Arizona Industrial Minerals

DEPARTMENT OF MINES & MINERAL RESOURCES
JOHN JETT, DIRECTOR

by
Ken A. Phillips

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DEPARTMENT OF MINES AND MINERAL RESOURCES
Phoenix, Arizona

John H. Jett, Director

Arizona Industrial Minerals

1987

Second Edition

by Ken A. Phillips

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TABLE OF CONTENTS

page

Introduction.....v

Commodity Review

Alunite 2
Asbestos 2
Barite 4
Clay 6
Corundum 6
Diatomite.....8
Feldspar.....8
Fluorspar.....11
Garnet.....13
Graphite.....13
Gypsum.....13
Limestone - Dolomite and Marble.....16
Magnesite - Brucite.....18
Mica.....19
Perlite.....21
Pumice, Pumicite (including some Basalt, Volcanic Scoria and Cinders).....23
Salt 26
Sand (Specialty) 28
Shale (Expansible) 28
Silica - Quartz 30
Sillimanite Group.....31
Slate.....33
Sodium Sulfate.....33
Strontium.....33
Vermiculite.....34
Wollastonite.....35
Zeolites.....35

Commodity Tables

Abrasives.....37
Alunite.....38
Asbestos.....39
Barite.....51
Clay.....66
Corundum.....74
Diatomite.....75
Feldspar.....77
Fluorspar.....83
Garnet.....102
Graphite.....104
Gypsum.....105
Limestone - Dolomite and Marble.....112
Magnesite - Brucite.....126
Mica.....127
Perlite.....136
Pumice Group.....139
Salt.....156

Silica - Quartz.....157
Sillimanite.....172
Sodium 174
Specialty Sand.....175
Slate.....177
Strontium.....178
Vermiculite.....180
Wollastonite.....182
Zeolites.....182

Addendum to second edition.....A1

LIST OF ILLUSTRATIONS

page

Table
Industrial Minerals by County.....1

Figure
1 Locations of Arizona asbestos deposits.....3
2 Locations of Arizona barite deposits.....5
3 Locations of Arizona clay deposits.....7
4 Locations of Arizona diatomite deposits.....9
5 Locations of Arizona feldspar deposits.....10
6 Locations of Arizona fluorspar deposits.....12
7 Locations of Arizona garnet and wollastonite deposits.....14
8 Locations of Arizona gypsum deposits.....15
9 Locations of Arizona limestone, dolomite and/or marble deposits.....17
10 Locations of Arizona mica deposits.....20
11 Locations of Arizona perlite, vermiculite and expansible shale deposits.....22
12 Locations of Arizona pumice. pumicite, volcanic cinders and selected basalt deposits.....25
13 Locations of Arizona salt, sodium sulfate, magnesium and strontium deposits.....27
14 Locations of Arizona silica quartz and specialty sand deposits.....29
15 Locations of Arizona sillimanite deposits.....32
16 Locations of Arizona zeolite deposits.....36

ARIZONA INDUSTRIAL MINERALS

Purpose

The purpose of this publication is to provide a tabulation of known industrial mineral occurrences in Arizona along with a brief discussion of each commodity. It is hoped this information will attract additional interest and investment in the State's mineral resources.

Scope

This report was compiled in 1986 and 1987 from the previous Arizona Department of Mines and Mineral Resources publication of the same name by E. A. Elevatorski, the Department's data base, Department mine files and published data. The information reported here is for all nonmetallic mineral commodities except sand and gravel, crushed and dimension stone and gem stones.

Introduction

Arizona holds a distinguished place among the mineral producing giants of the world. Although best known for its copper production, Arizona has produced and continues to produce important quantities of industrial minerals and other metals.

Industrial minerals currently produced in Arizona are: perlite, limestone, diatomite, bentonite (low swelling and non-swelling), mica, silica-quartz, gypsum, specialty sands, pumice, tuff, scoria (cinders), salt, dimension stone, dolomite, clays (ball, fire, and common varieties), gemstones (agate, amethyst, chrysocolla, peridot, petrified wood, opal and turquoise), zeolites, and pozzolan. The value of these minerals exceeded $290,000,000 in 1986.

In past years Arizona has also produced feldspar, barite, fluorspar, asbestos, and sodium sulfate.

Uses of Directory

Locations of active or former mines, prospects, and occurrences are reported by cadastral survey i.e. section, township, and range. To assist in locating the properties an applicable U.S. Geological Survey map (if available in 1985) is listed. Also included are an index for locating specific industrial minerals by counties and a township and range index map. Most listings contain some descriptive comments. A few have no available information other than that they are a reported occurrence. It is recommended that the Arizona Department of Mines and Mineral Resources be contacted for additional information on any occurrence as the Department continues to gain information from field work, private contributions and abstracting of newly published data. The Department solicits contributions of information on all mineral occurrences in Arizona.

The construction minerals; sand and gravel, and crushed and dimension stone have not been included in this directory. Gemstones are a highly specialized group of industrial minerals and are included in a separate publication.

Acknowledgment

The first issue of this directory was authored and published by E.A. Elevatsrski. Mr. Elevatorski subsequently donated the publication to the Arizona Department of Mines and Mineral Resources as a contribution by him to the minerals field and as a possible stimulant to the exploration and development of Arizona's industrial mineral deposits.

ARIZONA INDUSTRIAL MINERALS

COMMODITY	APACHE	COCHISE	COCONINO	GILA	GRAHAM,	GREENLEE	LA PAZ	MARICOPA	MOHAVE	NAVAJO	PIMA	PINAL	SANTA CRUZ	YAVAPAI	YUMA
ALUNITE				X	X		X						X		
ASBESTOS		X	X	X			X				X	X			X
BARITE		X		X	X		X	X	X		X	X	X	X	X
CLAY	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
CORUNDUM									X		X				
DIATOMITE	X	X		X	X	X		X				X	X	X	
FELDSPAR		X		X			X	X	X	X			X		X
FLUORSPAR		X		X	X	X	X	X	X	X		X	X	X	X
GARNET	X			X	X	X		X	X						
GYPSUM		X	X	X			X	X	X	X	X	X		X	X
LIMESTONE-DOLOMITE	X	X	X	X		X	X	X	X	X	X	X	X	X	X
MAGNESITE-BRUCITE									X						
MICA		X			X		X	X	X		X	X		X	X
PERLITE				X	X	X		X	X		X	X		X	
PUMICE & PUMICITE	X	X	X	X	X	X	X	X	X	X			X	X	
SALT	X	X						X	X	X				X	
SAND (SPECIALTY)	X		X						X	X					
SHALE (EXPANSIBLE)			X									X			X
SILICA-QUARTZ		X		X		X	X	X	X	X	X	X	X	X	
SILLIMANITE		X					X	X	X					X	
SODIUM SULFATE														X	
STRONTIUM							X	X							
VERMICULITE								X	X			X			
WOLLASTONITE		X					X				X				
ZEOLITE	X	X		X	X	X	X	X	X		X	X		X	X

ARIZONA INDUSTRIAL MINERALS

COMMODITY REVIEW

A brief review of each industrial mineral commodity and its primary uses is given. Many industrial minerals are sold on the basis of direct negotiations between the buyer and seller and not by published prices. Further each consumer often has precise quality requirements which must be met for their particular end use.

ALUNITE

Alunite is a hydrous sulfate of aluminum and potassium. In a pure state it contains 37% alumina, 11% potassium oxides, 39% sulfur trioxide, and the remainder, combined water. The pure variety is white sometimes gray. Pink and brownish shades are representative of impure varieties.

Alunite is usually massive and in that form is difficult to distinguish by inspection from rocks such as limestone and dolomite and other massive minerals such as anhydrite and granular magnesite. However, a simple closed tube test for acid water as described in most mineralogy texts will serve to distinguish alunite from similar appearing minerals.

Potential uses of alunite are as a domestic alternative to bauxite for alumina in aluminum production and possibly for fertilizers composed of potassium salts. Interest in either use is currently low. Alunite has not yet been mined in Arizona.

A deposit of alunite occurs near Quartzsite, La Paz County, as veins in a schistose dacite host rock. Occurrences are reported in Gila and Santa Cruz Counties. There may be a few additional occurrences on which data is so sketchy that they are not listed in this report.

ASBESTOS

Asbestos is the generic name referring to a group of fibrous mineral silicates found in nature. They are amenable to mechanical separation into fine filaments which have some of the useful characteristics of organic fibers such as cotton or wool but are noncombustible.

There are six different minerals with an asbestiform habit which are considered of possible commercial use. The fibrous form of serpentine known as chrysotile is by far the most important to industry and accounts for over 90% of asbestos production and consumption. The other five are minerals of the amphibole group: crocidolite, amosite, anthophyllite, tremolite, and actinolite. Chrysotile has been the only asbestos produced in Arizona. Tremolite has been reported in Arizona, but has not been commercially produced.

Two classes of asbestos are recognized on the basis of use - spinning and nonspinning fiber. Each has many uses. Spinning fiber is chrysotile that can be flexed repeatedly like a thread of silk without breaking and if long enough the fibrils can be processed into textiles. In contrast, chrysotile that is harsh or resilient like a broomstraw when flexed is unsuitable for textile use and is thus referred to as nonspinning fiber.

Spinning fiber asbestos is used in packings and gaskets, woven fiber thermal insulation, woven friction products such as certain types of brake shoes and fire proof curtain and protective clothing. Nonspinning fiber is used for binders in asbestos cement pipe, asbestos cement sheeting, floor tiles, roofing products, molded friction products such as brake shoes and clutch plates, and to strengthen certain plastic and papers.

ASBESTOS

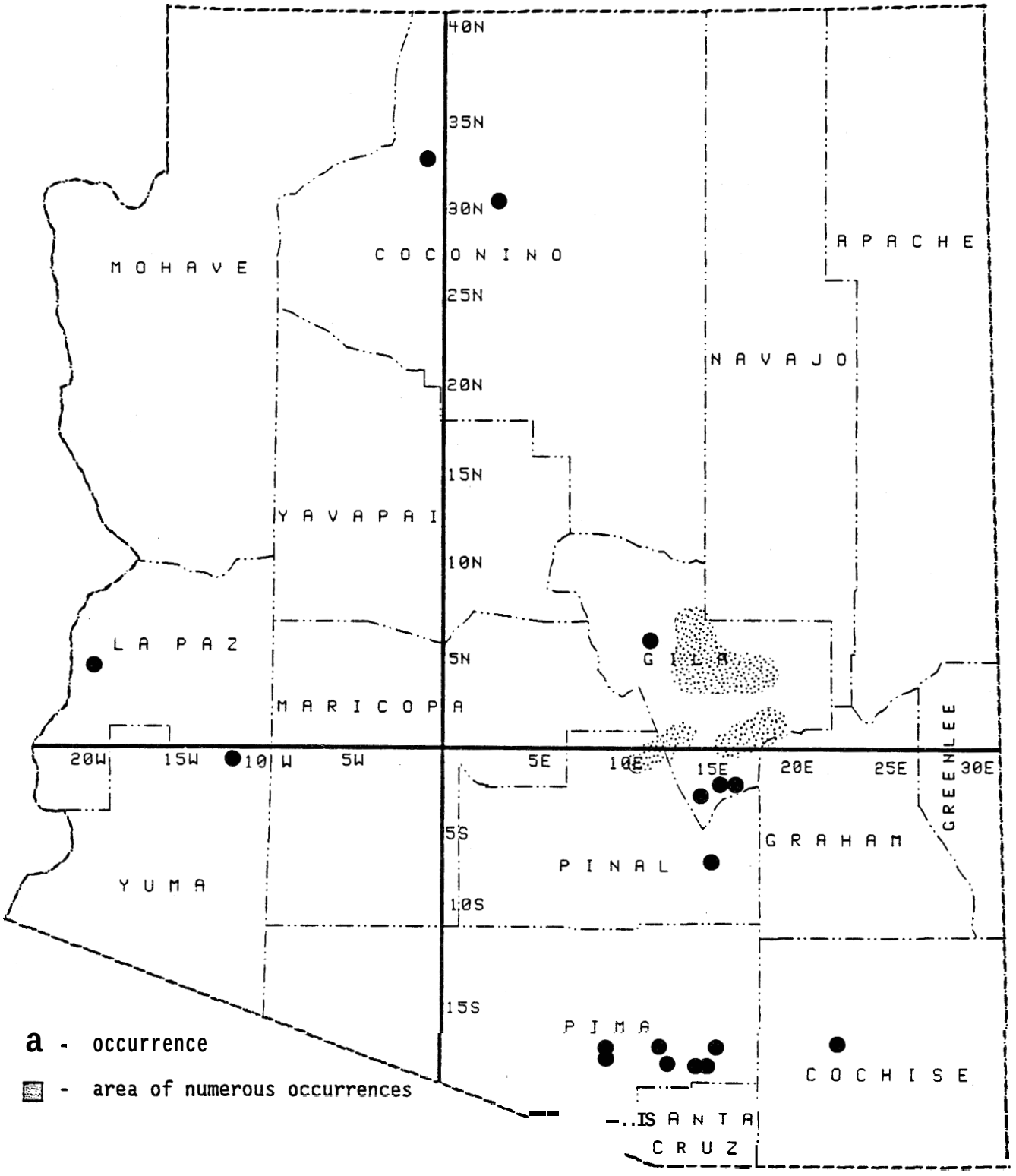


Figure 1. Locations of Arizona asbestos deposits.

Arizona asbestos deposits are unique in that those exploited contain a relatively large portion of long staple fibers (as much as 20% as compared to less than a tenth of 1% for most large tonnage deposits). Compared to most economic asbestos deposits in the world, Arizona deposits are very small in size, but their fiber is of very high quality.

In preparation for marketing, crude asbestos fibers are generally milled to provide a specified length or mixture of lengths. Processed asbestos is a high priced mineral and depending upon length and grade, varies in price from $80 to over $1700 per ton.

Mines located in Gila County near the Salt River have long been important producers of high quality low iron chrysotile asbestos. The asbestos occurs in flat lying vein type deposits within serpentinized Mescal limestone in proximity to diabase sills and dikes. The cross fiber veins are in the serpentine layers within silicate zones. Important producers have been the El Dorado and Victory Mines, Apache Mine, Sloan Creek Group, Walnut Creek Group, Cherry Creek Group, Asbestos Peak Group, Stansbury Mine, Regal Group, Canadian Mine, Phillips Mine, EMSCO Mine, Bear Canyon Mine, Pinetop Mine, Globe and Miami Group and Fiber King Mine. A few additional chrysotile deposits are found in Pinal County. Tremolite and actinolite veinlets associated with marble occur in Pima and Yuma Counties.

At the time of this writing (winter 1987) Arizona's asbestos mines are idle and have been since 1982. This fact is not due to the lack of either good deposits or markets, but to the politics of environmental and health related issues. Low iron chrysotile asbestos from Arizona is considered by many authorities to be so different from most asbestos that it does not cause those health problems typically attributed to other types and occurrences of asbestos.

Detailed information on a number of Arizona asbestos deposits was obtained by the Department of Mines and Mineral Resources as part of a grant completed for the U.S. Bureau of Mines - Minerals Availability System. The final report is available for further study.

BARITE

Barite ($BaSO_4$) is an unusually heavy mineral for having a nonmetallic appearance. Barite, also called barytes, tiff, rawk or heavy spar, is the most common and abundant ore mineral of barium. Pure barite contains 58.8% Ba (or 65.7% BaO) and 34.3% SO_3. It has a calculated specific gravity of 4.5. Its most distinctive characteristic is its high specific gravity. Barite is commonly white to light gray, but specimens have been found which are light blue, brown, and nearly black. It is generally opaque and has a pearly to vitreous luster. The hardness is 2.5 to 3.5 on Mohs scale. Crystallized specimens, either clear or colored and translucent are prized by specimen collectors. Commercially, the terms "soft" and "hard" refer to the ease with which barite can be ground.

Barite is used in many applications. Weighting for oil well drilling fluids (mud) accounts for the majority of barite consumption. It is also used in refining sugar, production of barium chemicals, paints, glass, rubber, heavy concrete, and as fillers and extenders in numerous products.

Barite occurs in vein, replacement, bedded, and residual deposits either alone or more commonly in association with quartz, fluorspar, and various carbonate and sulfide minerals. Nearly all of the known barite deposits in Arizona occur in veins associated with faults, breccias, and fracture zones.

BARITE

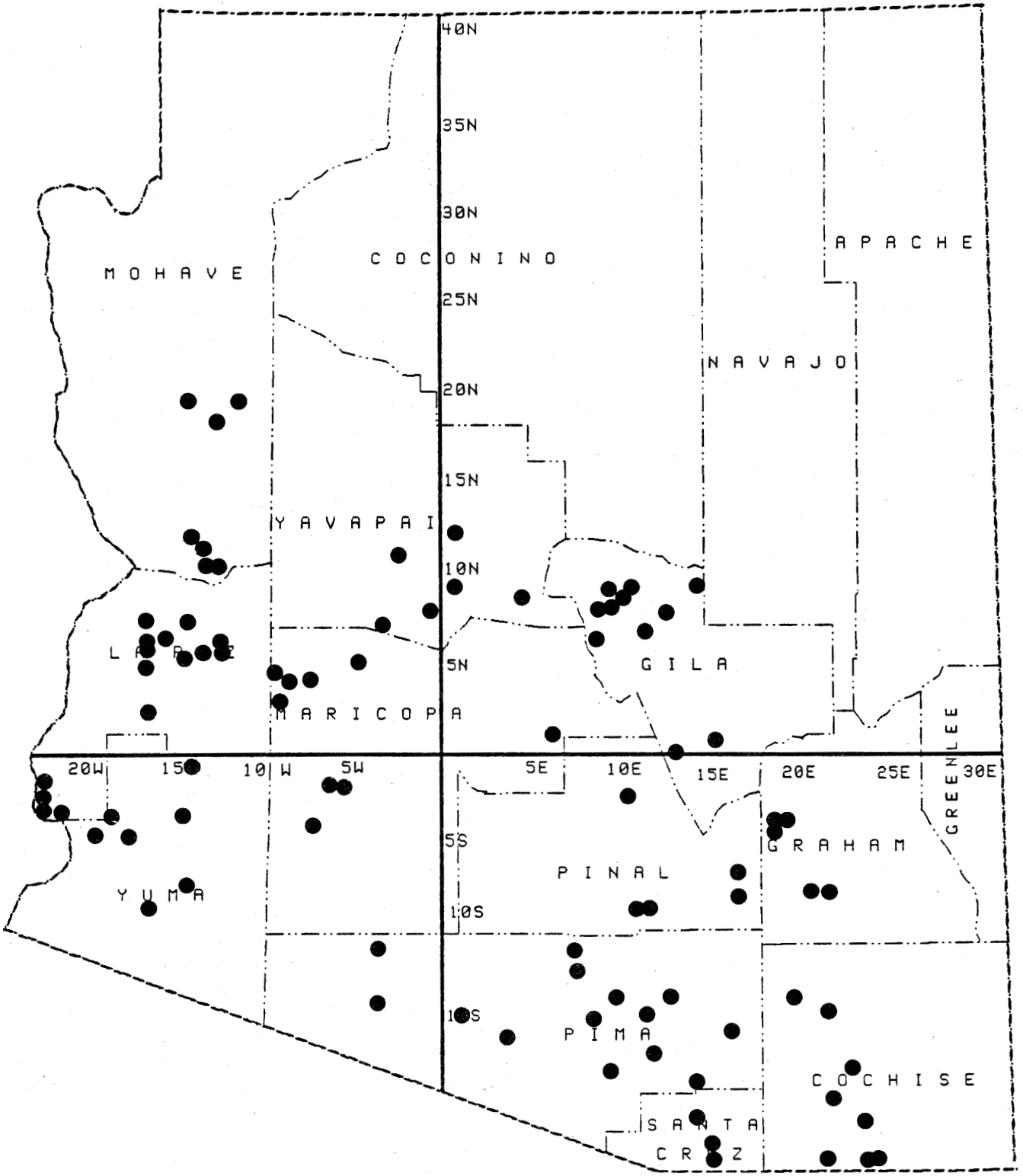


Figure 2. Locations of Arizona barite deposits.

Most of Arizona's barite production has come from the Granite Reef (Arizona Barite, Macco) Mine in Maricopa County. There has also been production from the Bouse District in northern Yuma (now La Paz) County. Further, there has been minor production from Cochise, Gila, Mohave and Yuma County. The most recent production has come from Gila County's Tonto Basin District during 1981 and 1982.

Prospecting For Barite by Clifford J. Hicks and Ken A. Phillips, Circular No. 4 published by the Arizona Department of Mines and Mineral Resources in 1981 further discusses barite, prospecting hints, field tests, and industry specifications, Listed in the tables under "BARITE" are included deposits of other barium minerals such as witherite.

CLAY

Excluding the common clays that are used in bricks and tiles, which are not generally included in this compendium, the industrial clays are bentonite, kaolin, and refractory clays.

Bentonite, composed chiefly of montmorillonite, is a clay type that results from the alteration of volcanic ash. There are two types: a sodium-based bentonite clay of high swelling capacity; and a calcium-based bentonite clay of low swelling capacity. Production in Arizona has been largely from the low swelling bentonite, mined from deposits near Sanders and Chambers in Apache County. It is shipped and processed for uses in refining and decolorizing oils, making petroleum catalysts, and in desiccants. The high swelling bentonites are used in oil well drilling mud, livestock feed binders, pelletizing iron ores, animal feeds, pharmaceuticals, canal-reservoir linings and heap leach pad sealants for the processing of metallic ores. Some production for these uses has come from the Camp Verde area, Yavapai County; and from the Burro Creek area of the Mohave-Yavapai County boundary.

Refractory clay, also referred to as fire clay and kaolin, are found as layers in hydrothermally altered volcanic rocks. These include kaolinite, an impure kaolin. High-grade kaolin is used in paper-coating material, whiteware, and the rubber industry. The refractory clays have a high resistance to heat and are used in making stoneware, refractory brick, and ceramic products. Near Globe, in Gila County, the Weary Lode has furnished kaolinite for ceramic products. For the copper industry, refractory clays have been made into bricks for lining smelter furnaces. Some production has been reported near Yucca in Mohave County. Several extensive deposits are located on the Navajo Indian Reservation where the kaolinite outcrops are typically capped or overlain by the Dakota sandstone.

CORUNDUM

Corundum is a very hard natural aluminum oxide having two uses: (1) as natural abrasives, and (2) as the precious or semi-precious gemstones; ruby and sapphire. Emery, another natural abrasive is a naturally occurring mixture of corundum, magnetite, and other minerals. Demand for natural abrasives is very limited as is the availability of exploitable deposits. Artificial substitutes are harder, more uniform, and ultimately more economic for most uses than the natural product. In general, ultramafic rocks and resultant placers offer the best prospecting locals for corundum. Potential for future production of abrasive quality corundum from Arizona is very low. However, specimens of gem quality might be found. Reported Arizona occurrences of corundum are in Mohave and Pinal Counties. There has not been any

CLAY

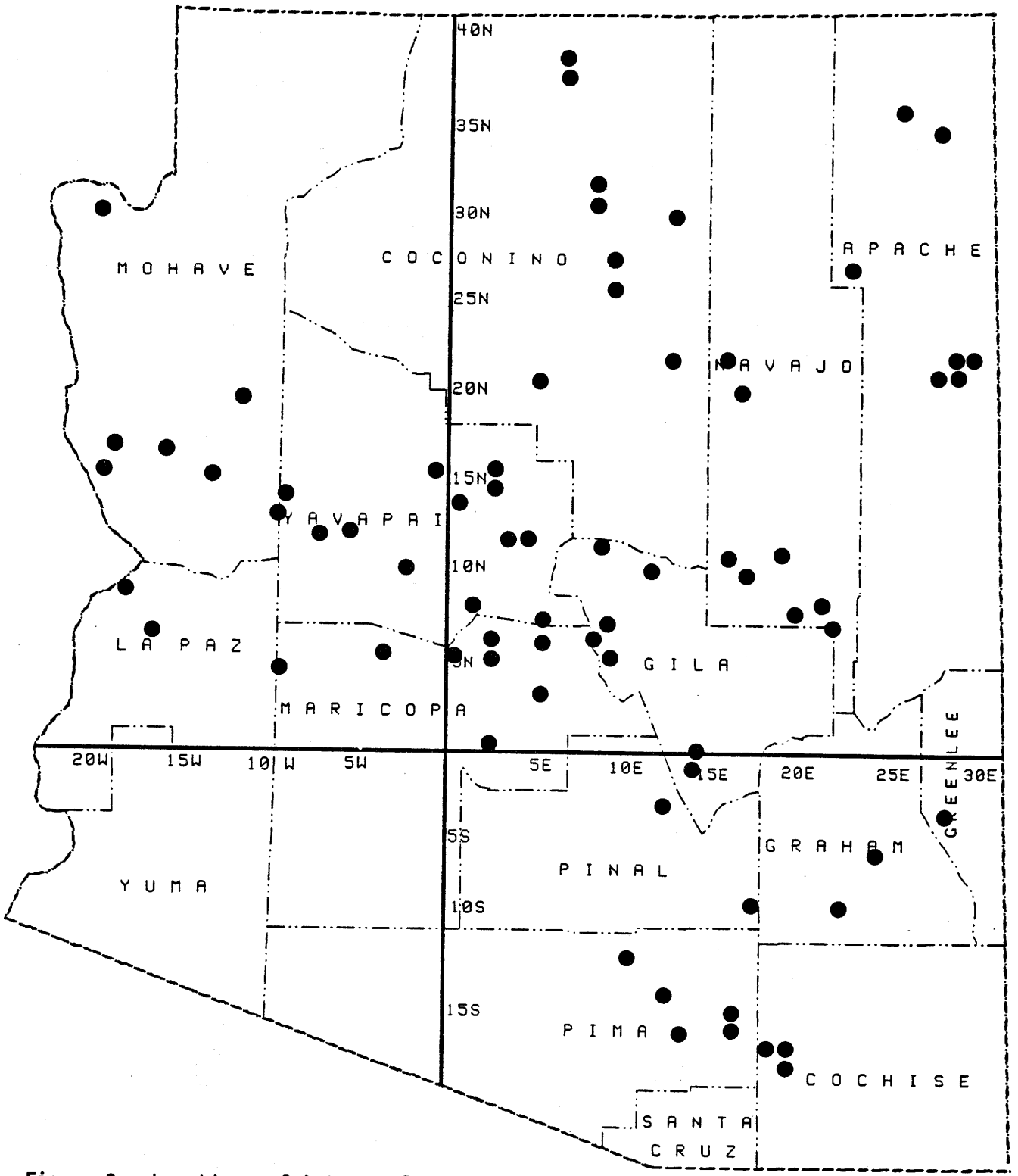


Figure 3. Locations of Arizona clay deposits.

corundum produced in Arizona for abrasive uses.

DIATOMITE

Diatomite or diatomaceous earth is a sedimentary rock composed of a high proportion of the microscopic-sized shells of minute water dwelling plants or algae called diatoms. It is also known as infusorial earth, kieselguhr and fossil flour. The frustules or shells of the diatoms are siliceous, opal 1ike skeletons containing pores and channelways that give them internal porosity and permeability. Major uses are for filtration, fillers and thermal insulation. Numerous miscellaneous applications include absorbents, pesticide carriers, light-weight aggregate, ceramics, floor sweep compounds and anticaking agents.

Although occurrences of diatomaceous sedimentary rocks in the Western United States are numerous, only selected deposits are exploited. Because of the variability of diatoms the suitability of any given deposit for particular uses requires extensive testing. Further, the nature and distribution of impurities such as volcanic ash, sand, clay, chert, and various colored oxides effect the potential end uses, processing requirements and value. Diatomite of particular specifications can bring relatively high prices.

The White Cliffs Mine, Pinal County, has been an important producer. Its output has been used for filter aids, fillers, and cement additives. The diatomite is associated with gypsum. Other occurrences associated with gypsum are found in Cochise and Yavapai Counties. A number of diatomite deposits also occur in Graham and Greenlee Counties at the locations described in the table,

FELDSPAR

The term feldspar is used in a general way to refer to a group of anhydrous aluminum silicates of potassium, sodium, and calcium. The potassium feldspars are the minerals orthoclase and microcline. Both have a vitreous luster, a hardness of 6, and a specific gravity of about 2.57. They differ in crystal habits. The sodium and calcium feldspar, called plagioclase form an isomorphic series ranging from sodium plagioclase (albite) to calcium plagioclase (anorthite). These feldspars are vitreous to pearly and have a hardness of 6 and a specific gravity range from 2.62 to 2.76. The potassium and sodium feldspars usually contain admixtures of each other often with small amounts of free quartz. Such material is called perthite.

The feldspar of commerce falls within microcline-perthite-albite mineralogy. The mineral has two significant properties of value and two major uses dependent on these properties. When ground to a powder and used as a constituent of ceramic mixes, feldspar acts as a flux, that is, it forms glass within the ceramic body at relatively low temperatures. The mineral has this property because of its content of the alkaline metals potassium and sodium. As such, feldspar is a basic raw material in the manufacture of china, high grade ceramic tile, porcelain and ceramic glazes. The second property that makes feldspar of value is its alumina content which is useful in the manufacture of silica glass. The substitution of alumina for a small part of the silica in glass increases the resistance of the glass to impact, bending, and thermal shock.

In 1982, pottery and ceramic manufacture consumed 82% and glass 18% of the domestic consumption.

DIATOMITE

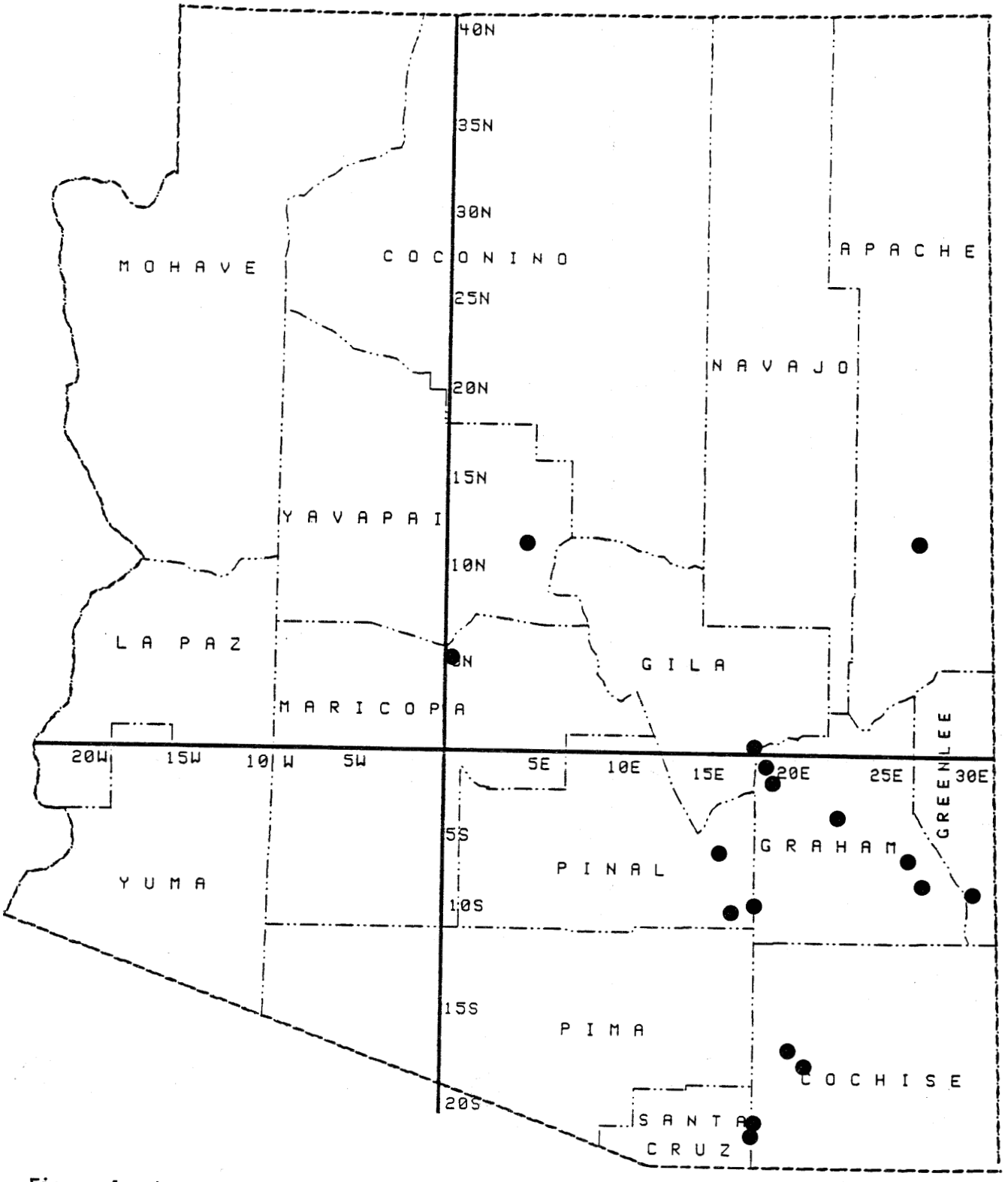


Figure 4. Locations of Arizona diatomite deposits.

FELDSPAR

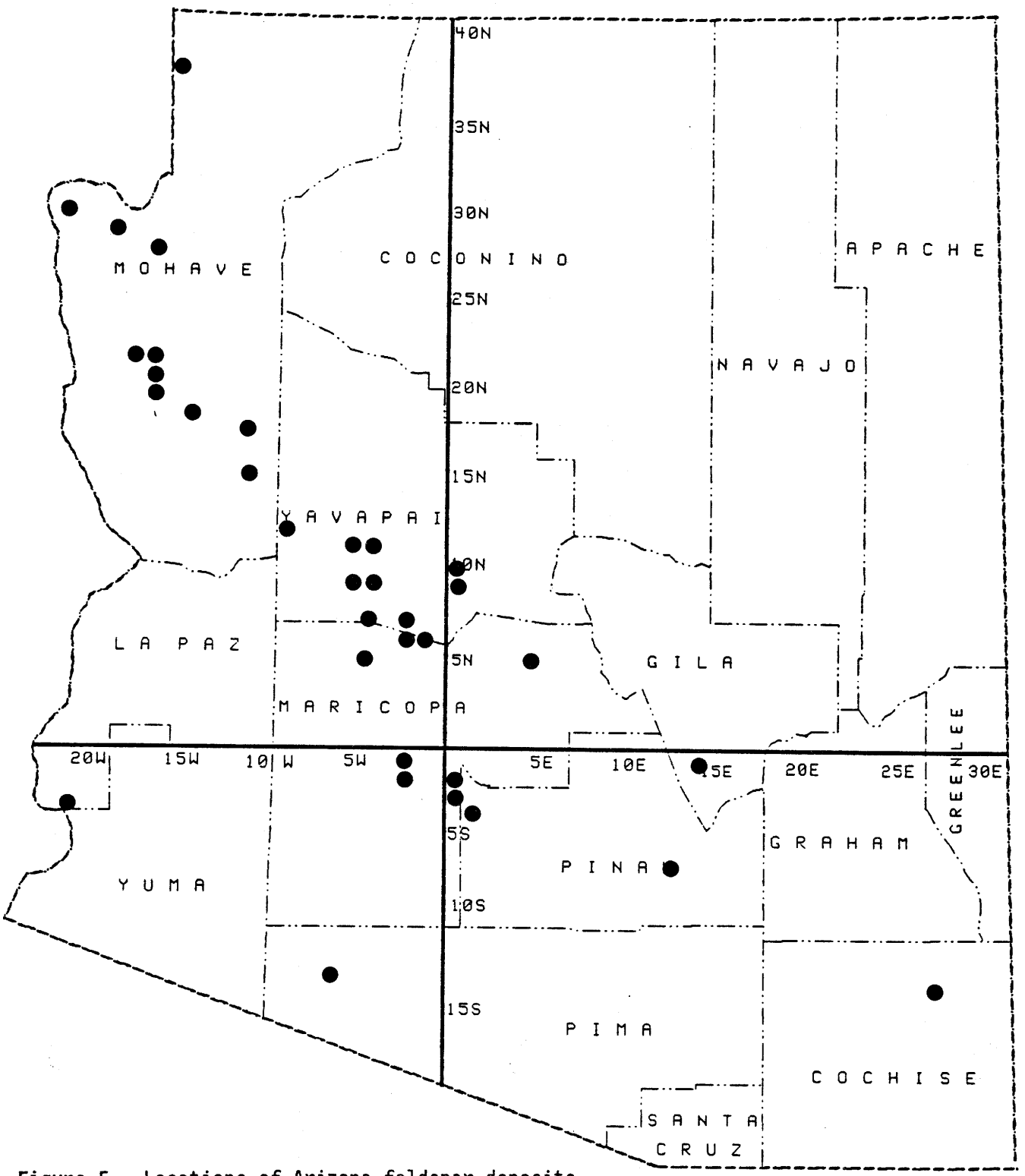


Figure 5. Locations of Arizona feldspar deposits.

Pegmatites are the only known commercial source of feldspar in Arizona. They occur in many parts of the western and southern portions of the State in a southeastward curving belt extending from Lake Mead in Mohave County to Cochise County. Productive and potentially productive pegmatites occur mainly in the older crystalline rocks exposed within this belt. Most of Arizona's past production has come from mines in the Cerbat Mountains north of Kingman. A feldspar processing plant operated in Kingman from 1931 through 1983.

Feldspar deposits are listed for Gila, Maricopa, Mohave, Pima, Pinal, and Yavapai County.

FLUORSPAR

Fluorspar is the commercial name generally applied to the mineral fluorite, whose chemical formula is CaF_2. It is the principle ore mineral of the industrial element fluorine. The mineral commonly occurs as crystals, in crystalline masses and as fine to course granular material. Fluorite has a specific gravity of 3.18, a hardness of 4, is easily cleavable and displays a wide variety of colors ranging from colorless and white to shades of green, yellow, brown, biue, and purple.

Fluorspar is important in the manufacture of hydrofluoric acid. Hydro-fluoric acid is used in the chemical industry to produce chloro-fluorocarbon refrigerants, fluorine chemicals for the production of aluminum and many additional specialty chemicals used in the uranium, electrical, metallurgical, wood products, plastics, and water treatment industries. The second greatest use of fluorspar is as a flux in steel making. Appreciable quantities are also used in the production of ceramic materials, enamels, and specialty glass.

Fluorspar has essentially three marketing grades referred to as acid grade, metallurgical grade, and ceramic grade. Each has separate pricing and purity standards and are discussed below.

Acid-grade fluorspar contains at least 97% CaF_2. Permissible impurities are limited to 1.0% - 1.5% silica and 0.03% - 0.10% sulfide or free sulfur. Some user specifications may also impose stringent limits on calcite, beryllium, and arsenic. It is typically the highest grade marketed and usually commands the highest price.

Metallurgical-grade fluorspar contains about 60% to 85% CaF_2. Also called "metspar" or "lump spar" it is sold and valued on the basis of effective calcium fluoride content rather than actual calcium fluoride content. Effective calcium fluoride is calculated by subtracting 2.5 times the silica content from the actual calcium fluoride content. Maximum limits on silica are set at about 5 to 6 percent. Sulfur is limited to 0.3%, lead to about .25 - .50 % maximum and phosphorus to a very small amount. Fine particle size is also detrimental.

Ceramic-grade fluorspar has specifications which are somewhat more variable than the other grades. Calcium fluoride content can vary from 85 to 97 percent. Limits are placed on silica, calcite, iron oxides, and any metallic mineral compounds which might cause discoloration in final products. In general, shipments of ceramic grade fluorspar are usually tailored to the specific needs of individual customers. Consistency between individual shipments is very often more important than actual grade.

The principal fluorspar deposits of Arizona are mainly epithermal veins that fill fissures and brecciated zones along faults. Production has come from nine districts in Arizona most of which have had small production of metallurgical grade material. Both

FLUORSPAR

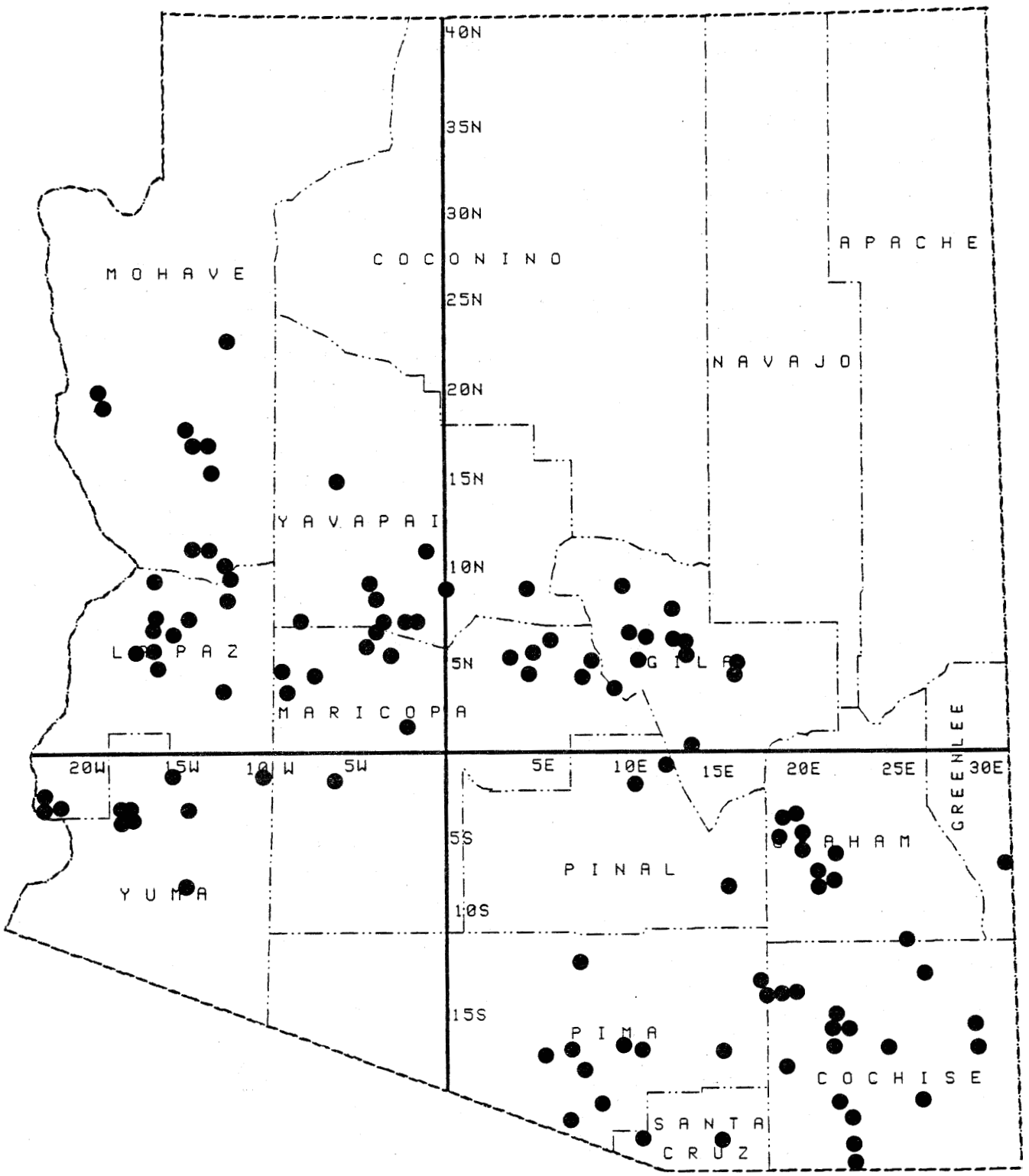


Figure 6. Locations of Arizona fluorspar deposits.

acid-grade and ceramic-grade concentrates have been produced from mines in central Gila County and processed by a mill in Tonto Basin.

Arizona Fluorspar by E.A. Elevatorski, Mineral Report No. 4 published by the Department of Mines and Mineral Resources in 1971 further discusses fluorspar occurrences in Arizona. Detailed information on a number of Arizona fluorspar deposits was obtained by the Department as part of a grant completed for the U.S. Bureau of Mines - Mineral Availability System. This information is available for further study.

GARNET

The garnet group consists principally of six mineral subspecies; grossularite, pyrope, almandine, spessartite, andradite, and uvarovite. All are silicates but with different combinations of aluminum, magnesium, iron manganese, calcium, and chromium. When transparent, free of flaws, and of pleasing color garnet is used as a semiprecious gemstone. Pyrope is recovered in alluvial deposits eroded from garnet-bearing diatreme structures on the Navajo Indian Reservation in Apache County and is known as "Arizona Ruby."

