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PRINTED: 09/04/2002

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES AZMILS DATA

PRIMARY NAME: TABLE MESA SLATE

ALTERNATE NAMES:
NEW RIVER SLATE

MARICOPA COUNTY MILS NUMBER: 766

LOCATION: TOWNSHIP 7 N RANGE 3 E SECTION 5 QUARTER SW
LATITUDE: N 33DEG 58MIN 31SEC LONGITUDE: W 112DEG 04MIN 49SEC
TOPO MAP NAME: DAISY MOUNTAIN - 7.5 MIN

CURRENT STATUS: PRODUCER

COMMODITY:
CLAY FIRE CLAY
STONE SLATE

BIBLIOGRAPHY:
ADMMR TABLE MESA SLATE FILE
"21ST FORUM ON THE GEOLOGY OF INDUSTRIAL
MINEALS" AZBM

10/15/85

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES FILE DATA

PRIMARY NAME: TABLE MESA SLATE

ALTERNATE NAMES:

MARICOPA COUNTY MILS NUMBER: 766

LOCATION: TOWNSHIP 7 N RANGE 3 E SECTION 5 QTR. SW

LATITUDE: LONGITUDE:

TOPO MAP NAME: DAISY MTN 7.5 MIN

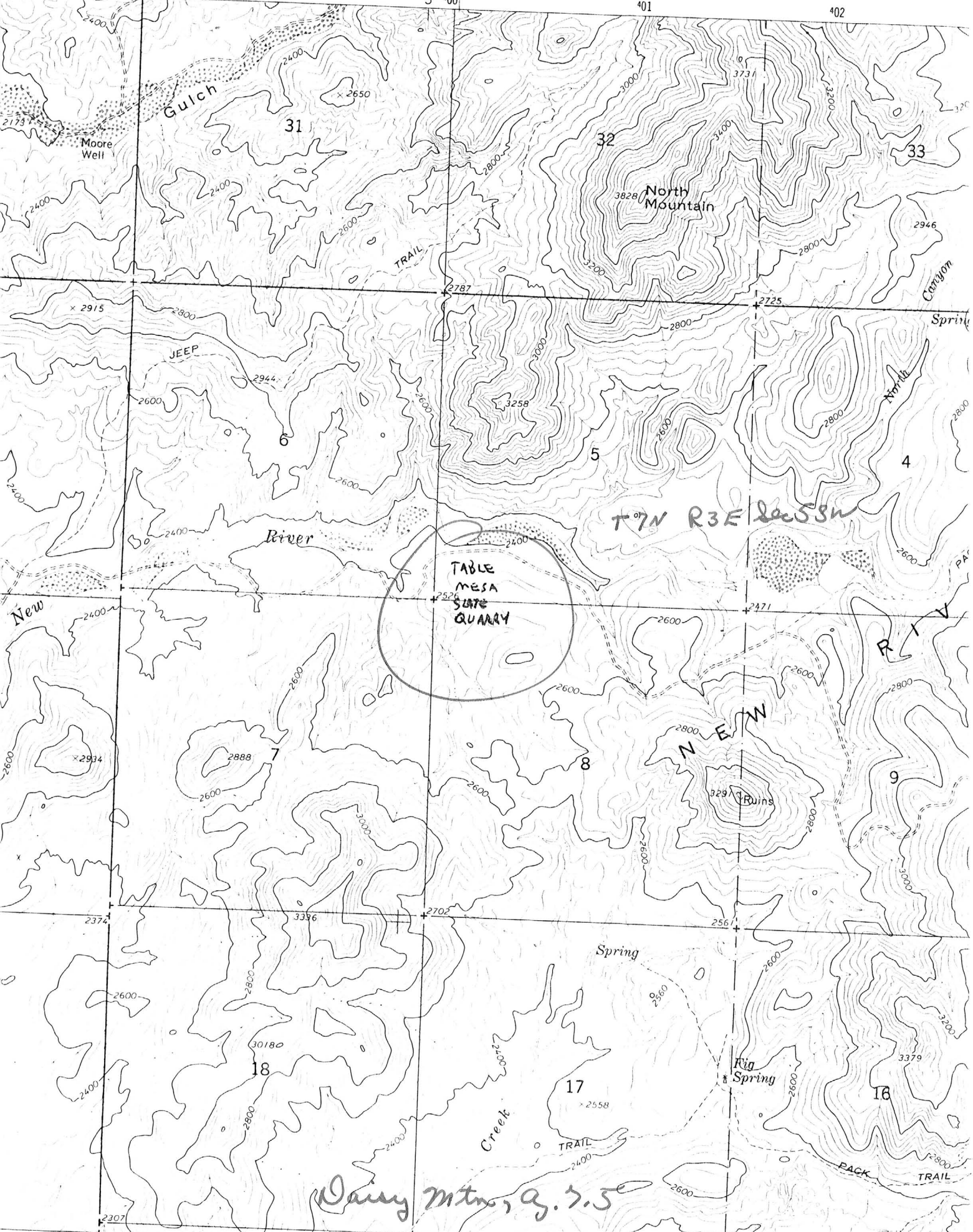
CURRENT STATUS: PRODUCER

COMMODITY:

CLAY-FIRE CLAY

BIBLIOGRAPHY:

ADMMR TABLE MESA SLATE FILE
"21ST FORUM ON THE GEOLOGY OF INDUSTRIAL
MINEALS" AZBM



Guich

North Mountain

TABLE MESA STATE QUARRY

River

T 1 N R 3 E Sec 5 SW

Ruin

Dairy Mtns, Q. 7.5

Moore Well

JEEP

TRAIL

Canyon

Spring

New

R T W

Spring

Rig Spring

Creek

TRAIL

PACK

TRAIL

Table Mesa Slate

Maricopa

ABSTRACTED FROM ADMMR ACTIVE MINES DIRECTORY, 1992

BUILDING PRODUCTS COMPANY

Phoenix Plant

4850 W. Buckeye Road, Phoenix, AZ 85043 - Phone 272-5576 - Clay mining by contractor - Plant consumes clay to produce extruded sewer pipe and roofing tile.

Plant Manager Vern Hamner

Mine Consultant Don Morris

Rim Quarry T11N R19E Sec. 30

Clay mine located 10 miles southwest of Clay Springs.

New River Slate Quarry T7N R3E Sec. 5

Slate quarry located approximately 6 miles northeast of New River.

Dewey Ranch #2 T14N R1E Sec. 15

Clay mine located approximately 6 miles north of Dewey.

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Clay mine located approximately 6 miles north of Dewey.

ABSTRACTED FROM ADMMR ACTIVE MINES DIRECTORY, 1990

BUILDING PRODUCTS COMPANY

Phoenix Plant

4850 W. Buckeye Road, Phoenix, AZ 85043 - Phone 272-5576 - Clay mining by contractor - Plant consumes clay to produce extruded sewer pipe and roofing tile.

Plant Manager Vern Hamner

Mine Consultant Don Morris

New River Slate Quarry T7N R3E Sec. 5

Slate quarry located approximately 6 miles northeast of New River.

ABSTRACTED FROM ADMMR ACTIVE MINES DIRECTORY, 1989

BUILDING PRODUCTS COMPANY

Phoenix Plant

4850 W. Buckeye Road, Phoenix 85043 - Phone 272-5576 - Clay mining by contractor - Plant consumes clay to produce extruded sewer pipe and roofing tile.

Plant Manager Vern Hamner
Mine Consultant Don Morris

Rim Quarry

T11N R19E Sec. 30

Clay mine located 10 miles southwest of Clay Springs.

New River Slate Quarry

T7N R3E Secs. 5 & 6

Slate quarry located approximately 6 miles northeast of New River.

Dewey Ranch #2

T14N R1E Sec. 15

Clay mine located approximately 6 miles north of Dewey.

ABSTRACTED FROM ADMMR ACTIVE MINES DIRECTORY, 1988

BUILDING PRODUCTS COMPANY

Phoenix Plant

4850 W. Buckeye Road, Phoenix 85043 - Phone 272-5576 - Employees 1 (mining)
- Plant consumes clay to produce extruded sewer pipe and roofing tile.

Plant Manager Vern Hamner
Mine Manager Don Morris

Rim Quarry

T11N R19E Sec. 30

Clay mine located 10 miles southwest of Clay Springs.

New River Slate Quarry

T7N R3E Secs. 5 & 6

Slate quarry located approximately 6 miles northeast of New River.

Dewey Ranch #2

T14N R1E Sec. 15

Clay mine located approximately 6 miles north of Dewey.

TABLE MESA SLATE

MARICOPA COUNTY

KAP WR 10/25/85: The Table Mesa Slate Quarry (file) Maricopa County, an open pit slate mine operated by Building Products, was added to the 1985 Directory of Active Mines for the first time.

KAP WR 10/23/87: In the process of gathering data for the new Directory of Active Mines in Arizona talked to Don Morris who reported the reported the proper name for the table Mesa Slate Quarry (file) Maricopa County is the New River Slate Quarry. He is continuing to mine slate for shipment to the Building Products Plant in Phoenix. The slate is used as a binder in the clay pipe. The quarry is located at the intersection of Secs 5,6,7, & 8, T7N R3E.

KAP WR 10/23/87: Don Morris reported that Building Products continues to produce vitrified clay sewer pipe from clays mined in Arizona. He is the only employee involved in mining for the company and operates all three clay mines on a rotating basis. The company has begun to produce clay roofing tile.

SUBJECT: Field Visit, Building Products Company

DATE: January 10, 1986

ENGINEERS: Ken Phillips, Nyal Niemuth and Dick Beard

In the company of Dick Beard and Nyal Niemuth a visit was made to the Building Products Company (file) clay pipe plant in Phoenix, Maricopa County. There they manufacture vitreous clay sewer pipe in sizes ranging from 4" diameter to 48" diameter. The plant consumes approximately 50,000 tons of clay annually. Four different clays are used, all of which are mined in Arizona. The clays are referred to as the Rim clays which are divided into the "Upper Pink" and the "Lower Blue" are both mined at the Saul Quarry (file) in Navajo County. The Rim Clays are considered refractory and are the most important. The Ranch Clay is mined at the Dewey Ranch #2 Mine (file) Yavapai County. The Ranch Clay is the glass clay which fuses at the lowest temperature. The Table Mesa Slate is mined at the Table Mesa Slate Quarry (file) Maricopa County. The slate does not enter into the fusion at all, but acts as a binding agent due to its platy nature when coarsely ground. All clays are mined by the company and hauled to and stockpiled at the plant. There they are blended along with added grog (broken and/or rejected fired pipe), crushed and ground to minus 20 mesh. The ground clay, with an added small amount of rejected green ware, is mixed with water in a pug mill. The mixed clay is forced through a vacuum chamber and through extrusion dies to produce green pipe. The pipe is then dried for 1-4 months before firing in a shuttle kiln or a beehive kiln. Building Products Company is owned by Mission Clay Pipe Inc. in California where they also have a clay pipe plant. The California plant has a higher capacity to produce small diameter (under 12") pipe while the Building Products plant can produce more large diameter pipe than local demand requires. As a result there is movement of pipe between the two plants as demand requires with small pipe coming to Arizona and large pipe moving to California.

CLASSIFICATION OF PURPLE SLATE
AS A NON CLAY MINERAL AGGREGATE

By Don Morris (?)

All substances which are called clay are composed of silica (SiO_2), Alumina (Al_2O_3) and water (H_2O) with frequently appreciable quantities of iron, alkalies and alkaline earths. This definition is based upon chemical analysis.

Physically, clay can be defined as an earthy fine grained material which develops plasticity when mixed with a limited amount of water. By plasticity is meant the property of the moistened material to be deformed under the application of pressure, with the deformed shape being retained when the deforming pressure is removed. The above is from "Clay Mineralogy," Ralph E. Grim, Research Professor of Geology, University of Illinois.

Grim also teaches that the moisture component is present in all clay minerals in the form of ions of hydroxyl (OH^-) with some hydrogen ions (H^+) and other metallic ions such as Na^+ (Sodium) - K^+ (Potassium) and others. These ions of hydroxylation, as they are called, are essential to give the clay, which is a micro crystalline substance, its physical and ceramic properties. This property is common to all clay mineral micro crystals.

The water of dehydroxylation is lost when clay is heated above 1100 degrees F. and the crystal structure is destroyed. The range for the majority of clays is from 7% to 14% loss of OH^- (Hydroxyl) ions in the form of moisture when heated above 1100 degrees F.

The Table No. 1 shows analysis of this property for several clays including Building Products materials, also some other non clay minerals for comparative purposes.

When a crystalline clay substance is subjected to heat and pressure over millions of years, the material is sometimes metamorphosed (or changed) into a different substance. In the case of the Purple Slate it was consolidated

and dehydroxylated almost completely until it will no longer swell with water or hydrolize with water soak. It has only 3.9% loss of dehydroxylated moisture when fired above 1100 degrees F. and it's nature is hard and rock like. When fired to higher temperatures it will vitrify and combine with the true clays in the mix composition to form a strong ceramic pipe.

The United States Geological Survey classifies all materials that will not break down with water and grinding below 2 μ (micron) size as non clay rocks and minerals.

Grim states that, "The non clay minerals are not present in particles much smaller than one to two microns and a separation of two microns is about the optimum size for best split of the clay mineral and non clay mineral components of natural materials." After fine grinding, soaking in water and agitation, standard sedimentation tests were run on our clays and Purple Slate.

The Purple Slate must be classified as a non clay mineral. It should be called a partially metamorphosed slate. There are fundamental reasons as stated by Grim for placing the upper limit of the clay size grade at 2 microns. Table No. 2 gives the results of a sedimentation analysis of Building Products Company raw materials.

The Purple Slate does not meet either of the above clay mineral test procedures for the following reasons:

(1) It does not have the required plasticity property and sufficient dehydroxylation water to develop the plasticity property. Purple Slate has just half the hydroxylation water of Illite, a clay mineral found frequently as a shale.

(2) It does not meet the United States Geological Department standard for clay minerals of having a sufficient quantity of particles that are smaller than 2 microns. Purple Slate's smallest particles are 7.2 microns in diameter.

Purple Slate is a non clay mineral aggregate.

TABLE NO. 1 - DEHYDROXYLATION - WATER LOSS

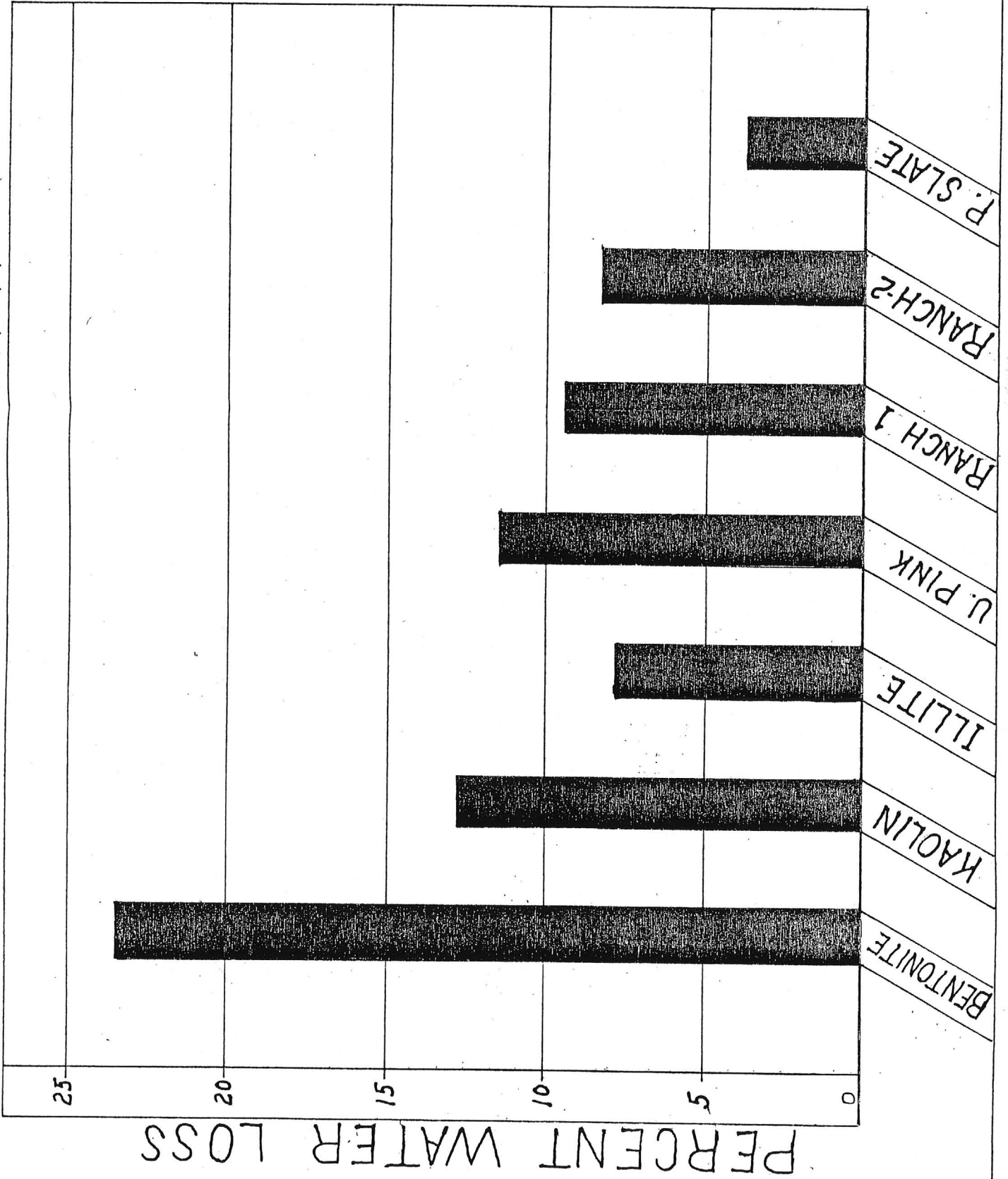
	<u>CLAYS</u>	<u>Percent H₂O Loss 1100 Deg. F. to 1900 Deg. F.</u>
**	a Kaolinte	12.80
	a Illite	7.88
	a Montmorillinite	23.47
**	b Upper Pink B.P.C.	11.50
	b Ranch No. 1	9.50
	b Ranch No. 2	8.20
	<u>NON CLAY MINERALS</u>	
	Silica Flour	Trace
**	b Purple Slate	3.90

** c TABLE NO. 2 - SEDIMENTATION PARTICLE SIZE DATA

	<u>CLAYS</u>	<u>Percent Smaller than 2 Micron</u>
**	d Upper Pink	27.5
	Rim Blue	15.5
	Ranch No. 1	10.5
	Ranch No. 2	10.5
	<u>NON CLAY MINERALS</u>	
	d Purple Slate	0.0
	Fine Silica Sand (Silica Flour)	0.0

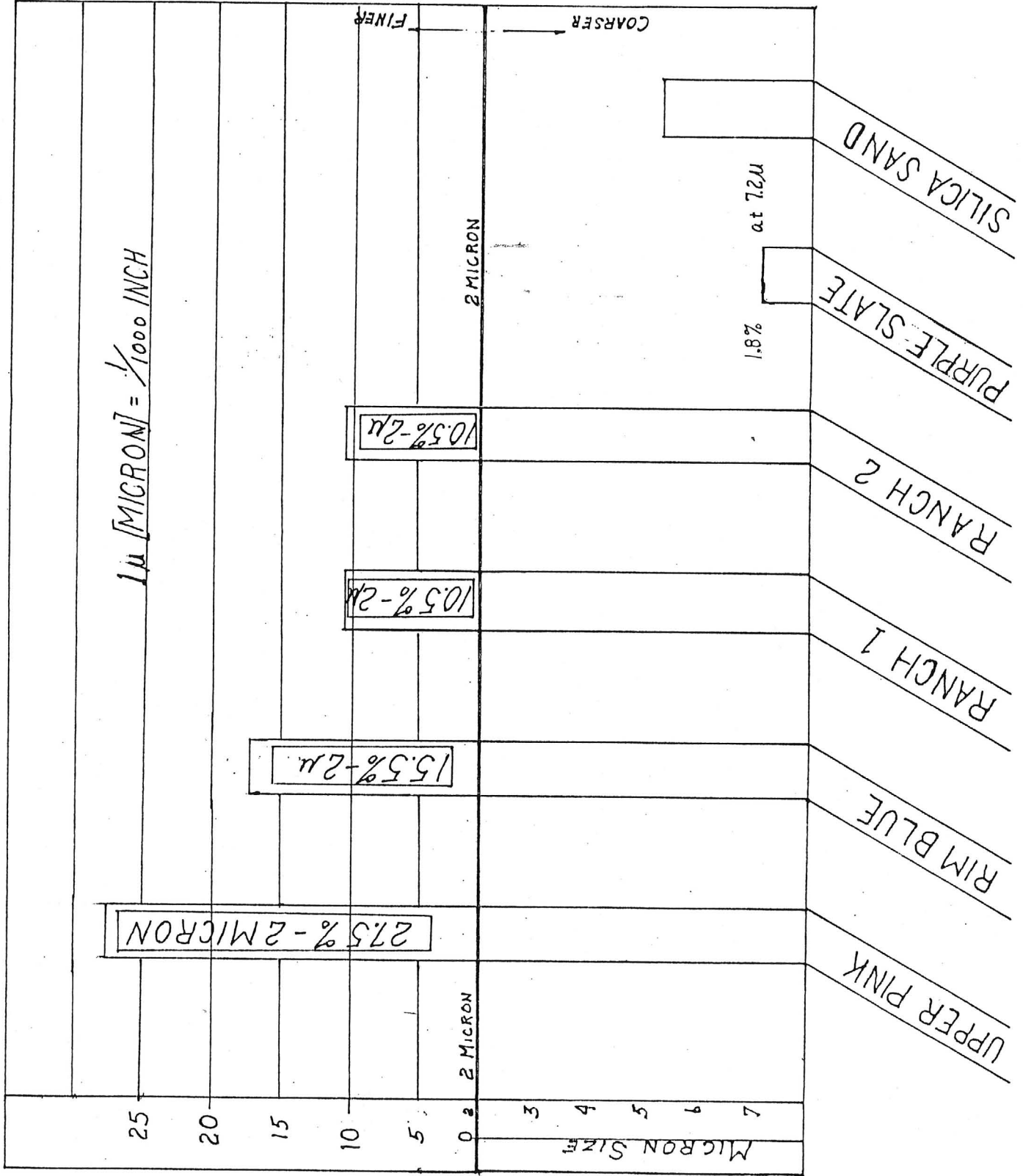
- ** a Clay Minerology - by Ralph E. Grim - McGraw Hill
 b Dickey Co. Research Laboratories - Pittsburg, Ks. -
 Run Analysis
 c Dickey Clay Research Laboratories Runall Sedimentation Tests
 d Arizona Clays and Non clay used by Building Products Company
 in a mix composition.

