	0.02	0.00	0.00
3725	55.85	17.07	1.74	7.90	2.88	4.83	5.04	2.22	1.88	0.59	0.00
3727	63.84	16.71	1.13	4.27	1.32	3.03	5.31	2.97	0.90	0.38	0.13
3727A	63.20	16.80	1.11	4.30	1.53	3.64	5.08	3.00	0.96	0.29	0.09
3728	60.18	17.90	1.23	5.07	1.79	4.45	5.08	2.49	1.14	0.53	0.12

TABLE 3. ADJUSTED ANALYSES OF MAJOR OXIDES IN WEIGHT PERCENT, CENTRAL MAP AREA--Continued

Sample No.	SiO_2	Al_2O_3	Fe_2O_3	FeO	MgO[1]	CaO[2]	Na_2O	K_2O	TiO_2	P_2O_5[1]	MnO[3]
3728A	59.68	17.95	1.28	5.46	1.94	4.24	5.15	2.44	1.19	0.53	0.13
3728B	65.49	16.27	0.96	3.56	0.82	2.58	5.99	3.30	0.65	0.21	0.17
3728C	59.52	17.24	1.28	5.38	2.61	5.78	4.33	2.21	1.26	0.29	0.10
3728D	66.39	16.48	0.93	3.35	0.69	2.43	5.60	3.37	0.49	0.21	0.06
3728E	58.62	16.76	1.45	6.31	2.38	5.17	4.76	2.49	1.60	0.35	0.10
3729	64.24	16.54	1.01	3.77	1.30	3.04	5.81	3.21	0.66	0.29	0.13
3729A	58.88	15.65	1.49	6.32	3.11	5.15	4.92	2.41	1.56	0.35	0.15
3729C	56.33	17.22	1.48	6.87	3.32	5.94	4.67	1.87	1.66	0.54	0.09
3729D	59.75	17.19	1.26	5.31	2.02	4.27	5.66	2.73	1.16	0.51	0.13
3729E	57.43	17.13	1.42	6.24	2.82	5.28	5.14	2.32	1.58	0.47	0.17
3729G	64.85	16.66	1.03	3.81	0.93	3.07	5.14	3.44	0.80	0.18	0.06
3729H	66.59	16.38	0.93	3.32	0.90	2.60	5.10	3.21	0.61	0.24	0.10
3729I	60.37	17.67	1.26	5.28	1.90	4.11	5.01	2.62	1.13	0.52	0.12
3729J	60.58	17.33	1.23	5.11	1.93	4.08	5.35	2.65	1.11	0.50	0.12
3729K	56.95	17.27	1.48	6.68	3.08	5.71	4.64	1.99	1.59	0.48	0.12
3729L	61.54	16.79	1.18	4.83	1.81	4.18	4.98	3.09	1.14	0.36	0.10
3729M	61.52	16.71	1.23	5.07	1.61	4.01	5.37	2.80	1.01	0.56	0.11
3729Q	55.96	17.50	1.55	7.08	3.41	6.42	4.30	1.75	1.65	0.40	0.00
3732	60.26	18.47	1.06	4.43	1.69	4.92	5.34	2.27	1.04	0.45	0.08
3732%	57.98	17.14	1.50	6.56	2.58	5.47	4.62	2.04	1.60	0.51	0.00
3732+	57.36	17.47	1.40	6.18	3.43	6.44	4.22	1.66	1.57	0.25	0.00
3732A	59.86	16.98	1.27	5.39	2.01	4.77	5.25	2.50	1.31	0.52	0.13
3732C	59.36	17.88	1.23	5.13	2.31	5.06	5.12	2.21	1.18	0.41	0.12
3732D	60.77	16.27	1.31	5.44	2.15	4.54	4.91	2.76	1.44	0.30	0.10
3732E	58.07	16.42	1.46	6.34	2.84	5.41	5.17	2.22	1.55	0.35	0.15
3732F	66.29	15.92	0.93	3.32	1.01	2.96	5.54	3.12	0.59	0.22	0.10
3732G	59.92	17.10	1.27	5.31	2.22	4.39	5.57	2.53	1.06	0.48	0.14
3732H	59.49	16.79	1.29	5.47	3.14	5.30	4.75	2.43	0.95	0.27	0.11
3732I	59.50	18.10	1.08	4.57	2.02	5.10	5.57	2.43	1.05	0.43	0.13
3732J	52.21	18.34	1.55	7.57	4.23	8.10	4.33	1.51	1.63	0.34	0.16
3732K	53.35	19.03	1.56	7.45	3.64	7.87	4.05	1.20	1.52	0.19	0.11
3732L	60.84	17.33	1.27	5.25	2.15	4.13	4.58	2.99	1.09	0.36	0.00
3732M	60.42	18.95	1.06	4.45	1.53	4.44	5.16	2.44	0.99	0.43	0.11

3732N	74.62	12.87	0.57	1.65	0.03	-0.10	5.74	4.38	0.14	0.03	0.06
3732O	60.40	17.32	1.23	5.18	2.09	4.08	5.08	2.68	1.27	0.54	0.12
3732P	69.35	15.51	0.86	3.01	0.42	-0.85	6.09	5.02	0.37	0.07	0.15
3732Q	59.44	17.33	1.48	6.44	1.40	3.62	5.36	2.69	1.55	0.54	0.13
3732R	55.41	17.33	1.62	7.45	3.32	6.18	4.39	2.05	1.73	0.40	0.12
3732S	59.63	16.06	1.51	6.33	2.13	4.69	4.89	2.67	1.53	0.43	0.13
3732T	59.74	16.93	1.26	5.36	2.12	4.60	5.45	2.54	1.29	0.54	0.16
3732U	60.21	16.94	1.28	5.32	1.96	4.44	5.43	2.52	1.26	0.49	0.15
3732V	60.03	16.95	1.28	5.37	1.88	4.45	5.49	2.54	1.30	0.52	0.17
3732W	60.66	17.08	1.28	5.26	1.33	4.33	5.50	2.64	1.27	0.51	0.15
3732X	60.37	16.93	1.26	5.23	1.68	4.51	5.50	2.56	1.26	0.54	0.16
3732Y	53.76	17.35	1.62	7.81	3.88	7.57	4.20	1.60	1.68	0.37	0.14
3732Z	53.71	16.85	1.71	8.11	3.98	7.16	4.39	1.75	1.74	0.43	0.15
3733	74.43	12.89	0.65	1.84	0.11	0.12	5.88	3.99	0.09	0.00	0.00
3733A	64.17	17.66	0.93	3.62	1.13	3.12	4.93	3.11	0.97	0.29	0.07
3733B	66.87	16.53	0.89	3.24	0.70	1.84	5.68	3.42	0.51	0.23	0.08
3733C	57.84	16.76	1.50	6.53	2.97	5.48	4.60	2.16	1.65	0.36	0.13
3733D	68.50	15.14	0.82	2.82	0.36	0.96	5.98	4.83	0.38	0.07	0.14
3733E	59.21	17.22	1.35	5.75	2.79	5.76	4.31	1.94	1.28	0.28	0.11
3734A	76.07	13.13	0.37	1.01	0.10	0.58	4.37	4.16	0.15	0.05	0.00
3819	62.49	17.50	1.15	4.54	1.51	3.31	5.41	2.73	0.85	0.50	0.00
3819A	66.06	16.56	1.01	3.85	0.84	2.54	4.89	3.46	0.56	0.24	0.00
3819B	75.12	13.32	0.28	0.77	0.10	0.11	5.14	4.14	0.08	0.03	0.00
3831	65.77	17.34	0.92	3.36	0.66	1.89	5.75	3.33	0.52	0.35	0.10
3831A	55.47	17.64	1.60	7.40	3.64	6.17	4.13	1.69	1.73	0.39	0.13
4401	48.13	16.77	2.01	10.50	6.07	8.51	3.62	1.09	2.67	0.46	0.18
4402	50.01	18.71	1.63	8.30	5.51	8.40	3.75	1.22	1.79	0.52	0.16
4405	53.52	15.50	1.51	7.28	7.82	7.29	3.44	1.78	1.42	0.28	0.15
4405A	48.78	17.27	1.67	8.76	7.07	10.32	3.00	0.76	1.82	0.38	0.16
4407	47.75	15.84	1.65	8.71	8.65	10.97	3.01	1.03	1.85	0.35	0.17
4409	46.75	19.41	1.73	9.32	6.32	10.48	3.05	0.61	1.86	0.28	0.18
4410	47.11	17.24	1.91	10.19	7.18	9.12	3.51	0.90	2.27	0.40	0.17
4413	46.97	16.64	2.03	10.86	6.65	8.73	3.86	1.11	2.68	0.47	0.00
4414	46.90	16.81	2.01	10.75	6.69	8.74	3.92	1.05	2.69	0.44	0.00
4416	53.66	16.45	1.63	7.87	6.02	7.18	3.48	1.53	1.63	0.40	0.14
4416A	49.84	16.38	1.76	8.91	7.99	8.42	3.57	1.06	1.75	0.30	0.00
4417	47.54	19.36	1.69	8.92	6.39	9.86	3.18	0.73	1.82	0.33	0.17
4417A	58.07	17.38	1.33	5.90	3.54	5.84	3.97	2.07	1.47	0.29	0.14
4417B	54.32	16.44	1.51	7.12	5.62	7.71	3.57	1.58	1.68	0.30	0.14

TABLE 3. ADJUSTED ANALYSES OF MAJOR OXIDES IN WEIGHT PERCENT, CENTRAL MAP AREA--Continued

Sample No.	SiO_2	Al_2O_3	Fe_2O_3	FeO	MgO[1]	CaO[2]	Na_2O	K_2O	TiO_2	P_2O_5[1]	MnO[3]
4425	48.25	16.15	1.74	9.08	8.46	9.77	3.31	0.93	1.94	0.36	0.00
4427	47.59	16.53	1.68	8.96	8.23	11.21	3.14	0.51	1.70	0.28	0.17
4427A	49.60	17.18	1.80	9.23	5.21	8.54	4.24	1.33	2.15	0.51	0.19
4428	58.83	14.96	1.26	5.37	4.66	6.84	3.76	2.74	1.04	0.42	0.12
4428A	60.27	14.88	1.20	5.00	3.96	6.19	3.96	3.06	0.96	0.40	0.12
4429	56.76	17.51	1.44	6.41	4.02	6.25	4.20	1.94	1.09	0.35	0.00
4429A	47.16	12.91	1.79	9.54	14.35	9.39	2.36	0.59	1.67	0.22	0.00
4432	59.41	14.98	1.22	5.20	4.52	6.50	3.66	2.95	1.00	0.43	0.12
4432A	47.74	17.33	1.73	9.22	5.90	9.69	3.51	1.69	2.01	0.98	0.18
4432B	47.97	17.07	1.68	8.91	6.30	10.02	3.38	1.69	1.90	0.91	0.18
4435	47.04	17.67	1.81	9.76	5.16	10.13	3.90	1.37	2.38	0.58	0.18
4435A	62.88	16.82	1.01	3.91	2.90	5.56	4.45	1.67	0.61	0.19	0.00
4436	48.75	16.56	1.76	9.14	7.04	9.23	3.73	1.22	2.05	0.37	0.17
4436A	48.16	18.83	1.77	9.20	5.79	8.52	3.97	1.05	2.19	0.50	0.00
4436B	47.41	17.09	1.85	9.92	7.24	9.35	3.52	0.89	2.12	0.42	0.17
4502	74.10	14.28	0.40	1.16	0.12	0.63	4.64	4.45	0.08	0.03	0.09
4503	75.00	14.08	0.25	0.74	0.00	0.85	4.41	4.55	0.04	0.00	0.08
4505	47.68	17.90	1.81	9.55	6.47	9.08	3.77	1.00	2.22	0.51	0.00
4506	48.62	17.88	1.79	9.34	6.05	8.62	3.66	1.08	2.19	0.60	0.18
4507	46.47	14.59	1.80	9.69	11.19	10.87	2.82	0.32	1.95	0.29	0.00
4508	47.22	14.70	1.82	9.67	9.97	10.77	2.87	0.41	2.08	0.32	0.17
4517	47.21	15.96	1.89	10.13	8.02	9.57	3.32	0.89	2.44	0.39	0.17
4517A	47.89	17.14	1.96	10.37	7.08	8.76	3.05	0.79	2.58	0.39	0.00
4521	47.33	16.99	1.98	10.56	6.42	8.72	3.49	1.06	2.74	0.49	0.20
4522	68.56	15.42	0.72	2.47	0.93	2.33	4.35	4.49	0.56	0.17	0.00
4522A	48.29	19.31	1.73	9.03	5.66	9.77	3.56	0.65	1.54	0.45	0.00
4522B	73.27	14.59	0.41	1.28	0.18	1.01	4.36	4.67	0.18	0.05	0.00
4525	48.47	17.58	2.09	10.93	4.52	6.76	4.41	1.53	3.12	0.59	0.00
4526	50.04	16.33	1.83	9.36	6.43	8.21	3.73	1.43	1.76	0.66	0.20
4526A	66.82	16.21	0.90	3.23	0.92	2.63	4.92	3.43	0.60	0.24	0.10
4526B	48.74	18.45	1.74	9.04	6.24	9.28	3.68	0.83	1.58	0.42	0.00
4527	52.59	16.24	1.93	9.44	4.08	6.48	4.41	2.06	1.65	0.86	0.24
4528	64.87	17.63	0.70	2.63	0.95	1.44	6.54	4.16	0.54	0.37	0.16

4528A	47.05	16.95	2.03	10.85	6.51	8.65	3.72	1.09	2.69	0.46	0.00
4532	57.85	17.72	1.35	5.88	2.16	4.43	5.40	2.88	1.28	0.90	0.16
4533	69.38	15.39	0.67	2.25	0.95	2.38	3.94	4.39	0.47	0.12	0.06
4533A	72.26	14.80	0.50	1.52	0.13	0.80	5.20	4.60	0.08	0.03	0.08
4534	70.64	15.55	0.61	2.01	0.60	1.76	4.42	3.89	0.33	0.11	0.08
4534A	62.83	16.26	1.05	4.18	2.56	4.51	3.78	3.53	0.96	0.25	0.09
4534B	62.35	16.13	1.15	4.52	2.79	4.70	4.14	2.84	1.02	0.24	0.10
4534D	75.14	13.21	0.54	1.53	0.01	0.40	4.67	4.33	0.06	0.02	0.07
4534E	59.24	18.65	1.23	5.35	2.15	4.39	5.06	2.12	1.25	0.36	0.17
4534F	69.27	15.33	1.00	3.30	0.73	1.69	4.45	3.76	0.30	0.15	0.00
4535	62.71	16.02	1.12	4.39	2.74	4.58	3.84	3.24	1.02	0.23	0.09
4535A	60.51	16.66	1.19	4.94	3.27	5.30	4.04	2.55	1.20	0.23	0.10
4535B	61.17	17.23	1.17	4.77	3.01	4.51	3.90	3.01	1.01	0.22	0.00
4536	65.51	15.87	0.91	3.39	2.03	3.53	4.20	3.48	0.81	0.18	0.07
4536A	49.78	17.76	2.05	10.30	4.26	6.29	4.61	1.55	2.86	0.54	0.00
4603	49.03	18.54	1.90	9.76	4.58	7.05	4.42	1.27	2.74	0.54	0.17
4607	50.83	18.28	1.86	9.26	4.24	6.88	4.17	1.40	2.41	0.48	0.16
4614	52.89	17.88	1.72	8.26	3.03	6.02	4.91	2.00	2.01	1.09	0.17
4619	48.75	18.16	1.99	10.42	4.99	7.87	3.42	1.11	2.72	0.57	0.00
4619A	49.43	16.93	2.12	10.91	3.83	6.11	4.95	1.82	2.35	1.55	0.00
4622	48.88	18.65	1.70	8.91	5.78	8.79	3.95	0.71	1.72	0.74	0.16
4624	46.88	17.51	1.70	9.09	7.52	10.01	3.36	1.02	1.95	0.79	0.18
4625	46.49	17.64	1.71	9.21	7.70	10.10	3.24	0.94	1.96	0.83	0.18
4626	46.64	16.83	1.69	9.08	9.34	10.65	2.64	0.78	1.58	0.58	0.18
4627	46.73	16.92	1.71	9.21	9.15	10.34	2.96	0.68	1.58	0.54	0.18
4629	49.04	17.42	2.07	10.64	4.45	6.71	4.58	1.55	2.97	0.56	0.00
4631	48.75	17.43	2.05	10.74	4.41	6.72	4.68	1.57	2.44	1.20	0.00
4631A	47.38	17.76	1.98	10.53	6.07	8.23	4.04	1.04	2.40	0.56	0.00
4634	46.86	17.85	1.79	9.54	7.82	9.41	3.35	0.74	1.73	0.69	0.18
4635	53.07	17.77	1.75	8.54	2.82	5.90	4.95	2.00	2.15	0.85	0.17
4636	48.40	18.16	1.90	9.97	5.64	8.57	3.17	1.03	2.40	0.58	0.17
4701	46.47	15.40	1.68	9.15	9.76	11.65	2.30	0.84	2.06	0.52	0.18
4703	47.70	15.15	1.71	9.10	9.41	11.06	2.62	0.73	1.84	0.50	0.17
4704	49.08	18.33	1.83	9.41	5.47	8.44	3.60	0.95	2.30	0.40	0.18
4707	46.31	15.54	1.73	9.39	9.41	11.28	2.53	0.90	2.13	0.58	0.18
4708	46.74	16.47	1.79	9.63	7.54	10.16	3.54	0.83	2.21	0.91	0.18
4710	49.22	17.10	1.57	8.04	6.90	10.97	2.99	0.78	1.37	0.84	0.19
4711	47.62	17.83	1.76	9.29	7.14	10.25	3.04	0.50	1.76	0.64	0.17
4712	46.95	17.14	1.69	9.13	8.14	11.25	2.89	0.45	1.66	0.53	0.17

