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WRA Engineering & Testing Laboratories
a division of Water Resources Associates, Inc. Phoenix, Arizona

FINAL REPORT
PRELIMINARY GEOTECHNICAL AND HYDROLOGICAL INVESTIGATION IN PORTIONS OF SECTION 28, TOWNSHIP 6N, RANGE 4W MARICOPA COUNTY, ARIZONA

Prepared for:

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Prepared by:

WATER RESOURCES ASSOCIATES, INC.
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April 15, 1992

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1.0 PURPOSE

The following report has been prepared by Water Resources Associates, Inc. for Newsboy Gold Mining Company, Morristown, Arizona. The study area is being considered as a tailings impoundment site for an open pit mining, milling, and processing operation. This report describes the preliminary geotechnical and hydrogeological findings of the study area. Subsurface information has been obtained through the drilling of an exploratory borehole. Surface and near surface conditions have been evaluated through the excavation of seven test pits. Preliminary site characteristics, based on these field examinations, give insight to both the soils/vadose zone and the zone of saturation.

2.0 SITE LOCATION

The study area consists of approximately 200 acres of land located in the north half of Section 28, Township 6N Range 4W in western Maricopa County, Arizona. Newsboy Gold Mining Company is the owner of unpatented mining claims on which these investigations were performed. The study area is encompassed by lands administered by the Bureau of Land Management, Lower Gila Resource Area.

The topographic relief in the study area is typical of dissected terrace areas along local drainages, and rarely exceeds 100 feet. Vegetation within the boundaries of the study area consists of mixed age communities of mesquite, greasewood, ironwood, various cacti species, desert grasses, and other typical plant species native to the Sonoran Desert ecosystem.

4.0 DATA COLLECTION

Field work was conducted in the study area during July 1 and 2, 1991. The field work consisted of inspecting drilling operations and performing geotechnical investigations. One exploratory borehole was drilled to a depth of 365 feet and seven test pits were excavated to varying depths. The field investigation during this period included the examination of the major drainage systems that cut through the study area for evidence of extensive fracturing or active springs.

4.1 GEOLOGY

On July 1 and 2, 1991, an air-rotary drill hole (RDH No. 28-1) was drilled to a total depth of 365 feet. This hole encountered a thin sequence of Quaternary alluvial material (0.0 to 160.0 feet) that directly overlies a relatively thick sequence of Tertiary volcanics/volcanoclastics of rhyolitic-basaltic-andesitic composition (160.0 to 365.0 feet).

Precambrian units may have been encountered at the bottom of the hole (360.0 to 365.0 feet) as there was a marked increase in chloritized and propylitically altered schists or mafic volcanic fragments. Detailed descriptions of the lithologic units that were encountered are presented in the drilling logs in Appendix A.

The volcanoclastic units encountered consist of arkosic sandstones and conglomerates. Massive rhyolitic units with extensive iron staining and silica veining were encountered at various intervals throughout the sequence.

4.2 HYDROGEOLOGY

Ground water was first encountered in Borehole RDH No. 28-1 at 360.0 feet. The ground water yield at that depth may be associated with a zone of increased permeability near the presumed Tertiary/Precambrian contact. The initial ground-water flow rate was estimated by the driller to be approximately 10 gallons per minute (gpm). No increase in ground-water volume was reported to the total depth of the boring.

Little ground-water data are available for Section 28 and the surrounding area. However, the aquifer can be characterized as a typical hard-rock aquifer in which the ground-water is contained in fractures and faults naturally-occurring in the rock units. Transmissivity of this type of aquifer is generally considered to be low, consequently well yields are correspondingly low. It is not known what the relationship is between the ground water encountered in this boring and the ground water is beneath the Hassayampa Plain to the south; however, large structural discontinuities (faults) may act as hydrologic boundaries between the site and the Hassayampa Plain. Regardless, the regional ground-water flow direction is assumed to be toward the south-southeast. The direction of flow and velocity of ground-water may be influenced by subflow or a ground-water "mound" beneath the Hassayampa River. However, it is not known at this time what the relationship is between surface water and ground water in this area.

4.3 SOILS

On July 2, 1991, seven test pits (T.P. #1 through T.P. #7) were dug to various depths throughout the study area to determine the geotechnical characteristics of the overlying Quaternary gravel material. The locations of these test pits are presented in Figure 1.

Most of the test pits encountered relatively thin sections of caliche-cemented sandy gravel material. Test Pit #6 was excavated to the maximum limit of the backhoe, and encountered a relatively thick (10.0 feet) section of loosely cemented gravelly sand. All the other test pits were dug to refusal in strongly cemented material. Photographs of the lithologies encountered are presented in Appendix B.

Samples of the excavated material collected from each test pit were tested for coarse and fine gradation characteristics. In addition, the sample taken from Test Pit #6 was tested for its sand equivalent characteristics. The laboratory results indicate that the material from most of the test pits has a high (average of 18.6% - #200 mesh screen) fines content and has a relatively low (65% - #4 mesh screen) aggregate content. The laboratory results on the material from Test Pit #6 indicated that this material was considerably finer, cleaner, and had a usable sand equivalent index of 51. This material probably could be processed as a source of washed sand. Detailed laboratory results of Test Pit #6 are presented in Appendix C.

5.0 RESULTS AND CONCLUSIONS

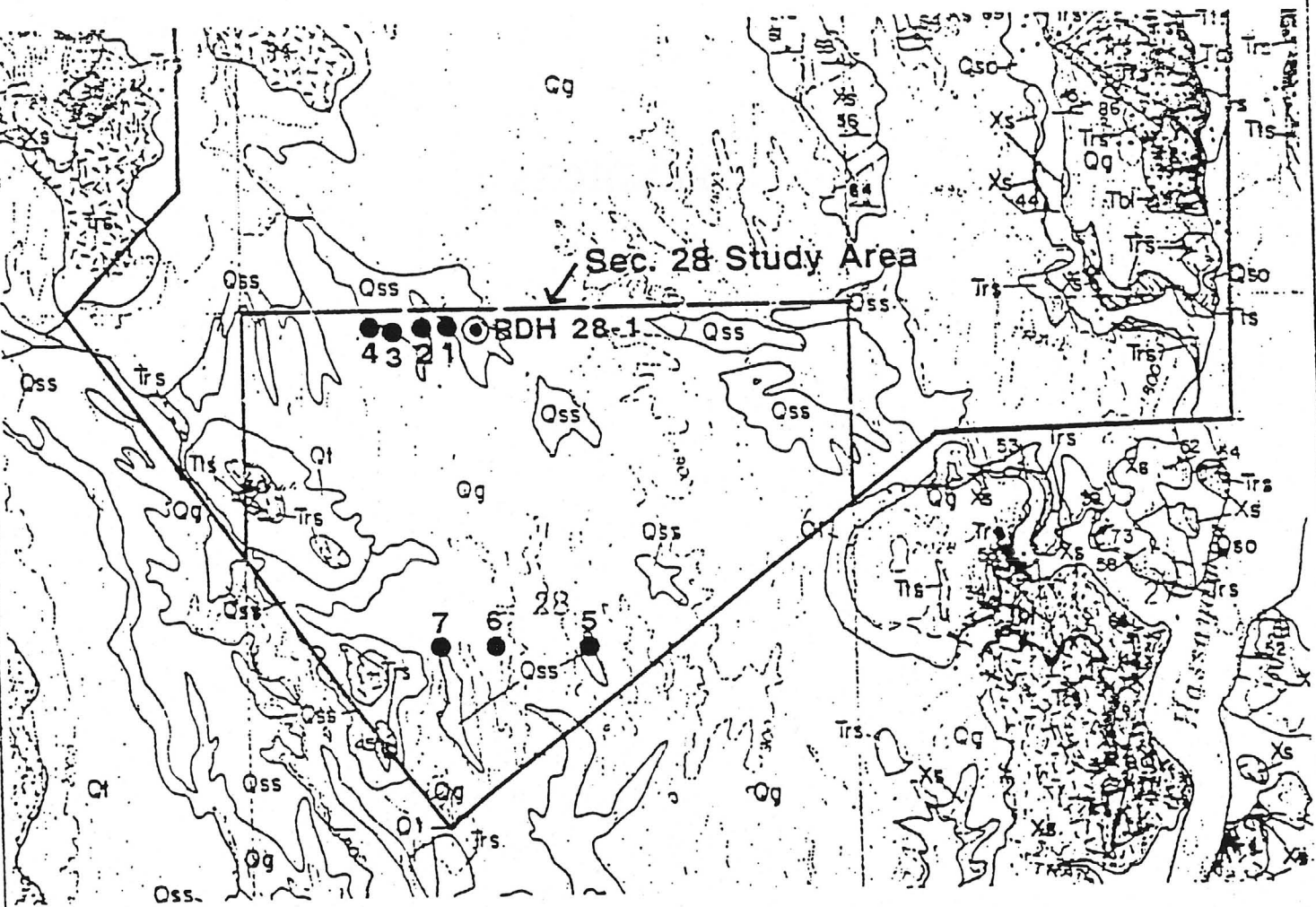
The lithologies encountered by Borehole RDH No. 28-1 are typical of the geology of the general region. The local aquifer which yields water to Borehole RDH No. 28-1 is probably associated with the fractured contact between the overlying Tertiary volcanic stratigraphy and the underlying Precambrian units. This type of fractured volcanic aquifer is not unusual to the geologic framework in the general area. Such local aquifers can occur when a fracture system invades a relatively rigid lithological unit. The aquifer may provide only a limited ground-water resource. From these data and the existing well information within the region, it would appear that minor ground water is available from small, structurally controlled bedrock sources. The depth to ground water is approximately 360 feet and ground-water flow direction is probably toward the south-southeast.