DEHYDROXYLATION DATA



PARTICLES OF CLAYS AND NONCLAYS MICRON SIZE - 2μ TO +8μ

$1\mu \text{ [MICRON]} = \frac{1}{1000} \text{ INCH}$



COARSER → PERCENT → SMALLER

2 MICRON

2 MICRON

FINER

COARSER

MICRON SIZE

25

20

15

10

5

0

3

4

5

6

7

UPPER PINK

RIM BLUE

RANCH 1

RANCH 2

PURPLE SLATE

SILICA SAND

Arizona Department of Mines and Mineral Resources

VERBAL INFORMATION SUMMARY

May be Reproduced

1. Information from: Don Morris -- Building Products Co.
Address: 4850 W. Buckeye Rd., Phoenix, AZ 85043 phone 272-5576
2. Mine: Various clay & slate quarries 3. ADMMR Mine File Buildings Products Co., Pla
4. County: described below in summary 5. District _____
6. Township 1N Range 1E Sec(s) 9 SW $\frac{1}{4}$
7. Location: _____
8. No. of Claims - Patented _____ Unpatented _____
9. Owner (if different from above) _____
10. Address: _____
11. Operating Company: _____
12. Pertinent People and/or Firm: _____
13. Commodities: clay, shale, slate
14. Operational Status: Active

15. Summary of information received, comments, etc.: Don Morris of Building Products Co., 4850 W. Buckeye Rd., Phoenix, AZ 85043 phone 272-5576 gave a talk at the "21st forum on the geology of industrial minerals" held in Tucson titled "Raw Materials and the Manufacture of Vitriified Clay Pipe in Arizona". The talk discussed the company's Phoenix plant operation and more important to us the three quarries they currently operate in Arizona. These include:
The Table Mesa Slate (new file) quarry, Maricopa Co. located at T7N R3E Sec. 6 SE $\frac{1}{4}$. This deposit of precambrian purple slate is held by state leases under the name B.P.C. Excavators Inc. and additionally covers parts of the following $\frac{1}{4}$ sections, NE $\frac{1}{4}$ 7, NW $\frac{1}{4}$ 8, SW $\frac{1}{4}$ 5, SE $\frac{1}{4}$ 6.

In Navajo County they mine two layers of refractory aluminous shale, the upper pink and the lower blue from the Saul quarry^{new} located at T11N R19E Sec. 19 SE $\frac{1}{4}$. This is in the Apache Sitgreaves National Forest just off forest road 46 about 10 miles southwest of Clay Springs.

In Yavapai near Dewey, Building Products Co. has mined cenozoic lacustrine clay material at 2 sites. The first Dewey Ranch Clay #1^{new} located at T14N R1E Sec. 28 NE $\frac{1}{4}$ has been abandoned as it contained excessive amounts of lime. The clay pit they presently operate is the Dewey Ranch Clay #2^{new} believed to be located in T14N R1E Sec. 15.

All the above quarries are operated on a seasonal or periodic basis. The plant operates year round on stockpiled materials, Building Products Co. should be contacted for listing in our next directory of active mines.

(Signature)

ADMMR

Date 4-12-85

Nyal J. Niemuth

Nyal J. Niemuth

21st Forum on the Geology of Industrial Minerals

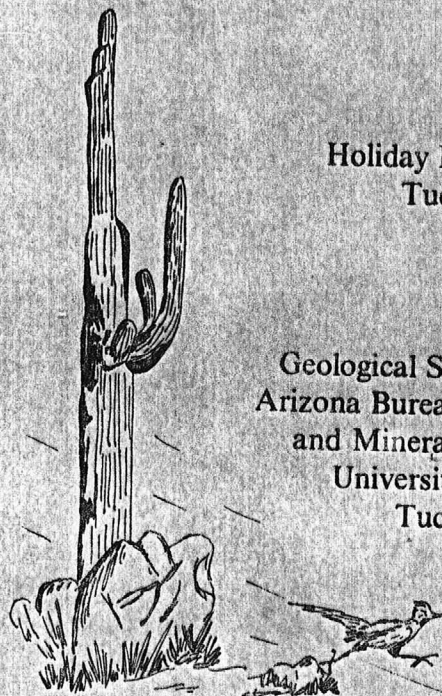
Program With Abstracts

Aggregates to Zeolites (AZ)

April 9-12, 1985

at the
Holiday Inn Broadway
Tucson, Arizona

sponsored by
Geological Survey Branch
Arizona Bureau of Geology
and Mineral Technology
University of Arizona
Tucson, Arizona



**AGGREGATE FOR LARGE WORKS: A CASE STUDY OF
THE SEARCH FOR NONREACTIVE AGGREGATE AT THE
PALO VERDE NUCLEAR GENERATING STATION**

R.E. MIGUES, Bechtel Civil and Minerals, Inc., 5400 Westheimer Way, Houston, TX 77056

Our object in 1975 was to identify a source of high-performance aggregate for the Palo Verde Nuclear Generating Station in central Arizona. This paper describes the anatomy of that search and some lessons for future aggregate searches for large projects.

Early work convinced us to reject reactive aggregate to avoid complications associated with moisture retention in massive concrete sections. The largest source areas of nonreactive rock, as well as potential sources of polluting reactive rock, were researched in the literature. Producing and inactive commercial pits and quarries were sampled and major igneous and volcanic bodies were examined. Potential gravel sources were considered by sampling wash confluences; care was taken to avoid known reactive source areas. Numerous smaller potential sources were examined and sampled.

Large gravel sources in central Arizona were found to have reactive aggregate because Cenozoic silicic volcanic rock is widely scattered and the main washes drain large areas. Smaller gravel sources were rejected to avoid difficult mixing needed to achieve uniformity in massive concrete sections. Potential new large quarry sites were typically eliminated because of relatively mediocre physical quality of the rock, complicated by the risk of a lengthy environmental-impact process. The most promising quarry sources were in Laramide and Precambrian granite, Paleozoic limestone and quartzite, and Quaternary basalt; the most promising gravel sources were in intermediate-size washes within terranes of these same rock types. Poor sources were in Precambrian schist and gneiss terranes and Cretaceous volcanics, which typically are silicic. The closest large sources filling the criteria are alluvial deposits at the base of the Gila Mountains, and these were used for construction.

Refinements to costly, time-consuming field searches would be welcome. LANDSAT imagery and computer enhancement may be such a refinement, allowing us to focus on favorable areas and avoid problem rock types.

**RAW MATERIALS AND THE MANUFACTURE OF
VITRIFIED CLAY PIPE IN ARIZONA 272-5576**

DON MORRIS, Building Products Company, 4850 W. Buckeye Rd., Phoenix, AZ 85043

The Building Products Company is Phoenix based and owned by Mission Clay Products of California. Building Products is the only manufacturer of vitrified clay pipe in Arizona. The marketing area includes Arizona, Nevada, Utah, New Mexico, and California.

Building Products, promoted by Arizona Public Service, was formed in 1970. Raw-materials prospecting was undertaken for 2 years, after which a \$5-million plant was built. Initially, a satisfactory vitrified product could not be made with the raw materials then in hand. Subsequent prospecting and testing led to an acceptable raw-materials mix. Testing to upgrade the final product is a continuing process.

The basic raw-materials supply must be adequate, secure, and capable of sustaining close tolerances in the final product. These needs are met by mining four geologic materials at three different localities: (1) refractory aluminous shales (two horizons - one pit) of Cretaceous age near Pinedale at the southern edge of the Colorado Plateau Province (Mogollon Rim); (2) less refractory aluminous materials from late Cenozoic lacustrine materials near Dewey in the Transition Zone (TZ); and (3) Precambrian "slate" from near New River along the southern edge of the TZ.

Other additives include grog (ground-up, broken pipe) and barium carbonate that ties up what gypsum there is. Calcium magnesium carbonates are deleterious components that are minimized by careful selection of the mined products.

The raw materials are blended and mixed, ground to 12 mesh, mixed in a pug mill, depleted of air, extruded into pipe ranging from 6 inches to 42 inches in diameter, transported to a hot-air drying room, forklifted to an appropriate kiln, and fired at a 1900-2000° F range.

The "Rim" kaolinitic shales, being the most refractory ingredient, stabilize the pipe during the firing process. They are very plastic, and therefore facilitate extrusion. The Dewey clay fuses at a low temperature and forms an impervious glasslike binder. It also is plastic. The "slate" forms platy particles that tend to orient themselves during laminar flow. This provides strength for both the green and dried product. It doesn't absorb water, which helps the drying process. Grog remains stable during firing, and therefore helps to control shrinkage.

The development of appropriate raw materials and proper mixtures has been done empirically.

SOLAR SALT IN ARIZONA

JERRY GROTT, Southwest Salt Company, P.O. Box 1237, Litchfield Park, AZ 85340

Southwest Salt Company is solution mining the Luke Salt Body of probable late Miocene age. The discovery hole, from which the first core was recovered, was drilled in 1968. The top of the salt was encountered at a depth of 880 feet, and the bit was still in salt at the bottom-hole depth of 4,500 feet.

The solar ponds, developed on land formerly dedicated to agriculture, have an annual capacity of about 90,000 tons. Because land values are very high, mining rates and procedures are governed by the need for near-saturated brine to minimize land requirements.

Because of the frequency of dust storms, the salt operation uses a unique wet-harvesting method. Most inventory is kept in the ponds under brine and harvested only a few days before shipment. Studies of the nature of crystal growth and the distribution of wind-blown and brine impurities led to the development of procedures for processing salt of high chemical purity and low insolubles content. The chemical purity exceeds that of the major percentage of salt produced in fuel-fired evaporators.

Salt is presently shipped from Phoenix as far east as west Texas and as far west as central California. Occasional shipments are made to Hawaii and Alaska.



WOMBAT MINING & EXPLORATION CO.

383 Venus Drive

Prescott, Arizona 86301

(520) 778-2346 (Office & Fax) or (520) 379-0186 (Mobile)

**Plan of Operations
for
Arizona State Land Department
Mineral Lease M-36275**

for the period

November 1, 1998

to

October 31, 2018

submitted by

**Richard J. Lundin
Mineral Exploration Consultant
and
Director
Wondjina Research Institute**

for

**BPC Excavators Inc.
4850 W. Buckeye Rd.
Phoenix AZ 85043**

to

Arizona State Land Department

October 1, 1998

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INTRODUCTION

BPC Excavators Inc. retained Wombat Mining & Exploration Co. (WME) and its Research and Development Division, Wondjina Research Institute (WRI) to prepare an Operating Plan for renewal of its 200 acre State of Arizona Mineral Lease on its New River slate quarry (Subject Property) in February of 1998. The renewal of the Mineral Lease would involve the continuation of current mining operations over the next 20 years (Proposed Action) in several additional areas (See Figures 1, 1a & 2 for the location of the Subject Property and Figure 4 for the location of these Expansion Areas) WME/WRI and BIOZONE personnel surveyed the Subject Property for cultural and biological resources and evaluated current and past mining operations. After consultation with Mr. Jon Humphreys, BPC Plant Manager and Mr. Walter Garrett, President of the company, Mr. Richard J. Lundin of WME/WRI prepared and submitted a draft operating plan to BPC management. This draft plan was revised on several occasions and has grown to the present document.

During the process of examining the Subject Property for cultural resources, a series of previously unrecorded archaeological sites (field designated for this report 2475-001 through 003 (WRI)) were encountered, mapped, photodocumented and recorded. Two of the sites are not thought to be eligible for either the national or State of Arizona Registers of Historical Places. The third site (2475-002(WRI)) appears to have been affected by past use of the Subject Property and has significant scientific research potential (see Figures 2-4 for the location of this site). As such, it may be eligible for nomination to the federal or State of Arizona Register of Historical Places under Criterion "D" of the National Historical Preservation Act of 1966 (NHPA). The site lies directly adjacent to the existing Pit of BPC but will not be impacted by any future expansion.

WME/WRI and BIOZONE personnel surveyed the floral and faunal resources of the Subject Property and found no evidence of "Threatened, Endangered" or any other special category plant or animal species that would be affected by the Proposed Action.

In response to the needs of the Arizona State Land Department (ASLD) to properly evaluate the nature of the Proposed Action, WME/WRI has prepared the following Mining Plan.

MINING PLAN

Proponents:

BPC is a local manufacturer of clay sewer pipe and is one of only few such suppliers in the United States. BPC's state-of-the-art fabricating plant is located within Maricopa County within the southwest portion of the metropolitan Phoenix area at 4850 W. Buckeye Road. BPC mines clays from several sources within Arizona and blends the slate material from its New River Pit with material from these other sources to make a durable product that is much in demand. BPC is represented in Arizona by Mr. Jon Humphreys, Plant Manager.

Location of the Proposed Action:

BPC's ongoing operation is an open-pit quarry that has existed on the site for nearly 20 years. Specifically, the quarry is located near the junction of Sections 5,6,7, and 8, Township 7N, Range 3E, G & SRBL &M in north-central Maricopa County (see Figures 1-4 for the location of the Subject Property). Areas in GREEN on Figure 4 denote the current Pit Area and areas being considered for future expansion.

Schedule:

BPC has mined an average of approximately 9,000 cubic yards of material per year from the Subject Property since 1978. Future mining operations under the Proposed Action may be increased to 10,000 cubic yards per year over the 20 year life of the Mineral Lease renewal. Although it is difficult to anticipate exactly where such mining might take place and any future time, an area (identified as Phase I Mining Area on Figure 4 and the Cross-Sections) has been tentatively identified as an area to be mined over the next 5 years. The mining of the Phase I Area would involve the removal of approximately 50,000 cubic yards of material from an area that has already been stripped of vegetative cover. The mining would not involve the use of explosives and drilling. Typically, such mining would take place during daylight hours and over a relatively short period of time (2-3 weeks of sustained activity). Mining occurs on an, intermittent, almost-seasonal basis with several months going by without any mining activity at all on the site.

Mining Activities:

Typically, over the past 20 years; BPC has not had to resort to drilling and blasting to mine the slate material. The slate material outcrops as vertically dipping beds in the Pit Area and is easily mined by ripping of the beds by a D-9 Caterpillar tractor. The tractor rips the material and pushes it into linear windrows and stockpiles. The material is, typically, naturally crushed into -12" material by the action of the Caterpillar tractor. A 2.5 yard loader that is kept at a nearby ranch then loads the pit-run material from the windrows and stockpiles into belly-dump trucks, which transport them to BPC's plant in Phoenix. The ease of crushing the material into usable pit-run feed make the use of explosives unnecessary and no explosives are used or stored at the site. Bench heights have been maintained at 20 feet with a natural bench slope of approximately 45 degrees (see the Cross-Sections and Figure 4 for a rendition of an idealized Mining Plan) No vehicle or equipment fueling or maintenance is done on the Subject Property and the Proposed Action would not change this situation. Mining under the Proposed Action would not entail any change in the mining practices that BPC has been successfully using for the past 20 years

Permits Approval and Compliance:

BPC's current operation and the Proposed Action are permitted under Arizona State Statute and are exempt from zoning restrictions under Maricopa County Mining Exemption. The Subject Property is exempt from ADEQ Air and Water quality permitting and meets Arizona State Mine

Inspector's Office guidelines for non-metal mining. ASLD and Arizona State Historic Preservation Office clearance for an Avoidance Plan dealing with site 2475-002(WRI) is pending. As the existing Pit Area and any future Expansion Areas lie outside of any FEMA-FIRM floodplain of the New River drainage, it is probable that the Proposed Action lies outside of the "waters of the USA" and will not involve any action by the US Army Corps of Engineers (USACOE).

Production Water:

Since BPC conducts no crushing within the Subject Property, there is no need for production water.

Slope Treatment & Revegetation:

BPC's mining operations have left several areas of the existing Pit Area with natural planned slopes of less than 5 degrees. The existing stockpiles have a natural slope of approximately 45 degrees. Under the Proposed Action, mining would occur under a series of benches with a bench height of 20 feet and slope of approximately 45 degrees (ideally as shown in the Cross-Sections). After mining an area down to its designed slope, BPC will plane off the tops of the benches and fill the bottoms of the cuts with its D-9 Caterpillar tractor to conform to the surrounding terrain in a manner illustrated in the Cross-Sections. Once an area is returned to a natural slope, native plant seed will be broadcast on the disturbed areas. The outcropping material does not revegetate easily but will sustain grasses over a 1-5 year period.

Erosion Protection:

BPC's past mining operations and the Proposed Action have not and will not have an appreciable impact on erosion. The slate material generally erodes into clays and then stabilizes outcropping rock fragments. The existing Pit Area ponds a small amount of water during heavy rains and is a sticky mass of clay until the material dries. This internal drainage captures and minimizes the amount of storm water runoff that could, normally be released into adjacent fluvial systems.

Fugitive Dust:

During mining operations very little dust is generated due to the nature of the material. Under extreme conditions of dry, windy weather, BPC will water down the Pit Area to control fugitive dust emissions.

Do not use

Inspector's Office guidelines for non-metal mining. ASLD and Arizona State Historic Preservation Office clearance for an Avoidance Plan dealing with site 2475-002(WRI) is pending. As the existing Pit Area and any future Expansion Areas lie outside of any FEMA-FIRM floodplain of the New River drainage, it is probable that the Proposed Action lies outside of the "waters of the USA" and will not involve any action by the US Army Corps of Engineers (USACOE).

Production Water:

Since BPC conducts no crushing within the Subject Property, there is little need for water. During especially dry or windy conditions, BPC will obtain water from a nearby low-water crossing of the New River and water down it's stockpiles and the general Pit Area. During time when the New River is dry, water has been obtained from nearby ranches.

Slope Treatment & Revegetation:

BPC's mining operations have left several areas of the existing Pit Area with natural planned slopes of less than 5 degrees. The existing stockpiles have a natural slope of approximately 45 degrees. Under the Proposed Action, mining would occur under a series of benches with a bench height of 20 feet and slope of approximately 45 degrees (ideally as shown in the Cross-Sections). After mining an area down to it's designed slope, BPC will plane off the tops of the benches and fill the bottoms of the cuts with it's D-9 Caterpillar tractor to conform to the surrounding terrain in a manner illustrated in the Cross-Sections. Once an area is returned to a natural slope, native plant seed will be broadcast on the disturbed areas. The outcropping material does not revegetate easily but will sustain grasses over a 1-5 year period.

Erosion Protection:

BPC's past mining operations and the Proposed Action have not and will not have an appreciable impact on erosion. The slate material generally erodes into clays and then stabilizes outcropping rock fragments. The existing Pit Area ponds a small amount of water during heavy rains and is a sticky mass of clay until the material dries. This internal drainage captures and minimizes the amount of storm water runoff that could, normally be released into adjacent fluvial systems.

Fugitive Dust:

Some dust is generated during mining operations. This appears to have less an impact as the use of the existing road system that crosses through the Subject Property. Under extreme conditions of dry, windy weather, BPC has watered down the Pit Area to control fugitive dust emissions.

Emergency Plan for Spills:

BPC will develop and post on the site an NPDES Storm Water Protection Plan after consultation with ADEQ personnel on the need for such a plan. As there are no refueling activities on the site, there is little need for a plan to deal with any chemical, or toxic waste spill.

ARIZONA STATE LAND DEPARTMENT
Minerals Section

Plan of Operation

The following information must be submitted to, and approved by the Department prior to initiating exploration or mining related activities on State land. In the case of exploration permits, the plan will only be approved for a period of one year. Any change in the below described operations must first be approved by the Department.

Note: This form is intended to provide the Department with information describing only the basic components of a scope of work. A mining operation will therefore require that separate written descriptions and attachments be submitted in order to fully describe the proposal. There should be included in a mining proposal all information such as site plans, flow charts, mining boundaries, preproduction development, infrastructure, pit and bench designs, etc.

Plan evaluation and approval may require 30 to 60 days.

EXPLORATION PERMIT, MINERAL LEASE, OR MINERAL MATERIAL LEASE
NUMBER(S) M-36275

NAME IN WHICH ISSUED BPC Excavators, Inc.

NAME OF OPERATOR Walter Garrett TELEPHONE 602-272-5576

ADDRESS OF OPERATOR 4850 W. Buckeye Rd., PHX, AZ 85043

NAME OF FIELD REPRESENTATIVE Jon Humphreys, Plant Manager
(If different than operator include address and telephone)

1) LAND DESCRIPTION AND MAP

Attach as Exhibit A to this Plan a U.S.G.S. topographic map of the referenced property.

County Maricopa Township 7N Range 3E Section(s) 5,6,7,8

2) PERIOD OF OPERATION

The operation is proposed to begin on November 1, 1998 and end on October 31, 2018. If exploration operations are proposed to exceed one year, an addendum to this plan must be filed prior to the plan expiration date.

3) ACCESS

Show on Exhibit A existing and proposed routes. Describe in detail the extent of all improved or newly constructed access. Note any locked gates and include any landmarks which will assist in locating the property.

The lease area is located east of U.S. Interstate 17, exit 236, in the
New River Mountains. Turn East off of exit 236 and go .6 miles to
unlocked gate. Proceed 1.9 miles to stockpiled slate area.

4) VEHICLES AND EQUIPMENT

List by type and size all vehicles and equipment which will be used in connection with the operation. Include the capacity of concentrators for placer operations. D-9 Dozer (not generally
on the Lease but is brought in for periodic mining operations), 2.5 yard
loader that is also only brought in during loading operations, and a
tractor-trailer with double belly dump trailers (these units are also
only present during loading activities).

5) SCOPE AND TYPE OF OPERATION

Describe the type and extent of the operation to be performed. Include the estimated area of disturbance and provide detailed information for any earth moving or site clearance operations. For placer type exploration include the amount of material to be processed from each test site, and the dimension of test sites.

Estimated area of disturbance: 350,000 square feet

Common slate is removed by planning the surface with a bulldozer and
pushing the material into a stockpile. Material is not drilled or blasted
and no explosives of any kind are used during the mining operation. The
material is loaded with a front end loader into double belly dump trailers
and hauled away for further processing. No screening, sorting or processing
of any kind occurs on-site. No explosives of any kind are used or stored
on the site.

8) WATER USE

If the use of water is required, describe the location and quantity to be used. No water is needed for the mining operation. Water

to control dust emissions from transportation of the slate material will
be added as needed.

9) RECLAMATION

Describe plans for reclamation of disturbed areas. Include measures for segregation of top soil, top soil stabilization, backfilling, erosion control, recontouring, seed bed preparation, method of seeding, seed species, etc. Unless otherwise approved, reclamation on property held under an exploration permit is to be completed within the approved plan period of one year.

The disturbed area from which the slate has been removed will be contoured
to blend with the surrounding terrain (see areas in BLUE on attached
Cross-Sections for final slopes). There will remain a few small outcrops
of slate that will remain after reclamation similar to what naturally
occur in the area. The area is arid and contains little topsoil, but
will re-seed and re-vegetate itself naturally with native flora as moisture
becomes available. After completion of mining a series of benches will
remain. These benches (see areas in DARK GREEN on attached Cross-Sections)
will be removed as a part of the reclamation process. Mined areas will
be filled (see areas indicated in BLUE as fill on Cross-Sections) and
contoured to meet the slope of the surrounding terrain.

Following the Department's evaluation of this plan, two copies will be sent to the applicant noting any conditions which may be required by the Department. The applicant shall sign and return one copy which will attach to, and become a part of, the permit or lease.

