CONTACT INFORMATION
Mining Records Curator
Arizona Geological Survey
416 W. Congress St., Suite 100
Tucson, Arizona 85701
520-770-3500
http://www.azgs.az.gov
inquiries@azgs.az.gov

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J.H.C.

J. H. C.
JAN 5 - 1972

AMERICAN SMELTING AND REFINING COMPANY
Tucson Arizona

January 5, 1972

TO: W. L. Kurtz

FROM: J. D. Sell

Massive Sulfide
Exploration Technique
Jerome-Prescott Area ← file
Yavapai County, Arizona

This is to transmit Mr. Peter Walker's file memo on the subject. Peter reviewed the literature while in Tucson and noted the similarity of features and geology of the Jerome area to other areas of Precambrian geology elsewhere in the world. His original sketch on C. A. Anderson's Bulletin 1324-C, Figure 3, paper is included for reference, although the redrafted figure clearly shows Peter's subdivisions.

As pointed out verbally by Walker, prospecting for new Jeromes and Iron Kings would be primarily along the two main horizons, but the other favorable zones could contain good mineralization. All pyritic and chloritic zones would be sampled in looking for indicative trace mineralization or halo effects. The down dip projections would then need to be drilled in looking for the massive sulfide zone.

USGS geologic maps, mainly at 1:24,000, are available for the area and would greatly facilitate an exploration program in the district.

James D. Sell

James D. Sell

JDS:lad
Enc.

AMERICAN SMELTING AND REFINING COMPANY
Tucson Arizona

December 10, 1971

FILE MEMORANDUM

Jerome-Prescott Area

A brief examination of literature on the massive sulfide deposits in the area, particularly the United Verde and Iron King deposits, indicates that these deposits show many features typical of the socalled "volcanic exhalutive" deposits found in many parts of the world, particularly in Precambrian rocks. In particular, these deposits show very similar features both on a regional and local scale to the large producers of this type found in Archean rocks.

The stratigraphic column in this area shows the same features of cyclic volcanism found in these other areas. In particular, they show several cycles of basaltic-rhyolitic volcanism with each successive cycle becoming more acidic as a whole ascending the column. In general, mineralization appears at the top of the rhyolitic phase immediately before the change to a more basic phase of volcanism and is usually confined to rhyolite fragmentals, but often with associated pipe-like bodies in the underlying rhyolites.