Review of the data from the test pit excavations indicates that the overlying Quaternary gravels are very well cemented in many parts of the study area. The use of most of this alluvium as bedding material for will require some modification prior to the installation of the synthetic pond liners. The material that was encountered in Test Pit #6 may, however, be acceptable for this type of application.

FIGURES

WRA Engineering & Testing Laboratories
a division of Water Resources Associates, Inc. Phoenix, Arizona
417 North Arizona Street
PRESCOTT, ARIZONA 86301
(602) 778-9001

JOB PG ECT
SHEET NO ____ OF ____
CALCULATED BY ____ DATE ____
CHECKED BY E.L DATE 2-7-91
SCALE ____



1● Test Pit.
RDH 28-1 ◉ Rotary Drill Hole

(Geology after Grubensky M.J. & Reynolds S.J. (1986))

Figure 1

APPENDICES

APPENDIX A

ABBREVIATIONS COMMONLY USED IN WRA DRILLING SAMPLING RECORDS

Color:

Tan:	Tan
Brn:	Brown
Wht:	White
Pink:	Pink
Red:	Red or Redish
Grn:	Green
Blk:	Black

General Usage:

min:	minor
Tr:	Trace (less than 1%)
cem:	cemented or cementation
cong:	conglomerate or conglomeratic
silic:	silicious or silicified

Lithology:

Qg:	Quaternary gravels
Tv:	Tertiary volcanics (undiferentiated)
Tb:	Tertiary basalt or other mafic volcanics
Tts:	Tertiary San Domingo Rhyolite (Pyroclastic Member) (After Grubensky & Reynolds, 1988)
Ts:	Tertiary Arkosic Sedimentary Rocks (After Grubensky & Reynolds, 1988)
Trs:	Tertiary San Domingo Rhyolite (Flow Member) (After Grubensky & Reynolds, 1988)
PCg:	Pre-Cambrian granites &gneisses (undifferentiated)
PCs:	Pre-Cambrian schist (undifferentiated)

Minerals:

Qtz:	Quartz (vein)
carb:	Non-ore carbonate vein or gangue minerals or crystalline carbonate accessory minerals (i.e. calcite, siderite, aragonite, manganocalcite)
py:	pyrite
ccpy:	chalcopyrite
ga:	galena
sphal:	sphalerite
hem:	hematite
goet:	goethite or limonite-goethite mixtures
mg:	magnetite or magnetite-ilmenite
CuOx:	undifferentiated copper oxides or carbonates
clay:	undifferentiated clays (montmorillionite-illite)

DRILL SAMPLING RECORD

Hole No.: RDH 28-1
Property: Newsboy Au

FOOTAGE FROM	TO	%-#16	ACCES MIN	DESCRIPTION	SAMPLE NUMBER	GRAPHIC LOG
0.0-	5.0	15	Tr Mg Tr hem	Tan-Brn cal. cem. Ts, ser. PCg w/Qtz-carb vns.		
5.0-	10.0	35	1% hem	Tan-Brn cal. cem. Trg, Ts, chlor. & ser. PCg & PCs, Qtz-carb. vns.		
10.0-	15.0	45	4% hem 1% goet	Brn-Red Trs & Ts, Grn PCs & PCg, Qtz-carb. vns.		
15.0-	20.0	40	4% hem	Brn-Red Trs & Ts, Grn PCs & PCg, Qtz-carb. vns.		
20.0-	25.0	25	1% hem	Brn-Red Trs & Ts, Grn PCs & PCg, Qtz-carb. vns.		
25.0-	30.0	20	2% hem	Brn-Tan Trs & Ts, Grn-Blk PCs & PCg, Qtz-carb. vns.		
30.0-	35.0	30	Tr hem	Brn-Tan Trs & Ts, Grn-Blk PCs, Qtz-carb. vns.		
35.0-	40.0	60	Tr hem	Brn-Tan Trs & Ts, Grn-Blk PCs, Qtz-carb. vns.		
40.0-	45.0	65	Tr hem Tr goet	Brn-Tan Trs & Ts, Grn-Blk PCs, Qtz-carb. vns.		
45.0-	50.0	15	1% hem	Brn-Tan Trs & Ts, Grn-Blk PCs, Qtz-carb. vns.		

DRILL SAMPLING RECORD

Sheet No. 2

Hole No.: RDH 28-1
Property: Newsboy Au

FOOTAGE FROM	FOOTAGE TO	%-#16	ACCES MIN	DESCRIPTION	SAMPLE NUMBER	GRAPHIC LOG
50.0	55.0	35	Tr hem	Brn-Tan Trs & Ts, Grn-Blk PCs, Qtz-carb. vns.		
55.0	60.0	37	Tr hem	Brn-Tan Trs & Ts, Grn-Blk PCs, Qtz-carb. vns.		
60.0	65.0	20	Tr hem Tr goet	Brn-Tan Trs & Ts, Grn-Blk PCs, Qtz-carb. vns.		
65.0	70.0	60	Tr hem	Brn-Tan Trs & Ts, Grn-Blk PCs, Qtz-carb. vns.		
70.0	75.0	80	Tr hem Tr goet	Brn Trs & Ts, Grn-Blk PCs & PCg, Qtz-carb. vns.		
75.0	80.0	80	1% hem	Brn Trs & Ts, Grn-Blk PCs & PCg, Qtz-carb. vns.		
80.0	85.0	75	1% hem 1% goet	Brn Trs & Ts, Grn-Blk PCs & PCg, Qtz-carb. vns.		
85.0	90.0	65	1% hem	Brn Trs & Ts, Grn-Blk PCs & PCg, Qtz-carb. vns.		
90.0	95.0	30	1% hem	Brn Trs & Ts, Grn-Blk PCs & PCg, Qtz-carb. vns.		
95.0	100.0	40	3% hem	Brn Trs & Ts, Grn-Blk PCs & PCg, Qtz-carb. vns.		
100.0	105.0	30	Tr hem	Brn Trs & Ts, Grn-Blk PCs, Qtz-carb. vns.		