TABLE 3. ADJUSTED ANALYSES OF MAJOR OXIDES IN WEIGHT PERCENT, CENTRAL MAP AREA--Continued

Sample No.	SiO_2	Al_2O_3	Fe_2O_3	FeO	MgO[1]	CaO[2]	Na_2O	K_2O	TiO_2	P_2O_5[1]	MnO[3]
4715	47.60	17.59	1.78	9.40	7.36	10.17	3.01	0.49	1.77	0.65	0.17
4717	46.03	15.88	1.75	9.57	8.88	11.38	2.67	0.83	2.18	0.64	0.18
4717A	48.36	17.51	1.73	9.05	6.92	9.61	3.07	0.97	1.83	0.78	0.17
4717B	47.80	17.68	1.75	9.24	6.82	9.71	3.27	0.95	1.89	0.72	0.17
4718	46.71	15.76	1.73	9.29	10.07	10.11	2.70	0.92	2.01	0.51	0.18
4718A	47.17	17.08	1.70	9.11	8.61	9.71	3.00	0.94	1.96	0.53	0.18
4719	50.31	18.92	1.95	9.80	3.57	5.74	4.64	1.47	3.02	0.41	0.16
4723	57.08	17.69	1.49	6.67	2.44	5.02	4.92	2.26	1.46	0.78	0.16
4723A	52.93	17.67	1.79	8.60	3.24	5.87	4.77	1.90	2.16	0.89	0.17
4723B	47.74	17.60	1.75	9.23	7.33	10.24	3.07	0.52	1.72	0.63	0.17
4726	45.97	14.94	1.72	9.48	10.78	10.81	2.37	0.98	2.27	0.48	0.18
4729A	49.15	17.99	1.82	9.42	4.77	8.11	3.96	1.29	2.38	0.92	0.19
4729B	50.19	14.09	1.41	7.16	8.75	11.63	3.00	1.43	1.31	0.86	0.16
4730	47.37	17.28	1.72	9.14	7.27	10.26	3.11	0.98	1.95	0.74	0.17
4735	62.24	16.91	1.16	4.70	1.81	3.82	4.80	3.03	1.04	0.38	0.10
4818	56.89	17.57	1.49	6.67	2.40	4.89	5.19	2.38	1.49	0.85	0.16
4819	49.78	17.39	1.56	8.03	6.13	9.64	3.51	1.31	1.82	0.65	0.17
5536	49.15	17.69	1.94	10.21	5.02	7.71	4.16	1.14	2.33	0.48	0.17
5732	51.23	18.06	1.91	9.42	3.47	6.38	4.66	1.34	2.64	0.72	0.16
5733A	47.82	16.60	1.68	8.90	8.76	10.20	2.88	0.82	1.78	0.39	0.16
5733B	61.13	18.57	0.94	3.89	1.40	3.29	6.26	3.06	0.77	0.52	0.17
5734	49.02	18.57	1.71	8.86	5.96	9.20	3.59	0.81	1.63	0.49	0.17
DC03A	74.53	12.87	0.61	1.75	0.14	0.00	5.52	4.35	0.14	0.03	0.05
DC03B	64.22	16.26	1.11	4.30	1.64	3.25	5.11	2.86	0.79	0.36	0.10
DC03C	60.87	16.73	1.23	5.14	2.57	5.32	4.20	2.26	1.23	0.32	0.11
DC04A	56.54	16.34	1.60	7.33	3.39	6.77	4.32	1.64	1.54	0.39	0.12
DC04B	52.98	17.55	1.63	7.96	4.42	7.77	4.08	1.47	1.61	0.36	0.15
DC04C	61.37	17.26	1.23	5.15	2.09	4.32	4.77	2.16	1.02	0.45	0.16
DC05	62.82	16.64	1.18	4.62	1.62	3.81	5.07	2.74	0.95	0.43	0.11
DC07	61.36	16.86	1.23	5.17	1.86	4.31	4.76	2.79	1.03	0.48	0.12
DC08	61.03	17.21	1.20	5.01	1.80	4.27	5.18	2.62	1.06	0.48	0.12
DC09	60.71	17.31	1.28	5.29	1.85	4.33	4.88	2.62	1.08	0.49	0.14
DC10	61.21	16.71	1.22	5.02	2.15	4.16	5.23	2.56	1.13	0.49	0.09

DC11	61.54	16.58	1.22	5.02	1.84	4.18	5.32	2.66	1.02	0.49	0.11
DC12	60.55	17.27	1.27	5.33	1.58	4.45	5.23	2.58	1.09	0.51	0.13
DC13A	60.38	17.01	1.32	5.52	1.87	4.32	5.26	2.55	1.12	0.51	0.14
DC13B	62.28	16.20	1.28	4.98	1.90	4.07	5.10	2.50	1.09	0.48	0.11
DC14	60.96	17.02	1.26	5.29	1.65	4.50	5.05	2.47	1.13	0.59	0.07
DC15	61.10	16.78	1.26	5.20	1.94	4.29	5.12	2.56	1.13	0.50	0.12
DC16	61.58	16.65	1.26	5.14	1.74	4.17	5.31	2.55	1.02	0.49	0.09
DC17	60.44	17.01	1.31	5.52	1.92	4.50	4.89	2.62	1.13	0.51	0.14
DC18	60.52	17.16	1.32	5.44	1.86	4.33	5.14	2.49	1.09	0.50	0.14
DC19	60.74	16.96	1.25	5.27	1.95	4.50	5.24	2.36	1.13	0.48	0.10
DC20	60.19	17.80	1.26	5.23	1.75	4.58	5.20	2.29	1.06	0.50	0.13
DC22	61.16	16.97	1.23	5.16	1.97	4.44	4.97	2.38	1.14	0.51	0.08
DC23	61.03	16.92	1.20	5.13	2.08	4.63	4.88	2.38	1.14	0.51	0.08
DC24	60.69	16.96	1.23	5.23	2.07	4.51	5.07	2.47	1.14	0.52	0.11
DC25A	61.15	16.85	1.20	5.08	1.97	4.52	5.07	2.38	1.14	0.51	0.10
DC25B	60.91	17.02	1.29	5.37	1.85	4.60	4.82	2.36	1.13	0.52	0.12
DC26	60.86	16.91	1.25	5.22	1.74	4.58	5.12	2.56	1.13	0.51	0.11
DC30	60.57	17.01	1.26	5.30	1.95	4.60	5.23	2.36	1.13	0.50	0.10
DC32	60.89	17.07	1.23	5.24	1.87	4.66	4.89	2.38	1.14	0.51	0.10
DC35	60.87	17.19	1.23	5.24	1.97	4.63	4.97	2.16	1.14	0.48	0.10
DC36	60.93	17.09	1.19	5.02	1.87	4.86	5.08	2.28	1.14	0.45	0.08
DC38	60.82	17.27	1.20	5.06	1.97	4.83	4.95	2.16	1.14	0.47	0.11
DC40	60.68	17.47	1.14	4.80	1.96	4.83	5.06	2.38	1.14	0.47	0.08
DC42	60.83	17.44	1.16	4.92	1.76	4.87	4.88	2.49	1.04	0.49	0.11
DC43	61.63	17.17	1.11	4.58	1.76	4.85	5.07	2.27	1.00	0.45	0.10
DC47	61.29	17.17	1.11	4.63	1.65	5.02	5.24	2.37	1.00	0.43	0.09
DC49	61.73	17.39	1.06	4.39	1.54	4.69	5.35	2.37	0.96	0.39	0.10
DC57	59.94	18.36	1.09	4.60	1.58	5.06	5.46	2.33	1.02	0.41	0.12
DC58	64.66	16.26	1.11	4.13	1.08	2.90	5.64	3.04	0.76	0.29	0.13
DC65	57.26	17.71	1.41	6.17	2.38	5.88	4.89	2.01	1.47	0.65	0.14

[1]0.00, value below limit of detection.

[2]CaO is insufficient in samples 2705B, 3732N, 3732P to combine with analyzed CO_2 in normative calcite; subtraction of normative calcite sufficient to reduce CO_2 to zero gives a small negative value for CaO. For these three samples, normative apatite (table 4) was calculated as if sufficient CaO was present to combine with P_2O_5.

[3]0.00, not determined.

TABLE 4. CIPW NORMATIVE COMPOSITIONS, CENTRAL MAP AREA

Sample No.	q	c	or	ab	an	di	hy	ol	ne	ac	ns	mt	il	ap	di			hy		ol	
															wo	en	fs	en	fs	fo	fa
0414	0.00	0.00	5.38	10.33	20.43	35.66	0.00	9.97	11.09	0.00	0.00	2.38	3.80	0.98	18.27	10.71	6.68	0.00	0.00	5.91	4.06
0414A	0.00	0.00	6.57	10.96	19.88	35.31	0.00	10.61	8.42	0.00	0.00	2.36	3.95	1.99	18.14	10.88	6.30	0.00	0.00	6.48	4.13
0414B	0.00	0.00	6.56	5.51	14.06	33.30	0.00	22.58	9.97	0.00	0.00	2.43	3.80	1.84	17.31	11.71	4.27	0.00	0.00	16.11	6.47
0414C	0.00	0.00	5.36	4.52	17.46	37.81	0.00	18.93	9.56	0.00	0.00	2.00	2.28	2.13	19.70	13.60	4.51	0.00	0.00	13.87	5.06
0414D	0.00	0.00	6.49	27.97	25.04	15.62	0.00	14.84	2.70	0.00	0.00	2.45	3.68	1.25	7.97	4.49	3.16	0.00	0.00	8.35	6.49
0414E	0.00	0.00	5.40	22.73	23.13	20.95	0.00	19.94	1.18	0.00	0.00	2.53	3.06	1.11	10.78	6.62	3.55	0.00	0.00	12.54	7.40
0414F	0.00	0.00	3.05	21.37	28.28	19.59	0.00	21.76	0.24	0.00	0.00	2.56	2.18	1.00	10.06	6.02	3.51	0.00	0.00	13.24	8.52
0414G	0.00	0.00	2.99	18.47	24.32	22.23	0.00	21.59	4.86	0.00	0.00	2.60	2.00	0.96	11.42	6.87	3.94	0.00	0.00	13.23	8.37
0414H	0.00	0.00	5.50	8.48	20.60	33.84	0.00	18.37	5.83	0.00	0.00	2.29	3.49	1.64	17.55	11.55	4.74	0.00	0.00	12.65	5.72
0414I	0.00	0.00	4.58	11.49	19.13	28.82	0.00	24.36	4.90	0.00	0.00	2.38	3.06	1.31	14.98	10.12	3.72	0.00	0.00	17.34	7.03
0501	0.00	0.00	4.67	23.13	29.88	16.32	11.59	7.92	0.00	0.00	0.00	2.67	3.12	0.72	8.30	4.47	3.55	6.47	5.13	4.23	3.69
0506	0.00	0.00	3.60	9.52	22.32	31.04	0.00	16.05	9.23	0.00	0.00	2.49	3.30	2.52	15.93	9.52	5.58	0.00	0.00	9.75	6.30
0603A	20.19	0.00	22.26	43.30	6.30	0.93	4.19	0.00	0.00	0.00	0.00	1.05	0.96	0.84	0.46	0.16	0.32	1.39	2.80	0.00	0.00
0603B	0.78	0.46	14.95	46.84	13.75	0.00	14.52	0.00	0.00	0.00	0.00	2.40	3.33	3.06	0.00	0.00	0.00	4.35	10.17	0.00	0.00
0614	23.36	0.00	23.81	43.30	5.01	0.36	2.64	0.00	0.00	0.00	0.00	0.67	0.48	0.38	0.18	0.06	0.13	0.82	1.81	0.00	0.00
0626	0.00	0.00	12.17	49.02	16.05	2.19	9.11	3.95	0.00	0.00	0.00	2.28	3.01	2.27	1.08	0.42	0.68	3.48	5.62	1.42	2.53
0626A	0.00	0.00	4.46	21.85	26.46	21.13	0.00	17.31	3.18	0.00	0.00	2.37	2.47	0.81	10.84	6.42	3.87	0.00	0.00	10.40	6.91
1408	7.98	0.00	13.32	44.20	16.85	2.64	9.90	0.00	0.00	0.00	0.00	1.80	1.83	1.53	1.31	0.48	0.85	3.60	6.30	0.00	0.00
1436	0.00	0.00	5.90	20.20	25.60	16.45	0.00	20.64	3.67	0.00	0.00	2.59	4.02	0.96	8.46	5.15	2.84	0.00	0.00	12.84	7.80
1504	0.00	0.00	7.53	14.26	23.22	25.86	0.00	15.37	5.78	0.00	0.00	2.37	3.45	2.21	13.28	7.97	4.61	0.00	0.00	9.38	5.98
1506	0.00	0.00	10.52	20.00	24.07	18.12	0.00	15.89	3.40	0.00	0.00	2.33	3.50	2.23	9.29	5.50	3.33	0.00	0.00	9.54	6.35
1508	0.00	0.00	9.59	31.21	27.17	7.13	16.32	2.48	0.00	0.00	0.00	2.31	2.99	0.83	3.62	1.89	1.63	8.78	7.54	1.28	1.21
1509	0.00	0.00	10.77	44.91	18.85	2.92	0.00	13.59	0.37	0.00	0.00	2.61	4.17	1.85	1.46	0.63	0.83	0.00	0.00	5.52	8.08
1517	0.00	0.00	5.88	21.66	26.24	14.50	0.00	20.66	3.23	0.00	0.00	2.67	4.20	0.98	7.44	4.43	2.63	0.00	0.00	12.50	8.16
1519	0.00	0.00	6.53	28.94	28.37	7.03	0.00	19.38	0.75	0.00	0.00	2.90	5.01	1.12	3.57	1.87	1.59	0.00	0.00	9.99	9.39
1609	2.68	0.00	12.63	42.79	18.27	1.18	15.10	0.00	0.00	0.00	0.00	2.27	2.84	2.29	0.59	0.23	0.36	5.92	9.18	0.00	0.00
1609A	0.34	0.33	12.12	46.03	18.56	0.00	15.25	0.00	0.00	0.00	0.00	2.25	2.79	2.41	0.00	0.00	0.00	5.71	9.54	0.00	0.00
1609B	5.70	0.00	15.23	46.84	14.70	0.34	11.52	0.00	0.00	0.00	0.00	1.91	2.07	1.73	0.17	0.06	0.11	4.29	7.23	0.00	0.00
1611	14.14	0.09	20.50	45.98	9.83	0.00	6.61	0.00	0.00	0.00	0.00	1.32	0.97	0.58	0.00	0.00	0.00	1.89	4.72	0.00	0.00
1611A	0.00	0.00	2.04	21.83	34.95	10.79	0.00	15.83	5.72	0.00	0.00	2.72	5.55	0.60	5.46	2.76	2.57	0.00	0.00	7.82	8.01
1611B	0.00	0.00	3.06	26.23	24.88	12.98	0.00	16.58	5.36	0.00	0.00	3.21	5.27	2.48	6.49	2.78	3.71	0.00	0.00	6.71	9.87
1611C	0.00	0.00	4.32	21.79	24.79	19.17	0.00	17.70	3.84	0.00	0.00	3.24	4.90	0.27	9.68	4.83	4.65	0.00	0.00	8.60	9.10
1611D	0.00	0.00	5.64	39.17	25.82	4.21	0.16	15.85	0.00	0.00	0.00	2.93	3.70	2.57	2.09	0.80	1.32	0.06	0.10	5.62	10.24
1611E	0.00	0.00	2.45	21.31	24.88	10.26	0.00	22.24	2.87	0.00	0.00	3.18	6.59	6.37	5.20	2.71	2.34	0.00	0.00	11.40	10.84