Garnet is well suited for use as an abrasive. Its hardness is 7.5 and it tends to break into thin, sharp chisel-like plates even when ground to fine sizes. It is used on abrasive paper and cloth as well as loose grains in the wood working industry. Arizona common garnet has not yet been mined for such uses. Andradite garnet occurs in contact metamorphic deposits in limestone in Gila, Graham, Greenlee, and Pima County.

GRAPHITE

Graphite is a soft, black, unctuous form of elemental carbon. It most commonly occurs as minute scales of flakes, as bladed or foliated masses, or as earthy cryptocrystalline lumps. Graphite has perfect basal cleavage, a dull to bright metallic luster and a gray streak. It is opaque in even the finest size particles. The softness and perfect basal cleavage of graphite make it highly slippery. It adheres readily to metal or other substances, filling the pores and making a slick surface. Graphite is extremely refractory (withstanding temperatures up to 3000°C), is immune to most acids and is a good conductor of electricity. These unique properties give rise to many uses in the lubrication, foundry, and steel industries along with special uses in electrical equipment, "lead" pencils and paints.

Graphite occurrences in Arizona thus far reported are of no commercial interest. They are, however, of mineralogical and geological interest.

GYPSUM

Gypsum is a hydrous calcium sulfate which normally occurs as a soft, compact granular rock. Its chemical symbol is $CaSO_4.2H_2O$. It also occurs as a fine-grained massive and sometimes translucent form called alabaster. There are a number of mineralogical forms, varieties, and associations such as selenite, satin spar, and gypsite. Gypsum may be colorless, white, gray, or hues of red, yellow, or brown. Pure gypsum contains 32.5% lime (CaO), 46.6% sulfur trioxide (SO_3) and 20.9% water.

Anhydrite, $CaSO_4$, is a closely related mineral and contains 41.2% CaO and 58.8% SO_3 with NO water of hydration.

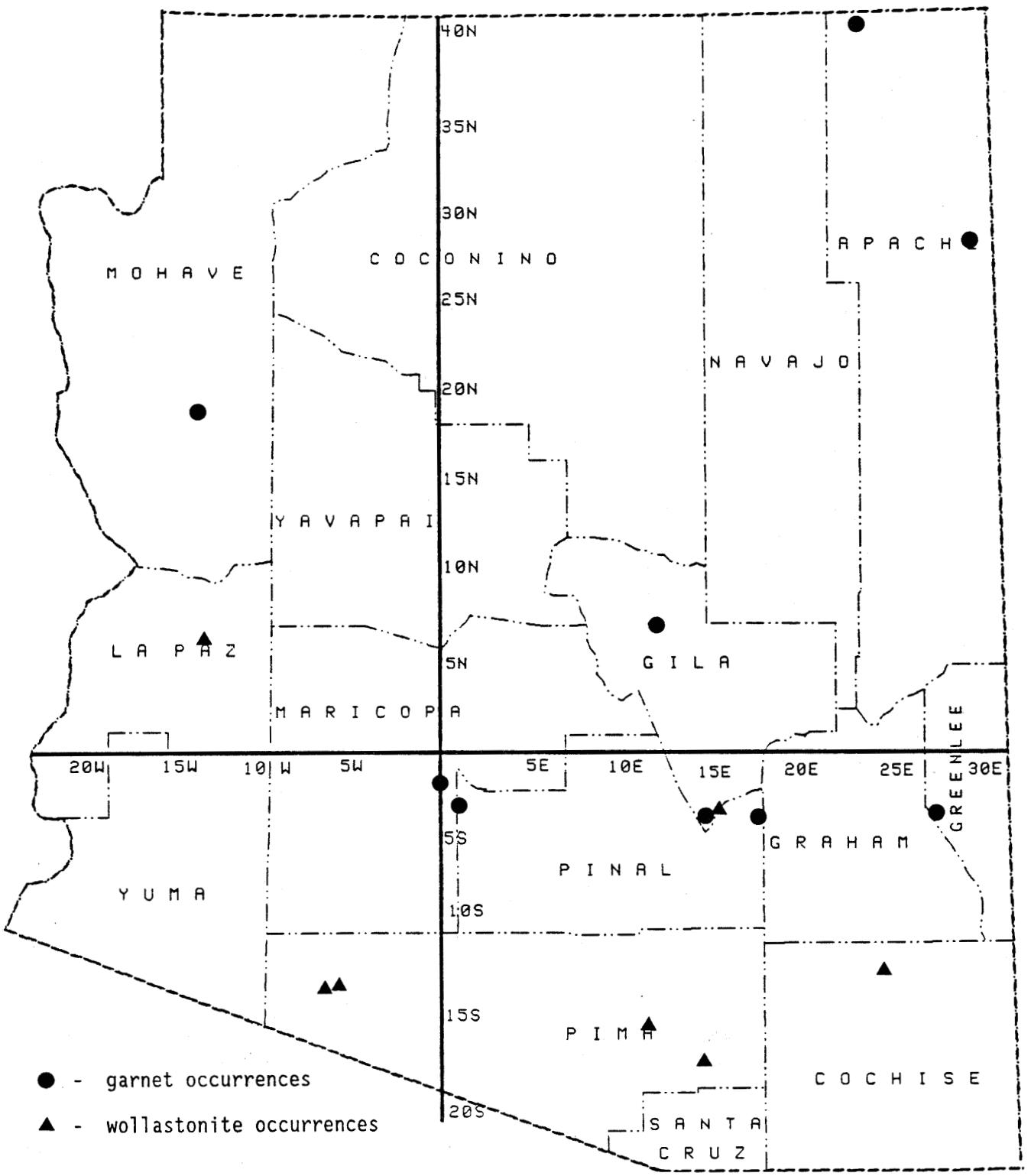


Figure 7. Locations of Arizona garnet and wollastonite deposits.

GYPSUM

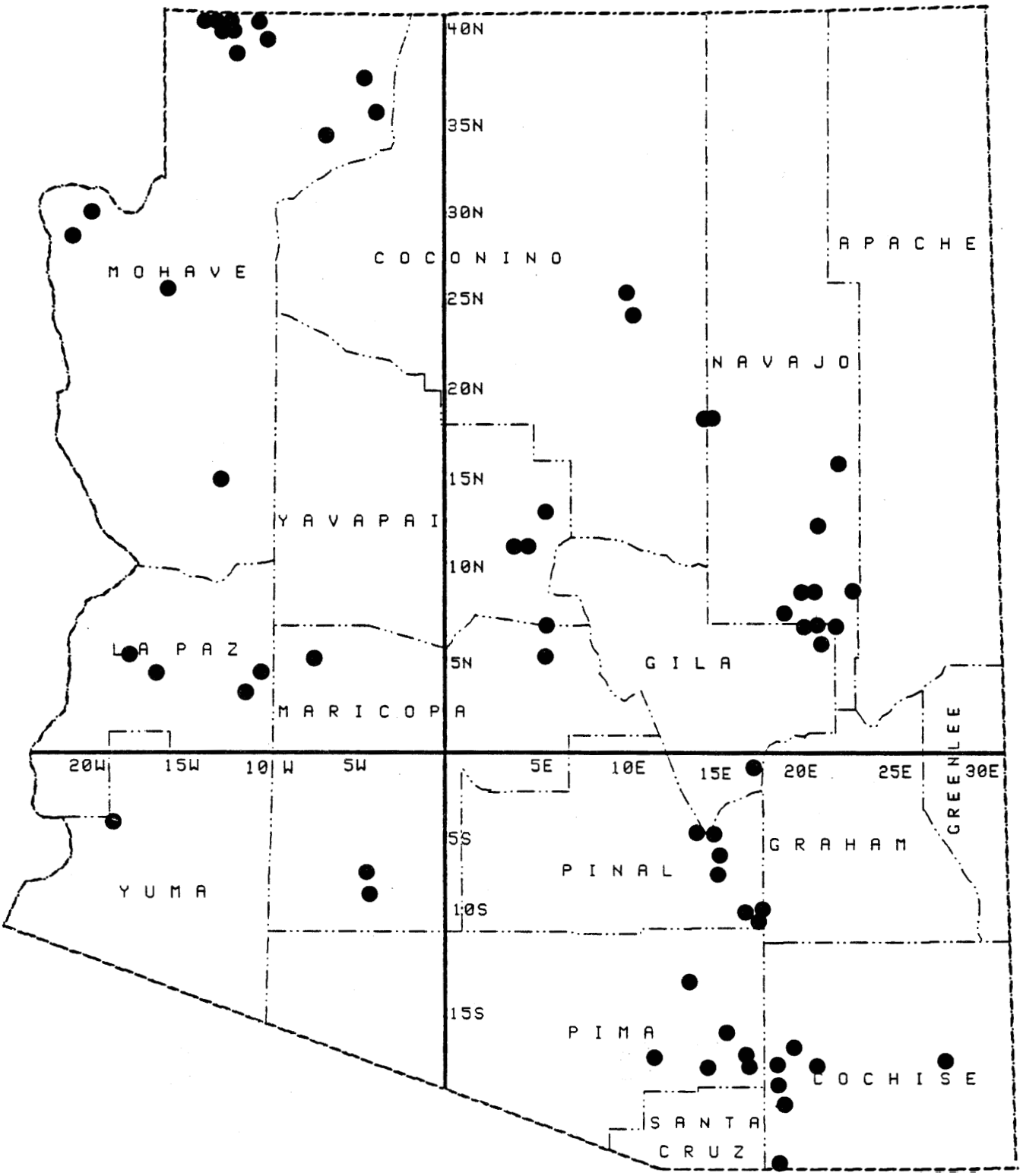


Figure 8. Locations of Arizona gypsum deposits.

The gypsum of commerce is the compact massive finely crystalline to granular rock containing at least 80% gypsum. For many uses gypsum rock must contain at least 90% gypsum. Impurities usually include interbedded limestone, shale, dolomite, clay, and salts. Gypsite which may contain as little as 50% gypsum mixed with the other impurities mentioned (except limestone) may be used for some agricultural applications. Alabaster, which is a comparatively rare form has been used for centuries for carving into lamp bases, bowls, and similar objects. The varieties selenite and satin spar have no industrial uses. However, selenite and satin spar when found as attractive specimens, are prized by collectors.

About one fourth of the gypsum consumed is as crude gypsum while the majority is calcined. Uncalcined gypsum is added to portland cement to retard setting time. It is also used as "land plaster" added to soil in agricultural areas where calcium and sulfur are required or to break down the sodium content of alkali soils.

Calcining gypsum produces either plaster of paris when roasted at temperatures of 250° - 400°F or "dead-burned gypsum" when roasted at temperatures of 900° - 1000°F. Plaster of paris, when mixed with water, forms an easily worked plaster that will recrystallize to gypsum. It is used directly as plaster or it can be molded between sheets of heavy paper to form gypsum board (also called wall board, sheetrock, or plaster board). Plaster of paris is also used for making casting molds and in many applications as a binder, filler, or chemical agent. Dead-burned gypsum which is chemically identical to anhydrite is used as desiccator and dehydrator and in specialty cements. Anhydrite cannot currently be used as an economical substitute for gypsum in making plaster-of-paris.

Gypsum has been produced commercially in Arizona since about 1880. It has been an important mineral commodity only since the mid 1950's when demand for its use in agriculture and construction increased substantially. Current production is from the Camp Verde area of Yavapai County and the Winkelman-Mammoth area of Pinal County. Most operating properties are captive mines, owned and operated by the processors.

Reserves of gypsum in Arizona are extensive with deposits existing in most counties. Extensive resources of anhydrite are known to exist buried in many of the State's evaporite filled basins. Of particular interest are the very large deposits encountered in drill holes within the Eloy Basin in Pinal County.

Important factors when evaluating gypsum deposits are their location relative to markets or areas of consumption (and easy transportation) and their development/mining costs. The grade of the deposit must also be considered, particularly the type and amounts of impurities. Generally, the higher the gypsum content, the better. Impurities may be a problem if they add color to products such as plaster-of-paris or reduce the chemical effectiveness in products such as agricultural gypsum.

LIMESTONE-DOLOMITE and MARBLE

Limestone, dolomite, and marble are calcium and calciurn-magnesium carbonate rocks that are very important and useful in the construction industry and for chemical and industrial use.

Pure limestone is 100% calcite $CaCO_3$ and pure dolomite rock is 100% dolomite $CaMg(CO_3)_2$. Neither rock often occurs pure in nature as dolomite substitutes for calcite in limestone and calcite substitutes for the mineral dolomite in dolomite rock. The names

LIMESTONE, DOLOMITE, MARBLE

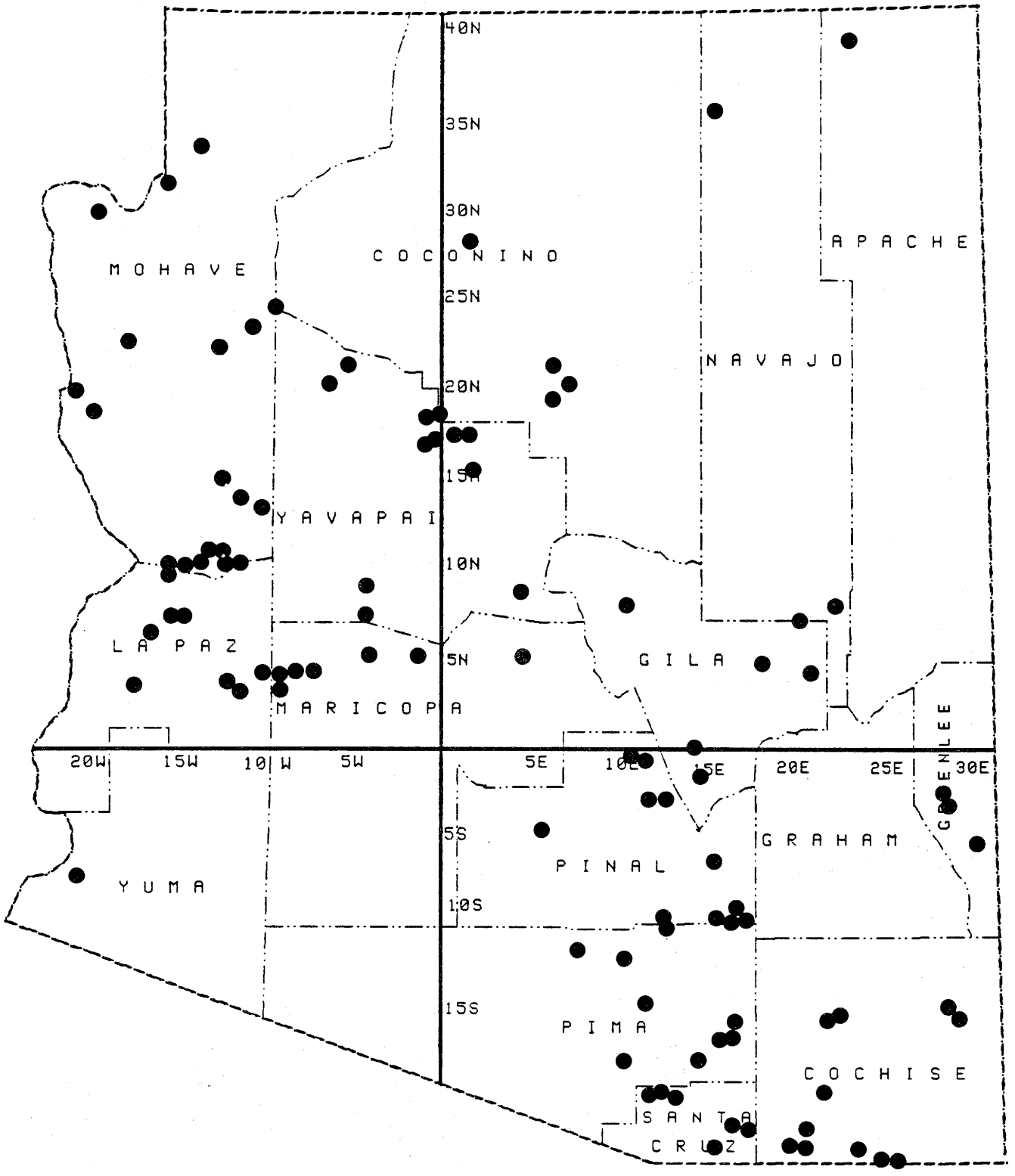


Figure 9. Locations of Arizona Limestone, dolomite and/or marble deposits.

"limestone" and "dolomite" include rocks consisting of at least 80% carbonate without regard to whether the carbonate is calcite, the mineral dolomite, or a combination of both. Calcite greatly predominates in limestone and dolomite predominates in dolomite rock, When calcite and dolomite are present in more or less equal proportions, the rock is termed a magnesian limestone. High calcium limestone contains at least 95% calcite.

Marble, which is limestone or dolomite that has been naturally recrystallized often has the same chemical and mineralogical composition as the original carbonate rock or it may contain new minerals formed during the metamorphic process. Marble is almost always more coarsely crystalline than the original carbonate rock. An economically important physical quality of some marble is its ability to take a smooth polish.

Uses for limestone, dolomite or marble of either composition include: (1) crushed stone for concrete aggregate, road material, railroad ballast, in a finer form for poultry grit, stuccos, fillers, and whiting agents; (2) as a fluxing agent in smelting and refining metals; (3) as a soil conditioner in those parts of the country where soil acidity is a problem (not, however, in the arid Southwestern United States); (4) as a source of lime; (5) as a chemical raw material in glass making, acid neutralization and other processes and; (6) as dimension stone. Limestone, but not dolomite is used as the basic raw material in the manufacture of portland cement. Dolomite, but not limestone is an important ingredient in high grade refractories.

In Arizona, limestone and limestone marble is used as crushed stone, as feed for lime plants and for the manufacture of portland-cement. Dolomite has been used as railroad ballast in part of the State. Lime is manufactured for export from the state as well as for mineral processing and numerous industrial applications within Arizona. Limestone as crushed and ground material is used to treat stack gases from electric generating plants and copper smelters and, to a lesser extent, to neutralize excess acid recovered at copper smelters. Limestone is mined and consumed by both of the State's cement plants in the manufacture of cement. Marble is used as roof granules, decorative and monument stone and dimension stone.

There are many deposits of limestone, magnesian limestone, dolomite, and marble in Arizona. However, only a few have been exploited for commercial use because of location, size, or quality of material. The best Arizona limestones for chemical and industrial use are Mississipian, Pennsylvanian-Permian, and Cretaceous in age. The two best limestones for overall purity, thickness, and availability over wide areas are the Escabrosa and Redwall limestones of Mississipian age and most current operations are in these limestone.

Limestone, dolomite, and marble are important resources in Arizona. The long term future for these industrial minerals is good. Limestones for cement and other construction uses, for production of lime and for quality dimension stone have the most attractive future due to probable market growth in the Southwest.

MAGNESITE-BRUCITE

Both magnesite and brucite are important for their magnesia content. Magnesium metal, although contained in both magnesite and brucite has not been extracted from those minerals for many years. Magnesium metal is instead extracted from magnesium salts recovered from brines.

Magnesite, when pure, contains 47.8% MgO and 52.2% CO_2. The pure mineral is sometimes, but rarely, found in transparent crystals resembling calcite. Magnesite may be either crystalline or amorphous. The crystalline form has a hardness of 3.5 to 4.0. The color may range from white to black with shades of yellow, blue, red, or gray. Crystalline magnesite is difficult to distinguish from dolomite. Cryptocrystalline magnesite is massive and resembles chert, but is distinguished from it by its lower hardness.

Brucite, $Mg(OH)_2$ contains 69% MgO and 21% H_2O. It is often associated limestone and/or magnesite. The mineral has a translucent appearance, is relatively soft, lightweight, has a hardness of 2.5 and a specific gravity of about 2.4. The color may be white, but it will often have a bluish or greenish cast.

Magnesite and brucite, when calcined at low temperatures (1,600°F), yield reactive or caustic-calcined magnesia that is used to make chemicals and cements. Magnesite when calcined at high temperatures (3,000° - 4,000°F) yield inert oxides known as dead-burned magnesite or periclase and is used to make refractories used in the cement, glass, steel, and copper industries.

Massive white brucite deposits occur at several places in a northwest-trending belt extending about one to six miles northwest of Oatman in Mohave County. It is doubtful any of these deposits have been mined for their magnesia content but some material may have been mined, transported to, and ground in Kingman for use as mineral filler.

A few deposits of brucite and none of magnesite are reported in Arizona. Although deposits are admittedly rare, the lack of reported occurrences may also be due to the difficulty of identification. Any large, markedly white, deposit of relatively soft mineral or rock material should be investigated in detail.

Many of the deep basins within the State's Basin and Range Province contain extensive evaporite deposits. Some may have the potential for the discovery of magnesium salts that might be produced as brines.

MICA

Mica is the general name applied to a group of complex hydrous potassium aluminum silicate minerals which share the common physical property of a perfect basal cleavage. All can be split into thin sheets having varying degrees of transparency, toughness, flexibility, and elasticity. Muscovite, sericite, phlogopite, biotite, and lepidolite are the most common mica minerals. Of these, muscovite and sericite and to a lessor extent phlogopite are the most important sources of commercial mica. Biotite, which is by far the least transparent of the micas finds only limited use as ground mica. Lepidolite is more important as a source of lithium than as commercial mica.

Crude mined mica is marketed in two general commercial classes: sheet mica and scrap mica (also known as flake mica). The classes vary so much in uses, production, form and price that they will be discussed separately.

Sheet mica is relatively flat and of sufficient size and free of structural defects such that it may be punched or trimmed into specified shapes. The minimum acceptable size of crude sheet mica is a piece from which a 3/4 inch circular disk can be punched. For most sheet applications the minimum size is one inch diameter. Uses of sheet mica are nearly all in the electrical-electronic industries where the material's excellent electrical insulation properties and resistance to heat are put to use.

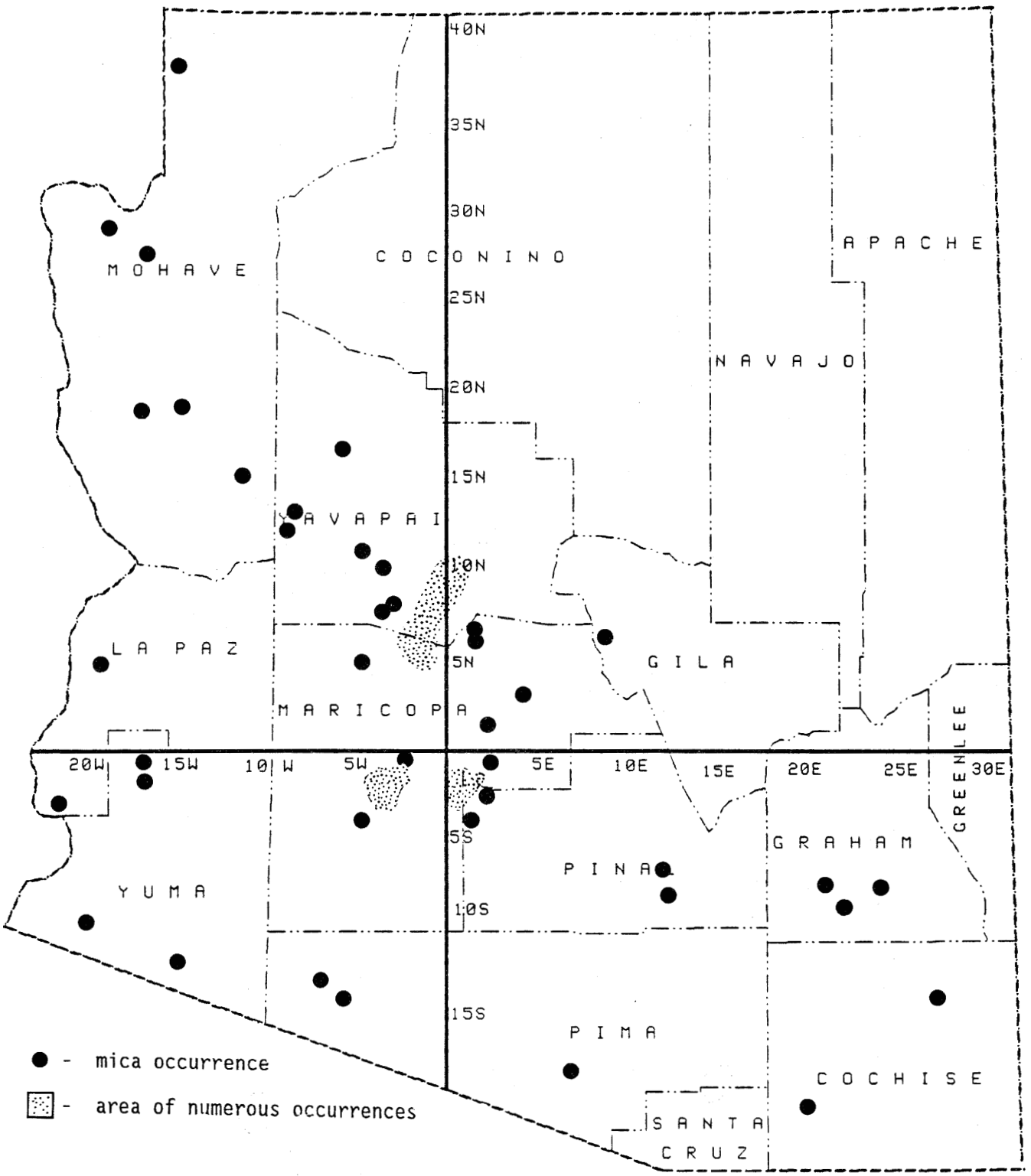


Figure 10. Locations of Arizona mica deposits.

These properties are effectively used even when the mica crystals are cleaved or "split" into film like sheets less than one thousandth of an inch thick. All sheet mica is produced from pegmatite deposits and typically as a co-product with the extraction of other economic pegmatite minerals. A very small quantity of sheet mica was produced in Arizona under war time conditions of supported prices and sold to a government agency operating under the name of the Colonial Mica Corporation.

There are many grades and classifications of sheet mica which command a rather wide range of prices based on differences in color, degree of preparation, sheet thickness and size, visual and electrical quality, and in the case of phlogopite, the degree of thermal stability.

Scrap mica is mica which for any of a number of reasons is unsuitable for use as sheet mica. Although most often specifically mined as scrap mica, it can be derived either from trimmings or from material otherwise rejected in the production of sheet mica. Ground mica is produced from scrap mica by any of a variety of wet or dry grinding methods. Ground mica is used in the manufacture of roofing materials, wallboard joint compound, oil well drilling mud, wallpaper, paint, rubber and molded electrical insulation. In 1983 joint cement accounted for 47% and paint 14% of the ground mica consumed.

Prices for sheet mica range from less than a dollar per pound up to a little over ten dollars per pound. On the other hand, prices for scrap and ground mica are given on a per ton basis and range from less than $50 per ton to a maximum of about $250 per ton.

Arizona mica deposits fall into three geologic categories: (1) mica schist deposits containing either sericite or muscovite/biotite; (2) pegmatite deposits and (3) sericite in hydrothermally altered vein and wall rocks. Mica schist deposits have been the most important sources of scrap mica production in Arizona. The small amount of sheet mica produced in the State has all been muscovite from pegmatite deposits in Mohave County.

Arizona has had mica production since at least 1936. Deposits in all but Coconino, Navajo and Apache counties have been mined to at least a small extent. Most production has been for scrap mica and has taken place primarily in Maricopa County and secondarily in La Paz(Yuma) County. During the period 1942-1948 a few hundred pounds of sheet mica was mined and purchased by the Colonial Mica Corporation.

Recent (circa 1980's) mica production in Arizona in exclusively scrap mica in the form of sericite from the Buckeye area of Maricopa County. It is ground for use in wallboard joint compound.

The potential for continued and additional mica production in Arizona is good. Arizona has both the deposits and the production history to justify such optimism. Statewide and West Coast markets show a continued interest in purchasing Arizona mica if it can be made available on a reliable basis and consistently meet required specifications.

PERLITE

Perlite is the name given to a glassy volcanic rock of rhyolitic composition that has a perlitic (onionskin or pearl-like) structure. Typical perlite contains 2 to 5 percent combined water and when heated to a specific temperature "pops" or suddenly expands like popcorn to produce a light weight cellular product that has many commercial applications.

When grains of crushed perlite are abruptly heated to the temperature of incipient fusion, their contained water

PERLITE, VERMICULITE, EXPANSIBLE SHALE

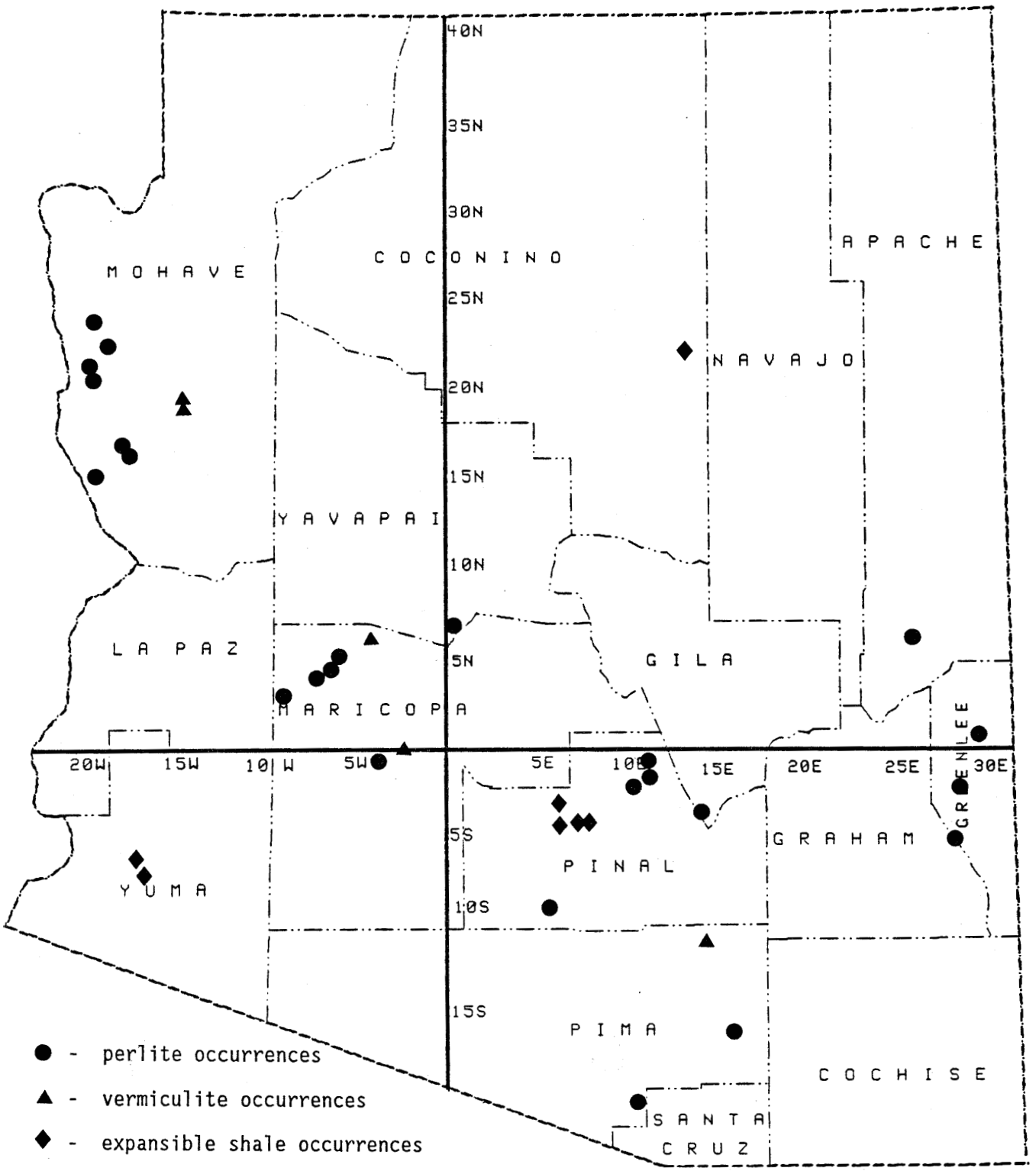


Figure 11. Locations of Arizona perlite, vermiculite and expansible shale deposits.

is converted to steam and they form light, fluffy, cellular particles. The volume of the crude perlite may be expanded 4 to 20 times at temperatures between 1,400° and 2,000°F. The time required ranges from a fraction of a second to many seconds. An increase in volume of at least 10 times is common. The optimum temperature at which a given perlite will "pop" depends on both its water content and its chemical composition. Variations in the composition of the glass affect the softening point, type and degree of expansion, size of the bubbles and wall thickness between them, and the porosity of the product. Further composition will affect whether the expanded material wi11 be fluffy and highly porous or a glazed glassy particle having a low porosity.

Expanded perlite is graded by bulk density. The most widely used grades range in bulk density from 7 to 15 pounds per cubic foot. Color, appearance and fluffy versus glassy are also important considerations in many end uses.

Expanded or "popped" perlite finds important uses in many products and industrial applications. The more important uses are in the construction industry for insulation, light weight concrete aggregate, acoustical plaster and tile, wallboard, and other formed products; in filter media; in agriculture as a fertilizer extender, insecticide carrier and soil conditioner; and as a filler for paper and plastic products, and a texturizer in paints and as an abrasive.

In the Basin and Range province of Arizona siliceous volcanic flow rocks of Cenozoic age (typically rhyolitic in composition) commonly contain segregations of volcanic glass but their popping characteristics (if they will pop at all) must be determined. Perlite occurrences have been identified in 9 of Arizona's 15 counties but production has been limited primarily to deposits in the Superior area of Pinal County. Popping plants have been operated intermittently in Arizona since 1946 but the large majority of the State's production has been shipped out-of-state as sized crude perlite. Additionally, one plant (in 1985) is popping perlite shipped in from New Mexico.

Known occurrences of perlite in Arizona offer opportunities for further exploration and development. Deposits in the Superior area are of sufficient extent to allow expansion of production capacity. The insulation and light weight characteristics of popped perlite should continue to spur demand for the commodity.

PUMICE AND PUMICITE (including some BASALT, VOLCANIC SCORIA AND CINDERS)

Pumice and pumicite are acidic, glassy volcanic materials having a chemical composition similar to that of rhyolite or dacite. They are often referred to as volcanic ash, dust, tuff, rhyolite sand and pumiceous rhyolite. Pumice differs from pumicite in mode of formation and textural characteristics. Both are normally white to light gray and are composed primarily of silica with lesser amounts of alumina, potash, soda, lime, magnesia and iron oxide. In general they are chemically inert, but can be reactive when in a very fine granular condition. Basalt, scoria and cinders, although significantly different in composition are included under this heading.

Pumice is a highly cellular, dull, glassy material. The open cavities or cells are separated by thin glassy walls. Due to its spongelike character, dry pumice is light in weight and many fragments and blocks of pumice will float on water. Pumice originates from molten lava that is highly impregnated with water vapor and other gases. The release of pressure

PUMICE, PUMICITE, VOLCANIC CINDERS, SELECTED BASALT

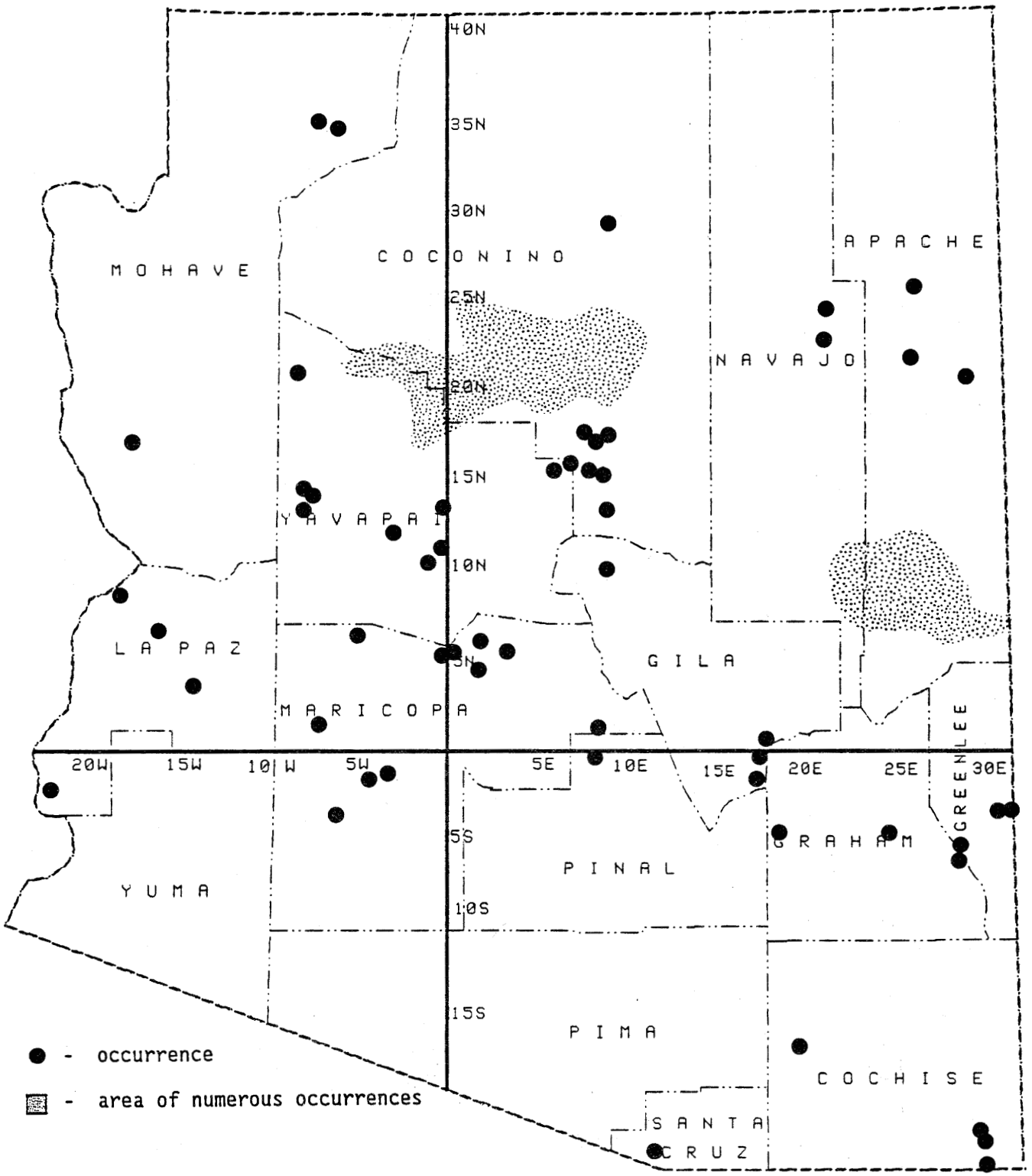


Figure 12. Locations of Arizona pumice, pumicite, volcanic cinders and selected basalt deposits.

upon extrusion of the lava allows the gasses to expand and the rapid cooling of the molten material preserves the mass of gas bubbles.

Silica rich lavas solidify at high temperatures and thus are found close to centers of volcanic activity. Deposits of pumice are found as irregular, lenslike bodies closely associated with other volcanic flows near major vents.

Pumicite, on the other hand, consists of finely divided, closely packed, angular, glassy, fragments ranging downward in size from about an eighth of an inch to extremely fine powder. Despite the fineness, pumicite will sink in water. It originates as volcanic ejecta, blown into the air by volcanic eruptions. The airborne particles are sorted in weight and size by gravity and wind and, after falling to the earth's surface, may be further classified by wind and water action. Thus pumicite may occur thinly spread over wide areas or in thick accumulations in local basins. In either case the deposition can be distant from the original source.

Pumice and pumicite are used both in the crude and processed form. The principle uses are for concrete aggregate and admixtures, decorative building blocks, landscaping, road construction and maintenance, and industrial abrasives. A variety of miscellaneous uses include diluents; absorbents (including pet litter and oil absorbing floor sweep); carriers for insecticides, herbicides, and fungicides; soil conditioners; fillers and extenders for paints and plastics; thermal insulation medium, roofing granules, and laundry scouring compounds.

Pumice occurs throughout much of Arizona, particularly in areas near major volcanic vents in some of the large areas underlain by Cenozoic basaltic flows. The quantity potentially available is very large. Pumicite occurrences are much less common and most Arizona deposits thus far identified have not been thick enough to support exploitation.

Characteristics of known pumice deposits vary widely. Material from each new deposit will require experimenting and testing to determine applicable uses.

Basalt includes the normally fine grained, dark colored igneous rocks consisting mainly of calcic feldspar and ferromagnesian minerals with little or no quartz. Textural varieties such as volcanic scoria and cinders have the chemical compositions of basalt but a texture and uses more similar to pumice.

Dense basalts are relatively heavy, tough, and durable. Color ranges from dull black to dark gray, greenish black or greenish gray. Weathering produces shades of red and brown.

Basalts normally occur as widespread extrusive masses, and exhibit smooth, wavy and ropy or rough, jagged, and clinkerlike surfaces. The term "malapais" (bad land) is applied to lava fields of the latter type. The upper parts of the flows and the volcanic ejecta are commonly vesicular with irregular open spaces constituting as much as 50% of the volume. These voids may be subsequently filled with quartz, opal, calcite, chlorite or zeolites. Vesicular basaltic rocks are called volcanic scoria or volcanic slag. Fragments of scoria less than 1 inch in diameter are called cinders.

Crushed and broken basaltic rocks, scoria and cinders account for almost all of the basaltic rocks produced. Where readily available they are important sources of concrete aggregate, roadstone, railroad ballast, riprap and cinder blocks. They are also used in cement manufacture, for road base filtration and filler, and in

making rockwool insulation. Volcanic scoria and cinders compete with sand and gravel as construction aggregate. Fused, cast basaltic lining and floor blocks, produced by controlled melting, molding, and annealing of high-alkali basalt, are finding favor where exceptional resistance to corrosion and abrasion is required.

The major center of commercial production of basaltic rocks has been from cinder cones around Flagstaff, Coconino County. For many years the Santa Fe Railway was the largest producer of cinders, most of which were used as railroad ballast. In the late 1970's this use was greatly reduced due to the abrasive nature of the cinders and dolomitic limestone was used in their place. Cinders have also been produced from the Flagstaff area as well as areas in Mohave, Navajo, Apache, Pima and Cochise Counties for highway maintenance, cinder blocks and light weight aggregate. Basalt has also been produced from Maricopa and Pinal Counties for the manufacture of rock wool insulation.

Arizona has plentiful resources of basalt. A major part of them is in large, generally scoriaceous, Cenozoic, lava flows which cover extensive areas in a belt across the central and southwestern part of the State. Individual flows range from a few hundred square feet to many square miles in surface extent and from a few feet to several tens of feet in thickness. Many of these basalt masses consist of several irregular and uneven coalescing flows that vary from place to place mineralogically and texturally and locally contain interbedded volcanic ash, agglomerate and erosional debris. The Quaternary basaltic areas are dotted with numerous cinder cones.