DRILL SAMPLING RECORD

Sheet No. 3

Hole No.: RDH 28-1
Property: Newsboy Au

FOOTAGE FROM	TO	%-#16	ACCES MIN	DESCRIPTION	SAMPLE NUMBER	GRAPHIC LOG
105.0		45	Tr hem	Tan-Brn Trs & Ts, Grn-Blk PCs, Qtz-carb. vns.		
	110.0					
110.0		20	Tr hem	Brn-Tan Trs & Ts, Grn-Blk PCs & PCg, Qtz-carb. vns.		
	115.0					
115.0		20	Tr hem	Brn-Tan Trs & Ts, Grn-Blk PCs & PCg, Qtz-carb. vns.		
	120.0					
120.0		40	Tr hem	Brn-Tan-Grn Trs & Ts, Grn-Blk PCs & PCg, Qtz-carb. vns.		
	125.0					
125.0		65	Tr hem	Brn-Tan-Grn Trs & Ts, Grn-Blk PCs & PCg, Qtz-carb. vns.		
	130.0					
130.0		40	1% hem 1% goet	Brn-Tan Trs & Ts, Grn-Blk PCs & PCg, Qtz-carb. vns.		
	135.0					
135.0		40	Tr hem	Brn-Tan Trs & Ts, Grn-Blk PCs & PCg, Qtz-carb. vns.		
	140.0					
140.0		37	Tr hem	Brn-Grn Trs & Ts, Brn-Blk PCs & PCg, Qtz-carb. vns.		
	145.0					
145.0		35	Tr hem	Brn-Gray-Grn Trs & Ts, Brn-Blk PCs & PCg, Qtz-carb. vns.		
	150.0					
150.0		40	1% hem 1% goet	Brn-Tan Trs & Ts, Grn-Blk PCs & PCg, Qtz-carb. vns.		
	155.0					

DRILL SAMPLING RECORD

Sheet No. 4

Hole No.: RDH 28-1
Property: Newsboy Au

FOOTAGE FROM	TO	%-#16	ACCES MIN	DESCRIPTION	SAMPLE NUMBER	GRAPHIC LOG
155.0	160.0	40	Tr hem	Brn-Grn Trs & Ts, Grn-Blk PCs & PCg, Qtz-carb. vns.		
160.0	165.0	65	2% hem	Brn-Red Trs & Ts, Brn-Blk PCs & PCg, Qtz-carb. vns.		
165.0	170.0	45	Tr hem	Brn-Grn Trs & Ts, Brn-Blk PCs & PCg, Qtz-carb. vns.		
170.0	175.0	45	1% hem	Brn-Grn Trs & Ts, Grn-Blk PCs & PCg, Qtz-carb. vns.		
175.0	180.0	55	Tr hem	Brn-Grn Trs & Ts, Grn-Blk PCs & PCg, Qtz-carb. vns.		
180.0	185.0	65	Tr hem	Brn-Blk Trs & Ts, Brn-Blk PCs & PCg, Qtz-carb. vns.		
185.0	190.0	60	Tr hem	Brn-Gray-Grn Trs & Ts, Brn-Blk PCs & PCg, Qtz-carb. vns.		
190.0	195.0	55	Tr hem	Brn-Grn Trs & Ts, Grn-Blk PCs & PCg, Qtz-carb. vns.		
195.0	200.0	70	Tr hem	Brn-Gray Trs & Ts, Brn-Blk PCs & PCg, Qtz-carb. vns.		
200.0	205.0	75	1% hem	Brn-Red Trs & Ts, Brn-Blk PCs & PCg, Qtz-carb. vns.		

DRILL SAMPLING RECORD

Sheet No. 5

Hole No.: RDH 28-1
Property: Newsboy Au

FOOTAGE FROM	FOOTAGE TO	%-#16	ACCES MIN	DESCRIPTION	SAMPLE NUMBER	GRAPHIC LOG
205.0		75	Tr hem	Brn-Red Trs & Ts, Blk PCs, Qtz-carb. vns.		
	210.0					
210.0		15	Tr hem Tr goet	Blk-Brn Trs & Ts, Grn-Blk PCs & PCg, Qtz-carb. vns.		
	215.0					
215.0		15	Tr hem	Blk Trs, Grn-Blk PCs & PCg, Qtz-carb. vns.		
	220.0					
220.0		45	Tr hem	Tan-Blk Trs & Grn Ts, Qtz-carb. vns.		
	225.0					
225.0		15	Tr hem	Tan-Blk Trs, Qtz-carb. vns.		
	230.0					
230.0		20	Tr hem	Tan-Blk Trs & Grn Ts, Blk-Brn PCs & PCg, Qtz-carb. vns.		
	235.0					
235.0		15	1% hem	Tan-Blk Trs & Grn Ts, Qtz-carb. vns.		
	240.0					
240.0		15		Tan Trs		
	245.0					
245.0		10		Tan-Brn Trs		
	250.0					
250.0		5		Tan-Brn Trs, Blk PCs, Qtz-carb. vns.		
	255.0					
255.0		15	1% hem	Tan-Brn Trs, Red Ts, Qtz-carb. vns.		
	260.0					

DRILL SAMPLING RECORD

Sheet No. 6

Hole No.: RDH 28-1
Property: Newsboy Au

FOOTAGE FROM	TO	%-#16	ACCESS MIN	DESCRIPTION	SAMPLE NUMBER	GRAPHIC LOG
260.0		15	Tr hem	Tan-Brn Trs Qtz-Carb. vns.		
	265.0					
265.0		20	Tr hem	Tan-Brn Trs		
	270.0					
270.0		15	Tr hem	Tan-Brn Trs		
	275.0					
275.0		40	Tr hem	Tan-Brn Trs		
	280.0					
280.0		20	Tr hem	Tan-Brn Trs,		
	285.0					
285.0		20	1% hem	Tan-Blk Trs, Brn Ts, Brn PCg, Qtz-carb. vns.		
	290.0					
290.0		70	1% hem	Blk-Brn Trs, Brn Ts, Brn PCg, Qtz-carb. vns.		
	295.0					
295.0		75	Tr hem	Blk-Brn Trs, Brn Ts, Qtz-carb. vns.		
	300.0					
300.0		75	Tr hem	Blk-Brn Trs, Brn Ts, Qtz-carb. vns.		
	305.0					
305.0		75	1% hem	Gray-Brn Trs, Brn Ts, Brn PCg, Qtz-carb. vns.		
	310.00					

DRILL SAMPLING RECORD

Sheet No. 6

Hole No.: RDH 28-1
Property: Newsboy Au

FOOTAGE FROM	TO	%-#16	ACCESS MIN	DESCRIPTION	SAMPLE NUMBER	GRAPHIC LOG
260.0-		15	Tr hem	Tan-Brn Trs Qtz-Carb. vns.		
	265.0					
265.0-		20	Tr hem	Tan-Brn Trs		
	270.0					
270.0-		15	Tr hem	Tan-Brn Trs		
	275.0					
275.0-		40	Tr hem	Tan-Brn Trs		
	280.0					
280.0-		20	Tr hem	Tan-Brn Trs,		
	285.0					
285.0-		20	1% hem	Tan-Blk Trs, Brn Ts, Brn PCg, Qtz-carb. vns.		
	290.0					
290.0-		70	1% hem	Blk-Brn Trs, Brn Ts, Brn PCg, Qtz-carb. vns.		
	295.0					
295.0-		75	Tr hem	Blk-Brn Trs, Brn Ts, Qtz-carb. vns.		
	300.0					
300.0-		75	Tr hem	Blk-Brn Trs, Brn Ts, Qtz-carb. vns.		
	305.0					
305.0-		75	1% hem	Gray-Brn Trs, Brn Ts, Brn PCg, Qtz-carb. vns.		
	310.00					

DRILL SAMPLING RECORD

Sheet No. 6

Hole No.: RDH 28-1
Property: Newsboy Au

FOOTAGE FROM	TO	%-#16	ACCESS MIN	DESCRIPTION	SAMPLE NUMBER	GRAPHIC LOG
260.0-		15	Tr hem	Tan-Brn Trs Qtz-Carb. vns.		
	265.0					
265.0-		20	Tr hem	Tan-Brn Trs		
	270.0					
270.0-		15	Tr hem	Tan-Brn Trs		
	275.0					
275.0-		40	Tr hem	Tan-Brn Trs		
	280.0					
280.0-		20	Tr hem	Tan-Brn Trs,		
	285.0					
285.0-		20	1% hem	Tan-Blk Trs, Brn Ts, Brn PCg, Qtz-carb. vns.		
	290.0					
290.0-		70	1% hem	Blk-Brn Trs, Brn Ts, Brn PCg, Qtz-carb. vns.		
	295.0					
295.0-		75	Tr hem	Blk-Brn Trs, Brn Ts, Qtz-carb. vns.		
	300.0					
300.0-		75	Tr hem	Blk-Brn Trs, Brn Ts, Qtz-carb. vns.		
	305.0					
305.0-		75	1% hem	Gray-Brn Trs, Brn Ts, Brn PCg, Qtz-carb. vns.		
	310.00					