1615	0.00	0.00	3.92	16.67	28.81	17.10	0.00	20.85	5.53	0.00	0.00	2.39	2.75	2.02	8.81	5.45	2.85	0.00	0.00	13.23	7.62
1615A	0.00	0.00	4.23	17.12	29.24	16.18	0.00	21.37	4.45	0.00	0.00	2.43	2.83	2.22	8.32	5.06	2.80	0.00	0.00	13.27	8.10
1616	0.00	0.00	6.55	29.13	26.82	15.55	0.00	15.51	0.03	0.00	0.00	2.52	3.10	0.80	7.91	4.28	3.36	0.00	0.00	8.31	7.20
1617	0.00	0.00	7.82	10.13	15.62	29.23	0.00	20.46	8.04	0.00	0.00	2.63	4.67	1.43	15.11	9.66	4.47	0.00	0.00	13.55	6.91
1618	0.00	0.00	9.41	35.40	19.86	5.57	0.00	15.29	4.69	0.00	0.00	2.81	5.29	1.72	2.80	1.28	1.49	0.00	0.00	6.69	8.59
1619	0.00	0.00	4.37	17.59	27.65	18.37	0.00	21.21	3.15	0.00	0.00	2.58	3.61	1.51	9.44	5.71	3.22	0.00	0.00	13.08	8.13
1620	0.00	0.00	4.11	22.54	26.86	14.53	0.00	21.39	2.66	0.00	0.00	2.69	3.83	1.43	7.45	4.36	2.72	0.00	0.00	12.68	8.72
1621	0.00	0.00	5.70	18.89	24.91	18.04	0.00	21.83	3.53	0.00	0.00	2.48	3.60	1.05	9.32	5.91	2.82	0.00	0.00	14.31	7.52
1623	1.70	0.00	13.65	50.49	12.84	2.46	12.31	0.00	0.00	0.00	0.00	2.06	2.41	2.13	1.22	0.46	0.78	4.60	7.71	0.00	0.00
1628	11.55	0.00	20.81	45.39	9.18	0.52	8.10	0.00	0.00	0.00	0.00	1.48	1.59	1.41	0.26	0.10	0.16	3.06	5.03	0.00	0.00
1629	0.00	0.00	14.46	51.03	12.38	2.04	4.29	7.72	0.00	0.00	0.00	2.25	3.03	2.86	1.02	0.41	0.62	1.70	2.59	2.88	4.84
1715	0.00	0.00	2.95	24.49	28.02	14.46	12.93	11.60	0.00	0.00	0.00	2.63	2.41	0.52	7.42	4.39	2.66	8.06	4.88	6.96	4.64
1722	0.00	0.00	8.84	38.48	20.50	6.41	1.64	15.17	0.00	0.00	0.00	2.83	3.66	2.54	3.21	1.44	1.76	0.74	0.90	6.45	8.72
1731	0.00	0.00	13.71	50.21	13.14	1.77	3.34	8.96	0.00	0.00	0.00	2.42	3.29	3.23	0.88	0.32	0.58	1.19	2.15	2.99	5.97
1807	15.14	0.00	18.64	45.92	10.05	0.80	6.55	0.00	0.00	0.00	0.00	1.44	0.96	0.51	0.39	0.11	0.30	1.76	4.79	0.00	0.00
1807A	14.39	0.00	19.08	45.33	10.77	0.83	6.63	0.00	0.00	0.00	0.00	1.43	1.04	0.51	0.41	0.11	0.32	1.73	4.90	0.00	0.00
1808	0.00	0.00	5.38	27.97	26.94	12.87	0.00	18.28	1.07	0.00	0.00	2.48	3.57	1.48	6.59	3.83	2.45	0.00	0.00	10.72	7.56
2401	0.00	0.00	4.64	21.58	29.06	17.67	0.00	18.93	1.46	0.00	0.00	2.51	3.27	0.91	9.07	5.40	3.21	0.00	0.00	11.44	7.49
2403	0.00	0.00	9.54	42.55	17.66	6.46	0.00	13.68	1.00	0.00	0.00	2.75	4.79	1.63	3.24	1.49	1.73	0.00	0.00	6.00	7.68
2405	27.34	0.00	27.23	43.16	0.21	0.42	1.16	0.00	0.00	0.00	0.00	0.36	0.08	0.05	0.20	0.04	0.18	0.19	0.96	0.00	0.00
2405A	25.55	0.83	18.52	39.74	9.30	0.00	4.27	0.00	0.00	0.00	0.00	0.92	0.56	0.31	0.00	0.00	0.00	1.40	2.87	0.00	0.00
2405B	0.00	0.00	4.27	23.81	28.96	20.88	0.00	14.90	1.13	0.00	0.00	2.45	2.80	0.82	10.66	5.99	4.24	0.00	0.00	8.37	6.53
2408	3.29	0.00	8.47	27.72	27.43	9.65	17.62	0.00	0.00	0.00	0.00	2.24	2.72	0.87	4.90	2.60	2.15	9.64	7.99	0.00	0.00
2409	0.00	0.00	9.11	38.75	22.18	3.13	0.00	15.22	2.33	0.00	0.00	2.77	4.91	1.64	1.57	0.71	0.86	0.00	0.00	6.52	8.70
2409A	11.93	0.00	16.57	28.53	15.72	10.32	13.82	0.00	0.00	0.00	0.00	1.47	1.10	0.55	5.34	3.43	1.55	9.52	4.30	0.00	0.00
2409B	10.18	0.00	15.28	26.92	17.42	10.49	16.39	0.00	0.00	0.00	0.00	1.60	1.19	0.54	5.44	3.56	1.50	11.54	4.85	0.00	0.00
2409C	0.00	0.00	4.71	22.27	26.53	21.13	0.00	18.04	1.17	0.00	0.00	2.31	2.92	0.93	10.90	6.81	3.42	0.00	0.00	11.61	6.43
2410	29.91	0.81	24.90	38.26	4.04	0.00	1.52	0.00	0.00	0.00	0.00	0.37	0.08	0.12	0.00	0.00	0.00	0.31	1.21	0.00	0.00
2413	0.00	0.00	4.81	25.02	26.09	18.79	0.00	17.72	0.71	0.00	0.00	2.53	3.43	0.90	9.64	5.74	3.41	0.00	0.00	10.70	7.02
2415	0.00	0.00	4.35	21.14	25.46	24.58	1.44	18.07	0.00	0.00	0.00	2.16	2.09	0.74	12.75	8.43	3.39	1.03	0.41	12.52	5.55
2415A	0.00	0.00	6.78	29.18	27.56	11.02	0.00	16.19	1.04	0.00	0.00	2.47	3.39	2.43	5.61	3.06	2.35	0.00	0.00	8.78	7.41
2416	0.00	0.00	5.97	25.04	24.63	21.52	4.45	12.74	0.00	0.00	0.00	2.28	2.65	0.74	11.08	6.81	3.63	2.90	1.55	8.03	4.71
2416A	0.00	0.00	8.38	23.14	21.67	12.34	29.51	0.57	0.00	0.00	0.00	1.91	1.79	0.72	6.43	4.45	1.46	22.20	7.31	0.42	0.15
2416B	0.00	0.00	5.21	22.04	23.42	14.08	14.31	16.23	0.00	0.00	0.00	2.08	1.90	0.76	7.34	5.12	1.61	10.88	3.43	12.04	4.19
2417	0.00	0.00	8.46	32.94	28.73	5.25	4.22	12.68	0.00	0.00	0.00	2.50	4.31	0.95	2.67	1.41	1.18	2.29	1.92	6.59	6.09
2421	0.00	0.00	8.52	37.79	26.94	3.56	9.19	6.92	0.00	0.00	0.00	2.46	3.62	1.03	1.79	0.84	0.92	4.39	4.80	3.14	3.78
2422	0.00	0.00	4.74	22.83	26.22	22.40	0.00	16.50	1.32	0.00	0.00	2.32	2.85	0.83	11.55	7.19	3.66	0.00	0.00	10.57	5.93
2422A	0.00	0.00	3.12	11.87	26.17	24.71	0.00	15.39	9.77	0.00	0.00	2.45	4.05	2.53	12.68	7.51	4.53	0.00	0.00	9.24	6.15
2425	0.00	0.00	6.49	28.78	27.58	8.78	0.00	17.21	1.91	0.00	0.00	2.76	5.30	1.22	4.46	2.41	1.90	0.00	0.00	9.21	8.00

TABLE 4. CIPW NORMATIVE COMPOSITIONS, CENTRAL MAP AREA--Continued

Sample No.	q	c	or	ab	an	di	hy	ol	ne	ac	ns	mt	il	ap	di			hy		ol	
															wo	en	fs	en	fs	fo	fa
2425A	0.00	0.00	4.96	23.71	29.33	18.50	3.03	15.17	0.00	0.00	0.00	2.19	2.06	1.08	9.52	5.86	3.12	1.98	1.05	9.56	5.61
2426	0.00	0.00	6.18	32.49	28.00	9.85	0.00	15.36	0.57	0.00	0.00	2.52	3.88	1.17	5.01	2.69	2.15	0.00	0.00	8.16	7.20
2426A	0.00	0.00	8.33	33.50	26.52	5.97	3.37	13.06	0.00	0.00	0.00	2.51	3.35	3.46	3.01	1.48	1.47	1.69	1.68	6.25	6.82
2429	0.00	0.00	6.13	25.20	26.79	17.95	0.00	16.43	1.15	0.00	0.00	2.26	3.23	0.88	9.25	5.75	2.95	0.00	0.00	10.50	5.93
2432	0.00	0.00	10.19	20.01	20.25	22.70	0.00	15.59	3.29	0.00	0.00	2.31	4.10	1.61	11.73	7.47	3.51	0.00	0.00	10.27	5.31
2432A	0.00	0.00	5.07	8.74	19.21	33.05	0.00	12.29	11.89	0.00	0.00	2.46	5.18	2.15	17.01	10.46	5.58	0.00	0.00	7.74	4.55
2435	0.00	0.00	4.65	12.95	26.27	22.88	0.00	15.06	8.67	0.00	0.00	2.47	4.26	2.85	11.70	6.71	4.47	0.00	0.00	8.69	6.38
2501	0.00	0.00	9.84	39.03	24.69	0.94	6.44	10.45	0.00	0.00	0.00	2.66	4.28	1.71	0.47	0.22	0.25	2.97	3.47	4.57	5.88
2506	5.78	0.00	13.81	48.99	13.12	2.83	9.33	0.00	0.00	0.00	0.00	1.86	2.32	2.02	1.40	0.50	0.93	3.29	6.04	0.00	0.00
2506A	16.16	0.43	21.75	44.99	8.45	0.00	5.60	0.00	0.00	0.00	0.00	1.01	0.85	0.78	0.00	0.00	0.00	2.22	3.38	0.00	0.00
2506B	14.35	0.98	21.16	49.35	6.63	0.00	5.10	0.00	0.00	0.00	0.00	0.96	0.78	0.70	0.00	0.00	0.00	1.76	3.34	0.00	0.00
2514	0.00	0.00	7.41	31.65	24.84	4.68	0.00	18.29	3.01	0.00	0.00	3.14	5.74	1.26	2.35	1.10	1.23	0.00	0.00	8.21	10.07
2517	0.00	0.00	6.57	26.06	26.20	10.96	0.00	18.72	2.84	0.00	0.00	2.76	4.89	1.02	5.60	3.17	2.19	0.00	0.00	10.62	8.11
2517A	0.00	0.00	7.17	30.85	25.55	8.35	0.00	17.07	1.80	0.00	0.00	2.76	4.99	1.50	4.24	2.26	1.85	0.00	0.00	8.98	8.08
2517B	0.00	0.00	6.45	28.60	27.56	8.51	0.00	19.03	0.94	0.00	0.00	2.74	5.10	1.10	4.34	2.41	1.76	0.00	0.00	10.56	8.47
2519	0.00	0.00	5.74	19.50	30.04	21.22	0.00	14.50	2.97	0.00	0.00	2.19	2.94	0.93	10.91	6.64	3.67	0.00	0.00	9.01	5.49
2520	0.00	0.00	4.61	29.62	29.62	10.08	0.00	18.94	0.13	0.00	0.00	2.64	3.63	0.76	5.15	2.91	2.02	0.00	0.00	10.73	8.21
2525	0.00	0.00	6.34	23.71	26.85	13.67	0.00	17.24	4.36	0.00	0.00	2.46	3.75	1.65	7.00	4.06	2.61	0.00	0.00	10.09	7.15
2525A	0.00	0.00	6.35	23.72	29.21	12.63	0.00	17.56	2.62	0.00	0.00	2.48	3.93	1.56	6.45	3.66	2.52	0.00	0.00	9.99	7.57
2527	1.52	0.00	14.40	49.83	14.19	2.56	11.12	0.00	0.00	0.00	0.00	1.90	2.35	2.19	1.27	0.52	0.76	4.51	6.61	0.00	0.00
2529	0.00	0.00	5.64	24.74	27.38	19.03	4.43	13.18	0.00	0.00	0.00	2.22	2.51	0.89	9.79	5.99	3.25	2.87	1.56	8.25	4.93
2530	0.00	0.00	5.12	34.26	27.94	6.55	0.00	16.26	1.63	0.00	0.00	2.65	4.17	1.46	3.32	1.69	1.55	0.00	0.00	8.09	8.17
2530A	0.00	0.00	5.63	21.15	25.07	17.27	8.04	17.85	0.00	0.00	0.00	2.21	1.89	0.90	8.95	5.90	2.42	5.70	2.34	12.29	5.56
2532	0.94	0.00	17.43	56.04	9.75	0.17	10.55	0.00	0.00	0.00	0.00	1.84	1.72	1.59	0.08	0.03	0.06	3.44	7.11	0.00	0.00
2532A	0.00	0.00	7.61	34.67	23.05	4.08	0.00	17.12	2.96	0.00	0.00	3.10	6.01	1.44	2.05	0.93	1.11	0.00	0.00	7.38	9.74
2532B	0.00	0.00	7.79	17.97	24.15	22.29	0.00	15.28	4.42	0.00	0.00	2.45	3.52	2.18	11.40	6.57	4.32	0.00	0.00	8.87	6.42
2533	0.00	0.00	5.23	23.75	31.05	9.12	0.00	21.20	2.34	0.00	0.00	2.49	2.36	2.51	4.65	2.61	1.86	0.00	0.00	11.88	9.32
2602	8.50	0.67	18.26	40.47	15.26	0.00	11.82	0.00	0.00	0.00	0.00	1.92	1.93	1.22	0.00	0.00	0.00	4.14	7.67	0.00	0.00
2602A	13.07	0.00	22.05	47.61	8.87	0.29	5.68	0.00	0.00	0.00	0.00	1.36	0.77	0.31	0.14	0.03	0.12	1.04	4.65	0.00	0.00
2604	0.00	0.00	10.79	40.36	22.48	1.95	3.72	11.57	0.00	0.00	0.00	2.73	4.71	1.74	0.97	0.41	0.57	1.55	2.17	4.54	7.02
2613	6.65	0.00	14.32	46.51	18.56	0.81	8.71	0.00	0.00	0.00	0.00	1.60	1.89	0.99	0.40	0.14	0.27	2.94	5.76	0.00	0.00
2616	0.00	0.00	8.22	37.46	23.29	4.13	0.00	15.86	1.63	0.00	0.00	2.84	5.17	1.45	2.08	0.99	1.06	0.00	0.00	7.27	8.59
2626	0.00	0.00	10.33	43.88	21.74	0.54	5.81	9.43	0.00	0.00	0.00	2.51	3.86	1.95	0.27	0.12	0.15	2.47	3.34	3.79	5.64
2630	0.00	0.00	3.26	20.27	27.70	16.33	0.00	21.69	3.61	0.00	0.00	2.66	3.32	1.19	8.38	5.04	2.90	0.00	0.00	13.26	8.43