SALT

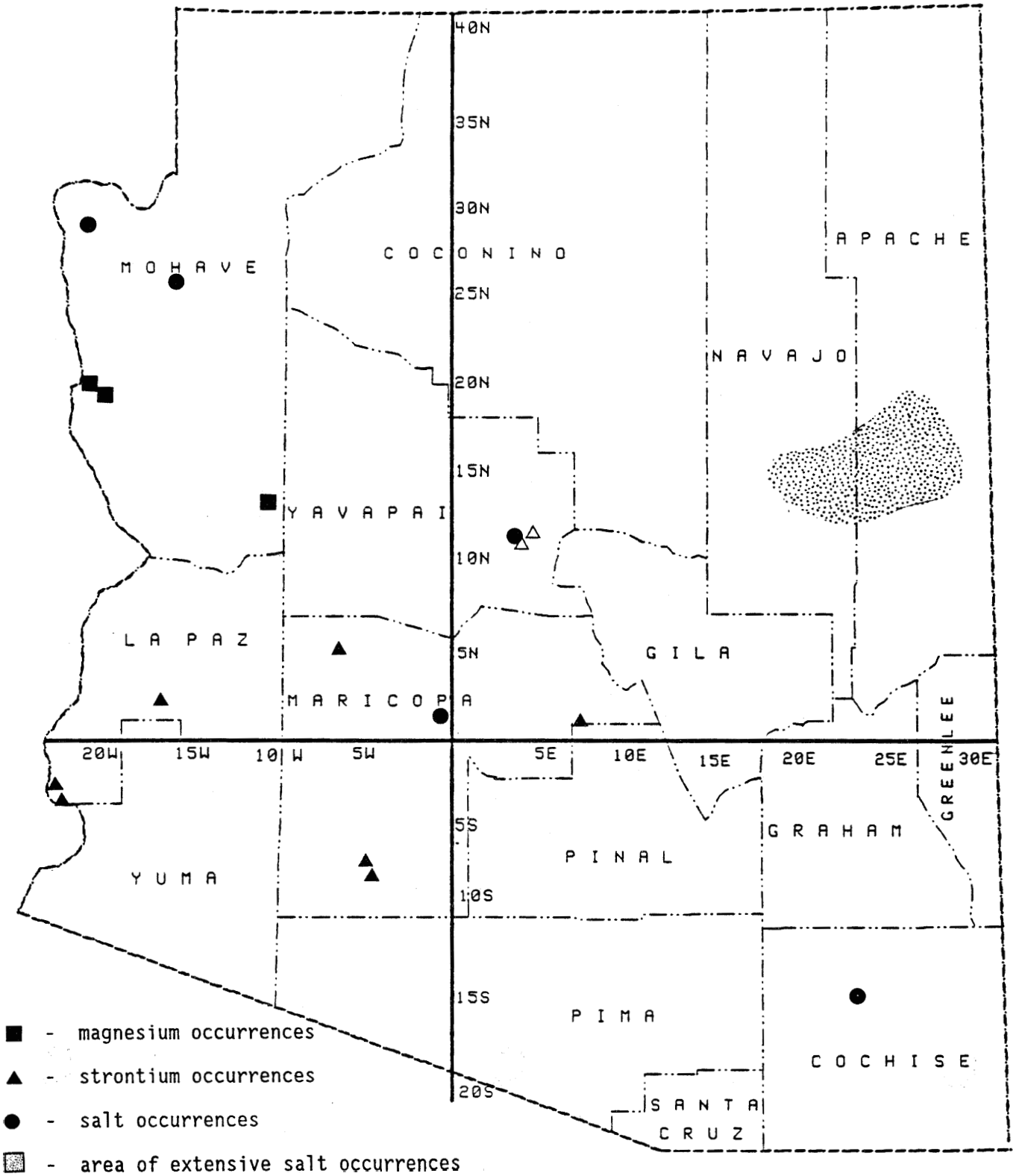
Salt is a word with a wide variety of meanings in the nomenclature of chemistry, mining and minerals. For the purpose of this publication its meaning will be limited to the mineral commodity - common salt or sodium chloride. Pure salt contains 39.34 percent sodium and 60.66 percent chlorine by weight. It normally forms cubical crystals which when pure are perfectly transparent. It is about 2.16 times heavier than water. A maximum of 30.4 parts of salt will dissolve in 100 parts of water at 32°F and will depress the freezing point of the thus formed water brine 38F° to minus 6°F. Salt in nature typically contains 1 to 4 percent impurities.

Salt is mined or quarried as rock salt, recovered as evaporated salt from brines by evaporation in kettles or pans and produced as solar salt by crystallization from evaporation from brines in shallow ponds by sun and wind.

By far the largest use of salt is in the chemical industry where it is used in the production of chlorine and caustic soda along with many other chemicals. Second in importance is its use for de-icing of roads. Food processing uses less than 10 percent of total consumption and use as table salt amounts to less than 3 percent of consumption. Other important uses include livestock feed, paper processing, metal processing, petroleum refining, and other manufacturing processes.

Common salt occurs as crystalline deposits of rock salt and in natural solutions in subterranean brine pools, surface brine pools and lakes and in the oceans. Salt is widely distributed in Arizona and occurs in many surface and subsurface waters as well as in deposits as crystalline rock salt. Rock salt has been mined in Yavapai County from deposits in the Verde Valley. Salt is currently

SALT, SODIUM SULFATE, MAGNESIUM, STRONTIUM



■ - magnesium occurrences

▲ - strontium occurrences

● - salt occurrences

▒ - area of extensive salt occurrences

A - sodium sulfate occurrences

Figure 13. Locations of Arizona salt, sodium sulfate, magnesium, and strontium depsoits.

(1987) being produced in Maricopa County from the Luke Salt deposit by solution mining and solar evaporation-. Large buried deposits of salt have been partially explored in Mohave, Navajo and Apache Counties. These deposits could support very large solution mining - solar evaporation type operations or be developed for underground storage of petroleum or disposal of radioactive wastes.

SAND (SPECIALTY)

Sand is a generic term for mineral particles of a size greater than 1/16 millimeter and smaller than 2 millimeters. It is generally quartz, but can be any mineral or combination of minerals. Specialty sand, also known as industrial sand is sand which is consumed in products or processes other than as a part of the aggregate for concrete, mortars or stuccos. Specialty sand might also be of any mineral, but it is typically quartz. Specialty sands of other minerals include feldspathic sand, zircon sand, magnetite sand and glauconite sand.

Specialty sands are defined by their use. The most important specialty sands are: abrasive sands for sandblasting, glass grinding, and stone sawing; glass sand for the manufacture of glass; chemical sand for manufacture of sodium silicate (water glass), silicon carbide (carborundum), silicones, gels and other chemicals; metallurgical sand for silicon alloys, silicon metal and reduction of phosphate rock; refractory sand for foundry molds and furnace linings; coal washing sand; filter sand; hydrofrac sand (spheroidal sand particles injected into oil producing strata to maintain production); standard testing sand and friction sand. Natural sand, as well as that produced by mineral processing operations may be used in special land treatment applications such as sand traps for golf courses. Sands of various colors and textures also have numerous decorative and landscaping applications. Each use has specific standards some of which fall in a very narrow range.

The source of most specialty sands is from the disintegration of sandstones and the natural classification of the resulting alluvial material by wind and water. Currently (1985) a specialty sand is produced near Sanders in Apache County. It is processed for use as hydrofrac sand and for sandblasting.

Extensive sand deposits occur in Apache and Navajo Counties and possibly in other ares. In Apache and Navajo Counties the sand is unconsolidated, fairly coarse grained, well rounded and sized, and is nearly pure quartz. As industries continue to locate in Arizona a local market may develop for specialty sand which could be met by additional production or new discoveries of Arizona deposits.

Large accumulations of mill tailings exist at numerous sites throughout the State. Some consist primarily of quartz, while others are a mixture of nonmetallic and metallic mineral particles.

SHALE (EXPANSIBLE)

Shale is commonly defined as a moderately hardened or cemented, laminated sedimentary rock composed primarily of mineral particles in the sizerangeof clay or silt. When used with reference to raw material for the production of lightweight aggregate however, the phrase "expansible shale" ordinarily includes virtually any fine-grained sedimentary or metasedimentary rock that expands when heated under suitable conditions. So called common shale and more massive rocks such as claystone and slate are included as expansible shale provided they will expand when heated.

SILICA QUARTZ, SPECIALTY SAND

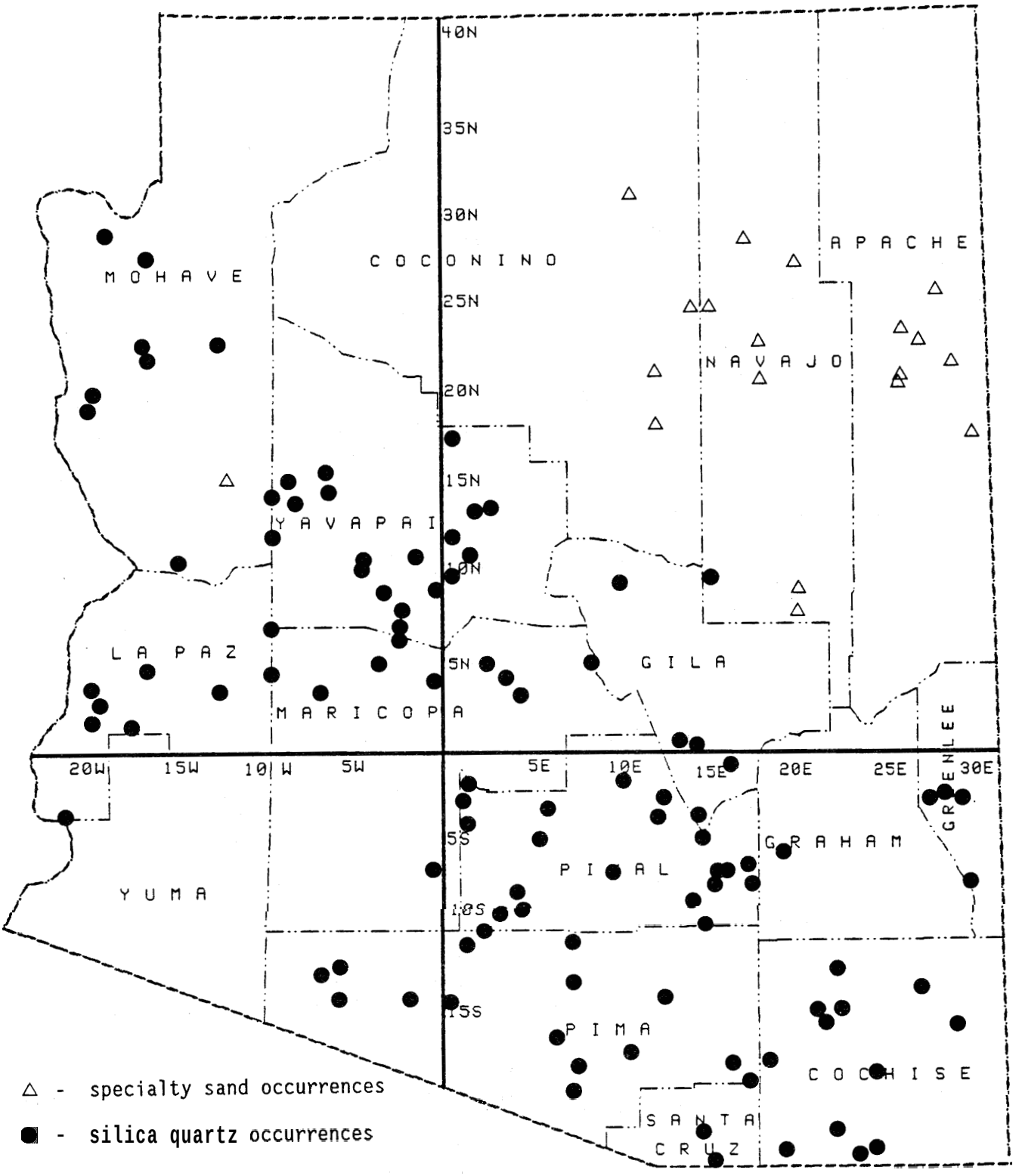


Figure 14. Locations of Arizona silica quartz and specialty sand deposits.

The shale particles expand when they reach the temperature where melting of the particle has just begun. At this point any gasses which are generated within the particle will expand and form a series of small cavities within the particle. The expansion will continue until the glass which is being formed becomes fluid enough to allow the gas to escape. Beyond this stage, the particle will melt completely and form a dense, heavy glass. The expansion characteristics of a particular shale is determined by a number of factors, the most important of which is the mineralogical make-up of the shale. The most important requirement of any expansible shale is that fusion and gas formation progress together through the range of temperatures at which expansion takes place.

Expanded shale is used as a lightweight aggregate in the manufacture of concrete products. It is used in the manufacture of concrete blocks, monolithic concrete structures, and a variety of prefabricated and prestressed concrete products such as roof, floor and wall panels, structural beams, silos and water tanks. Expanded shale accounts for the largest portion of all lightweight aggregates used.

Shale with expansion properties is reported from only a few localities in Arizona. Occurrences have been identified in Coconino, Pinal and Yuma counties. Although only a very few occurrences have been reported it is doubtful that all outcrops of potential material have been tested in Arizona.

SILICA - QUARTZ

Quartz is the most common mineral in the earth's crust. It is silicon dioxide (SiO_2), also known as silica, and ranges from coarsely crystalline to cryptocrystalline. Quartz is normally colorless or white but it also occurs in a wide variety of colors due to included impurities. When crystalline, the usual form is a hexagonal prism with pointed terminations. Quartz is hard and will readily scratch glass, is extremely durable, has a vitreous luster like glass, and breaks with a conchoidal fracture. Quartz is an important constituent of many common rocks and the sole mineral in quartzite - a metamorphic quartz sandstone. Quartz generally predominates in mineral veins and as a gangue mineral in ore deposits and it is the principle mineral constituent in most sand, gravel and soil.

Quartz is utilized as natural crystals, crushed quartz and quartzite, as fine ground silica and as naturally occurring quartz sand. (Quartz/silica sand is discussed under SAND-SPECIALTY.)

The optical and piezoelectric properties of quartz crystal make it indispensable for high quality lenses, lens components, wedges, plates, and prisms; and for accurate frequency control in communication, time control and other electronic devices, These uses require the best colorless and defect free quartz crystals. For most optical and electronic uses cultured quartz crystals are used. "Lascas" is the SiO_2 feed stock material needed for cultured quartz crystal production. "Lascas" is quartz crystal and crystalline material of extreme chemical purity but with some structural and/or clarity defects. Quartz in the form of fused silica glass is used for optical applications. Both lascas and clean quartz sand are the raw materials used by most manufacturers of silica glass.

Mine run and crushed quartz of relative high purity (+97%) is used as raw material for production of silicon "metal" and ferrosilicon. Quartz and quartzite of lesser purity and quartz vein material containing base and precious metals is used as

metallurgical flux in copper smelters. Siliceous metallurgical flux should contain at least 70% silica and be low in alumina and iron. Crushed or powdered quartz and quartzite are used in "flint" sandpaper, scouring compounds, and abrasive metal polishes. Hard, tough quartz and quartzite are used as grinding pebbles and linings in tube and ball mills where a colorless and inert grinding medium are needed.

Small quantities of quartz crystal have been found in a number of Arizona localities but no sources have been developed that could thus far produce high quality crystals that could be extracted intact and economically. Quartz for the ceramic industry, abrasives, and the production of silicon has been produced from deposits north of Kingman in Mohave County.

The majority of quartz and quartzite produced in Arizona has been used for metallurgical flux by the State's copper smelters. Smelters prefer siliceous flux which contain copper or precious metal values. However, in recent years a consistent supply of such material has not been available and most of the smelters have developed local supplies of barren quartz or quartzite.

Arizona contains many occurrences of quartz and quartzite. Most have not been adequately evaluated for industrial uses. Most metal bearing quartz veins which are exposed at the surface have been evaluated as metal deposits. The lack of available grinding facilities has hindered the search for and development of industrial deposits other than for siliceous flux.

SILLIMANITE GROUP

The sillimanite group (also known as the kyanite group) of minerals includes the aluminous silicate minerals kyanite, sillimanite, andalusite, dumortierite and topaz. These minerals all contain about 60 percent alumina and are used to manufacture various types of high temperature ceramic materials. These minerals are all converted at high temperatures to the compound mullite ($3Al_2O_3.2SiO_2$). Mullite has the ability to withstand high temperatures and abrupt temperature changes.

The principal products in which the sillimanite group of minerals is used are high temperature refractories for use in metallurgical and glass furnaces and certain types of kilns and boilers. Metallurgical uses in the iron and steel industry include blast furnace linings and molten metal handling equipment. Uses in the nonferrous metallurgical industry include high temperature linings in alumina reduction cells. Mscellaneous uses include kiln furniture, brake linings, blown high temperature insulation, ceramic tile, spark plug insulators (the original use - just after the turn of the century), grinding media, extrusion dies and welding rod coatings.

In Arizona all reported occurrence of sillimanite group minerals occur in what have been considered to be areas of Precambrian metamorphic rocks. Kyanite has been produced from a deposit in Maricopa County. Dumortierite has been produced for the lapidary industry from an occurrence in Yuma County. The information currently available is insufficient to show whether any deposits in Arizona are of the size and quality required to have economic value. Promising occurrences must be explored thoroughly to determine if quality and size of reserves are adequate to justify development.

SILLIMANITE

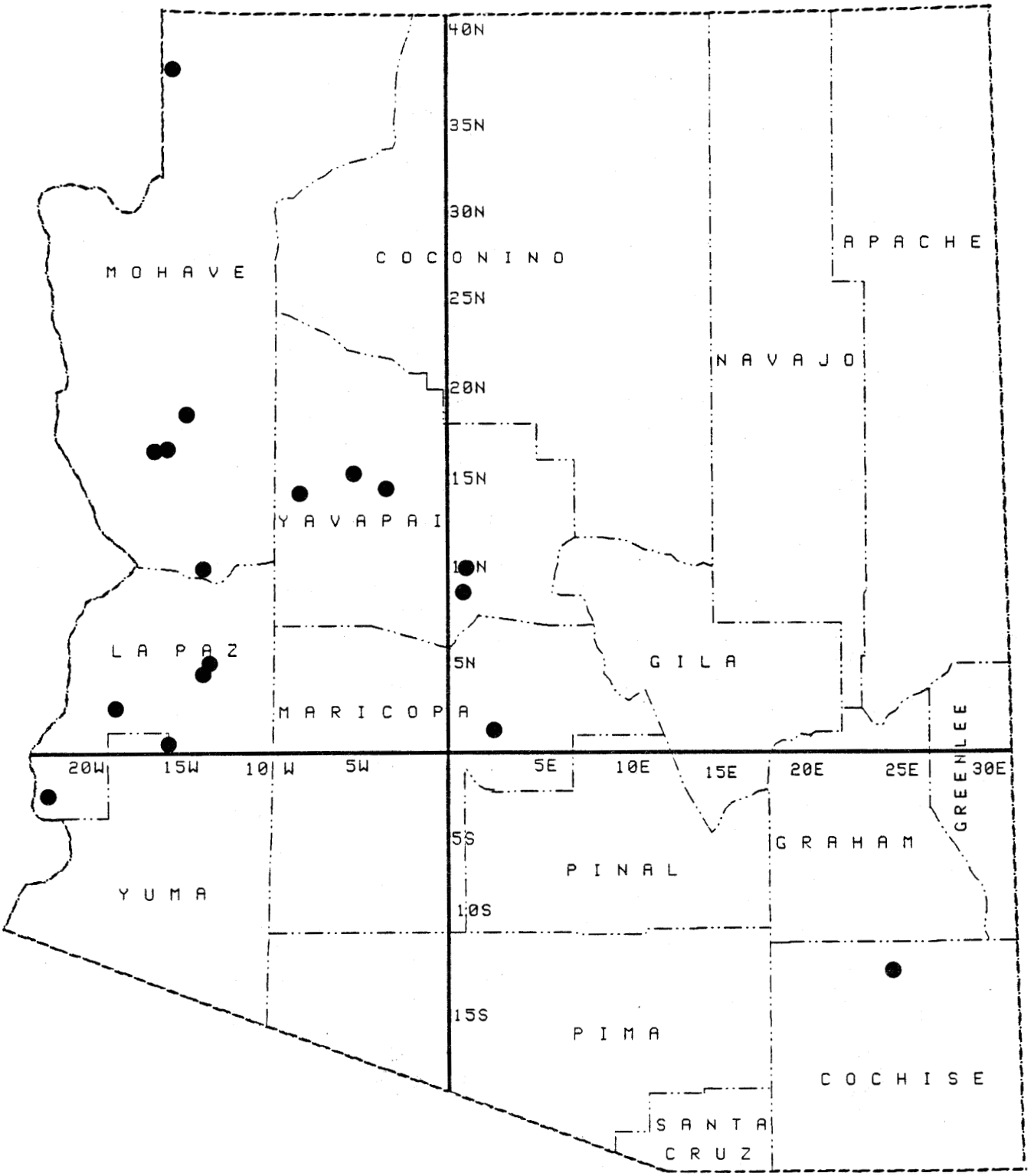


Figure 15. Locations of Arizona sillimanite deposits.

SLATE

Slate is a fine-grained, argillaceous, metamorphic rock having a natural, well-developed cleavage in one plane which permits the stone to be split into thin, smooth plates. Slate originates from the compaction of clay and shale beds by the weight of overlying sediments or by the induration of the beds by heat and pressure. Slate may have a wide variation in chemical and mineralogical composition. The main constituents are usually quartz, sericite, chlorite, and sometimes graphitic or carbonaceous matter. Slate is dark gray to black but red, brown, yellow and purple colors are also common and caused by the iron content. Some slate is green, which is caused by chlorite. Slate is firm but soft enough to be readily cut and shaped.

Historically dimension slate was used for roofing, blackboards, electrical panels, laundry tubs and sinks and floor tile. It is used as flagging, but such use as dimension stone is beyond the scope of this report.

Crushed and broken slate is used for lightweight aggregate production, granules for composition materials, and slate flour for filler.

Slate has been quarried in Arizona at intermittent periods in the past. It is currently being quarried north of Phoenix for use as a binder-filler in the manufacture of vitreous clay pipe.

Slate of good quality for speciality uses such as flooring and structural uses in believed to be scarce in Arizona. Most occurrences are actually phyllite and argillaceous rocks intermediate in metamorphic grade between slate and schist or mica slate of poor structural quality.

Arizona has potential to develop additional slate deposits for markets which utilize crushed or ground slate.

SODIUM SULFATE

The principal sodium sulfate minerals are thenardite (Na_2SO_4), mirabilite or glauber salt ($Na_2SO_4.10H_2O$), and glauberite ($Na_2SO_4.CaSO_4$). The primary uses of sodium sulfate are in the digestion of pulp-wood used in the craft paper and as a filler in laundry detergents. Other uses include the manufacture of sodium-based chemicals, and in ceramics, dyes, animal feed supplements, inks and sulfonated oils. Sodium sulfate is produced from brines and as a byproduct of various chemical processes. Historically it has been produced from crystalline evaporite deposits.

In Arizona, the only known sodium sulfate deposit of significant size occurs in the Verde formation 1.5 miles southwest of Camp Verde in Yavapai County. This deposit was mined in the early 1930's.

STRONTIUM

Strontium is an alkaline earth metal closely related to calcium. In metallic form it is used in limited quantities in electronic devices. The majority of uses for the element are in the form of one or more of its salts.

The most important strontium salts are the carbonate ($SrCO_2$), the nitrate and the natural sulfate (celestite-$SrSO_4$). The major use of strontium (in the form of strontium carbonate) is in the manufacture of color television picture tubes where it is added to the glass to provide radiation shielding of the television screen. Strontium (in the form of strontium nitrate) is used for the brilliant red color which strontium imparts to a flame. Such uses include military and civilian signal flares and in pyrotechnics for entertainment.

In Arizona, two deposits of celestite of possible commercial interest are known, both are located in Maricopa County. In much of southwestern Arizona the geologic conditions are similar to those at the two known deposits, and, therefore, are considered favorable for the occurrence of celestite. Currently (1987) all of the United States' strontium needs are imported. There has been some renewed interest in developing domestic deposits, and Arizona deposits might make good prospecting targets.

VERMICULITE

Vermiculite is a micaceous hydrated silicate formed by the low temperature alteration of other sheet mica minerals, chiefly biotite. The mineral rapidly expands upon heating to produce a low-density material. The term "vermiculite concentrate" denotes the mined ore that has been beneficiated and sized. The exfoliated product is also called vermiculite. The phenomenon of exfoliation, which causes vermiculite's bulk to increase up to 12 times, is dependent upon conversion of some of its water of hydration into steam which, in turn, forces the laminae apart in the direction perpendicular to the cleavage planes to form an accordion like product. Exfoliation occurs over a temperature range of 800° to 2,000°F and is completed in no more than a few seconds. Exfoliated vermiculite is incombustible and retains its thermal insulating properties to 2,000°F.

The principal uses of exfoliated vermiculite are as lightweight aggregates, thermal insulation, agricultural soil supplements and as carriers, fillers and extenders. Although no vermiculite is currently (1987) mined in Arizona, there are two plants in Maricopa County which produce exfoliated vermiculite from out of state material; one, as a constituent of plant-growing medium (potting soil) and the other as insulation material.

Vermiculite occurs intermingled with other rock-forming minerals in many igneous and metamorphic rocks. Most commercially important vermiculite deposits appear to have been formed by alteration of pyroxenes, amphiboles and olivine in igneous and metamorphic ultramafic rocks by solution and volatilization from intrusive syenites, carbonatites and pegmatites to form biotite, phlogopite, serpentine and chlorite. Supergene alteration by circulating ground waters later removed the alkalis, redistributed magnesium, and added water as interlayered molecules to form vermiculite.

Comparatively little is known about possible commercial vermiculite deposits in Arizona. A few deposits have been discovered and tested, but no commercial production has yet (1987) been made. Deposits have been identified in Maricopa, Mohave and Pinal Counties.

A commercial vermiculite deposit should contain 30% to 50% vermiculite, little or no biotite, and good sized flakes with few fines. Chemical composition is of little value in determining the expansion characteristics of vermiculite; exfoliation tests provide the only satisfactory evaluation. In prospecting for vermiculite, the material can be identified by heating it with a candle flame or match.

Arizona currently (1987) has a stable vermiculite exfoliation industry based on out of state material. This industry should provide a market for a quality vermiculite concentrate produced within the State.

ZEOLITES

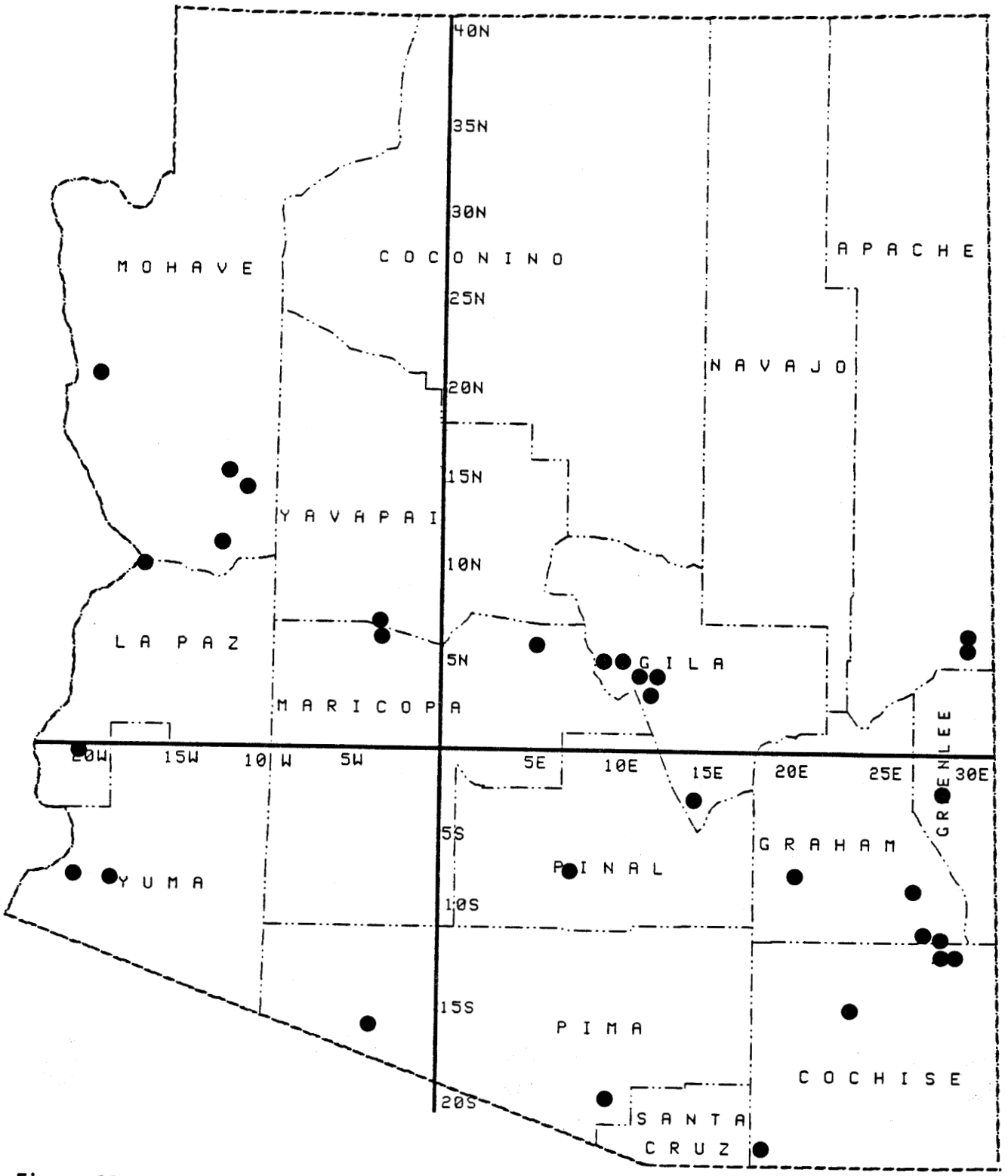


Figure 16. Locations of Arizona zeolite deposits.

WOLLASTONITE

Wollastonite is a calcium metasilicate with a chemical composition of $CaSiO_3$. It is seldom found in a pure state due to the ease with which it takes into solution the metasilicates of manganese, magnesium, iron and strontium. It is commonly associated with garnet, diopside, epidote, calcite and quartz. It has a specific gravity of 2.8 to 3.0, and a hardness of 4.5 to 5 on the Mohs scale. When pure, it has a brilliant white color, but with impurities it may be grayish or brownish.

The ceramic industry is the major consumer of wollastonite in the manufacture of tile. Important quantities are also used for fillers, extenders and whiting agents in paints and plastics. Only wollastonite with a brilliant white color is usable in most applications. Wollastonite has been used to produce mineral wool insulation.

Wollastonite is a contact metamorphic mineral occurring within impure limestones near intrusive bodies of granite or other acidic rocks. It can be formed by metasomatism of calcareous sediments and by crystallization of certain magmas. Wollastonite, garnet and diopside often occur together in skarn deposits. Arizona occurrences of wollastonite at or near contacts between intrusives and limestone are reported from Cochise, Gila, Pima and La Paz Counties.

ZEOLITES

Zeolites are a collective name for a group of over 30 minerals which are hydrated aluminosilicates of the alkali and alkaline earth elements. They have a frame work structure that encloses inter-connected cavities occupied by the relatively large cations and water molecules. The cations and water have considerable freedom of movement which give the zeolites their cation exchange and reversible hydration properties. The porous character of the zeolites enables them to act as molecular sieves for the separation of molecular mixtures based on the size and shape of the molecular compounds or for the selective adsorption of gases.

These unique properties suggest diverse industrial uses in processes such as purification and drying of gases and liquids, chemical separations, catalysis, solar energy, and decontamination of water treatment plant effluent and radioactive wastes.

Most zeolites used by industry are produced synthetically. Natural chabazite is currently (1987) being mined near Bowie in Cochise County. A zeolitized tuff is currently mined near Wickenburg and processed for odor absorbents. Future development of other known Arizona zeolite deposits is likely as industrial uses and processing becomes more widespread. Zeolite minerals, uses, geology, analytical methods, mining operations and Arizona occurrences are discussed in detail in the revised edition of ARIZONA ZEOLITES by Ted H. Eyde to be published in early 1988 as Arizona Department of Mines and Mineral Resources Mineral Report No. 5. Reported Arizona deposits contain one or more of the following zeolites: clinoptilolite, chabazite, mordenite, phillipsite, analcime and erionite.

ABRASIVES (NOT OTHERWISE CLASSIFIED)

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
NAVAJO COUNTY			
Winslow, Joseph City, & Holbrook Areas	Winslow 15' Joseph City 15' Holbrook 15' Clear Creek Reservoir 7.5' Hibbard 7.5'	No Name Group	Reported wide spread scattered chert pebbles suitable for grinding uses.

ALUNITE

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
GILA COUNTY			
Secs. 23 & 24 1N,15E	Globe 7.5'	Old Dominion Mine	Reported alunite, kaolinite masses, some halloysite in fractured quartz monzonite.
GRAHAM COUNTY			
Sec. 26 5S,26E	Safford 15'	Terra Firma	Vein of alunogen normal to contact between andesite and rhyolite.
LA PAZ COUNTY			
Secs. 3 & 4 3N,20W	Middle Camp Mtn. 7.5'	Sugarloaf Peak	White alunite veins in schistose dacite.
SANTA CRUZ COUNTY			
Set. 36 22S,15E	Nogales 15'	Three R, Evening Star Prospect	Pinkish alunite, quartz, pyrite, chalcopyrite in pegmatitic granite.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
COCHISE COUNTY			
Sec. 34 17S,23E	Pearce 15'	Abril Zinc Mine	Chrysotile asbestos in Permian limestone; a noteworthy mineral occurrence in a zinc-copper deposit.
COCONINO COUNTY			
Sec. 22 33N, 1W	Havasupai Point 15'	Bass Asbestos	Small production of 4" asbestos fiber from veins in limestone intruded by diabase.
Sec. 27 31N, 4E	Vishnu Temple 15'	Hance	Asbestos associated with serpentine alteration resulting from intruded diabase dikes.
GILA COUNTY			
Secs. 34 & 35 8N,14E	McFadden Peak 15'	Cherry Creek, Buckhorn	Past production; chrysotile veins in Mescal Limestone.
Secs. 19, 20, 29 & 30 8N,15E	Young 15'	Walnut Creek, Wilson Creek, Arizona Asbestos Group, Tony, Wolf Spring Group	Past production, chrysotile asbestos veins in Mescal limestone in Precambrian formation intruded by diabase sills.
Secs. 27 & 35 8N,15E	McFadden Peak 15' Young 15'	Sloan Creek Group, Kyle Asbestos	Past production.
Sec. 24 7N, 15E	McFadden Peak 15'	White Hill	Past production.
Sec. 13 7N,15.5E (proj.)	Blue House Mtn. 15'	Double Buttes	Past production; crysotile asbestos in Mescal limestone intruded or cut by diabase dikes and sills.
Sec. 14 7N,15E	McFadden Peak 15'	Tank House Creek	
Sec. 20 7N, 12E	Picture Mtn 7.5'	Independent	Crysotile asbestos with serpentine in limestone intruded by diabase.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
GILA COUNTY (CONT.)			
Secs. 4 & 5 7N, 14E (proj.)	McFadden Peak 15'	Bore Tree Saddle, Ash Creek	Past production.
Secs. 10, 11 14 & 15 7N, 15E	McFadden Peak 15'	American Fiber Group, Rock House, King, Many, Montezuma	Past production; chrysotile asbestos.
Sec. 10 7N, 15E	McFadden Peak 15'	Pierce Mine	Past production.
Sec. 15 7N, 15E	McFadden Peak 15'	May Mine	Past production.
Secs. 7, 8, 17 & 18 6N, 14E	McFadden Peak 15'	Rosa Group	
Sec. 15 6N, 14E	McFadden Peak 15'	Lucky Strike, Metate Mine	Past production.
Sec. 22 6N, 14E	McFadden Peak 15'	Pueblo	Past production.
Secs. 29 & 30 5N, 19E (proj.)	Carrizo SE 7.5'	Stansbury Mine, K & M Lease	Past production; asbestos veins in Mescal Limestone, adjacent to diabase sill.
Secs. 7 & 8 5N, 17E	Blue House Mtn. 15'	Apache Mine, Seven Star, McIntyre Mine	Past production; chrysotile asbestos veins in limestone near diabase sill.
Sec. 7 5N, 17E	Blue House Mtn. 15'	Apache Extension	Asbestos-bearing serpentine in limestone.
Sec. 8 5N, 17E (proj.)	Blue House Mtn. 15'	Loey & Lena	Asbestos bearing zone, algal limestone.
Sec. 12 5N, 16E	Blue House Mtn. 15'	Fiber King, Salt Bank, Riverside	Past production; asbestos zone in massive bedded limestone in Mescal Limestone.

ASBESTOS

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
GILA COUNTY (CONT.)			
Sec. 21 6N, 14E	McFadden Peak 15'	Reynolds Creek, Reynolds Fall	
Secs. 19 & 20 5N, 14E	McFadden Peak 15'	Asbestos Peak, Pocket Creek, Loafer Claim, Zimmerman Dome, Old Knighton Property	Past production; asbestos veins in algal Mescal Limestone.
Sec. 32 5N,14E	Rockinstraw Mtn. 15'	Friday Claim, Globe and Miami Group	Small past production; short, good quality chrysotile fiber with serpentine in limestone intruded by diabase; also contains magnetic zone.
Sec. 24 5N, 16E (proj.)	Blue House Mtn. 15'	Regal Group, Corral Creek	Past production, asbestos bearing zones within Mescal Limestone.
Sec. 32 4.5N,17E (proj.)	Chrysotile 7.5'	Little Favor Group	Chrysotile asbestos in Mescal Limestone intruded by diabase dikes and sills.
Sec. 33 5N, 17E	Blue House Mtn. 15'	Phillips Mine, Grandview Mine	Past production of chrysotile asbestos in Mescal Limestone intruded or cut by diabase dikes or sills.
Sec. 28 5N,17E	Blue House Mtn. 15'	Canadian, Ladder	Past production; chrysotile asbestos in Mescal Limestone intruded or cut by diabase dikes and sills.
Sec. 34 4.5N,17E	Chrysotile 7.5'	Victory Mine, El Dorado Mine, Chrysotile Mines	Past production from chrysotile veins within serpentine layers of dolomitic Mescal Limestone.
Sec. 30 5N, 18E	Beckers Butte 7.5'	Snake Hill Mine	

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
GILA COUNTY (CONT.)			
Sec. 30 5N, 17E	Blue House Mtn. 15'	Bluff Mine	Asbestos bearing zones in Mescal Limestone beneath diabase sill.
Secs. 22 23 & 24 5N, 17E	Blue House Mtn. 15'	Enders Mine, Horseshoe, White Tail	Asbestos veinlets in serpentine zone of Mescal Limestone intruded by diabase sill.
Sec. 20 5N, 18E	Beckers Butter 7.5'	Roadside Mine, Prochnow	Asbestos veinlets in algal Mescal Limestone adjacent to diabase sill.
Sec. 30 5N, 18E	Beckers Butte 7.5'	Wonder Claims, Silk Claims	
Sec. 31 5N,18E (proj.)	Beckers Butte 7.5'	I.S. Hole Canyon	
Sec. 35 5N, 17E	Blue House Mtn. 15'	Great View Mine	Chrysotile asbestos in Mescal Limestone intruded or cut by diabase dikes and sills.
Sec. 25 5N, 18E	Beckers Butte 7.5'	Dream Girl, Soren-Williams	
Sec. 35 5N,17E (proj.)	Blue House Mtn. 15'	Emsco Property, Accident Claims	Past production; Chrysotile asbestos in Mescal Limestone intruded or cut by diabase dikes and sills; wollastonite has been reported.
Sec. 34 5N, 17E (proj.)	Blue House Mtn. 15'	Pinetop Mine	Past production; harsh fiber asbestos lenses in Mescal Limestone.
Sec. 29 4.5N,18E	Beckers Butte 7.5'	Sulphur Springs Claim	
Sec. 20 4.5N,18E	Beckers Butte 7.5'	Asbestos Prospects	Asbestos bearing serpentine in Mescal Limestone.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
GILA COUNTY (CONT.)			
Sec. 11 2N,19E	Cassadore Spring 7.5'	Bear Canyon Mine	Past production; asbestos bands in limestone, over and underlain by diabase sills.
Sec. 30 2N,19E	Natural Corral 7.5'	Cassadore Property, Black Mesa	Harsh fiber; chrysotile asbestos in Mescal Limestone intruded or cut by diabase dikes and sills.
Sec. 2 2N,19E (proj.)	Cassadore Spring 7.5'	Upper Bear Creek	Asbestos bearing limestone bounded by diabase.
Sec. 17 2N,20E	Sontag Creek 7.5'	Prospect West of Blue River	Chrysotile veinlets in Mescal Limestone.
Sec. 24 1N,18E	Natural Corral 7.5'	Oak Creek	Asbestos occurrence in limestone.
Secs. 19 & 30 1N,17E	Dourine Canyon 7.5'	Apache Claims	Past production, asbestos zone in Mescal Limestone underlain by diabase sill.
Sec. 1 2N,14E	Rockinstraw Mtn. 15'	G & H Prospect	Asbestos serpentine zone within limestone.
Sec. 34 2N, 14E	Inspiration 7.5'	Chuckwalla	Chrysotile asbestos in Mescal Limestone intruded or cut by diabase dikes and sills.
Sec. 1 1N,13E	Haunted Canyon 7.5'	North American	
Sec. 9 2S, 17E	Cutter 7.5'	Chiricahua Prospect	Asbestos serpentine zone parallel to Mescal Limestone bedding.
Sec. 9 2S,17E	Cutter 7.5'	Mystery Prospect	Asbestos serpentine zone in Mescal Limestone.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
GILA COUNTY (CONT.)			
Sec. 20 2S,17E	Mescal Warm Spring 7.5'	Red Whiskers Spring	Asbestos outcrops in algal Mescal Limestone.
Sec. 26 5N,16E	Blue House Mtn. 15'	Fourth of July Blue Eyes Group	Past production, asbestos veins in algal limestone.
Sec. 35 8N, 15E	McFadden Peak 15'	Aileen & Cowboy Claims	Past producer; chrysotile asbestos in Mescal Limestone intruded or cut by diabase dikes and sills.
Sec. 21 4.5N,17E	Blue House Mtn. 15'	Alamo Prospects, Poor Mining Co., Alamo Asbestos	Chrysotile asbestos in Mescal Limestone intruded or cut by diabase dikes and sills.
Secs. 19 & 20 5N, 14E	McFadden Peak 15'	American Ores, Asbestos Peak Property	Chrysotile asbestos in Mescal Limestone intruded or cut by diabase dikes and sills.
Sec. 13 2S,15E	Pinal Peak 7.5'	Asbestos Claims	Chrysotile asbestos in Mescal Limestone intruded or cut by diabase dikes and sills.
Sec. 28 2N, 19E	Sontag Creek 7.5'	Asbestos Deposit 21	Chrysotile asbestos in Mescal Limestone intruded or cut by diabase dikes and sills.
Sec. 35 3N,19E	Sontag Creek 7.5'	Asbestos Deposit 23	Chrysotile asbestos in Mescal Limestone intruded or cut by diabase dikes and sills.
Sec. 31 5N, 19E	Beckers Butte 7.5'	Asbestos Prospect	Asbestos bearing serpentine in Mescal Limestone above intruded diabase sill,

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
GILA COUNTY (CONT.)			
Sec. 2 2N,18E	Sontag Creek 7.5'	Asbestos Prospect 20	Chrysotile asbestos in Mescal Limestone intruded or cut by diabase dikes and sills.
Sec. 28 2N, 19E	Sontag Creek 7.5'	Asbestos Prospect 22	Chrysotile asbestos in Mescal Limestone intruded or cut by diabase dikes and sills.
Sec. 2 1N,14E	Inspiration 7.5'	Asbestos Prospects	Chrysotile asbestos in Mescal Limestone intruded or cut by diabase dikes and sills.
Sec. 8 1N,16E	Cammerman Wash 7.5'	Asbestos Queen	
Sec. 32 5N, 14E	Rockinstraw Mtn. 15'	Black Diamond	Chrysotile asbestos in Mescal Limestone intruded or cut by diabase dikes and sills.
Sec. 30 8N,15E	Young 15'	Buckhorn, Triangle Asbestos, American Asbestos Cement Co.	Past production of up to 3" soft fiber; chrysotile asbestos in Mescal Limestone intruded or cut by diabase dikes and sills.
Sec. 35 8N, 15E	McFadden Peak 15'	Cato Claims	Chrysotile asbestos in Mescal Limestone intruded or cut by diabase dikes and sills.
Sec. 2 7N, 14E	McFadden Peak 15'	Challenge 1-3 Property	Soft to semi-harsh asbestos in serpentine zones in Mescal Limestone intruded by diabase dikes and sills.
Sec. 31 4.5N,17E	Chrysotile 7.5'	Locke Property	Past producer; chrysotile asbestos in Mescal Limestone intruded or cut by diabase dikes and sills.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
GILA COUNTY (CONT.)			
Sec. 8 1N,16E	Cammeran Wash 7.5'	Chromo Butte Prospect	Chrysotile asbestos in Mescal Limestone intruded or cut by diabase dikes and sills; contains fairly harsh fiber up to 1 1/2 inches long.
Sec. 24 5N,16E	Blue House Mtn. 15'	Cliffbestos	Chrysotile asbestos in Mescal Limestone intruded or cut by diabase dikes and sills.
Sec. 22 7N,15E	McFadden Peak 15'	Delong Asbestos Claims	
Sec. 12 1N,14E	Inspiration 7.5'	Dixon Group	Short fiber.
Sec. 10 3S,15E	El Capitan 7.5'	Mescal Mtn. Deposit	Weathered asbestos in shaly limestone.
Sec. 27 5N,17E	Blue House Mtn. 15'	Dream Girl Prospect, Long and Wright Group	Past production; chrysotile asbestos in Mescal Limestone intruded or cut by diabase diabase dikes and sills.
Sec. 20 8N,15E	Young 15'	Home Property, Wilson Claims	Past production of shortfiberasbestos; one of the earliest worked deposits; chrysotile asbestos in Mescal Limestone intruded or cut by diabase dikes and sills.
Sec. 5 2S,16E	Cutter 15'	Indian Springs Deposit	Chrysotile asbestos in Mescal Limestone intruded or cut by diabase dikes and sills.
Sec. 30 5N,18E	Carrizo SE 7.5'	K & M Property, Stansbury Property, Reidhead and Greenwade.	Numerous asbestos bearing zones; past producer; chrysotile asbestos in Mescal Limestone intruded or cut by diabase dikes and sills.