DRILL SAMPLING RECORD

Sheet No. 6

Hole No.: RDH 28-1
Property: Newsboy Au

FOOTAGE FROM	TO	%-#16	ACCES MIN	DESCRIPTION	SAMPLE NUMBER	GRAPHIC LOG
260.0-		15	Tr hem	Tan-Brn Trs Qtz-Carb. vns.		
	265.0					
265.0-		20	Tr hem	Tan-Brn Trs		
	270.0					
270.0-		15	Tr hem	Tan-Brn Trs		
	275.0					
275.0-		40	Tr hem	Tan-Brn Trs		
	280.0					
280.0-		20	Tr hem	Tan-Brn Trs,		
	285.0					
285.0-		20	1% hem	Tan-Blk Trs, Brn Ts, Brn PCg, Qtz-carb. vns.		
	290.0					
290.0-		70	1% hem	Blk-Brn Trs, Brn Ts, Brn PCg, Qtz-carb. vns.		
	295.0					
295.0-		75	Tr hem	Blk-Brn Trs, Brn Ts, Qtz-carb. vns.		
	300.0					
300.0-		75	Tr hem	Blk-Brn Trs, Brn Ts, Qtz-carb. vns.		
	305.0					
305.0-		75	1% hem	Gray-Brn Trs, Brn Ts, Brn PCg, Qtz-carb. vns.		
	310.00					

DRILL SAMPLING RECORD

Sheet No. 7

Hole No.: RDH 28-1
Property: Newsboy Au

FOOTAGE FROM	TO	%-#16	ACCES MIN	DESCRIPTION	SAMPLE NUMBER	GRAPHIC LOG
310.0-	315.0	70	Tr hem	Blk-Brn Trs, Brn Ts, Qtz-carb. vns.		
315.0-	320.0	80		Blk-Brn Trs, Brn Ts, Qtz-carb. vns.		
320.0-	325.0	60		Blk-Brn Trs, Qtz-carb. vns.		
325.0-	330.0	40	Tr hem	Blk-Brn Trs, Brn Ts, Brn PCg, Qtz-carb. vns.		
330.0-	335.0	25		Brn-Red Trs, Brn Ts, Qtz-carb. vns.		
335.0-	340.0	40		Brn-Red Trs, Qtz-carb. vns.		
340.0-	345.0	5		Brn-Red Trs, Qtz-carb. vns.		
345.0-	350.0	15		Brn-Red Trs, Qtz-carb. vns.		
350.0-	355.0	15	Tr Hem	Brn-Red Trs, Qtz-carb. vns.		
355.0-	360.0	<5	Tr Hem	Brn-Red Trs, Qtz-carb. vns.		
360.0-	365.0	10		Grn PCs, Qtz-carb. vns.		

Total Depth of Boring-365'
First Water Encountered-360' Below Land Surface

DRILL SAMPLING RECORD

Sheet No. 7

Hole No.: RDH 28-1
Property: Newsboy Au

FOOTAGE FROM	TO	%-#16	ACCES MIN	DESCRIPTION	SAMPLE NUMBER	GRAPHIC LOG
310.0-	315.0	70	Tr hem	Blk-Brn Trs, Brn Ts, Qtz-carb. vns.		
315.0-	320.0	80		Blk-Brn Trs, Brn Ts, Qtz-carb. vns.		
320.0-	325.0	60		Blk-Brn Trs, Qtz-carb. vns.		
325.0-	330.0	40	Tr hem	Blk-Brn Trs, Brn Ts, Brn PCg, Qtz-carb. vns.		
330.0-	335.0	25		Brn-Red Trs, Brn Ts, Qtz-carb. vns.		
335.0-	340.0	40		Brn-Red Trs, Qtz-carb. vns.		
340.0-	345.0	5		Brn-Red Trs, Qtz-carb. vns.		
345.0-	350.0	15		Brn-Red Trs, Qtz-carb. vns.		
350.0-	355.0	15	Tr Hem	Brn-Red Trs, Qtz-carb. vns.		
355.0-	360.0	<5	Tr Hem	Brn-Red Trs, Qtz-carb. vns.		
360.0-	365.0	10		Grn PCs, Qtz-carb. vns.		

Total Depth of Boring-365'
First Water Encountered-360' Below Land Surface

DRILL SAMPLING RECORD

Sheet No. 7

Hole No.: RDH 28-1
Property: Newsboy Au

FOOTAGE FROM	TO	%-#16	ACCES MIN	DESCRIPTION	SAMPLE NUMBER	GRAPHIC LOG
310.0-	315.0	70	Tr hem	Blk-Brn Trs, Brn Ts, Qtz-carb. vns.		
315.0-	320.0	80		Blk-Brn Trs, Brn Ts, Qtz-carb. vns.		
320.0-	325.0	60		Blk-Brn Trs, Qtz-carb. vns.		
325.0-	330.0	40	Tr hem	Blk-Brn Trs, Brn Ts, Brn PCg, Qtz-carb. vns.		
330.0-	335.0	25		Brn-Red Trs, Brn Ts, Qtz-carb. vns.		
335.0-	340.0	40		Brn-Red Trs, Qtz-carb. vns.		
340.0-	345.0	5		Brn-Red Trs, Qtz-carb. vns.		
345.0-	350.0	15		Brn-Red Trs, Qtz-carb. vns.		
350.0-	355.0	15	Tr Hem	Brn-Red Trs, Qtz-carb. vns.		
355.0-	360.0	<5	Tr Hem	Brn-Red Trs, Qtz-carb. vns.		
360.0-	365.0	10		Grn PCs, Qtz-carb. vns.		

Total Depth of Boring-365'
First Water Encountered-360' Below Land Surface

DRILL SAMPLING RECORD

Sheet No. 7

Hole No.: RDH 28-1
Property: Newsboy Au

FOOTAGE FROM	TO	%-#16	ACCES MIN	DESCRIPTION	SAMPLE NUMBER	GRAPHIC LOG
310.0-	315.0	70	Tr hem	Blk-Brn Trs, Brn Ts, Qtz-carb. vns.		
315.0-	320.0	80		Blk-Brn Trs, Brn Ts, Qtz-carb. vns.		
320.0-	325.0	60		Blk-Brn Trs, Qtz-carb. vns.		
325.0-	330.0	40	Tr hem	Blk-Brn Trs, Brn Ts, Brn PCg, Qtz-carb. vns.		
330.0-	335.0	25		Brn-Red Trs, Brn Ts, Qtz-carb. vns.		
335.0-	340.0	40		Brn-Red Trs, Qtz-carb. vns.		
340.0-	345.0	5		Brn-Red Trs, Qtz-carb. vns.		
345.0-	350.0	15		Brn-Red Trs, Qtz-carb. vns.		
350.0-	355.0	15	Tr Hem	Brn-Red Trs, Qtz-carb. vns.		
355.0-	360.0	<5	Tr Hem	Brn-Red Trs, Qtz-carb. vns.		
360.0-	365.0	10		Grn PCs, Qtz-carb. vns.		

Total Depth of Boring-365'
First Water Encountered-360' Below Land Surface

APPENDIX C

WATER RESOURCE ASSOCIATES' BIOLOGICAL ASSESSMENT

WRA Engineering & Testing Laboratories
a division of Water Resources Associates, Inc. Phoenix, Arizona

BIOLOGICAL ASSESSMENT OF THE PROPOSED NEWSBOY MINE AND MILLING COMPLEX MARICOPA COUNTY, ARIZONA

Prepared for:

NEWSBOY GOLD MINING COMPANY
42811 Grand Ave.
Morristown, AZ 85342-0279

Prepared by:

WRA ENGINEERING AND TESTING LABORATORIES
417 North Arizona Street
Prescott, AZ 86301

May 14, 1992

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ABSTRACT

A survey was made of known literature sources for any site-specific information pertaining to the presence of threatened or endangered plant or animal species associated with approximately 1,000-acres in Sections 15, 16, 17, 20, 21, 22, 26, and 27, Township 6 North, Range 4 West, Maricopa County, Arizona (herein will be know as, the "subject property"). The location of the subject property is shown in Figure 1. No threatened or endangered plant or animal species were found to be recorded within the subject property.