2633	1.83	0.00	17.21	54.83	10.72	1.84	8.92	0.00	0.00	0.00	0.00	1.55	1.67	1.46	0.92	0.38	0.54	3.72	5.20	0.00	0.00
2635	9.47	0.00	17.51	48.34	11.46	0.84	8.53	0.00	0.00	0.00	0.00	1.60	1.33	0.96	0.41	0.14	0.29	2.79	5.73	0.00	0.00
2703	10.11	0.00	17.58	41.82	14.68	1.83	9.34	0.00	0.00	0.00	0.00	1.76	2.05	0.86	0.91	0.36	0.55	3.71	5.63	0.00	0.00
2704	15.89	0.73	19.01	45.50	8.65	0.00	7.03	0.00	0.00	0.00	0.00	1.50	1.16	0.55	0.00	0.00	0.00	1.85	5.19	0.00	0.00
2704A	13.42	0.86	17.87	44.19	11.07	0.00	8.67	0.00	0.00	0.00	0.00	1.61	1.57	0.77	0.00	0.00	0.00	2.97	5.71	0.00	0.00
2704B	6.32	0.00	13.23	40.55	18.07	2.52	12.97	0.00	0.00	0.00	0.00	2.12	3.01	1.24	1.26	0.55	0.71	5.68	7.29	0.00	0.00
2704C	16.55	1.07	20.22	45.17	7.06	0.00	6.96	0.00	0.00	0.00	0.00	1.44	0.97	0.58	0.00	0.00	0.00	1.81	5.15	0.00	0.00
2704D	8.92	0.10	21.52	50.36	8.64	0.00	7.34	0.00	0.00	0.00	0.00	1.43	1.12	0.58	0.00	0.00	0.00	2.08	5.26	0.00	0.00
2705A	24.79	0.00	25.49	43.31	0.00	0.58	2.91	0.00	0.00	1.91	0.81	0.00	0.21	0.00	0.27	0.00	0.31	0.00	2.91	0.00	0.00
2705B	26.65	0.00	25.84	42.46	0.00	0.00	2.91	0.00	0.00	1.63	0.62	0.00	0.27	0.09	0.00	0.00	0.00	0.05	2.86	0.00	0.00
2705D	1.49	0.00	10.15	37.15	21.68	7.93	15.28	0.00	0.00	0.00	0.00	2.39	3.05	0.90	3.99	1.92	2.02	7.44	7.84	0.00	0.00
2705E	7.20	0.00	13.68	43.89	21.31	0.40	9.14	0.00	0.00	0.00	0.00	1.55	1.88	0.96	0.20	0.08	0.12	3.60	5.54	0.00	0.00
2705F	7.24	0.00	13.71	43.89	20.59	0.87	9.28	0.00	0.00	0.00	0.00	1.59	1.91	0.96	0.43	0.18	0.26	3.78	5.50	0.00	0.00
2705G	6.70	0.00	15.05	42.31	15.78	1.21	12.74	0.00	0.00	0.00	0.00	2.19	2.91	1.14	0.60	0.24	0.37	4.96	7.79	0.00	0.00
2706	12.83	3.03	16.31	38.75	15.86	0.00	9.16	0.00	0.00	0.00	0.00	1.47	1.83	0.78	0.00	0.00	0.00	3.61	5.55	0.00	0.00
2712	11.93	0.00	22.20	48.19	8.12	0.39	6.41	0.00	0.00	0.00	0.00	1.36	0.96	0.45	0.19	0.05	0.15	1.73	4.68	0.00	0.00
2722	19.32	2.77	21.23	41.85	7.08	0.00	5.42	0.00	0.00	0.00	0.00	1.13	0.77	0.44	0.00	0.00	0.00	1.32	4.10	0.00	0.00
2724	0.00	0.00	8.47	38.96	22.78	2.78	0.00	15.17	2.34	0.00	0.00	2.74	5.10	1.69	1.39	0.62	0.77	0.00	0.00	6.42	8.76
2725	14.86	1.33	18.78	43.41	11.32	0.00	7.25	0.00	0.00	0.00	0.00	1.45	1.04	0.58	0.00	0.00	0.00	2.22	5.03	0.00	0.00
2725A	14.21	0.00	18.85	46.88	11.11	0.29	5.66	0.00	0.00	0.00	0.00	1.23	1.17	0.60	0.14	0.05	0.10	1.87	3.79	0.00	0.00
2725B	14.43	0.07	19.52	45.69	10.79	0.00	6.48	0.00	0.00	0.00	0.00	1.42	1.05	0.56	0.00	0.00	0.00	1.63	4.85	0.00	0.00
2727	8.68	0.00	16.58	45.76	13.73	0.62	10.10	0.00	0.00	0.00	0.00	1.78	1.71	1.08	0.31	0.11	0.20	3.60	6.51	0.00	0.00
2733	14.02	0.00	19.44	46.11	9.16	1.68	6.57	0.00	0.00	0.00	0.00	1.49	1.00	0.55	0.82	0.25	0.61	1.89	4.68	0.00	0.00
2733A	0.00	0.00	7.45	34.04	27.66	8.79	8.79	7.01	0.00	0.00	0.00	2.43	3.14	0.72	4.44	2.19	2.16	4.42	4.37	3.36	3.65
2733B	0.00	0.00	7.35	31.67	25.66	9.02	0.00	16.03	1.67	0.00	0.00	2.67	4.98	0.98	4.58	2.41	2.03	0.00	0.00	8.30	7.73
2736	14.95	0.86	18.93	44.90	9.17	0.00	7.37	0.00	0.00	0.00	0.00	1.48	0.95	1.42	0.00	0.00	0.00	2.00	5.38	0.00	0.00
2736A	19.79	2.28	18.45	38.27	11.30	0.00	6.94	0.00	0.00	0.00	0.00	1.42	0.98	0.60	0.00	0.00	0.00	2.16	4.78	0.00	0.00
2818	9.12	0.00	20.87	46.81	10.33	1.25	8.05	0.00	0.00	0.00	0.00	1.55	1.36	0.68	0.61	0.21	0.42	2.66	5.39	0.00	0.00
2829	0.00	0.00	7.94	35.35	24.46	3.58	0.00	15.94	3.19	0.00	0.00	2.73	5.20	1.66	1.80	0.87	0.91	0.00	0.00	7.38	8.56
2830	12.44	0.00	18.60	46.94	10.63	1.11	6.94	0.00	0.00	0.00	0.00	1.51	1.21	0.62	0.55	0.18	0.39	2.14	4.80	0.00	0.00
3401	0.00	0.00	6.99	27.75	28.79	13.96	0.00	14.90	0.85	0.00	0.00	2.41	3.45	0.92	7.11	3.88	2.97	0.00	0.00	8.08	6.82
3404	0.00	0.00	4.11	14.05	32.92	19.68	0.00	15.38	6.31	0.00	0.00	2.68	3.77	1.12	9.99	5.29	4.39	0.00	0.00	8.03	7.35
3411	0.00	0.00	5.84	31.69	30.17	6.49	0.00	18.21	0.14	0.00	0.00	2.74	3.53	1.21	3.29	1.69	1.51	0.00	0.00	9.19	9.03
3416	0.00	0.00	5.43	30.24	31.58	8.91	0.00	17.09	0.18	0.00	0.00	2.47	2.84	1.29	4.52	2.38	2.01	0.00	0.00	8.84	8.25
3417	0.00	0.00	9.70	37.89	23.98	8.70	5.22	7.97	0.00	0.00	0.00	2.26	3.33	0.97	4.40	2.19	2.11	2.66	2.56	3.86	4.11
3417A	0.00	0.00	5.48	29.13	29.88	12.52	0.00	15.55	0.96	0.00	0.00	2.44	3.20	0.86	6.37	3.44	2.72	0.00	0.00	8.31	7.24
3421	26.40	0.00	25.34	43.69	0.00	1.28	1.50	0.00	0.00	0.96	0.71	0.00	0.13	0.00	0.62	0.17	0.48	0.40	1.10	0.00	0.00
3422	28.74	0.00	25.52	42.49	1.43	0.05	1.27	0.00	0.00	0.00	0.00	0.39	0.08	0.05	0.03	0.00	0.03	0.12	1.14	0.00	0.00
3423	0.00	0.00	5.21	23.70	25.91	18.52	0.00	17.90	1.85	0.00	0.00	2.56	3.42	0.97	9.50	5.62	3.40	0.00	0.00	10.74	7.16

TABLE 4. CIPW NORMATIVE COMPOSITIONS, CENTRAL MAP AREA--Continued

Sample No.	q	c	or	ab	an	di	hy	ol	ne	ac	ns	mt	il	ap	di			hy		ol	
															wo	en	fs	en	fs	fo	fa
3423A	0.00	0.00	9.80	31.73	25.43	8.03	6.40	11.89	0.00	0.00	0.00	2.33	3.38	1.03	4.11	2.36	1.57	3.84	2.56	6.86	5.03
3424	0.00	0.00	2.86	10.90	23.25	30.83	0.00	22.09	4.24	0.00	0.00	2.24	2.95	0.67	16.04	10.94	3.84	0.00	0.00	15.93	6.16
3425	29.62	0.65	25.18	39.41	3.12	0.00	1.50	0.00	0.00	0.00	0.00	0.35	0.08	0.09	0.00	0.00	0.00	0.47	1.03	0.00	0.00
3425A	0.00	0.00	4.90	29.98	25.84	10.13	15.42	6.44	0.00	0.00	0.00	2.47	3.85	1.01	5.19	3.07	1.87	9.58	5.84	3.86	2.59
3425C	29.40	0.17	27.19	37.53	3.74	0.00	1.47	0.00	0.00	0.00	0.00	0.36	0.10	0.05	0.00	0.00	0.00	0.26	1.21	0.00	0.00
3426	0.00	0.19	14.71	45.24	15.07	0.00	8.62	7.65	0.00	0.00	0.00	2.93	2.71	2.95	0.00	0.00	0.00	2.13	6.50	1.75	5.90
3426A	0.00	0.00	9.65	29.64	21.77	13.63	0.00	16.72	2.10	0.00	0.00	2.29	3.06	1.16	6.99	4.15	2.49	0.00	0.00	10.06	6.65
3426B	7.50	0.21	17.65	50.54	10.72	0.00	9.01	0.00	0.00	0.00	0.00	1.45	1.55	1.42	0.00	0.00	0.00	3.59	5.42	0.00	0.00
3428	28.59	0.00	25.13	44.25	0.48	0.03	1.00	0.00	0.00	0.00	0.00	0.38	0.10	0.05	0.02	0.00	0.02	0.00	1.00	0.00	0.00
3428A	26.04	0.30	22.87	37.69	8.24	0.00	3.31	0.00	0.00	0.00	0.00	0.76	0.57	0.24	0.00	0.00	0.00	1.18	2.13	0.00	0.00
3432	28.60	0.32	24.75	39.00	4.73	0.00	1.96	0.00	0.00	0.00	0.00	0.43	0.14	0.07	0.00	0.00	0.00	0.59	1.37	0.00	0.00
3433A	31.94	0.03	26.82	37.36	2.17	0.00	1.07	0.00	0.00	0.00	0.00	0.40	0.16	0.05	0.00	0.00	0.00	0.00	1.07	0.00	0.00
3433B	26.95	0.00	25.34	45.01	0.55	1.14	0.48	0.00	0.00	0.00	0.00	0.40	0.10	0.05	0.53	0.00	0.61	0.00	0.48	0.00	0.00
3434	30.65	0.87	28.78	35.07	2.82	0.00	1.32	0.00	0.00	0.00	0.00	0.36	0.08	0.07	0.00	0.00	0.00	0.10	1.21	0.00	0.00
3435	0.00	0.00	14.90	53.75	12.07	1.59	10.29	1.02	0.00	0.00	0.00	2.11	2.30	2.02	0.78	0.24	0.57	3.03	7.26	0.28	0.74
3501	15.56	0.00	19.27	36.32	15.22	2.24	8.06	0.00	0.00	0.00	0.00	1.38	1.54	0.43	1.13	0.59	0.51	4.32	3.74	0.00	0.00
3501A	0.00	0.00	8.41	33.92	27.11	2.74	16.66	2.74	0.00	0.00	0.00	2.72	4.57	1.16	1.38	0.63	0.73	7.71	8.95	1.20	1.54
3502A	6.01	0.00	12.60	42.79	19.88	2.32	11.37	0.00	0.00	0.00	0.00	1.80	2.35	0.91	1.16	0.53	0.63	5.16	6.20	0.00	0.00
3502C	7.69	0.00	14.53	31.72	20.07	6.71	14.50	0.00	0.00	0.00	0.00	1.94	2.22	0.64	3.42	1.87	1.42	8.24	6.26	0.00	0.00
3502D	29.76	0.00	28.49	36.29	2.60	0.50	1.59	0.00	0.00	0.00	0.00	0.52	0.17	0.07	0.24	0.05	0.20	0.32	1.27	0.00	0.00
3502E	21.44	0.00	22.99	36.78	10.58	1.00	5.02	0.00	0.00	0.00	0.00	0.98	0.90	0.31	0.51	0.24	0.26	2.36	2.65	0.00	0.00
3503	4.34	0.00	12.49	33.63	21.06	7.26	15.81	0.00	0.00	0.00	0.00	2.10	2.54	0.79	3.69	1.99	1.59	8.79	7.02	0.00	0.00
3503B	1.73	0.00	10.82	32.27	23.35	8.18	17.94	0.00	0.00	0.00	0.00	2.19	2.73	0.82	4.17	2.28	1.73	10.19	7.75	0.00	0.00
3503C	6.11	0.00	13.18	33.23	20.29	7.02	14.85	0.00	0.00	0.00	0.00	2.08	2.50	0.76	3.56	1.89	1.57	8.12	6.73	0.00	0.00
3503D	17.43	0.01	23.68	35.79	12.30	0.00	7.56	0.00	0.00	0.00	0.00	1.29	1.38	0.58	0.00	0.00	0.00	3.45	4.10	0.00	0.00
3503E	2.96	0.00	11.99	32.19	21.73	8.58	17.07	0.00	0.00	0.00	0.00	2.17	2.53	0.81	4.37	2.38	1.83	9.66	7.42	0.00	0.00
3503F	10.09	0.00	16.83	41.14	16.11	0.30	10.82	0.00	0.00	0.00	0.00	1.68	2.16	0.89	0.15	0.07	0.08	5.00	5.82	0.00	0.00
3503G	32.46	0.84	27.60	34.76	2.17	0.00	1.44	0.00	0.00	0.00	0.00	0.47	0.19	0.07	0.00	0.00	0.00	0.18	1.27	0.00	0.00
3503H	6.91	0.00	13.70	32.30	22.65	5.14	14.54	0.00	0.00	0.00	0.00	1.85	2.25	0.67	2.62	1.44	1.08	8.30	6.25	0.00	0.00
3503I	21.12	0.34	27.47	34.41	8.48	0.00	5.78	0.00	0.00	0.00	0.00	1.02	0.87	0.51	0.00	0.00	0.00	2.52	3.26	0.00	0.00
3503J	28.47	2.13	27.58	37.45	1.35	0.00	2.35	0.00	0.00	0.00	0.00	0.47	0.12	0.08	0.00	0.00	0.00	0.68	1.67	0.00	0.00
3503K	4.88	0.00	13.02	33.71	20.52	6.65	15.51	0.00	0.00	0.00	0.00	2.13	2.88	0.72	3.38	1.81	1.46	8.57	6.95	0.00	0.00
3504	13.64	0.25	20.67	38.84	14.02	0.00	8.73	0.00	0.00	0.00	0.00	1.45	1.50	0.93	0.00	0.00	0.00	3.65	5.08	0.00	0.00
3504A	0.00	0.00	4.88	27.90	27.73	12.73	0.00	18.34	0.40	0.00	0.00	2.60	4.15	1.29	6.51	3.74	2.48	0.00	0.00	10.59	7.76