FOR DEPARTMENT USE ONLY

PLAN NUMBER _____

BOND AMOUNT _____

APPROVED FOR THE PERIOD: BEGINNING _____ EXPIRING _____

APPROVED BY: _____

REASONS FOR DENIAL: _____

DATE OF PERMIT OR LEASE ISSUE: _____

DATE LAST PLAN SUBMITTED: _____ PLAN NUMBER _____

REMARKS: _____

SECTION PLAT SHEET

(EXHIBIT B)

SECTION _____ TOWNSHIP _____ RANGE _____

COUNTY _____ STATE _____ SCALE: 1" = 660'

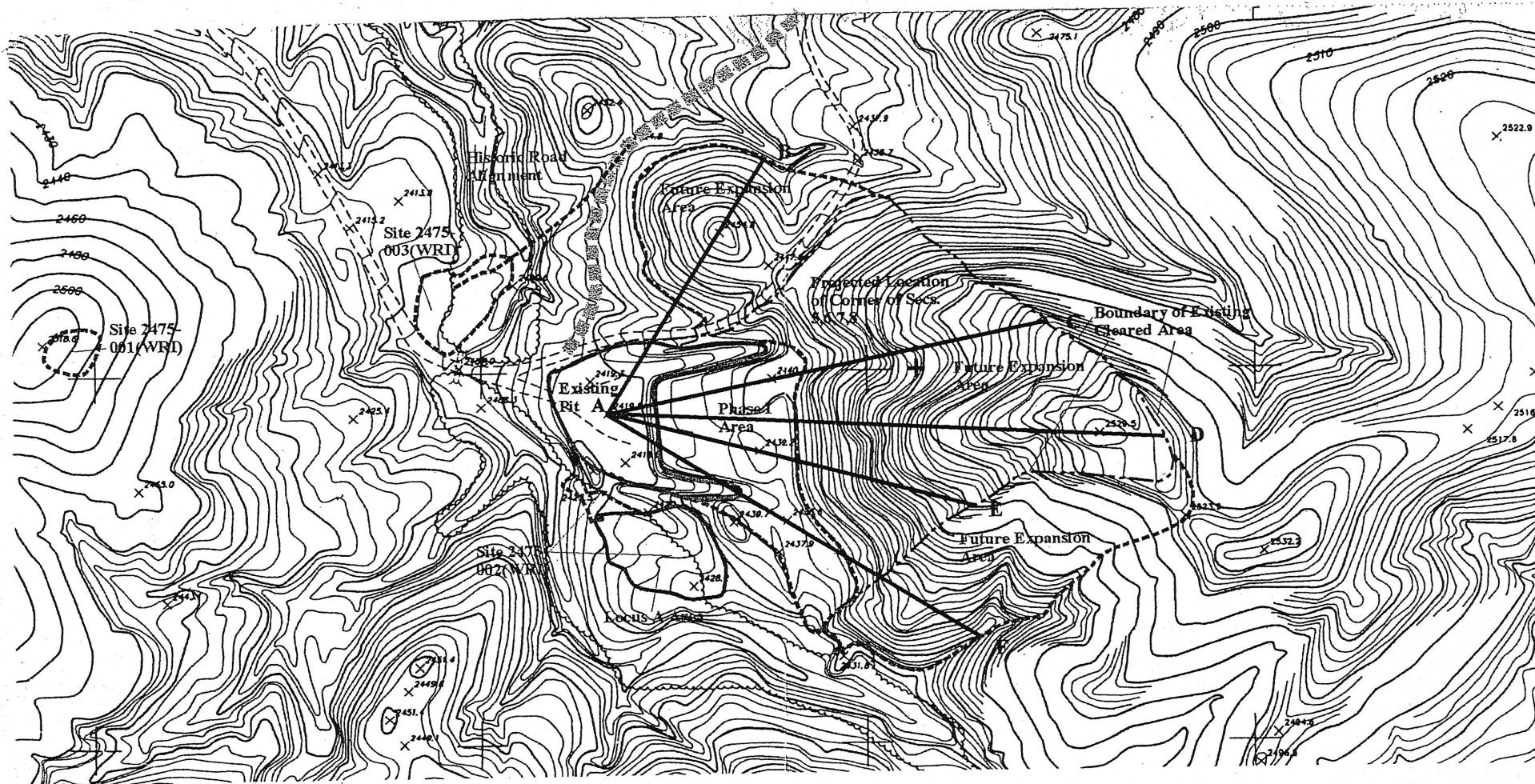


Figure 4: BPC Mine Expansion Areas, Proposed New Road Alignment & Archaeological Sites

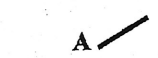
Legend for Figure 4
Scale: 1"=200'

Archaeological Site Boundaries



Proposed New Road Alignment

Cross-Section



Pit Expansion Areas



Wondjina Research Institute

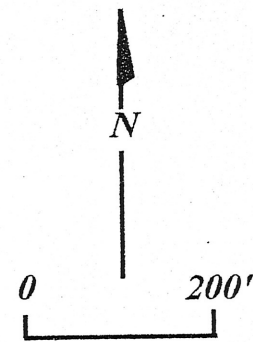
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(520) 379-0186 Mobile

Richard J. Lundin, Director



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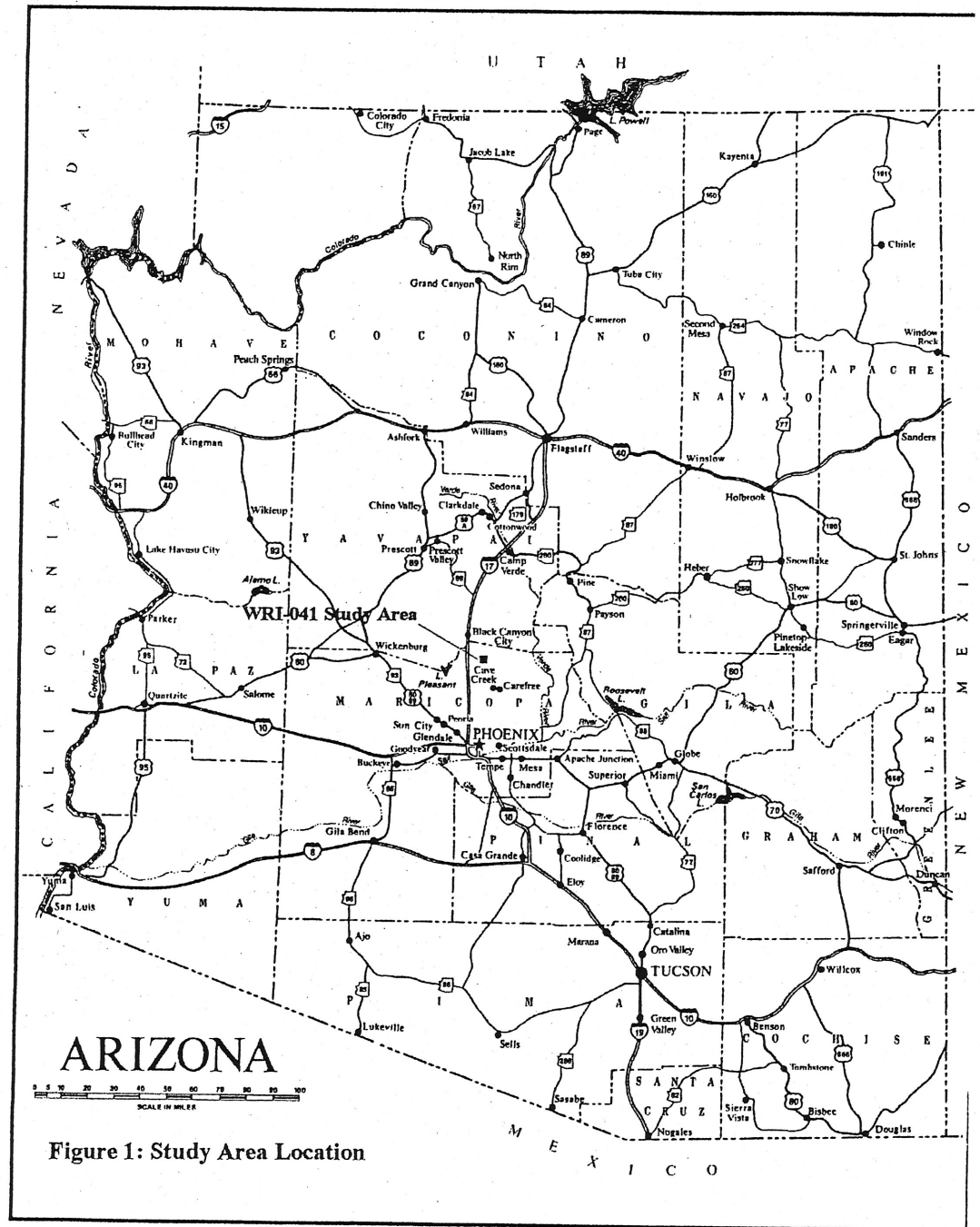


Figure 1: Study Area Location



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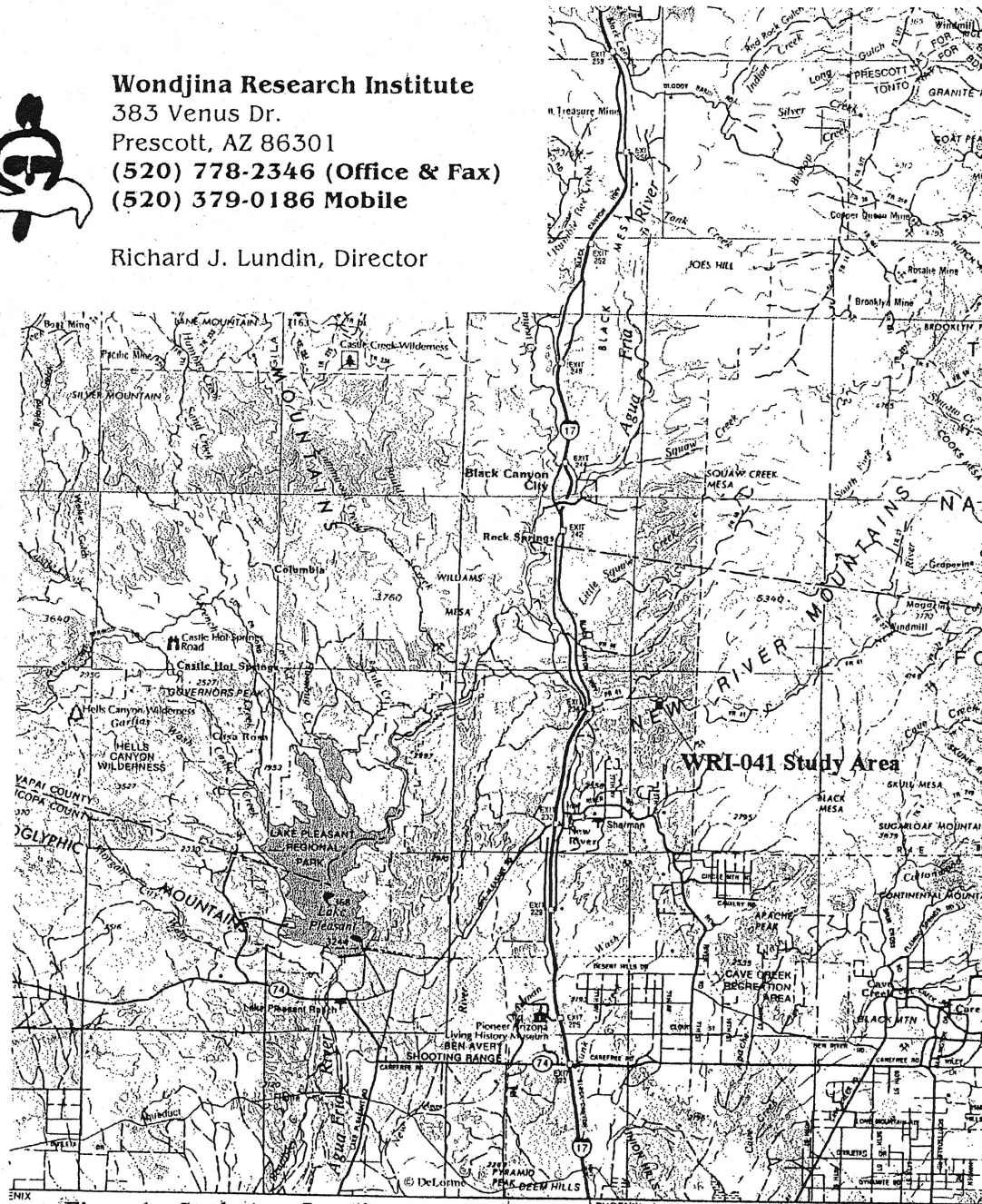
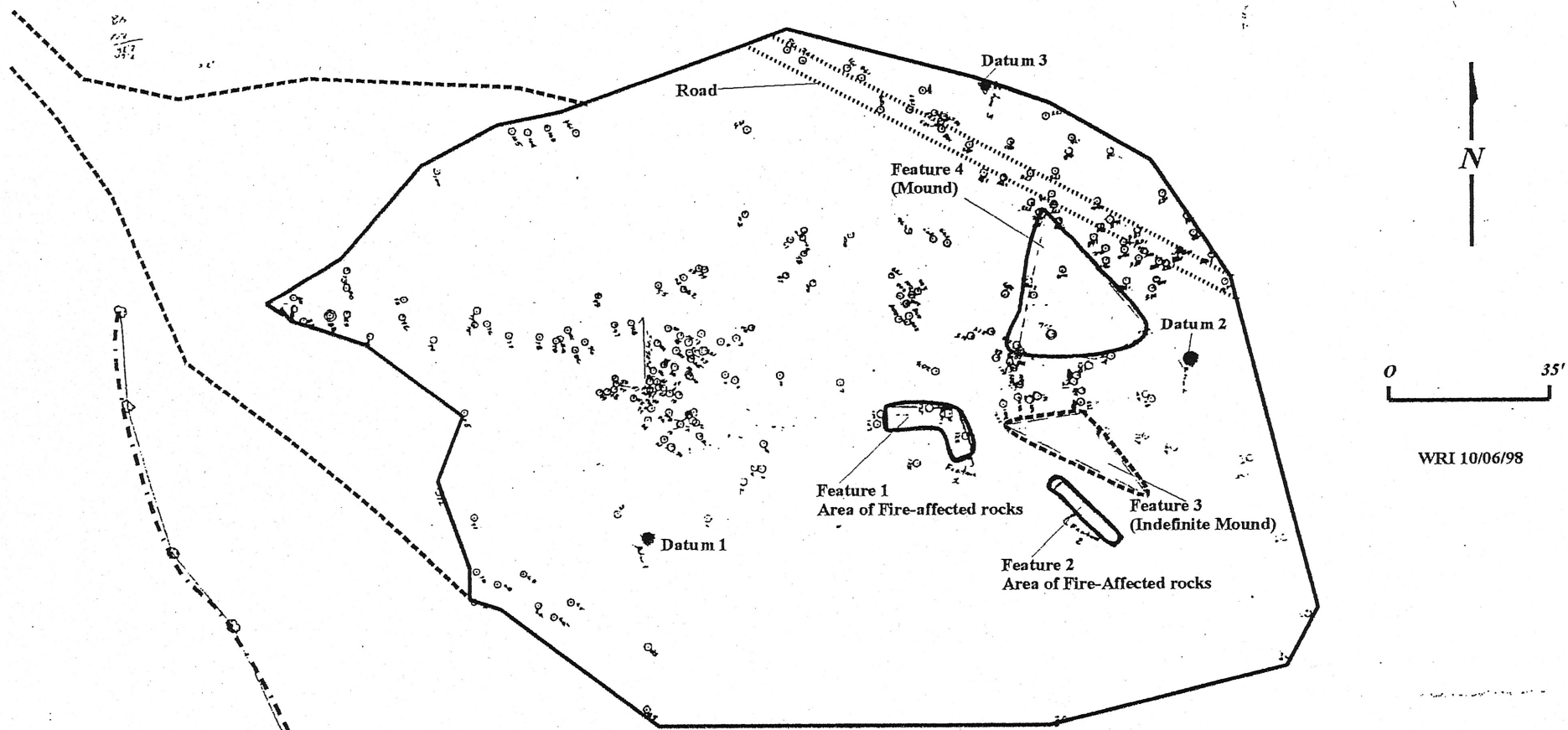


Figure 1a: Study Area Location

Scale 1:250,000
1 inch represents 4 miles

Contour interval
200 feet (61 meters)

Continue on
Page 57



WRI 10/06/98

Figure 3: Field Map of Locus A, Site 2475-002(WRI) (After Clyde (06/05/98) and Lundin (09/22/98))

Legend for Figure 3
 Scale 1"=35' (approx.)
 Prehistoric Artifact Locations:
 ○ Ceramics
 □ Lithics
 □ Ground Stone
 --- Water Course
 - - - Site Boundary (Dashed where inferred)






○ ○ Features
 Road



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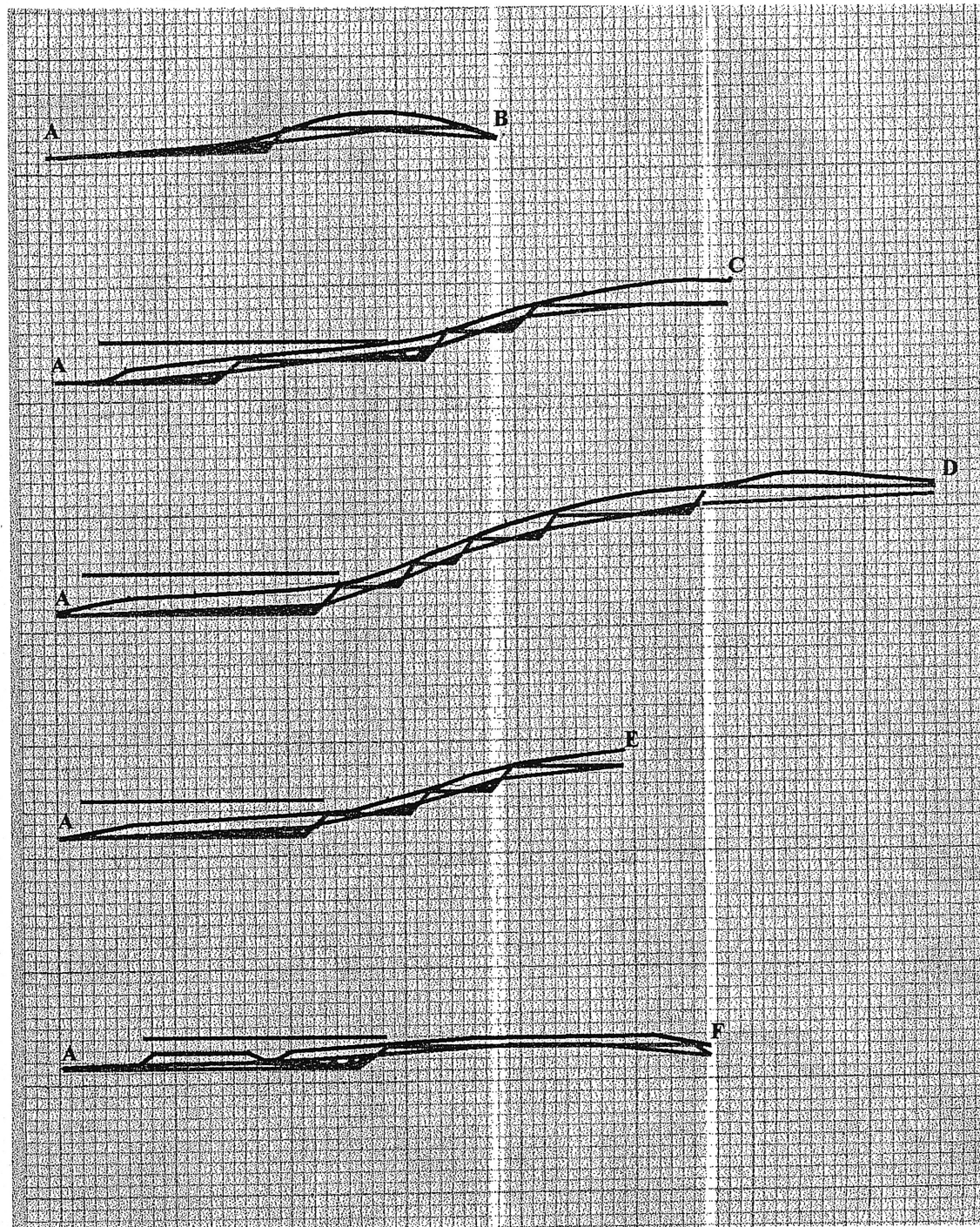
Richard J. Lundin, Director

Legend For Cross-Sections:

-  Present Land Surface
-  Land Surface after Mining
-  Land Surface after Reclamation
-  Fill Material
-  Phase I Mining

Scale: 1"= 145' (approx.)
 Horizontal & Vertical
 Base Elevation at A is 2419.4'

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APPENDIX A



Wondjina Research Institute

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DRAFT

WONDJINA RESEARCH INSTITUTE ARCHAEOLOGICAL REPORT

**A Cultural Resources Inventory
for a Quarry**

near New River, Arizona

by

Richard J. Lundin

Archaeologist and Director

Wondjina Research Institute

and

Principal Investigator

acting under the supervision of

Dr. Charles A. Hoffman

Senior Associate Archaeologist

Wondjina Research Institute

and

Co-Investigator

submitted by

Richard J. Lundin

General Manager

Wombat Mining and Exploration

and

Director

Wondjina Research Institute

Prescott, Arizona

for

Jon Humphreys, Manager

BPC Excavators Inc.

Phoenix, Arizona 85502

for

various local projects

Wondjina Research Institute Project Number WRI-041

July 15, 1998

ABSTRACT

WONDJINA RESEARCH INSTITUTE REPORT NO.: WRI-041

LEAD FEDERAL/STATE AGENCY:
Arizona State Land Department (ASLD)

SPONSORING ORGANIZATION & CONTACT:
BPC Excavators Inc. (BPC)
4850 W. Buckeye Rd.
Phoenix, Arizona 85043
(602) 272-5576

PROJECT TITLE: Cultural Resources Inventory for a Quarry near New River, Arizona,
Wondjina Research Institute Project No. WRI-041

PROJECT DESCRIPTION: Expansion of an existing Materials Source (Pit) from approximately 30 acres (12.5 ha) to 50 acres (20.66 ha) for material extraction and the operation of the Pit for a period of 20 years.

LOCATION (FIGURES 1-3 Include):

- A. **Nearest Community:** New River
- B. **County:** Maricopa
- C. **State:** Arizona
- D. **Land Status:** State of Arizona Trust Lands
- E. **UTM Zone:** 12
- F. **UTM Center of Transect(s):** 3759938 N, 399983 E
- G. **UTM End of Transect(s):** 3758822 N, 399983 E
- H. **UTM Beginning of Transect(s):** 3759938 N, 399983 E
- I. **Map Name(s):** USGS 7.5 minute Daisy Mtn., Arizona 1964
- J. **Area:** T. 7N., R. 3E., Portions of Sections 5,6,7,8

NUMBER OF SURVEYED ACRES: 200 acres (82.6 ha), approximately

NUMBER OF SITES: 3

LIST OF ELIGIBLE SITES: 1

LIST OF INELIGIBLE SITES: 2175-001(WRI), 2175-003(WRI)

COMMENTS: Wondjina Research Institute was contracted by BPC to perform a Cultural Resources Inventory of an approximate 200 acre (82.6 ha) area (Subject Property and Study Area) which has been used as a phyllite quarry since the 1970's. BPC plans to continue operations at the Pit and expand it's mining operations to the SE over the next 20 years. The Class II (100% coverage) survey was conducted to follow up on the Class I survey of the literature.

The Class I survey of the literature and pertinent file data indicated that within the boundaries of the Subject Property there were no recorded Pre-Historic or Historic Era sites. Several Pre-Historic Era trail alignments and several, well-known sites are reported in the literature and by local informants in the general vicinity of the Study Area (See Figure 2 and Appendix B for the locations of these alignments)

The Class II surveys were conducted in February-April, 1998 by archaeologists Richard J. Lundin and Gary Clyde. Dr. Charles A. Hoffman visited the property with Richard J. Lundin in March and April, 1998. Both Mr. Lundin and Mr. Clyde were acting under the supervision of Dr. Charles A. Hoffman, who reviewed this report after visiting the Subject Property.