ASBESTOS

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
GILA COUNTY (CONT.)			
Sec. 35 8N,15E	McFadden Peak 15'	Last Chance	Chrysotile asbestos in serpentinized zone in Mescal Limestone.
Sec. 30 2N,14E	Inspiration 7.5'	Shackelford Prospect	Somewhat harsh fiber; chrysotile asbestos associated with pale colored serpentine in limestone immediately above a diabase sill.
Sec. 3 3S,15E	El Capitan Mtn. 7.5'	Silver Dime, Oversight Extension Claim, V-9 Group	Harsh fiber asbestos in a small isolated remnant block of Mescal Limestone surrounded by sills and dikes of diabase.
Sec. 5 2S, 16E	Cutter 7.5'	Lone Pine Prospects	Chrysotile asbestos in Mescal Limestone intruded or cut by diabase dikes and sills.
Sec. 16 5N,17E	Blue House Mtn. 15'	Salt River Group	Chrysotile asbestos in Mescal Limestone intruded or cut by diabase dikes and sills.
Sec. 35 8N, 14E	McFadden Peak 15'	Melrose Group	Chrysotile asbestos in Mescal Limestone intruded or cut by diabase dikes and sills.
Sec. 19 8N, 15E	Young 15'	Number Two-Vosberg Claims	Past producer; chrysotile asbestos in Mescal Limestone intruded or cut by diabase dikes and sills.
Sec. 14 5N,16E	Blue House Mtn. 15'	Victory Group, Bacon Group	Part of the Johns-Manvills Co. group of properties in the area; at one time the largest asbestos mine in the U.S.; chrysotile asbestos in Mescal Limestone intruded or cut by diabase dikes and sills.

LOCATION.	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
GILA COUNTY (CONT.)			
Sec. 28 5N,17E	Blue House Mtn. 15'	Oso Claim	Chrysotile asbestos in Mescal Limestone intruded or cut by diabase dikes and sills.
Sec. 17 5N,17E	Blue House Mtn. 15'	Punto Negro Group	Chrysotile asbestos in Mescal Limestone intruded or cut by diabase dikes and sills; possible small production.
Sec. 20 5N,17E	Blue House Mtn. 15'	River Group	Narrow veinlets of asbestos in Mescal Limestone between concordant diabase sills.
Sec. 30 4.5N,17E	Chrysotile 7.5'	Ruiz Prospects, Longview, Eagle Nest	Chrysotile asbestos in Mescal Limestone intruded or cut by diabase dikes and sills.
Sec. 29 4.5N,18E	Beckers Butte 7.5'	Sulphur Springs Claims MS 3872	Chrysotile asbestos in Mescal Limestone intruded or cut by diabase dikes and sills,
Sec. 25 5N, 18E	Beckers Butte 7.5'	Sorsen Asbestos, Salt River, Sorsen-Williams Claims	Chrysotile asbestos in Mescal Limestone intruded or cut by diabase dikes and sills.
Sec. 30 5N, 18E	Beckers Butte 7.5'	Snake Hill Deposit	Chrysotile asbestos in Mescal Limestone intruded or cut by diabase dikes and sills.
Sec. 4 4N, 17E	Chrysotile 7.5'	Triple Star Mining Co. Property, Donato	Chrysotile asbestos in Mescal Limestone intruded or cut by diabase dikes and sills.

ASBESTOS

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
GILA COUNTY (CONT.)			
Sec. 35 5N,16E	Blue House Mtn. 15'	Wonder Group	Asbestos bearing serpentine zone under base of algal limestone near diabase sill.
LA PAZ COUNTY			
Sec. 8 5N, 20W	Moon Mts. 15'	Bowyer	Amphibolite and actinolite reported.
PIMA COUNTY			
Sec. 26 17S,10E	Palo Alto Ranch 15'	Palo Alto Ranch No. 1	Tremolite and actinolite associated with marble.
Sec. 28 17S,16E	Empire Mtns. 15'	Empire Mtns. No. 1	Tremolite-actinolite associated with marble.
Sec. 31 17S,13E Sec. 6 18S,13E	Twin Buttes 15'	Twin Buttes, Asbestos Prospect	Tremoilte and actinolite.
Sec. 12 18S,10E	Palo Alto Ranch 15'	Palo Alto Ranch No. 2	Tremolite and actinolite.
Secs. 14 & 23 18S,15E	Sahuarita 15'	Sahuarita	Tremolite and actinolite associated with marble.
Sec. 29 18S,16E	Empire Mtns. 15'	Rosemont	Tremolite and actinolite associated with marble.
PINAL COUNTY			
Sec. 14 1N,12E	Haunted Canyon 7.5'	Kennedy Ranch	
Secs. 18 & 19 1N,12E	Iron Mtns. 7.5'		
Sec. 13 1S,11E	Picketpost Mtn. 7.5'	El Marmol Claims	Mescal Limestone cut by diabase; asbestos reported.
Sec. 22 1S,11E	Picketpost Mtn. 7.5'	Hewitt Canyon, Martinez Sand Wash	Reported asbestos occurrence; also dimension stone marble and serpentine.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
PINAL COUNTY (CONT.)			
Sec. 14 1N,12E	Haunted Canyon 7.5'	Kennedy Ranch	
Secs. 18 & 19 1N,12E	Iron Mtns. 7.5'		
Sec. 13 1S,11E	Picketpost Mtn. 7.5'	El Marmol Claims	Mescal Limestone cut by diabase; asbestos reported.
Sec. 22 1S,11E	Picketpost Mtn. 7.5'	Hewitt Canyon, Martinez Sand Wash	Reported asbestos occurrence; also dimension stone marble and serpentine.
Sec. 13 2S,12E	Superior 7.5'	Vesta	
Sec. 18 3S,14E	Sonora 7.5'		
Sec. 8 7S,16E	Lookout Mtn. 7.5'	Putnam Wash	Chrysotile veins in Mescal Limestone near diabase intrusion.
Sec. 13 2S,12E	Superior 7.5'	Vesta	
Sec. 18 3S,14E	Sonora 7.5'		
Sec. 8 7S,16E	Lookout Mtn. 7.5'	Putnam Wash	Chrysotile veins in Mescal Limestone near diabase intrusion.
YUMA COUNTY			
Sec. 3 1S,12W	Eagletail Mts. 15'	Actinolite Asbestos, Cemetary Ridge	Long fiber, but very brittle asbestiform actinolite in lensing veins in Mesozoic schist near irregular dikes consisting mainly of actinolite, partly altered to chlorite, and veinlets and masses of magnetite.

BARITE

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
COCHISE COUNTY			
Sec. 13 14S,20E	Dragoon 15'	American Shaft	Barite, fluorite, quartz, specularite in vein in Precambrian granodiorite.
Sec. 23 15S,22E	Dragoon 15'	Mammoth Mine Area	Barite in quartz veins with pyrite, galena, and chalcopyrite.
Secs. 23 & 24 18S,23E	Pearce 15'	Standard Tungsten Mine AKA: Johnnie Boy No. 1, Head Center	Barite pods and scheelite in limestone.
Sec. 15 20S,22E	Tombstone 7.5'	Cuss Mine	White barite crystals and manganese oxides.
Sec. 22 20S,22E	Tombstone 7.5'	Ground Hog Mine	White barite veinlets in faulted limestone with minor fluorite.
Sec. 30 21S,24E	Potter Mtn.7.5'	Gadwell Canyon, Ramirez, Gila Monster, Corrine	Barite with galena in vein along fault in Morita Sandstone.
Sec. 4 22S,23E	Tombstone SE 7.5'	Hopeful Claim	Barite in base metal vein in Horquilla Limestone.
Sec. 16 23S,24E	Bisbee SE 7.5'	Mammoth Claim	Barite gangue with manganese oxides in Naco limestone.
Sec. 10 23S,25E	Bisbee NE 7.5'	Gold Hill	Barite gangue with manganese oxides in Naco limestone.
GILA COUNTY)			
Set. 15 10N,15E	Young 15'	Baronite Group	Iron-stained barite stringers in granite.
Sec. 1 9N, 9E	North Peak 7.5'	Zulu	Parallel barite veins in quartz-diorite in Precambrian formation
Sec. 4 9N,10E	Payson South 7.5'	Gilmore Spring Prospect	Minor barite veinlets in quartz diorite.

BARITE

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
GILA COUNTY (CONT.)			
Sec. 5 9N,10E	Payson South 7.5'	Pat Walsh Group	Barite veinlets.
Sec. 6 9N,10E	Payson South 7.5'	Grey Fox Group	Barite stringers in diorite in Precambrian formation.
Sec. 7 9N,11E	Payson South 7.5'	Gisela (Spook) Deposit	Barite vein in fractured granite.
Sec. 31 8N,12E	Picture Mtn. 7.5'	Top Hat Mine, A & B Group	Barite vein in faulted quartzitic schist in Precambrian formation. Produced high grade barite for paint industry.
Sec. 35 7N, 9E	Reno Pass 7.5'	Lone Pine Claim, Mt Ord Barium	Barite vein in pyroxenite.
Secs. 7 & 8 2N,16E (proj.)	Rockinstraw Mtn. 15'	Richmond Basin	Barite veins.
Secs. 20 & 29 1N,14E	Inspiration 7.5'	Castle Dome Mine, Pinto Valley Copper Mine	Barite-fluorite mineralization, copper ores within quartz monzonite.
Sec. 1 9N,9E	North Peak 7.5'	Green Valley 1 & 2	Slight amounts of barite in fractures in quartz diorite.
Sec. 31 10N,10E	North Peak 7.5'	Belch Group	Barite stringers in precious metal vein.
Sec. 15 10N,11E	McDonald Mtn. 7.5'	Baronite Group	"Bedded" barite deposit between coarse grained granite hanging wall and fine grained siliceous breccia foot-wall.
Sec. 20 9N,13E	Buzzard Roost Mesa 7.5'	Jones Barite-Fluorite	Barite and fluorite in vein with manganese oxides between Dripping Springs Quartzite and diabase.

BARITE

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
GRAHAM COUNTY			
Sec. 19 4S,20E Sec. 24 4S,19E	San Carlos Reservoir 15'	Barium King Group, Mtchell Barite	Barite vein with fluorite in trachyte.
Secs. 28 & 29 4S,19E	San Carlos Reservoir 15'	Copper Reef Mine, North Star, Coronado Group	Numerous small occurrences of barite with lessor fluorite generally along bedding planes in limestone.
Sec. 11 5S,19E	San Carlos Reservoir 15'	Silver Spar Prospect, Little Mule Group	Barite veins in fractured diorite.
Sec. 20 8S,22E	Eureka Ranch 7.5'	Graham Prospect	Barite vein with minor fluorite in fractures in coarse grained granite.
Sec. 5 8S,21E	Buford Hill 7.5'	Barium 1-8	Barite in base metal vein.
Sec. 13 8S,21E	Eureka Ranch 7.5'	Kinney Kye Mine, Marcotte Group	Barite veins with fluorite, copper oxides in volcanic agglomerate.
LA PAZ COUNTY			
Sec. 25 3S,23W	Hidden Valley 7.5'	Amelia Mine	Barite as a gangue mineral in a fissure vein deposit containing silver, lead and zinc mineralization.
Sec. 34 8N,17W	Bouse 15'	Black Mountain Group	Past production of barite from deposit in fissure vein with fluorspar in a volcanic agglomerate.
Sec. 6 6N,17W	Bouse 15'	Black Stud No. 6	Barite occurs in a group of narrow veins in a volcanic agglomerate.
Sec. 13 7N,13W	Salome 15'	Bullard Mine Group, Mohawk, Columbia, Columbus Group	Barite as gangue mineral with copper, gold and silver mineralization in a strong fissure vein.

BARITE

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
LA PAZ COUNTY			
Sec. 7 7N, 17W	Bouse 15'	Bullion Mine Group, Scotchman	Barite as a gangue mineral with copper-gold mineralization in fissure veins.
Sec. 7 6N,13W	Salome 15'	Bunker Prospect	Narrow, lensing, fault vein containing spotty masses of barite plates associated with iron-stained cherty gauge and minor copper staining.
Sec. 29 6N, 17W	Bouse 15'	Burro Barite Group	Banded barite veins with fluorite, quartz and copper oxides in volcanic agglomerate.
Sec. 20 7N, 17W	Bouse 15'	Burro Barite No. 6 & 8	Barite veinlets in volcanic agglomerate with copper and manganese oxides with some fluorite.
Sec. 7 4S,22W	Picacho 7.5'	Chloride Mandarin Cash Entry	Veins of mainly successive bands, up to 1/4" wide of finely crystalline quartz and fluorite, cut by bladed crystals of barite and veinlets of calcite.
Sec. 25 3S, 23W	Hidden Valley 7.5'	Clip Mine, Silver Clip, Blaine	Fluorite and barite as gangue minerals with lead-zinc mineralization in a lensing vein in a fault zone cutting andesitic to dacitic flows, tuffs and breccias.
Sec. 5 6N, 13W	Salome 15'	Cottonwood Pass Deposit	Past production of barite from a vein along the hanging wall of a fault in granite and schist. Vein gangue is black chert.

BARITE

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
LA PAZ COUNTY			
Sec. 11 7N, 13W	Salome 15'	Critic Mine	Barite as a gangue mineral with copper, gold and silver mineralization in spotty pockets and irregular lenses in a fissure vein.
Sec. 13 7N, 13W	Salome 15'	Cuprite Mine Group, Wilkinson Group, Emerald Group, Little Giant Extension	Barite as a gangue mineral with copper-gold mineralization in a fissure vein.
Sec. 7 7N, 16W	Utting 15'	Happy Day No. 1	Barite with some fluorite occurs along fissure in a volcanic rock.
Sec. 7 6N, 14W	Utting 15'	Hall Mine	Platy barite with iron-stained, cherty gangue and minor copper staining in a narrow vein along a fault in Precambrian schist. Some past production.
Sec. 31 7N, 17W	Bouse 15'	Happy Day No. 3 Mine, Black Mule, Barite No. 3	Barite with minor amounts of fluorite occurs in fractures in a rhyolite.
Sec. 20 7N, 16W	Bouse 15'	Happy Day No. 4	Barite occurs with some fluorspar in 2 fractures in a volcanic flow rock.
Sec. 25 6N, 15W	Utting 15'	Jewel Anne Group	Disseminated blebs and pockets of scheelite with quartz, siderite, barite, iron oxide and copper staining in small narrow stringers in silicified Paleozoic marble cut by faulting.
Sec. 31 7N, 17W	Bouse 15'	Monarch No. 1	Barite with minor fluorite in fractures in rhyolite porphyry.

BARITE

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
LA PAZ COUNTY			
Sec. 21 5N, 17W	Bouse 15'	Keiser Barite Mine, Sierra Blanca	Barite with fluorite in lenses along a fault fissure in Cretaceous or Tertiary andesitic volcanics.
Sec. 1 8N, 15W	Swansea 15'	Mammoth, Chicago, Copper Glance, Pitts-burgh	Fluorite, barite, quartz, copper oxides in sheared gneiss - schist.
Sec. 1 4S, 23W	Picacho 7.5'	Mendevil Claim, Draper	Barite as a gangue mineral with base and precious metal miner-alization in a fault zone.
Sec. 35 2S, 23W	Hidden Valley 7.5'	Mina De La Manana	Barite with lead, zinc and manganese mineral-ization in fault zone in interbedded andesite porphyry and tuff.
Sec. 32 7N, 17W	Bouse 15'	Morning Sun, Greasewood No. 1	Barite mineralization occurs in a narrow vein in volcanic agglomerate.
Sec. 31 5N, 10W	Lone Mtn. 15'	Norps Group	Barite and fluorite in vein deposit with iron and manganese oxides in granite-gneiss.
Sec. 1 6N, 14W	Salome 15'	Old Ernest Hall Property, Arizota, Gold-Copper Mine Group, Hall	Past production of barite from veins in gneiss and schist.
Sec. 29 7N, 17W	Bouse 15'	Pay Day	Barite occurs with some fluorspar along 2 fracture zones in a volcanic rock,
Sec. 1 4S, 23W	Picacho 7.5'	Princess & Hamburg Mines	Fluorite and barite as gangue minerals cementing breccia in lead, zinc and silver mineralized irregular fissure filling.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
LA PAZ COUNTY			
Sec. 2 3N,17W	Vicksburg 15'	Ramsey Mine, R and A	Barite as a gangue mineral with base and precious metal mineralization in a relatively wide vein zone of fractures and fissures, strongly brecciated along the contact of Mesozoic limestone, quartzite, sandstone and shale with Cretaceous or Tertiary rhyolite flows and tuff.
Sec. 1 4S, 23W	Picacho 7.5'	Silver King Claim	Fluorspar and barite occur in a vein in a brecciated zone in andesite.
Sec. 31 6N, 17W	Bouse 15'	Red Chief	Barite interbedded with numerous thin layers of quartz and jasper, considerable fluorite, and minor amounts of manganese and copper. Deposit occurs in 2 to 4 parallel veins in fractures in a volcanic agglomerate.
Sec. 2 4S, 23W	Picacho 7.5'	Red Cloud Mine	Barite as a gangue mineral in a lead, zinc and silver deposit in an irregular fault vein.
Sec. 3 6N, 13W	Salome 15'	Sterling No. 1	Minor amounts of barite mixed with wall rock and calcite, and stained with copper, iron and manganese oxides occur in a fault zone in a granitic rock.
Sec. 13 7N, 17W	Bouse 15'	White Christmas	Barite associated with fluorspar in veins in volcanic breccia.

BARITE

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
LA PAZ COUNTY			
Sec. 18 7N, 17W	Bouse 15'	White Rock & White Eagle	Barite in nearly pure plates with lower grade material in limestone formation. A small amount of fluorite is associated with the barite.
Sec. 17 7N, 17W	Bouse 15'	White Eagle	Barite occurs in a limestone ledge and also in 2 siliceous veins in rhyolite, the barite being mixed with rock fragments.
Sec. 20 7N, 17W	Bouse 15'	White Rock No. 2	Barite mineralization with siliceous gangue in fractures in rhyolite.
Sec. 17 7N, 17W	Bouse 15'	White Rock No. 3	Barite mineralization with some fluorite in fractures in rhyolite.
MARICOPA COUNTY			
Sec. 34 5N, 10W	Lone Mtn. 15'	Princess Ann, Fay L	Past production, barite veins, fluor-spar in volcanic conglomerate.
Sec. 35 5N, 10W	Lone Mtn. 15'	White Rock Claims, Blue Bird	Barite-fluorspar veins in basalt.
Sec. 4 2N, 7E	Granite Reef Dam 7.5'	Granite Reef Mine, Macco, Arizona Barite, Christman	Past production for drilling mud, barium chemicals, barite veins in faulted conglomerate.
Sec. 19 2S, 6W (proj.)	Woolsey Peak 15'	B&H Claim #6	Baritevein in biotite schist in Precambrian formation.
Sec. 25 4S, 8W	Dendora Valley 15'	Rawley Mine	Barite gangue, copper-gold ores within andesite.
Sec. 14 2S, 7W	Arlington 15'	Butte	Barite in quartz veins.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
MARICOPA COUNTY (CONT.)			
Sec. 34 5N, 10W	Lone Mtn. 15'	Arizona Spar-Barite	Veins and stringers of barite with minor amounts of pale green fluorite in a fine to medium grained andesite.
Sec. 4 6N,5W	Vulture Mtns. 15'	Big Spar Mine, Big Star	Barite in fluorspar veins in faulted andesite; past production of fluorspar.
Sec. 19 5N,9W	Aguila 15'	Black Queen, Armour Group, Hatton Claims	Minor barite in a manganese occurrence in breccia in andesite.
Sec. 4 4N, 10W	Lone Mtn. 15'	Lemons Fluor-spar	Barite and fluorspar replacement of limestone along contact with quartzite.
Sec. 6 4N, 10W	Lone Mtn. 15'	Rainbow, Copper Penny, Norps Group	Fluorspar-barite gangue in copper bearing quartz vein along Precambrian schists intruded by granite.
Sec. 17 5N,9W	Aguila 15'	Rogers Well	Barite deposits.
Sec. 29 5N, 10W	Lone Mtn. 15'	Snowball, Snow-ball-Monolith	Fluorspar 1enses with some barite in veins in faulted limestone cut by felsite dikes; past production for cement and metallurgical flux.
Sec. 20 5N,8W	Aguila 15'	Valley-view, Yarnell, Prieta Chinda, Wheeler Claims, Manganese Development.	Manganese ores with fluorite, barite, black calcite and chalcedony in andesite breccia.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
MOHAVE COUNTY			
Sec. 20 20N,12W	Tin Mtn. 7.5'	Rucker Group	Past production; barite veins and pods in granite.
Sec. 25 13N,15W	Castaneda Hills 15'	McCracken Lead Mine	Barite veins, quartz, galena carbonates.
Sec. 1 11N,13W	Artillery Peak 15'	Black Jack Group	Barite gangue with manganiferous material along fault zone.
Sec. 26 19N,13W	Pilgrim Wash 7.5'	Hylstad	Reported witherite occurrence with barite and silver.
Sec. 36 12N,14W	Artillery Peak 15'	Polianite, Tate Manganese	Small amounts of barite with black and white calcite and manganese in narrow lenticular shoots along parallel fractures cutting sandtrap conglomerate.
Sec. 21 12N,14W	Artillery Peak 15'	Red Top, Barite	High grade barite across 3 feet in limestones.
Sec. 1 11N,14W	Artillery Peak 15'	Shannon	Limited amount of barite with calcite and quartz as gangue in manganese deposit.
Sec. 17 15N,20W	Francohia 7.5'	Yucca, Santa Fe Manganese Mine, Chapin Manganese, J H Jones Mine	Limited amount of barite with calcite and quartz as gangue in manganese deposit.
PIMA COUNTY			
Sec. 33 11S,8E	Vaca Hills 15'	Silver Bell	Barite prospect.
Secs. 11 & 15 11S,8E	Vaca Hills 15'	Silver Bell	Barite gangue within copper ores in altered quartz monzonite.
Secs. 23 & 26 16S,4E	Comobabi 15'	Steppe Mine, Little Mary Mine	Barite, galena, quartz silver-gold values in andesite.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
PIMA COUNTY (CONT.)			
Sec. 16 14S,4W	Mount Ajo 15'	Gunsight Mine	Barite, quartz, calcite, metallic sulfides in granitic stock.
Sec. 33 14S,13E	Cat Mtn. 7.5'	Old Mission Mine, Old Bat, Pellegrin	Barite gangue, copper oxides in rhyolite.
Sec. 3 15S,12E	San Xavier Mission 7.5'		Barite occurrence.
Sec. 35 15S,2E	Quijotoa Mtns. 15'	Peer & Peerless Groups	Barite gangue in silver-gold ores in rhyolite.
Sec. 11 15S,2E	Quijotoa Mtns. 15'	White Prince	Barite vein minor fluorite in fault contact of limestone-andesite.
Sec. 17 15S,9E	Cocoraque Butte 15'	St. Jude Mine	Barite gangue, silver-lead mineralization.
Sec. 8 16S,17E	Rincon Valley 15'	Heavy Boy Group	Barite stringers in cherty limestone.
Sec. 11 17S,12E	Twin Buttes 15'	San Xavier	Barite gangue, copper minerals.
Sec. 12 18S,10E	Palo Alto Ranch 15'	Sunshine Mine	Barite gangue, lead-silver ores in limestone. Paleozoic
Sec. 26 19S,15E	Sahuarita 15'	Quebec Mine	Barite gangue in lead-silver ores adjacent to quartz latite stock.
Sec. 4 12S,8E	Vaca Hills 15'	Mammoth Mine, Old Boot, Union, Imperial	Barite-fluorspar veinlets.
Sec. 34 15S,2E	Quijotoa Mtns. 15'	Quijotoa Mine	Silver property containing a barite lined fissure cavities. The largest is approx. 200 feet long, 20 feet high and 20 feet wide.
Sec. 8 16S,4E	Comobabi 15'	North Molly Vein Area	

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
PIMA COUNTY (CONT.)			
Sec. 21 11S,4W	Mount Ajo 15'	Kerlin Et Al Group	
Sec. 5 16S,4E	Comobabi 15'	Digmore 2 Claims	
Sec. 16 11S,4W	Mount Ajo 15'	Crescent Et Al Group	
Sec. 34 14S,10E	Cocoraque Butte 15'	Cocoraque Butte No. 1	
PINAL COUNTY			
Sec. 9 2S,11E	Picketpost Mtn. 7.5'	Gonzales Pass Deposit	Barite vein in Pinal schist; Precambrian.
Secs. 15 & 22 7S, 18E	Klondyke 15'	Table Mtn. Mine	Barite gangue in copper-go1d ores.
Sec. 10 8S, 18E	Galivro Mtns. 15'	Old Reliable Mine	Barite gangue in copper ores.
Sec. 27 2S,11E	Mineral Mtn. 7.5'	Habstritts Silver Lode Claim A	Barite gangue in argentiferous manganese vein deposit.
Sec. 26 9S,12E	Tortolita Mtn. 15'	Big Property	Mineralization along fault in andesite consisting largely of barite with some copper oxide and occasional galena.
Sec. 3 9S,11E	Tortolita Mtn. 15'	Huerfanito Deposit	Barite gangue with copper mineralization in tuffaceous sandstone.
SANTA CRUZ COUNTY			
Set. 33 22S,16E	Lochiel 15'		Barite veinlets.
Sec. 8 21S,15E	Mt. Wrightson 15'	Dixie, Dixie Queen	Bladed masses of barite in veins of massive quartz.
Sec. 17 23S,16E	Harshaw 7.5'	Morning Glory	Minor barite in base metal replacement deposit.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
YAVAPAI COUNTY			
Sec. 2 12N, 3W	Wilhoit 7.5'	White Spar Claim	Barite veins in diorite.
Sec. 29 9N, 1W	Copperopolis 7.5'	French Creek Deposit	Barite veins in faulted schist.
Sec. 20 13N, 1E	Poland Junction 7.5'	Silver Belt Mine	Barite vein, ankerite, galena, sphalerite in schist.
Sec. 25 8N, 4W	Sam Powell Peak 7.5'	MGM Claims	Barite replacement lenses and breccia fillings in granite and volcanic breccia.
Sec. 1 10N, 1E	BumbleBee7.5'	Irle Claims, Excalibur, Cactus Wren, Porter Claims	Barite reported with base and precious metal mineralization.
Sec. 14 8N, 4W	Sam Powell Peak 7.5'	Lucky Jack and Adams	Barite with fluorite and calcite in lenses associated with dark-fine grained dikes in quartz-feldspar-mica gneiss.
Sec. 11 10N, 5E	Tule Mesa 7.5'	Santa Claus, Christmas Tree Claims	Barite and fluorspar in vein deposit in a red coarse grained granite.
YUMA COUNTY			
Set. 19 5S,20W	Laguna 15'	Annie, Anna	Spotty, partially oxidized, argentiferous galena and sphalerite in a gangue of barite.
Sec. 36 4S, 19W	Castle Dome Mts. 15'	Buckeye Vein Group, Castle Dome, New Dil-New Chance No. 1, Lady Edith & New Chance No. 4, Big Dome-Dusty No. 4, Hopkins, Miller, Norma, Caledona, William Penn	Locally abundant fluorite as gangue with minor barite in lead-silver-fluorite vein deposit.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
YUMA COUNTY (CONT.)			
Sec. 15 9S,17W	Mohawk 15'	Baker Peak Barite	Reported large barite occurrence.
Sec. 36 4S,19W	Castle Dome Mts. 15'	Flora Temple Mine	Lenses and shoots of rich, argentiferous galena up to 10 feet wide, separated by barren or weakly mineralized zones, with barite, calcite and fluorite gangue.
Sec. 25 4S,19W	Castle Dome Mts. 15'	Haack Mine Group, Barite Nip No. 1, Bronza-Hardrock, Algodones-Nip No. 2, Abe No. 10, Senora Mine	Spotty, partially oxidized, argentiferous galena with minor oxidized copper and zinc mineralization and gangue of crystalline calcite, fluorite and barite in narrow, lensing veins in Mesozoic shale.
Sec. 31 5S,18W	Castle Dome Mts. 15'	Mable, Mabel, Puckett	Spotty pockets and irregular masses of partly oxidized argentiferous galena with minor barite in gangue in fissure veins in Mesozoic shales.
Sec. 11 8S,15W	Mohawk 7.5'	Renner Barite, Toltec, Renner & Sam, Mohawk Claims, Renner Mine	Lensing masses of barite crystals with minor fluorite and crystalline calcite in a fault zone bordered by irregular layers of chlorite and calcite.
Sec. 15 4S,15W	Engesser Pass 7.5'	Silver Prince Mine, Addie Group, Nottbusch Mine	Irregular bunches of argentiferous galena with barite, minor fluorite and silver and copper mineralization in lensing veins in brecciated fault zones in Mesozoic schist.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
YUMA (CONT.)			
Sec. 36 4S, 19W	Castle Dome Mts. 15'	Sonora Mine, Linda Group	Irregular veins and masses of partly oxidized argentiferous galena in a gangue of banded, blocky calcite, crystalline fluorite, bladed to massive barite and minor quartz; past production of fluorspar and lead.
Sec. 1 1S, 15W	Kofa Butte 15'	Sheep Tanks Mine, Resolution Group	Barite as a gangue mineral in irregular vein deposits containing gold and silver mineralization along fault zones cutting Tertiary volcanics.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
APACHE COUNTY			
Sec. 8 21N,29E	Sanders 7.5'	Cheto Mine (also known as the Cheto # 2)	Active bentonite mine; bleaching clay used in filtering; occurs as altered vitric tuff in Bidahochi Formation.
Sec. 22 21N,29E	Sanders 7.5'	Cheto No.2 Mine (also known as the Gurley Bentonite Mine	Active bentonite mine; bleaching clay used in filtering; occurs as altered vitric tuff in Bidahochi Formation.
Sec. 14 27N,23E	Steamboat Canyon 7.5'	Steamboat School Clay	Kaolinized sandstone in Cow Springs Formation below Dakota Sandstone.
Sec. 34 36N,26E	Many Farms NE 7.5'	Round Rock Mesa Clay	Bentonitic clay.
Sec. 3 35N,28E	Yellowstone Canyon 7.5'	Lukachuki Creek Clay	Bentonitic clay.
Sec.8 21N,28E	Chambers 7.5'	Chambers Mine	Past production of bleaching clay in an altered vitric tuff; Bidahochi Formation.
Sec. 6 21N,28E	Chambers 7.5'	Big Six Mine	Past production of bleaching clay in an altered vitric tuff.
Sec. 7 22N,29E	Burntwater Wash 7.5'	Burntwater Wash Clay Deposit	Bleaching clay in altered tuff.
Sec. 35 22N,30E	Houck 7.5'	Lupton Bentonitic Clay Deposit	Bentonitic clay in the Chinle Formation; located southeast of Lupton.
Sec. 9 21N,29E	Sanders 7.5'	Bleaching Clay Deposit	Bleaching clay.
Sec. 26 21N,29E	Tolapai Spring 7.5'	Allentown Mine	Bleaching clay. Past production.
COCHISE COUNTY			
Sec. 13 18S,20E	Benson 15'	Bentonite Mine	Bentonitic clay.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
COCHISE COUNTY (CONT.)			
Sec. 35 17S,19E	Benson 15'	Whetstone Mtns, Clay Deposit	Black graphic clay; used for brick lining of smelter converters.
Secs. 20 & 21 17S,20E	Benson 15'	Benson	Bentonitic clay with gypsum lenses.
COCONINO COUNTY			
Secs. 1, 12, 13, 23, 24, 26, 31 & 32, 39N,7E	Lees Ferry 15' and Tanner Wash 15'	Foot of Echo Cliffs	Grayish-green bentonite beds in Triassic Chinle Formation.
3 miles SE of Cedar Ridge	Shimnumo Altar 15'	Paint Pots	Olive-green bentonitic clay in Triassic Chinle Formation.
East 1/2 38N,7E	Tanner Wash 15'	Echo Cliffs	Bentonite in Triassic Chinle Formation.
Secs. 2 & 11 32N, 9E (proj.)	Moa Ave NW 7.5'	Willow Springs Area	Grayish-green bentonitic shale in Chinle Formation.
30N,13E	Coal Mine Mesa 7.5'	Coal Mine Canyon	White kaolinized sandstone in Cow Springs Formation at contact with Dakota Sandstone.
N1/2 22N,13E (proj.)	Leupp 15'	Leupp Area Canyon	Grayish bentonitic clay in Chinle Formation.
Secs. 31 & 32 21N, 6E	Bellemont 15'	Rogers Lake	High-silica clay derived from decomposed andesite and basalt.
NW1/4 28N,10E (proj.)	Cameron 15'	Black Point	Bentonitic clay in Chinle Formation.
N1/2 26N,10E	Wupatki SE 7.5'		Bentonitic clay in Chinle Formation,

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
COCONINO COUNTY (CONT.)			
NE1/4 31N, 9E	Moa Ave. SW 7.5'		Bentonitic clay.
GILA COUNTY			
Secs. 20 & 29 8N, 10E	Gisela 7.5'	Quintonite	Tufa deposit; production has been a ground and bagged product for soil supplement and oil adsorbent.
Secs. 27 & 28 12N, 9E	Buckhead Mesa 7.5'	Florence Ceramics, Red Giant	Past production of kaolinitic clay with limestone particles.
Sec. 27 7N,23E	Round Top Mtn 7.5'	North Fork, White River	Kaolinite in sandstone.
Sec. 22 1N,15E	Pinal Peak 7.5'	Weary Lode McKusick Mosaic	Past production; kaolinitic clay in altered granitic rocks; used for tiles, pond linings, ceramic ware.
Sec. 11 3S, 13E	Sonora 7.5'	No. 1 Mine	Kaolinite in altered granitic porphyry.
Sec. 28 7N,9E	Reno Pass 7.5'	Reno Pass Four	
Sec. 7 1S,15E	Pinal Peak 7.5'	Azurite Property	Light pink clay occurs in fault gouge along vein.
Sec. 14 6N, 10E	Tonto Basin 7.5'	Clay Deposit	Fine bedded and variable colored clay beds in lake deposits.
Sec. 36 11N,13.5E	Woods Canyon 15'	Chris Clay Deposit	Sandy reddish-orange clay interbedded with sandstone.
GRAHAM COUNTY			
Sec. 21 6S,25E	Thatcher 15'	Rhoades-Mathews	Bentonitic clay 18'-20' thick with 3' of dirt and gravel overburden.
Sec. 36 9S,23E	Fort Grant 7.5'		Clay pits.

CLAY

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
GREENLEE COUNTY			
Sec. 17 4S,29E	Clifton 15'	Copper Mtn.	Kaolinite.
LA PAZ COUNTY			
Sec. 25 7N,17W	Utting 15'	Bentonite Mine	Bentonitic clay in alluvium; probably swelling type derived from alteration of tuffaceous sediments.
Sec. 24 7N,17W	Utting 15'	Bouse Area Clay	Bentonitic clay with volcanic ash.
Sec. 34 10N,19W	Black Peak 15'	Clay King Mine	Clay overlaying limestone.
Sec. 30 5N,10W	Lone Mtn. 15'	Yellow Flower	Past production of diopside ($CaMgSi_2O_6$) for use in ceramics.
MARICOPA COUNTY			
Sec. 15 6N,4W	Wickenburg SW 7.5'	Charbonneau Clay, Morristown Kaolin Deposit	Kaolin? clay deposit.
Sec. 14 7N,6E	Horseshoe Dam 7.5'	Horseshoe Dam Clay, Verde Vista Group	Low swelling bentonite - mostly montmorillonite.
Sec. 15 6N,1E	Biscuit Flat 7.5'	Lake Pleasant	Past production of diatomite from beds in Cenozoic lake sediments interbedded with bentonite.
Sec. 22 4N,6E	Ft. McDowell 7.5'	McDowell Clay Deposit, Tiger Enterprises	Large deposit of brown clay, well compacted in Verde River Valley lake deposits.
Sec. 35 6N,3E	New River SE 7.5'	Pearl Chemical, Irish Claims	White illite clay; small past production.
Sec. 18 1N,3E	Phoenix 7.5'	Phoenix Brickyard, Tolleson Clay Pit	Clay in recent sediments; current production for structural brick.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
MARICOPA COUNTY (CONT.)			
Sec. 5 7N,3E	Daisy Mtn 7.5'	Table Mesa Slate	Grey slate meto-sediments in Yavapai Series; current production for mixture with clays in production of vitreous clay pipe.
NAVAJO COUNTY (CONT.			
Sec. 24 8N, 20E	Show Low 15'		Kaolinite reported in sandstone.
Sec. 19 8N,21E	Show Low 15'		Ceramic clay in Cretaceous shale.
Sec. 19 22N,16E	Long Tom Cabin 7.5'	Long Tom Cabin No. 1 Mine, Bird Springs Wash-Area	Kaolin reported.
	Boot Mesa 15'	Base of Owl Rock	Bentonite in Triassic Chinle Formation.
Sec. 11 20N,17E	Winslow 15'	Bentonite Clay Deposit	Bentonite in Triassic Chinle Formation.
Secs. 7, 7 & 18 21N,16E	Winslow 15'	Coyote Wash	Bentonite in Triassic Chinle Formation.
	Boot Mesa 15'	Along Skeleton Mesa	Bentonite in Triassic Chinle Formation.
Sec. 9 10N,17E	Heber 15'	North Fork, Phoenix Wash	White refractory clay in sandstone overlying coal seams.
Sec. 33 11N,16E	Heber 15'	Turkey Springs	Gray refractory clay associated with shaly coal seams.
Sec. 19 11N,19E	Clay Springs 15'	Saul Quarry, Rim Clay	Refractory aluminous shales; kaolinitic shales used in clay mixtures as the stabilizing constituent in the manufacture of vitrified pipe.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
PIMA COUNTY			
Sec. 26 16S,17E	Rincon Valley 15'	Pantano Clay Pit	Structural clay mined for brick manufacture.
Sec. 26 12S,11E	Avra 7.5'	Rillito Mine	Past producer; clay-shale mined, used for making cement.
Sec. 27 16S,17E	RinconValley 15'	RinconValley No. 4	
Sec. 35 16S,17E	RinconValley 15'	RinconValley No. 2	
Sec. 27 15S,17E	Rincon Valley 15'	Rincon Valley No. 1	
Sec. 6 16S,14E	Tucson SW 7.5'	Hamilton Brick Co.	
Sec. 14 14S,13E	Tucson 7.5'	Grabe Brick Co.	
Sec. 11 14S,13E	Tucson 7.5'	De Vay Brick Co.	
Sec. 23 16S,17E	Rincon Valley 15'	Calif. - Portland Cement Co.	
Secs. 28,21 & 27 15S,17E	Rincon Valley 15'	Rincon Valley No. 7	
Secs. 26,27, 28 & 29 16S,17W	Rincon Valley 15'	Rincon Valley No. 6	
PINAL COUNTY			
Sec. 19 9S,18E	Clark Ranch 7.5'	Whitecliffs, Arizite Products, Kaolin Claims, Arizona Gypsum, Nuez Claims, Oversite Claims	Clays overlaying flat laying diatomite beds.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
YAVAPAI COUNTY			
Sec. 18 16N, 3E	Clarkdale 15'	Lakebed	Active clay-shale quarry in Cenozoic Verde Formation; used in making cement.
Sec. 5 14N,10W	Kaiser Spring SE 7.5'	Along Burro Creek, Little Jimmie Claim	Past production of bentonite, from rhyolitic tuff.
Sec. 12 13N, 6W	Bismarck Mesa 7.5'	Lyles Deposit	Past production, lithium-magnesium bentonitic clay used for reservoir sealer; Cenozoic lake beds under basalt.
Sec. 21 8N, 6E	Chalk Mtn. 7.5'	Chalk Mtn.	Kaolin (?) reported.
Sec. 11 13N, 5E	Camp Verde 7.5'	Larson Quarry	Past production bentonitic clay associated with gypsum, used for iron ore pelletizing and canal-reservoir sealer.
SE1/4 9N, 2E	Squaw Creek Mesa 7.5'		Sepiolite reported, with magnesite.
Sec. 1 13N, 4E	Camp Verde 7.5'	Camp Verde Salt Mne, Graham Wingfield Sulphate	Past production from flat bedded deposit of thenardite, mirabilite, gypsum, glauberite, halite, and clay in Cenozoic Verde Formation.
Sec. 22 9N, 2E	Black Canyon City 7.5'	Clay Claims	Light brown to red clay bedded with white clays.
Sec. 1 13N, 6W	Bismarck Mesa 7.5'	Dave 1-4	Reported lithium clay occurrence in intermixed beds of clays and tuffs.
Sec. 28 14N, 1E	Prescott Valley South 7.5'	Dewey Ranch Clay #1	White to grey clays used in manufacture of vitreous clay pipe.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
YAVAPAI COUNTY (CONT.)			
Sec. 15 14N, 1E	Prescott Valley South 7.5'	Dewey Ranch Clay #2	White to grey clays used in manufacture of vitreous clay pipe.
Sec. 5 16N, 1W	Paulden 15'	Favour Pipestone Deposit	Catlinite deposit. Red to deep maroon metamorphosed red siltstone, sporadic production as carving material.
Sec. 1 15N, 3E	Cottonwood 7.5'	McCarthy Clay	Bedded deposits of red and white structure clay.
Sec. 16 13N, 5E	Camp Verde 7.5'	Verde River Qeposit	Diatomite beds interbedded with gypsum, clays and limestone.
Sec. 11 13N, 8W	Malpais Mesa NE 7.5'	Meershaum	Clay occurrence.
Sec. 12 11N, 3W	Walnut Grove 7.5'	White Clay	Gently dipping bed of white clay on talc.

CORUNDUM

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
MOHAVE COUNTY			
Sec. 14 34N,14W	Grand Gulch Bench 7.5'	Red Lake District	Corundum and andalusite in pegmatite.
PINAL COUNTY			
Sec. 12 6S, 6E	Gila Butte SE 7.5'	Sacaton Mtns.	Irregular corundum masses with rutile and quartz in felsite dikes.

DIATOMITE

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
APACHE COUNTY			
Sec. 33 12N,26E	Hunt 15'	Concho Creek	Diatomite bed capped by basalt.
COCHISE COUNTY			
Sec. 27 17S,20E	Benson 7.5'	Post Ranch	Diatomite, past producer for light weight aggregate and scouring powder.
Sec. 17 18S,21E	St. David 15'	Curtiss	Horizontal diatomite bed interbedded with volcanic ash.
GILA COUNTY			
Sec. 26 1N,18E (proj.)	Natural Corral 7.5'	Skeleton Wash	Diatomite interbedded with limestone within lake sediments.
GRAHAM COUNTY			
Sec. 31 1S,19E	San Carlos 7.5'	San Carlos Deposits	
Secs. 1 and 11 2S, 19E (proj.)	Mt. Triplet 7.5'	Triplets Wash	Diatomite overlain by alluvium.
Sec. 24 4S, 23E	Ft. Thomas 15'		Impure diatomite.
Secs. 21, 22, 23 and 26 8S, 28E	Dry Mountain 7.5'	Whitlock Deposit, Flat Tire Mine, White Bluffs Uranium	Impure diatomite beds and volcanic ash with zeolites.
Sec. 35 6S,27E	Safford 15'	Solomon Deposit	Diatomaceous beds interbedded with clay and alluvium.
GREENLEE COUNTY			
Sec. 12 8S,31E	Duncan 15'	Duncan	Diatomite bed interbedded with clay in Gila Formation.