3504B	8.10	0.00	14.15	34.91	18.75	5.51	13.78	0.00	0.00	0.00	0.00	1.90	2.26	0.67	2.80	1.52	1.18	7.75	6.03	0.00	0.00
3505	0.00	0.00	7.15	25.67	26.12	14.26	0.00	17.09	2.45	0.00	0.00	2.49	3.88	0.92	7.31	4.27	2.69	0.00	0.00	10.10	7.00
3505A	0.00	0.00	7.25	25.11	24.80	15.37	0.00	16.55	3.68	0.00	0.00	2.52	3.84	0.91	7.87	4.56	2.94	0.00	0.00	9.68	6.86
3505B	0.00	0.00	5.68	27.84	30.35	10.34	2.92	14.48	0.00	0.00	0.00	2.64	4.56	1.23	5.25	2.79	2.30	1.60	1.32	7.59	6.90
3508	0.00	0.00	5.18	23.93	29.23	14.51	0.00	16.27	3.20	0.00	0.00	2.50	4.25	0.96	7.42	4.29	2.80	0.00	0.00	9.47	6.81
3508A	0.83	0.00	15.60	52.24	11.43	3.10	10.45	0.00	0.00	0.00	0.00	1.94	2.49	1.97	1.54	0.60	0.96	4.03	6.42	0.00	0.00
3508B	0.00	0.00	5.67	11.65	25.35	23.54	0.00	20.12	6.84	0.00	0.00	2.34	3.59	0.93	12.19	7.94	3.41	0.00	0.00	13.66	6.46
3508C	0.00	0.00	5.64	28.35	28.85	11.50	0.00	17.10	0.37	0.00	0.00	2.60	4.49	1.13	5.86	3.24	2.40	0.00	0.00	9.42	7.69
3509	3.21	0.00	15.96	48.27	12.29	2.64	11.12	0.00	0.00	0.00	0.00	1.95	2.61	1.99	1.32	0.56	0.76	4.73	6.39	0.00	0.00
3509A	0.00	0.00	3.71	18.43	26.24	19.75	0.00	22.66	2.67	0.00	0.00	2.42	3.09	1.05	10.23	6.64	2.89	0.00	0.00	15.31	7.35
3509B	0.00	0.00	4.10	21.70	28.31	17.59	0.00	18.86	2.51	0.00	0.00	2.45	3.41	1.09	9.05	5.55	2.99	0.00	0.00	11.83	7.03
3510	9.44	0.00	15.13	34.63	18.82	4.10	12.96	0.00	0.00	0.00	0.00	1.89	2.35	0.69	2.08	1.08	0.94	6.95	6.01	0.00	0.00
3511	0.00	0.00	4.73	23.07	26.43	16.25	0.00	18.75	2.52	0.00	0.00	2.65	4.08	1.56	8.32	4.81	3.12	0.00	0.00	10.93	7.82
3511A	0.00	0.00	5.03	24.79	28.48	14.25	1.15	18.06	0.00	0.00	0.00	2.68	4.10	1.51	7.28	4.14	2.82	0.68	0.47	10.31	7.75
3512	0.00	0.00	6.03	17.14	27.07	20.58	0.00	17.62	4.62	0.00	0.00	2.44	3.56	0.97	10.59	6.51	3.48	0.00	0.00	11.09	6.53
3515	1.43	0.00	6.04	20.94	34.15	1.59	26.53	0.00	0.00	0.00	0.00	2.83	5.30	1.21	0.81	0.42	0.37	14.20	12.33	0.00	0.00
3516	4.59	0.00	13.26	50.20	14.81	0.34	11.45	0.00	0.00	0.00	0.00	1.96	1.86	1.56	0.17	0.06	0.11	3.94	7.51	0.00	0.00
3517	0.00	0.00	8.15	27.71	27.18	10.49	0.00	17.20	1.35	0.00	0.00	2.48	4.41	1.06	5.37	3.08	2.05	0.00	0.00	9.91	7.29
3518	0.00	0.00	11.43	41.48	20.75	3.42	9.36	5.82	0.00	0.00	0.00	2.59	3.96	1.21	1.71	0.76	0.95	4.15	5.21	2.44	3.38
3518A	0.00	0.00	5.89	23.21	26.15	13.23	0.00	17.78	4.96	0.00	0.00	2.86	5.05	0.88	6.73	3.66	2.84	0.00	0.00	9.60	8.18
3522	0.00	0.00	4.45	21.14	31.10	14.37	11.30	10.63	0.00	0.00	0.00	2.56	3.53	0.93	7.35	4.25	2.77	6.85	4.46	6.19	4.44
3523	0.00	0.00	9.55	36.53	23.11	5.54	0.00	15.31	1.01	0.00	0.00	2.85	5.02	1.11	2.79	1.33	1.42	0.00	0.00	7.06	8.26
3523A	0.00	0.00	4.00	19.15	29.60	15.99	0.00	21.52	2.91	0.00	0.00	2.30	3.05	1.53	8.26	5.23	2.51	0.00	0.00	14.08	7.44
3527	0.00	0.00	5.96	24.30	25.85	17.94	0.00	17.56	2.00	0.00	0.00	2.45	3.13	0.83	9.22	5.58	3.14	0.00	0.00	10.84	6.71
3528	7.77	0.00	15.03	35.55	16.18	7.89	13.10	0.00	0.00	0.00	0.00	1.90	2.01	0.58	4.02	2.21	1.66	7.47	5.63	0.00	0.00
3528A	0.00	0.00	3.77	14.30	27.42	22.25	0.00	20.85	4.42	0.00	0.00	2.31	2.71	2.02	11.50	7.33	3.43	0.00	0.00	13.75	7.10
3531	14.85	0.12	21.17	50.24	7.41	0.00	4.02	0.00	0.00	0.00	0.00	0.88	0.72	0.61	0.00	0.00	0.00	1.05	2.98	0.00	0.00
3531A	25.16	0.79	25.39	42.27	3.63	0.00	1.87	0.00	0.00	0.00	0.00	0.49	0.23	0.19	0.00	0.00	0.00	0.40	1.47	0.00	0.00
3601	0.00	0.00	6.60	24.92	29.17	9.01	6.12	15.58	0.00	0.00	0.00	2.74	4.98	0.91	4.60	2.63	1.77	3.66	2.46	8.95	6.63
3601A	0.00	0.00	4.54	23.33	31.56	13.33	0.00	18.26	0.90	0.00	0.00	2.57	4.32	1.21	6.81	3.86	2.66	0.00	0.00	10.37	7.89
3604	28.67	0.73	24.43	38.71	4.91	0.00	1.78	0.00	0.00	0.00	0.00	0.51	0.16	0.12	0.00	0.00	0.00	0.28	1.50	0.00	0.00
3606	0.00	0.00	8.43	36.97	25.71	5.09	4.60	10.80	0.00	0.00	0.00	2.71	4.53	1.17	2.56	1.16	1.37	2.11	2.49	4.70	6.11
3609	0.00	0.00	5.89	23.57	25.55	18.16	0.00	17.21	2.32	0.00	0.00	2.44	3.79	1.09	9.33	5.66	3.16	0.00	0.00	10.66	6.56
3610	0.00	0.00	7.88	37.32	20.48	8.83	13.95	2.79	0.00	0.00	0.00	2.84	4.87	1.07	4.42	1.98	2.42	6.28	7.67	1.19	1.60
3610A	0.00	0.00	10.25	39.70	19.46	4.55	14.65	2.59	0.00	0.00	0.00	2.63	4.46	1.76	2.28	1.04	1.22	6.74	7.91	1.13	1.46
3611	0.00	0.00	7.56	27.34	24.99	15.74	12.33	6.50	0.00	0.00	0.00	2.03	2.10	1.44	8.11	5.00	2.63	8.08	4.25	4.11	2.38
3612	28.02	0.00	23.50	41.38	3.71	0.03	2.52	0.00	0.00	0.00	0.00	0.70	0.15	0.00	0.01	0.00	0.01	0.57	1.95	0.00	0.00
3612B	7.78	0.00	16.27	42.51	17.72	2.36	7.86	0.00	0.00	0.00	0.00	1.70	2.64	1.19	1.16	0.37	0.83	2.42	5.44	0.00	0.00
3612C	9.44	0.00	20.40	36.03	17.42	0.11	11.47	0.00	0.00	0.00	0.00	1.76	2.23	1.17	0.05	0.02	0.03	4.64	6.83	0.00	0.00

TABLE 4. CIPW NORMATIVE COMPOSITIONS, CENTRAL MAP AREA--Continued

Sample No.	q	c	or	ab	an	di	hy	ol	ne	ac	ns	mt	il	ap	di			hy		ol	
															wo	en	fs	en	fs	fo	fa
3614	9.60	0.00	16.85	40.29	18.38	0.13	10.31	0.00	0.00	0.00	0.00	1.69	1.88	0.90	0.07	0.03	0.04	4.00	6.31	0.00	0.00
3614A	12.69	0.00	15.67	40.57	16.85	0.24	9.61	0.00	0.00	0.00	0.00	1.66	1.82	0.92	0.12	0.05	0.07	3.76	5.85	0.00	0.00
3615	0.08	0.00	7.92	35.75	21.78	7.92	18.11	0.00	0.00	0.00	0.00	2.73	4.50	1.25	3.98	1.84	2.11	8.43	9.68	0.00	0.00
3616	0.00	0.00	6.56	30.76	24.48	12.99	2.57	14.38	0.00	0.00	0.00	2.68	4.41	1.20	6.62	3.64	2.73	1.47	1.10	7.87	6.51
3616A	23.32	0.98	26.93	44.56	1.40	0.00	2.00	0.00	0.00	0.00	0.00	0.60	0.14	0.07	0.00	0.00	0.00	0.08	1.92	0.00	0.00
3617	0.00	0.00	6.17	19.10	27.47	17.75	0.00	17.75	4.56	0.00	0.00	2.44	3.79	0.98	9.12	5.52	3.11	0.00	0.00	10.95	6.80
3621	0.00	0.00	10.80	36.93	21.26	3.15	17.65	1.15	0.00	0.00	0.00	2.72	4.63	1.76	1.58	0.71	0.87	7.95	9.71	0.49	0.66
3621A	0.25	0.00	11.04	37.77	21.18	4.33	16.69	0.00	0.00	0.00	0.00	2.68	4.34	1.77	2.15	0.84	1.34	6.40	10.29	0.00	0.00
3622	13.95	0.00	19.37	44.21	10.19	1.18	7.55	0.00	0.00	0.00	0.00	1.56	1.28	0.73	0.58	0.19	0.41	2.36	5.18	0.00	0.00
3622A	0.00	0.00	10.76	41.10	18.93	5.19	8.03	7.22	0.00	0.00	0.00	2.64	4.42	1.75	2.60	1.18	1.40	3.68	4.36	3.13	4.09
3627	0.00	0.00	9.87	37.65	19.92	4.23	0.00	15.47	3.11	0.00	0.00	2.99	5.24	1.56	2.12	0.94	1.18	0.00	0.00	6.50	8.97
3630	4.44	0.34	11.06	43.37	20.45	0.00	13.63	0.00	0.00	0.00	0.00	2.23	2.60	1.91	0.00	0.00	0.00	4.18	9.45	0.00	0.00
3633	0.00	0.00	9.25	38.04	22.80	3.68	8.88	7.91	0.00	0.00	0.00	2.78	5.10	1.58	1.84	0.82	1.01	3.99	4.89	3.36	4.55
3634	0.00	0.00	9.06	43.27	19.12	5.32	2.29	11.84	0.00	0.00	0.00	2.71	4.66	1.77	2.66	1.17	1.49	1.00	1.29	4.91	6.93
3705	0.00	0.00	7.94	34.15	22.43	7.98	0.00	15.75	2.34	0.00	0.00	2.77	5.10	1.57	4.02	1.97	1.99	0.00	0.00	7.46	8.29
3707	5.48	0.00	11.05	34.49	23.88	3.58	15.30	0.00	0.00	0.00	0.00	2.30	3.18	0.77	1.79	0.80	0.98	6.88	8.42	0.00	0.00
3707A	8.23	0.00	16.60	39.87	17.50	1.18	11.27	0.00	0.00	0.00	0.00	1.91	2.52	0.93	0.59	0.25	0.34	4.74	6.53	0.00	0.00
3710	12.35	0.00	18.21	47.01	10.36	0.35	8.02	0.00	0.00	0.00	0.00	1.59	1.37	0.77	0.17	0.06	0.12	2.54	5.48	0.00	0.00
3711	10.05	0.00	16.17	42.19	15.94	0.34	10.64	0.00	0.00	0.00	0.00	1.84	1.87	0.98	0.17	0.07	0.11	4.07	6.57	0.00	0.00
3712	15.35	1.99	12.60	42.97	14.53	0.00	8.54	0.00	0.00	0.00	0.00	1.64	1.37	1.03	0.00	0.00	0.00	2.53	6.01	0.00	0.00
3713A	16.44	1.06	24.40	46.02	6.12	0.00	4.14	0.00	0.00	0.00	0.00	0.85	0.59	0.38	0.00	0.00	0.00	1.25	2.89	0.00	0.00
3719	3.91	0.00	11.27	35.02	23.61	2.89	16.88	0.00	0.00	0.00	0.00	2.29	3.21	0.94	1.46	0.69	0.75	8.10	8.78	0.00	0.00
3720	13.07	0.00	17.48	43.36	14.01	0.06	8.37	0.00	0.00	0.00	0.00	1.50	1.49	0.67	0.03	0.01	0.02	3.10	5.26	0.00	0.00
3721	7.05	0.00	12.71	35.73	21.52	3.11	13.83	0.00	0.00	0.00	0.00	2.20	3.00	0.88	1.56	0.71	0.84	6.31	7.52	0.00	0.00
3723	28.11	1.28	24.73	42.32	1.82	0.00	1.44	0.00	0.00	0.00	0.00	0.30	0.00	0.02	0.00	0.00	0.00	0.41	1.03	0.00	0.00
3723B	30.12	0.09	29.11	36.15	2.84	0.00	1.27	0.00	0.00	0.00	0.00	0.39	0.04	0.00	0.00	0.00	0.00	0.15	1.12	0.00	0.00
3725	1.08	0.00	13.18	42.62	17.38	2.33	15.98	0.00	0.00	0.00	0.00	2.52	3.57	1.39	1.16	0.49	0.68	6.68	9.30	0.00	0.00
3727	11.63	0.17	17.53	44.93	12.53	0.00	8.98	0.00	0.00	0.00	0.00	1.63	1.70	0.91	0.00	0.00	0.00	3.28	5.70	0.00	0.00
3727A	10.80	0.00	17.71	43.02	14.16	1.65	8.55	0.00	0.00	0.00	0.00	1.61	1.82	0.69	0.82	0.34	0.49	3.48	5.07	0.00	0.00
3728	7.32	0.01	14.71	43.05	18.63	0.00	11.10	0.00	0.00	0.00	0.00	1.78	2.16	1.27	0.00	0.00	0.00	4.47	6.64	0.00	0.00
3728A	6.60	0.41	14.48	43.55	17.53	0.00	12.09	0.00	0.00	0.00	0.00	1.86	2.26	1.26	0.00	0.00	0.00	4.83	7.26	0.00	0.00
3728B	10.38	0.00	19.52	50.72	7.73	3.11	5.43	0.00	0.00	0.00	0.00	1.39	1.24	0.51	1.52	0.46	1.13	1.57	3.86	0.00	0.00
3728C	8.52	0.00	13.05	36.61	21.11	4.67	11.13	0.00	0.00	0.00	0.00	1.85	2.39	0.70	2.35	1.12	1.20	5.39	5.74	0.00	0.00
3728D	13.32	0.00	19.92	47.37	9.88	0.68	6.06	0.00	0.00	0.00	0.00	1.35	0.92	0.50	0.33	0.09	0.26	1.62	4.44	0.00	0.00