Some isolated evidence of Pre-Historic, Historic and Recent Era (after 1946) use of the Subject Property was encountered. The evidence of Pre-Historic occupation consisted of widely scattered isolated finds of Pre-Historic Era lithic and ceramic materials. (See Figure 2 for the locations of these Isolated Occurrences (I.O.s) The Pre-Historic Era lithic artifacts consisted of primary flakes of red chert, and chalcedony (N=5), and one red chert point fragment. The Pre-Historic Era ceramic isolates consisted of several small fragments of Wingfield plainwares.

Artifacts from Site 2475-001(WRI) consist of Wingfield plainware sherds (N>20) that are found directly on phyllite bedrock. The site does not appear to have any subsurface extent and probably represents the breakage and downslope dispersion of one or more large Wingfield plainware vessels. This site does not possess sufficient integrity for nomination to either the National or State of Arizona Registers of Historic Places.

Site 2475-002(WRI) consists of an extensive scatter of Wingfield plainware sherds (N>150) that occurs with chipped stone (N>50) and groundstone (N>5) fragments over an extensive area that is adjacent to the Pit and has been cut by an old road. Concentrations of artifacts are found in association with at least one mound and one area of fire-affected rock. This site may represent a significant Pre-Historic Era habitation site. The site has been somewhat affected by past use of the old road that passes through it. The road cut clearly indicates that cultural materials have accumulated to the depth of 50-130 cm and that large pieces of relatively intact ceramic materials are being eroded into the road cut. Apart from the destruction caused by the road cut, the site is relatively undisturbed. This site has continuing potential for the study of the residential life and subsistence activities of the Prehistoric inhabitants of the area and is eligible for inclusion in the National Register of Historic Places under Criterion "D". WRI's recent survey activity has brought public attention to this site and there is evidence of recent visits to the sites (trash, additional shell casings etc.) Fortunately, no vandalism has occurred to date. It is recommended

that the artifacts that are currently visible and have already been pin-flagged be mapped in place. Such mapping by plane table and alidade methods may better define areas of cultural activity with the site. Once mapping has taken place, the pin flags should be removed, leaving the artifacts undisturbed. It is strongly recommended that access vto the site be further restricted by the closing of the existing gap in the berm around the existing Pit Area. If this action proves not to be sufficient to deter visitors to the site, it is recommended that the entire site perimeter be strongly fenced with woven wire mesh fencing and the site be monitored on a regular basis by a volunteer with the Arizona Site Steward Program.

Artifacts from Site 2475-003(WRI) consist of Wingfield plainware sherds (N>50) that are outside of the Study Area. The site does not appear to have any subsurface extent. This site does not possess sufficient integrity for nomination to either the National or State of Arizona Registers of Historic Places.

It is further recommended that at some future time, if the site appears to be affected by the proposed mining operations, pot hunting or unauthorized visitors, that full excavation of the site occur with the goal of full data recovery.

Historic Era isolated artifacts include claim posts and rock monuments, a cobalt blue glass fragment and a metal tobacco can. A diffuse scatter of isolated Historic?-Recent era artifacts (N>1000) was noted in the vicinity of the Pit; they include plastic, cardboard, metal, glass and wood fragments, and several whole glass and metal beverage containers. Adjacent to and within the Pit is a large quantity of brass, steel, plastic and cardboard shell casing materials associated with target practice with many different gauges of firearm and manner of targets represented.

One Recent-Historic Era fenceline segment was observed in the southern portion of the Study Area in Section 7 and would not be impacted by the Proposed Action.

Based on the lack of significant archaeological findings it is recommended that the project be allowed to proceed as planned with the provision that Site 2475-002(WRI) be avoided and left undisturbed.

INTRODUCTION

On February 16, 1996 Mr. Jon Humphreys, Plant Manager for BPC contracted Wombat Mining and Exploration (WME) to prepare an Operating Plan for the further development of a Quarry for the production phyllite as temper material for ceramic pipe (Proposed Activity).

As an integral part of the Operating Plan preparation process, Wondjina Research Institute (WRI), a research and development subsidiary of WME, was authorized to conduct a Class I-II cultural resources inventory of approximately 200 acres (82.6 ha) of Arizona State Trust Land, administered by the ASLD (Subject Property and Study Area) for a materials extracting facility and haul access road near New River, Arizona. The inventory was performed to determine the location of any cultural resources that might be impacted by the Proposed Activity.

The cultural resource inventory consisted of conducting a Class II (100% coverage) survey and a Class I survey of the literature.

The Class I survey of the literature and pertinent file data indicated that several Historic Era road and trail alignments may have crossed the Study Area. With the exception of a segment of a deeply eroded road alignment that can be seen in the northern portion of the Study Area, none of the reported features were apparent within or adjacent to the Study Area.

The Class II surveys were conducted in February-April, 1998 by archaeologists Richard J. Lundin and Gary Clyde. Dr. Charles A. Hoffman visited the property with Richard J. Lundin in March and April 1998. Both Mr. Lundin and Mr. Clyde were acting under the supervision of Dr. Hoffman, who is the ASM Permit holder (ASM Permit 98-126bl) and reviewed this report after visiting the Subject Property on several occasions.

Field work was carried out in accordance with the provisions of the National Historic Preservation Act of 1966 as amended, the National Environmental Policy Act of 1969, the Archaeological and Historical Preservation Act of 1974 and the Archaeological Resource Protection Act of 1979. All notes, maps and other materials pertaining to this inventory (Wondjina Research Institute Project WRI-041) are on file at the offices of Wondjina Research Institute in Prescott, Arizona.

Dr. Charles A. Hoffman has a Bachelor of Science in Journalism and a Master of Arts Degree in Anthropology from the University of Florida. Dr. Hoffman has a Doctorate in Anthropology from the University of Arizona and 34 years of experience in the survey, documentation and excavation of Pre-Historic and Historic Era sites throughout Arizona, the Southwestern portion of the United States and overseas. Dr. Hoffman has recently submitted several reports that have been accepted by the Arizona State Historic Preservation Office (AZSHPO).

Mr. Lundin has a BA in Anthropology and Geology from Beloit College in Wisconsin, has successfully completed over 55 graduate hours in Anthropology and History at the University of

the Americas in Mexico City, University of Nevada in Reno and NAU in Flagstaff and received his MA in Anthropology from NAU in May of 1997. Mr. Lundin has completed and successfully submitted several archaeological reports on Pre-Historic and Historic Era sites on private holdings in Arizona and New Mexico to the AZSHPO.

Dr. Hoffman has wide experience in recording and interpreting Pre-Historic and Historic Era sites of the Central Arizona Region and is Professor Emeritus in Anthropology from NAU. Both Mr. Lundin and Mr. Clyde have wide experience in recording and interpreting Pre-Historic and Historic era sites of the Central Arizona region. Mr. Lundin and Mr. Clyde are both instructors in anthropology in the Community College system.

PROJECT LOCATION

Figure 1 shows the location of the Project Area within the State of Arizona.

Figure 1a shows the location of the Project Area in the vicinity of New River, Arizona

Figure 2 shows the location of the Project Area being in portions of Sections 5,6,7,8 T. 7N., R. 3E of the USGS Daisy Mtn., Arizona 1964 7.5 minute quadrangle; the location of known archaeological sites within the area, and the locations of I.O.'s encountered.

Figure 3 shows the location of Locus A, Site 2475-002(WRI).

Figure 4 shows the location of the proposed BPC Mine Expansion Area, a Proposed New Road Alignment and the I.O.'s and features within the Study Area and is an enlargement of new topographic mapping commissioned by BPC for this study.

The Project Area lies approximately 2.0 miles (3.23 km) east of US Interstate Route 17 and approximately 6.0 miles (9.67 km) northeast of New River Valley, Arizona. (Figure 1a).

ENVIRONMENT (Abstracted from Clyde 1998)

The physical environment of central Arizona ranges from relatively flat terrains characterized by vegetation consistent with that found in the Southwestern Desert scrub biotic community of the Lower Sonoran Life-zone as defined by Lowe (1964:15-20,24-31). The Subject Property particularly exhibits the flora found in the rocky foothills of the New River fluvial system. The Study Area is located within a paloverde-saguaro (*Cercidium-Cereus*) plant community that is rich and diverse. Several grasses flourish throughout the Project Area, the primary types are grammas (*Bouteloua spp.*).

Shrubs observed were desert hackberry (*Celtis pallida*), bursage (*Ambrosia deltoidea*), jojoba (*Simmondsia chinensis*), creosotebush (*Larrea tridentata*), brittlebush (*Encelia farinosa*), burrobrush (*Hymenoclea salsola*), fairyduster (*Calliandra eriophylla*), desert mistletoe (*Phoradendron californicum*), cat's claw (*Acaccia greggii*), Mormon-tea (*Ephedra trifurca*),



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(520) 379-0186 Mobile

Richard J. Lundin, Director

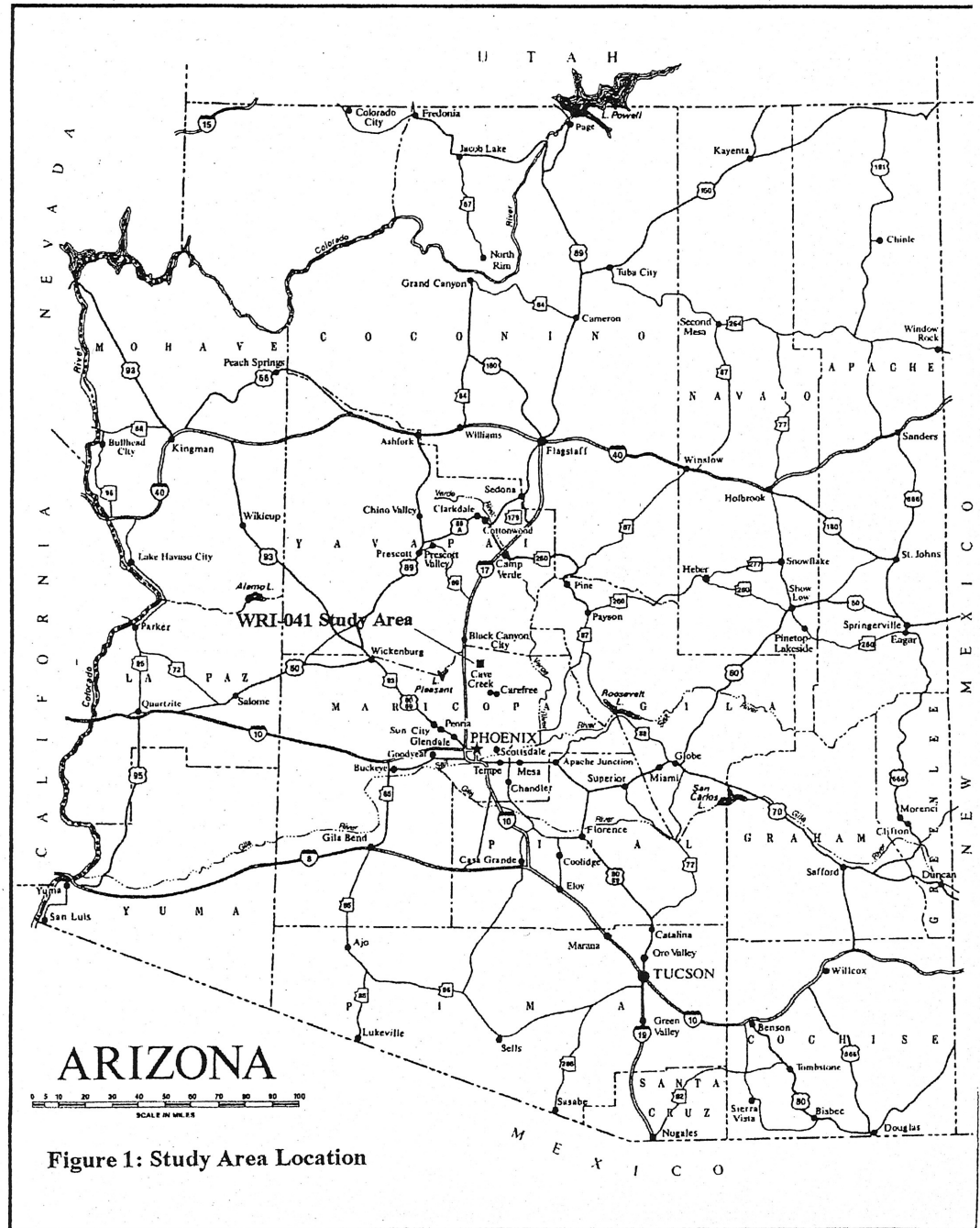


Figure 1: Study Area Location



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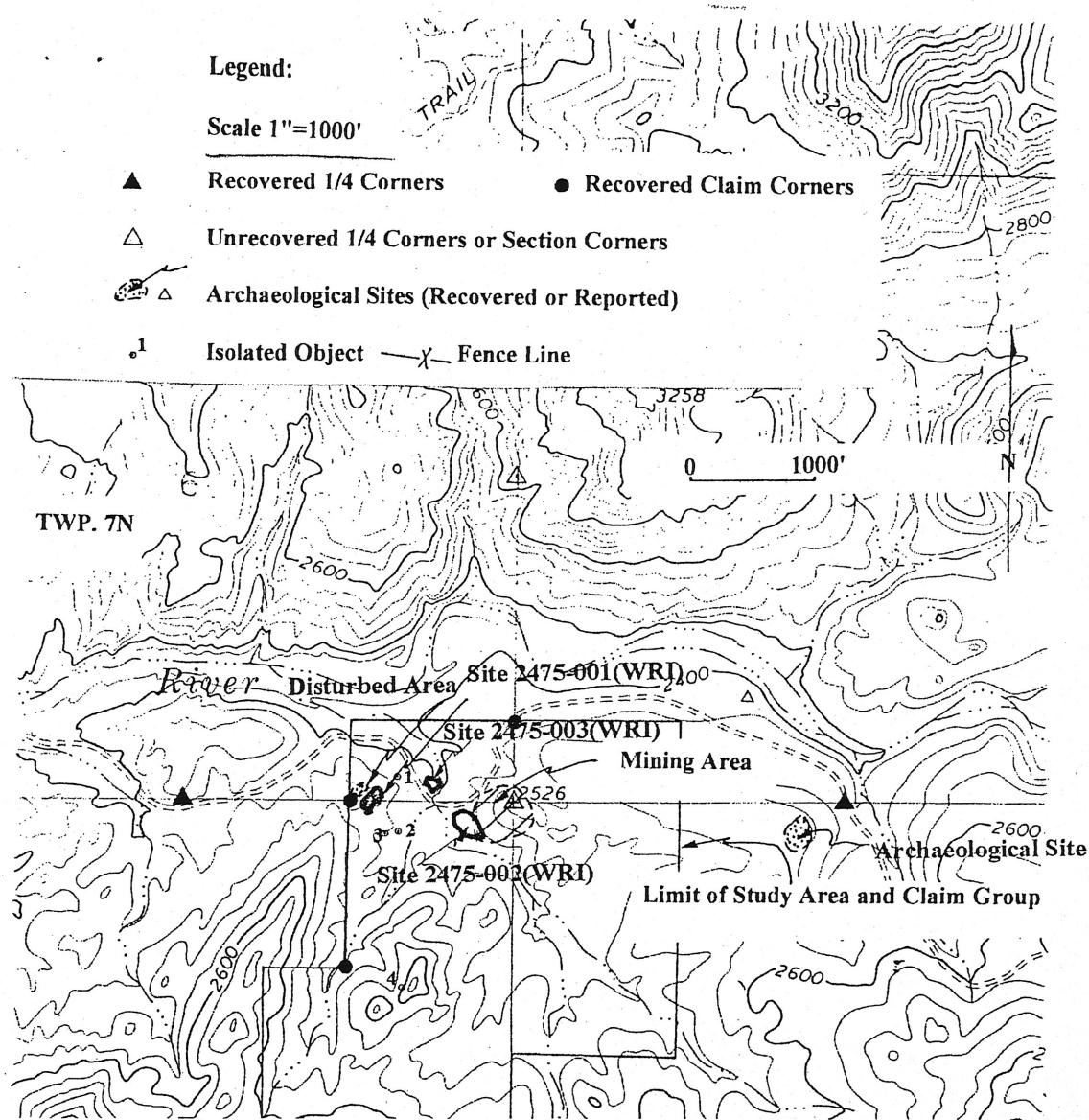
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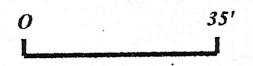
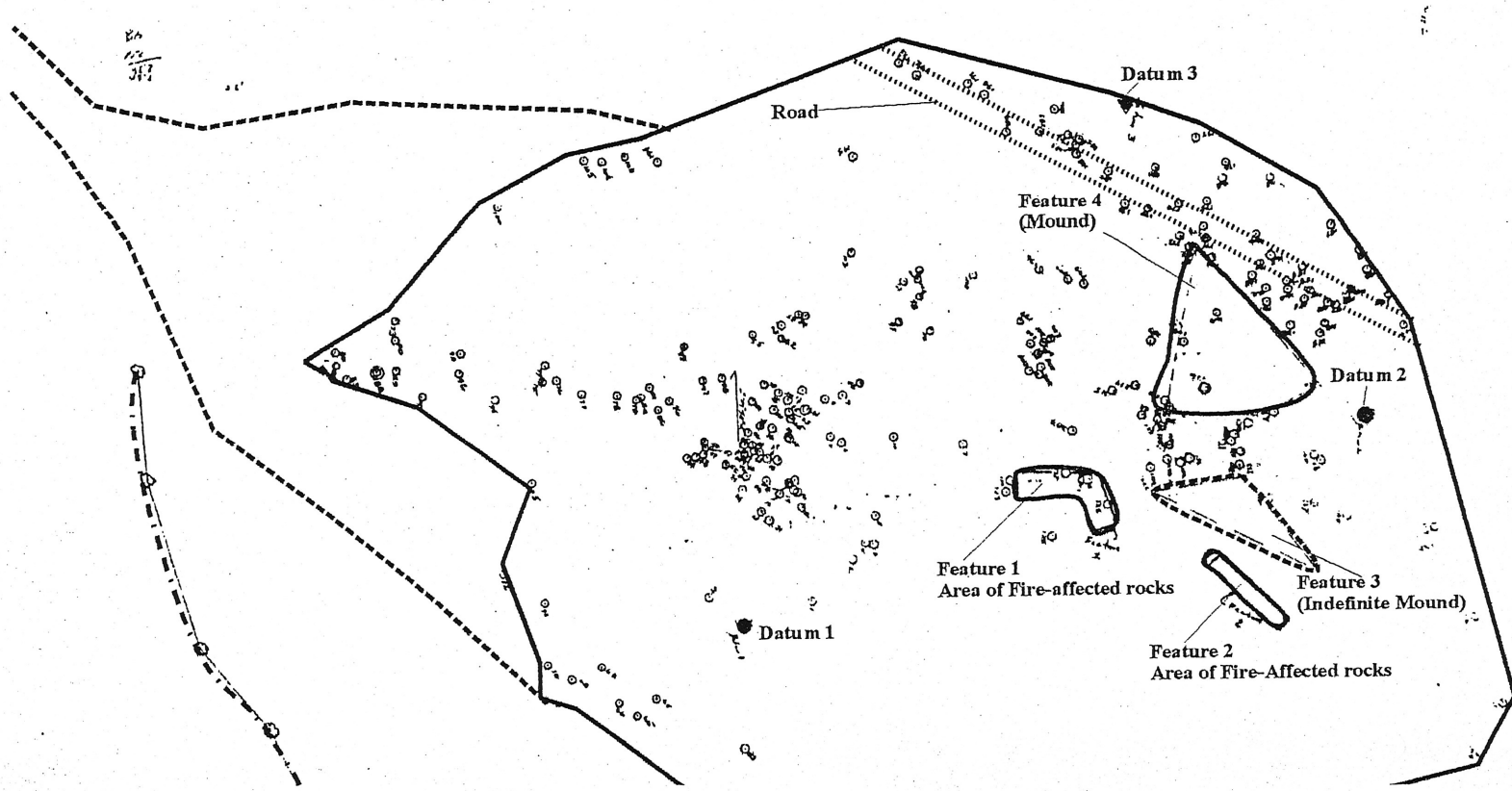


Legend:

Scale 1"=1000'

- ▲ Recovered 1/4 Corners ● Recovered Claim Corners
- △ Unrecovered 1/4 Corners or Section Corners
- ⊙ Δ Archaeological Sites (Recovered or Reported)
- Isolated Object -X- Fence Line