DIATOMITE

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
MARICOPA COUNTY			
Sec. 15 6N,1E	Biscuit Flat 7.5'	Lake Pleasant Mine	Past production, diatomite beds in Cenozoic lake sediments interbedded bentonite.
PINAL COUNTY			
Sec. 19 9S,18E Sec. 24 9S,17E	Clark Ranch 7.5'	White Cliffs Mine	Past production for fillers and filter aids, horizontal diatomite beds beneath clay.
Sec. 26 6S, 16E	Saddle Mtn. 7.5'	Feldman	Past producer; gypsum mine some diatomite interhorizontal diatomite beds beneath clay.
SANTA CRUZ COUNTY			
Set. 35 21S,18E	Preatt Ranch 7.5'	Lyle Creek	Impure diatomite outcrops.
Sec. 1 22S,18E	Preatt Ranch 7.5'	Eagle	Diatomite occurrences.
YAVAPAI COUNTY			
Sec. 16 13N, 5E	Camp Verde 7.5'	Verde River	Diatomite beds interbedded with gypsum, clay and calcium carbonate.

FELDSPAR

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
COCHISE COUNTY			
Sec. 23 14S,28E	Cochise Head 15'	Beryl Hill & Live Oak Prospects	Feldspar, beryl, mica and quartz in pegmatite; past producer of beryl.
GILA COUNTY			
Sec. 32 1S,15E	Pinal Peak 7.5'	Signal Peak Area	Feldspar and sillimanite in schist.
Sec. 24 9N,12E	Buzzard Roost Mesa 7.5'	Jones Beryllium Prospect	Veins of feldspar and quartz in altered Precambrian schist.
LA PAZ COUNTY			
Sec. 6 4S, 22W	Picacho 7.5'	John Hummer Mine	Pegmatite dikes containing potash feldspar, mica and quartz.
MARICOPA COUNTY			
Sec. 16 7N,3W	Red Picacho 7.5'	Morning Star	Past production; potash feldspar pods, green muscovite, quartz, lithium minerals in pegmatite.
Sec. 16 7N,3W	Red Picacho 7.5'	Sunset	Potash feldspar, quartz, muscovite, in pegmatite within amphibole schist.
Sec. 23 7N, 3W	Red Picacho 7.5'	Hertz, Weatherman	Pegmatite with feldspar, quartz.
Sec. 4 or 5 2S,3W	Buckeye 7.5'	Varnum Feldspar	
Sec. 31 1S,3W	Buckeye 15'	Arrowhead, Faith in you Group, Rusty Point, Sunset, Chickisow	Feldspar in pegmatite.
Sec. 5 2S,3W	Buckeye 15'	Balanced Rock	Feldspar in pegmatite in granite.
Sec. 24 3S,1E	Montezuma Peak 7.5'	Frost	Albite feldspar in pegmatite.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
MARICOPA COUNTY (CONT.)			
Sec. 17 6N, 5W	Vulture Mtns. 15'	Lucky Mica, Fortner & Boyd Lithium	Albite feldspar, muscovite mica, lithium minerals, beryl and reported columbium - tantalum minerals in complex pegmatite.
Sec. 12 6N,5E	Humboldt Mtn 7.5'	Manley Bickle Group	Acid feldspar in mineralization at intersection of shears in Precambrian granite.
Sec. 36 2S,1E	Montezuma Peak 7.5'	Sylvania Mica	Feldspar with muscovite books in pegmate; small amounts of "sheet" or "punch".
MOHAVE COUNTY			
Sec. 29 38N,16W	Virgin Peak 15'	Hummingbird Group	Feldspar, kyanite, muscovite, beryl, chrysoberyl in pegmatite within gneiss-schist.
Sec. 6 30N,22W	Hoover Dam 15'	Painted Desert	Feldspar, quartz in pegmatite.
Sec. 13 22N,18W	Cerbat 7.5'	Champion, Atwater Kent Group, Roadside Claims, Needles	Coarse reddish granite or pegmatite composed mainly of feldspar makes up a 5 foot section of the footwall at the Champion Vein.
Sec. 26 28N,17W	Garnet Mtn. 15'	M and P Claims	Pegmatite with potassium feldspar, perthite, quartz-muscovite.
Sec. 22 22N,17W	Stockton Hill 7.5'	White Spar Mine	Past production, feldspar-quartz processed for use as abrasives, ceramics.
Sec. 26 22N,17W	Stockton Hill 7.5'	Taylor Mine	Active quarry, feldspar-quartz pegmatite, gray-white microcline pods, used in glass, enamels, pottery.

FELDSPAR

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
MOHAVE COUNTY (CONT.)			
Sec. 27 22N,17W	Stockton Hill 7.5'	Hopkins Prospect	Feldspar-quartz pegmatite.
Sec. 6 21N,17W	Kingman NW 7.5'	Cerbat Mtns.	Quartz core pegmatite with potassium feldspar.
Sec. 1 16N,12W	Cedar Basin 7.5'	Rare Metals Mine	Microcline in pegmatite with yttrotantalite, fluorite, quartz, muscovite, garnet.
Sec. 24 18N,12W	Tom Brown Canyon 7.5'	Silica Hill	Quartz core pegmatite with microcline.
Sec. 23 22N,17W	Stockton Hill 7.5'	Cinco De Mayo	Feldspar in pegmatite.
Sec. 10 22N,17W	Stockton Hill 7.5'	Consolidated Feldspar Prospect	Potassium feldspar and quartz with some plagioclase in the finer grained parts of pegmatite.
Sec. 6 30N,22W	Hoover Dam 15'	Grand View & Grand View Ex.	Feldspar in pegmatite.
Sec. 24 28N,17W	Garnet Mtn. 15'	White Cap	Granite pegmatite dike about 20 feet wide containing feldspar, quartz, biotite, hornblende, euxenite, beryl, and uranium other minerals.
Sec. 15 20N,17W	Kingman SE 7.5'	Mineral X (Claims)	Feldspar in pegmatite with rare earth minerals.
Sec. 32 21N,15W	Rattlesnake Hill 7.5'	Rose #1 & 2	White feldspar with quartz in pegmatite;
Sec. 10 19N,15W	Dean Peak 7.5'	Mica Giant, Wayne Mica	feldspar in pegmatite; past production of muscovite.
Sec. 14 29N,19W	Senator Mtn. 15'	Muscovite Mica	Small production of muscovite from pegmatite.

FELDSPAR

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
PIMA COUNTY			
Secs. 2 & 11 13S,7W	Ajo 15'	San Antonio Mine	Past production of feldspar and scrap mica, pegmatite dikes in granite, feldspar-silica mixture used for copper smelter flux.
PINAL COUNTY			
Secs. 7 & 8 4S, 2E	Enid 7.5'	Sierra Estrella	Microcline, muscovite, quartz in pegmatite.
Sec. 2 7S, 13E	Black Mtn. 7.5'	B M Group, Darlene A Group	Zoned simple pegmatite containing feldspar mica and quartz.
YAVAPAI COUNTY			
Sec. 16 10N, 1E	Crown King 7.5'	Silver Christmas Mine	Orthoclase feldspar.
Sec. 34 8N, 3W	Red Picacho 7.5'	Friction Mine	Perthite feldspar, quartz in pegmatite.
Sec. 34 8N, 3W	Red Picacho 7.5'	Outpost Extension	Pegmatite bodies containing perthite, albite, massive quartz.
Sec. 3 7N, 3W	Red Picacho 7.5'	Outpost Mine	Potash feldspar pods, muscovite, bismutite, quartz masses in pegmatite.
Sec. 10 7N, 3W	Red Picacho 7.5'	Picacho Vein Mine	Potash feldspar pods, mica, quartz in pegmatite.
Sec. 1 7N, 3W	Red Picacho7.5'	Buena Vista, Starlight, Monster, Pachen, Patchin, Pechan	Feldspar in pegmatites.
Sec. 21 8N, 5W	Flores 7.5'	Burchfield Feldspar	Feldspar and muscovite mica in pegmatite dikes.
Sec. 29	Battle Flat 7.5'	Feldspar	Feldspar occurrence.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
YAVAPAI COUNTY (CONT.)			
Sec. 23 10N, 6W	Congress 7.5'	Congress, Congress Mine, Niagra, Queen of the Hills, Golden Key, Herskowitz Property	Feldspar in pegmatite veins in vicinity of quartz vein precious deposit.
Sec. 34 8N, 3W	Red Picacho 7.5'.	Friction	Potassium feldspar in large pegmatite.
Sec. 9 13N,10W	Arrastra Mtn NE 7.5'	Jeep Claims	Pegmatite veins in Precambrian schist containing feldspar, quartz and biotite mica.
Sec. 23 12N, 6W	Weaver Peak 7.5'	Lucky Probe	Pegmatite deposit containing orthoclase; deposit occurs in granite; deposit reported to contain polycrase.
Sec. 34 12N, 5W	Weaver Peak 7.5'	Monte Cristo, Dixie Queen	Feldspar with quartz, muscovite and sericite mica and beryl in zoned pegmatite dike. Past producer of feldspar.
Sec. 6 10N, 1E	Crown King 7.5'	Muscovite Mine, B.A.R.R. 4 Mica, Vasser Mica	Feldspar in poorly zoned pegmatite dike.
Sec. 10 7N, 3W	Red Picacho 7.5'	Picacho View	Albite and potash feldspar in zoned pegmatite.
Sec. 20 7N, 2W	Garfias Mt. 7.5'	Shamrock Mng. & Development	Feldspar, mica, quartz tourmaline, pyrite and uranium minerals in pegmatites.
Sec. 4 10N, 1E	Crown King 7.5'	Silver Christmas	Reported feldspar occurrence.
Sec. 10 7N,3W	Red Picacho 7.5'	White Jumbo	Pegmatite deposit with a wall zone containing potash feldspar and some plagioclase feldspar.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
YAVAPAI COUNTY (CONT.)			
Sec. 36 10N, 5W	Yarnell 7.5'	Uranus, Mizpah, Total Wreck, Planet Saturn, Nest Egg, Terminal, Helen Morris, Mizpah, Total Wreck	Feldspar, some mixed with quartz in vein likedeposits.

FLUORSPAR

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
COCHISE COUNTY			
Sec. 34 13S,27E	Luzena 15'	Buckeye Canyon Prospect	Fluorspar veinlets in granite cut by rhyolite dikes.
Sec. 13 14S,20E	Dragoon 15'	American Mine, AKA: War Eagle, La Ventia	Fluorite-barite gangue with metallic sulfides in vein in granodiorite.
Sec. 17 16S,30E	Cochise Head 15'	Indian Creek AKA: Pague Prospect	Fluorspar vein in faulted limestone.
Sec. 23 15S,22E	Dragoon 15'	Peabody Mine	Fluorite-quartz gangue with copper-zinc ores in vein in limestone.
Sec. 1 16S,22E	Dragoon 15'	Banks Mine	Fluorite gangue with scheelite, huebnerite in a tungsten and base metal sulfide occurrence in quartz monzonite.
Sec. 5 16S,22E	Dragoon 15'	Homestake Claim Group	Fluorite, quartz, gold and scheelite in a tungsten and sulfide base/precious metal deposit in Pinal schist.
Sec. 13 20S,27E	Swisshelm Mtns 15'	Little Lulu	Beryl in tactite and meta limestone with fluorite and copper and manganese minerals.
Sec. 35 24S,23E	Bisbee 7.5'	Capt Fluorspar	Fluorite in vein with galena in granite porphyry.
Secs. 12 & 13 16S,22E	Dragoon 15'	Mt. Allen, Higgins Estate	Fluorite gangue with copper oxides and scheelite in quartz monzonite.
Secs. 3 & 9 16S,22E	Dragoon 15'	Little Fanny Mine, Last Chance, Alvera Extension	Past production of fluorspar; also quartz, beryl and tungsten minerals in quartz monzonite.

FLUORSPAR

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
COCHISE COUNTY (CONT.)			
SW 1/4 16S,23E	Dragoon 15'	Dragoon Mtns. Prospect	Fluorspar veins, replacement in limestone.
Sec. 12 17S,30E	Portal 15'	Paradise Area	Past production; fluorspar in quartz veins in faulted granite.
Sec. 33 17S,25E	Pearce 15'	Fluorine Hill Mine, AKA: Little Jessie, Cartmill	Past production; purple fluorite with uranium minerals in in silicified rhyolite.
Sec. 24 17S,22E	Knob Hill 7.5'	Knob Hill No.1	Fluorspar stringers in Paleozoic limestone near granite intrusion.
Sec. 3 14S,19E	Happy Valley 7.5'	Driscoll Mtn. Prospect	Green fluorspar veins in limestone intruded by porphyritic rhyolite dikes.
Secs. 26 & 35 18S,19E	Benson 15'	Lone Star Mine	Past production for metallurgical uses; banded fluorspar and quartz veins in Precambrian schist; intruded by aplite dikes and an alaskite stock.
Sec. 11 20S,22E	Tombstone 7.5'	Empire Mine	Green and purple fluorspar with some lead in silicified limestone and shale.
N. 1/2 21S,23E	Tombstone or Gleeson 15'	Government Draw Prospect	Purple fluorite crystals associated with quartz veins.
Sec. 21 22S,23E	Tombstone SE 7.5'	Stout Prospect	Fluorite-quartz veins in porphyritic granite.

FLUORSPAR

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
GILA COUNTY			
Sec. 32 ION, 10E	Payson South 7.5'	Ox Box Mine	Fluorspar veinlets with epidote, gold, silver in hornblende diorite.
Sec. 20 7N,11E	Picture Mtn. 7.5'	Quartz Ledge Prospect, White Cow	Past production for acid grade concentrates, fluorspar-quartz lenses and veins in granite in Precambrian formation.
Sec. 36 7N,14E	McFadden Peak 15'	Jerky Group	Vein in Dripping Springs Quartzite.
Sec. 19 7N,12E	Picture Mountain 7.5'	Red Rock	Vein in quartzite.
Sec. 20 9N,13E	Buzzard Roost Mesa 7.5'	Jones Barite-Fluorite	Fluorite and barite in vein with iron and manganese oxides between Dripping Springs Quartzite and diabase.
Sec. 35 7N, 13E	McFadden Peak 15'	McFadden Peak Fluorspar, Mack Claims, Western Fluorspar Property	Fluorite in vein in quartzite and hornfels with interbedded quartzite; past producer of both acid and metallurgical grade fluorspar.
Sec. 14 5N,16E	Blue House Mtn. 15'	Tomato Juice Deposit	Fissure vein which locally contains dark-purple fluorite, chalcopyrite, and pyrite; vein occurs in Precambrian meda sediments intruded by diabase dikes and sills.
Sec. 36 5N,16E	Blue House Mtn. 15'	Hillside Deposit	A little fluorite with pyrite, calcite, gypsum and uranium minerals in Dripping Springs Quartzite underlain by diabase sill.

FLUORSPAR

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
GILA COUNTY (CONT.)			
Sec. 9 6N,11E	Greenback Creek 7.5'	Tonto Basin, Packard Claims, Walnut, Bluebird Claims	Past production for acid grade concentrates, fluorspar-quartz lenses and veins in granite in Precambrian formation
Sec. 2 6N,14E	McFadden Peak 15'	Quartzite Claims, Cherry Creek	Brecciated white fluorite; copper mineral bornite in Mescal Limestone.
Sec. 20 1N,14E	Inspiration 7.5'	Castle Dome Copper Mine, Pinto Valley Mine	Fluorspar, barite, copper sulfides in fractured quartz monzonite.
GRAHAM COUNTY			
Sec. 19 4S,20E Sec. 24 4S,19E	San Carlos Reservoir 15'	Barium King Mine	Fluorite, barite, calcite vein in brecciated trachyte.
Sec. 20 4S,20E	San Carlos Reservoir 15'	Mitchell Barite Prospect	Barite vein with fluorite in trachyte.
Secs. 28 & 29 4S,19E	San Carlos Reservoir 15'	Coronado Group Copper Reef Mine, North Star	Numerous small occurrences of barite with lessor fluorite generally along bedding planes in limestone.
Sec. 12 5S,19E	San Carlos Reservoir 15'	Little Mule Group, Silver Spar Prospect	Vein of fluorite, barite, quartz, lead-silver values in latite or andesite breccia
Sec. 19 5S,20E	Cobre Grande 7.5'	Iron Cap	Fluorite in a base and precious metal vein deposit.
Sec. 20 5S,20E	Cobre Grande 7.5'	Orejana	Siliceous flow breccia containing a little fluorite.
Sec. 29 5S,20E	Klondyke 15'	Landsman Group	Purple fluorite stringers, lead-silver values in faulted limestone.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
GRAHAM COUNTY (CONT.)			
Sec. 6 6S,20E	Jackson Mountain 15'	Mt. Jackson, Rhodes Spar	Past production; purple-green fluorspar veins in granite in Precambrian formation.
Sec. 29 6S,20E	Cobre Grande 7.5'	Grand Reef Mine	Fine-grained brecciated fluorite, quartz, lead-silver values in schist intruded by rhyolite dikes.
Sec. 6 6S,22E	Jackson Mtn. 15'	Spar Fluorite Group	Small production of fluorspar from veins in gneiss.
Sec. 22 7S,21E	Jackson Mtn. 15'	Edith 1 & 2	Fluorspar veinlets in granite in Precambrian formation.
Sec. 23 7S,21E	Buford Hill 7.5'	Crazy Horse	Coarse grained crystalline fluorite in a faulted Precambrian granite.
Sec. 13 8S,21E	Eureka Ranch 7.5'	Marcotte Claims	Veins of barite, fluorite, calcite, silver-gold values in volcanic agglomerate.
Sec. 23 11S,26E	Luzena 15'	Fluorite Claims	Fluorite with hematite and limonite in a shear zone in granite.
Sec. 20 8S,22E	Blue Jay Peak 7.5'	Graham Prospect	Barite, fluorite, copper oxides in granite in Precambrian formation,
GREENLEE COUNTY			
Secs. 3 & 10 7S,32E	York Valley 15'	Lucky No. 1,2	Past production; fluorspar and quartz veins in faulted andesite porphyry-rhyolite tuff.
Sec. 10 7S,32E	York Valley 15'	Goat Camp Mine	Past production;. fluorspar in vein,

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
GREENLEE COUNTY (CONT.)			
Sec. 4 7S,32E	York Valley 15'	Fourth of July Mine, Ellis Shaft	Past production; fluorspar veins, quartz-calcite in rhyolite porphyry.
Sec. 5 7S,32E	York Valley 15'	Daniels Camp Mine	Past production; fluorspar stringers in fractured andesite.
Sec. 9 7S, 32E	York Valley 15'	Polly Ann, Forbis Mine	Past production; fluorspar veins in rhyolite tuff and andesite porphyry.
Sec. 15 7S,32E	York Valley 15'	Phillips Mine	Past production; fluorspar occurs along narrow dikes in tuff and andesite.
Sec. 22 7S,32E	York Valley 15'	Eureka	Vein deposit in volcanics.
LA PAZ COUNTY			
Sec. 34 8N, 17W	Bouse 15'	Black Mtn. Group	Barite occurs in fissure veins with fluorspar in a volcanic agglomerate.
Sec. 11 4S, 23W	Picacho 7.5'	Black Rock Mine, Pacific Mines	Fine grained fluorite as a gangue mineral with zinc, lead and silver mineralization in lensing ore shoots.
Sec. 29 6N, 17W	Bouse 15'	Burro Barite Group	Banded barite veins with fluorite, quartz and copper oxides in volcanic agglomerate.
Sec. 20 7N, 17W	Bouse 15'	Burro Barite No. 6 & 8	Barite veinlets in volcanic agglomerate with copper and manganese oxides with some fluorite.
Sec. 19 10N, 17W	Black Peak 15'	Osbourne Wash Prospect	Fluorite veinlets in a faulted basalt.

FLUORSPAR

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
LA PAZ COUNTY (CONT.)			
Sec. 7 4S, 22W	Picacho 7.5'	Chloride Mandarin Cash Entry	Vein of mainly successive bands, up to 1/4" wide of finely crystalline quartz and fluorite, cut by bladed crystals of barite and veinlets of calcite.
Sec. 25 3S, 23W	Hidden Valley 7.5'	Clip Mine, Silver Clip, Blaine	Fluorite and barite as gangue minerals with lead-silver mineralization in a lensing vein in a fault zone cutting andesitic to dacitic flows, tuff and breccias.
Sec. 34 3S, 23W	Picacho 7.5'	Geronimo North & South Mines	Fluorite as a gangue mineral in irregular lensing veins along faults with base and precious metal mineralization.
Sec. 7 7N, 16W	Utting 15'	Happy Day No. 1	Barite with some fluorite occurs along fissures in a volcanic rock.
Sec. 31 7N, 17W	Bouse 15'	Happy Day No. 3 Mine, Black Mule, Barite No. 3	Barite with minor amounts of fluorspar occurs in fractures in a rhyolite.
Sec. 20 7N, 16W	Bouse 15'	Happy Day No. 4	Barite occurs with some fluorspar in 2 fractures in a volcanic flow rock.
Sec. 5 9N, 13W	Ives Peak 15'	Fluorspar Mine, Ives Peak Area	Fluorspar veins in sheared granite-gneiss.
Sec. 21 5N, 17W	Bouse 15'	Keiser Barite Mine	Barite with fluorite in lenses along a fault fissure in Cretaceous or Tertiary andesitic volcanics.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
LA PAZ COUNTY (CONT.)			
Sec. 1 8N, 15W	Swansea 15'	Mammoth, Chicago, Copper Glance, Pittsburgh (Pat.)	Fluorite, barite, quartz, copper oxides in sheared gneiss-schist.
Sec. 10 4N, 13W	Hope 15'	Mathews Claims	Fluorite as a gangue mineral along with quartz in wide metalliferous veins.
Sec. 17 10N, 13W	Ives Peak 15'	Mystery Hill Mine Group, Clayton, Diana May, East Side, Mildred, Blue Bell	Copper carbonates and silicates, with local lead carbonate, in fissure veins associated with strong silicification and some epidote, fluorite and selenite, in altered Precambrian schist and gneiss along a fault zone.
Sec. 31 5N, 10W	Lone Mtn. 15'	Norps Group	Barite and fluorite in vein deposits with iron and manganese oxides in granite-gneiss.
Sec. 11 4S, 23W	Picacho 7.5'	Papago Mine	Fluorite as a gangue mineral in an irregular vein containing lead, silver and zinc mineralization along fault zone.
Sec. 29 7N, 17W	Bouse 15'	Pay Day	Barite occurs with some fluorspar along 2 fracture zones in a volcanic rock.
Sec. 29 10N, 17W	Black Peak 15'	Planet Peak Prospect	Green fluorspar and copper minerals in fault contact of limestone and granite.

FLUORSPAR

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
LA PAZ COUNTY (CONT.)			
Sec. 1 4S,23W	Picacho 7.5′	Princess & Hamburg Mines	Fluorite and barite as gangue minerals cementing breccia in lead, zinc and silver mineralized irregular fissure filling.
Sec. 31 6N,17W	Bouse 15'	Red Chief	Barite interbedded with numerous thin layers of quartz and jasper, considerable fluorite, and minor amounts of manganese and copper; deposit occurs in 2 to 4 parallel veins in fracture in a volcanic agglomerate.
Sec. 2 4S,23W	Picacho 7.5′	Red Cloud Mine	Barite as a gangue mineral in a lead, zinc and silver deposit in an irregular fault vein.
Sec. 35 4S,23W	Picacho 7.5'	Seger Lease	Fluorite as a minor gangue mineral in vein fillings of inanganiferous to ferruginous white calcite in a breccia vein containing copper mineralization.
Sec. 1 4S,23W	Picacho 7.5'	Silver King Claim	Fluorspar and barite occur in a vein in a brecciated zone in andesite.
Sec. 13 7N,17W	Bouse 15'	White Christ-mas, Barium Gold Dollar	Barite associated with fluorspar in veins in volcanic breccia.
Sec. 17 7N,17W	Bouse 15'	White Rock No. 3	Barite mineralization with some fluorite in fractures in rhyolite.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
LA PAZ COUNTY (CONT.)			
Sec. 18 7N, 17W	Bouse 15'	White Rock & White Eagle	Barite in large plates with lower grade material in limestone formation; a small amount of fluorite is associated with the barite.
MARICOPA COUNTY			
Sec. 2 6N, 5W	Vulture Mtns. 15'	Contact Mine	Past production; fluorspar vein in andesite.
Sec. 4 6N, 5W	Vulture Mtns. 15'	Big Spar Mine	Past production; fluorspar veins in faulted andesite.
Sec. 12 6N, 5W	Wickenburg 7.5'	Jumbo Mine, Union Hill	Past production, fluorspar-quartz veins in andesite.
Sec. 7 6N, 4W	Wickenburg 7.5'	Good Luck	Fluorspar vein in altered diorite (schist); past production.
Sec. 7 6N, 4W	Wickenburg 7.5'	Mammoth Spar, Luck Strike Mine	Past production.
Sec. 7 6N, 4W	Wickenburg SW 7.5'	Lilly Belle Mine	Fluorspar veins in granite, trachyte and diorite.
Sec. 22 6N, 4W	Wickenburg SW 7.5'	Cactus Queen, Texas Queen	Fluorspar vein in granite.
Sec. 18 5N, 8E	Maverick Mtn. 7.5'	Muskhog Claims	Fluorspar vein in granite in Precambrian formation.
Secs. 17 & 20 5N, 8W	Aguila 15'	Valley View Mine	Manganese ores with fluorite, barite, black calcite, chalcedony in andesite breccia.
Sec. 35 5N, 10W	Lone Mtn. 15'	White Rock, Blue Bird	Barite-fluorspar stringers in volcanic agglomerate.

FLUORSPAR

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
MARICOPA COUNTY (CONT.)			
Sec. 29 5N, 10W	Lone Mtn. 15'	Snowball Deposit	Past production for cement flux, fluorspar lenses-veins in faulted limestone cut by felsite dikes.
Sec. 34 5N, 10W	Lone Mtn. 15'	Princess Ann, Fay L	Fluorspar-barite stringers in volcanic agglomerate.
Sec. 5 2N,3W (approx)	White Tank Mtns. SE 7.5'	White Tank Mtns.	Fluorspar occurrence.
Sec. 32 5N,5E	McDowell Peak 7.5'	White Quartz Quarry	Fluorspar associated with white quartz.
Sec. 30 4N, 10E	Four Peaks 7.5'	Adventure	Purple fluorite in vein in granite.
Sec. 31 7N,6E	Humboldt Mtn. 7.5'	Amethyst, Lookout Pat. Claim #1196	Irregular fluorite - quartz veins in granite.
Sec. 34 5N, 10W	Lone Mtn. 15'	Arizona Spar-Barite	Veins and stringers of barite with minor amounts of pale green fluorite in a fine to inedium grained andesite.
Sec. 14 2S,7W	Arlington 15'	Butte	Barite-fluorspar in quartz veins.
Sec. 4 6N,5W	Vulture Mtns. 15'	Carlsbad #2, Vyne-Coins Claims	Fluorite gangue in base/precious metal vein deposit along granite schist contact.
Sec. 5 6N,4W	Wickenburg 7.5'	Chilco	Flat dipping fluor-spar in decomposed diorite.
Sec. 1 6N,5W	Wickenburg SW 7.5'	Contact 1,2,3	Veins of fluorite 1/2 to 1 ft. wide in a red andeiste; estimate average grade 60% CaF_2.
Sec. 12 6N,5W	Wickenburg 7.5'	Fluorspar Occurrence	Fluorspar veins in dark colored schist.

FLUORSPAR

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
MARICOPA COUNTY (CONT.)			
Sec. 6 6N,4W	Wickenburg 7.5'	Conteras & Nickel	Fluorspar in a short lense in a fracture in granite.
Sec. 25 5N,8W	Big Horn Mtns. 15'	Eclipse	Fluorspar in lead, silver, gold vein occurrence.
Sec. 11 6N,4E	New River Mesa 7.5'	Gold Cliff	Fluorite gangue in ferberite (tungsten) bearing quartz vein deposits in slaty to sericitic gray Precambrian schist.
Sec. 4 4N,10W	Lone Mtn. 15'	Lemons Fluor-spar	Fluorite and barite replacement of lime-stone along contact with quartzite.
Sec. 12 6N,5E	Humboldt Mtn. 7.5'	Manley Bickle Group	Mineralized zone in Precambrian granite containing acid feldspar, horn-blende, fluorite, calcite and uranium minerals.
Sec. 31 6N,4W	Wickenburg 7.5'	Nickel	Fluorspar veins in faulted andesite.
Sec. 1 6N,5W	Wickenburg 7.5'	Queen Spar	Fluorspar veins in faulted andesite.
Sec. 31 6N,4W	Wickenburg 7.5'	Palo Verde	Fluorspar veins in faulted andesite.
Sec. 6 4N,10W	Lone Mtn. 15'	Rainbow, Copper Penny, Norps Group	Fluorspar-barite gangue in copper bearing quartz veins in Precambrian schist intruded by granite.
Sec. 33 7N,5W	Vulture Mtns. 15'	San Francisco	Fluorspar in lenses along very narrow veins near contact between granite, rhyolite and a dark colored volcanic rock; small past production.

FLUORSPAR

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
MARICOPA COUNTY (CONT.)			
Sec. 12 6N,5W	Wickenburg 7.5'	West End, Good Luck	Fluorspar vein in schist.
Sec. 35 5N,10W	Lone Mtn. 15'	White Rock Claims, Blue Bird	Barite-fluorspar veins in basalt.
Sec. 14 6N,5E	Wildcat Hill 7.5'	May Be Claims	Fluorspar in vein deposit.
Sec. 20 6N,9E	Boulder Mtn. 7.5'	Kandarian Fluorspar Prospect	Purple and white fluorite in vein deposit in Pre-cambrian granite.
MOHAVE COUNTY			
Sec. 28 20N,20W	Oatman 7.5'	Mossback Mine, Moss Mine	Fluorite associated with quartz, gold-silver ores in quartz monzonite.
Sec. 5 19N,20W	Oatman 7.5'	Hardy Mine	Fluorite gangue associated with quartz vein, gold-silver ores.
Secs. 7 & 9 19N,20W	Oatman 7.5'	Times Mine, Gilpen, Key-note, Miller	Fluorite gangue associated with gold-silver ores.
Sec. 7 23N,13W	Valentine 7.5'	Blue Daisy	Fluorspar veins in limestone.
Sec. 18 18N,15W	Wabayuma Peak 7.5'	Boriana Mine	Purple fluorspar, associated with tungsten-quartz veins in granite-phyllite schist cut by aplite dikes.
Sec. 34 17N,15W	Diamond Joe Beak 7.5'	Craig Spar	Fluorspar vein in granite.
Sec. 30 17N,14W	Diamond Joe Peak 7.5'		Fluorspar vein in granite.
Sec. 21 12N,14W	Artillery Peak 15'	Lead Pill, Florine	Green fine grained fluorite in fissure veins with base and precious metal mineralization.

FLUORSPAR

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
MOHAVE COUNTY (CONT)			
Sec. 17 12N,14W	Artillery Peak 15'	Potts Mtn.	Fluorspar veins.
Sec. 12 11N,13W	Artillery Peak 15'	Burro Wash Area, Red Hills Prospect	Fluorite-barite stringers with malachite, wulfenite in Artillery Formation.
Sec. 6 19N,20W	Oatman 7.5'	Navy Group	Green and red fluorite in precious metal vein deposits in granite porphyry.
Sec. 18 18N,15W	Wabayuma 7.5'	Bull Canyon Tungsten	Minor fluorite occurs with chalcopyrite molybdenite in tungsten bearing quartz veins.
Sec. 17 16N,14W	Wikieup NW 7.5'	Hopkins Claim	Fluorite in vein in schist and gneiss.
Sec. 13 12N,15W	Castaneda Hills 15'	Centennial	Fluorite with base and precious metal minerals in vein deposit.
PIMA COUNTY			
Set. 4 12S,8E	Vaca Hills 15'	Mammoth Mine	Fluorspar, barite associated with lead-silver ores in Paleozoic limestone contact with alaskite porphyry.
Sec. 15 13S,18E	Redington 15'	Sure Fire No. 1	Fluorspar, quartz, calcite veinlets, uranium minerals in schist and gneissic granite.
Sec. 23 17S,10E	Palo Alto Ranch 15'	Black Dike Group, Bobson Group	Fluorite, pyrite, pitch-blende in contact zone of gneissic-granite with basalt dike.
Sec. 29 17S,16E	Empires Mtns. 15'	New York Mine, Beuhman Mine	Fluorspar-quartz veins lead ores in limestone-quartz monzonite contact.

FLUORSPAR

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
PIMA COUNTY (CONT.)			
Secs. 5 & 8 17S,11E	Twin Buttes 15'	Neptune, Fluxore, Cardiella, Turtle Spar, Gunsight Mtn. Mine	Past production for steel flux, fluorspar veins in faulted schist and granite intruded by aplite dikes.
Sec. 4 21S,7E	Presumido Peak 15'	Les Jimfre Claims, Greenfield State Lease, Carlson, Fernstrom, Cummins	Minor fluorspar in sheer zones with sporadic scheelite and beryllium mineralization.
Sec. 25 20S,9E	Arivaca 15'	Las Guijas Mine, Black Gold Group, Immense Lodes, Grand Lodes, General Electric, Obregon Claims	Irregular, lensing quartz-fissure veins of Laramide age containing tungsten, base and precious metal mineralization with fluorite and manganese.
Sec. 24 17S,6E	Baboquivari Peak 15'	Independence Group	Fluorite with copper oxides and scheelite in a narrow fracture striking northwest.
Sec. 16 14S,18E	Happy Valley 7.5'	Driscoll Mtn. Prospect	Coarse grained crystalline green fluorspar, 3 to 4 feet wide in a faulted Devonian or Mississippian limestone.
Sec. 32 17S,7E	Baboquivari Peak 15'	Big Banana Mine	Fluorspar gangue within scheelite ores.
Sec. 28 18S,8E	Baboquivari Peak 15'	Contreras Canyon Area	
PINAL COUNTY			
Sec. 26 8S,16E	Mammoth 7.5'	Mammoth Mine, St. Anthony	Fluorspar-barite gangue; lead-zinc-copper sulfides, quartz monzonite host rock.
Sec. 16 2S,11E	Picketpost Mtn. 7.5'	Gonzales Pass Deposit	Minor fluorspar in barite veins.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
PINAL COUNTY (CONT.)			
Sec. 12 1S,13E	Pinal Ranch 7.5'	Rainbow Group, Clark Claims, Clark Prospect	Fluorite occurring sparsely as minute grains in the greisen and in vugs in-the quartz in a stock-work of subparallel veinlets of quartz in a deposit containing tungsten, molybdenum and copper mineralization,
SANTA CRUZ COUNTY			
Set. 8 23S,11E	Ruby 15'	Annie Laurie Claims	Purple fluorspar stringers, quartz, calcite, galena and sphalerite in granite.
Sec. 3 23S,16E	Harshaw 7.5'	Alta Mine	Reddish fluorite gangue, quartz, silver-lead values in quartz diorite cut by rhyolite dike.
Sec. 4 23S,16E	Harshaw 7.5'	Alta	Reddish fluorite and quartz gangue in a base metal replacement deposit in rhyolite.
YAVAPAI COUNTY)			
Secs. 26 & 27 15N,9W	Bagdad 15'	Lawler Peak Area	Fluorite associated with bismutite in granite intruded by aplite dikes.
Sec. 24 12N, 2W	Mt. Union 15'	Venezia	Purple fluorite gangue, copper ores.
Sec. 16 10N, 1W	Crown King 7.5'	Springfield Group	Purple fluorite stringers associated with copper oxides, pyrite, in grano-diorite intruded by quartz dikes.
Sec. 12 8N, 9W	Date Creek Ranch SW 7.5'	Hatton (Harris) Mine	Fluorite, barite, black calcite associated with manganese oxides in andesite.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
YAVAPAI COUNTY (CONT.)			
Sec. 7 9N, 5W	Congress 7.5'	Fluorite Crystal Area	Dodecahedra1 fluorite crystals in pegmatite.
Sec. 11 8N, 3W	Morgan Butte 7.5'	Abe Lincoln Mine	Fluorite veinlets along contact of basalt and trachyte dike in granite.
Sec. 8 8N, 2W	Copperopolis 7.5'	Swallow Mine	Fluorite gangue, quartz calcite, copper ores in granite.
Sec. 18 15N, 7W	Bagdad 15'	Black Pearl	Fluorite gangue within tungsten-bismuth ores associated with quartz bodies in granite.
Sec. 32 8N, 3W	Red Picacho 7.5'	Great Southern, Kilroy, Hogan	Fluorite, galena, quartz and calcite in a brecciated dike.
Sec. 14 8N, 4W	Sam Powell Peak 7.5'	Lucky Jack and Adams	Fluorspar with quartz and copper minerals in a fissure vein.
Sec. 11 10N, 5E	Tule Mesa 7.5'	Santa Claus, Christmas Tree Claims	Fluorspar and barite in vein deposit in a red coarse grained granite.
Sec. 36 10N, 5W	Yarnell 7.5'	Uranus, Mizpah, Total Wreck, Planet Saturn, Nest Egg, Terminal, Helen Morris, Mizpah, Total Wreck	Purple fluorite with feldspar, calcite, pyrite and uranium mineralization in vein like deposit.
YUMA COUNTY			
Sec. 15 2S,11W	Eagletail Mts. 15'	Yellow Breast Prospect	Green fluorite, galena and wulfenite in quartz veins in schist.
Sec. 36 4S, 19W	Castle Dome Mts. 15'	Flora Temple Mine	Lenses and shoots of rich, argentiferous galena, up to 10 feet wide, separated by barren or weakly mineralized zones, with barite, calcite and fluorite gangue.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
YUMA COUNTY (CONT.)			
Sec. 36 4S, 19W	Castle Dome Mts. 15'	Buckeye Vein Group, Castle Dome, New Dil-New Chance No. 1, Lady Edith & New Chance No. 4, Big Dome-Dusty No. 4, Hopkins, Miller, Norma, Caledona, William Penn	Locally abundant fluorite as gangue in lead-silver-fluorspar vein deposit; old underground back fill and surface dumps have been reworked for fluorspar.
Sec. 12 5S, 19W	Castle Dome Mts. 15'	Colorado, Lincoln, La Colorado, Modesti Property	Spotty bunches and pockets of partly-oxidized, argentiferous galena in a gangue of calcite, fluorite and minor barite.
Sec. 25 4S, 19W	Castle Dome Mts. 15'	Haack Mine Group, Barite Nip No. 1, Bronza-Hard-rock, Algodones Nip No. 2, Abe No. 10, Senora Mine	Spotty, partially oxidized, argentiferous galena with minor oxidized copper and zinc mineralization and gangue of crystalline calcite, fluorite and barite in narrow, lensing veins in Mesozoic shale.
Sec. 24 4S, 19W	Castle Dome Mts. 15'	Hull Mine, Rialto Group, Chief of Dome, Diana, Surprise, Douglas and Pocahontas, Railroad	Past production of lead, silver and fluorspar from fissure veins in shales cut by porphyry dikes; production of fluorspar was used for steel flux.
Sec. 31 5S, 18W	Castle Dome Mts. 15'	Mable, Mabel, Puckett	Spotty pockets and irregular masses of partly oxidized argentiferous galena in a gangue of crystalline calcite, fluorite and minor barite in fissure veins in Mesozoic shales.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
YUMA COUNTY (CONT.)			
Sec. 31 4S,18W	Castle Dome Mts. 15'	Adams Mine Group, Dandy Boy Group, Puzzler, Silver Dollar	Irregular and spotty masses of galena in a gangue of crystalline fluorite in lensing faultzonecuttingshale.
Sec. 36 4S,19W	Castle Dome Mts. 15'	Little Dome Mine, Linda Extension, De Luce, Haack, Wall	Past production of lead, silver and fluorspar from fissure veins in shales cut by porphyry dikes; production of fluorspar was used for steel flux.
Sec. 11 8S, 15W	Mohawk 7.5'	Renner Barite, Toltec, Renner & Sam, Mohawk Claims, Renner Mine	Lensing masses of barite crystals with minor fluorite and crystalline calcite in fault zone bordered by irregular layers of chlorite and calcite.
Sec. 15 4S, 15W	Engesser Pass 7.5'	Silver Prince Mine, Addie Group, Nottbusch Mine	Irregular bunches of argentiferous galena with barite, minor fluorite and silver and copper mineralization in lensing veins in brecciated fault zones in Mesozoic schist.
Sec. 6 2S,16W	Kofa Butte 15'	King of Arizona Lead-Fluorite	Fluorite, galena and calcite occur in a vein of faulted schist near a monzonite porphyry dike.
Sec. 36 4S,19W	Castle Dome Mts. 15'	Sonora Mine, Linda Group	Irregular veins and masses of oxidized argentiferous galena in a gangue of banded, blocky calcite, crystalline fluorite, bladed to massive barite and minor quartz; past producer of lead and fluorspar.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
APACHE COUNTY			
Sec. 22 41N,24E	Dinnehosto 15'	Garnet Ridge	Pyrope garnets in volcanic breccia pipe.
Sec. 11 2N,6W N. B & M	Buell Park 15'	Buell Park	Pyrope garnets in kimberlite tuff with some olivine.
9 Mi. SW of Mexican Water	Dinnehotso 15'	Buell Park	Pyrope garnets in volcanic breccia pipe.
3 Mi. West of Mexican Water	Mexican Water 7.5'	Mexican Water	Garnet bearing material in alluvium.
GILA COUNTY			
NE1/4 8N, 13E	Young 15'		Brown garnet bed associated with magnetite.
Sec. 30 4S, 16E (approx.)	Christmas 7.5'	Dripping Springs Mtns.	Massive andradite beds, wollastonite.
Sec. 30 4S, 16E	Christmas 7.5'	Christmas Pit & Underground, Inspiration MS 4443, Gila Copper Sulphide Co. Claim, Saddle Mt Co Claims	Green andradite garnet "rock" resulting from contact metamorphism of limestone; deposit is noted for its copper production.
GRAHAM COUNTY			
Sec. 36 4S,19E	San Carlos Reservoir 15'	Quartzite Mtn.	Andradite garnet in metamorphosed limestone in Paleozoic formation.
GREENLEE COUNTY			
Sec. 16 4S, 29E	Clifton 15'	Morenci Open Pit, Montezuma, Manganese Blue, Ryerson, Humboldt, King, Copper King	Massive andradite in contact metamorphic (scarn) deposit at the southwest corner of large open pit copper mine.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
GREENLEE COUNTY (CONT.)			
Sec. 4 4S, 29E	Clifton 15'	Shannon Mtn.	Andradite garnet in altered limestone.
MARICOPA COUNTY			
Sec. 36 2S,1E	Montezuma Peak 7.5'	Sylvania Mica	Massive garnet associated with pegmatite.
MOHAVE COUNTY			
Sec. 6 20N,14W	Hualapai Peak NE 7.5'	Hualapai Placer Claims	Large magnetite placer depositwith possible garnet and zircon by products.