A representative biological field survey was made of the subject property. The field survey encountered no evidence of threatened or endangered plant or animal species. On the basis of the work performed to date, it appears that biological clearance can be recommended.

1.0 INTRODUCTION

At the request of Newsboy Gold Mining Company (Newsboy) of Tucson, Arizona, WRA Engineering and Testing Laboratories (WRA) retained Mr. Michael U. Owens, Associate Biologist of Cultural and Environmental Systems, Inc. (C&ES), and Dr. Archie Dickey, Associate Biologist with WRA and Professor of Biology, Yavapai Community College, to assist in a Biological Assessment of approximately 1,000 acres in portions of Sections 15, 16, 17, 20, 21, 22, 26, 27, and 28, Township 6 North, Range 4 West, Maricopa County, Arizona. This work was commissioned to facilitate the process of obtaining permits for an open-pit mine and milling facility proposed by Newsboy. The field phase of the program was conducted during the period from August 19-23, 1991, and several day trips thereafter up to May 10, 1992.

This report documents the location, methods, and results of biological survey and records search conducted for lands administered by the Bureau of Land Management (BLM) and the Arizona State Land Department. In total, this investigation was performed to provide an inventory and assessment of plant and animal resources which might be affected by the proposed exploration and mining operations. A total of approximately 1,000 acres surrounding and including the 260-acre mine site were investigated during this biological survey.

Dr. Archie M. Dickey (WRA associate project biologist) and Michael U. Owens (C&ES associate biologist) served as principal investigators for the project, while Richard J. Lundin (WRA) served as project manager. Michael U. Owens, Dr. Archie M. Dickey, and Richard J. Lundin completed the field phase of the study. In addition, Michael U. Owens conducted the literature research efforts. Dr. Archie M. Dickey and Michael U. Owens shared in the responsibilities for compiling the field data and preparing the final report.

2.0 NATURAL ENVIRONMENT AND CURRENT LAND USE

2.1 LEGAL DESCRIPTION

The Newsboy Project is located approximately 45 miles northwest of Phoenix and 10 miles south of Wickenburg in Township 6 North, Range 4 West, portions of Sections 15, 16, 17, 20, 21, 22, 26, 27 and 28 in Maricopa County, Arizona (Wickenburg SW Quadrangle, USGS Topographic 7.5 minute series).

The proposed project was acquired by Newsboy from Westmont Mining, Inc. The entire project through leases and private holdings consists of approximately 18,000 acres of combined BLM, Private and Arizona State Land Department property. Presently only 260 acres are being proposed for actual ground-disturbing. The impacted 260 acres plus approximately 740 additional acres were were the focus of the biological survey.

Numerous studies have been performed by Newsboy which documents and validates that an economic occurrence of precious metals is present. These studies range from reserve estimation, process design, metallurgical recovery, and optimization test work to project feasibility. In excess of 25,000 feet of test drilling have been completed to date. An in-situ resource of nearly 6.0 million tons has been identified.

The proposed operation will consist of an open pit mine, processing and crusher plant, tailings impoundment site, and waste rock dump sites. The proposed locations for these facilities are illustrated on the overlay created for Figure 1.

2.2 INVESTIGATIVE PROCEDURE

The following field techniques were utilized to characterize the plant and animal resources within the area studied.

- Walking transects 20 meters apart were done along the northern, southern, and western roads which cross the area.

- Major drainage, pre-existing mining area and entire eastern edge were assessed for plant and animal species.

- Small mammal survey was done over a 2-night period using Sherman live traps, a total of 140 traps were set.

2.3 GENERAL ENVIRONMENTAL SETTING

The subject property can be best characterized as being "...within the Arizona Upland Division of the Sonoran Desert. This portion of the Sonoran Desert is characterized by soils of granite, (gneiss, schist) or volcanic rock origin with a bi-seasonal rainfall varying between 5 and 13 inches annually" (Jaeger, 1957). The Wickenburg portion receives a relatively even portion of summer-winter precipitation (Brown and Lowe, 1977). Topographic relief within the project area is generally less than 300 feet, with the majority of the subject property being characterized by relatively flat terrace areas that are dissected by steep-walled canyons and arroyos. Outcrops of bedrock which form local topographic highs and ridges adjacent to the Hassayampa River are made of resistant units of Tertiary volcanics that have been locally eroded. These rocks are cavernous and some of the shallow caves are seasonally occupied by fauna of the area.

The Hassayampa River lies to the east of the subject property. In this area the flow is seasonal and subterranean for most of the year and typically devoid of standing water. This adjacent portion of the Hassayampa River has no upper story trees typical of riparian areas in many parts of the Sonoran Desert. Along the western edge of the river are shrubs which are typically found in any drainage area of the Sonoran Desert, like Desert broom, Burro Bush, and Mesquite.

Several small ephemeral drainages lead away from the river westward into Newsboy's holdings. Here several more drainage edge species are found and their density decreases as the drainages reach higher elevations within the property. Species found in this area include Ironwood, Palo Verde, Mesquite, Mormon tea, Catclaw acacia, Wolfberry, and Desert hackberry.

Away from the Hassayampa River and the drainages, the rolling hills (Area A) are typical Arizona Upland in nature. Some of the plants found there are creosote, bursage, saguaro, several cactus species, and many annuals.

2.3.1 Site Specific Environmental Setting

The Newsboy site elevations range from a low of 1,836 feet to a high of 2,044 feet (USGS, 1965). The lack of extreme elevations along with the relatively small size of the area allows for a relatively homogeneous vegetation community.

This area can be divided up into two basic ecological units. The first and dominate area (Figure 2, Area A) is the entire section which falls outside of its eastern border with the Hassayampa River. The second or penetrate area is that which borders the site on the east and consists of the Hassayampa River drainage (Figure 2, Area B). The proposed Newsboy project surface disturbance does not affect Area B.

3.0 LITERATURE AND RECORDS REVIEW

3.1 AGENCY CONSULTATION

Date	Name and Affiliation	Action Taken
Prior to 8/19/91	Mr. Tim Goodman Supervisory BLM Wildlife Biologist Phoenix, AZ	Phone discussion and forwarded literature
Prior to 8/19/91	Mr. Ron Olding Game Biologist AZ Game & Fish Department Region V Tucson, AZ	Provided copy of most current list of Arizona's threatened wildlife.
Prior to 8/19/91	Mr. Rick Gerhard Habitat Specialist AZ Game & Fish Department Region V Tucson, AZ	Provided additional information regarding Arizona's threatened fauna and flora.
8/21/91	Tim Goodman, Supervisory BLM Wildlife Biologist Lori Young, BLM Wildlife Biologist Dave Hoerath, BLM Wildlife Biologist	Field consultation at Newsboy site.
9/6/91	University of Arizona Herbarium staff	Aided in the identification of collected plant species.
3/23/92	Tim Goodman, Supervisory BLM Wildlife Biologist	Aided in the identification of collected bat remains.

3.2 LITERATURE SEARCH

An extensive literature search was undertaken to supplement field data gathered for this report. The University of Arizona Science Library and Yavapai College Biology Department reference collection provided information used to prepare this report. BLM provided four reports and Arizona Game and Fish Department (AG&F) provided one. Literature was surveyed for T&E species which might occur within the study area. There were no previously reported T&E species for this area.

4.0 DISCUSSION

4.1 ECOLOGICAL ZONES

The entire subject property lies within the Arizona Upland Division of the Sonoran Desert. The Sonoran Desert is divided into several major ecological sub-divisions. The first and most dominant is the Upland Sonoran Desert.

4.1.1 Upland Sonoran Desert Unit (Figure 2, Area A)

The Upland Sonoran Desert Unit consists of sparsely vegetated areas that are devoid of standing water and encompasses most of the subject property.

Flora - Vegetation in the Upland Sonoran Desert is noted for its uniformity and relative similarity throughout its range (Shreve and Wiggins, 1964). The vegetation type found in this area, as well as all Arizona Upland Sonoran Desert, is identified by the saguaro cactus (Cereus giganteus) (Jaeger, 1957; Brown and Lowe, 1973).