WRI 10/06/98

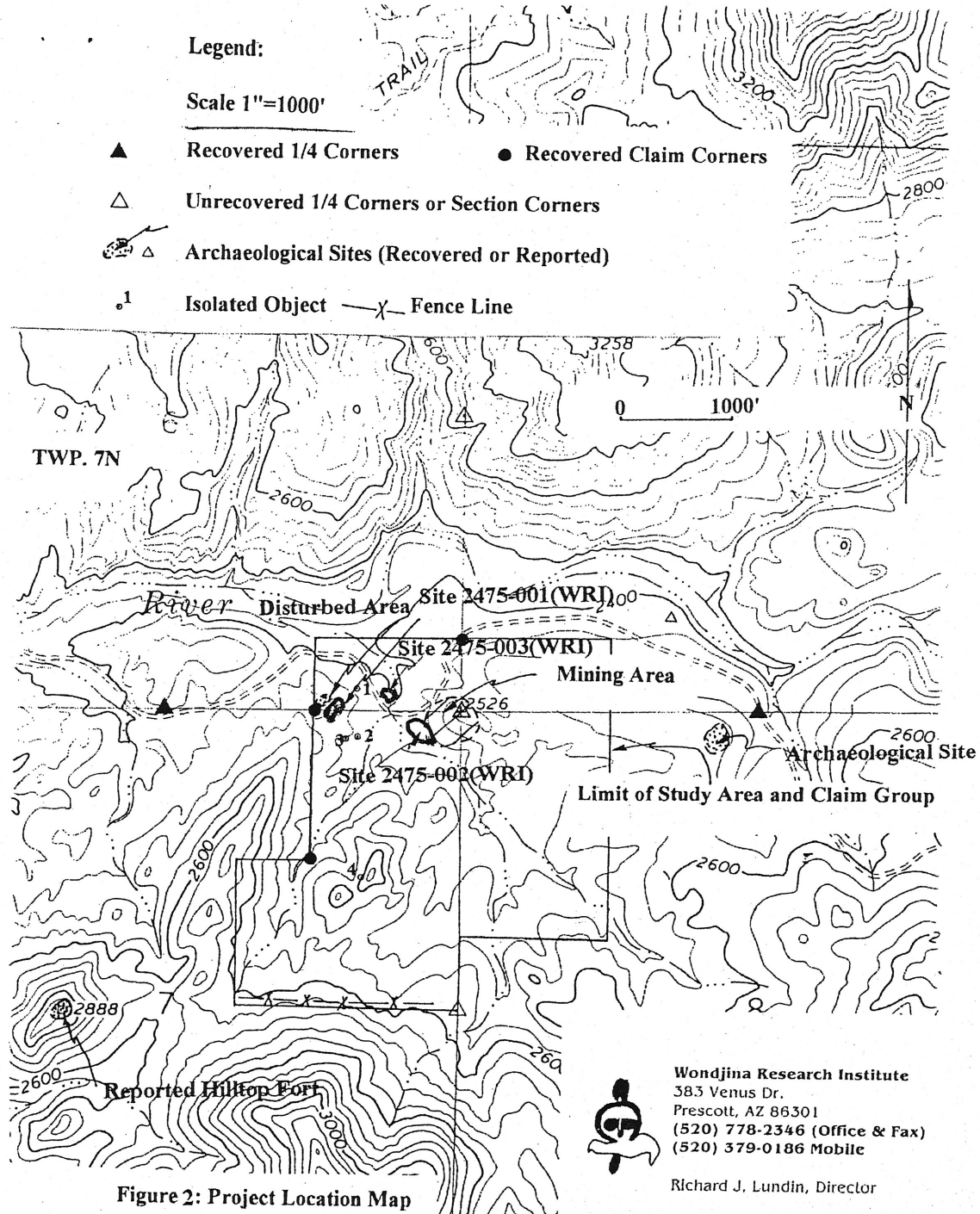


Figure 2: Project Location Map

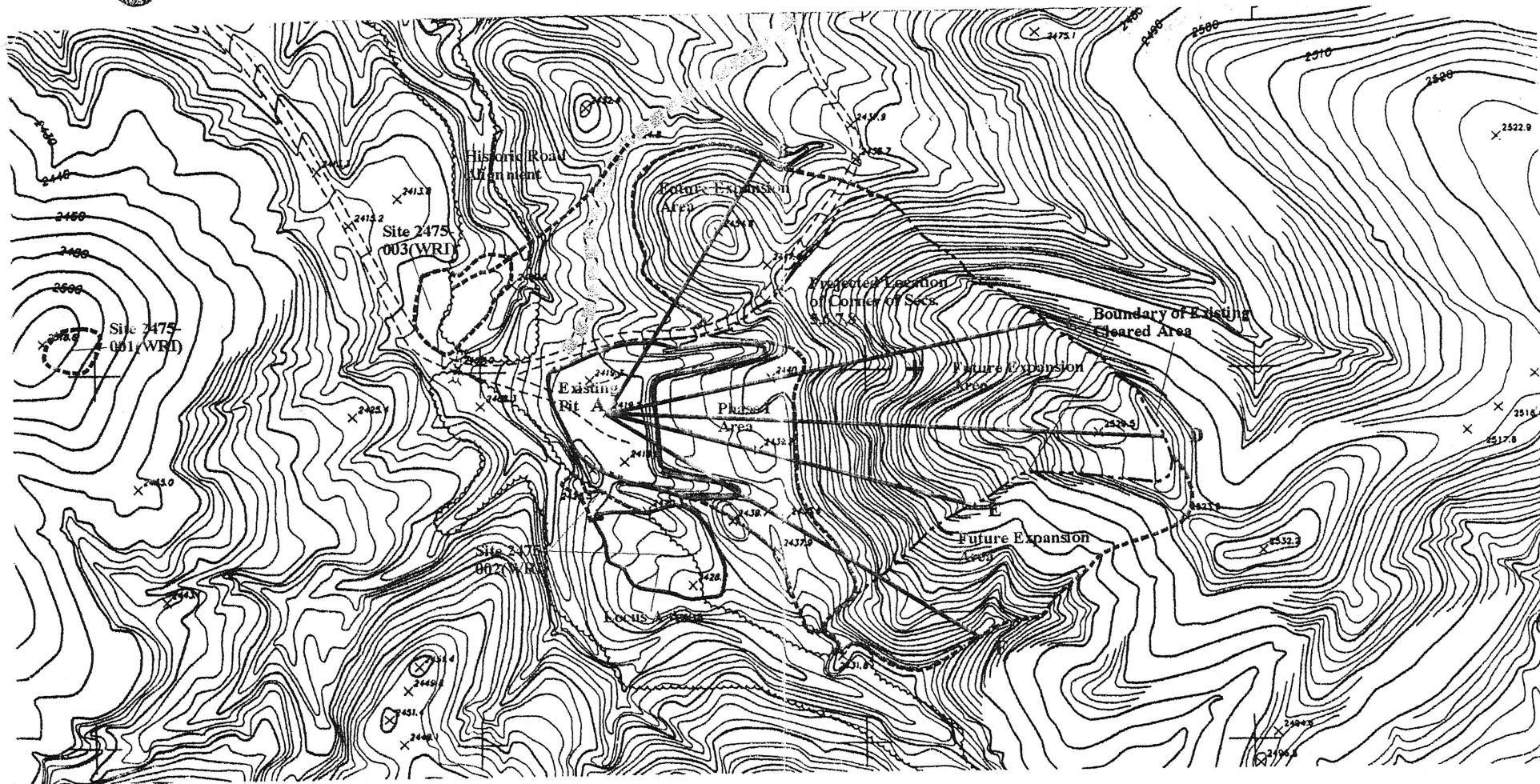


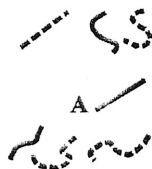
Figure 4: BPC Mine Expansion Areas, Proposed New Road Alignment & Archaeological Sites

Legend for Figure 4
Scale: 1"=200'



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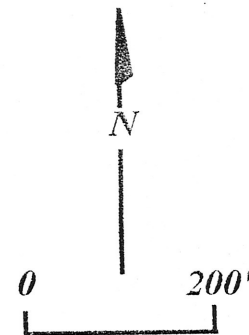
Richard J. Lundin, Director



Archaeological Site Boundaries
Cross-Section
Pit Expansion Areas



Proposed New Road Alignment



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rev. 10/01/98

3/6/00

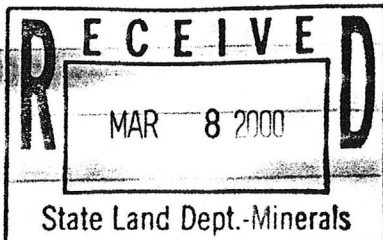
Mike

Sorry I didn't get this to
you sooner. Please call if you need
anything else.

Thanks

SON

Humphreys



flat-top buckwheat (*Eriogonum fasciculatum*), range ratany (*Krameria parvifolia*), ocotillo (*Fouquieria splendens*), broad-leaf yucca (*Yucca arizonica*) and several agave species (*Agave spp.*). Cacti found in the Study Area include saguaro (*Carnegiea gigantea*), barrel cactus (*Ferocactus wislizenii*), Engelmann's hedgehog (*Echinocereus engelmannii*), Pincussion and Fishhook (*Mammillarias spp.*), Buckhorn Cholla (*Opuntia echinocarpa*), cane cholla (*Opuntia spinsior*), christmas cholla (*Opuntia leptocaulis*), chainfruit cholla (*Opuntia fulgida*) and prickly pear species (*Opuntia spp.*). Other vegetation noted in the survey areas which are consistent with this biotic community include honey mesquite (*Prosopis velutina*), foothills or yellow mesquite (*Cercidium microphyllum*), blue palo verde (*Cercidium floridum*) and white thorn acacia (*Acacia constricta*).

The Project Area has been utilized for cattle grazing in the recent past. A number of mammals (desert cottontail, rock squirrel, and Harris Antelope squirrel) were observed. Evidence of desert mule deer, badger, white-throated woodrat or packrat, javelina, kangaroo rat and pocket mouse were also noted.

Various iguanid lizards were observed throughout the Study Area but were not specifically identified.

Geologically, for the most part, the area on the south side of the New River drainage north of Cave Creek is composed of Precambrian metavolcanic and metasedimentary units that are locally capped by Quaternary age lava flows and volcanoclastic tuffaceous units (Chronic, 1983).

Drainage of the Project Area is toward the south and west. Elevations are as follows: 2400 feet above sea level along the New River drainage at the northeast end of the Study Area, 2600 feet along the southern boundary of the Study Area.

The closest major water source to the Project Area is the New River drainage system. All of the Project Area lies within this system.

Parts of the Project Area have already been disturbed by previous use. The Project Area is characterized as consisting of a series of rolling hills between two branches of a fluvial system that flow north into the New River drainage. The existing BPC Quarry has been subject to intensive use for target practice. Portions of the existing Pit Area have been previously cleared and were extensively disturbed by past ranching, mining and camping activities.

Materials from the Subject Property is being used by BPC as temper in the manufacture of ceramic pipe.

CULTURAL BACKGROUND

Data to substantiate Archaic occupation of the upper reaches of the New River basin are inadequate. However, considering the environmental resources of the area, it would be reasonable to expect evidence of human occupation prior to the agricultural time period. The area does not

have abundant water and the soils are particularly rocky. This restriction would have limited agricultural activity by sedentary populations. The general Pre-Historic cultural affiliation of this region during the early ceramic (Pueblo I) period is the Prescott Culture. This culture is poorly defined on the basis of its associated ceramic assemblage and the use of large boulder basin metates, similar to one found within the Study Area. They occupied a large area of west central Arizona and were successful agriculturalists, living a sedentary, peaceful lifestyle from approximately A.D. 620 to 1310.

From the 1860's Anglo-American, Hispanic and Chinese prospectors, miners and ranchers used the New River System as a natural pathway for exploration and development of the region. With the discovery of lode and placer deposits of gold along the southern foothills of the New River Mountains in the 1860s, there was a flurry of lode mineral prospecting and mining activities from the 1860s to the 1950s. Several nearby base metal mining properties (Red Rover Mine, Orizaba Mine) and various gold mines in the Cave Creek area were developed and patented during this period. With the development of base and precious metal deposits in the nearby areas near Black Canyon City a realization that similar geological environments existed on the east side of the Agua Fria River drainage. This realization led to massive exploration efforts within and adjacent to the Study Area in the 1950-1980 period. Several mines and prospects upstream on the New River from the Study Area show evidence of recent activity.

THE SURVEY

Prior to conducting fieldwork, site files and records at the following agencies were consulted:

1. Arizona State Museum (ASM).
2. Museum of Northern Arizona (MNA).
3. Northern Arizona University (NAU).
4. State Historic Preservation Office (SHPO).
5. Cave Creek Ranger District Office, Prescott National Forest (TNF-CCDO).
6. Tonto National Forest Supervisor's Office (TNF-SO).
7. Cave Creek Museum (CCM).
8. Arizona Pioneer Historical Society (APHS).
9. Arizona State University (ASU).
10. Arizona State Land Department (ASLD).

11. Arizona Archaeological Society (Cave Creek Chapter).

No previously recorded sites were found to lie within the boundaries of the Study Area. However, GLO mapping suggested that Historic Era road and trail alignments crossed the Study Area. Several sites were recorded by Southern Illinois University (see SIU Ecotone Survey 1973 site cards in Appendix A) to the east of the Study Area but would not be affected by the Proposed Activity.

Survey Methods:

The entire Study Area consisting of approximately 200.00 acres (82.6 ha) was surveyed over the proposed Project Area by two archaeologists walking 50-foot (approx. 15m.) transects northwest to southeast until all the areas were covered. Ground visibility was marginal to very good with mineral soils and rock exposed in most places.

Much of the Project Area has been relatively undisturbed by current cattle grazing, and ranching activities.

SURVEY RESULTS

Some isolated evidence of Pre-Historic, Historic and Recent Era (after 1946) use of the Subject Property was encountered. The evidence of Pre-Historic occupation consisted of widely scattered isolated finds of Pre-Historic Era lithic and ceramic materials. (See Figure 2 for the locations of these Isolated Occurrences (I.O.s) The Pre-Historic Era lithic artifacts consisted of primary flakes of red chert, and chalcedony (N=5), and one red chert point fragment. The Pre-Historic Era ceramic isolates consisted of several small fragments of Wingfield plainwares.

Artifacts from Site 2475-001(WRI) consist of Wingfield plainware sherds (N>20) that are found directly on phyllite bedrock. The site does not appear to have any subsurface extent and probably represents the breakage and downslope dispersion of one or more large Wingfield plainware vessels. This site does not possess sufficient integrity for nomination to either the National or State of Arizona Registers of Historic Places.

Site 2475-002(WRI) consists of an extensive scatter of Wingfield plainware sherds (N>150) that occurs with chipped stone (N>50) and groundstone (N>5) fragments over an extensive area that is adjacent to the Pit and has been cut by an old road. Concentrations of artifacts are found in association with at least one mound (Feature 1 on Figure 2) and one area of fire-affected rock (Feature 2 on Figure 2). This site may represent a significant Pre-Historic Era habitation site. The site has been somewhat affected by past use of the old road that passes through it. The road cut clearly indicates that cultural materials have accumulated to the depth of 50-130 cm and that large pieces of relatively intact ceramic materials are being eroded into the road cut. Apart from the destruction caused by the road cut, the site is relatively undisturbed. This site has continuing potential for the study of the residential life and subsistence activities of the Prehistoric

inhabitants of the area and is eligible for inclusion in the National Register of Historic Places under Criterion "D".

Artifacts from Site 2475-003(WRI) consist of Wingfield plainware sherds (N>10) and lithic materials (N>10 dacite/basalt porphyry flakes) that are outside of the Pit Area. The site does not appear to have any subsurface extent. Transecting the site is a section of an old wagon road is presumed to be the one shown on GLO plats of the area. The road alignment is quite visible within the site as a series of deeply cut ruts in the bedrock. No Historic or Recent era artifacts were found in association with this section of the wagon road. This site does not possess sufficient integrity for nomination to either the National or State of Arizona Registers of Historic Places.

CONCLUSIONS AND RECOMMENDATIONS

WRI's recent survey activity has brought public attention to site 2475-002(WRI) and there is evidence of recent visits to the sites (trash, additional shell casings etc.) Fortunately, no vandalism has occurred to date. It is recommended that the artifacts that are currently visible have already been pin-flagged be mapped in place. Such mapping by plane table and alidade methods may better define areas of cultural activity with the site. Once mapping has taken place the pin flags should be removed, leaving the artifacts undisturbed. It is strongly recommended that access to the site be further restricted by the closing of the existing gap in the berm around the existing Pit Area. If this action proves not to be sufficient to deter visitors to the site, it is recommended that the entire site perimeter be strongly fenced with woven wire mesh fencing; the site be monitored on a regular basis by a volunteer with the Arizona Site Steward Program.

It is further recommended that at some future time, if the site appears to be affected by proposed mining operations, pot hunting or unauthorized visitors, that full excavation of the site occur with the goal of full data recovery.

In the event that previously undetected or subsurface cultural resources are encountered during any activities, it is recommended that those activities in the immediate vicinity of the find be halted and a qualified archaeologist be called in to assess the extent and significance of the discovery.

REFERENCES

- Chronic, H.:
1983 *Roadside Geology of Arizona*, Mountain Press Publishing Co., Missoula, MT
- Clyde, G.
1998 Biological Community, Unpublished Memorandum Report to R.J. Lundin of regarding Project WRI-041, Ms., Copy on file with WRI

Table 1: List of Isolated Objects (I.O.) Recorded

I.O. Number	Description	Provenience	Photo No./ Reference
WRI-041-001	red chert point	Pre-Historic	N/A
WRI-041-002	white chalcedony flake	Pre-Historic	WRI-041- 01:03
WRI-041-003	2 red chert flakes	Pre-Historic	N/A
WRI-041-004	1 cobalt glass fragment	Historic?	N/A

APPENDIX A
REPRESENTATIVE PHOTOS

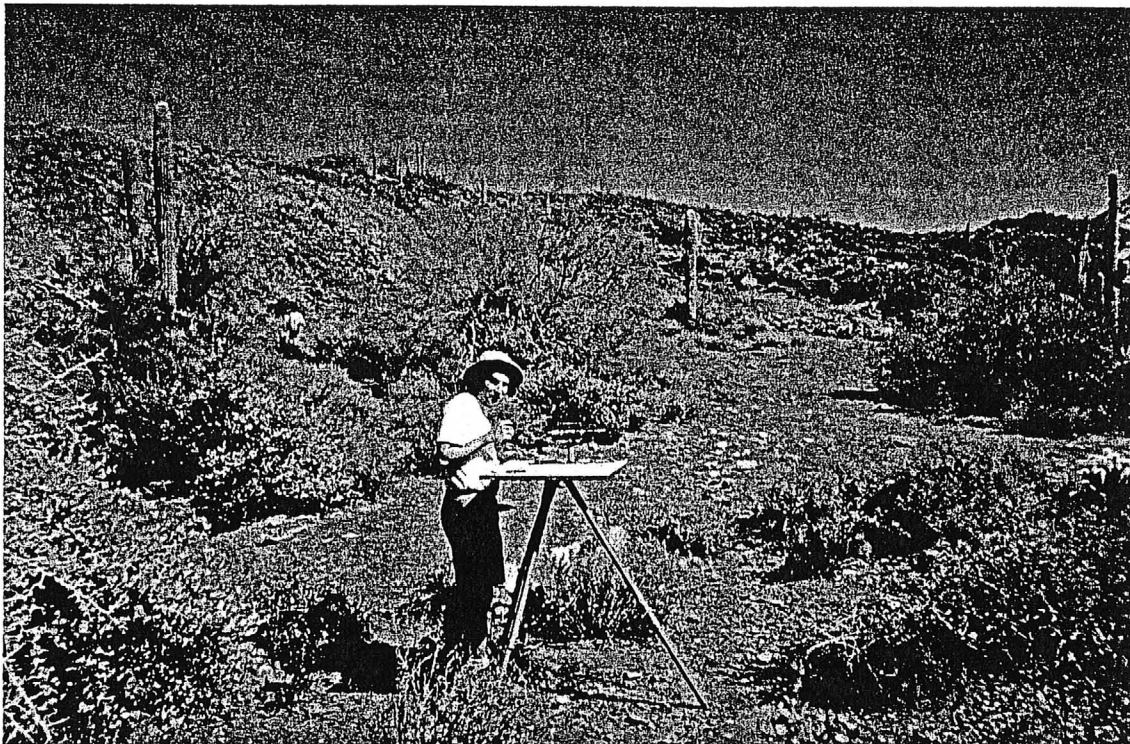


Photo WRI-041-01:01

View to SE of E margin of Site 2475-002(WRI), abandoned road and Pit Area in background w/J. Garrotto at Datum 3



Photo WRI-041-01:02

View to NW of abandoned road alignment adjacent to Pit Area with pinflagged locations of artifacts



Photo WRI-041-01:19

View to NW of area adjacent to Feature 4 of Site 2475-002(WRI) with pinflagged locations of artifacts

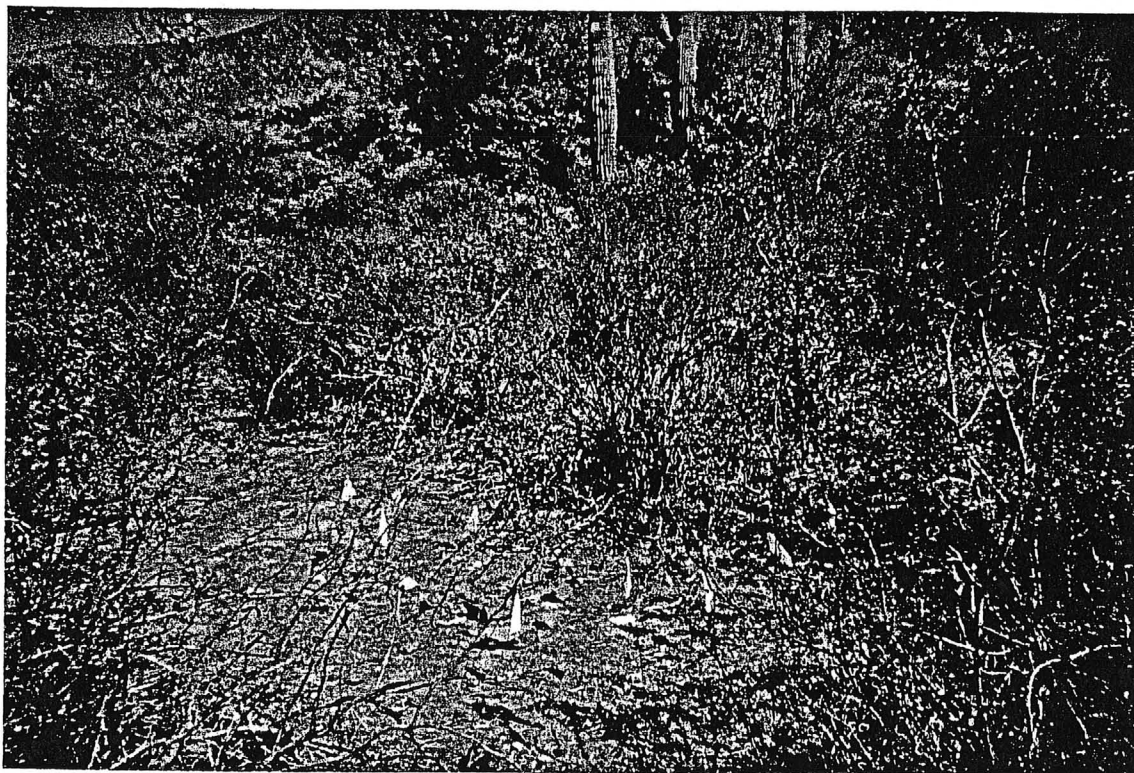


Photo WRI-041-01:04

View to NE of Feature 1 of site 2475-002(WRI) with pinflagged locations of artifacts and fire-affected rocks