3728E	5.50	0.00	14.73	40.28	17.01	5.30	11.24	0.00	0.00	0.00	0.00	2.10	3.04	0.83	2.65	1.14	1.52	4.82	6.42	0.00	0.00
3729	8.92	0.00	18.95	49.18	9.56	3.06	6.94	0.00	0.00	0.00	0.00	1.47	1.26	0.69	1.52	0.59	0.95	2.66	4.28	0.00	0.00
3729A	4.83	0.00	14.23	41.59	13.53	8.07	11.81	0.00	0.00	0.00	0.00	2.17	2.97	0.83	4.07	1.96	2.04	5.78	6.02	0.00	0.00
3729C	3.05	0.00	11.04	39.50	20.52	4.43	14.89	0.00	0.00	0.00	0.00	2.15	3.15	1.30	2.23	1.07	1.14	7.20	7.68	0.00	0.00
3729D	3.38	0.00	16.13	47.91	13.42	3.79	10.17	0.00	0.00	0.00	0.00	1.83	2.21	1.20	1.89	0.79	1.11	4.24	5.92	0.00	0.00
3729E	2.21	0.00	13.70	43.48	16.83	5.20	12.43	0.00	0.00	0.00	0.00	2.06	3.00	1.12	2.61	1.21	1.38	5.82	6.61	0.00	0.00
3729G	12.46	0.00	20.35	43.49	12.23	1.55	6.47	0.00	0.00	0.00	0.00	1.50	1.53	0.43	0.76	0.25	0.54	2.07	4.40	0.00	0.00
3729H	16.33	0.37	18.97	43.19	11.32	0.00	6.76	0.00	0.00	0.00	0.00	1.35	1.15	0.58	0.00	0.00	0.00	2.25	4.52	0.00	0.00
3729I	7.81	0.36	15.51	42.43	16.98	0.00	11.74	0.00	0.00	0.00	0.00	1.82	2.15	1.23	0.00	0.00	0.00	4.73	7.01	0.00	0.00
3729J	6.37	0.00	15.65	45.25	15.45	1.34	10.89	0.00	0.00	0.00	0.00	1.79	2.11	1.18	0.67	0.28	0.39	4.52	6.37	0.00	0.00
3729K	3.93	0.00	11.77	39.31	20.38	4.01	14.32	0.00	0.00	0.00	0.00	2.15	3.03	1.14	2.02	0.94	1.06	6.74	7.58	0.00	0.00
3729L	8.18	0.00	18.26	42.12	14.34	3.39	9.00	0.00	0.00	0.00	0.00	1.72	2.17	0.85	1.69	0.71	0.99	3.78	5.22	0.00	0.00
3729M	7.72	0.00	16.55	45.42	13.22	2.53	9.55	0.00	0.00	0.00	0.00	1.79	1.92	1.33	1.25	0.47	0.80	3.53	6.02	0.00	0.00
3729Q	3.71	0.00	10.34	36.41	23.26	4.97	15.02	0.00	0.00	0.00	0.00	2.24	3.13	0.94	2.50	1.20	1.27	7.29	7.73	0.00	0.00
3732	6.51	0.00	13.40	45.18	19.73	1.46	9.18	0.00	0.00	0.00	0.00	1.53	1.97	1.06	0.73	0.31	0.42	3.89	5.29	0.00	0.00
3732%	6.27	0.00	12.04	39.10	20.03	3.18	13.00	0.00	0.00	0.00	0.00	2.17	3.04	1.20	1.59	0.70	0.89	5.74	7.27	0.00	0.00
3732+	6.17	0.00	9.82	35.74	23.81	5.35	13.51	0.00	0.00	0.00	0.00	2.03	2.98	0.60	2.71	1.40	1.24	7.15	6.36	0.00	0.00
3732A	5.91	0.00	14.75	44.40	15.41	4.12	9.89	0.00	0.00	0.00	0.00	1.84	2.49	1.24	2.06	0.87	1.20	4.15	5.74	0.00	0.00
3732C	5.62	0.00	13.06	43.34	19.26	2.61	11.15	0.00	0.00	0.00	0.00	1.78	2.23	0.98	1.31	0.60	0.70	5.15	6.00	0.00	0.00
3732D	7.88	0.00	16.32	41.55	14.18	5.28	9.44	0.00	0.00	0.00	0.00	1.90	2.74	0.73	2.64	1.17	1.47	4.18	5.26	0.00	0.00
3732E	2.99	0.00	13.18	43.74	15.01	7.90	11.30	0.00	0.00	0.00	0.00	2.12	2.95	0.84	3.97	1.82	2.11	5.24	6.06	0.00	0.00
3732F	13.66	0.00	18.45	46.88	9.34	3.28	5.39	0.00	0.00	0.00	0.00	1.34	1.13	0.53	1.62	0.59	1.07	1.92	3.48	0.00	0.00
3732G	4.15	0.00	14.95	47.11	14.21	3.72	10.91	0.00	0.00	0.00	0.00	1.83	2.02	1.13	1.86	0.81	1.05	4.74	6.17	0.00	0.00
3732H	5.37	0.00	14.35	40.23	17.31	5.94	12.49	0.00	0.00	0.00	0.00	1.88	1.81	0.65	3.00	1.49	1.45	6.32	6.17	0.00	0.00
3732I	3.49	0.00	14.35	47.10	17.27	4.36	8.88	0.00	0.00	0.00	0.00	1.57	2.00	1.01	2.19	0.99	1.18	4.05	4.83	0.00	0.00
3732J	0.00	0.00	8.93	36.68	26.14	9.76	2.34	10.01	0.00	0.00	0.00	2.25	3.10	0.81	4.93	2.45	2.38	1.19	1.15	4.84	5.17
3732K	0.44	0.00	7.18	34.27	30.17	6.33	16.02	0.00	0.00	0.00	0.00	2.26	2.88	0.46	3.18	1.49	1.66	7.59	8.44	0.00	0.00
3732L	8.65	0.00	17.69	38.76	17.90	0.23	12.03	0.00	0.00	0.00	0.00	1.85	2.07	0.84	0.11	0.05	0.06	5.30	6.73	0.00	0.00
3732M	7.85	0.79	14.40	43.65	19.20	0.00	9.66	0.00	0.00	0.00	0.00	1.55	1.88	1.03	0.00	0.00	0.00	3.80	5.86	0.00	0.00
3732N	26.33	0.00	25.91	41.78	0.00	0.00	2.99	0.00	0.00	1.65	1.15	0.00	0.27	0.07	0.00	0.00	0.00	0.08	2.91	0.00,	0.00
3732O	7.26	0.00	15.82	43.03	16.52	0.19	11.74	0.00	0.00	0.00	0.00	1.78	2.41	1.29	0.10	0.04	0.05	5.16	6.58	0.00	0.00
3732P	12.03	0.04	29.69	51.57	0.00	0.00	5.50	0.00	0.00	0.00	0.00	1.25	0.71	0.16	0.00	0.00	0.00	1.04	4.46	0.00	0.00
3732Q	5.87	0.33	15.91	45.40	14.36	0.00	11.77	0.00	0.00	0.00	0.00	2.15	2.95	1.30	0.00	0.00	0.00	3.48	8.29	0.00	0.00
3732R	1.92	0.00	12.13	37.16	21.52	5.43	15.29	0.00	0.00	0.00	0.00	2.34	3.28	0.94	2.73	1.25	1.46	7.03	8.26	0.00	0.00
3732S	6.68	0.00	15.76	41.38	13.99	5.42	10.68	0.00	0.00	0.00	0.00	2.19	2.90	1.03	2.70	1.08	1.64	4.23	6.45	0.00	0.00
3732T	4.77	0.00	14.98	46.10	14.26	4.22	10.13	0.00	0.00	0.00	0.00	1.83	2.46	1.28	2.11	0.91	1.20	4.37	5.76	0.00	0.00
3732U	5.75	0.00	14.88	45.94	14.43	3.70	9.93	0.00	0.00	0.00	0.00	1.86	2.40	1.15	1.85	0.77	1.09	4.12	5.81	0.00	0.00
3732V	5.29	0.00	15.02	46.47	14.10	3.89	9.71	0.00	0.00	0.00	0.00	1.86	2.47	1.23	1.94	0.79	1.17	3.90	5.81	0.00	0.00
3732W	6.54	0.00	15.58	46.51	14.14	3.43	8.37	0.00	0.00	0.00	0.00	1.85	2.41	1.20	1.69	0.57	1.17	2.74	5.63	0.00	0.00

TABLE 4. CIPW NORMATIVE COMPOSITIONS, CENTRAL MAP AREA--Continued

Sample No.	q	c	or	ab	an	di	hy	ol	ne	ac	ns	mt	il	ap	di			hy		ol	
															wo	en	fs	en	fs	fo	fa
3732X	5.94	0.00	15.10	46.50	13.99	4.04	8.95	0.00	0.00	0.00	0.00	1.82	2.39	1.30	2.01	0.78	1.26	3.42	5.54	0.00	0.00
3732Y	0.00	0.00	9.43	35.64	23.76	9.44	14.96	0.38	0.00	0.00	0.00	2.34	3.19	0.88	4.75	2.25	2.44	7.17	7.79	0.17	0.21
3732Z	0.00	0.00	10.35	37.26	21.05	9.71	11.74	3.12	0.00	0.00	0.00	2.48	3.31	1.01	4.88	2.30	2.53	5.59	6.14	1.41	1.71
3733	25.69	0.00	23.60	44.08	0.00	0.53	3.22	0.00	0.00	1.89	0.82	0.00	0.17	0.00	0.25	0.02	0.26	0.25	2.97	0.00	0.00
3733A	14.04	1.21	18.36	41.73	13.59	0.00	7.21	0.00	0.00	0.00	0.00	1.35	1.85	0.68	0.00	0.00	0.00	2.81	4.40	0.00	0.00
3733B	14.35	0.68	20.20	48.05	7.66	0.00	6.26	0.00	0.00	0.00	0.00	1.30	0.98	0.53	0.00	0.00	0.00	1.74	4.52	0.00	0.00
3733C	5.17	0.00	12.84	38.92	18.67	5.12	13.14	0.00	0.00	0.00	0.00	2.17	3.13	0.86	2.57	1.20	1.34	6.20	6.94	0.00	0.00
3733D	11.81	0.00	28.58	50.60	0.19	3.56	3.19	0.00	0.00	0.00	0.00	1.18	0.72	0.17	1.71	0.33	1.52	0.56	2.62	0.00	0.00
3733E	8.62	0.00	11.44	36.47	21.92	4.04	12.48	0.00	0.00	0.00	0.00	1.95	2.44	0.65	2.03	0.96	1.04	5.99	6.49	0.00	0.00
3734A	32.86	0.49	24.59	37.01	2.57	0.00	1.54	0.00	0.00	0.00	0.00	0.54	0.29	0.12	0.00	0.00	0.00	0.25	1.29	0.00	0.00
3819	9.93	0.84	16.11	45.79	13.13	0.00	9.76	0.00	0.00	0.00	0.00	1.67	1.61	1.20	0.00	0.00	0.00	3.77	5.99	0.00	0.00
3819A	15.95	0.74	20.45	41.36	11.02	0.00	7.41	0.00	0.00	0.00	0.00	1.46	1.06	0.57	0.00	0.00	0.00	2.09	5.32	0.00	0.00
3819B	27.22	0.24	24.50	43.53	0.35	0.00	3.54	0.00	0.00	0.00	0.00	0.41	0.15	0.07	0.00	0.00	0.00	2.49	1.05	0.00	0.00
3831	13.40	1.70	19.67	48.65	7.07	0.00	6.36	0.00	0.00	0.00	0.00	1.33	1.00	0.84	0.00	0.00	0.00	1.63	4.73	0.00	0.00
3831A	3.75	0.00	9.99	34.98	24.60	2.88	17.31	0.00	0.00	0.00	0.00	2.32	3.29	0.92	1.45	0.69	0.74	8.39	8.92	0.00	0.00
4401	0.00	0.00	6.47	30.09	26.30	10.62	0.00	17.19	0.27	0.00	0.00	2.91	5.07	1.09	5.38	2.76	2.48	0.00	0.00	8.65	8.54
4402	0.00	0.00	7.21	31.73	30.61	6.32	4.28	12.90	0.00	0.00	0.00	2.36	3.40	1.23	3.21	1.71	1.40	2.35	1.93	6.77	6.13
4405	0.00	0.00	10.53	29.13	21.58	10.37	18.55	4.32	0.00	0.00	0.00	2.18	2.70	0.66	5.35	3.32	1.71	12.23	6.32	2.75	1.57
4405A	0.00	0.00	4.50	25.40	31.41	14.15	4.55	13.25	0.00	0.00	0.00	2.42	3.46	0.90	7.23	4.11	2.81	2.70	1.84	7.57	5.69
4407	0.00	0.00	6.10	19.75	26.65	20.66	0.00	17.00	3.12	0.00	0.00	2.39	3.52	0.84	10.62	6.47	3.57	0.00	0.00	10.57	6.43
4409	0.00	0.00	3.59	23.05	37.48	10.39	0.00	17.29	1.49	0.00	0.00	2.51	3.54	0.67	5.28	2.81	2.31	0.00	0.00	9.07	8.22
4410	0.00	0.00	5.30	25.12	28.65	11.44	0.00	19.00	2.48	0.00	0.00	2.76	4.31	0.96	5.83	3.18	2.44	0.00	0.00	10.30	8.70
4413	0.00	0.00	6.56	24.95	24.83	12.65	0.00	17.72	4.16	0.00	0.00	2.94	5.10	1.12	6.42	3.39	2.84	0.00	0.00	9.23	8.49
4414	0.00	0.00	6.18	24.83	25.19	12.56	0.00	17.68	4.53	0.00	0.00	2.92	5.10	1.05	6.38	3.40	2.78	0.00	0.00	9.29	8.39
4416	1.25	0.00	9.04	29.47	24.72	6.79	22.34	0.00	0.00	0.00	0.00	2.37	3.10	0.95	3.46	1.94	1.38	13.05	9.29	0.00	0.00
4416A	0.00	0.00	6.34	30.23	25.48	11.70	2.19	17.50	0.00	0.00	0.00	2.55	3.32	0.71	6.00	3.55	2.15	1.37	0.83	10.50	7.00
4417	0.00	0.00	4.29	26.09	36.43	8.46	0.00	17.63	0.44	0.00	0.00	2.44	3.45	0.79	4.31	2.34	1.81	0.00	0.00	9.51	8.12
4417A	7.40	0.00	12.22	33.62	23.47	2.97	14.92	0.00	0.00	0.00	0.00	1.93	2.80	0.68	1.51	0.79	0.68	8.04	6.89	0.00	0.00
4417B	1.86	0.00	9.35	30.20	24.16	9.82	18.50	0.00	0.00	0.00	0.00	2.19	3.20	0.75	5.02	2.88	1.92	11.11	7.39	0.00	0.00
4425	0.00	0.00	5.47	24.99	26.46	15.95	0.00	18.42	1.65	0.00	0.00	2.53	3.69	0.86	8.19	4.94	2.82	0.00	0.00	11.30	7.11
4427	0.00	0.00	3.00	21.74	29.50	19.75	0.00	17.08	2.62	0.00	0.00	2.43	3.22	0.67	10.13	5.97	3.66	0.00	0.00	10.19	6.89
4427A	0.00	0.00	7.86	31.37	23.89	12.50	0.00	14.03	2.46	0.00	0.00	2.62	4.08	1.22	6.32	3.18	3.00	0.00	0.00	6.87	7.16
4428	6.05	0.00	16.19	31.78	15.88	12.47	12.86	0.00	0.00	0.00	0.00	1.83	1.97	1.00	6.39	3.73	2.35	7.88	4.98	0.00	0.00
4428A	7.48	0.00	18.06	33.50	13.81	11.68	10.98	0.00	0.00	0.00	0.00	1.74	1.83	0.94	5.97	3.38	2.34	6.49	4.50	0.00	0.00

4429	3.63	0.00	11.48	35.62	23.15	4.59	16.56	0.00	0.00	0.00	0.00	2.09	2.07	0.84	2.33	1.21	1.06	8.83	7.74	0.00	0.00
4429A	0.00	0.00	3.51	20.01	22.86	17.89	1.13	28.31	0.00	0.00	0.00	2.60	3.17	0.52	9.30	6.26	2.33	0.82	0.31	20.08	8.23
4432	7.09	0.00	17.44	30.94	15.75	11.14	12.98	0.00	0.00	0.00	0.00	1.76	1.90	1.02	5.71	3.33	2.10	7.96	5.02	0.00	0.00
4432A	0.00	0.00	10.01	23.67	26.55	12.42	0.00	15.49	3.27	0.00	0.00	2.51	3.82	2.33	6.30	3.30	2.81	0.00	0.00	7.99	7.50
4432B	0.00	0.00	9.98	22.82	26.42	14.24	0.00	15.27	3.13	0.00	0.00	2.44	3.62	2.15	7.25	3.94	3.05	0.00	0.00	8.24	7.04
4435	0.00	0.00	8.07	20.86	26.66	16.37	0.00	12.92	6.59	0.00	0.00	2.63	4.55	1.38	8.26	4.06	4.05	0.00	0.00	6.16	6.77
4435A	13.64	0.00	9.89	37.64	20.99	4.38	10.39	0.00	0.00	0.00	0.00	1.47	1.16	0.45	2.24	1.24	0.91	5.98	4.42	0.00	0.00
4436	0.00	0.00	7.22	26.39	24.85	15.12	0.00	16.35	2.78	0.00	0.00	2.55	3.89	0.89	7.72	4.35	3.05	0.00	0.00	9.23	7.12
4436A	0.00	0.00	6.18	29.51	30.48	7.03	0.00	16.69	2.22	0.00	0.00	2.57	4.18	1.18	3.57	1.90	1.55	0.00	0.00	8.78	7.91
4436B	0.00	0.00	5.23	25.15	28.25	12.63	0.00	18.56	2.51	0.00	0.00	2.69	4.02	0.99	6.43	3.54	2.66	0.00	0.00	10.16	8.40
4502	27.74	0.74	26.30	39.36	2.92	0.00	2.13	0.00	0.00	0.00	0.00	0.58	0.15	0.07	0.00	0.00	0.00	0.30	1.83	0.00	0.00
4503	29.54	0.36	26.92	37.32	4.19	0.00	1.24	0.00	0.00	0.00	0.00	0.36	0.08	0.00	0.00	0.00	0.00	0.00	1.24	0.00	0.00
4505	0.00	0.00	5.91	26.73	28.98	10.48	0.00	17.07	2.79	0.00	0.00	2.62	4.24	1.20	5.34	2.91	2.24	0.00	0.00	9.25	7.83
4506	0.00	0.00	6.40	30.93	29.19	7.94	0.54	16.86	0.00	0.00	0.00	2.60	4.15	1.42	4.03	2.14	1.76	0.29	0.24	8.84	8.02
4507	0.00	0.00	1.90	19.15	26.21	20.85	0.00	22.34	2.55	0.00	0.00	2.61	3.71	0.69	10.77	6.86	3.22	0.00	0.00	14.72	7.61
4508	0.00	0.00	2.43	22.32	26.02	20.51	0.00	20.33	1.06	0.00	0.00	2.65	3.94	0.76	10.56	6.51	3.45	0.00	0.00	12.84	7.50
4517	0.00	0.00	5.23	24.04	26.03	15.45	0.00	18.78	2.19	0.00	0.00	2.74	4.66	0.92	7.90	4.53	3.02	0.00	0.00	10.82	7.95
4517A	0.00	0.00	4.68	25.84	30.71	8.36	8.37	13.41	0.00	0.00	0.00	2.84	4.89	0.91	4.26	2.35	1.75	4.79	3.58	7.36	6.05
4521	0.00	0.00	6.34	27.55	27.54	10.33	0.00	17.98	1.07	0.00	0.00	2.87	5.21	1.15	5.24	2.75	2.34	0.00	0.00	9.28	8.70
4522	19.09	0.00	26.52	36.77	9.31	0.94	4.86	0.00	0.00	0.00	0.00	1.05	1.06	0.41	0.47	0.20	0.27	2.10	2.75	0.00	0.00
4522A	0.00	0.00	3.87	29.00	34.74	8.87	0.00	16.40	0.63	0.00	0.00	2.51	2.93	1.07	4.49	2.31	2.07	0.00	0.00	8.26	8.14
4522B	26.94	0.64	27.62	36.93	4.68	0.00	2.16	0.00	0.00	0.00	0.00	0.60	0.33	0.12	0.00	0.00	0.00	0.44	1.72	0.00	0.00
4525	0.00	0.00	9.04	33.86	23.71	4.96	0.00	16.26	1.85	0.00	0.00	3.03	5.93	1.39	2.49	1.14	1.33	0.00	0.00	7.10	9.16
4526	0.00	0.00	8.48	31.60	23.56	10.56	2.63	15.64	0.00	0.00	0.00	2.66	3.34	1.57	5.37	2.85	2.34	1.45	1.19	8.21	7.43
4526A	16.78	0.21	20.24	41.60	11.47	0.00	6.69	0.00	0.00	0.00	0.00	1.31	1.14	0.58	0.00	0.00	0.00	2.30	4.39	0.00	0.00
4526B	0.00	0.00	4.90	29.49	31.40	9.76	0.00	17.08	0.88	0.00	0.00	2.52	2.99	1.01	4.96	2.65	2.14	0.00	0.00	9.04	8.05
4527	0.00	0.00	12.18	37.31	18.43	6.80	9.03	8.33	0.00	0.00	0.00	2.80	3.14	2.03	3.40	1.47	1.94	3.89	5.14	3.39	4.94
4528	5.75	0.63	24.61	55.35	4.74	0.00	6.04	0.00	0.00	0.00	0.00	1.02	1.02	0.87	0.00	0.00	0.00	2.38	3.67	0.00	0.00
4528A	0.00	0.00	6.42	25.99	26.33	11.16	0.00	18.00	2.98	0.00	0.00	2.95	5.10	1.10	5.66	2.97	2.53	0.00	0.00	9.28	8.72
4532	1.80	0.00	16.99	45.66	15.63	0.39	13.06	0.00	0.00	0.00	0.00	1.95	2.42	2.13	0.20	0.08	0.12	5.29	7.77	0.00	0.00
4533	22.17	0.11	25.92	33.32	11.06	0.00	5.27	0.00	0.00	0.00	0.00	0.97	0.89	0.29	0.00	0.00	0.00	2.36	2.92	0.00	0.00
4533A	21.58	0.00	27.19	43.96	3.48	0.26	2.58	0.00	0.00	0.00	0.00	0.73	0.15	0.07	0.12	0.02	0.12	0.31	2.27	0.00	0.00
4534	24.47	1.15	22.99	37.36	7.98	0.00	4.28	0.00	0.00	0.00	0.00	0.88	0.63	0.27	0.00	0.00	0.00	1.49	2.79	0.00	0.00
4534A	12.90	0.00	20.85	32.02	16.96	3.13	10.22	0.00	0.00	0.00	0.00	1.53	1.83	0.58	1.59	0.83	0.71	5.53	4.69	0.00	0.00
4534B	12.16	0.00	16.79	35.09	16.99	3.90	10.89	0.00	0.00	0.00	0.00	1.67	1.95	0.57	1.98	1.04	0.88	5.91	4.98	0.00	0.00
4534D	29.51	0.15	25.58	39.52	1.87	0.00	2.40	0.00	0.00	0.00	0.00	0.80	0.11	0.05	0.00	0.00	0.00	0.03	2.38	0.00	0.00
4534E	6.84	0.89	12.54	42.84	19.49	0.00	12.42	0.00	0.00	0.00	0.00	1.80	2.37	0.85	0.00	0.00	0.00	5.36	7.06	0.00	0.00
4534F	22.56	1.22	22.21	37.68	7.41	0.00	6.54	0.00	0.00	0.00	0.00	1.45	0.59	0.36	0.00	0.00	0.00	1.81	4.73	0.00	0.00
4535	13.09	0.00	19.12	32.51	16.90	3.59	10.69	0.00	0.00	0.00	0.00	1.63	1.94	0.55	1.82	0.97	0.80	5.86	4.83	0.00	0.00