Dominate vegetation types found on the subject property include catclaw acacia (Acacia greggii), creosote bush (Larrea tridentata), jojoba (Simmondsia chinesis), bursage (Ambrosia dumosa), and Cholla (Opuntia sp.). A list of the flora found in this area is presented below (Section 4.1.3). The species found on this area agree, in general, with those described by Jaeger (1964), and Lowe and Brown (1973), and Brown (1982) as typical of this Division.

Fauna - Fauna species are represented by reptiles, birds, and mammals. A list of the fauna of this area is found below (Section 4.1.3). This list, in general, agrees with the fauna listed by Lowe and Brown (1973) and Brown (1982) as typical of this Division.

4.1.2 Hassayampa River Edge and Drainages (Figure 2, Area B)

The second major ecological area occupied by this site occurs on the far eastern edge of the area. It consists of a very narrow band at the western edge of the Hassayampa River. This area encompasses less than 10% of the study area and is well removed from proposed mining activity.

Flora - Vegetation include Mesquite (Prosopis juliflora) Four-wing saltbush (Atriplex canescens), Crucifixion thorn (Holacantha enmorvi), Datura (Datura sp.), Devil's claw (Proboscidia sp.), Desert Broom (Baccharis sarothroides), Seep willow (Baccharis ghetinos), and Burrow brush (Hymenoclea salsola). All of the above listed flora is typical of those species found along ephemeral drainages in the Sonoran Desert Division (Brown, 1982 and Lowe, 1967). A list of the flora found in this area is found in Section 4.1.3.

Fauna - Fauna species are represented by reptiles, birds, and mammals. A list of the fauna of this area is presented below (Section 4.1.3). This list, in general, agrees with the fauna listed by Lowe and Brown (1973), and Brown (1982) as typical of this Division.

4.1.3 Flora and Fauna

VEGETATION

A = Area A, Fig. 2
B = Area B, Fig. 2
L = Literature

Family	Genus/Species	Common Name	
Acanthaceae	Anisacanthus thurberi	Chuparosa, Desert	B
Boraginaceae	Amsinckia intermedia		A, B
	Cryptantha circumscissa		A, B
	Pectocarya setosa	Moonseed	A, B
Buxaceae	Simmondsia chinensis	Jojoba	A
Cactaceae	Cereus giganteus	Saguaro	A
	Echinocereus fasciculatus	Hedgehog cactus	A
	Ferocactus acanthodes	Compass Barrel Cactus	A
	Ferocactus wislzenii	Barrel cactus	A
	Mammilaria sp.	Pincushion cactus	A
	Opuntia acanthocarpa	Buckhorn cholla	A
	Opuntia arbuscula	Pencil Cholla	L
	Opuntia basilaris	Beaver tail	L
	Opuntia bigelovii	Teddy Bear Cholla	A
	Opuntia fulgida	Jumping cholla	A
	Opuntia leptocaulis	Desert Christmas cactus	A
	Opuntia phaeacantha	Prickle pear	A
	Peniocereus greggii	Night Blooming Cereus	B
Chenopodiacea	Atriplex canescens	Four-wing salt bush	B
Compositae	Ambrosia deltoides	Triangle-leaf Bursage	B
	Ambrosia dumosa	White Bursage	A
	Baccharis glutinosa	Seep-willow	B

A = Area A, Fig. 2
B = Area B, Fig. 2
L = Literature

Family	Genus/Species	Common Name	
Compositae	Baccharis sarothrodes	Desert Brown	B
	Baileya multiradiata	Desert marigold	A, B
	Cirsium arizonicum	Thistle	A
	Encelia farinosa	Brittle bush	A, B
	Eriophyllum lanosum	Wooly daisy	L
	Hymenoclea salsola	Burro Brush	B
	Monoptilon bellioides	Desert star	L
	Psilostrophe cooperi	Paper flower	A
	Rafinesquia neomexicana	Desert chickory	A
Cruciferae	Dithyrea wislizenii	Spectacle pod	A, B
	Lesquerella gordoni	Bladder pod	A, B
Ephedraceae	Ephedra nevadensis	Mormon tea or Joint-fir	A
Fouquieriaceae	Fouquieria splendens	Ocotillo	A
Geraniaceae	Erodium cicutarium	Filaree, Heron's Bill	A, B
Gramineae	Bromus rubens	Foxtail Brome	A
Hydrophyllacaea	Nama demissum	Purplemat	L
	Phacelia crenulata	Phacelia	A
	Phacelia distans	Phacelia	A
Krameriaceae	Krameria gravi	White Ratany	L
Labiatae	Hyptis emoryi	Desert Lavender	L
	Salvia columbariae	Chia	A, B
Leguminosae	Acacia constricta	White-thorn acacia	
	Acacia greggii	Catclaw acacia	A
	Calliandra eriophylla	Fairy-duster	A
	Cercidium floridum	Palo Verde	B
	Cercidium microphyllum	Little-leaf Paloverde	A
	Dalea neomexicana	Dalea	A
	Olneya tesota	Ironwood	A, B
	Parkinsonia aculeata	Jerusalem-thorn	A
	Prosopis juliflora	Mesquite	B
Loasaceae	Mentzelia albicaulis	Stickleaf	L

Family	Genus/Species	Common Name	A = Area A, Fig. 2 B = Area B, Fig. 2 L = Literature
Loranthaceae	Phoradendron ealifornicum	Desert mistletoe	B
Malvaceae	Sphaeralcea coulteri	Coulter Globe Mallow	A, B
Martyniaceae	Proboscidea sp.	Devil's claw	B
Nyctaginaceae	Mirabilis bigelovii	Four o'clock	L
Plantaginaceae	Plantago insularis Plantago purshii	Plantain Plantago	A A, B
Polemoniaceae	Eriastrum diffusum	Wooly bluets	L
Polygonaceae	Eriogonum inflatum	Buckwheat	A, B
Simaroubaceae	Holacamtha emorvi	Crucifixion thorn	A
Solanaceae	Datura sp. Lycium andersonii Lycium fremontii	Datura Anderson Thornbush Fremont thornbush	B B B
Ulmaceae	Celtis pallida	Desert Hackberry	B
Zygophyllaceae	Larrea tridentata	Creosote bush	A

HERPETOFAUNA

Family	Genus/Species	Common Name	A = Area A, Fig. 2 B = Area B, Fig. 2 L = Literature
LIZARDS			
Gekonidae	Coleonyx variegatus	Banded Gecko	L
Colubridae	Lampropeltis getulus	Common Kingsnake	A
Helodermatidae	Helkoderma suspectam	Gila Monster	L

Family	Genus/Species	Common Name	A = Area A, Fig. 2 B = Area B, Fig. 2 L = Literature
Iguanidae	Callisaurus draconoides	Zebra-tailed Lizard	A
	Crotaphytus collaris	Collared Lizard	L
	Crotaphytus wislizenii	Leopard Lizard	L
	Dipsosaurus dorsalis	Desert Iguana	L
	Sceloporus magister	Desert Spiny Lizard	L
	Uta stansburiana	Side-blotched Lizard	A, B
Teiidae	Cnemidophorus tigris	Western Whiptail	A, B
SNAKES			
Colubridae	Masticophis flagellum	Red Racer	L
	Pituophis melanoleuous	Gopher Snake	L
Viperidae	Crotalus atrox	Western Diamondback	L
	Crotalus mitchelli	Speckled Rattlesnake	L
	Crotalus molossus	Blacktailed Rattlesnake	A, B
	Crotalus scutulatus	Mohave Rattlesnake	L
	Crotalus viridis cerberus	Arizona Black Rattlesnake	A, B
TURTOISE			
Testudinidae	Gopherus agassizi	Sonoran Desert Tortoise	A

AVIFAUNA
(Sighted in August Survey)

Family	Genus/Species	Common Name	A = Area A, Fig. 2 B = Area B, Fig. 2 L = Literature
Accipitridae	Buteo jamaicensis	Red-tailed Hawk	A
Aegithalidae	Psaltriparus minimus	Bushtit	A, B
Caprimulgidae	Chordeiles minor	Common Nighthawk	A
Cathartidae	Cathartes aura	Turkey Vulture	A
Columbidae	Zenaida macroura	Mourning Dove	A, B
Falconidae	Falco sparverius	American Kestrel	B