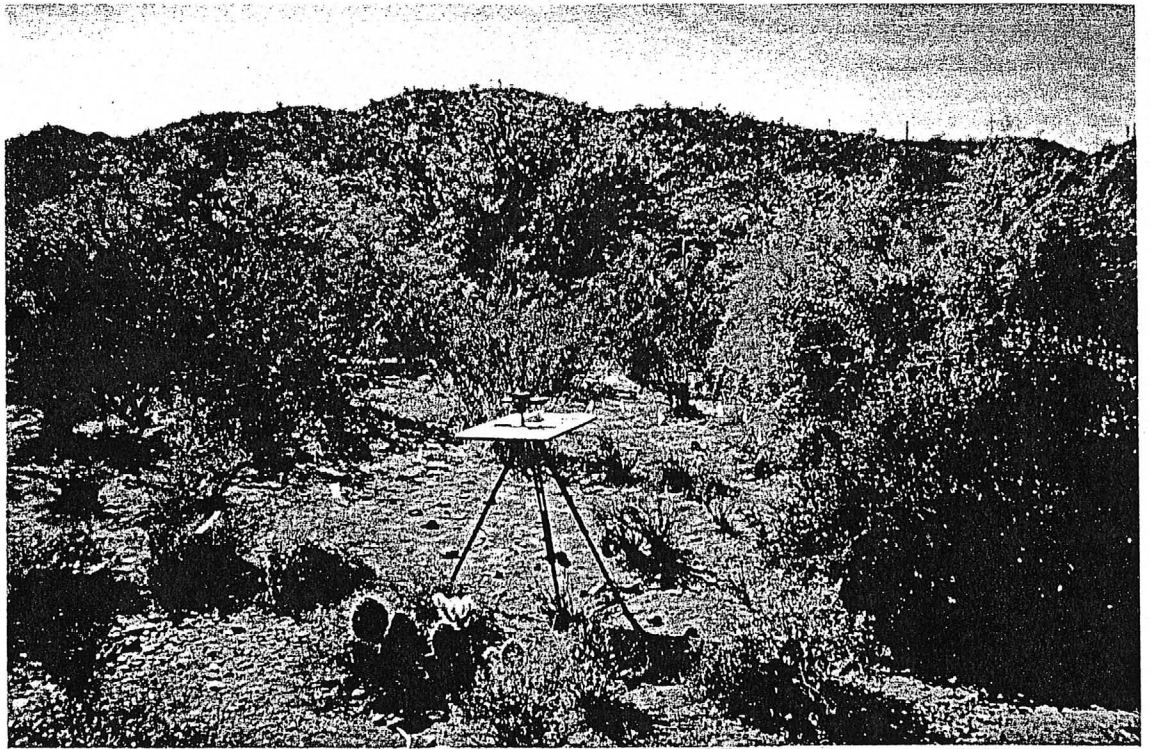
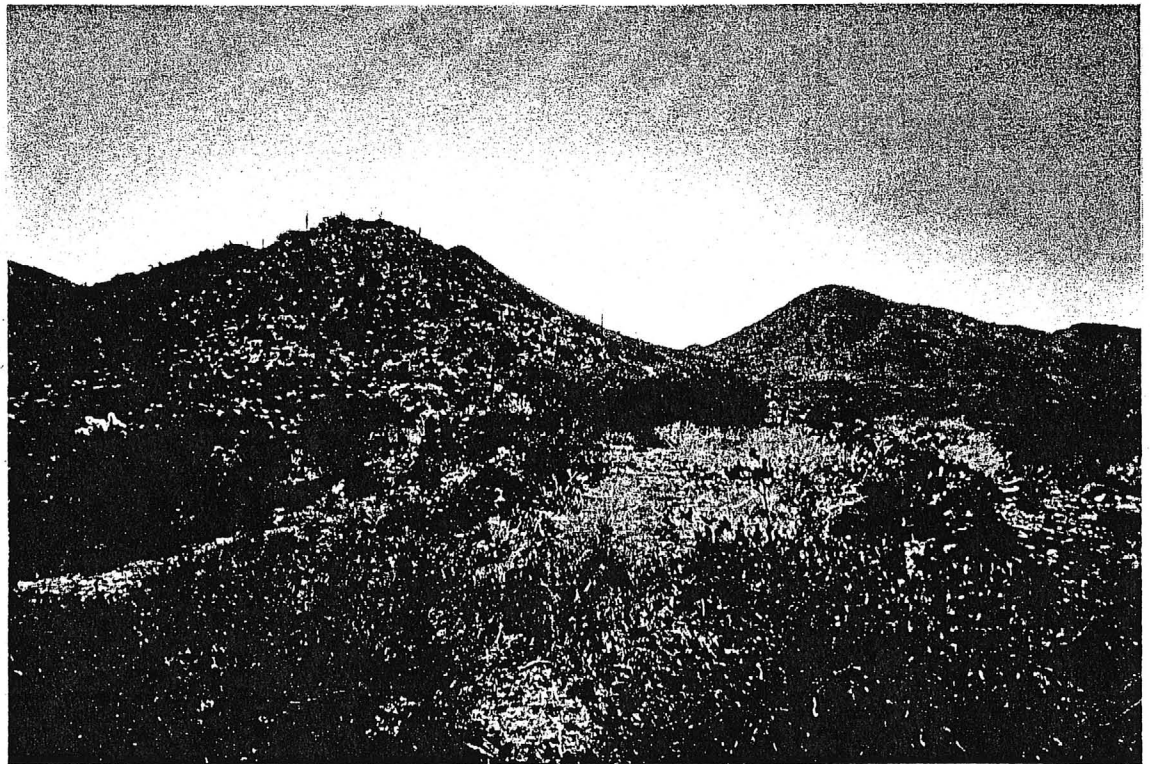


Photo WRI-041-01:05

View to W of Features 3 & 4, Site 2475-002(WRI) with pinflagged locations of artifacts in the vicinity of Datum 2



PhotoWRI-041-01:06

View to SW of Site 2475-001(WRI)

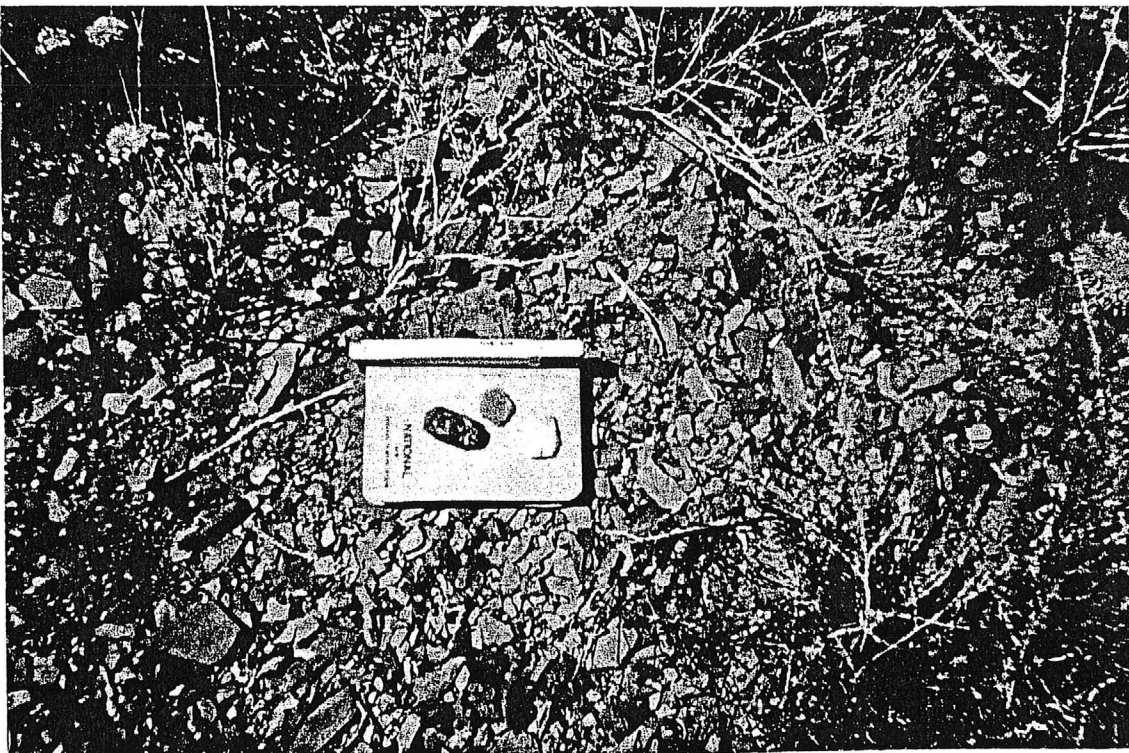


Photo WRI-041-01:07

View to W of typical artifacts from site 2475-001(WRI)

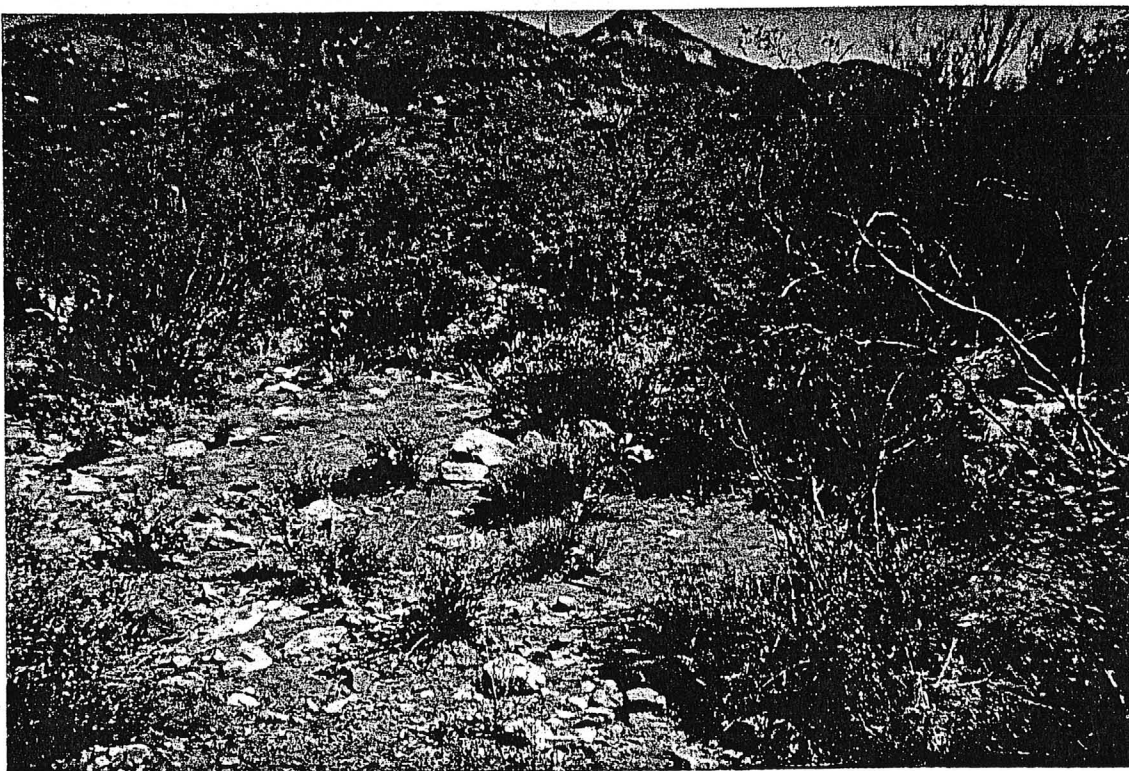


Photo WRI-041-01:09

View to N of rock alignments associated with site 2475-003(WRI)



Photo WRI-041-01:10
View to N of typical artifacts from site 2475-003(WRI)

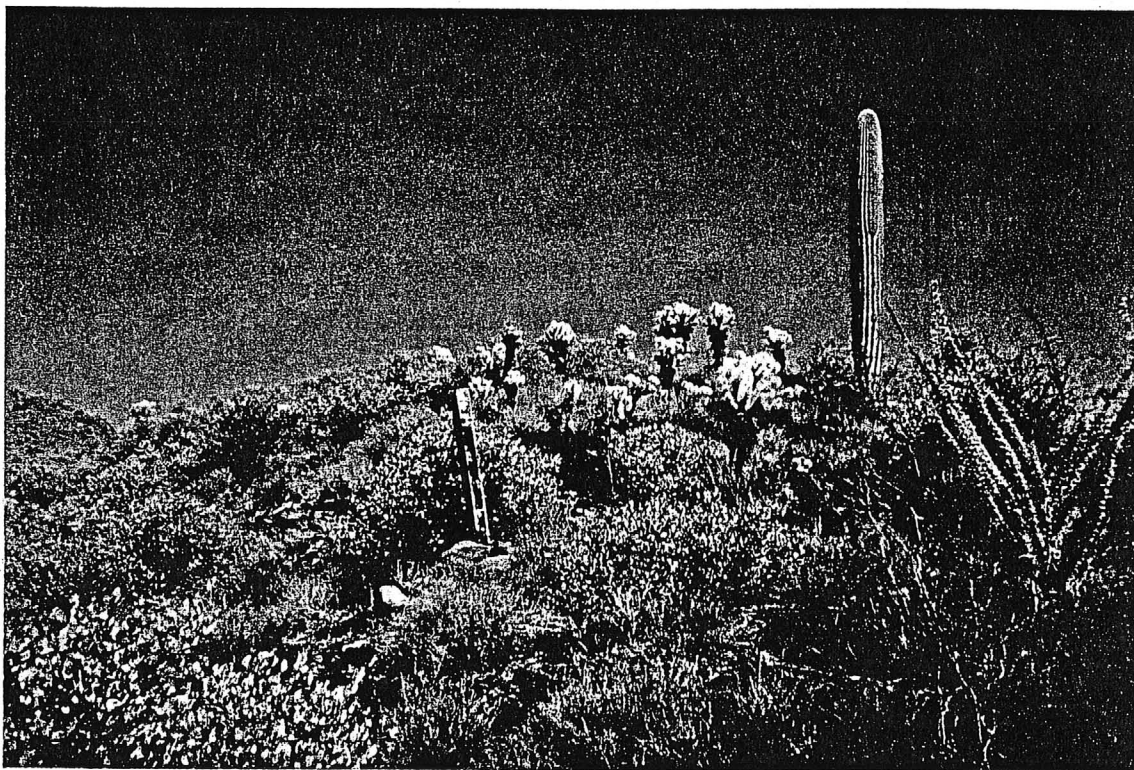


Photo WRI-041-01:11
View to NE of BPC claim post

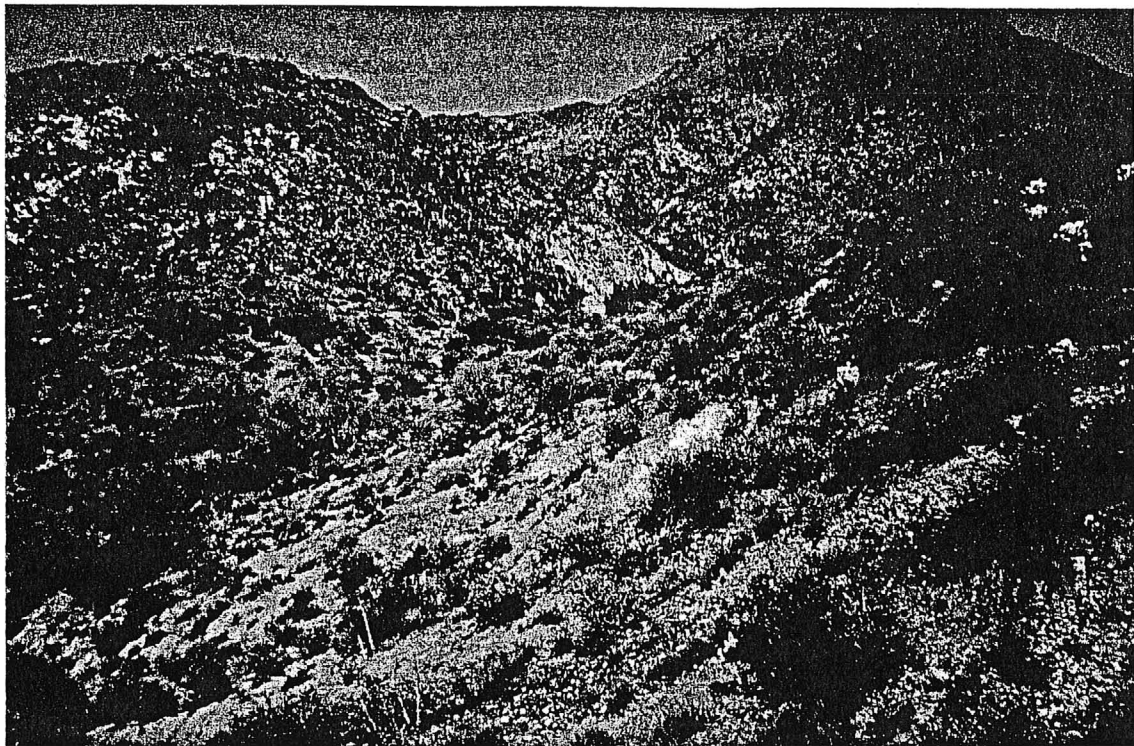


Photo WRI-041-01:12
View to N of "Disturbed Area" near BPC claim post



Photo WRI-041-01:13
View to S of typical red chert material found along trails in Study Area

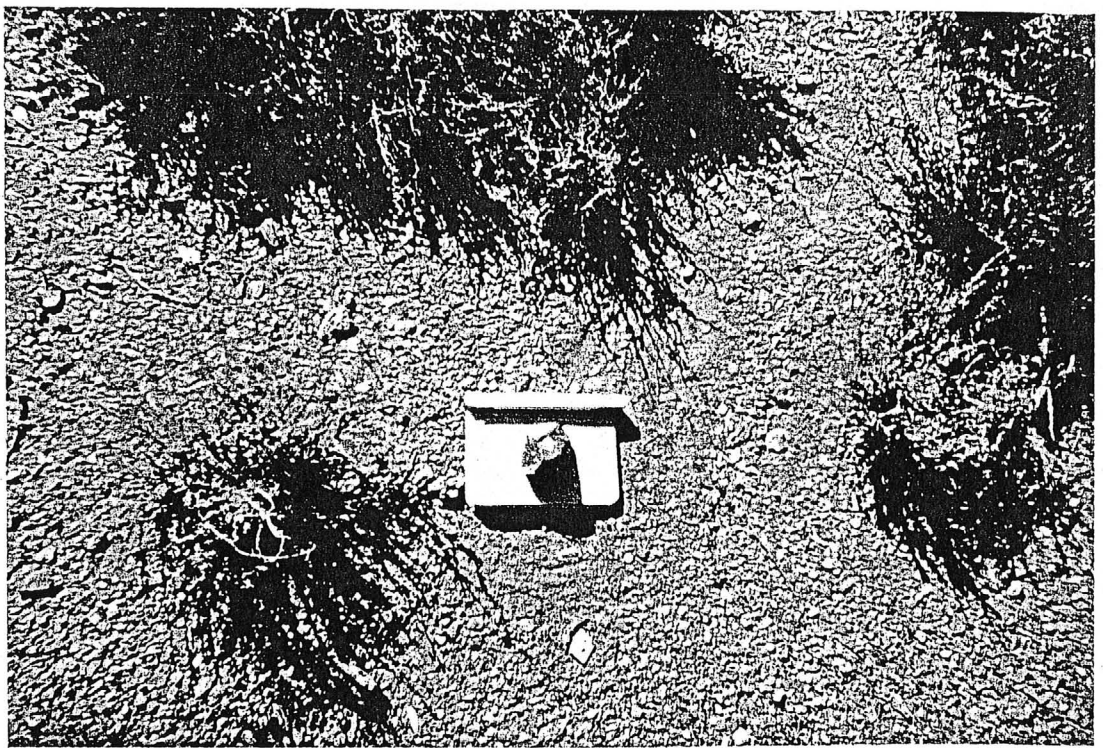


Photo WRI-041-01:14

View to NW of a typical dacite/basalt porphyry core found in Study Area

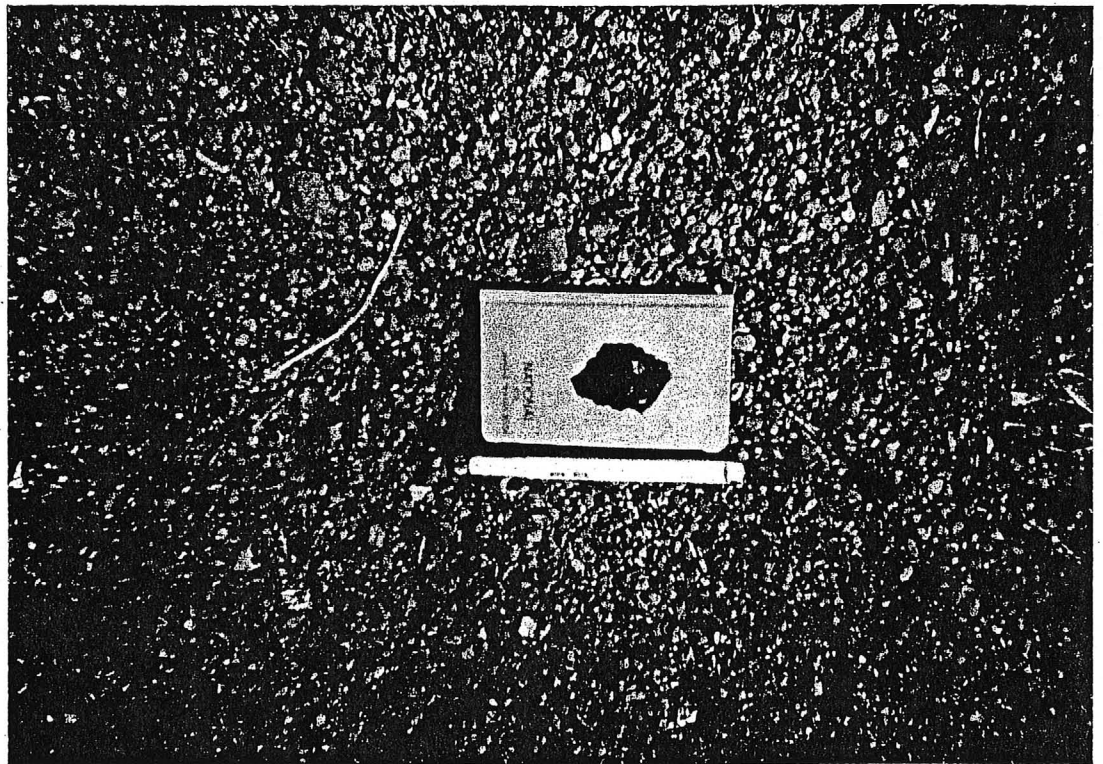


Photo WRI-041-01:15

View to W of typical dacite/basalt porphyry retouched flake found in Study Area



Photo WRI-041-01:16
View to N of typical rock cluster found in Study Area

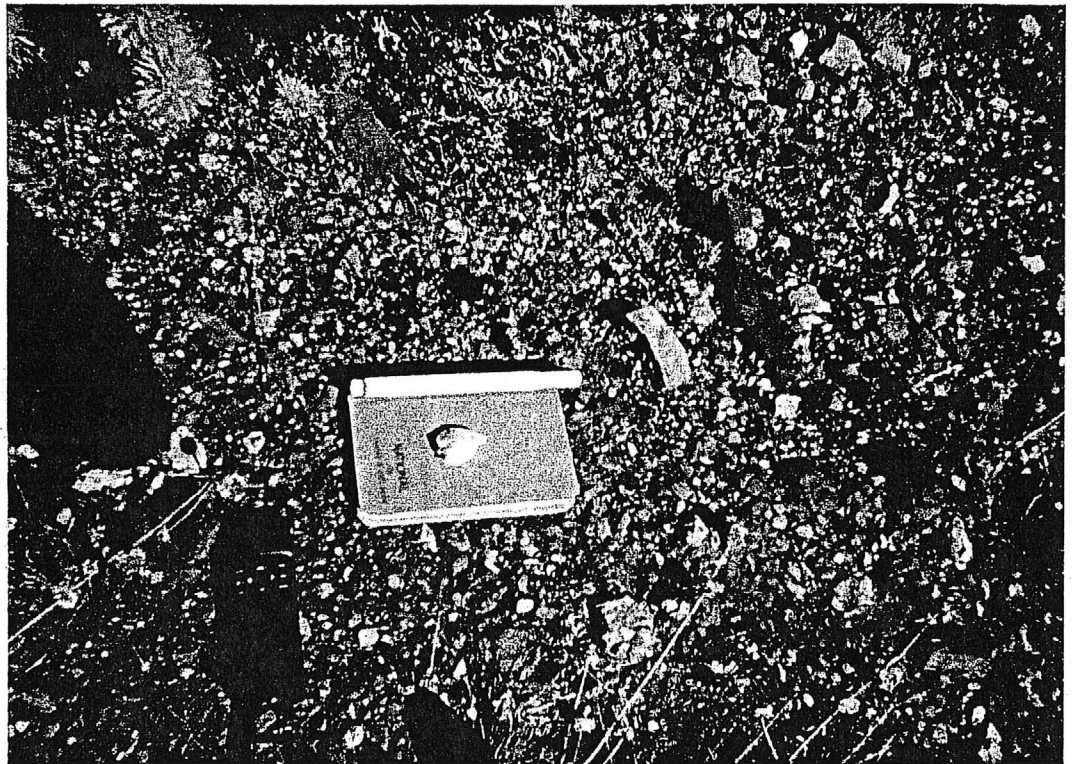


Photo WRI-041-01:03
View to N. of typical white chalcedony flake found in Study Area