GRAPHITE

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
MOHAVE COUNTY			
Sec. 20 23N,17W	Stockton Hill 7.5'	Canyon Station Wash, Black-bird Mine	Graphite veins in Precambrian schist.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
COCHISE COUNTY			
Secs. 2,11,12, 13,14 & 15 24S,19E	College Peaks 15'	D Hill Area AKA: Gypsite Quarries	Past production for gypsum blocks and plaster; gypsite and gypsum overlying clay and shale.
Sec. 4 18S,28E	Squaretop Hills 15'	Turkey Ridge Creek Deposits	Gypsum beds with interbedded sediments.
Secs. 32 & 33 19S,19E and Secs. 4, 5,9,10, 15 & 16 20S,19E	Mustang Mtns. 7.5'	Southern Whetstone Mtns Gypsum Deposits	Gypsum beds interbedded with siltstone and Epitah dolomite; covers many sections.
Sec. 19 18S,21E	St. David 15'	Land	Gypsum beds interbedded with clay, caliche and sandstone.
Secs. 30 & 32 18S,19E	Benson 15'	Whetstone Mtns Gypsum Deposits	Gypsum beds in Epitah dolomite.
Secs. 20 & 21 17S,20E	Benson 7.5'	Gypsum Claims	Gypsum lenses, selenite crystals and interbedded bentonitic clay.
COCONINO COUNTY			
Sec. 32 25N,11E (proj.)	Standing Rocks 7.5'	Central Wash	Gypsum beds, gypsite in Moenkopi shale in Triassic Formation.
Sec. 21 19N,15E	Tucker Mesa 7.5'	Acme Cement Plaster	Flat lying gypsum beds in Moenkopi shale and sandstone.
Secs. 32 & 33 26N,11E	Standing Rocks 7.5' (Projected)	Black Falls Gypsum	Irregular gypsum lenses locally 4' thick in Triassic Moenkopi Formation; Est. 362,500 tons, of 97.5% gypsum.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
GILA COUNTY			
Secs. 14 & 17 7N,21E	Cedar Creek 7.5'	Middle & East Cedar Creeks	Gypsum beds in Supai Formation in Permain formation.
Sec. 4 7N, 20E	Cibecue Peak 7.5'		Gypsum beds in Permian Supai Formation.
Sec. 16 7N,22E	Round Top Mtn. 7.5'	C Dart Spring Area	White-gray gypsum interbedded silt-stone.
Sec. 8 6N,21E	Cone Butte 7.5'		
Sec. 9 1S,18E	Bucket Mtn. 7.5'	San Carlos Gypsum Deposit	Granular gypsum inter bedded with mudstone in lake sediments in Cenozoic formation.
LA PAZ COUNTY			
Sec. 1 6N, 18W	Bouse 15'	Alabaster Frog	Gypsum deposit in altered limestone; specimen of carving quality varicolored alabaster from this locality are in Arizona Mineral Museum collection.
Sec. 2 4N,12W	Lone Mtn. 15'	A-Z Gypsum Mine	Aggregates of sele-nite crystals mixed with clay and soil in a small playa deposit down drain-age from the Harquahala Gypsum Mine; past production of gypsite for agri-cultural use.
Sec. 30 5N,11W	Lone Mtn. 15'	Harquahala Gypsum Mine, Harquahala Mtns., Desert Mtn. Gypsum	Past production of gypsum interbedded with limestone; gypsum used for agriculture soil supplement; an irregular, lensing, white, crystalline bed 1-12 feet thick, of gypsum in folded Permian (?) limestone.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
LA PAZ COUNTY (CONT.)			
Sec. 6 5N, 17W	Bouse 15'	Mudersback Gypsum, Tuck	Bed or stratun of gypsum several feet wide and several hundred feet long; gypsum has resulted from the alteration of limestone in place; often intermixed with limestone; past production of gypsum for local agricultural use.
MARICOPA COUNTY			
Secs. 26 & 34 7S,5W	Theba 15'	Black Gap	Gypsum beds, celestite interbedded in tuff in Tertiary formation.
Sec. 24 6N, 8W	Aguila 15'	Black Butte Uranium	Gypsum in Tertiary lake bed sediments.
Sec. 14 6N, 8W	Aguila 15'	Jar Claim	Gypsum and quartz veinlets and seams in Tertiary lake bed sediments.
Sec. 34 7S,5W	Theba 15'	Montezuma Claims, Strontium Group	Celestite with gypsum in sandstone and conglomerate.
Sec. 4 8S,5W	Theba 15'	Strontium Group	Celestite and gypsum interbedded with sandstone and conglomerate.
MOHAVE COUNTY			
41N,13W	Wolf Hole Mtn. NW 7.5'	Black Rock Canyon	Gypsum lenses in Triassic Moenkopi shale.
Secs. 3 & 4 41N,14W	Littlefield 15'	Beaver Dam Mtns.	Past production for agriculture, gypsum lenses in limestone.
40N,10W	Gyp Pocket 7.5'	Hurricane Cliff	Gypsum in Permian Kaibab Limestone.
39N,12W	Sullivan Draw 7.5'	Black Rock Springs	Gypsum lenses in Triassic Moenkopi shale.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
MOHAVE COUNTY (CONT.)			
Sec. 10 et al 40N,12W	Lizard Point 7.5' Wolf Hold Mtn. 7.5'	Mokaac Wash Area AA	Past production for agriculture use, gypsum lenses in red beds between Permian limestone.
SE1/4 39N,12W	Wolf Hole Mtn. E 7.5'	Wolf Hole	Gypsum in Permian Kaibab Limestone.
E1/2 38N, 5W	Heaton Knolls 15'	Antelope Wash	Gypsum in Kaibab Limestone.
Sec. 26 36N, 4W	Jumpup Canyon 15'	Hack Canyon	Gypsum lenses in limestone breccia, Kaibab Limestone,
35N, 7W	Mt. Trumbull NE 7.5'	Toroweap Canyon	Gypsum lenses in Kaibab Limestone.
NW1/4 30N,20W	Senator Mtn. 15'	Detrital Wash	Gypsum beds in Muddy Creek Formation.
Sec. 27 16N,13W	Tule Wash 7.5'	Burro Wash	Gypsum in Cenozoic lake beds.
Sec. 13 40N,13W	Wolf Hole Mtn. W 7.5'	Ace #1 - #19	White, bright gypsum of high purity.
Sec. 26 41N,12W	Lizard Pt 7.5'	Baxter Gypsum, Gypsum City	Extensive gypsum deposits.
Sec. 1 29N,21W	Senator Mtn. 15'	Gypsum 1-6	Gypsum prospect; no information.
Sec. 21 30N,20W	Senator Mtn. 15'	Lucky 44	Selenite and calcite crystallization abundant in lacustrine deposits of interbedded bentonitic clay, opalitic silica and fluvial sandy conglomerate; carnotite and uranophane as surface coating on bedding planes.
Sec. 11 41N,11W	Yellowhorse Flat 7.5'	Unknown Mine and Prospects	Gypsum deposits.
Sec. 30 26N,16W	Mt Tipton SE 7.5'	Red Lake Area Salt Deposits 1	Evaporite deposit containing sodium chloride and anhydrite.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
MOHAVE COUNTY (CONT.)			
Sec. 28 26N,16W	Music Mtns SW 7.5'	Red Lake Salt Deposits 2	Evaporite deposit containing sodium chloride and anhydrite.
NAVAJO COUNTY			
Sec. 15 19N,15E	Tucker Mesa 7.5'	Toltec Divide	Former production for cement, plaster, agricultural purposes, alabaster-gypsum beds overlain by Moenkopi shale in Triassic age.
Sec. 9 13N,21E	Snowflake 7.5'	Snowflake Quarry	Gypsum in Triassic Moenkopi shale.
Sec. 16 16N,22E	Holbrook 15'	Woodruff	Gypsum in Triassic Moenkopi shale.
Sec. 18 9N,20E	Limestone Canyon N 7.5'	Hop Canyon	Gypsum in Permian Supai Formation.
Sec. 33 9N,21E	Show Low 15'		Gypsum in Permain Supai Formation.
Sec. 20 8N, 19E	Cibecue 15'		
Sec. 15 19N,15E	Winslow 15'	Acme Cement	Flat bedded gypsum resting on red shale and overlain by a green shale all probably of Permain age; gypsum approaches alabaster in fineness.
Sec. 31 9N,22E	Show Low 15'	Ft. Apache Gypsum	Gypsum and gypsiferous beds, 1-40 feet thick.
PIMA COUNTY			
Secs. 3 & 4 13S,14E	Tucson North 7.5'	Alamo Springs	Past production, gypsum calcined for plaster, gypsum beds in clay, shale, sandstone; Cenozoic?
Secs. 12 & 13 16S,16E	Rincon Valley 15'	Vail	Gypsum and gypsite lenses in sediments. Cenozoic.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
PIMA COUNTY (CONT.)			
Sec. 2 17S,12E	Twin Buttes 15'	San Xavier	Gypsum lenses in Permian limestone.
Secs. 19,28,29, 30,32,33 17S,17E Secs. 3, 4 & 8 18S,17E	Empire Mtns. 15'	Empire Mtns.	Irregular gypsum beds in marl, limestone; Permain
Secs. 13 & 14 18S,15E	Sahuarita 15'	Helvetia	Gypsum beds in Epitah dolomite; Permian.
Sec. 2 17S,12E	Twin Buttes 15'	Twin Buttes No. 1	
PINAL COUNTY			
Sec. 25 5S,15E	Winkelman 7.5'	Winkelman	
Secs. 2 & 11 5S,16E	Christmas 7.5'	Ash Creek	Gypsum in andesite flows.
Sec. 23 6S,16E	Saddle Mtn. 7.5'	Crystal Cove	White massive gypsum beds.
Secs. 26 & 27 6S,16E	Saddle Mtn. 7.5'	Feldman, Winkelman Gypsum Pit	Quarry, massive gypsum beds in Cenozoic lake sediments; processed into plaster board, agricultural applications.
Secs. 26, 35 & 36 6S,16E	Lookout Mtn. 7.5'	Arizona Gypsum	Quarry; gypsum beds in Cenozoic lake sediments, for agricultural use and cement retarder.
Secs. 13 & 14 7S,16E	Lookout Mtn. 7.5'	Pinal Mammoth Gypsum	Past producer; gypsum interbedded with silt; gypsum used for agricultural purposes.
Secs. 10 & 14 7S,16E	Lookout Mtn. 7.5'	Garcia Gypsum	Past production; agricultural use, gypsum beds in lake sediments.

GYPSUM

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
YAVAPAI COUNTY (CONT.)			
Sec. 16 13N, 5E	Camp Verde 7.5'	Verde River Deposit	Diatomite beds inter-bedded with gypsum, clays, and limestone.
YUMA COUNTY			
Sec. 24 4S,19W	Castle Dome Mts. 15'	Castle Dome Gypsum	Gypsum occurrence reported.

LIMESTONE - DOLOMITE (INCLUDING SOME MARBLE)

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
APACHE COUNTY			
Sec. 33 40N,23E	Dinnehotso 7.5,	Dinnehotso	Limestone lenses within Navajo sandstone.
2-3 Mi. NW of Chinle Wash Bridge	Mexican Water 7.5'	Chinle Wash	Limestone interbedded with Navajo sandstone.
1 Mi S of Chinle Wash Bridge	Mexican Water 7.5'	Chinle Wash	Cherty limestone outcrops.
COCHISE COUNTY			
Sec. 24 20S,22E	Tombstone 7.5'	Tombstone	Massive dolomitic limestone-shale in Naco formation.
Secs. 28 & 29 16S,30E	Cochise Head 15'	Cochise Marble	Dolomitic marble in Escabrosa limestone.
Sec. 10 16S,23E	Cochise 15'	Ligier Marble Quarries AKA: Dragoon Marble Quarries.	Producer of marble and slate. Metamorphosed upper paleozoic limestone.
Sec. 22 23S,21E	Nicksville 7.5'	Corbett Marble Quarry	Past producer of marble. Metamorphosed upper paleozoic limestone.
Sec. 17 23S,24E	Bisbee 7.5'	Yakima	Dolomite in upper half of Martin limestone. Black-grey dolomite with silica.
Sec. 36 23S,20E	Sunnyside 15'	Stump Canyon	Escabrosa limestone and marble.
Sec. 7 24S,26E	Paul Spur 7.5'	Paul's Lime Quarry	Active producer of lime, metallurgical uses and food processing. Mural limestone.
Sec. 14 24S,25E	Bisbee SE 7.5'	Bisbee SE No.1	Dolomitic limestone, Martin formation.
Secs. 12 & 13 16S,22E	Dragoon 15'	Centurion Prospect	Dolomitic marble.

LIMESTONE - DOLOMITE (INCLUDING SOME MARBLE)

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
COCHISE COUNTY (CONT.)			
Secs. 28 & 29 16S,30E	Cochise Head 15'	Whitetail Canyon, AKA: Cochise Marble	Marble in Escabrosa limestone-dolomite.
Sec. 20 15S,29E	Cochise Head 15'	Pavanazzo & Pentelicus Quarries.	Past production of dolomitic marble.
Sec. 4 16S,23E	Dragoon 15'	Marmobello Mine	Active and/or past producer.
COCONINO COUNTY			
1 mile SW of Goldtooth	Goldtooth 7.5'		Limestone lenses in Navajo sandstone.
8 miles NW of Tonalea	Shonto 7.5'		Bluish-gray limestone lenses in Navajo sandstone.
1/4 mile W of Cow Springs	Cow Springs 7.5'		Limestone lenses in Navajo sandstone in Jurassic Formation.
Secs. 20 & 29 22N, 7E	Sunset Crater West 7.5'	Humphrey Peak No. 1	White limestone and marble in Redwall Formation.
Sec. 25 21N, 8E	Flagstaff East 7.5'	Winona No. 1	Kaibab limstone in Permian Formation.
Secs. 2 & 3 20N, 7E (approx.)	Flagstaff West 7.5'		Kaibab limstone in Permian Formation.
Secs. 20 & 29 29N, 2E	Tusayan West 7.5' and Red Butte 7.5'	Anita	Limestone breccia fragments in base metal mineralized breccia pipe.
GILA COUNTY			
Secs. 31, 32 & 34 9N,11E	Picture Mtn. 7.5'	Chalk Mtn. Area Grantham-Withers Property	Limestone.
Sec. 24 1N,15E	Globe 7.5'	Limestone Quarry	Naco limestone in Pennsylvanian formation,

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
GILA COUNTY (CONT.)			
Secs. 17 & 20 5N,18E (proj.)	Beckers Butte 7.5'	Flying V Canyon	Kaibab and Ft Apache limestone in Permian formation.
Secs. 27 & 28 4.5N,21E	Forks Butte 7.5'	Horse Mesa	Naco limestone in Pennsyvanian formation.
Secs. 9 & 10 1N,15E	Globe 7.5'	Hoopes Lime Pit, Moore	Past producer of limestone for lime and metallurgical flux produced from Escabrosa limestone in Mississippian formation.
Sec. 11 5S,15E	Hayden 7.5'	Hayden Quarry	Active quarry, lime and metall. flux produced from Escabrosa limestone in Mississippian formation.
Sec. 27 2S,15E	El Capitan 7.5'	Swan Property	
GREENLEE COUNTY			
Sec. 33 3S,29E	Clifton 15'	Morenci Quarry	Past production, Modoc limestone in Mississippian Formation for smelter flux.
Sec. 15 4S,29E	Clifton 15'		Blue-grey Modoc limestone, dolomite and quartzite.
Sec. 27 4S,29E	Clifton 15'		Limestone-dolomite in Modoc Formation.
Sec. 21 6S,31E	York Valley 15'	Iceland Spar	Calcite vein in volcanic rock. Some may meet optical requirements.

LIMESTONE - DOLOMITE (INCLUDING SOME MARBLE)

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
LA PAZ COUNTY			
Set. 1 8N, 16W	Swansea 15'	Arizona Midway Mine	Schist containing limestone bands. Limited exposures of varicolored marble bounded by schist.
Sec. 3 8N, 15W	Swansea 15'	Battleship Peak	Dolomitic limestone.
Sec. 18 5N, 10W	Gladden 15'	Blue Tank Canyon	Dolomitic marble.
Sec. 16 5N, 11W	Lone Mtn. 15'	Bracken Marble Claims	Marble deposit.
Sec. 35 10N, 16W	Swansea 15'	Buckskin Mtns.	Coarse crystalline limestone and marble.
Sec. 1 8N, 16W	Swansea 15'	Chisholm Claims	Varicolored marble. Orange red to brown red is most common. Green, red and white marble also noted.
Sec. 23 4N, 18W	Quartzsite 15'	Grace 1 and 2	Limestone and marble deposit.
Sec. 30 5N, 11W	Lone Mtn. 15'	Harquahala Gypsum Mine, Harquahala Mtns., Desert Mtn. Gypsum	Past production of white limestone, marble and gypsum.
Sec. 27 4N, 13W	Hope 15'	Martin Peak Area	Dolomitic limestone.
Sec. 6 11N, 16W	Swansea 15'	Planet (New Plant) Mine	Past production of limestone used locally for metallurgical flux at copper smelter.
Sec. 5 4N, 12W	Hope 15'	Thompson Group	Dolomite occurrence.
Sec. 8 7N, 17W	Bouse 15'	Townsend Marble Claims	Past production of "blood-red" marble from deposit of locally metamorphosed limestone for decorative purposes.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
LA PAZ COUNTY (CONT.)			
Sec. 9 5N,11W	Gladden 15'	White Marble Group, Marble Mine, Amber	White marble with lesser local occurrences of pink marble. Metamorphosed Paleozoic limestone. Past production of white marble for roofing granules, fillers, and terrazzo.
MARICOPA COUNTY			
Sec. 2 6N,5W	Vulture Mtns 15'	Calsite, Banker Lime	Dolomitic marble.
Sec. 17 4N, 10W	Lone Mtn. 15'	Law Claims, Freeze Tail	Dolomitic marble.
Sec. 15 6N, 5E	Wildcat Hill 7.5'	White Ledge Property	Dolomitic marble.
Sec. 19 6N,5E	Cave Creek 7.5'	Lone Mtn. Group, White Eagle Mine	Past production, stucco filler, from Tertiary dolomitic limestone.
Sec. 6 4N,10W	Lone Mtn. 15'	Rainbow, Copper Penny, Norps Group	Paleozoic/Mesozoic limestone-dolomites at base/precious metal vein deposit.
Sec. 4 6N,2W	Garfias Mtn. 7.5'	Sam Group	Calcite veins and stringers with quartz.
Sec. 29 5N, 10W	Lone Mtn. 15'	Snowball, Snowball-Monolith	Past production for cement flux, fluorspar lenses and veins in faulted limestone cut by felsite dikes.
Sec. 29 5N,9W	Big Horn Mtns. 15'	Victory # 1&2, Gallagher & Flynn, Black Warrior	Calcite and quartz gangue manganese veins in granite.
Sec. 20 5N, 8W	Aguila 15'	Valley-View, Yarnell, Prieta Chinda, Wheeler Claims, Manganese Development	Manganese ores with fluorite, barite, black calcite, and chalcedony in andesite breccia.

LIMESTONE - DOLOMITE (INCLUDING SOME MARBLE)

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
MARICOPA COUNTY (CONT.)			
Sec. 25 5N,10W	Lone Mtn. 15'	Webb Claims	Calcite gangue with manganese mineralization in two fracture zones in andesitic lava.
MOHAVE COUNTY			
W1/2 32N,16W	Iceberg Canyon 15'	Tassai Ridge	Dolomitic limestone.
Secs. 19 & 30 25N,10W	Peach Springs 7.5'	Peak Springs Area	Flat-lying Mississipian Redwall dolomite.
Sec. I8 11N,13W	Artillery Peak 15'	Oversight	Calcite as gangue in manganese deposits.
Sec. 12 24N,11W	Williams 7.5'	Shipley Pit	Dolomite used for railroad balast.
Sec. 29 11N,14W	Artillery Peak 15'	Silverfield	Limestone pods in schist. Some pods contain precious and base metal replacement deposits.
E1/2 16N,13W NW 15N,12W	Wikieup 7.5'	Big Sandy Formation	Bedded limestone, light brown or light green, thin to thick bedded and commonly vuggy and wavy bedded.
Sec. 7 23N,13W	Valentine 7.5'	Blue Daisy	Faulted limestone containing fluorspar deposit.
Sec. 21 34N,14W	Grand Gulch Bench 7.5'	Grand Gulch, Adams Patented	Copper and silver mineralization in limestone.
Sec. 21 11N,15W	Castaneda Hills 15'	Mesa Manganese	Paleozoic limestone, inpart mineralized with manganese.
Sec. 6 11N,12W	Artillery Peak 15'	Black Diamond	Calcite gangue in manganese deposit.
Sec. 36 12N,14W	Artillery Peak 15'	Last Chance	Calcite gangue in manganese deposit.

LIMESTONE - DOLOMITE (INCLUDING SOME MARBLE)

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
MOHAVE COUNTY (CONT.)			
Sec. 1 11N,13W	Artillery Peak 15'	Black Jack Group	Calcite and barite gangue minerals with manganiferous material along fault zone.
Sec. 3 23N,18W	Chloride 7.5'	Johnny Bull, Silver Knight Claims	Calcite and quartz gangue in base and precious metal deposit.
Sec. 21 30N,20W	Senator Mtn. 15'	Lucky 44	Calcite and selenite crystallization abundant in lacustrine deposits of interbedded bentonitic clay, opalitic silica and fluvial sandy conglomerate. Carnolite and uranophane as surface coating on bedding planes.
Sec. 31 12N,13W	Artillery Peak 15'	Maggie	Calcite gangue in manganese deposit.
Sec. 13 14N,11W	Kaiser Spring 7.5'	Magnesite Deposit	Variable and discontinuous beds of magnesite formed by leaching of CaO from dolomite. Deposits of probably Tertiary age also contain dolomite and limestone.
Sec. 18 11N,13W	Artillery Peak 15'	Oversight	Calcite gangue in manganese deposit.
Sec. 6 19N,20W	Oatman 7.5'	Navy Group	White and gray crystalline calcite with green and red fluorite in precious metal vein deposit in granite porphyry.
Sec. 36 12N,14W	Artillery Peak 15'	Polianite, Tate Manganese	Black and white calcite with small amounts of barite with manganese in narrow lenticular shoots along parallel fracture cutting Sandtrap conglomerate.

LIMESTONE - DOLOMITE (INCLUDING SOME MARBLE)

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
MOHAVE COUNTY (CONT.)			
Sec. 36 12N,14W	Artillery Peak 15'	Lone Star	Calcite in a manganese deposit in a basalt flow.
Sec. 31 12N,13W	Artillery Peak 15'	Rudy Group, Nigger Boy	Calcite gangue in manganese deposit.
Sec. 1 11N,14W	Artillery Peak 15'	Shannon	Calcite gangue in manganese deposit.
Sec. 20 19N,20W	Oatman 7.5'	Vivian, Jacks shaft, Leland-Mitchell-Vivian Group, Oro Fino Group	Crystalline dark calcite gangue in precious metal vein deposits.
Sec. 24 20N,21W	Oatman 7.5'	Meals Ledge, W. H. Meals	Gold bearing calcite vein.
NAVAJO COUNTY			
Secs. 5, 6 & 7 7N,20E	Cibecue 15'	Cedar Mesa Tank	Pennslyvanian Fossiliferous limestone.
Sec. 22 8N, 22E	Show Low 15'	East Fought Ridge	Permian limestone overlain by sandstone.
Sec. 23 8N,22E	Show Low 15'	West Fought Ridge	Permian Kaibab limestone in outcrops.
Sec. 27 36N,15E	Shonto 7.5'	Shonto Area	Bluish-grey limestone bed, interbedded sandstone.
2.3 mi. N. of Kayenta	Agathla Peak 15'		
PIMA COUNTY			
Sec. 26 12S,11E	Avra 7.5'	Twin Peaks Quarry	Past producer. Naco limestone (Penn-Permian) used for making cement.
Secs. 11 & 14 18S,15E	Corona De Tucson 7.5'	Santa Rita Limestone Quarry	Past producer, Escabrosa limestone in Mississippian formation used for lime products.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
PIMA COUNTY (CONT.)			
Secs. 17 & 18 16S,17E	Rincon Valley 15'	Aqua Verde	Epitah dolomite and Colina limestone. Permian
Sec. 30 17S,17E	Empire Mtns. 15'	Andrada Marble Quarry	Past producer. Dolomitic-limestone in Mississippian formation processed for roofing granules, feed additives, and plaster flux.
Sec. 21 17S,16E	Empire Mtns. 15'	Serasio, Blowout Marble	Dolomitic marble.
Sec. 19 17S,17E	Empire Mtns. 15'	Burris Marble, Hamill Marble	Dolomitic marble.
Sec. 27 17S,16E	Empire Mtns. 15'	Empire Mtns.	Limestone.
Sec. 14 18S,11E	Twin Buttes 15'	Jay Jay Claims	Marble.
Sec. 19 18S,11E	Palo Alto Ranch 15'	Marble Top	Escabrosa limestone. Mississippian
Sec. 7 14S,6W	Kino Peak 15'	Lime Hill	Mississippian-Devonian limestone.
Sec. 19 18S,11E	Palo Alto Ranch 15'	White Hope Quarry	Limestone and marblized limestone. Marble is typically fine grained and jointed. Zone of high calcium carbonate rocks are separated by zones of dolomite.
Sec. 4 15S,12E	Cat Mtn. 7.5'	Snyder Hill Limestone Deposit	Limestone deposit.
Sec. 30 17S,17E	Empire Mtn. 15'	Simons Marble	Whitemarblewith some limestone.
Sec. 15 11S,13E	Twin Buttes 15'	Catalina Marble Quarry	White marble used in plaster, crushed stone, and "white sand".

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
PIMA COUNTY (CONT.)			
Sec. 19 17S,17E	Empire Mtn. 15'	Empire Mtn. No. 5	
Sec. 29 17S,17E	Empire Mtn. 15'	Empire Mtn. No. 3	
Sec. 30 17S,17E	Empire Mtn. 15'	Empire Mtn. No. 2	
Sec. 19 17S,17E	Empire Mtn. 15'	Echo Group	
Sec. 25 12S,8E	Silver Bell Peak 15'	Happy Jack	Palezoic limestone and dolomite.
PINAL COUNTY			
Sec. 36 1S,12E	Superior 7.5'	Superior	Dolomite in Martin Form. Devonian.
Sec. 7 5S, 6E	Gila Butte SE 7.5'	Sacaton Mtns.	Devonian limestone.
Sec. 29 9S,17E	Peppersauce 7.5'	San Manuel Limestone	Past producer of limestone and silica for metallurgical use in treating copper ores.
Sec. 19 10S,18E	Peppersauce Wash 7.5'	Black Hills	Past producer. Escabrosa limestone used for smelter flux. Mississippian.
Secs. 28, 33 & 34 10S,16E	Campo Bonito 7.5'	Santa Catalina Mtns.	Escabrosa limestone. Mississippian.
Sec. 32 10S,17E	Campo Bonito 7.5'	San Manuel Lime Pit	Limestone mined for manufacture of lime used in treating copper ores.
Sec. 14 3S, 13E	Sonora 7.5'	Lime Pit	Limestone mined for manufacture of lime used in treating copper ores.
Sec. 33 10S,13E	Tortolita Mtn. 15'	San Francisco Marble Quarry	Past producer of white marble for crushed stone and specialty sand.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
PINAL COUNTY (CONT.)			
Sec. 33 10S,13E	Tortolita Mtns. 15'	Tortolita Mtns.	White Escabrosa limestone and marble.
Sec. 22 1S,11E	Picketpost Mtn. 7.5'	El Marmol Claims, Superstition Secret Stone Co.	Thick section of lower Mescal limestone cut by diabase.
Sec. 5 7S,16E	Lookout Mtn. 7.5'	San Manuel Limestone Quarry	Past producer of limestone and silica for metallurgical use in treating copper ores.
Sec. 7 3S,13E Secs. 1, 6 & 12 3S,12E	Teapot Mtn. 7.5'	Star of Arizona	Naco limestone. Large deposit of possible economic interest for production of cement.
Sec. 33 10S,13E	Tortolita Mtn. 15'	San Francisco Marble Quarry	Past producer of white marble for crushed stone and specialty sand.
SANTA CRUZ COUNTY			
Sets. 29, 30 & 33 22S,18E Secs. 24 & 25 22S,17E	Canelo Pass 7.5'	Canela Hills	Paleozoic limestone blocks interbedded in welded tuff.
Sec. 15 23S,16E	Harshaw 7.5'	Mowry Area	Escabrosa (Miss.) limestone.
Sec. 13 20S,13E Secs. 18 & 19 20S,14E	Mt. Wrightson 15'	Concha	Permian concha limestone.
Secs. 8 & 9 20S,12E	Tubac 15'	Amado Area	Paleozoic white limestone.
YAVAPAI COUNTY			
S1/2 22N, 6W			Dolomitic Mississippian Redwall limestone.

LIMESTONE - DOLOMITE (INCLUDING SOME MARBLE)

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
YAVAPAI COUNTY (CONT.)			
Sec. 5 18N, 1W Sec. 32 19N, 1W	Paulden 15'	Drake	Active quarry, fresh water in Tertiary limestone, used for smokestack scrubbing.
Sec. 26 25N,10W	Nelson 7.5'	Nelson Quarry	Active quarry, Mississippian Redwall limestone processed into hydrated lime and quicklime.
Secs. 25, 26 & 27 18N, 2W	Paulden 7.5'	Upper Chino Valley	Past production. Mississippian Redwall limestone and Devonian Martin limestone for lime manufacture,
Sec. 11 16N, 2E	Munds Draw 7.5'	Clarkdale Quarry	Quarry, Mississippian Redwall limestone processed for cement and sugar refining.
Secs. 31 & 32 18N, 2E	Clarkdale 15'	Perkinsville	Past production, Mississippian Redwall limestone and dolomitic limestone.
NE1/4 21N, 7W	Turkey Canyon 15'	Juniper Mtns.	Mississippian-Devonian dolomitic limestone,
Sec. 34 18N, 2W	Paulden 15'	Abra	Devonian Martin limestone.
Secs. 5 & 6 19N, 1W Sec. 1 19N, 2W	Paulden 7.5'	Limestone Canyon	Mississippian Redwall limestone.
Sec. 31 18N, 2E	Perkinsville 7.5'	Storey Quarry	Past production of limestone from quarry in the Mississippian Redwall limestone. Production was used for lime manufacture and for metallurgical flux.
Sec. 16 16N, 2E	Munds Draw 7.5'	Limestone Quarries, Divide	Limestone quarry.

LIMESTONE - DOLOMITE (INCLUDING SOME MARBLE)

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
YAVAPAI COUNTY (CONT.)			
Sec. 28 18N, 1E	Hell Point 7.5'	Hell Point 4	Prospects in Redwall limestone which yielded coarse calcite, cubes of galena and wulfenite and vanadinite crystals.
Sec. 36 10N, 5W	Yarnell 7.5'	Uranus, Mizpah, Total Wreck, Planet Saturn, Nest Egg, Terminal, Helen Morris, Mizpah Total Wreck	Purple fluorite with feldspar, calcite, pyrite and uranium mineralization in vein like deposit.
Sec. 1 18N, 2W	Paulden 7.5'	Apache Limestone	Redwall and Martin limestone of high lime and low magnesia content.
Sec. 13 8N, 5W	Sam Powell Peak 7.5'	Iron City	High lime content in iron rich precious metal vein deposit.
Sec. 22 10N, 5E	Bloody Basin 7.5'	Marble Mine, White Castle	Past producer of marble or onyx. White marble crushed for decorative uses and filler.
Sec. 3 16N, 2E	Clarkdale 7.5'	Phoenix Cement Co. Claims	Limestone deposit held for future reserves for cement manufacture.
YUMA COUNTY			
Sec. 15 8S,21W	Fortuna 7.5'	Marble Gully	White crystalline marble, greenish banded marble, and greenish marble banded with quartz.

MAGNESITE-BRUCITE

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
MOHAVE COUNTY			
Sec. 8 19N,20W	Oatman 7.5'	Mag Group	Brucite beds in sedimentary beds (Miocene) overlain by andesite.
Sec. 17 19N,20W	Oatman 7.5'	Midnight Group	White brucite layers overlain by andesite.
Secs. 17, 18 & 20 19N,20W	Oatman 7.5'	White House Group, Martin	Past production of brucite.
Sec. 25 20N,21W	Oatman 7.5'	Moss Wash Group	Brucite layers in volcanics.
Sec. 13 14N,11W	Kaiser Spring 7.5'	Magnesite Deposit	Variable and discontinuous beds of magnesite formed by leaching of CaO from dolomite; deposits of probably Tertiary age also contain dolomite and limestone.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
COCHISE COUNTY			
Sec. 23 14S,28E	Cochise Head 15'	Beryl Hill & Live Oak Prospects	Feldspar, beryl, mica and quartz in pegmatite; past producer of beryl.
Sec. 25 20S,21E	Fairbank 7.5'	Charleston Lead Mine. AKA: Woolrey, Brother George, Mary Jo Group	Past production of scrap mica, sericite bodies in faulted volcanic rocks.
GRAHAM COUNTY			
Sec. 25 8S,22E	Blue Jay Peak 7.5'	Snowrock Claims	Muscovite in pegmatite with quartz and feldspar.
Sec. 10 9S,23E	Webb Peak 7.5'	Twilight and Grey Groups	Mica and scattered beryl in pegmatite in granite.
Sec. 33 8S,25E	Mt. Graham 7.5'	Lost Goat	Muscovite of possible sheet or punch quality in quartz or pegmatite dike.
LA PAZ COUNTY			
Set. 6 4S,22W	Picacho 7.5'	John Hummer Mine	Pegmatite dikes containing mica, quartz and potash feldspar.
Sec. 8 5N,20W	Moon Mts. 7.5'	Smith Sericite, Lucky Chance Group, Dome Rock Mtns Mica	Past production of scrap mica flaky muscovite and sericite in quartz mica schists,
MARICOPA COUNTY			
Sec. 16 7N,3W	Red Picacho 7.5'	Morning Star	Past production K-spar; muscovite flakes and books; feldspar in pegmatite.
Sec. 16 3S,1E	Mobile NE 7.5'	Hightower Mica	Past production of ground mica, muscovite books, sericite in pegmatite.
Sec. 36 1S,3W	Buckeye 7.5'	Estermill Group	Muscovite books in schist.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
MARICOPA COUNTY (CONT.)			
Secs. 20 29 & 32 1S,3W	Buckeye 7.5'	Buckeye Hills Mica	Sericite mica in gneiss with pegmatites; used for paints and roofing materials.
Sec. 5 6N,2W	Garfias Mtn 7.5'	Big Reef Mine	Past production of scrap mica; muscovite books in pegmatite.
Sec. 31 1S,3W	Buckeye 7.5'	Arrowhead, Faith In You Group, Rusty Point, Sunset, Chickisow	Mica in pegmatite.
Sec. 5 2S, 3W	Buckeye 7.5'	Balanced Rock	Mica and feldspar in granite.
Sec. 20 4N,5E	McDowell Peak 7.5'	Brown Claims	Sericite schist.
Sec. 2 3S, 1E	Montezuma Peak 7.5'	Crusher Mica Quarry	Muscovite mica in pegmatite; small past production of scrap and flake mica.
Sec. 20 1S,3W	Buckeye 7.5'	Elder, Ofie Homba Claims	Mica schist (sericite).
Sec. 24 3S, 1E	Montezuma Peak 7.5'	Frost	Mica in pegmatite.
Sec. 23 7N,3W	Red Picacho 7.5'	Hertz, Weatherman Mica	Pegmatite with muscovite mica, feldspar and quartz.
Sec. 17 6N,5W	Vulture Mtns 15'	Lucky Mica, Fortner & Boyd Lithium	Muscovite mica in complex pegmatite.
Sec. 14 6N,5W	Vulture Mtns 15'	Lucky Mica Claims 1-2, Quartz #1,	No information - possibly part of Lucky Mica Property.
Sec. 18 3S, 4W	Cotton Center 7.5'	Maricopa Mica, Lemon Mica	Muscovite mica in quartz-mica pegmatite; approximately 200 tons of 15% mica ore produced for test; primarily scrap mica; books rarely exceed 1" in diameter.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
MARICOPA COUNTY (CONT.)			
Sec. 23 7N,3W	Red Picacho 7.5′	Mica Peer	Muscovite mica in pegmatite; reportedly pegmatite contains 50% mica.
Sec. 8 1S,3E	Lone Butte 7.5'	Muscovite Placer - Pat. 2964	No data.
Sec. 27 7N,2E	New River 7.5'	Murray Sericite & Tuff	Hydro-sericite derived from the weathering of sericite schist overlain by volcanic tuff originally deposited in a lake.
Sec. 8 7N,9E	Reno Pass 7.5′	Oneida, Ward Group	Sericite mica schists, locally impregnated with cinnabar.
Sec. 13 2N,3E	Sunnyslope 7.5'	Sealrock Group	Mica schist occurrence with quartz stringers; past production of small amount of kyanite possible.
Sec. 12 4S,5W	Cotton Center 7.5′	Stockton Claim, Arlene, Mint, Treasure	Muscovite mica in pegmatites.
Sec. 15 2S,4W	Hassayampa 7.5'	Striped Mtn Claims	Mica, quartz, feldspar in poorly zoned pegmatites with accessory garnets in granite.
Sec. 16 7N,3W	Red Picacho 7.5′	North Morning Star	Mica in pegmatite with lithium minerals.
Sec. 16 7N,3W	Red Picacho 7.5'	Sunset	Muscovite, K-spar and quartz in pegmatite in schist.
Sec. 36 2S,1E	Montezuma Peak 7.5'	Sylvania Mica	Muscovite books in pegmatite; small amount of "sheet" or "punch" grade mica produced in past.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
MARICOPA COUNTY (CONT.)			
Sec. 27 7N,2E	New River 7.5'	White Star	Sericite mica associated with pegmatites.
Sec. 33 2S, 1E	Montezuma Peak 7.5'	Mackenzie Copper Prospect	Muscovite mica in unzoned pegmatites.
MOHAVE COUNTY			
Sec. 27 38N,16W	Virgin Peak 15'	Hummingbird Group	Past production of scrap mica; muscovite books, feldspar, sericite in pegmatite within schists.
Sec. 24 19N,17W	Kingman SE 7.5'	Mica Ace	Muscovite in pegmatite.
Sec. 26 28N,17W	Garnet Mtn. 15'	M & P Claims	Past production of sheet mica; flawed muscovite books, potassium feldspar quartz in pegmatite.
Sec. 10 19N,15W	Dean Peak 7.5'	Mica Giant Mine	Past production sheet and scrap mica; muscovite books in pegmatite.
Sec. 16 19N,15W	Dean Peak 7.5'	Mica Hill (Merlo) Mine	Past production, scrap and sheet mica. (Probably part of Mica Giant)
Sec. 31 38N,16W	Virgin Peak 15'	Bachmann Mica, O.K. Bachmann	Muscovite mica in pegmatites.
Sec. 14 29N,19W	Senator Mtn. 15'	Muscovite Mica	Simp1e unzoned pegmatite with coarse muscovite mica, feldspar and quartz.
Sec. 1 16N,12W	Cedar Basin 7.5'	Rare Metals, Waldren Mining Co.	Muscovite mica with microcline, quartz, garnet, and other minerals in complex pegmatite.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
MOHAVE COUNTY (CONT.)			
Sec. 24 28N,17W	Garnet Mtn. 15'	White Cap	Biotite mica in granite pegmatite dike about 20 feet wide; also contains feldspar, quartz, hornblende, euxenite, beryl and other uranium minerals.
Sec. 30 16.5N,11W	Cedar Basin 7.5'	Williams Tungsten, Wothree	Fine grained scaly masses of pale green muscovite or sericite adjacent to vein walls in tungsten bearing quartz vein.
PIMA COUNTY			
Secs. 2 & 11 13S,7W	Ajo 15'	San Antonio Mine	Past production, flake and ground mica for drilling mud and roofing material,
11S,8E	Vaca Hills 15'	Tinker Bell, J & D	Pegmatite containing mica and quartz,
Sec. 6 14S,6W	Kino Peak 15'	Growler Mica	Mica in pegmatite.
PINAL COUNTY			
Sec. 19 2S, 2E	Montezuma Peak 7.5'	Butterfly Mtn. Area	Muscovite books, quartz in pegmatite.
Sec. 23 3S, 3E	Pima Butte 7.5'	North Spur of Pima Butte	Flaky muscovite, feldspar, quartz in pegmatite within schist.
Secs. 7 & 8 4S, 2E	Enid 7.5'	Eastern Estrella Mtns.	Past production of sheet and scrap mica, muscovite books in pegmatite, sericite in schist.
Sec. 5 8S,13E	Ninetysix Hills 7.5'	Tucson Mica Property	Pegmatites containing mica, quartz and feldspar; past producer of mica.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
PINAL COUNTY (CONT.)			
Sec. 2 7S,13E	Black Mountain 7.5'	B M Group, Darlene A Group	Zoned simple pegmatite containing feldspar, mica and quartz.
YAVAPAI COUNTY			
Sec. 29 9N, 1W	Copperopolis 7.5'	Queen of Mica	Past production of muscovite, pegmatite within schist containing feldspar and quartz.
Sec. 10 14N, 9W	Bagdad 15'	Big Strike Mica, Space Age Mica	Large mica schist deposit containing lenses of nearly pure muscovite and biotite mica.
Sec. 21 8N, 5W	Flores 7.5'	Burchfield Feldspar	Books of mica in pegmatite dike.
Sec. 34 12N, 5W	Weaver Peak 7.5'	Dixie Queen	Past production of scrap mica from pegmatite.
Sec. 19 10N, 1E	Crown King 7.5'	Black Magic Mine	Past production, muscovite books in pegmatite.
Secs. 30 & 31 8N, 2W	Morgan Butte 7.5' Red Picacho 7.5'	Long Dike Mine	Muscovite, quartz in pegmatites, past production of scrap mica.
Sec. 31 8N, 2W	Red Picacho 7.5'	New Lookout	Muscovite, quartz pods, perthite in pegmatites.
Sec. 26 11N, 4W	Peeples Valley 7.5'	Berrier Claims	Past production, muscovite books in pegmatite-within schist.
Sec. 8 7N, 2W	Garfias Mt. 7.5'	Big Reef, Green Dragon	Past production of scrap muscovite mica from partially zoned pegmatites.
Sec. 19 10N, 1E	Crown King 7.5'	Black Magic	Past production of small quantity of scrap mica.
Sec. 24 17N, 6W	Camp Wood 15'	Camp Wood	Pegmatite containing mica.