TABLE 4. CIPW NORMATIVE COMPOSITIONS, CENTRAL MAP AREA--Continued

Sample No.	q	c	or	ab	an	di	hy	ol	ne	ac	ns	mt	il	ap	di			hy		ol	
															wo	en	fs	en	fs	fo	fa
4535A	9.89	0.00	15.09	34.18	19.80	4.06	12.44	0.00	0.00	0.00	0.00	1.73	2.28	0.55	2.07	1.12	0.87	7.01	5.43	0.00	0.00
4535B	10.74	0.00	17.77	32.99	20.62	0.23	13.49	0.00	0.00	0.00	0.00	1.70	1.92	0.53	0.12	0.06	0.05	7.43	6.07	0.00	0.00
4536	16.23	0.00	20.54	35.51	14.21	1.75	8.47	0.00	0.00	0.00	0.00	1.33	1.54	0.43	0.89	0.47	0.39	4.60	3.87	0.00	0.00
4536A	0.00	0.00	9.17	37.96	23.17	3.79	0.00	15.68	0.58	0.00	0.00	2.97	5.44	1.27	1.90	0.87	1.02	0.00	0.00	6.82	8.86
4603	0.00	0.00	7.53	35.65	26.99	3.61	0.00	16.06	0.93	0.00	0.00	2.75	5.20	1.31	1.82	0.87	0.92	0.00	0.00	7.40	8.66
4607	0.00	0.00	8.26	35.32	27.03	3.28	9.20	8.50	0.00	0.00	0.00	2.70	4.60	1.14	1.65	0.77	0.86	4.35	4.85	3.82	4.68
4614	0.00	0.00	11.84	41.56	20.81	1.58	9.15	6.20	0.00	0.00	0.00	2.50	3.82	2.60	0.79	0.33	0.46	3.77	5.38	2.42	3.79
4619	0.00	0.00	6.58	28.93	30.91	3.64	11.97	8.60	0.00	0.00	0.00	2.89	5.16	1.35	1.84	0.88	0.92	5.85	6.12	3.99	4.61
4619A	0.00	0.00	10.76	39.59	18.53	1.43	0.00	17.26	1.31	0.00	0.00	3.07	4.46	3.66	0.71	0.29	0.43	0.00	0.00	6.48	10.79
4622	0.00	0.00	4.18	33.40	31.08	6.37	0.52	16.99	0.00	0.00	0.00	2.47	3.27	1.75	3.23	1.69	1.45	0.28	0.24	8.71	8.28
4624	0.00	0.00	6.01	22.77	29.68	12.07	0.00	18.39	3.07	0.00	0.00	2.47	3.71	1.88	6.18	3.55	2.35	0.00	0.00	10.63	7.76
4625	0.00	0.00	5.56	22.26	30.79	11.34	0.00	19.13	2.82	0.00	0.00	2.48	3.72	1.96	5.80	3.34	2.20	0.00	0.00	11.10	8.03
4626	0.00	0.00	4.60	20.27	31.80	14.03	0.00	21.40	1.12	0.00	0.00	2.45	3.00	1.37	7.21	4.37	2.45	0.00	0.00	13.23	8.16
4627	0.00	0.00	3.99	21.35	30.92	13.67	0.00	21.34	1.98	0.00	0.00	2.49	3.01	1.29	7.02	4.21	2.44	0.00	0.00	13.02	8.32
4629	0.00	0.00	9.17	34.81	22.42	5.98	0.00	15.56	2.12	0.00	0.00	3.00	5.65	1.34	3.00	1.38	1.60	0.00	0.00	6.81	8.75
4631	0.00	0.00	9.28	36.21	21.93	2.90	0.00	17.44	1.83	0.00	0.00	2.97	4.63	2.87	1.45	0.64	0.81	0.00	0.00	7.26	10.18
4631A	0.00	0.00	6.15	28.18	27.25	8.22	0.00	18.21	3.26	0.00	0.00	2.87	4.57	1.32	4.16	2.13	1.93	0.00	0.00	9.11	9.11
4634	0.00	0.00	4.40	25.20	31.50	8.72	0.00	21.00	1.70	0.00	0.00	2.60	3.29	1.64	4.45	2.52	1.75	0.00	0.00	11.89	9.11
4635	0.00	0.00	11.84	42.00	20.29	2.86	8.03	6.39	0.00	0.00	0.00	2.53	4.08	2.02	1.42	0.56	0.88	3.12	4.91	2.34	4.05
4636	0.00	0.00	6.07	26.84	32.27	5.33	10.59	10.25	0.00	0.00	0.00	2.76	4.56	1.37	2.70	1.36	1.27	5.48	5.11	5.05	5.19
4701	0.00	0.00	4.96	17.30	29.20	20.41	0.00	19.41	1.18	0.00	0.00	2.43	3.91	1.24	10.52	6.56	3.33	0.00	0.00	12.44	6.97
4703	0.00	0.00	4.29	22.16	27.44	19.59	0.49	18.89	0.00	0.00	0.00	2.48	3.50	1.19	10.08	6.19	3.32	0.32	0.17	11.87	7.03
4704	0.00	0.00	5.60	30.46	31.09	6.72	5.91	12.27	0.00	0.00	0.00	2.65	4.37	0.96	3.40	1.74	1.58	3.10	2.81	6.15	6.13
4707	0.00	0.00	5.34	17.63	28.38	19.33	0.00	19.39	2.04	0.00	0.00	2.50	4.05	1.37	9.95	6.09	3.29	0.00	0.00	12.16	7.23
4708	0.00	0.00	4.88	23.71	26.62	14.64	0.00	17.90	3.36	0.00	0.00	2.60	4.19	2.15	7.48	4.25	2.92	0.00	0.00	10.19	7.71
4710	0.00	0.00	4.60	25.31	30.96	14.71	6.88	10.73	0.00	0.00	0.00	2.27	2.61	1.99	7.52	4.30	2.90	4.11	2.77	6.16	4.57
4711	0.00	0.00	2.93	25.74	33.53	10.77	3.73	15.94	0.00	0.00	0.00	2.55	3.34	1.51	5.49	3.05	2.24	2.15	1.58	8.81	7.12
4712	0.00	0.00	2.64	22.16	32.48	16.21	0.00	18.43	1.25	0.00	0.00	2.46	3.16	1.25	8.30	4.83	3.08	0.00	0.00	10.82	7.61
4715	0.00	0.00	2.92	25.45	33.06	10.83	4.32	15.99	0.00	0.00	0.00	2.58	3.35	1.53	5.53	3.09	2.22	2.51	1.81	8.92	7.07
4717	0.00	0.00	4.91	17.58	28.88	19.05	0.00	18.70	2.73	0.00	0.00	2.54	4.14	1.51	9.78	5.86	3.41	0.00	0.00	11.40	7.31
4717A	0.00	0.00	5.71	26.00	31.12	9.40	6.04	13.94	0.00	0.00	0.00	2.51	3.48	1.84	4.80	2.67	1.94	3.50	2.54	7.75	6.19
4717B	0.00	0.00	5.61	27.11	30.73	10.46	0.00	17.97	0.33	0.00	0.00	2.54	3.59	1.70	5.33	2.94	2.20	0.00	0.00	9.85	8.13
4718	0.00	0.00	5.45	20.42	28.18	15.08	0.00	22.05	1.30	0.00	0.00	2.51	3.81	1.21	7.78	4.86	2.45	0.00	0.00	14.17	7.88
4718A	0.00	0.00	5.53	23.48	30.38	11.65	0.00	20.50	1.05	0.00	0.00	2.46	3.73	1.25	5.98	3.59	2.08	0.00	0.00	12.51	7.99

4719	0.00	0.23	8.67	39.36	25.77	0.00	4.57	11.88	0.00	0.00	0.00	2.83	5.74	0.98	0.00	0.00	0.00	1.97	2.60	4.84	7.03
4723	3.59	0.00	13.36	41.63	19.51	0.27	14.90	0.00	0.00	0.00	0.00	2.16	2.77	1.86	0.14	0.06	0.08	6.06	8.84	0.00	0.00
4723A	0.00	0.00	11.23	40.37	21.18	1.79	12.10	4.56	0.00	0.00	0.00	2.59	4.11	2.11	0.89	0.38	0.52	5.11	7.00	1.82	2.74
4723B	0.00	0.00	3.09	25.94	32.74	11.40	3.15	16.43	0.00	0.00	0.00	2.54	3.26	1.50	5.82	3.26	2.32	1.84	1.31	9.21	7.22
4726	0.00	0.00	5.78	16.18	27.22	18.83	0.00	21.94	2.12	0.00	0.00	2.50	4.32	1.14	9.73	6.20	2.90	0.00	0.00	14.48	7.47
4729A	0.00	0.00	7.59	33.48	27.54	5.52	3.14	13.45	0.00	0.00	0.00	2.64	4.52	2.18	2.78	1.35	1.39	1.55	1.59	6.29	7.15
4729B	0.00	0.00	8.45	23.93	20.76	25.30	0.00	14.25	0.80	0.00	0.00	2.04	2.48	2.04	13.07	8.35	3.88	0.00	0.00	9.42	4.82
4730	0.00	0.00	5.79	24.27	30.28	12.94	0.00	17.71	1.11	0.00	0.00	2.49	3.70	1.75	6.61	3.75	2.58	0.00	0.00	10.07	7.64
4735	10.29	0.00	17.92	40.60	15.66	0.69	10.30	0.00	0.00	0.00	0.00	1.69	1.98	0.90	0.35	0.15	0.20	4.35	5.95	0.00	0.00
4818	2.10	0.00	14.14	43.91	17.57	0.97	14.35	0.00	0.00	0.00	0.00	2.16	2.83	2.02	0.48	0.20	0.29	5.79	8.57	0.00	0.00
4819	0.00	0.00	7.75	29.73	27.82	12.92	0.67	13.90	0.00	0.00	0.00	2.26	3.46	1.53	6.59	3.71	2.62	0.39	0.28	7.82	6.09
5536	0.00	0.00	6.72	34.17	26.22	7.40	0.00	16.58	0.58	0.00	0.00	2.82	4.42	1.13	3.72	1.76	1.91	0.00	0.00	7.55	9.03
5732	0.00	0.00	7.95	39.39	24.41	2.11	9.28	7.41	0.00	0.00	0.00	2.76	5.01	1.71	1.06	0.45	0.61	3.95	5.33	2.98	4.44
5733A	0.00	0.00	4.85	23.96	29.98	14.65	0.00	19.63	0.20	0.00	0.00	2.44	3.39	0.94	7.53	4.55	2.57	0.00	0.00	12.10	7.53
5733B	2.90	0.24	18.09	52.93	12.89	0.00	8.91	0.00	0.00	0.00	0.00	1.37	1.46	1.24	0.00	0.00	0.00	3.49	5.42	0.00	0.00
5734	0.00	0.00	4.80	30.34	32.17	8.47	2.00	15.52	0.00	0.00	0.00	2.47	3.09	1.16	4.30	2.27	1.91	1.09	0.92	8.05	7.47
DC03A	26.18	0.00	25.70	41.97	0.00	0.00	3.43	0.00	0.00	1.81	0.62	0.00	0.27	0.00	0.00	0.00	0.00	0.35	3.08	0.00	0.00
DC03B	12.64	0.00	16.92	43.26	12.96	0.68	9.61	0.00	0.00	0.00	0.00	1.62	1.50	0.85	0.34	0.14	0.20	3.94	5.67	0.00	0.00
DC03C	11.32	0.00	13.35	35.61	20.09	3.52	11.25	0.00	0.00	0.00	0.00	1.79	2.34	0.75	1.77	0.86	0.89	5.53	5.72	0.00	0.00
DC04A	4.50	0.00	9.72	36.53	20.36	8.88	13.84	0.00	0.00	0.00	0.00	2.32	2.93	0.93	4.46	2.05	2.38	6.40	7.44	0.00	0.00
DC04B	0.00	0.00	8.69	34.58	25.20	9.12	12.70	3.45	0.00	0.00	0.00	2.37	3.07	0.85	4.60	2.27	2.24	6.39	6.31	1.65	1.80
DC04C	11.02	0.30	12.82	40.40	18.44	0.00	12.22	0.00	0.00	0.00	0.00	1.80	1.94	1.08	0.00	0.00	0.00	5.20	7.03	0.00	0.00
DC05	10.99	0.00	16.19	42.94	14.55	1.30	9.53	0.00	0.00	0.00	0.00	1.71	1.81	1.01	0.65	0.26	0.39	3.79	5.75	0.00	0.00
DC07	9.54	0.00	16.51	40.28	16.41	1.55	10.86	0.00	0.00	0.00	0.00	1.80	1.97	1.13	0.77	0.31	0.47	4.33	6.53	0.00	0.00
DC08	7.79	0.00	15.49	43.85	15.94	1.76	10.28	0.00	0.00	0.00	0.00	1.75	2.02	1.14	0.88	0.36	0.53	4.13	6.14	0.00	0.00
DC09	8.49	0.00	15.51	41.32	17.57	0.66	11.42	0.00	0.00	0.00	0.00	1.86	2.05	1.16	0.33	0.13	0.20	4.48	6.94	0.00	0.00
DC10	7.88	0.00	15.15	44.25	14.56	2.40	10.71	0.00	0.00	0.00	0.00	1.77	2.14	1.17	1.21	0.54	0.66	4.82	5.89	0.00	0.00
DC11	7.86	0.00	15.73	45.05	13.50	3.40	9.61	0.00	0.00	0.00	0.00	1.77	1.95	1.16	1.69	0.69	1.01	3.90	5.71	0.00	0.00
DC12	7.13	0.00	15.24	44.24	16.04	2.33	9.92	0.00	0.00	0.00	0.00	1.84	2.08	1.21	1.15	0.42	0.76	3.51	6.42	0.00	0.00
DC13A	6.62	0.00	15.04	44.54	15.28	2.36	10.93	0.00	0.00	0.00	0.00	1.92	2.13	1.21	1.17	0.46	0.73	4.21	6.73	0.00	0.00
DC13B	10.59	0.00	14.77	43.14	13.92	2.63	9.89	0.00	0.00	0.00	0.00	1.86	2.09	1.14	1.32	0.56	0.76	4.17	5.71	0.00	0.00
DC14	8.93	0.00	14.63	42.77	16.44	1.72	10.18	0.00	0.00	0.00	0.00	1.82	2.16	1.39	0.85	0.32	0.54	3.79	6.39	0.00	0.00
DC15	8.33	0.00	15.12	43.30	15.27	2.27	10.58	0.00	0.00	0.00	0.00	1.83	2.14	1.19	1.13	0.47	0.67	4.37	6.21	0.00	0.00
DC16	8.39	0.00	15.09	44.94	14.04	2.91	9.74	0.00	0.00	0.00	0.00	1.82	1.94	1.16	1.45	0.57	0.90	3.76	5.98	0.00	0.00
DC17	7.99	0.00	15.48	41.40	16.71	1.91	11.29	0.00	0.00	0.00	0.00	1.90	2.14	1.21	0.95	0.38	0.59	4.42	6.87	0.00	0.00
DC18	7.46	0.00	14.72	43.53	16.39	1.57	11.21	0.00	0.00	0.00	0.00	1.91	2.08	1.18	0.78	0.31	0.49	4.33	6.87	0.00	0.00
DC19	7.58	0.00	13.97	44.36	15.76	2.84	10.41	0.00	0.00	0.00	0.00	1.82	2.15	1.14	1.41	0.59	0.84	4.28	6.13	0.00	0.00
DC20	7.15	0.00	13.52	44.02	18.47	0.85	10.98	0.00	0.00	0.00	0.00	1.82	2.04	1.18	0.42	0.16	0.27	4.20	6.78	0.00	0.00
DC22	9.45	0.00	14.06	42.03	16.98	1.44	10.92	0.00	0.00	0.00	0.00	1.79	2.16	1.20	0.72	0.30	0.42	4.59	6.32	0.00	0.00