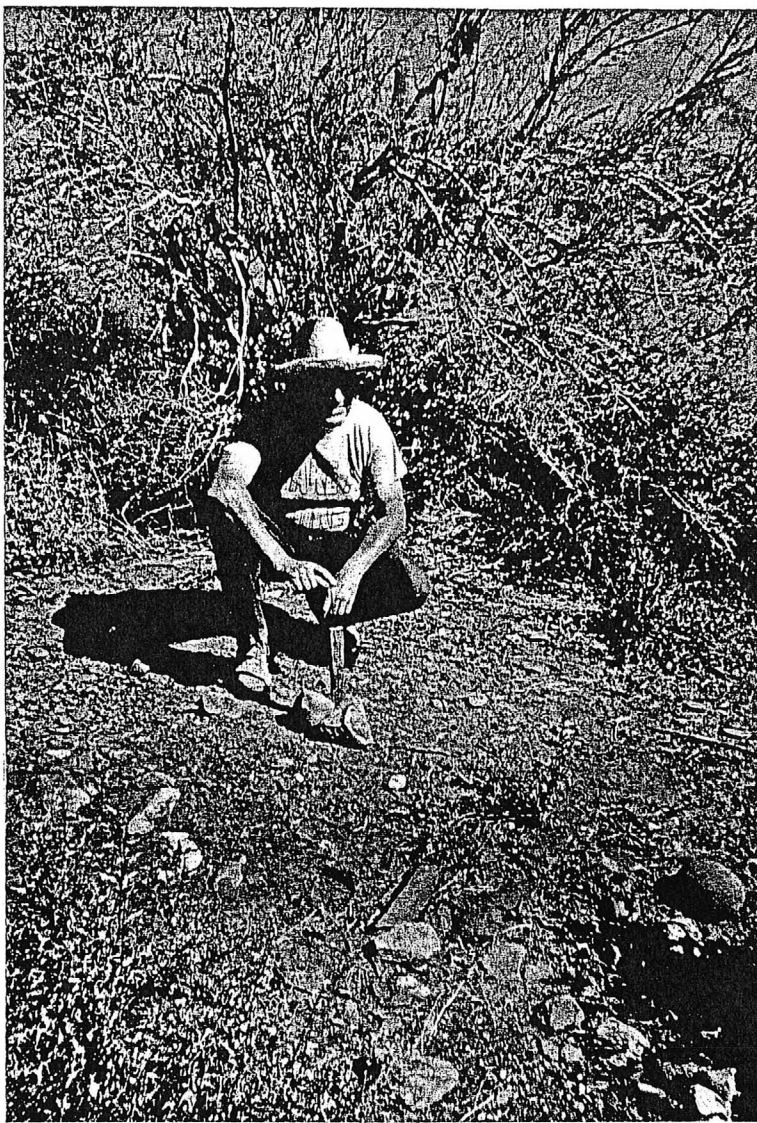


Photo WRI-041-01:23

View to E of wooden stake (ADOT? Use of the Study Area) and G. Clyde

APPENDIX B
SHPO Site File Records

SITE DESIGNATION(S): T: 4: 39 STEW SN06 103
A1203-12-01-445

LOCATION: T 7 N S, R 3 E W, S614NW14NW1/4 Section 4

STATUS: Ownership, USFS , BLM , BR , Military , Wildlife , IR ,
State , County , Municipal , Private , Other

Land Use, Ag , Comm/Indus , Rec , Govt , Residential , IR ,
Vacant , Other

Condition, Undisturbed , Modified , Destroyed , Tested ,
Excavated , Unknown

Significance, NR , NR Eligible , State Register , Undetermined

DESCRIPTION: Site Type

(Prehistoric) int
rooms - Stone, lime
terrace

(Historic) _____

Cultural Affiliation

Salado Mexican Maricopa
Hohokam Spanish Apache
Sinagua Pima/Papago Yavapai
Anglo Yuman Other

Date(s), AD 1000

Size, 60 m² g

DATA SOURCE: Site File/Institution, STW 1973 / USFS T0010

Reference, _____

EVALUATION: Endangerment Status, _____

Endangerment Source, _____

Site Significance, _____

COMMENTS/RECOMMENDATIONS: _____

MARICOPA COUNTY ARCHAEOLOGICAL SITE INVENTORY
Archaeological Research Services, Inc.

2

SITE DESIGNATION(S): T: 4132 ST u SARG 96
AR-03-17-d-4:7

LOCATION: T 7 N 3 E W, SE 1/4 NW 1/4 SE 1/4 of Section 4

STATUS: Ownership, USFS , BLM , BR , Military , Wildlife , IR ,
State , County , Municipal , Private , Other
Land Use, Ag , Comm/Indus , Rec , Govt , Residential , IR ,
Vacant , Other
Condition, Undisturbed , Modified , Destroyed , Tested ,
Excavated , Unknown
Significance, NR , NR Eligible , State Register , Undetermined

DESCRIPTION: Site Type
(Prehistoric) Wakpa - Navajo Indian
Petro
(Historic) _____

Cultural Affiliation

Salado Mexican Maricopa
Hohokam Spanish Apache
Sinagua Pima/Papago Yavapai
Anglo Yuman Other

Date(s), AD 1000
Size, 750m

DATA SOURCE: Site File/Institution, SDU 1973 / USES TONIV
Reference, _____

EVALUATION: Endangerment Status, _____
Endangerment Source, _____
Site Significance, _____

COMMENTS/RECOMMENDATIONS: _____

MARICOPA COUNTY ARCHAEOLOGICAL SITE INVENTORY
Archaeological Research Services, Inc.

SITE DESIGNATION(S): T:4:31 SIU SAP # 95
AI-03-12-01-438

LOCATION: T 7 N S, R 3 E W, SW 1/4 SE 1/4 NW 1/4 of Section 4

STATUS: Ownership, USFS , BLM , BR , Military , Wildlife , IR ,
State , County , Municipal , Private , Other

Land Use, Ag , Comm/Indus , Rec , Govt , Residential , IR ,
Vacant , Other

Condition, Undisturbed , Modified , Destroyed , Tested ,
Excavated , Unknown

Significance, NR , NR Eligible , State Register , Undetermined

DESCRIPTION: Site Type

(Prehistoric) Shed + Lithic Scatter

(Historic) _____

Cultural Affiliation

Salado <input type="checkbox"/>	Mexican <input type="checkbox"/>	Maricopa <input type="checkbox"/>
Hohokam <input checked="" type="checkbox"/>	Spanish <input type="checkbox"/>	Apache <input type="checkbox"/>
Sinagua <input type="checkbox"/>	Pima/Papago <input type="checkbox"/>	Yavapai <input type="checkbox"/>
Anglo <input type="checkbox"/>	Yuman <input type="checkbox"/>	Other <input type="checkbox"/>

Date(s), AD 1000

Size, 20,020'

DATA SOURCE: Site File/Institution, SIU 1973 / USFS TON 10

Reference, _____

EVALUATION: Endangerment Status, _____

Endangerment Source, _____

Site Significance, _____

COMMENTS/RECOMMENDATIONS: _____

SITE DESIGNATION(S): T: 4: 46 ST u SARG 110
AR03-12-01-469

LOCATION: T 7 N, R 3 E, _____ of Section 5

STATUS: Ownership, USFS , BLM _____, BR _____, Military _____, Wildlife _____, IR _____,
State _____, County _____, Municipal _____, Private _____, Other _____.

Land Use, Ag _____, Comm/Indus _____, Rec _____, Govt _____, Residential _____, IR _____,
Vacant _____, Other _____.

Condition, Undisturbed _____, Modified _____, Destroyed _____, Tested _____,
Excavated _____, Unknown .

Significance, NR _____, NR Eligible _____, State Register _____, Undetermined

DESCRIPTION: Site Type
(Prehistoric) Academy room

(Historic) _____

Cultural Affiliation

Salado _____ Mexican _____ Maricopa _____
Hohokam _____ Spanish _____ Apache _____ NA
Sinagua _____ Pima/Papago _____ Yavapai _____
Anglo _____ Yuman _____ Other _____

Date(s), _____ NA

Size, 10m x 10m

DATA SOURCE: Site File/Institution, SEU 1973 / USFS T(ant)

Reference, _____

EVALUATION: Endangerment Status, _____

Endangerment Source, _____

Site Significance, _____

COMMENTS/RECOMMENDATIONS: _____

MARICOPA COUNTY ARCHAEOLOGICAL SITE INVENTORY
Archaeological Research Services, Inc.

SITE DESIGNATION(S): T:4:47 SEU SAR 6-111
AR 03-12-01-450

LOCATION: T 7 N 3 E W of Section 8

STATUS: Ownership, USFS , BLM , BR , Military , Wildlife , IR ,
State , County , Municipal , Private , Other

Land Use, Ag , Comm/Indus , Rec , Govt , Residential , IR ,
Vacant , Other

Condition, Undisturbed , Modified , Destroyed , Tested ,
Excavated , Unknown

Significance, NR , NR Eligible , State Register , Undetermined

DESCRIPTION: Site Type

(Prehistoric) Habitat Masonry

(Historic) _____

Cultural Affiliation

Salado <input type="checkbox"/>	Mexican <input type="checkbox"/>	Maricopa <input type="checkbox"/>
Hohokam <input type="checkbox"/>	Spanish <input type="checkbox"/>	Apache <input type="checkbox"/>
Sinagua <input type="checkbox"/>	Pima/Papago <input type="checkbox"/>	Yavapai <input type="checkbox"/>
Anglo <input type="checkbox"/>	Yuman <input type="checkbox"/>	Other <input type="checkbox"/>

N6

Date(s), N6

Size, 845m

DATA SOURCE: Site File/Institution, SEU 1973/USFS Tonto

Reference, _____

EVALUATION: Endangerment Status, _____

Endangerment Source, _____

Site Significance, _____

COMMENTS/RECOMMENDATIONS: _____

SITE DESIGNATION(S): T: 4051W S: A26 10L1
AR03-12-01-446

LOCATION: T 7 N S, R 7 E W, _____ of Section 8

STATUS: Ownership, USES 1, BLM _____, BR _____, Military _____, Wildlife _____, IR _____,
State _____, County _____, Municipal _____, Private _____, Other _____.
Land Use, Ag _____, Comm/Indus _____, Rec _____, Govt _____, Residential _____, IR _____,
Vacant _____, Other _____.
Condition, Undisturbed _____, Modified _____, Destroyed _____, Tested _____,
Excavated _____, Unknown _____.
Significance, NR _____, NR Eligible _____, State Register _____, Undetermined _____.

DESCRIPTION: Site Type
(Prehistoric) Two Mason Ro 12
SI 100-1124103
(Historic) _____

Cultural Affiliation

Salado _____ Mexican _____ Maricopa _____
Hohokam _____ Spanish _____ Apache _____
Sinagua _____ Pima/Papago _____ Yavapai _____ NG
Anglo _____ Yuman _____ Other _____

Date(s), _____
Size, 100m x 125 to 150 m

DATA SOURCE: Site File/Institution, STU 1973 / USES TA 12
Reference, _____

EVALUATION: Endangerment Status, _____
Endangerment Source, _____
Site Significance, _____

COMMENTS/RECOMMENDATIONS: _____

✓
MARICOPA COUNTY ARCHAEOLOGICAL SITE INVENTORY
Archaeological Research Services, Inc.

SITE DESIGNATION(S): T: 4.42 STEU 3A26-106
AR03-12-01-448

LOCATION: T 7N6, R 3E4, _____ of Section 8

STATUS: Ownership, USFS , BLM _____, BR _____, Military _____, Wildlife _____, IR _____,
State _____, County _____, Municipal _____, Private _____, Other _____

Land Use, Ag _____, Comm/Indus _____, Rec _____, Govt _____, Residential _____, IR
Vacant _____, Other _____.

Condition, Undisturbed _____, Modified _____, Destroyed _____, Tested _____,
Excavated _____, Unknown

Significance, NR _____, NR Eligible _____, State Register _____, Undetermined _____

DESCRIPTION: Site Type

(Prehistoric) Madamey Combs

(Historic) _____

Cultural Affiliation

Salado _____	Mexican _____	Maricopa _____
Hohokam _____	Spanish _____	Apache _____
Sinagua _____	Pima/Papago _____	Yavapai _____
Anglo _____	Yuman _____	Other _____

AL

Date(s), NG

Size, 60x200m.

DATA SOURCE: Site File/Institution, STU 1973/USFS

Reference, _____

EVALUATION: Endangerment Status, _____

Endangerment Source, _____

Site Significance, _____

COMMENTS/RECOMMENDATIONS: _____

APPENDIX C
“Biological Community”
G. Clyde, 1998

BIOLOGICAL COMMUNITY

The project area, located on Arizona State Trust Land in the north Township 7 North, Range 3 East, Gila and Salt River Meridian, is situated in an upland area near New River in northern Maricopa County, Arizona. The elevation is in the neighborhood of 3000 feet (900 meters) and the vegetation is typical of the Desertscrub biotic community of the Lower Sonoran Life-zone (Lowe 1964:1). A small ephemeral stream that retains water following precipitation is located adjacent to the site and New River is less than 5/8 mile (one kilometer) from the site. The area is part of the paloverde-saguaro (*Cercidium-Cereus*) desert community of the lush Sonoran Life-zone. It contains an exceedingly rich and diverse collection of plants and animals and would provide a bountiful harvest for prehistoric residents.

Flora that occur on or in the immediate vicinity of the site are separated into groups: cacti, trees, shrubs, and annuals. Among the cactus family, *Cylindropuntia* (*saguaro*), *Ferocactus wislizenii* (barrel cactus), *Echinocereus engelmannii* (hedgehog), *Mammillarias* spp. (pincushion and fishhook species), *Opuntia* (*Buckhorn Cholla*), *Opuntia spinosior* (cane cholla), *Opuntia leptocaulis* (*Claytonia*), *Opuntia fulgida* (chainfruit cholla), and *Opuntia* spp. (prickly pear species) were seen on or near the site. Desert trees occur on the site, in the nearby drainage, and on surrounding hillslopes (Dodge 1985; Bowers 1989). *Prosopis velutina* (*Honey Mesquite*), *Cercidium microphyllum* (foothills or yellow palo verde), *Cercidium floridum* (*Ironwood*), and *Acacia constricta* (white thorn acacia) were noted. These could have supplied wood and beanpods, heating and cooking fuel, tools, and building materials to prehistoric residents. Among the shrubs observed were *Celtis pallida* (desert hackberry), *Amaranthus* (*bursage*), *Simmondsia chinensis* (*jojoba*), *Larrea tridentata* (*creosotebush*), *Artemisia* (*brittlebush*), *Hymenoclea salsola* (*burrobrush*), *Calliandra eriophylla* (*cholla*), *Phoradendron californicum* (desert mistletoe), *Acacia greggii* (*cat's claw*), *Eriogonum fasciculatum* (*Mormon-tea*), *Eriogonum fasciculatum* (flat-top buckwheat), *Krameria polytricha* (*ratany*), *Fouquieria splendens* (*ocotillo*), *Yucca arizonica* (*broad-leaf yucca*), and *Agave* (*agave species*). Many of these could have been used for food or drink (e.g., *Mormon-tea*, *agave*), fuel wood, medicines (*creosotebush*, *Mormon-tea*), and fiber (e.g., *sandals* (*Yucca* and *agave*)). A number of annuals were evident at the time of the survey compiled (mid-April) including *Oenothera primivivris* (spring evening primrose), *Oenothera intermedia* (*fiddleneck*), *Sphaeralcea ambigua* (*globe mallow*), *Machaeranthera* (*desert aster*), *Cirsium neomexicanum* (*New Mexico thistle*), *Baileya multiceps* (*marigold*), *Senecio douglasii* (*desert groundsel*), *Castilleja* spp. (*Indian paintbrush*), *Senecio neomexicana* (*Desert-Chicory*), and *Dichelostemma pulchellum* (*desert-hyacinth*). These could have been used for food (*desert-hyacinth*), medicines, and dyes for fabrics.

A number of mammals (*desert cottontail*, *rock squirrel*, and *Harris' Antelope*), reptiles (members of the family *Iguanidae*), and birds (*Harris hawk*, *turkey vulture*, *quail*, *mourning dove*, *greater roadrunner*, *common raven*, *cactus wren*, *curve-billed thrasher*, and *phainopepla*) were observed during compilation of this site inventory. A number of other species were noted through observation of calls (*canyon wren*, *peccary*, *desert mule deer*), skeletal remains (*desert mule deer*), and burrows (*white-throated woodrat*, *kangaroo rat*, *pocket mouse*). Mammals therefore known to pass through the near-site environs include *Odocoileus hemionus* (*desert mule deer*).

audubonii (desert cottontail), *Taxidea taxus* (badger), *Neotoma albigula* (white-throated woodrat or pack rat), *Spermophilus variegatus* (rock squirrel), *Ammospermophilus harrisi* (Harris' Antelope squirrel), *Dicotyles tajacu* (javelina or collard peccary), *Dipodomys spectabilis* (kangaroo rat), *Perognathus* spp. (pocket mouse), (Burt 1976; Olin 1982).

In addition to those noted above, several other mammals could be expected to live in or near the site area or use the site area during hunting or foraging activities. Many of these are nocturnal and would not have been observed during daylight reconnaissance. These could include large predators such as *Felis concolor* (mountain lion), *Felis rufus* (bobcat), *Canis latrans* (coyote), *Urocyon cinereoargenteus* (gray fox), and *Vulpes macrotis* (kit fox); small predators such as *Mephitis macroura* (hooded skunk), *Mephitis mephitis* (striped skunk), *Conepatus mesoleucus* (hognose skunk), *Spilogale gracilis* (spotted skunk), *Procyon lotor* (raccoon), and *Bassariscus astutus* (ringtail); and their prey including *Spermophilus tereticaudus* (roundtail ground squirrel) and *Peromyscus* spp. (cactus mouse). Many if not all of these mammals were likely hunted during prehistoric time. Although presently extinct in the near-site area the *Ovis canadensis mexicana* (desert bighorn sheep) was endemic to mountains in the desert area and probably was found near enough to be occasionally hunted. *Canis lupus* (gray wolf) would also have been a prehistoric resident of the site area. *Antilocapra americana* (pronghorn) currently live on Perry Mesa less than 15 miles (24 kilometers) to the north and would have been accessible to hunting parties. Though not considered a desert mammal, an *Ursus americanus* (black bear) was struck and killed by a vehicle a few years ago on Pima Road in north Scottsdale so its prehistoric presence on the fringes of the desert cannot be totally discounted. All of the above mammal species would have been present during the Hohokam period save the collard peccary for which no evidence exists in the prehistoric record (Day 1985:1-2).

No reptiles or amphibians (save for a couple of unidentified members of the iguanid family) were seen during site reconnaissance. However, the site lies within the range of a large number of amphibian, lizard, and reptile species (Stebbins 1985) and any of these could be residents of the area. Included among amphibians are *Bufo alvarius* (Colorado River toad), *Bufo cognatus* (Great Plains toad), *Bufo microscaphus microscaphus* (Arizona toad), *Bufo woodhousei woodhousei* (Western Woodhouse toad), *Bufo woodhousei australis* (Southwestern Woodhouse toad), *Rana catesbeiana* (bullfrog - an introduced species not present prehistorically), *Rana yavapaiensis* (lowland leopard frog), *Hyla arenicolor* (canyon treefrog), *Pseudacris triseriata triseriata* (Midland chorus frog), *Scaphiopus hammondi* (western spadefoot), and *Scaphiopus couchii* (couch spadefoot).

Reptiles include turtles, lizards, and snakes. The only turtle possibly indigenous to the site area is *Gopherus agassizii* (the desert tortoise). Lizards include *Sauromalus obesus tumidus* (Arizona chuckwalla), *Heloderma suspectum* (Gila Monster), *Phrynosoma platyrhinos calidiarum* (southern desert horned lizard), *Phrynosoma douglassii* (short-horned lizard), *Phrynosoma solare* (regal horned lizard), *Holbrookia maculata* (lesser earless lizard), *Cophosaurus texanus* (greater earless lizard), *Callisaurus draconoides* (zebra-tailed lizard), *Gambelia wislizenii wislizenii* (large-spotted leopard lizard), *Crotaphytus collaris baileyi* (western collard lizard), *Dipsosaurus dorsalis* (desert iguana), *Uta stansburiana* (side-blotched lizard), *Urosaurus ornatus* (tree lizard), *Urosaurus graciosus shannoni* (Arizona brush lizard), *Sceloporus magister magister* (Sonoran spiny lizard), *Sceloporus clarkii* (Clark spiny lizard), *Eumeces obsoletus* (Great Plains skink), *Eumeces gilberti arizonensis* (Arizona skink), *Eumeces multivirgatus gaigeae* (variable skink), *Gerrhonotus multicarinatus kingii* (madrean alligator

lizard), *Xantusia vigilis arizonae* (Arizona night lizard), *Cnemidophorus tigris gracilus* (Arizona desert whiptail lizard), *Cnemidophorus uniparens* (desert grassland whiptail lizard), *Cnemidophorus inornatus* (little striped whiptail lizard), *Cnemidophorus sonora* (Sonoran spotted whiptail lizard), and *Coleonyx variegatus* (western banded gecko). Among snakes are found *Leptotyphlops humilis* (western blind snake), *Masticophis bilineatus* (Sonoran whipsnake), *Masticophis flagellum* (coachwhip), *Micruroides euryxanthus* (western coral snake), *Rhinocheilus lecontei* (long-nosed snake), *Lampropeltis getulus* (common kingsnake), *Tantilla hobartsmithi* (southwestern black-headed snake), *Diadophis punctatus regalis* (regal ringneck snake), *Sonora semiannulata* (ground snake), *Chilomeniscus cinctus* (banded ground snake), *Chionactis occipitalis annulata* (Colorado desert shovel-nosed snake), *Chionactis occipitalis klauberi* (Tucson shovel-nosed snake), *Pituophis melanoleucus affinis* (Sonoran gopher snake), *Arizona elegans noctivaga* (Arizona glossy snake), *Trimorphodon biscutatus lambda* (Sonoran lyre snake), *Hypsiglena torquata* (night snake), *Phyllorhynchus decurtatus nubilis* (clouded leaf-nosed snake), *Phyllorhynchus decurtatus perkinsi* (western leaf-nosed snake), *Phyllorhynchus browni lucidus* (Maricopa leaf-nosed snake), *Salvadora hexalepis hexalepis* (desert patch-nose snake), *Tantilla hobartsmithi* (southwestern black-headed snake), *Thamnophis cyrtopsis* (black-necked garter snake), *Thamnophis marcianus* (checkered garter snake), *Crotalus scutulatus* (Mojave rattlesnake), *Crotalus atrox* (western diamondback rattlesnake), *Crotalus mitchelli pyrrhus* (southwestern speckled rattlesnake), *Crotalus tigris* (tiger rattlesnake), *Crotalus molossus* (black-tailed rattlesnake), (Stebbins 1985).

Birds known to be present in the site area based on observation include the *Parabuteo unicinctus* (Harris hawk), *Cathartes aura* (turkey vulture), *Corvus corax* (common raven), *Geococcyx californianus* (greater roadrunner), *Callipepla gambelli* (Gambel's quail), *Zenaida macroura* (mourning dove), *Campylorhynchus brunneicapillus* (cactus wren), *Toxostoma curvirostre* (curve-billed thrasher), *Catherpes mexicanus* (canyon wren), *Phainopepla nitens* (phainopepla), and *Calypte costae* (Costa's hummingbird). Other birds that would be likely visitors in the site area include *Buteo jamaicensis* (red-tailed hawk), *Falco sparverius* (American kestrel), *Bubo virginianus* (great horned owl), *Melanerpes uropygialis* (Gila woodpecker), *Colaptes auratus* (northern flicker), *Zenaida asiatica* (white-winged dove), *Tyrannus verticalis* (western kingbird), *Sialia mexicana* (western bluebird), *Cardinalis cardinalis* (northern cardinal), *Pipilo fuscus* (canyon towhee), *Euphagus cyanocephalus* (Brewer's blackbird), *Quiscalus mexicanus* (great-tailed grackle), *Icterus galbula* (northern oriole), and *Calypte anna* (Anna's hummingbird) (Cunningham 1990; Peterson 1990). This is a small sampling of birds that may be found in the site area and numbers would likely grow during times of ample water in nearby New River.