MICA

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
YAVAPAI COUNTY (CONT.)			
Sec. 26 10N, 1W	Crown King 7.5'	Kale Group	Mica in pegmatite.
Sec. 32 9N, 4W	Sam Powell Peak 7.5'	Krueger, Marine Placers	Mica in pegmatites.
Sec. 28 11N, 1E	Battle Flat 7.5'	Last Found	Muscovite mica in small, irregular unzoned simple pegmatites.
Sec. 30 8N, 2W	Red Picacho 7.5'	Lone Giant	Scattered muscovite mica in the core zone of a well zoned lithium - beryllium - columbium bearing pegmatite.
Sec. 28 9N, 1W	Columbia 7.5'	Long Day Pegmatite	Muscovite in unzoned simple pegmatite.
Sec. 3 7N, 3W	Red Picacho 7.5'	Outpost, Outpost Extension	Complex pegmatite containing muscovite mica, quartz, sodium feldspar, beryl and bismuth minerals.
Sec. 30 8N, 2W	Morgan Butte 7.5'	Long Dike	Past production of muscovite mica.
Sec. 9 7N, 3W	Red Picacho 7.5'	Lower Jumbo	Muscovite mica in lithium pegmatite.
Sec. 26 10N, 1W	Crown King 7.5'	Lukes Hoist Area	Simple poorly zoned pegmatites containing muscovite mica.
Sec. 7 8N, 2E	Black Canyon City 7.5'	Mica Mule, Silver Mica	Muscovite mica in a swarm of pegmatite dikes; includes small zones containing up to 70% mica; past production only on a trial basis.
Sec. 34 12N, 5W	Weaver Peak 7.5'	Monte Cristo, Dixie Queen	Muscovite and sericite mica in zoned pegmatite dike containing feldspar, quartz and beryl.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
YAVAPAI COUNTY (CONT.)			
Sec. 6 10N, 1E	Crown King 7.5'	Muscovite Mine, B.A.R.R. 4 Mica, Vasser Mica	Past production of muscovite mica from poorly zoned pegmatite dike.
Sec. 22 13N,10W	Arrastra Mtn NE 7.5'	New Hope, Good Luck, Russell Tungsten	Minor muscovite mica inasimplepegmatite.
Sec. 31 8N, 2W	Red Picacho 7.5'	New Lookout	Muscovite mica in pegmatites.
Sec. 29 9N, 1W	Copperopolis 7.5'	Queen of Mica	Muscovite mica in quartz-feldspar pegmatite~;mica is primarily scrap with some punch and sheet mica recoverable by careful cobbing.
Sec. 10 7N, 3W	Red Picacho 7.5'	Picacho View	Muscovite mica in zoned pegmatite.
Sec. 3 7N, 3W	Red Picacho 7.5'	Outpost, Outpost Extension	Complex pegmatite containing muscovite mica quartz, sodium feldspar, beryl, bismuth minerals.
Sec. 21 12N, 5W	Weaver Peak 7.5'	Peeples Valley	Past production of scrap muscovite mica from a lenticular mass of quartz-feldspar pegmatite in coarse-grained granite.
Sec. 10 14N, 9W	Bagdad 15'	Space Age Mica, Richard Jonathon 1-3	Muscovite and biotite schist.
Sec. 20 7N, 2W	Garfias Mt. 7.5'	Shamrock Mng. &	Mica, feldspar, quartz, tourmaline, pyrite and uranium minerals in pegmatite.
Sec. 9 8N, 2W	Copperopolis7.5'	Silver Side, Mayflower	Micaceous schist deposit.
Sec. 10 7N, 3W	Red Picacho 7.5'	Sunrise	Pegmatite containing muscovite mica and rare metals.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
YUMA COUNTY			
Sec. 22 10S,20W	Fortuna Mine 7.5'	Montgomery	Quartz-feldspar-kaolin aggregate rich in mica; muscovite mica forms thin books.
Sec. 11 2S, 17W	Kofa Butte 15'	Schullenbacker Mica Mines	Mica with quartz and feldspar in pegmatite in schist; mica breaks into clean sheets.
Sec. 22 10S,20W	Fortuna Mine 7.5'	Pool Mica Mine	Partially zoned dike containing muscovite mica.
Sec. 23 10S,20W	Fortuna Mine 7.5'	Fortuna Pegmatite	Muscovite mica and samarskite in irregular pegmatites in small intrusives of Laramide granite.
Sec. 36 1S,17W	Kofa Butte 15'	Kofa Butte Mica	Muscovite reported.
Sec. 29 12S,15W	Cabeza Prieta Peak 15'	Cabeza Prieta Mts. Mica	Black mica books in pegmatite cutting granite.
Sec. 15 10S,20W	Fortuna Mine 7.5'	Gila Mts. Mica	Flaky muscovite, sericite in pegmatites cutting schists.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
GILA COUNTY			
Secs. 27 & 28 4S, 15E	Hayden 7.5'	London Arinona Consolidated	Perlite occurrence.
GRAHAM COUNTY			
Sec. 8 6N, 27E	Safford 15'	Gila Mtns.	An approximate location; no additional information.
Sec. 28 6S, 29E	Guthrie 15'	Haigler Claims	Past production, pumicite and perlite with zeolitized volcanic ash used for "cinder" blocks and lightweight aggregates.
GREENLEE COUNTY			
S 1/2 1N,30E	Dutch Blue Creek 7.5'	Rousensock Creek	Perlite, pumice in quartz latite and rhyolite.
Sec. 10 3S,29E	Clifton 15'	Granville Area	Gray to black perlite and agglomerate.
MARICOPA COUNTY			
Sec. 17 6N,7W	Aguila 15'	Black Butte	Perlite occurrence.
Secs. 14 & 15 4N, 10W	Lone Mtn. 15'	Big Horn Mtns.	Perlite occurrence.
Sec. 26 1S,5W	Hassayampa 7.5'	Powers Butte	Perlite occurrence.
Sec. 34 5N, 8W	Big Horn Mtn 15'	Beehive Claims	Gray perlite; reportedly "hard".
Sec. 18 5N,7W	Aguila 15'	Protectio Claims	Large deposit of perlite; some testing done.
Sec. 15 5N, 8W	Aguila 15'	White Perlite	Large deposit of perlite; some testing done.
Sec. 33 5N, 8W	Big Horn Mts. 15'	Perlite Claims	Bed of perlite between other bedded volcanic rocks.

PERLITE

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
MOHAVE COUNTY			
Sec. 31 24N,20W	Grasshopper Jct. NW 7.5'	Black Mtns.	Perlite.
Sec. 31 23N,19W	Grasshopper Jct. NW 7.5'	Middle Black Mtns.	Perlite outcrops.
Sec. 2 22N,20W	Burns Spring 7.5'		Perlite masses with latite in volcanic breccia overlain by tuff.
Sec. 14 21N,20W	Union Pass 15'	Union Pass Area	Perlitic outcrops.
Secs. 27 & 35 17N,18W	Yucca 7.5'	Perlite 1, Southern Black Mtns., Haviland Area	Past production for fillers and expanded for insulation; perlite lenses intermixed with latite.
Sec. 20 16.5N,18W	Yucca 7.5'	Perlite	Perlite outcrops.
Sec. 9 16N, 19W	Topock 15'	Franconia Mill	Large deposit of white to gray perlite.
PIMA COUNTY			
Secs. 7, 17 & 18 20S,11E	Arivaca 15' & Tubac 15'	Cerro Colorado Mtns.	Gray-pinkish perlite in rhyolite vitrophyre.
PINAL COUNTY			
Secs. 8 & 9 2S,12E	Picketpost Mtn. 7.5'	Mary Ann Mine, Chemi-cote Mine	Past producer; glassy perlitic flows underlying rhyolite; used for soil conditioners, lt.-wt. aggregate, plaster mix and expanded for use as insulation material.
Secs. 9 & 16 2S,12E	Picketpost Mtn. 7.5'	Chicago Pit, Old Cliff	Past producer; perlite produced for filter aid; same occurrence as Mary Ann Mine.
Sec. 9 2S,12E	Superior 7.5'	Adams Mine, Iberri Mine	Past production output for plaster mix, soil conditioner and light weight aggregate.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
PINAL COUNTY (CONT.)			
Secs. 7, 8 & 17 2S,12E	Picketpost Mtn. 7.5'	Arnett and Telegraph Canyons	Perlite outcrops.
Sec. 18 2S,12E	Picketpost Mtn. 7.5'	Picketpost Mtn.	Glassy perlitic flows underlies glassy rhyolite and overlies tuff and breccia.
E1/2 9S, 6E	Silver Reef Mtn. 15'		Perlitic flows.
Sec. 15 2S, 12E	Superior 7.5'	Antone Claims	"Dark" perlite.
Sec. 9 2S,12E	Picketpost Mtn. 7.5'	Superior Obsidian, Boyer Claims	Perlite and obsidian occurrence.
Sec. 8 2S,12E	Picketpost Mtn. 7.5'	Apache Tears Deposit	Perlite deposit containing "Apache Tears" gemstones; a variety of marekanite.
Sec. 2 2S,11E	Picketpost Mtn. 7.5'	Driftwood, Driftwood Ext.	"Onion" perlite deposit; past production for filter aid.
Sec. 16 2S,12E	Picketpost Mtn. 7.5'	Cottonwood, Self Protection	Continuation of perlite deposits.
Sec. 12 2S,12E	Picketpost Mtn. 7.5'	Talley-Barnett Claims	"Onion" perlite deposit.
Secs. 19, 20,29,30 1S,12E	Picketpost Mtn. 7.5'	Snow White	Gray, relatively massive perlite with little or no "onion" perlite.
YAVAPAI COUNTY			
Sec. 33 8N, 1E	Columbia 7.5'	Willbanks Prospect	Perlite occurrence.

PUMICE GROUP

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
APACHE COUNTY			
Sec. 11 5N,24E	Corn Creek Plateau 7.5'	East Fork White River	Cinder cone.
Sec. 6 9N,28E	Springerville NW 7.5'	Cienega Draw Cinder Deposit	Active cinder pit; basalt cinders, scoria, used for concrete aggregates and roads.
Sec. 29 12N,26E	Concho 7.5'	Concho Spring Cinder Deposit	Cinder deposit; quarry.
Sec. 25 11N,24E	Ortega Mtn. 7.5'	Dobbs Cutoff Cinder Deposit	Cinder deposit; quarry.
Sec. 33 10N,28E	Springerville NW 7.5'	Carnero Creek Cinder Deposit	Cinder deposit; quarry.
Sec. 35 8N,26E	Greens Peak 7.5'	Sheep Springs Cinder Deposit	Cinder deposit; quarry.
Sec. 23 10N,28E	Springerville 7.5'	Hiway Hill Cinder Deposit	Cinder deposit; quarry.
Sec. 34 10N,27E	Springerville NW 7.5'	Quemado Draw Cinder Deposit	Cinder deposit; quarry.
Sec. 32 10N,27E	Whiting Knoll 7.5'	Bare Cinder Deposit	Cinder deposit; quarry.
Sec. 29 10N,27E	Springerville NW 7.5'	Cerro Quemado Cinder Deposit	Cinder deposit; quarry.
Sec. 18 10N,27E	Cerro Hueco 7.5'	Mallory Draw Cinder Deposit	Cinder deposit; quarry.
Sec. 16 10N,26E	Cerro Hueco 7.5'	Cerro Montoso Cinder Deposit	Cinder deposit; quarry.
Sec. 15 10N,26E	Cerro Hueco 7.5'	Radio Tower Cinder Deposit	Cinder deposit; quarry.
Sec. 21 10N,25E	Boundary Butte 7.5'	Serviceberry Hill Cinder Deposit	Cinder deposit; quarry.
Sec. 10 10N,24E	Ortega Mtn. 7.5'	Dobbins Knoll South Cinder Deposit	Cinder deposit; quarry.
Sec. 13 10N,24E	Ortega Mtn. 7.5'	Dog Bone Hill Cinder Deposit	Cinder deposit; quarry.

PUMICE GROUP

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
APACHE COUNTY (CONT.)			
Sec. 14 10N,24E	Ortega Mtn. 7.5'	Ortega Draw Cinder Deposit	Cinder deposit; quarry.
Sec. 7 10N,25E	Vernon 7.5'	Vernon Cinder Deposit	Cinder deposit; quarry.
Sec. 8 10N,24E	Ortega Mtn. 7.5'	Brown Creek Cinder Deposit	Cinder deposit; quarry.
Sec. 3 10N,24E	Ortega Mtn. 7.5'	Dobbins Knoll Cinder Deposit	Cinder deposit; quarry.
Sec. 23 9N,24E	Spoonseller Mtn. 7.5'	Spoonseller Mtn. Cinder Deposit	Cinder deposit; quarry.
Sec. 5 9N,25E	Boundary Butte 7.5'	Aniceto Spring Cinder Deposit	Cinder deposit; quarry.
Sec. 1 9N,26E	Whiting Knoll 7.5'	Halls Cinder Deposit	Cinder deposit; quarry.
Sec. 23 9N,26E	Whiting Knoll 7.5'	Little Giant Cinder Deposit	Cinder deposit; quarry.
Sec. 35 8N,28E	Eagar 7.5'	Mexican Hay Cinder Deposit	Cinder deposit; quarry.
Sec. 35 8N,25E	Horseshoe Cienega 7.5'	Horseshoe Cinder Deposit	Cinder deposit; quarry.
Sec. 30 8N,26E	Horseshoe Cienega 7.5'	Cinder Pit Mtn. Cinder Deposit	Cinder deposit; quarry.
Sec. 36 8N,27E	Greer 7.5'	Benny Cinder Deposit	Cinder deposit; quarry.
Sec. 2 8N,28E	Eagar 7.5'	Coon Cinder Deposit	Cinder deposit; quarry.
Sec. 13 8N,28E	Eagar 7.5'	Big Ditch Cinder Deposit	Cinder deposit; quarry.
Sec. 8 7N,31E	Loco Knoll 7.5'	Loco Knoll Cinder Deposit	Cinder deposit; quarry.
Sec. 29 8N,25E	Horseshoe Cienega 7.5'	Shush Cinder Deposit	Cinder deposit; quarry.
Sec. 26 7N,28E	Big Lake 7.5	Ruad Knoll Cinder Deposit	Cinder deposit; quarry.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
APACHE COUNTY (CONT.)			
Sec. 7 7N,26E	Horseshoe Cienega 7.5'	Sheep Cienega Cinder Deposit	Cinder deposit; quarry.
Sec. 13 7N,25E	Horseshoe Cienega 7.5'	Ryan Cinder Deposit	Cinder deposit; quarry.
Sec. 20 6N,28E	Big Lake 15'	Su Knoll Cinder Deposit	Cinder deposit; quarry.
Sec. 19 6N,28E	Big Lake 15'	Crescent Cinder Deposit	Cinder deposit; quarry.
Sec. 3 7N,30E	Nelson Reservoir 7.5'	Stone Creek Cinder Deposit	Cinder deposit; quarry.
Sec. 28 10N,28E	Springerville NW 7.5'	Kidney Mountain Cinder Deposit	Cinderdeposit; quarry.
Sec. 27 10N,28E	Springerville 7.5'	Springerville Cinder Deposit	Cinder deposit; quarry.
Sec. 22 8N,29E	Eagar 7.5'	Round Mountain Cinder Deposit	Cinder deposit; quarry.
Sec. 23 8N,27E	Greer 7.5'	Lang Creek Cinder Deposit	Cinder deposit; quarry.
Sec. 30 8N,27E	Greens Peak 7.5'	Fish Creek Cinder Deposit	Cinder deposit; quarry.
Sec. 36 21N.29E	Tolapai Spring 7.5'	Bluebird Well Area	Pumicite.
Sec. 5 10N,24E	Ortega Mtn. 7.5'	Bordshack Knoll Pit	Pumice occurrence.
Sec. 29 22N,26E	Dripping Water Well 7.5'	Padre Mesa Area	Whitish-gray pumicite; Bidahochi formation.
Sec. 5 26N,26E	Ganado 7.5'	Ganado Area	White pumicite bed in rhyolite.
COCHISE COUNTY			
Sec. 27 17S,20E	Benson 7.5'	Industrial Management Corp Pumice	White to grey fine pumice.
Sec. 34 21S,30E	Pedregosa Mtn 7.5'	Pedregosa Mtn. No.1	Volcanic cinders.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
COCHISE COUNTY (CONT.)			
Sec. 22 22S,30E	Pedregosa Mtn 7.5'	Bernardino	Scoria-volcanic cinders.
Secs. 8 & 17 23S,30E	College Peaks 15'	Cinder Hill Quarry	Past production of volcanic and scoria for lightweight aggregate.
COCONINO COUNTY			
Sec. 23 30N, 9E	Cameron 15'	Little Shadow Mtn.	Pumicite.
Sec. 33 25N, 9E	Wupatki SW 7.5' Cameron 15'	Wupatki SW No. 2 Borrow Pit	Cinder pit.
Sec. 15 23N, 2E	Williams 15'	Red Lake	Cinder pit.
NW1/4 23N, 4W	Mount Floyd 7.5'	Mt. Floyd	Pumicite.
Sec. 17 22N, 6E	Wing Mountain 7.5'	Larry's Store	Cinder deposit; quarry.
Sec. 19 23N, 8E	Sunset Crater West 7.5'	Sugarloaf Peak	Past production of rhyolitic pumice used for pozzolan.
Sec. 27 24N, 6E	White Horse Hills 7.5'	White Horse Hills No. 1 Cinder Pit.	Cinder pit.
Sec. 10 23N, 8E	O'Leary Peak 7.5'	O'Leary Peak	Rhyolitic pumice.
Sec. 31 23N, 8E	Sunset Crater West 7.5'	Bosley Deposit	Decomposed rhyolitic pumice.
Secs.13, 14, 23, & 24 23N, 7E	Sunset Crater West 7.5'	More Sand and Moon Sand Sugarloaf Mtn. Area	Production of white pumiceous rhyolite ash used for pozzolan.
Sec. 31 24N,11E	Roden Crater 7.5'	Roden Crater	Cinder cone.
Secs. 18 & 19 30N, 9E	Cameron 15'	Shadow Mtn.	Volcanic cinders, past production for road aggregate.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
COCONINO COUNTY (CONT.)			
Secs. 9 & 10 24N, 8E	O'Leary Peak 7.5'	Cedar Ridge	Red cinders.
Sec. 26 22N, 2E	Williams 15'	West Side	Cinder pit.
Sec. 15 22N, 4E	Parks 7.5'	North of Parks	Cinder pit.
Sec. 27 22N, 4E	Parks 7.5'	Parks	Cinder pit; volcanic cinders.
Secs. 7, 8, 17 & 18 22N,11E	Merriam Crater 7.5'	North and South Sheba Craters	Cinder cones.
Sec. 13 22N,15E (proj.)	Bird Springs Wash 7.5'	Bird Springs Wash Area	Pumicite.
Secs. 3 & 4 21N, 2E	Bill Williams Mtn. 15'	Arizona Mine, Old Williams, Bill Williams Pumice and Pumice No. 1	Past production of rhyolitic pumice for buildingblocksand red volcanic cinders.
Secs. 5, 6,7 & 8 21N, 5E	Garland Prairie 7.5'	Volunteer Mtn.	Cinder cones.
Secs. 4 & 9 21N, 8E	Flagstaff East 7.5'	Wildcat Hill	Active cinder pit.
Secs. 4, 9 & 10 23N, 8E	O'Leary Peak 7.5'	Robinson Crater Area	Pumice sand; sand pits.
Secs. 2 & 11 21N, 9E	Winona 7.5'	Darling Cinder Pit	Active cinder pit, used for cinder blocks, aggregates and ballast.
Sec. 15 21N, 2E	Bill Williams Mtn. 15'	Sevier Flat	Cinder pit.
Sec. 14 20N, 2E	Bill Williams Mtn. 15'	Bill Williams No. 1 Cinder Pit	Cinder pit.

PUMICE GROUP

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
COCONINO COUNTY (CONT.)			
Sec. 16 20N, 3E	Bill Williams Mtn. 15'	Perkins Knoll	Cinder pit.
Secs. 2, 3, 11 & 12 24N, 8E	O'Leary Peak 7.5'	Deadman Wash Area	Pumice and cinders.
Sec. 12 22N, 2E	Williams 15'	Pit Tank	Cinder pits.
Sec. 14 20N, 2E	Bill Williams Mtn. 15'	Bill Williams Mtn. No. 1 Cinder Pit	Cinder pits.
Sec. 23 20N, 3E	Bill Williams Mtn. 15'	Hill 1	Cinder pit.
Sec. 10 21N, 9E	Winona 7.5'	Baker Pit	Active cinder pit.
Secs. 14 & 23 21N, 9E	Winona 7.5'	Winona	Active cinder pit.
Sec. 32 22N, 2E	Bill Williams Mtn. 15'	Williams	Cinder pit.
Sec. 3 20N,10E	Angell 7.5'	Angell No. 1 Cinder Pit	Volcanic cinders.
Sec. 29 16N, 9E	Happy Jack 7.5'	Happy Jack No. 1 Cinder Pit	Cinder deposit; quarry.
Sec. 28 21N,10E	Angell 7.5'	Angell No. 2 Cinder Pit	Volcanic cinders.
Sec. 15 21N, 6E	Bellemont 7.5'	Bellemont No. 1 Cinder Pit	Cinder deposit; quarry.
Sec. 17 21N, 6E	Bellemont 7.5'	Bellemont No. 2 Cinder Pit	Cinder deposit; quarry.
Sec. 18 21N, 6E	Bellemont 7.5'	Bellemont No. 3 Cinder Pit	Cinder deposit; quarry.
Sec. 18 21N, 6E	Bellemont 7.5'	Bellemont No. 4 Cinder Pit	Cinder deposit; quarry.
Sec. 33	Bellemont 7.5'	Bellemont No. 5	Cinder deposit; quarry.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
22N, 5E		Cinder Pit	
COCONINO COUNTY (CONT.)			
Sec. 33 22N, 5E	Bellemont 7.5'	Bellemont No. 6 Cinder Pit	Cinder deposit; quarry.
Sec. 33 22N, 5E	Bellemont 7.5'	Bellemont No. 7 Cinder Pit	Cinder deposit; quarry.
Sec. 23 20N, 2E	Bill Williams Mtn. 15'	Bill Williams Mtn. No. 2 Cinder Pit	Cinder deposit; quarry.
Sec. 34 21N, 2E	Bill Williams Mtn. 15'	Bill Williams Mtn. No. 6 Cinder Pit	Cinderdeposit. quarry.
Sec. 35 21N, 6E	Flagstaff West 7.5'	Flagstaff West No. 1 Cinder Pit	Cinder deposit; quarry.
Sec. 30 21N, 7E	Flagstaff West 7.5'	Flagstaff West No. 2 Cinder Pit	Cinder deposit; quarry.
Sec. 35 22N, 4E	Garland Prairie 7.5'	Garland Prairie No. 1 Cinder Pit	Cinder deposit; quarry.
Sec. 35 21N, 5E	Garland Prairie 7.5'	Garland Prairie No. 2 Cinder Pit	Cinder deposit; quarry.
Sec. 29 16N, 9E	Happy Jack 7.5'	Happy Jack No. 2 Cinder Pit	Cinder deposit; quarry.
Sec. 29 16N, 9E	Happy Jack 7.5'	Happy Jack No. 3 Cinder Pit	Cinder deposit; quarry.
Sec. 25 20N, 5E	Dutton Hill 7.5'	Dutton Hill No. 1 Cinder Pit	Cinder deposit; quarry.
Sec. 25 22N, 9E	Sunset Crater East 7.5'	Sunset Crater East No. 1 Cinder Pit	Cinder deposit; quarry.
Sec. 29 22N, 9E	Sunset Crater East 7.5'	Sunset Crater East No. 2 Cinder Pit	Cinder deposit; quarry.
Sec. 19 22N,10E	Sunset Crater East 7.5'	Sunset Crater East No. 3 Cinder Pit	Cinder deposit; quarry.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
COCONINO COUNTY (CONT.)			
Sec. 30 23N, 9E	Sunset Crater East 7.5'	Sunset Crater East No. 4 Cinder Pit	Cinder deposit; quarry.
Sec. 19 16N, 8E	Stoneman Lake 7.5'	Stoneman Lake No. 1 Cinder Pit	Cinder deposit; quarry.
Sec. 10 22N, 4E	Parks 7.5'	Wright Hill Cinder Pit	Cinder deposit; quarry.
Sec. 21 22N, 4E	Parks 7.5'	Spitz Spring Cinder Pit	Cinder deposit; quarry.
Sec. 21 19N, 1E	Matterhorn 7.5'	Matterhorn No. 1 Cinder Pit	Cinder deposit; quarry.
Sec. 8 23N, 2W	Eagle Nest Mtn. 7.5'	Eagle Nest Mtn. No. 1 Cinder Pit	Cinder deposit; quarry.
Sec. 2 21N, 8E	Flagstaff East 7.5'	Turkey Hills Cinder Pit	Cinder deposit; quarry.
Sec. 16 23N, 4E	Parks 7.5'	Section 16 Hill Cinder Pit	Cinder deposit; quarry.
Sec. 11 25N, 4E	Ebert Mtn. 15'	Ebert Mountain Cinder Pit	Cinder deposit; quarry.
Sec. 10 21N, 8E	Flagstaff East 7.5'	Flagstaff East No. 5 Cinder Pit	Cinder deposit; quarry.
Sec. 15 21N, 6E	Flagstaff West 7.5'	Flagstaff West No. 3 Cinder Pit	Cinder deposit; quarry.
Sec. 25 21N, 6E	Flagstaff West 7.5'	Flagstaff West No. 4 Cinder Pit	Cinder deposit; quarry.
Sec. 25 21N, 6E	Flagstaff West 7.5'	Flagstaff West No. 5 Cinder Pit	Cinder deposit; quarry.
Sec. 16 22N, 1E	Hearst Mtn. 15'	Upper Buss Cinder Pit	Cinder deposit: quarry.
Sec. 25 22N, 1W	Hearst Mtn. 15'	Johnson Canyon Cinder Pit	Cinder deposit; quarry.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
COCONINO COUNTY (CONT.)			
Sec. 14 22N, 2W	Hearst Mtn. 15'	Hearst Mtn. No. 3 Cinder Pit	Cinder deposit; quarry.
Sec. 26 22N, 2W	Hearst Mtn. 15'	Hearst Mtn. No. 4 Cinder Pit	Cinder deposit; quarry.
Sec. 25 23N, 2W	Hearst Mtn. 15'	Hearst Mtn. No. 5 Cinder Pit	Cinder deposit; quarry.
Sec. 28 22N, 2W	Horse Trap Mesa 7.5'	Horse Trap Mesa No. 1 Cinder Pit	Cinder deposit; quarry.
Sec. 17 23N, 2W	Horse Trap Mesa 7.5'	Horse Trap Mesa No.2 Cinder Pit	Cinder deposit; quarry.
Sec. 29 23N, 2W	Horse Trap Mesa 7.5'	Horse Trap Mesa No. 3 Cinder Pit	Cinder deposit; quarry.
Sec. 17 23N, 6E	Kendrick Peak 7.5'	Kendrick Peak No, 1 Cinder Bit	Cinder deposit; quarry.
Sec. 6 24N, 6E	Kendrick Peak 7.5'	Kendrick Peak No. 2 Cinder Pit	Cinder deposit; quarry.
Sec. 20 18N,10E	Kinnikinick Lake 7.5'	Kinnikinick Lake	Cinder deposit; quarry.
Sec. 34 18N, 9E	Mormon Lake 7.5'	Sedge Spring Cinder Pit	Cinder deposit; quarry.
Sec. 27 18N, 8E	Mormon Mountain 7.5'	Mormon Mtn. No. 1 Cinder Pit	Cinder deposit; quarry.
Sec. 12 22N, 2E	Williams 15'	Pit Tank	Cinder deposit; quarry.
Sec. 22 22N, 2E	Williams 15'	Williams No. 2 Cinder Pit	Cinder deposit; quarry.
Sec. 11 22N, 1E	Williams 15'	Williams No. 3 Cinder Pit	Cinder deposit; quarry.
Sec. 24 22N, 1E	Williams 15'	Three Sisters Cinder Pit	Cinder deposit; quarry.
Sec. 15 25N, 2E	Valle 15'	Valle No. 1 Cinder Pit	Cinder deposit; quarry.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
COCONINO COUNTY (CONT.)			
Sec. 24 25N, 2E	Valle 15'	Valle No. 2 Cinder Pit	Cinder deposit; quarry.
Sec. 10 25N, 3E	Valle 15'	White Hill Cinder Pit	Cinder deposit; quarry.
Sec. 26 23N, 2E	Williams 15'	Williams No. 6 Cinder Pit	Cinder deposit; quarry.
Sec. 3 24N, 2E	Williams 15'	Williams No. 7 Cinder Pit	Cinder deposit; quarry.
Sec. 26 24N, 2E	Williams 15'	Williams No. 8 Cinder Pit	Cinder deposit; quarry.
Sec. 20 22N, 6E	Wing Moutain 7.5'	Star #28 Cinder Pit	Cinder deposit; quarry.
Sec. 21 22N, 6E	Wing Moutain 7.5'	Star #29 Cinder Pit	Cinder deposit; quarry.
Sec. 2 23N, 2E	Williams 15'	Williams No. 9 Cinder Pit	Cinder deposit; quarry.
Sec. 10 23N, 2W	Hearst Mtn. 15'	Hearst Mtn. No. 6 Cinder Pit	Cinder deposit; quarry.
Sec. 27 22N, 3E	Williams 15'	Williams No.10 Cinder Pit	Cinder deposit; quarry.
Sec. 5 21N, 8E	Flagstaff East 7.5'	Sheep Hill Cinder Pit	Cinder deposit; quarry.
Sec. 26 22N, 1W	Hearst Mtn. 15' 7.5'	Hearst Mtn. No. 7 Cinder Pit	Cinder deposit; quarry.
Sec. 22 23N, 6E	Humphreys Peak 7.5'	Humphreys Peak No.1 Cinder Pit	Cinder deposit; quarry.
Sec. 35 26N, 2E	Valle 15'	Valle No. 4 Cinder Pit	Cinder deposit; quarry.
Sec. 14 25N, 2E	Valle 15'	Valle No. 5 Cinder Pit	Cinder deposit; quarry.
Sec. 18 23N, 8E	O'Leary Peak 7.5'	Harenberg # 1 Claim	Cinder deposit.
Sec. 36 21N, 6E	Flagstaff West 7.5'	Lava Claim	Cinder deposit.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
COCONINO COUNTY (CONT.)			
Sec. 3 22N, 2E	Williams 15'	Pouquette	Pumice deposit.
Sec. 11 20N, 7E	Flagstaff East 7.5'	Cinder Station Cinder Pit	Cinder deposit; quarry.
Sec. 35 25N, 5E	Ebert Mtn. 15'	Slate Mountain Cinder Pit	Cinder deposit; quarry.
Sec. 13 14N, 9E	Long Valley 7.5'	Sunset Mining Claims	Volcanic ash beds with manganese mineralization.
Sec. 24 23N, 7E	O'Leary Peak 7.5'	McCormick	Perlite with obsidian in cinder bed; uranium detected.
Sec. 17 23N, 8E	O'Leary Peak 7.5'	O'Leary Peak No. 1 Cinder Pit	Cinder deposit; quarry.
Sec. 7 25N, 5E	Ebert Mtn. 15'	House Tank Cinder Pit	Cinder deposit; quarry.
Sec. 34 22N, 8E	Flagstaff East 7.5'	Sheep Pit	Cinder pit, cinders for icy highway treatment.
Sec. 9 21N, 8E	Flagstaff East 7.5'	Red Hill Pit	Cinder pit, cinders for icy highway treatment, road beds and landscaping.
Sec. 19 23N, 8E	Sunset Crater West 7.5'	Sunset Crater Pumice, Bonner Pozzolan	Production of white pumiceous rhyolite ash used for pozzolan.
GILA COUNTY			
NE1/4 11N, 9E	Pine 15'		Basalt.
Parts of 1S,18E 2S,18E 1N,18E	San Carlos 7.5' Natural Corral 7.5'	"Tufa" Quarry	Pumiceous tuff.

PUMICE GROUP

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
GRAHAM COUNTY			
Sec. 28 6S,29E	Guthrie 15'	Haigler Claims	Past production, pumicite and perlite with zeolitized volcanic ash used for "cinder" blocks and lightweight aggregates.
Sec. 29 6S, 29E	Guthrie 15'	Pumice, Blue Bird, Triangle Claims	Past production, pumicite and perlite with zeolitized volcanic ash used for "cinder" blocks and lightweight aggregates.
Sec. 7 7S, 29E	Guthrie 15'	Haigler Pumice	Cinders and pumice.
GREENLEE COUNTY			
Sec. 20 4S,32E	Big Lue Mtns. 15'	Big Lue Mtns. No. 1 Gravel Pit	Pumice outcrops.
Sec. 25 4S,31E	Big Lue Mtns. 15'	Big Lue Mtns. No. 1 Quarry	Pumice outcrops.
Sec. 29 4S,32E	Big Lue Mtns. 15'	Big Lue Mtns. No. 2 Gravel Pit	Pumice outcrops.
LA PAZ COUNTY			
Secs. 24 & 25 7N, 17W	Utting 15'	Blackbird Deposit	Past producer of pumicite.
9N,19W	Black Peak 15'	Black Peak Pumice	Massive scoria-basalt.
Sec. 1 4N, 15W	Vicksburg 15'	Hope	Cellular gray pumicite overlain by basalt.
Sec. 16 3S, 23W	Hidden Valley 7.5'	Trigo Mtns. Perlite	Perlite occurrence.

PUMICE GROUP

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
MARICOPA COUNTY			
NE1/4 6N,1E	Biscuit Flat 7.5' New River 7.5'	Morgans Wash	Scoria.
Secs. 5 & 6 6N,4E	New River Mesa 7.5'		Scoria.
Sec. 30 7N,6W	Vulture Mtns. 15'	Vulture Tuff	Perlitic welded tuff, interbedded pumice.
Secs. 3, 4 & 5 2N,8W	Big Horn Mtns 15'	Big Horn Mtns.	Pumicite.
SW1/4 2S,5W	Woolsey Peak 15'	Gillespie Dam Area	Basalt.
Sec. 18 4S,7W	Dendora Valley 15'	Black Rock	Fractured and decomposed lava.
Sec. 23 6N, 1W	Baldy Mtn 7.5'	Lake Pleasant Rhyolite	Pumiceous rhyolite.
Sec. 27 7N,2E	New River 7.5'	Murray Sericite & Tuff	Hydro-sericite derived from the weathering of sericite schist overlain by volcanic tuff originally deposited in a lake.
Sec. 8 2N,9E	Mormon Flat 7.5'	Tuff Mine, Concrete Industries	Past production. Volcanic tuff in extensive beds; used as lightweight aggregate.
MOHAVE COUNTY			
NW1/4 17N,18W	Yucca 7.5'	Black Mtns.	Basalt.
Sec. 2 35N, 8W	Mt. Trumbull NE 7.5'	Toroweap Valley Cinder Pit	Cinder deposit.
Sec. 32 35N, 7W	Mt. Trumbull NE 7.5'	Uinkaret Plateau Cinder Pit	Cinder deposit.

PUMICE GROUP

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
NAVAJO COUNTY			
Sec. 12 23N,21E	Indian Wells 7.5'	Bidahochi Butte Deposit	Volcanic ash; diatreme containing tuff.
Secs. 1, 11 & 12 25N,21E	White Cone 15'	White Cone Peak	Pumiceous tuff.
Secs. 1 & 12 8N, 22E	McNary 15'		Cinders.
Secs. 8,13,18, 22,23,24, 27 & 33 8N, 23E	Indian Pine 7.5'	Pine Area	Cinders.
Sec. 3 9N,23E	McNary 15'	McNary	Cinders.
Sec. 27 8N,23E	Indian Pine 7.5'	Indian Pine No.1 Cinder Pit	Cinder deposit; quarry.
Sec. 33 8N,23E	Indian Pine 7.5'	Indian Pine No.2 Cinder Pit	Cinder deposit; quarry.
Sec. 27 8N,23E	Indian Pine 7.5'	Indian Pine No. 3 Cinder Pit	Cinder deposit; quarry.
Sec. 22 8N,23E	Indian Pine 7.5'	Indian Pine No. 4 Cinder Pit	Cinder deposit; quarry.
Sec. 5 8N,23E	Indian Pine7.5'	Indian Pine No. 5 Cinder Pit	Cinder deposit; quarry.
Sec. 3 7N,23E	Indian Pine 7.5'	Indian Pine No.6 Cinder Pit	Cinder deposit; quarry.
Sec. 30 9N,23E	Lakeside 7.5'	Lakeside No. I Cinder Pit	Cinder deposit; quarry.
Sec. 23 9N,23E	Lakeside 7.5'	Lakeside No. 2 Cinder Pit	Cinder deposit; quarry.
Sec. 5 9N,23E	Lakeside 7.5'	Lakeside No. 3 Cinder Pit	Cinder deposit; quarry.
Sec. 1 10N,23E	Ortega Mtn. 7.5'	Ortega Mtn No. 1 Two Cinder	Cinder deposit; quarry.

PUMICE GROUP

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
NAVAJO COUNTY (CONT.)			
Sec. 14 10N,22E	Silver Springs 7.5'	Owens Pit, Knoll Pit No. 1	Cinder deposit; quarry.
Sec. 18 10N,23E	Silver Springs 7.5'	Second Knoll Pit - Eastside	Cinder deposit; quarry.
Sec. 24 10N,22E	Silver Springs 7.5'	Second Knoll Pit - Lakeside	Cinder deposit; quarry.
Sec. 25 11N,22E	Silver Springs 7.5'	Silver Springs No. 1 Cinder	Cinder deposit; quarry.
Sec. 11 11N,22E	Silver Springs 7.5'	Silver Springs No. 2 Cinder	Cinder deposit; quarry.
PINAL COUNTY			
Sec. 21 1S,10E	Florence Junction 7.5'	Arizona Rhyolite	Pumiceous rhyolite breccia located on the edge of the Superstition Volcanic Field; material currently used as a lightweight aggregate.
SANTA CRUZ COUNTY			
Sec. 24 23S,12E	Ruby 15'	Pumice Group	Pumicite outcrops.
YAVAPAI COUNTY			
Secs. 2 & 3 14N, 9W Secs. 34 & 35 15N, 9W	Bagdad 15'	Sanders Mesa	Basalt and water transported pumice.
N1/2 22N, 6W		Along Chino Wash	Cinders.
Secs. 21 & 22 21N, 2W	Ashfork 15'	Cruice Pit	Past production of basalt scoria for cinder blocks and aggregate.
NE1/4 20N, 2W	Ashfork 15'	Meath	Olivine basalt.
Sec. 28 13N, 4W	Kirkland 7.5'	Kirkland	Pumicite.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
YAVAPAI COUNTY (CONT.)			
Sec. 30 14.5N,8W	Bagdad 15'	Bagdad Pumice, Agro-lite	Thick beds of light grey to white pumiceous material produced for floor sweeping compound, "kitty litter" and light-weight aggregate.
Sec. 34 16N, 6E	Casner Butte 7.5'	Adot Materials Pit #5780	Cinder (scoria) deposit, quarry.
Sec. 25 12.5N,1W	Poland Junction 7.5'	Christmas Gift	Cinder deposit.
Sec. 11 20N, 2W	Ashfork 7.5'	Olivine Basalt Pits	Cinder (scoria) deposit, quarry.
Sec. 16 14N, 1W	Prescott 7.5'	Craigs Quarries	Scoria deposit; mixed, colorful material developed for building and facing stone.
Sec. 9 21N, 9W	Cross Mtn NW 7.5'	Cinder Pit	Cinder (scoria) deposit, quarry.
Sec. 16 22N, 5W	Seligman SE 7.5'	Cinder Pit	Cinder (scoria) deposit, quarry.
Sec. 18 22N, 5W	Seligman SE 7.5'	Cinder Pit	Cinder (scoria) deposit, quarry.
Sec. 23 22N, 4W	Crookton 7.5'	Cinder Pit	Cinder (scoria) deposit, quarry.
Sec. 24 22N, 4W	Crookton 7.5'	Cinder Pit	Cinder (scoria) deposit, quarry.
Sec. 12 21N, 2W	Ashfork 7.5'	Cinder Pit	Cinder (scoria) deposit, quarry.
Sec. 35 22N, 4W	Picacho Butte 7.5'	Cinder Pit	Cinder (scoria) deposit, quarry.
Sec. 2 21N, 2W	Ashfork 7.5'	Cinder Pit	Cinder (scoria) deposit, quarry.
Sec. 23 21N, 2W	Ashfork 7.5'	Cinder Pit	Cinder (scoria) deposit, quarry.
Sec. 25 21N, 2W	Ashfork 7.5'	Cinder Pit	Cinder (scoria) deposit, quarry.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
YAVAPAI COUNTY (CONT.)			
Sec. 27 21N, 2E	Ashfork 7.5'	Cinder Pit	Cinder (scoria) deposit, quarry.
Sec. 36 21N, 2W	Ashfork 7.5'	Cinder Pit	Cinder (scoria) deposit, quarry.
Sec. 36 21N, 2W	Ashfork 7.5'	Cinder Pit	Cinder (scoria) deposit, quarry.
Sec. 24 20N, 2W	Meath Spring 7.5'	Cinder Pit	Cinder (scoria) deposit, quarry.
Sec. 30 20N, 1W	Meath Spring 7.5'	Cinder Pit	Cinder (scoria) deposit, quarry.
Sec. 17 19N, 1W	Meath Spring 7.5'	Cinder Pit	Cinder (scoria) deposit, quarry.
Sec. 13 18N, 2W	Paulden 7.5'	Cinder Pit	Cinder (scoria) deposit, quarry.
Sec. 32 16N, 7E	Casner Butte 7.5'	Cinder Pit	Cinder (scoria) deposit, quarry.
Sec. 15 21N, 2W	Ashfork 15'	Cinder Pit	Cinder (scoria) deposit, quarry.
Sec. 22 21N, 2W	Ashfork 7.5'	Cinder Pit	Cinder (scoria) deposit, quarry.
Sec. 35 11N, 2W	Walnut Grove 7.5'	Remington Non-Metallic Prop.	Fine grained white pumice.
Sec. 32 13N, 4W	Kirkland 7.5'	Magic Mtn., Maverick, Rynearson Tuff Quarries, Kirkland Tuff Quarries	Light tan to gray volcanic tuff; past producer of quarried masses for building stone and crushed screened material for "oil sweep" and "kitty litter".

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
NAVAJO COUNTY			
16N,23E 16N,24E	numerous	Holbrook Basin Evaporite Deposits	Extensive halite deposit with some sylvite bearing zones in Permian formation; subsurface halite occurs over an area of about 2300 square miles.
YAVAPAI COUNTY			
Sec. 1 13N, 4E	Camp Verde 7.5'	Camp Verde Salt Mine	Past production of halite for cattle feed, with mirabilite and thenardite in old lake bed.

SILICA - QUARTZ

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
COCHISE COUNTY			
Sec. 25 23S,24E	Bisbee 7.5'	Bisbee Queen	Silica breccia outcrops within Escabrosa Limestone.
Sec. 14 23S,20E	Sunnyside 15'	Tungsten Reef Mine	Quartz veins with gold and silver.
Sec. 17 23S,24E	Bisbee 7.5'	Don Luis Pit	Past producer; sandstone and meta-sandstone mined for copper smelter flux.
Sec. 12 24S,20E	Montezuma Pass 7.5'	Tracey Mine	Quartz vein in granite; possible use as copper smelter flux.
Sec. 17 23S,25E	Bisbee NE 7.5'	Easter Sunday Mine	Past production of smelter flux; fractured quartzite bed with gold, silver and pyrite in Morita formation.
Sec. 25 22S,23E	Bisbee 7.5'	Juniper Flats Area Mines	Siliceous copper, lead, gold and silver mineralization in veins in granite.
Sec. 25 22S,23E	Bisbee 7.5'	Juniper Flats Area Mines	Siliceous copper, lead, gold and silver mineralization in veins in granite.
Sec. 23 14S,28E	Cochise Head 15'	Beryl Hill & Live Oak Prospects	Feldspar, beryl, mica and quartz in pegmatite; past producer of beryl.
Sec. 31 13S,23E	Winchester Mtns. 15'	Hearst Mine	Past production; argentiferous silica flux from deposit in paleozoic limestone with jasperoid masses.
Secs.25 26 & 35 15S,22E	Dragoon 15'	Burro Pit, AKA: Chicora Mine, Strong and Harris	Past production of smelter flux; bolsa quartzite with copper mineralization.