A = Area A, Fig. 2
B = Area B, Fig. 2
L = Literature

Family	Genus/Species	Common Name	
Mimidae	Toxostoma curvirostre	Curve-billed Thrasher	A, B
Paridae	Parus wollwebei	Bridled titmouse	B
Phasianidae	Callipepla gambelii	Gambel's Quail	A, B
Picidae	Colaptes auratus	Common Flicker	A, B
	Melanerpes uropygialis	Gila Woodpecker	A, B
Ptilogonatidae	Phainopepla nitens	Phainopepla	A, B
Remizidae	Auriparus flaviceps	Verdin	A, B
Troglodytidae	Catherpes mexicanus	Canyon Wren	B
Tyrannidae	Sayornis nigricans	Black Phoebe	A, B
	Sayornis saya	Say's Phoebe	A
Tytonidae	Bubo virginianus	Horned owl	A, B

MAMMALS

A = Area A, Fig. 2
B = Area B, Fig. 2
L = Literature

Family	Genus/Species	Common Name	
Canidae	Canis latrans	Coyote	A, B
	Urocyon cincroargentenus	Grey Fox	L
Cervidae	Odocoileus hemionus	Desert mule deer	A, B
Felidae	Felis concolor	Mountain Lion	L
	Lynx rufus	Bobcat	L
Leparidea	Lepus californicus	Jackrabbit	A
	Sylvilagus audubonii	Desert cottontail	A
Materomyidae	Dipodomys merriami	Merrium Kangaroo Rat	A, B
	Perognathus amplus	AZ Pocket Mouse	A, B
	Perognathus intermedius	Rock Pocket Mouse	A, B

Family	Genus/Species	Common Name	A = Area A, Fig. 2 B = Area B, Fig. 2 L = Literature
Muridae	Neotoma albigula	Woodrat	A
	Onychomys torridius	Southern Grasshopper Mouse	L
	Peromyscus eremicus	Cactus Mouse	L
Mustelidae	Taxadea taxus	Badger	L
Sciuridae	Ammospermophilus harrisi	Antelope squirrel	A
Tayassuidae	Tayassu tajacu	Collared Peccary	A, B
Trocyonidae	Bassariscus astutas	Ringtail	L
Vespertilionidae*	Myotis velifer	Common cave bat	L
	Myotis volans		L

* Identified by Tim Goodman, BLM

4.2 THREATENED AND ENDANGERED SPECIES

No threatened or endangered species as listed by Arizona Game and Fish Department (AG&FD) (Guideline by U.S. Fish and Wildlife Service) were encountered on the proposed site (AG&FD, 1988: Rick Gerhart, Per. Comm.: 1991). The site would not be classified as "Critical Habitat" as defined by the U.S. Fish and Wildlife Service (USFWS, 1990). No threatened or endangered plant species were found.

4.3 CANDIDATE SPECIES FOR THREATENED AND ENDANGERED SPECIES STATUS

4.3.1 Sonoran Desert Tortoise (Gopherus agassizi)

The Sonoran Desert Tortoise (Gopherus agassizi) was sighted in the SW 1/4 of Section 15 and scat was found in two separate areas in the SW 1/4 of Section 21 (USGS, 1965). Both sitings were outside the areas of proposed surface disturbance.

In July 1991 the U.S. Fish and Wildlife Service determined that the Sonoran Desert Tortoise (Gopherus agassizi) would not be classified as a Threatened or Endangered species at this time (Rick Gerhard: pers. comm). However, BLM feels that, due to the limited nature of the populations and habitats, the Sonoran Desert tortoise (Gopherus agassizi) is particularly vulnerable to human activities (Sprag et al, 1988). BLM

has drafted a "Strategy for Desert Tortoise Habitat Management on Public Lands in Arizona" (BLM, 1990). This management document allows for mining and mineral processing activities in close proximity as long as the management goal of no net loss is maintained.

The BLM has classified the Sonoran Desert Tortoise (Gopherus agassizi) habitat in the general area of the subject area as Category II.

Items	Category II Habitat Areas
Category Goals	Maintain stable, viable populations and halt further declines in tortoise habitat values.
Criterion 1	Habitat Area may be essential to maintenance of viable populations.
Criterion 2	Most conflicts resolvable.
Criterion 3	Medium to high density or low density contiguous with medium or high density.
Criterion 4	Stable or decreasing population.

The Newsboy mining proposal has an interim classification of Criteria 2 with final BLM classification to be done in June 1992.

4.3.2 Chuckwalla (Sauromalus obesus)

Chuckwalla (Sauromalus obesus) has been recently added to the Candidate species list. Literature search indicates the possibility of its occurrence within the study area, but no field observations have been made by any of the field workers. Chuchwalla's usually occur in areas where there are large boulders or other rocky outcrops. This type of habitat allows them to maneuver into crevices as a defense mechanism (Stebbins, 1985). The study area has no boulder area and limited rocky outcrops. It is unlikely that they occur within the study area.

4.3.3 Yavapai Pocket Mouse (Perognathus amplus amplus)

There were two general areas sampled using small mammal traps, the mine site and the western edge of the site (W edge of Section 21). Trapping resulted in the capture of six Perognathus amplus amplus. This constituted 35 percent of the mammals captured. This pocket mouse seems to have a distribution across the site.

Arizona pocket mouse (Perognathus amplus) has been divided into four or less subspecies (Hall and Kelson, 1959; Hoffmeister, 1986). This portion of the population has been divided into at least three subspecies by the two references listed above.

Perognathus amplus jacksoni
Perognathus amplus rotundus
Perognathus amplus amplus

Hoffmeister (1986) indicates that there is a great amount of morphological variation within this purposed subspecies.

In other studies which I have done in western Yavapai County, this species is very common (its different "subspecies") in portion of the Sonoran Desert.

4.4 SUMMARY

The Newsboy holding is located on some 18,000 acres with a proposed mine site of 260 acres. This area is located in the Arizona Upland Division of the Sonoran Desert.

Approximately 1,000 acres, including the mine site, were part of the biological study. The emphasis during this entire study focused on the location of threatened and endangered species. As discussed, there was no evidence of either. Literature review collaborated these findings of no known previous record of T&E plant or animal species in this area. This area is not unique to the Arizona Upland Division of the Sonoran Desert.

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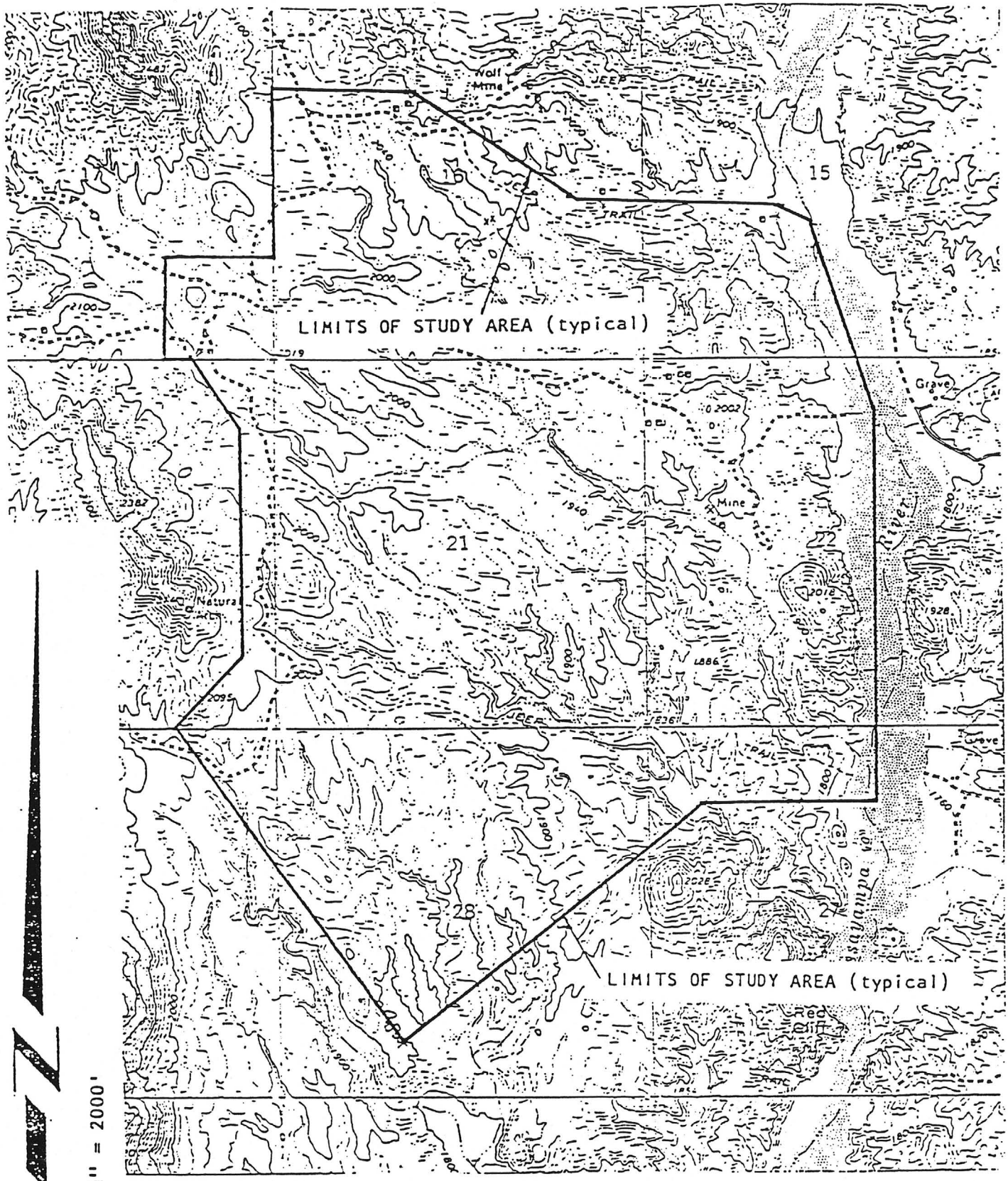
FIGURES