The large number of flora and fauna would have made this area an excellent place to live in prehistoric times. Large mammals lived in the near-site area and others would have been accessible to hunting parties within a day or two. Small mammals, birds, and reptiles inhabited the area and were available for harvest. Many trees, shrubs, and plants that furnished food, fuel, and other resources are found in the immediate site area. Additionally, large, relatively flat areas along New River to the north of the site could have been used for agriculture. This area could have provided a comfortable home to a frontier Hohokam population.

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APPENDIX B

Biological Survey for T & E Species
New River Project Site
W 1318

For

Wondjina Research Institute

October 1998

by

BIOZONE, INC.

1490 W. Gurley St. - Suite C,
PRESCOTT, AZ. 86305

Biological Survey for T & E Species

Biological survey of the project area was conducted to check for threatened and endangered species. The project area is located at an elevation of ca. 2550 feet in northern Maricopa county (Township 7 north, Range 3 East and at the corners of sections 5, 6, 7, and 8).

This area is typical Sonoran Desert Scrub, Arizona Upland Subdivision. Typical species include; saguaro, jojoba, buckwheat, brittle bush, octillo, mesquite and foothills palo verde. (Table 1)

Table 1. Biotic Communities

- 1,100 Nearctic UPLAND Vegetation
- 150 DESERTLAND FORMATION
- 154 Tropical-Subtropical Desertlands
- 154.1 Sonoran Desertscrub
- 154.12 Paloverde-Mixed Cacti Series
- 154.123 *Simmondsia chinensis*-mixed scrub Association
- 154.122 *Carnegiea gigantea* mixed scrub Association

*Classifications are based on: Brown, D.E. (ed.) 1982. Biotic Communities of the American Southwest-United States and Mexico. Desert Plants. Vol 4. No1-4. Boyce Thompson Southwestern Arboretum, Superior AZ.

Woody species composition on the slopes of the survey area varies only slightly. The south facing slopes have more saguaros, but most of the slopes are predominately jojoba and buckwheat. The drainages contain mesquite and desert hackberry. The south slope where the expansion is to occur has approximately 60 saguaros. (see plant species list)

The area contains typical Sonoran fauna component (see species list).

No Endangered or Threatened species or critical habitats were found within the project boundaries.

Disclaimer

This document provides data regarding natural conditions and biotic organisms existing in October 1998. Descriptions and data concerning the natural resources associated with the designated survey area does not reflect changes that have occurred since the termination of the study or future changes that occur as a result of flooding, natural events, population changes, or human initiated activities.

PLANTS

Family	Genus Species	Common Name
Boraginaceae	<i>Amsinckia intermedia</i>	fiddlehead
	<i>Cryptantha maritima</i>	
Buxaceae	<i>Pectocarya recurvata</i>	moonseed
	<i>Simmondsia chinensis</i>	Jojoba
Cactaceae	<i>Cereus giganteus</i>	saguaro
	<i>Echinocereus fasciculatus</i>	hedgehog
	<i>Ferocactus acanthodes</i>	barrel cactus
	<i>Opuntia bigelovii</i>	Teddy Bear cholla
	<i>Opuntia leptocaulis</i>	Christmas Cholla
	<i>Opuntia phaeacantha</i>	Prickley Pear
	<i>Opuntia ramossissima</i>	pencil cholla
	<i>Opuntia versicolor</i>	staghorn cholla
Compositae	<i>Ambrosia dumosa</i>	White bursage
	<i>Baccharis sarothroides</i>	desert broom
	<i>Baileya multiradiata</i>	desert marigold
	<i>Encellia farinosa</i>	brittle bush
	<i>Gutierrezia microcephala</i>	snakeweed
Fouquieriaceae	<i>Fouquieria splendens</i>	ocotillo
Geraniaceae	<i>Erodium cicutarium</i>	filaree
Krameriaceae	<i>Krameria parviflora</i>	Ratany
Labiatae	<i>Hyptis emoryi</i>	desert-lavender
	<i>Marrubium vulgare</i>	horehound
	<i>Salvia columbariae</i>	sage
Leguminosae	<i>Acacia greggii</i>	catclaw
	<i>Calliandra eriophylla</i>	fairduster
	<i>Cercidium microphyllum</i>	foothills palo verde
	<i>Mimosa biuncifera</i>	Walt-a-minute
	<i>Prosopis glandulosa</i>	mesquite
Malvaceae	<i>Sphaeralcea ambigua</i>	globe mallow
Polygonaceae	<i>Eriogonum fasciculatum</i>	buck brush
Solanaceae	<i>Lycium pallidum</i>	Desert-thorn
Ulmaceae	<i>Celtis pallida</i>	Desert Hackberry
Zygophyllaceae	<i>Larrea tridentata</i>	Creosote

AMPHIBIANS

None

REPTILES

Zebra-Tailed Lizard	<i>Callisaurus draconoides</i>
Western Collard Lizard	<i>Crotaphytus collaris baileyi</i>
Tree Lizard	<i>Urosaurus oranatus</i>
Desert Horned Lizard	<i>Phrynosoma platyrhinos cal</i>
Western Whiptail	<i>Cnemidophorus tigris tigris</i>
Gila Monster	<i>Heloderma suspectum cinct</i>
Coachwhip	<i>Masticophis flagellum picu</i>
Striped Whipsnake	<i>Masticophis taeniatus</i>
Western Patch-Nosed Snake	<i>Salvadora hexalepis hexalep</i>
Gopher Snake	<i>Pituophis melanoleucus af</i>
Common Kingsnake	<i>Lampropeltis getulus califo</i>
Night Snake	<i>Hypsiglena torquata</i>
Western Diamondback Rattlesnake.....	<i>Crotalus atrox</i>

BIRDS

Turkey Vulture	<i>Cathartes aura</i>
Red-Tailed Hawk	<i>Buteo jamaicensis</i>
Gambel's Quail	<i>Callipepla gambelli</i>
Mourning Dove	<i>Zenaidura macroura</i>
Greater Roadrunner	<i>Geococcyx californianus</i>
Common Poorwill	<i>Phalaenoptilus nuttallii</i>
Black-Chinned Hummingbird	<i>Archilochus alexandri</i>
Gila Woodpecker	<i>Melanerpes uropygial</i>
Northern Flicker	<i>Colaptes auratus</i>
Ash-Throated Flycatcher	<i>Myiarchus cinerascens</i>
Brown-Crested Flycatcher	<i>Myiarchus tyrannulus</i>
Common Raven	<i>Corvus corax</i>
Verdin	<i>Auriparus flaviceps</i>
Cactus Wren	<i>Campylorhynchus brunne</i>
Canyon Wren	<i>Catherpes mexicanus</i>
Black-Tailed Gnatcatcher	<i>Polioptila melanura</i>
Curve-Billed Thrasher	<i>Toxostoma curvirostre</i>
Phainopela	<i>Phainopepla nitens</i>
Bell's Vireo	<i>Vireo bellii</i>
Summer Tanager	<i>Piranga rubra</i>
Northern Cardinal	<i>Cardinalis cardinalis</i>
Canyon Towhee	<i>Pipilo fuscus</i>
Chipping Sparrow	<i>Spizella passerina</i>
Hooded Oriole	<i>Icterus cucullatus</i>
Scott's Oriole	<i>Icterus parisorum</i>

MAMMALS

Desert Cottontail	<i>Sylvilagus auduboni</i>
Black-Tailed Jack Rabbit	<i>Lepus californicus</i>
Harris' Antelope Squirrel	<i>Ammospermophilus harrisi</i>
Rock Squirrel	<i>Spermophilus variegatus</i>
Rock Pocket Mouse	<i>Perognathus intermedius</i>
Desert Pocket Mouse	<i>Perognathus penicillatus</i>
Cactus Mouse	<i>Peromyscus eremicus</i>
So. Grasshopper Mouse	<i>Onychomys torridus</i>
White-Throated Wood Rat	<i>Neotoma albigula</i>
Coyote	<i>Canis latrans</i>
Gray Fox	<i>Urocyon cinereoargenteus</i>
Ringtail	<i>Bassaricus astutus</i>
Badger	<i>Taxidea taxus</i>
Striped Skunk	<i>Mephitis mephitis</i>
Mountain Lion	<i>Felis concolor</i>
Bobcat	<i>Felis rufus</i>
Horse	<i>Equus caballus</i>
Collard Pecarry	<i>Tayassu tajacu</i>
Mule Deer	<i>Odocoileus hemionus</i>
Cattle	<i>Bos taurus</i>

APPENDIX C

Site Photographs

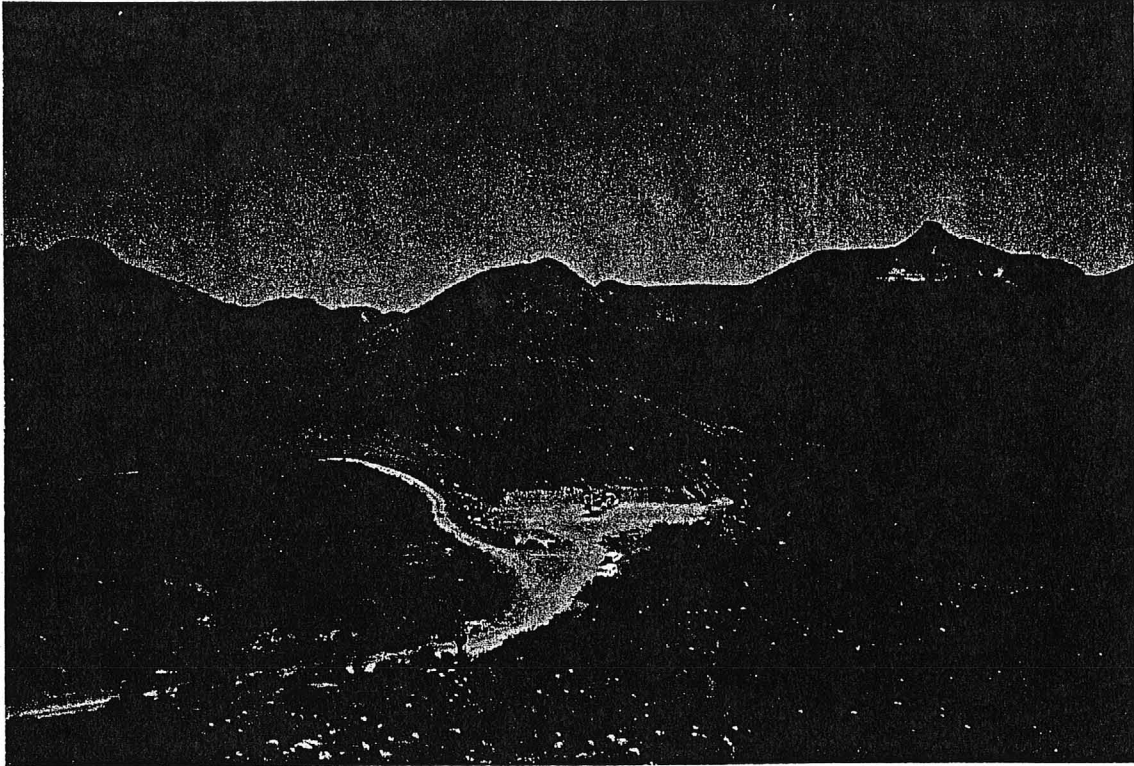


Photo W1318-001: View to E of BPC Pit Area

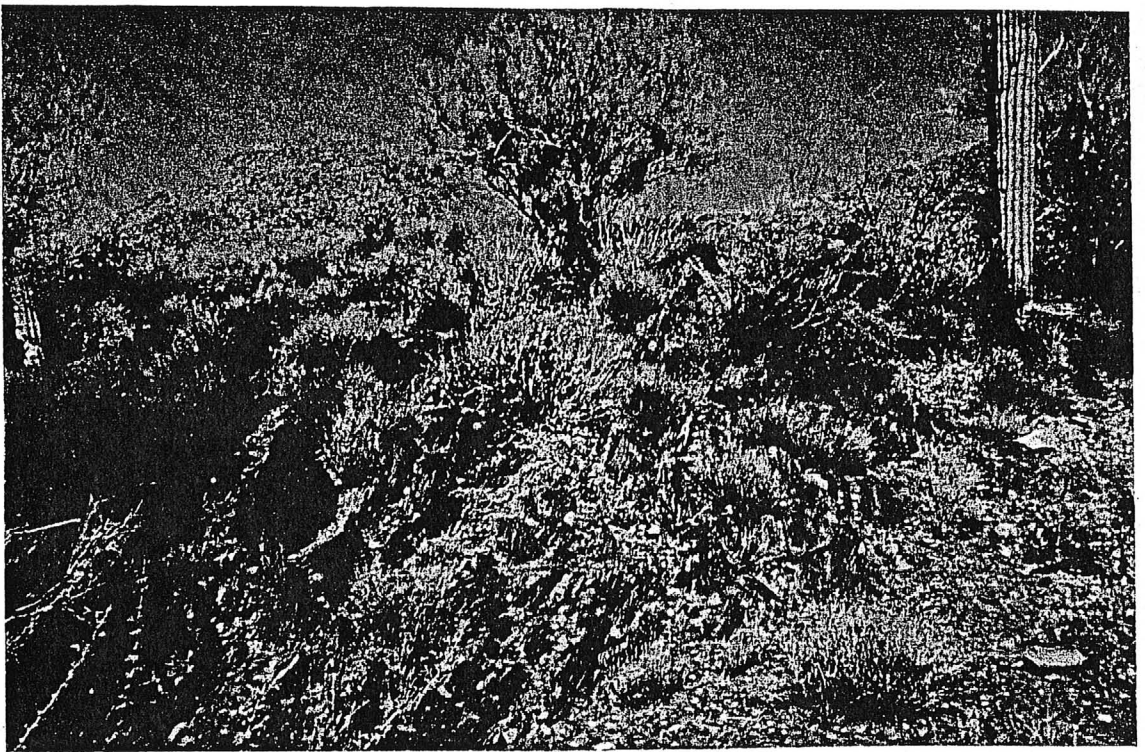
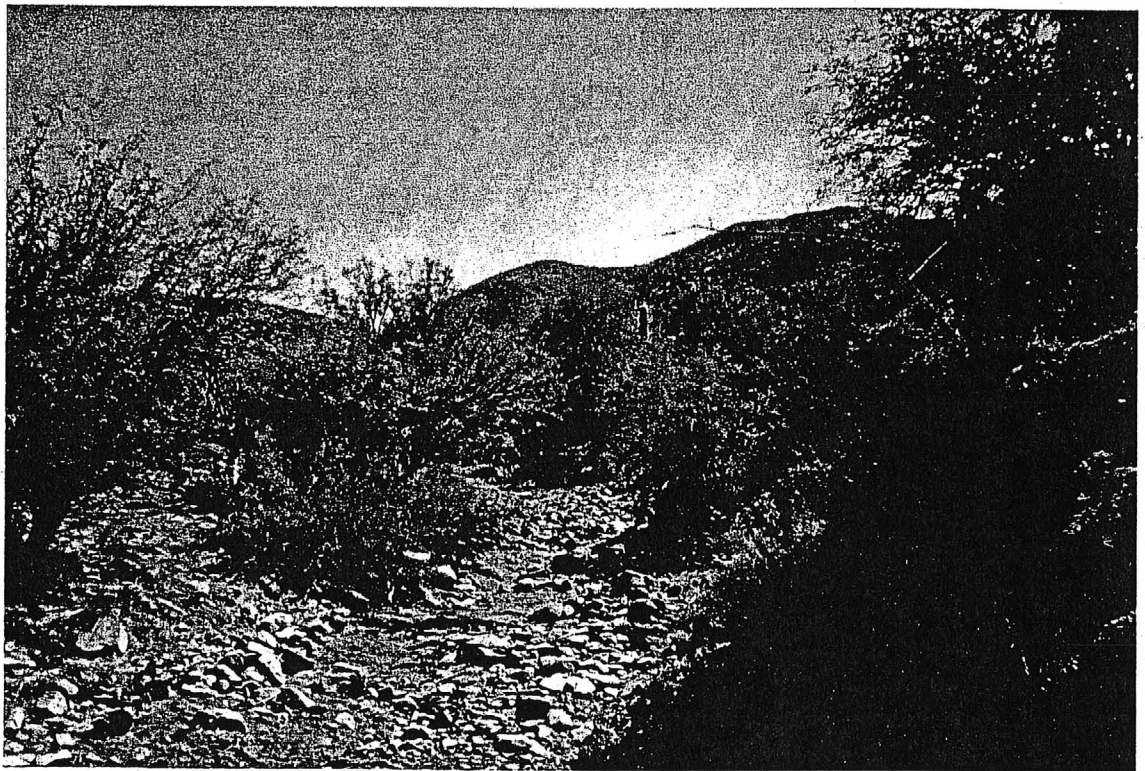


Photo W1318-002: View to NE of outcropping slate material



W1318-003: View to S of Riparian Area near existing Pit Area



Photo W1318-004: View to SW of Sonoran flora in the vicinity of Pit Area

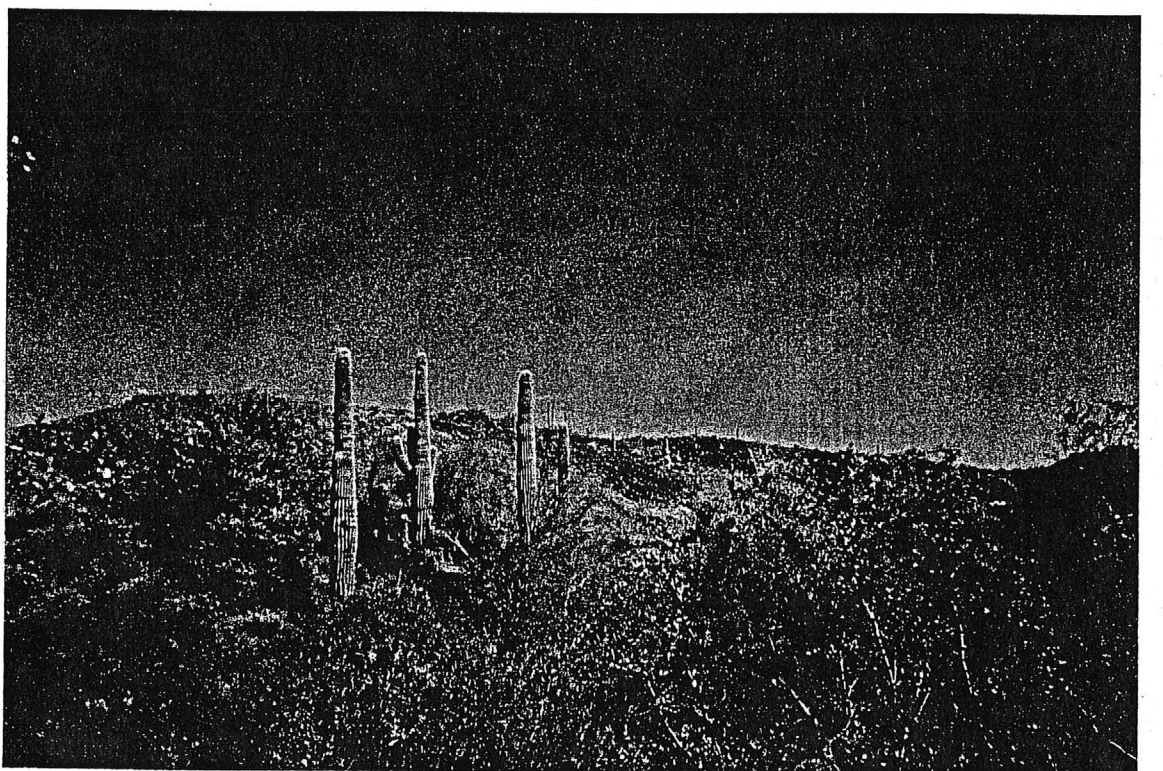


Photo W1318-005: View to SE of Sonoran Flora in the immediate vicinity of Pit Area

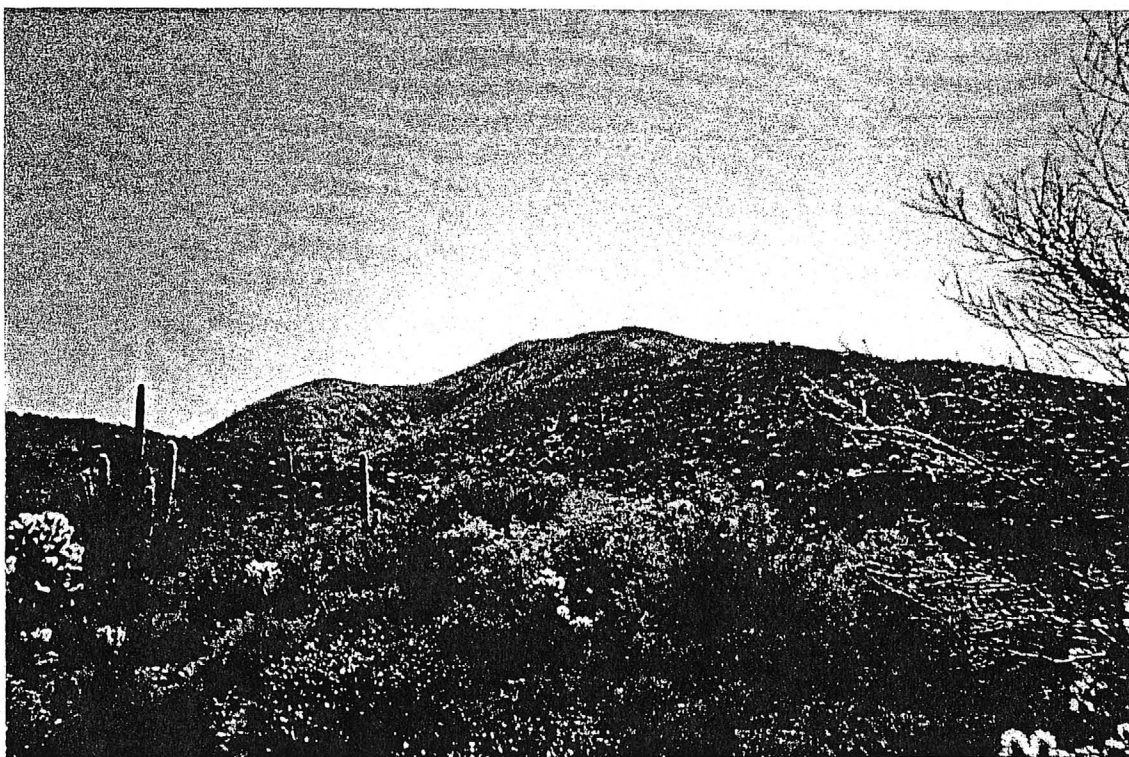


Photo W1318-006: View to SW of brush-covered ridges on the Subject Property



Photo W1318-007: View to NW of Sonoran plant community on rocky slopes