LOCATION	QUADRANGLE MAP.	KNOWN NAMES	DESCRIPTION-COMMENTS
COCHISE COUNTY (CONT.)			
Secs. 11 & 14 15S,23E	Cochise 15'	Red Bird Mine, AKA: Gold Coin	Past production of smelter flux. Quartz veins with gold and silver mineralization
Secs. 17 & 20 16S,30E	Cochise Head 15'	Indian Creek	Quartz masses.
Secs. 3 & 9 16S,22E	Dragoon 15'	Bluebird Mine	Quartz crystals.
Sec. 24 18S,19E	McGrew Spring 7.5'	Ricketts Quarry	Past production; Bull quartz masses in alaskite and quartz monzonite.
Sec. 28 19S,25E	Pearce 15'	Nancy Group	Past producer silica for smelter flux from Bolsa quartzite.
Sec. 21 23S,24E	Bisbee 7.5'	Wade Hampton Mine	Past production of silica flux containing copper and lead mineralization in siliceous Abrigo Limestone.
GILA COUNTY			
Sec. 15 1N,15E	Globe 7.5'	Copper Hill Mine, Moore's Silica	Past producer: Troy quartzite in Cambrian formation used for smelter flux.
Sec. 22 4S, 15E	Hayden 7.5'	Chillito Mine	Past producer of silica flux for copper smelters.
Sec. 36 1S,17E	Bucket Mtn 7.5'	Prospect Near Bucket Mtn.	Bull quartz vein cutting Precambrian granite.
Sec. 20 10N,11E	McDonald Mtn. 7.5'	Beauty 1-7	Quartz dike 300-500 feet wide containing massive quartz, quartz crystals, amethyst and agate.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
GILA COUNTY (CONT.)			
Sec. 13 1N,14E	Inspiration 7.5'	R & H Group	Quartz vein containing precious and base metal mineralization.
GRAHAM COUNTY (CONT.)			
Sec. 25 5S,25E	Cobre Grande 7.5'	Arizona	Laminated quartz containing massive quartz with lead, silver, copper, gold and zinc mineralization.
Sec. 36 5S,19E	Cobre Grande 7.5'	Number One	Bolsa quartzite reached at depth in prospect on lead occurrence.
Sec. 17 6S, 20E	Cobre Grande 7.5'	Tenstrike Group	Quartz crystals in vein druses.
Sec. 29 6S, 20E	Cobre Grande 7.5'	Grand Reef	Silicified breccia containing base and precious metals; possible siliceous fluxing ore.
GREENLEE COUNTY			
Sec. 28 3S, 28E	Clifton 15'	Willis Mine, Harmony No. 1	Past producer. Coronado quartzite in Cambrian formation used for smelter flux.
Sec. 11 8S,30E	York Valley 15'	Ash Peak Mine	Siliceous gold-silver-manganese deposit; producer of precious metal bearing smelter flux.
Sec. 24 8S,31E	Duncan 15'	Carslile	Quartz-calcite veins containing gold and silver values in andesite.
Sec. 33 3S, 29E	Clifton 15'	Clifton No. 1 Silica Pit	Sandstone-quartzite for nonferrous metal smelter flux.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
GREENLEE COUNTY (CONT.)			
Sec.8 3S,30E	Clifton 15'	Independence, Big Medicine, White Property, Henry Ford, Greenlee Gold	Siliceous base and precious metal vein.
LA PAZ COUNTY (CONT.)			
Set. 34 4N,20W	Middle Camp Mtn. 7.5'	Crystal Cavern, Big Bertha	Quartz crystals in fissure in highly altered schists.
Sec. 10 2N, 18W	Quartzite 15'	Crystal Peak	Clear rock crystals measuring .5 to 2 inches in diameter and 1 to 6 inches in length; crystals occur in pockets in rhyolite (?).
Sec. 10 4N, 13W	Hope 15'	Silica Deposit	White bull quartz occurrence.
Sec. 31 4N,20W	Middle Camp Mtn. 15'	Strange Silica Claim	Quartz breccia deposit. Angular fragments of quartz loosely cemented; high silica content with faint minor red staining.
Sec. 22 2N,20W	Cunningham Mtn. 7.5'	Rainbow, Top Sil	Quartz vein deposit containing gold, silver and cooper mineralization; possible source of siliceous ores for copper smelter flux.
Sec. 33 5N, 17W	Quartzsite 15'	Perry Chrysoprase	Narrow, irregular stringers of chrysoprase in Cretaceous or Tertiary volcanics.
Sec. 10 4N, 13W	Hope 15'	Mathews Claim	Fluorite as a gangue mineral along with quartz in wide metallurgical vein.
Sec. 6 4S, 22W	Picacho 7.5'	John Hummer Mine	Pegmatite dikes containing mica, quartz and potash feldspar.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
LA PAZ COUNTY (CONT.)			
Sec. 14 3N,20W	Cunningham Mtn. 7.5'	Kellogg Mine	Quartz vein deposit containing gold, silver and copper mineralization; possible source of fluxing ores for copper smelters.
MARICOPA COUNTY			
Secs. 14 & 15 6N,9E	Boulder Mtn. 15'	Harrison Deposit, Dixie Claims	Quartz veins,
Sec. 16 7N,3W	Red Picacho 7.5'	Morning Star	Pegmatite containing large quartz masses and potash feldspar, green muscovite, lithium minerals and beryl.
Sec. 19 7S,1W	Estrella 15'	Altuda	Past production siliceous smelter flux containing gold and silver from quartz vein deposit.
Sec. 18 6N,3E	New River SE 7.5'	Brian Lode	Quartz veins containing base and precious metals; possible siliceous flux deposit.
Sec. 1 4N,5E	McDowell Peak 7.5'	Enders Silica	Past production; white bull quartz mined for ceramic use.
Sec. 4 5N,4E	Cave Creek 7.5'	Mormon Girl, S&J Copper Prop., Henry M. Grady, Mormon Mine #2, Mamie Maude	Base and precious metal bearing quartz vein; now subdivided for home sites.
Sec. 14 5N,10W	Gladden 15'	Sunrise, Ophir, Grant	Quartz vein with precious metal values; possible siliceous smelter flux.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
MARICOPA COUNTY (CONT.)			
Sec. 22 6N, 4W	Wickenburg SW 7.5'	Newsboy, G.W. Mining & Minerals Co., Chas. Black Claims, Gnome Development, Grande Group	Quartz, manganese, gold and silver deposit; possible source of precious metal bearing silica flux.
Sec. 36 4N, 7W	Belmont Mtn 15'	Tonopah-Belmont, Belmont-McNeil, Economy Mining, East Vulture	Lead, copper, silver and gold vein deposit; some portions of which contain siliceous ores of possible fluxing grade.
Sec. 10 5N, 1W	Baldy Mtn 7.5'	White Peak, Charlotte Group, Triphahn	Pegmatite quartz deposit.
Sec. 15 5N, 1W	Hieroglyphic Mtns SW 7.5'	White Peak Silica	Pegmatitic quartz deposit; past production of silica for copper smelter flux.
MOHAVE COUNTY			
Sec. 28 20N, 20W	Oatman 7.5'	Mossback Mine	Quartz crystals.
Sec. 10 22N, 17W	Stockton Hill 7.5'	Consolidated Feldspar Prospect, T.F.F. Quarry	Quartz with potassium feldspar in pegmatite.
Sec. 23 22N, 17W	Stockton Hill 7.5'	Cinco De Mayo	Quartz in pegmatite.
Sec. 26 28N, 17W	Garnet Mtn. 15'	MP Mica Claims	Quartz, potassium feldspar and muscovite in pegmatite.
Sec. 22 22N, 17W	Stockton Hill 7.5'	White Spar, Weeks "Silica, White Top Mine	Past production, quartz-feldspar processed for use as abrasives and ceramics; production from pegmatites.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
Sec. 36 11N,15W	Swansea 15'	Silverfield, Townsend Property	Quartz as siliceous copper, gold and silver mineralization in replacement deposit in quartzite and limestone; possible silica flux.
Sec. 29 23N,17W	Stockton Hill 7.5'	Rico	Quartz vein containing precious and base metal mineralization.
Sec. 26 22N,17W	Stockton Hill 7.5'	Kingman Feldspar Mine, Taylor, Grand Silica Annex	Quartz with feldspar in zoned simple pegmatite.
Sec. 36 23N,13W	Valentine SE 7.5'	Copper Giant, Copper King	Quartz veins containing base and precious metal mineralization and beryl.
Sec. 14 29N,19W	Senator Mtn. 15'	Muscovite Mica	Simple unzoned pegmatite with quartz, muscovite mica and feldspar.
Sec. 6 19N,20W	Oatman 7.5'	Navy Group	Quartz vein containing calcite, fluorite and precious metal mineralization.
NAVAJO COUNTY			
Secs. 27, 34 & 35 10N,15.5E	Chediski Peak 15'	Chediski Butte, Cow Creek	Grayish-white quartzite.
PIMA COUNTY			
Sec. 29 14S,2W	Pisinimo 15'		Quartz veins.
Sec. 18 14S,6W	Kino Peak 15'	Little Chief Mine	Past producer; quartzite used for copper smelting flux.
Secs. 18 & 19 14S,13E	Cat Mtn. 7.5'	Battle Axe Mine	Past production, quartz veins with gold-silver values used for smelter flux.

SILICA - QUARTZ

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
PIMA COUNTY (CONT.)			
Sec. 33 18S,17E	Baboquivari Peak 15′	Allison Mine	Quartz lenses, silver-gold values, past production of silica flux.
Sec. 34 17S,11E	Twin Buttes 15′	Fresnal Canyon	Quartz veins.
SW1/4 18S,8E NW1/4 19S,8E	Baboquivari Peak 15′	Baboquivari Mtns.	Quartz lenses.
Sec. 31 16S,7E	San Juan Springs 7.5'	Antelope Mine	Past producer of quartzite as flux for copper smelter.
Sec. 36 11S,2E	Gu Achi 15′	Freeman Silica, Sheridan Pit	Past producer of quartzite for copper smelter flux.
11S,8E	Vaca Hills 15'	Tinker Bell, J & D	Pegmatite containing quartz and mica.
Sec. 25 17S,11E	Twin Buttes 15'	Silica Quarry	Silica quarry.
Sec. 11 13S,7W	Ajo 15′	San Antonio Mine, Growler #1,2,3,4, Sun-Shine, Valentina Mining Claim, Desert White Queen	Past producer of silica for smelter flux; pegmatites contain quartz, muscovite mica and sodium feldspar.
Sec. 6 12S,6W	Ajo 15′	Right on Group	Base and precious metal occurrence containing quartz.
Sec. 17 12S,6W	Ajo 15'	Old Hickles Property	Silica deposit containing copper, gold and silver.
Sec. 2 13S,7W	Ajo 15'	Mica Mine, Clark Silica	Past producer of silica flux for copper smelter; pegmatite deposit.
Sec. 2 15S,2E	Quijotoa Mtns. 15'	Johnson Mine	Past production of quartz (with small amount of copper oxides) for copper smelter flux.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
PIMA COUNTY (CONT.)			
Sec. 19 14S,2W	Mt. Ajo 15'	Little Chief Mine, Chief Pit	Past producer of silica for copper smelter flux; strong irregular quartz veins cutting Laramide granitic intrusive.
Sec. 10 14S,1E	Pisinimo 15'	Lime Chief 1 and 2, Phelps Dodge Silica Mine	Past producer of quartz for copper smelter flux.
Sec. 7 12S,6W	Ajo 15'	Copper Valley Claims, Way Out, Right On, Bonnie Lee	Siliceous gold, silver, copper occurrence; possible source of siliceous copper smelter flux.
Sec. 24 19S,18E	Apache Peak 7.5'	Copper Plate Mine	Past producer of copper-silver bearing silica flux for copper smelter.
Sec. 2 13S,8E	Silver Bell Peak 15'	Carlo, Eclipse	Past producer of quartz for siliceous smelter flux for copper smelter; deposit contains copper and silver.
Sec. 6 12S,6W	Ajo 15'	Bonnie Lee Group, Bonnie Lee Nos. 1-10	
Sec. 19 14S,13E	Cat Mtn. 7.5'	Battle Axe Mine	Past producer of silica flux for copper smelter; closely spaced, irregular quartz veins containing copper and silver mineralization.
PINAL COUNTY			
Sec. 8 7S,16E	Lookout Mtn. 7.5'	Camp Grant	Past production; Troy quartzite used for smelter flux; Precambrian.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
PINAL COUNTY (CONT.)			
Sec. 19 2S, 2E	Montezuma Peak 7.5'	Butterfly Mtn. Area	Pegmatitic quartz vein, muscovite books.
Secs. 25 & 26 9S, 4E (proj.)	Silver Reef Mtns. 15'	Orizaba Silica Mine	Silica for copper smelter flux.
Sec. 31 3S, 2E	Enid 7.5'	Sierra Estrella	Massive white quartz veins.
Sec. 7 5S, 6E	Gila Butte SE 7.5'	Sacaton Mtns.	Lustrous white quartz outcrops and grayish-white quartzite. Cambrian.
Sec. 9 5S, 6E	Sacaton 7.5'	Five Mile Peak	Quartz vein.
Secs. 2 & 11 8S, 18E	Klondyke 15'	Copper Creek District	Quartz crystals.
Sec. 26 8S, 16E	Mammoth 7.5'	Tiger Mine Tailings, Mammoth Tailings	Silica for copper smelter flux.
Sec. 33 9S,15E	Oracle 15'	Gold Hill Mine	Silica for copper smelter flux.
Sec. 30 5S, 15E	Winkelman 7.5'	Babbitt Claims, Winkelman Silica Mine	Silica for copper smelter flux.
Sec. 13 3S, 13E	Sonora 7.5'	Copper Ace Group, Copper Ace MS 4640	Past production of highly siliceous copper ore from vein deposit.
Sec. 17 7S, 18E	Holy Joe Peak 7.5'	Cobre Grande Property, Table Mountain Property	Reported past producer of siliceous fluxing copper ore.
Sec. 8 10S, 3E	Vekol Mtn. 15'	Hilltop Ext. Claims, Cimarron Claims, Arizona Hilltop Mines, Slims Workings	Siliceous copper-silver replacement deposit.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
PINAL COUNTY (CONT.)			
Sec. 16 4S,13E	Grayback 7.5'	Honey Bee Claims	Quartz vein deposit containing copper-silver mineralization.
Sec. 8 7S,10E	Picacho Rsvr SE 7.5'	North Star, Randall Copper Properties	Siliceous copper ores in vein deposit; past production of siliceous copper ore for smelter flux.
Sec. 23 9S, 4E	Silver Reef Mtn. 15'	Pico Ace Group, George Freeman Pit, Sofpa Claims, Esta Bales Claims	Past production of plus 90% silica for copper smelter flux; deposit consists of base and precious metal mineralization in quartzite.
Sec. 22 2S,11E	Mineral Mtn. 7.5'	Reymert, Alaska Shaft, Australia, Denoon Property, Devoux Property	Epithermal silver manganese vein system; high silica-silver zones currently being mined for copper smelter flux.
Secs. 7 & 8 4S, 2E	Enid 7.5'	Sierra Estrella	Microcline, muscovite and quartz in pegmatite.
Sec. 23 8S, 5E	Silver Reef Mtn. 15'	Silver Reef, Hornsilver Claims, Santiago, Cholla, Lead Boulder, Nugget	Siliceous silver ores with copper, gold and lead in quartz veins.
Secs. 19 & 20 10S,16E	Campo Bonito 7.5'	Southern Belle, Careless, Cross Town, Apache Girl, Dolphin, Apache Peak Cons. Mng. Co., Jim Douglas, Fortuna, Aravaipa Metals	Auriferous silica fluxing ores mined for copper smelter flux; past production from quartz veins.
Sec. 24 9S, 4E	Silver Reef Mtn. 15'	Sofpa Claims, Wagnon Claims	High silica content vein containing silver, gold and lead.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
PINAL COUNTY (CONT.)			
Sec. 2 7S,17E	Holy Joe Peak 7.5'	Southwest Silver Corp. #1, Jim Douglas, Fortuna, Aravaipa Metals	Siliceous silver-copper ores produced from steeply dipping brecciated fault zone cutting diabase and quartzite.
Sec. 31 9S, 5E	Silver Reef Mtn. 15'	Jackrabbit Property, Agwa, Keystone, Sahuarro, Casa Grande Cu and Au Mng. Co., Tuba City Co., Jack Rabbit Silica	Quartzite produced for copper smelter flux.
Sec. 30 3S, 13E	Teapot Mtn. 7.5'	Copper Butte, Patented Claims, June Bug, Cochise, Old Fred Mitchell Property, James Incline, Poor Mans Wash Property, Wallace Shaft	Past production of copper bearing silica flux for use in copper smelters; deposit occurs in fault in conglomerate.
SANTA CRUZ COUNTY			
Set. 2 24S,16E	Lochiel 15"	Bonanza	Small pockets of quartz crystals in base-precious metal replacement deposit.
Sec. 36 22S,15E	Nogales 15'	Old Timer, George Morris Gold Claim, Homestake	Siliceous gold ore; possibly source of flux for copper smelters.
YAVAPAI COUNTY			
Sec. 32 15N, 9W	Bagdad 15'	Niagara Creek	Vuggy quartz, quartz crystals in breccia pipes.
Sec. 13 12N, 2W	Mt. Union 15'	Cash Mine	Quartz crystals, adularia calcite in fractured granite.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
YAVAPAI COUNTY (CONT.)			
Sec. 21 15N, 9W	Bagdad 15'		Quartz veins.
Sec. 3 7N, 3W	Red Picacho 15'		Quartz masses, feldspar associated with pegmatite.
Sec. 26 16N, 7W	Camp Wood 15'	Black Magic, Mary D, Joy, Black Diamond	Coarsely crystalline grayish-white quartz as vein fillings 3 inches to 10 feet in width.
Sec. 18 15N, 7W	Bagdad 15'	Black Pearl, Camp Wood Tungsten Mine	Coarse grained crystal line quartz as gangue in tungsten deposit.
Sec. 36 12.5N,2W	Groom Creek 7.5'	Cash, Senator Cash	Reported occurrence of quartz crystals at base and precious metal vein deposit.
Sec. 23 8N, 3W	Morgan Butte 7.5'	Buckhorn (Drumm) Group, Mardis	Siliceous copper-gold deposit; possible source of fluxing ores for copper smelters.
Sec. 10 14N, 3E	Cherry 7.5'	Etta	Lenses of coarsely crystalline white quartz.
Sec. 10 7N, 3W	Red Picacho 7.5'	White Jumbo	Pegmatite deposit with massive quartz core.
Sec. 28 11N, 1E	Battle Flat 7.5'	Last Found	Massive quartz in unzoned pegmatite.
Sec. 36 14N,10W	Kaiser Spring SE 7.5'	Mammoth	Quartz with base metal mineralization in breccia pipe deposit.
Sec. 32 15N, 9W	Bagdad 15'	Niagara Claims	Breccia pipe deposit with quartz cementing the breccia; pockets of quartz crystals are possible.
Sec. 3 7N, 3W	RedPicacho7.5'	Outpost, Outpost Extension	Zoned complex pegmatite containing quartz and various rare metals,

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
YAVAPAI COUNTY (CONT.)			
Sec. 13 13N,1.5E	Hurnboldt 7.5'	Atlas Copper, Cheryl Prop., Bauman Prop., Humboldt Copper	Siliceous copper-gold-silver mineralization; past production of fluxing ores.
Sec. 11 8N,10W	Smith Peak 7.5'	Bullard, Little Giant	Gently dipping quartz horizon containing base and precious metal mineralization; past production of siliceous fluxing ores.
Sec. 16 11N, 5W	Weaver Peak 7.5'	Cuba, Independence, Rooney	Past production of siliceous fluxing ores containing copper, gold and silver from quartz veins.
Sec. 33 9N, 3W	Morgan Butte 7.5'	Gold Bar, O'Brien, Black Bear, Homestake, Little Jim, Crown, Interior Mng & Trust Co., Jenny Lynn	Quartz vein contain precious metal mineralization.
Sec. 32 12N, 2E	Mayer 7.5'	Iowa Group, Roese Mining Co. Property	Past production of siliceous copper ores for copper smelter flux; copper mineralization in ferruginous chert unit.
Sec. 34 12N, 5W	Weaver Peak 7.5'	Monte Cristo, Dixie Queen	Large zoned pegmatite; past production of beryl feldspar and quartz.
Sec. 22 13N,10W	Arrastra Mtn NE 7.5'	New Hope, Good Luck, Russell Tungsten	Quartz pegmatite in gneiss or schist.
Sec. 5 14N, 2E	Humboldt 7.5"	Shylock,	Siliceous base and precious metal mineralization along fault in Precambrian schist series.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
YAVAPAI COUNTY (CONT.)			
Sec. 26 12N, 5W	Peeples Valley 7.5'	Side Bet No. 1 and 2	Gold in quartz vein. Possible source of siliceous gold ores for copper smelter flux.
Sec. 28 18N, 1E	Hell Point 7.5'	United' States, Supai Claims	Copper carbonates in paleozoic sandstones; past production of siliceous copper ores for copper smelter flux.
Sec. 10 8N, 3W	Morgan Butte 7.5'	Wren	Quartz veins containing copper-precious metal mineralization; possible source of siliceous ores for copper smelter flux.
Sec. 33 10N, 1W	Crown King 7.5'	Wansfell	Quartz vein containing gold-copper mineralization; possible source of siliceous ores for copper smelter flux.
Sec. 29 10N, 4W	Yarnell 7.5'	Yellow Jacket, Old Tunnell, Last Chance, etc.	Quartz vein deposit contains base and precious metal mineralization.

SILLIMANITE GROUP

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
COCHISE COUNTY			
Sec. 15 13S,25E	Wilcox 15'	Drury	Dumortierite vein in schist.
LA PAZ COUNTY			
Secs. 31 & 32 6N,14W Secs. 5 & 6 5N,14W	Salome 15' Utting 15'	Sulfa Group, Saffire	Kyanite with lesser amounts of sillimanite and andalusite dissem-inated in gneiss; includes some higher grade segregations of kyanite.
Sec. 5 3N,19W	Quartzsite 15'	Dumortierite, Quartzite, Bayles	Kyanite-dumortierite-pyrophyllite in quartz mica schist.
Sec. 7 3S,23W	Picacho NW 7.5'	Clip Wash	Blue dumortierite, kyanite in quartzose schist boulders.
Sec. 10 1N,16W	Kofa Butte 15'	Alamo Springs Area	Pyrophyllite veins.
MARICOPA COUNTY			
Sec. 13 2N,3E	Sunnyslope 7.5'	Sealrock Group	Kyanite in micaceous schist; property included in Phoenix city park; small past production.
MOHAVE COUNTY			
Sec. 27 38N,16W	Virgin Peak 15'	Hummingbird Group	Kyanite associated with feldspar, muscovite.
Secs. 10 & 15 19N,15W	Dean Peak 15'	Maynard Dis-trict	Sillimanite associated with quartz veins in schist.
Secs. 3 & 4 17N,16W	Wabayuma Peak 7.5'	Cedar District	Andalusite associated with quartz veins in schist.
Sec. 13 11N,14W	Artillery Peak 15'	Cactus Queen Mine	Pyrophyllite.
NE1/4 17N,17W	Yucca SE 7.5'		Pyrophyllite.

SILLIMANITE GROUP

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
YAVAPAI COUNTY			
Sec. 26 15N, 4W	Skull Valley 7.5'	Granite Mtns.	Andalusite-kyanite reported in schist.
Sec. 17 16N, 6W	Camp Wood 15'	Camp Wood, Sillimanite Group	Sillimanite, andalusite in schist.
Sec. 33 15N, 9W	Bagdad 15'	Copper Creek	Sillimanite in mica schist.
Sec. 6 11N, 1E	Mt. Union 15'	Mule Canyon	Andalusite occurrence.
N1/2 10N, 1E	Mayer 7.5'		Andalusite occurrence.
Sec. 20 11N, 1E	Battle Flat 7.5'	Middleton Andalusite	Andalusite and kyanite occur in widely separated small pockets and pods at contacts between small, discontinuous quartz dikes and schist.

SODIUM SULFATE

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
YAVAPAI COUNTY			
Sec. 1 13N, 4E	Camp Verde 7.5' Middle Verde 7.5'	Camp Verde Salt Mine	Past production; flat bedded deposit of thenardite, mirabilite, gypsum, glauberite, halite clay in Cenozoic Verde Formation.
Sec. 19 13N, 5E	Horner Mtn. 7.5'		Past production; thenardite in Cenozoic Verde Formation.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
APACHE COUNTY			
Sec. 2 18N,30E	Barth Well 7.5'	Barth Well Sand Pits	Rounded silica sand particles, past production.
Sec. 23 23N,27E	Wide Ruins 7.5'	Wide Ruins Area Silica Sand Occurrences	Past production of hydrofrac sands, from Bidahochi Formation.
Sec. 18 22N,29E	Burntwater Wash 7.5'	Burntwater Mine	Active mine producing hydrofrac sands, used in oil well industry.
Sec. 2 24N,26E	Klagetoh North 7.5'	Klagetoh	Silica sand in the Bidahochi Formation.
Sec. 19 22N,26E	Tanner Springs 7.5'	Tanner Springs Area Silica Sand Occurrences	Silica sand deposits.
Sec. 26 21N,26E		Graywater Wash Silica Sand Occurrences	Silica sand deposits in the Bidahochi Formation used as hydrofrac sand.
SE 1/4 26N,29E	Lukachukai 15'	Lukachukai Mtns Silica Sand Occurrences	Silica sand deposits in the Chuska Formation.
5 Mi E. of Rough Rock	Rough Rock 7.5'		Silica sand deposits in the Cow Springs Formation.
6 Mi N. of Black Mtn.			Silica sand deposits in the Morrison Formation.
8 Mi NW of Ganado			Silica sand deposits in the Carmel Formation.
COCONINO COUNTY			
NW1/4 32N,11E (proj.)	Tuba City 7.5'	Tuba City Area	Sand dunes.
Sec. 16, 17,20 25N,14E	Garces Mesa 7.5'	Red Lake	Quartz sand deposit.
N1/2 22N,13E (proj.)	Leupp 15'	Leupp Area	Quartz sand.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
COCONINO COUNTY (CONT.)			
2 miles East of Goldtooth	Goldtooth 7.5'		Sand deposit in Pleistocene formation.
Sec. 13 19N,12.5E	Meteor Crater 7.5'	Barringer, Jupiter, Venus Mars, Saturn	Fused silica from meteor impact; past production; fused silica in Coconino sandstone shipped for glass and foundry uses.
MOHAVE COUNTY			
Secs. 24 & 25 16N,13W	Wickiup 7.5'	Wickiup Area	Glauconitic green sand beds.
NAVAJO COUNTY			
SW1/4 29N,17E	Oraibi 15'	Second Mesa	
NW1/4 28N,20E	Keams Canyon 15'		Sand lenses in Mesa Verde Formation.
26N,16E 25N,15E	Tovar Mesa 15'	Polacca Wash	
SW1/4 23N,18E	Chimney Butte 7.5'	Coyote Wash	Sand lenses in Wingate Formation.
SW1/4 21N,18E		15 mi. SW of Dilcon	
	Black Mesa Wash Ne 7.5'	20 mi. NE of Red Lake (Tonalea)	Sand lenses within Pleistocene terrace.
Sec. 2 9N,20E	Cibecue 15'	Hop Canyon	White sandstone in Supai Formation.
Sec. 24 8N,20E	Cibecue 15'		Cretaceous sandstone.
Sec. 27 8N, 20E	Cibecue 15'	Corduroy Creek Area	White quartzitic sandstone in Supai Formation

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
MARICOPA COUNTY			
Sec. 5 7N, 3E	Daisy Mtn. 7.5'	Table Mesa Slate	Production of slate from Yavapai schist for use in manufacture of vitreous clay pipe.

STRONTIUM

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
LA PAZ COUNTY			
Sec. 25 3S, 23W	Hidden Valley 7.5'	Amelia Mine, Gallo	Celestite as a gangue with silver, lead and zinc mineralization in fissure fillings along normal faults.
Sec. 25 3S,23W	Hidden Valley 7.5'	Clip Mine, Silver Clip, Blaine	Celestite as a gangue mineral in a lensing vein in a fault zone containing lead and silver mineralization.
Sec. 1 4S, 23W	Picacho 7.5'	Mendevil Claim, Draper	Celestite as a gangue mineral in irregular veins in a fault zone containing lead and silver mineralization.
Sec. 1 4S,23W	Picacho 7.5'	Princess & Hamburg Mines	Celestite as a gangue mineral in an irregular fault fissure filling vein containing silver-lead-zinc mineralization.
Sec. 2 3N, 17W	Vicksburg 15'	Ramsey Mine, R and A	Celestite with barite gangue in a relatively wide strongly brecciated vein zone of fractures and fissures containing lead, silver, zinc and copper mineralization.
Sec. 36 3S,23W	Picacho 7.5'	Saxon Mine, Dives, Padre Kino	Celestite with barite gangue in an irregular fissure vein containing silver-lead-zinc mineralization.
MARICOPA COUNTY			
Sec. 20 6N,7W	Aguila 15'	Milton Ray, Black Butte, Aguila Celestite	Celestite interbedded in shaly tuff in Tertiary formation.
Secs. 3, 4,5,8, 9 & 10 8S,5W	Theba 15'	Montezurna Claims, Strontium Group	Celestite with gypsum in sandstone and conglomerate.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
MARICOPA COUNTY (CONT.)			
Sec. 29 7S,5W	Theba 15'	Black Gap	Gypsum beds with celestite inter-bedded in a Tertiary tuff.
Sec. 29 2N,8E	Goldfield 7.5'	Coyote Claim	Shear zone in andesite containing lead, zinc, silver, manganese and strontium.

VERMICULITE

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
MARICOPA COUNTY			
Sec. 21 7N,5W	Vulture Mtns 15'	Bar FX Ranch	Vermiculite occurrence.
Sec. 4 1N,3W	Valencia 7.5'	Vermiculite, Solomon	Weathered (altered) biotite in high biotite zone in gneiss.
MOHAVE COUNTY			
Sec. 10 19N,15W	Dean Peak 7.5'	Valley View	Vermiculite occurrence.
Sec. 6 20N,15W	Rattlesnake Hill 7.5'	Micro-Cell, Vermiculite Lode	Vermiculite in a zone of a granitic rock complex.
PINAL COUNTY			
Sec. 10 10S,15E	Oracle 15'	Irene Wash, Little Matty Claims	Vermiculite occurrence.

WOLLASTONITE

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
COCHISE COUNTY			
Sec. 12 20S,22E	Tombstone 7.5'	Silver Thread and West Side Mines	Fibrous masses of wollastonite.
GILA COUNTY			
Sec. 30 4S,16E (approx.)	Christmas 7.5'	Dripping Springs Mtns.	Massive andradite beds, wollastonite.
Sec. 30 4S,16E	Christmas 7.5'	Christmas Pit & Underground, Inspiration MS 4443, Gila Copper Sulphide Co. Claim, Saddle Mt Co Claims	Green andradite garnet "rock" resulting from contact metamorphism of limestone; deposit is noted for its copper production; occurrence contains soine wollastonite.
LA PAZ COUNTY			
Set. 21 6N,14W	Salome 15'	Salome Peak Wollastonite	Wollastonite in metamorphosed limestone.
Sec. 15 6N,14W	Salome 15'	Cobralla	Wollastonite replacing limestone in a contact metamorphic occurrence where contact metamorphic minerals have been developed on a large scale.
PIMA COUNTY			
Secs. 17, 18,19,20 14S,6W Secs. 13 & 14 14S,7W	Kino Peak 15'	Scarface Mtn. Area	White wollastonite lenses in altered limestone, garnet, copper minerals
Secs. 25 & 36 18S,15E	Sahuarita 7.5'	Santa Rita Mtns.	Wollastonite and garnet in metamorphosed limestone.
Sec. 35 16S,12E	Twin Buttes 7.5'	Mineral Hill	Minor wollastonite in metamorphosed limestone.

ZEOLITES

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
APACHE COUNTY			
Sec. 6 6N,30E	Alpine 15'	Nutrioso Zeolite	Analcime and clinoptilolite in sandstone.
Sec.11 5N, 30E	Alpine 15'	Alpine Zeolite	Clinoptilolite in tuff.
COCHISE COUNTY			
Secs. 1 & 2 12S,29E	Bowie 15'	Grace 1-4, AKA: San Simon Creek	Chabazite, analcime, clinoptilolite, and eronite in Cenozoic lacustrine voleanic tuff.
Sec. 12 15S,24E	Cochise 15'	Wilcox Playa	Analcime in Pleistocene mudstone.
Sec. 14 23S,19E	Sunnyside 15'	Eureka Canyon	Leonhardite occurrence.
Sec. 7 12S,30E	Bowie 15'	Bowie Chabazite Deposit	Producers of chabazite from unnamed section of Plio-Pleistocene lake beds within a tuff bed.
GILA COUNTY			
Sec. 31 5N, 13E	Windy Hill 7.5'	Dager Ranch Chabazite Deposit	Chabazite bed in brownish-white altered vitric tuff.
Sec. 35 3S,15E	El Capitan Mtn. 7.5'	Dripping Spring Valley Chabazite	Chabazite in altered vitric tuff of grayish white color.
Sec. 4 4N,13E	Windy Hill 7.5'	Roosevelt Lake Chabazite Deposit	Chabazite in three distinct lithologies: 1) altered vitric tuff, 2) altered ashy mudstone, and 3) altered ashy tuff.
Sec. 34 5N, 12E	Windy Hill 7.5'	Roosevelt Lake Phillipsite	Phillipsite in altered vitric ash.
Sec. 12 6N,10E	Tonto Basin 7.5'	Tonto Basin Chabazite Deposit	Chabazite in 6 distinct lithologies-all altered ashy tuffs; also contains traces of clinoptilolite.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
GILA COUNTY (CONT.)			
Sec. 35 6N,11E	Greenback Creek 7.5'	Tonto Basin East Deposit	Chabazite in pinkish-white altered vitric tuff.
GRAHAM COUNTY			
Sec. 19 (and others) 11S,29E	Bowie 15'	Arizona Chabazite Mine, E-Z Claims, San Simon Creek	Past production of chabazite from vitric tuff in Cenozoic formation.
Sec. 28 7S,21E	Buford Hill 7.5'	Exposed Rhyolite Dike	Tuffaceous beds containing clinoptilolite and mordenite.
Sec. 22 8S,28E	Dry Mountain 7.5'	Flat Tire	Zeolites in an altered volcanic ash with diatomite beds.
Sec. 12 11S,28E	Bowie 15'	San Simon Zeolite Deposits	Chabazite, analcime, clinoptilolite and eronite in Cenozoic lacustrine volcanic tuffs.
Sec. 34 11S,29E	Bowie 15'	NRG Mining Co. Claims	Chabazite, analcime, clinoptilolite and eronite in Cenozoic lacustrine volcanic tuffs.
GREENLEE COUNTY			
Sec. 16 3S,29E	Clifton 15'	Morenci Mordenite	Clinoptilolite and mordenite in lapilli and tuff in Tertiary formation.
LA PAZ COUNTY			
Sec. 28 1S,21W	Trigo Peaks 15'	Trigo Mts. Clinoptilite	Clinoptilolite occurs in a massive yellow-ish-white altered clastic tuff inter-bedded with Cretaceous age andesites that include flows, dikes, plugs, tuffs and agglomerates.

ZEOLITES

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
LA PAZ COUNTY (CONT.)			
Set. 36 11N,18W	Swansea 15'	Mineral Wash Clinoptilite	Clinoptilolite occurs in altered yellowish-orange colored tuff enclosed by a reddish-violet agglomerate.
MARICOPA COUNTY			
Sec. 12 7N,6E	Horseshoe Dam 7.5'	Horseshoe Dam, Clinoptilolite	Clinoptilolite in tuff of Verde Formation; Cretaceous.
Sec. 28 7N,4W	Wickenburg 7.5'	Wickenburg Clinoptilolite	Rhyolitic tuff partially altered to clinoptilolite; volcanics are Cretaceous.
MOHAVE COUNTY			
Sec. 25 21N,20W	Secret pass 7.5'	Union Pass Mordenite Deposit, Union Pass South, Union Pass West	Mordenite in an altered brownish-white pumiceous tuff exposed in a road cut.
Sec. 11 16N,13W	Wikieup 7.5'	East of Big Sandy River	Analcime, chabazite, erionite, phillipsite, clinoptilolite in Pliocene lacustrine tuff.
Secs. 24, 25 & 26 16N,13W	Wikieup 7.5'	Wikieup Area	Green analcime in mud-stones, Pliocene Big Sandy Formation.
Sec. 22 21N,20W	Union Pass 7.5'	Union Pass	Mordenite in tuff and lapilli of Tertiary Golden Door volcanics.
Sec. 18 15N,12W	Wikieup 7.5'		Green analcime chaba-zite erunite in Big Sandy Formation; lacustrine tuff.
Secs. 29 & 30 15N,12W	Greenwood Peak 7.5'		Yellow clinoptilolite in tuff within silt-stone-sandstone.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
MOHAVE COUNTY (CONT.)			
Sec. 6 15N,12W Secs. 1 & 12 15N,13W	Wikieup 7.5'	Sycamore Creek	Analcime, chabazite, eronite in Pliocene lacustrine tuff.
Secs. 30 & 31 12N,13W	Artillery Peak 15'	Maggie Canyon	Analcime in Pliocene sandstone.
E1/2 16N,13W NW1/4 15N,12W	Wikieup 7.5'	Big Sandy Formation	Pliocene age Big Sandy Formation covers about 30 square miles; zeolites within the formation in lucustrine rocks; mainly mudstone with interbedded tuff and limestone; the zeolite minerals: analcime, clinoptilolite, erionite, chabazite and lesser amounts of phillipsite, mordenite and harmotome have resulted from alteration of vitric tuffs.
Sec. 31 21N,19W	Secret Pass 7.5'	Black Mtn. Mordenite	Zeolitized tuff bed; zeolite bed is an altered vitrophyre overlain by a clastic vitric tuff which altered to mordenite and clinoptilolite.
Sec. 20 15N,12W	Wickieup 7.5'	Wickieup Zeolite Occurrence	Vitric tuff beds that are altered to analcime, phillipsite, erionite, and at one locality clinoptilolite; part of the Big Sandy Formation.
Sec. 31 12N,13W	Artillery Peak 15'	Maggie Canyon Analcime	Analcime reported in Pliocene sandstone.

ZEOLITES

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
PIMA COUNTY			
Sec. 1 20S,10E	Arivaca 15'	Cerro Colorado Clinoptilite	Bed of tuff breccia and agglomerate partially altered to clinoptilolite.
16S,4W	Mt. Ajo 15'	Ajo Mtns. Clinoptilite	Flow enclosed zeolitized tuff bed containing fragments which have altered to clinoptilolite.
PINAL COUNTY			
Sec. 25 7S, 8E	Picacho Reservoir 7.5'	Picacho Reservoir, Analcime	Analcime in silty claystone; Tertian.
YAVAPAI COUNTY			
Sec. 29 8N, 4W	Sam Powell Peak 15'	Cat's Pause, Rhyolite 1-12	Clinoplilolite in zeolitic volcanic tuff used for "kitty litter" and amonium adsorbent.
YUMA COUNTY			
Sec. 23 8S,19W	Willton 15'	Muggins Mts. Clinoptilolite	Clinoptilolite bearing tuffs; clinoptilolite occurs both in a hard, white, altered vitric tuff bed and also in an overlying bed of grayish-white altered ashy tuff.
Sec. 14 8S,21W	Laguna 15'	Dome Clinoptilolite	Clinoptilolite associated with bentonite in Tertiary lacustrine tuff.

ADDENDUM TO SECOND EDITION

ARIZONA INDUSTRIAL MINERALS

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LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
		CLAY	
Mohave County			
Sec. 35 17N,19W	Warm Springs SE 7.5'	Klaner & Doolin Pits	White kaolinite, quartz, cristobalite in hydrothermally altered volcanic rocks. Past and/or present production.
Sec. 6 14N,10W	Grayback Mtns. 7.5'	Burro Creek, Bentonite	Bentonite in rhyolite tuff. Past and/or present production.
Sec. 15 20N,12W	Austin Peak 7.5'	Bentonite Placer Claims	Bentonite overlaying mudstone, siltstone and sandstone.
Sec. 4 17N,16W	Wabayuma Peak 7.5'	Antler, Spuyten Duyvil	Fine felty serpentine or possibly talc is an apparent breakdown of magnesium-bearing minerals. Economic potential is not known.
Sec. 35 17N,19W	Warm Springs SE 7.5'	Clay Deposit	Refractory clay.
Sec. 21 30N,20W	Senator Mtn. 15'	Lucky 44	Lacustrine deposit of interbedded bentonitic clay, opalitic silica and fluxial sandy conglomerate. Selenite and calcite crystallization is abundant. Carnolite and uranophane as surface coating on bedding planes.
Sec. 36 16N,14W	Wikieup NM 7.5'	Giles Clay Deposit	Clay varying from white to red outcropping around old lake beds (Pleistocene).
Sec. 35 16N,21W	Topock 15'	Self Bentonite	Bentonite occurrence.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION- COMMENTS
		GYPSUM	
PINAL COUNTY			
Secs. 1, 2,3,4 7S, 16E	Lookout Mtn. 7.5'	North of Aravaipa Creek	Gypsum beds.
Sec. 26 10S,18E	Galiuro Mtn. 15'	Reddington	Gypsum beds in Cenozoic lake sediments.
Sec. 19 9S,18E	Clark Ranch 7.5'	Whitecliffs, Arizite Products, Kaolin claims, Arizona Gypsum, Nuez Claims, Oversite Claims	Gypsum interbedded in flat laying diatomite beds.
Sec. 16 9S,17E	Clark Ranch 7.5'	Day Star Property	Massive gypsum beds in lake sediments.
YAVAPAI COUNTY			
Sec. 18 14N, 6E	Camp Verde 7.5'	Clear Creek Gypsum	Gypsum beds in Cenozoic Verde Formation.
Sec. 1 13N, 4E	Camp Verde 7.5'	Camp Verde Salt Mine, Graham Wing-Field Sulphate	Past production from flat bedded deposit of thenardite, mirabilite, gypsum, glauberite, halite, and clay in Cenozoic Verde Formation.
Sec. 22 13N, 5E	Camp Verde 7.5'	Wingfield Gypsum Deposit, Wingfield-McLeod Gypsum	Gypsum associated with other salines in mudstone in Cenozoic Verde Formation.
Sec. 21 8N, 6E	Chalk Mtn. 7.5'	Gypsum and Kaolin Deposit	Gypsum beds in lake sediments with interbedded clays. (reportedly kaolin?)
Sec. 12 13N, 4E	Middle Verde 7.5'	Gypsum Beds	Gypsum beds in Cenozoic Verde Formation.
Sec. 11 13N, 5E	Camp Verde 7.5'	Larson Quarry, Verde Gypsum	Past production of gypsum from beds in mudstone facies of the Cenozoic Verde Formation; used for cement retarder and agricultural applications.

1/88

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION- COMMENTS
		MARBLE	
Maricopa County			
Secs. 10 & 11 5N,10W	Gladden 15'	Sunset Canyon	White & colored marble with some diopside and tremolite. Occasionally mined for decorative stone.
		MICA	
~~La Paz~~ County			
Sec. 3 3N,20W	Middle Camp Mt. 7.5'	Sugarloaf Peak	Rotary hole drilled in 1985 on Westworld Inc. claims reportedly intercepted +200 feet of "fine white sericite" in a quartz-mica schist.
		PUMICE	
Cochise County			
Secs. 25 & 26 21S,29E	Pedregosa Mtns. East 7.5'	Natures' Pride	Grey pumice reported.
		PYROPHYLLITE	
~~La Paz~~ County			
Sec. 3 3N,20W	Middle Camp Mt. 7.5'	Brown Hill (?), Westworld SP Claims	White talcose pyrophyllite beneath silicious zones in mesozoic (?) schistose volcanic rocks has been prospected near the surface. Three rotary holes drilled in 1985 reportedly intercepted 250 ft of massive pyrophyllite with silicious partings at a shallow depth.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION- COMMENTS
		SALT	
APACHE COUNTY			
16N,23E 16N,24E	numerous	Holbrook Basin Evaporite Deposits	Extensive halite deposit with some sylvite bearing zones in Permian formation. Subsurface halite occurs over an area of about 2300 miles. square miles.
COCHISE COUNTY			
Sec. 4 15S,24E	Cochise 15'	Wilcox Playa Brine	Sodium chloride brine in dry lake playa deposit.
MARICOPA COUNTY			
Sec. 19 2N,1W	Waddell 7.5'	Halite Occurrence	Massive deep halite deposit; likely part of Luke Salt Deposit.
Sec. 2 2N,1W	El Mirage 7.5'	Luke Salt Deposit	Massive deep halite deposit; production by solution mining.
Sec. 21 2N,1W	El Mirage 7.5'	Solid Salt Occurrence	Halite deposit encountered in deep water well.
MOHAVE COUNTY			
Sec. 11 29N,21W	Black Canyon 15'	Detrital Valley Salt Deposit, Zuber	Buried evaporite deposit.
Sec. 14 29N,21W	Black Canyon 15'	Detrital Valley Salt Deposit, Kerr McGee Well 1	Buriedevaporite deposit.
Sec. 30 26N,16W	Mt. Tipton SE 7.5'	Red Lake Area Deposits 1, Kerr McGee Well 1	Evaporite deposit containing sodium chloride and anhydrite.
Sec. 28 26N,16W	Music Mtns. SW 7.5'	Red Lake Salt Deposits 2, Kerr McGee Well 2, El Paso Natural Gas Wells	Evaporite deposit containing sodium chloride and anhydrite.

LOCATION	QUADRANGLE MAP	KNOWN NAMES	DESCRIPTION-COMMENTS
		ZEOLITES	
Pinal County			
6S,18E	Brandenburg Mt. 7.5'	Hells Half Acre Tuff Member, Galiuro Volcanics	The lowest unit of the extensive ash flow tuff sequence consists of 0-50 ft of well bedded, probably water lain, yellow-yellow brown tuff containing pumice lapill & quartz in a matrix altered to clinoptilolite. Portions of the middle unit, a massive white to pale pink tuff, have also been reported as locally altered to clinoptilolite.
Secs. 7-11,14, 23,29-36 6S,18E Secs. 1-18 7S, 18E	Brandenburg Mt. 7.5' Holy Joe Peak 7.5' Klondike 15'	Aravaipa Member, Galiuro Volcanics	A non-welded basal tuff and distal margin of a rhyolitic ash flow sheet have been altered to clinoptilolite and locally mordenite. Altered thickness ranges from 0 to +50 ft. The Aravaipa Member locally underlies the Hells Half Acre Tuff.
Secs. 19, 30-34 6S,18E	Klondike 15' Holy Joe Peak 7.5' 7.5'	Tuff of Bear Springs Canyon, Galiuro Volcanics	Ash flow tuff sequence which lies below the Aravaipa Member & is composed of two units. The lowest, a pink non-welded tuff has been altered to clinoptilolite with traces of quartz, feldspar and biotite. The clinoptilolite is reportedly 0 to 50 ft thick.