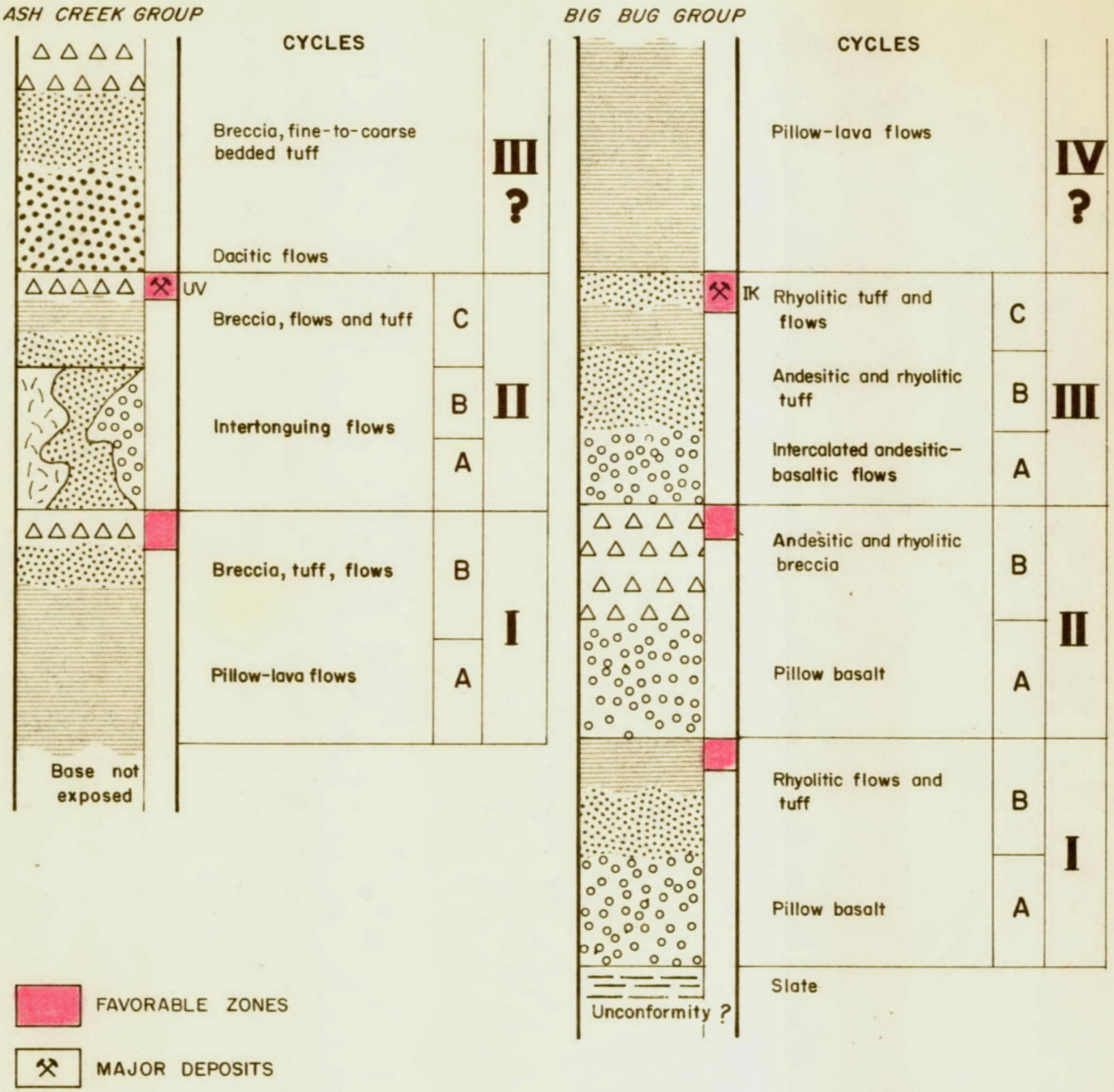
These bodies typically show a halo of chloritic alteration in the underlying rocks and around the pipe-like stockwork deposits as is shown at United Verde. At one deposit in Australia, this chloritic alteration zone showed as a prominent colour anomaly. The mineralized horizons often are highly siliceous and show marked concentrations of hematite and pyrite features well displayed apparently at the Iron King deposit.

Both the Iron King and United Verde occur near the top of the cyclic sequence at the close of the last full recognizable cycle (see attachment). Two full cycles can be recognized in the Ash Creek Group and three in the Big Bug Group. The tops of the lower sequences; e.g., the Buzzard rhyolite, the top of the Green Gulch Volcanics rhyolitic member, and of the Spud Mountain rhyolitic members, are also favourable zones for mineralization. Deposits of this type tend to form clusters near vent zones and may show very large variations in size in one area and a copper-zinc tabular ore body may overlie a pipe-like copper ore body.

P. N. Walker

PNW:lad
Attach.

cc: JDSell



(Modified from Figure 3, U.S.G.S. bulletin 1324-C, p.C7) Revision of Precambrian Stratigraphy in the Prescott-Jerome area, Yavapai County, Arizona