TABLE 4. CIPW NORMATIVE COMPOSITIONS, CENTRAL MAP AREA--Continued

Sample No.	q	c	or	ab	an	di	hy	ol	ne	ac	ns	mt	il	ap	di			hy		ol	
															wo	en	fs	en	fs	fo	fa
DC23	9.42	0.00	14.11	41.28	17.22	2.03	10.84	0.00	0.00	0.00	0.00	1.76	2.17	1.21	1.02	0.44	0.57	4.73	6.11	0.00	0.00
DC24	7.89	0.00	14.66	42.87	16.20	2.34	10.90	0.00	0.00	0.00	0.00	1.78	2.16	1.22	1.17	0.50	0.67	4.65	6.25	0.00	0.00
DC25A	8.95	0.00	14.06	42.90	16.23	2.43	10.34	0.00	0.00	0.00	0.00	1.76	2.16	1.20	1.22	0.52	0.70	4.38	5.96	0.00	0.00
DC25B	9.79	0.00	13.94	40.78	17.85	1.31	11.10	0.00	0.00	0.00	0.00	1.87	2.14	1.24	0.65	0.26	0.40	4.34	6.76	0.00	0.00
DC26	7.97	0.00	15.14	43.35	15.57	3.22	9.61	0.00	0.00	0.00	0.00	1.81	2.14	1.21	1.60	0.63	0.99	3.71	5.90	0.00	0.00
DC30	7.37	0.00	13.93	44.23	16.00	2.96	10.38	0.00	0.00	0.00	0.00	1.83	2.14	1.19	1.48	0.61	0.88	4.24	6.14	0.00	0.00
DC32	9.28	0.00	14.15	41.40	17.55	1.87	10.63	0.00	0.00	0.00	0.00	1.78	2.17	1.21	0.93	0.38	0.56	4.29	6.34	0.00	0.00
DC35	9.36	0.00	12.85	42.05	18.17	1.43	11.09	0.00	0.00	0.00	0.00	1.80	2.16	1.13	0.71	0.30	0.42	4.60	6.49	0.00	0.00
DC36	8.65	0.00	13.47	42.97	17.13	3.40	9.46	0.00	0.00	0.00	0.00	1.73	2.17	1.06	1.69	0.71	0.99	3.94	5.52	0.00	0.00
DC38	9.17	0.00	12.84	42.01	18.43	2.10	10.47	0.00	0.00	0.00	0.00	1.74	2.16	1.10	1.05	0.45	0.60	4.45	6.02	0.00	0.00
DC40	8.00	0.00	14.05	42.86	17.91	2.52	9.78	0.00	0.00	0.00	0.00	1.65	2.16	1.10	1.26	0.56	0.70	4.33	5.44	0.00	0.00
DC42	8.81	0.00	14.72	41.29	18.33	2.20	9.86	0.00	0.00	0.00	0.00	1.69	1.97	1.16	1.10	0.44	0.66	3.95	5.91	0.00	0.00
DC43	9.77	0.00	13.44	42.87	17.37	3.09	8.88	0.00	0.00	0.00	0.00	1.60	1.91	1.08	1.54	0.65	0.90	3.73	5.15	0.00	0.00
DC47	8.20	0.00	13.98	44.38	16.33	4.85	7.77	0.00	0.00	0.00	0.00	1.61	1.89	1.02	2.41	0.98	1.46	3.12	4.65	0.00	0.00
DC49	8.58	0.00	13.98	45.27	16.44	3.60	7.85	0.00	0.00	0.00	0.00	1.55	1.82	0.93	1.79	0.72	1.09	3.12	4.73	0.00	0.00
DC57	5.28	0.00	13.74	46.21	18.75	3.05	8.47	0.00	0.00	0.00	0.00	1.60	1.94	0.98	1.52	0.60	0.93	3.33	5.15	0.00	0.00
DC58	11.16	0.00	17.99	47.68	10.08	2.05	7.32	0.00	0.00	0.00	0.00	1.61	1.44	0.69	1.01	0.33	0.71	2.35	4.96	0.00	0.00
DC65	4.12	0.00	11.91	41.39	20.42	3.75	12.06	0.00	0.00	0.00	0.00	2.05	2.80	1.54	1.87	0.80	1.08	5.14	6.92	0.00	0.00

TABLE 5. ANALYSES OF TRACE ELEMENTS IN PARTS PER MILLION, CENTRAL MAP AREA
[ND, not determined]

Sample No.	Ba	Rb	Sr	Zn	Zr	Y	Cd	Li	Co	Cr	Cu	Ga	Ni	Sc	V	Lab. No.	Analysts[1]	Remarks
0603A	920	38	480	45	141	<8	ND	26	4	3	5	29	<2	3	17	M133192	LE,ML	Dacite, vent 0603.
0603B	1030	12	1170	103	280	32	ND	20	15	<2	13	36	<2	12	30	M133193	LE,ML	Benmoreite, vent 0603.
0614	920	35	300	23	109	<8	ND	48	<2	<2	3	26	<2	<2	<2	M133191	LE,ML	Rhyolite, vent 0614.
0626	1030	10	1360	78	250	12	ND	18	15	<2	13	38	<2	10	75	M133190	LE,ML	Benmoreite,vent 0614.
1611	1400	26	590	74	340	<5	ND	30	5	3	5	29	4	6	38	M131428	ML	Dacite, vent 1602.
1611A	158	<5	1150	72	54	<5	ND	14	58	14	24	40	8	37	380	M131429	ML	Gabbro, vent 1602.
1611B	370	<5	1000	142	120	57	ND	17	35	6	25	46	9	50	340	M131430	ML	Do.
1611C	300	<5	760	110	86	11	ND	16	61	7	32	46	10	42	310	M131431	ML	Do.
1611D	920	<5	1150	117	123	29	ND	23	27	6	37	39	7	22	210	M131432	ML	Do.
1611E	182	<5	960	111	92	35	ND	13	60	3	42	32	17	39	290	M131433	ML	Do.
1628	1200	32	800	65	250	18	ND	23	6	<2	3	20	3	9	31	M133194	LE,ML	Dacite, vent 1628.
1629	1120	11	1270	110	300	39	ND	16	11	<2	9	33	3	8	30	M133195	LE,ML	Benmoreite, vent 1628.
1715	400	17	440	109	94	15	2	23	51	320	66	32	230	31	190	M125983	REM,MV,BK,SN	Basalt, type d.
1731	1000	8	1160	95	280	17	ND	130	16	<2	14	40	<2	12	40	M133189	LE,ML	Benmoreite, vent 0603.
2403	800	17	1400	78	205	23	ND	9	35	<2	56	25	9	19	145	M129373	MV,BK,CH	Basalt, type h, vent 3433.
2409A	940	36	490	<50	160	16	<2	<50	24	34	39	13	100	21	130	M126471	TF,VM	Basaltic andesite, vent 2416.
2409C	580	17	490	<50	170	22	<2	<50	47	430	94	18	140	42	260	M137016	TF,VM	Basalt, type j, vent 2416 A.
2410	1050	55	200	51	50	<5	ND	31	<2	2	3	24	6	<2	<2	M129357	MV,BK,CH	Rhyolite, Wright Hill.
2413	460	10	620	<50	200	26	<2	<50	48	220	80	20	130	38	240	W188064	TF,VM	Basalt, type g, vent 3521.
2416	560	12	470	<50	160	21	<2	<50	43	360	58	16	130	37	230	M126467	TF,VM	Basalt, type f, vent 2416.
2416A	740	8	580	<50	160	17	<2	<50	42	800	63	14	250	32	180	W188048	TF,VM	Basalt, type f, vent 2416.
2520	300	<10	760	<50	160	23	<2	<50	43	120	53	19	92	29	200	M131413	TF,VM	Basalt, type h, vent 2603?
2616	610	12	1100	56	200	33	<2	<50	32	<10	26	18	12	19	120	M131420	TF,VM	Do.
2635	1300	16	900	93	320	12	ND	22	6	3	5	28	4	7	51	M131427	ML	Benmoreite, vent 1602.
2705	8	139	14	163	900	61	ND	55	<2	2	6	46	4	<2	<2	M129375	MV,BK,CH	Rhyolite, San Francisco Mtn.
2736	1000	51	530	81	300	26	1	67	4	4	20	31	<2	4	18	M125981	REM,MV,BK,SN	Dacite, Elden Mtn.
3426	1510	32	ND	110	306	ND	ND	ND	14	ND	ND	ND	ND	10	ND	M126474	LS	Basalt, type h, vent 3426.
3432	1050	43	191	47	55	<5	ND	ND	2	<2	3	20	2	<1	4	M129341	MV,BK	Rhyolite, Sitgreaves.
3434	550	93	89	49	39	<5	ND	36	<2	4	1	29	5	<2	<2	M129356	MV,BK,CH	Rhyolite, Government Hill.
3502	860	55	570	74	198	10	ND	12	28	63	62	26	34	21	139	M129367	BK,CH,MV	Andesite, Kendrick Peak.
3503	780	42	560	81	193	12	ND	10	35	97	71	27	46	26	159	M129366	BK,CH,MV	Andesite, Kendrick Peak.
3503A	1050	93	345	64	240	6	ND	27	7	7	6	23	7	7	32	M129368	BK,CH,MV	Dacite, Kendrick Peak.
3503G	486	103	ND	38	159	ND	ND	ND	<1	4	ND	ND	ND	2	ND	M124492	LS	Rhyolite, Kendrick Peak.

TABLE 5. ANALYSES OF TRACE ELEMENTS IN PARTS PER MILLION, CENTRAL MAP AREA--Continued

(ND, not determined)

Sample No.	Ba	Rb	Sr	Zn	Zr	Y	Cd	Li	Co	Cr	Cu	Ga	Ni	Sc	V	Lab. No.	Analysts[1]	Remarks
3504	1250	64	600	68	270	14	ND	24	13	<2	15	27	5	10	59	M129369	BK,CH,MV	Dacite, Kendrick Peak.
3528	960	34	410	<50	240	25	<2	<50	23	120	36	17	52	18	120	M131395	TF,VM	Basaltic andesite, vent 3528A.
3531	2200	46	900	73	405	<5	ND	22	<2	2	4	30	4	<2	16	M129354	MV,BK,CH	Dacite, vent 2506.
3531B	1650	11	1700	109	285	17	ND	8	13	2	10	34	6	13	29	M129353	MV,BK,CH	Benmoreite, vent 2506.
3531C	1450	62	315	46	145	<5	ND	22	<2	2	2	27	4	<2	<2	M129355	MV,BK,CH	Rhyolite, vent 2506.
3634	630	16	1200	61	230	32	<2	<50	28	<10	21	17	10	16	91	W188086	TF,VM	Basalt, type h, vent 3634.
3705	450	18	900	59	240	28	<2	<50	39	<10	37	18	27	21	160	W188084	TF,VM	Basalt, type h, vent 3705.
3713	1350	85	122	81	47	<5	ND	29	<2	2	1	25	2	4	<2	M129376	MV,BK,CH	Dacite, North Sugarloaf.
3723	<2	275	5	105	24	42	1	500	<2	<2	6	38	<2	<4	<2	M125971	REM,MV,BK,SN	Rhyolite, Sugarloaf.
3723A	<2	265	13	93	53	43	ND	86	<2	<2	<1	38	6	4	<2	M129377	MV,BK,CH	Rhyolite, Sugarloaf.
3729	1050	52	560	83	315	17	2	54	4	<2	6	30	<2	5	15	M125964	REM,MV,BK,SN	Dacite, San Francisco Mtn.
3729A	900	43	640	94	215	29	2	62	23	4	32	36	10	20	100	M125963	REM,MV,BK,SN	Andesite, San Francisco Mtn.
3729B	1150	58	540	68	270	16	ND	35	8	3	8	30	4	8	16	M129358	MV,BK,CH	Dacite, San Francisco Mtn.
3732	880	27	840	120	250	19	2	67	8	<2	8	36	<2	8	44	M125974	REM,MV,BK,SN	Andesite, San Francisco Mtn.
3732A	1100	40	680	97	285	26	ND	16	12	<2	14	30	4	20	66	M129365	MV,BK,CH	Do.
3732B	780	65	83	83	470	25	ND	25	3	2	11	37	5	10	6	M129374	MV,BK,CH	Rhyolite, San Francisco Mtn.
3732Z	860	9	830	105	169	16	ND	12	36	50	45	35	29	28	200	M131425	ML	Basalt, San Francisco Mtn.
3831	1700	33	720	80	435	12	ND	19	4	<2	4	28	<2	6	7	M129378	MV,BK,CH	Dacite, San Francisco Mtn.
4405A	627	<30	ND	83	110	ND	ND	ND	43	133	ND	ND	ND	27	ND	M138204	LS	Basalt, type I, vent 5432A.
4424	2350	57	880	98	495	12	ND	23	4	<2	5	25	3	8	26	M129370	CH,MV,BK	Trachyte, Bull Basin Mesa.
4534	1000	86	345	46	176	<5	ND	29	5	<2	4	23	5	<2	8	M129371	BK,CH,MV	Dacite, Kendrick Peak.
DC05	880	40	640	85	295	23	ND	12	12	<2	8	28	2	12	37	M129364	MV,BK,CH	Andesite, San Francisco Mtn.
DC32	880	39	750	101	265	19	ND	17	14	<2	13	29	5	14	46	M129363	MV,BK,CH	Do.
DC36	880	24	800	95	255	16	ND	19	13	<2	9	26	4	12	45	M129362	MV,BK,CH	Do.
DC57	920	33	820	81	255	16	ND	18	14	6	19	38	7	13	48	M129361	MV,BK,CH	Do.
DC58	980	38	510	83	300	19	ND	35	7	2	7	34	7	10	23	M129360	MV,BK,CH	Dacite, San Francisco Mtn.
DC65	900	32	820	96	193	20	ND	23	21	2	31	38	6	18	75	M129359	MV,BK,CH	Andesite, San Francisco Mtn.

[1]Analysts:

BK = Bi-Shia King
CH = Chris Heropoulos
LE = L. Espos
LS = L. J. Schwarz
ML - Michael Long
MV = M. Villarreal
REM = R. E. Mays
SN = Sarah Nell
TF = T. L. Fries
VM = V. McDaniel