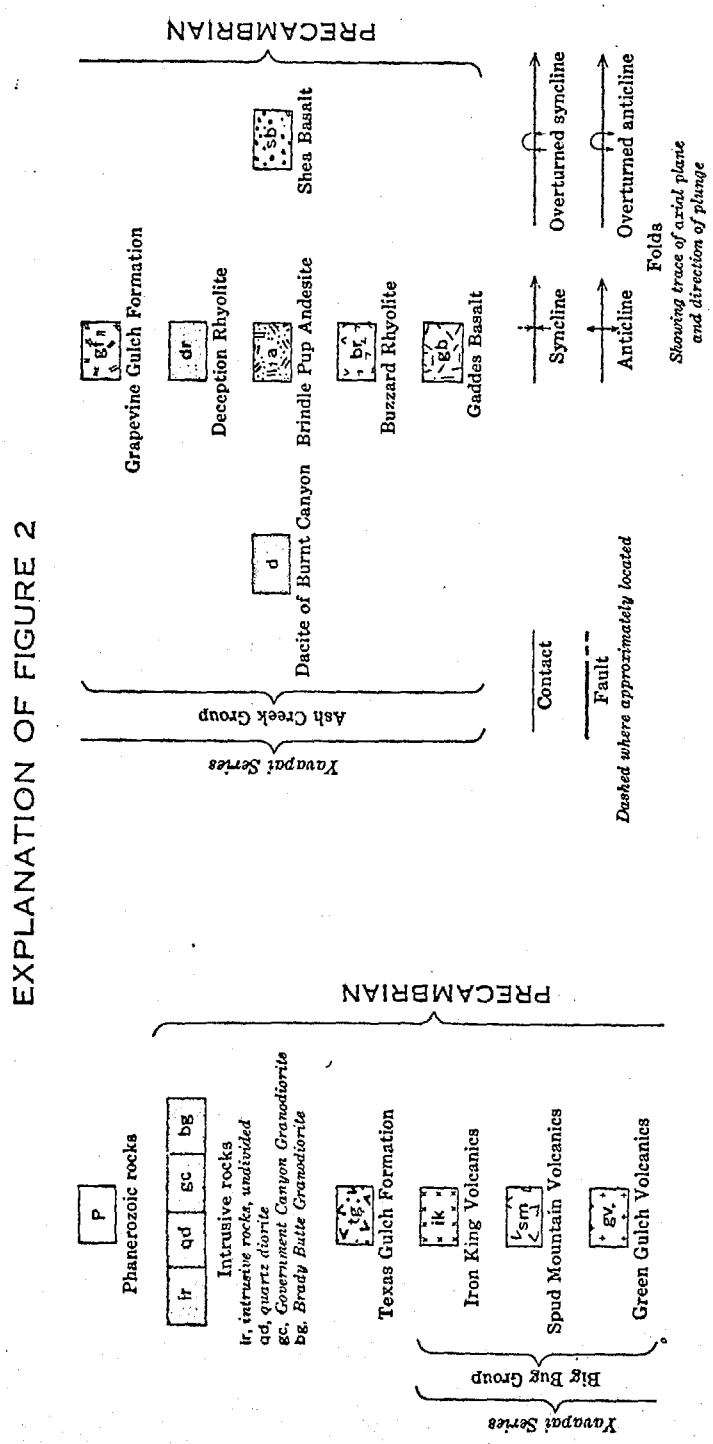


FIGURE 2.—Geologic map of the Prescott, Mingus Mountain, Mount Union, and Mayer quadrangles—Continued

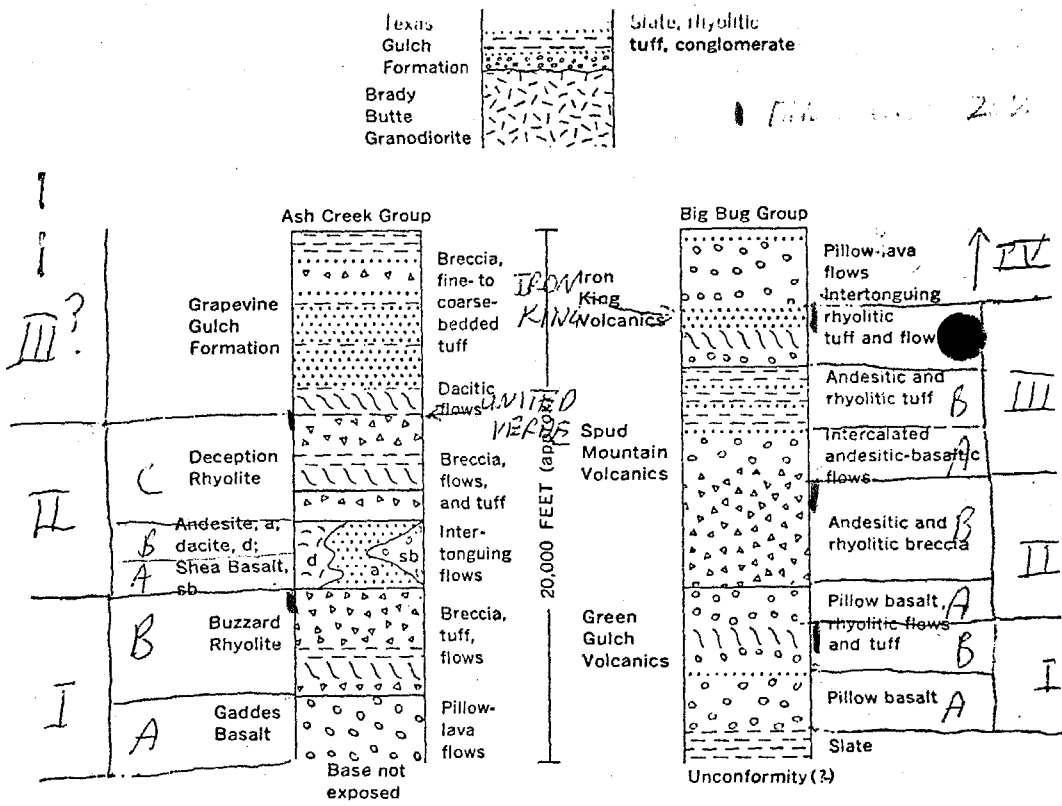


FIGURE 3.—Generalized sections of the Ash Creek and Big Bug Groups and of the Texas Gulch Formation.

BIG BUG GROUP

The Big Bug Group is exposed more or less continuously southward from the Prescott and Mingus Mountain quadrangles into the Mount Union quadrangle and western margin of the Mayer quadrangle (fig. 2). It is also exposed east of the Shylock fault zone and south of the younger pluton of quartz diorite in the Mayer quadrangle. The Big Bug Group is here named for its exposures along Big Bug Creek, originating west of Big Bug Mesa in the Mount Union quadrangle and joining the Agua Fria River in the Mayer quadrangle (fig. 2). This type locality cuts across a complete section of the Spud Mountain Volcanics and Iron King Volcanics. In the eastern half of the Mount Union quadrangle and the western part of the Mayer quadrangle, the Big Bug Group is isoclinally folded and, in general, well foliated. East of the Shylock fault zone and northwest of the

JHC file

Precambrian geology of the Prescott-Jerome area

by Charles A. Anderson, U. S. Geological Survey, Menlo Park, California

J.H.C.
JUL 13 1965

Abstract

The stratified Precambrian rocks are assigned to the Yavapai Series composed of the Ash Creek and Alder Groups. The Ash Creek Group is exposed in Mingus Mountain and the Alder Group is to the west and southwest.

Alder Group	Ash Creek Group
Iron King Volcanics	Grapevine Gulch Formation
Pillow basalt and rhyolitic tuff	Tuffaceous rocks, chert, volcanic breccia, dacite flows
Spud Mountain Volcanics	Deception Rhyolite
Intertonguing andesitic breccia, rhyolitic and andesitic tuff, basaltic flows	Intertonguing Shea Basalt, Brindle Pup Andesite, dacite of Burnt Canyon
Green Gulch Volcanics	Buzzard Rhyolite
Pillow basalt and rhyolitic rocks	Gadies Basalt
Texas Gulch Formation	Pillow lavas
Rhyolitic tuff, purple and gray slate, conglomerate	

The Alder Group is largely foliated and in isoclinal folds whereas the Ash Creek Group is largely non-foliated and in open folds. A piercement structure containing the Texas Gulch Formation separates the two groups and no correlation can be made across the structure.

The Alder Group is unconformable above granodiorite gneiss and both groups are intruded by Precambrian igneous rocks, including quartz porphyry, gabbro, and various quartz-bearing plutonic rocks.

The lower part of the Spud Mountain Volcanics northeast of Mayer is intensely altered to quartz-sericite rocks resembling the alteration of the Deception Rhyolite south of Jerome. Many smaller masses of quartz-sericite rocks are interpreted as alteration products.

Massive pyritic deposits occur in the lower and upper part of the Spud Mountain Volcanics; near the base and at the top of the Iron King Volcanics; at the base of the Grapevine Gulch Formation; in the Deception Rhyolite; and in the Shea Basalt.

Granodiorite stocks of early Tertiary(?) age crop out in an east-trending belt from Walker to Poland Junction. Some of the ore deposits are related to these stocks and younger north-northeast-trending rhyolitic dikes.