Water Resources Associates, Inc.

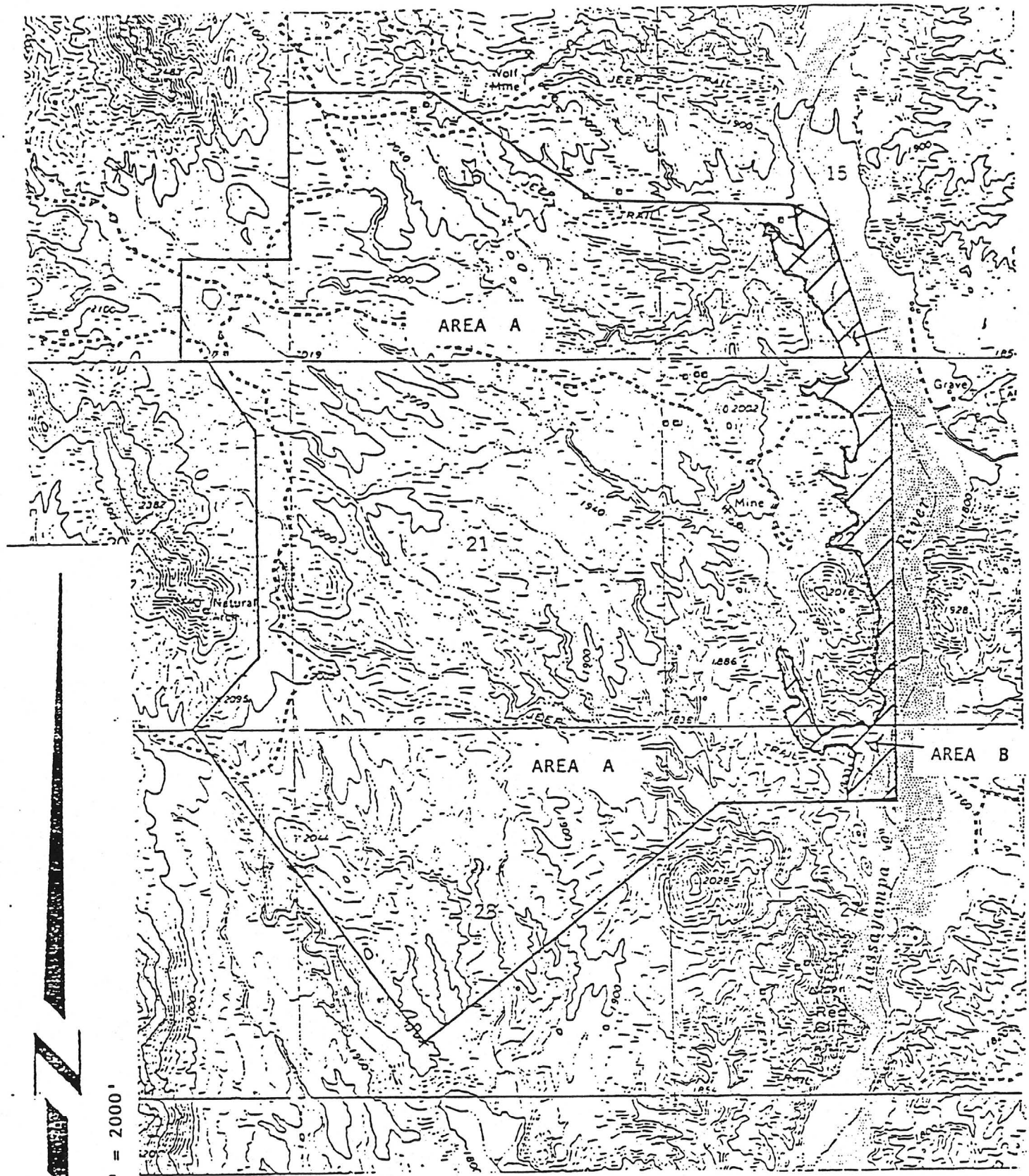
Hydrologists • Hydrogeologists • Engineers • Forensic Hydrologists

PROJECT NO. | DRAWN BY

DATE | CHECKED BY

Map of Study Area

Figure 1



Water Resources Associates, Inc. Hydrologists • Hydrogeologists • Engineers • Forensic Hydrologists PROJECT NO. | DRAWN BY DATE | CHECKED BY		Vegetation Map of Study Area	Figure 2

APPENDICES

APPENDIX A

Resumes of Key Personnel

MICHAEL U. OWENS

February 1991

EDUCATION

1983 University of Arizona, Wildlife Biology, M.S.

1975 University of Arizona, Anthropology/Zoology, B.A.

AREAS OF EXPERTISE

Mammals and botany of the Southwest; birds and reptiles of Arizona; environmental mining reclamation; biological fieldwork, reports, and project management; environmental impact statement review and response (biology).

EXPERIENCE

1988-present
Wildlife Biologist, Cultural & Environmental Systems, Inc., Tucson.

1987-1988
Salesman (hunting and fishing equipment), Bob's North, Tucson.

1986
Field Archaeologist, Arizona State Museum, Tucson.

1983-1985
Substitute teacher (Biology, Chemistry, Mathematics), Tucson Unified School District, Tucson.

1982-1983
Reclamation Specialist, The Hopi Tribe, Kykotsmovi.

1982
Teaching Assistant, "Legal Basis of Wildlife Ecology," University of Arizona, Tucson.

1981
Research Assistant (fieldwork and data gathering on the white-tail deer in the Santa Rita Mountains, Arizona), U.S. Fish and Wildlife Service.

1980-1983
Research Assistant (fieldwork for M.S. thesis--ecology of mammals in chaparral vegetation), University of Arizona, Tucson.

1980-1981
Research Assistant (fieldwork on ecology of mammals, birds, reptiles, and plants for the Central Arizona Project), Professor Norman Smith, University of Arizona, Tucson.

1980
Teaching Assistant, "Wildlife Management Techniques," University of Arizona, Tucson.

1979-1983
Research and Teaching Assistant and Seminar Organizer, University of Arizona, Tucson.

1979-1981
Field Assistant (volunteer) (field check stations for dove, ducks, quail, mule and white-tail deer, and collared-peccary), for Arizona Game and Fish Department.

1979-1980
Field and Library Research Assistant (mammals of Arizona for revision of a mammalogy text) for Dr. E. L. Cockrum, University of Arizona, Tucson.

1977-1979
Field and Laboratory Assistant for Arid Lands (research on various botanical projects in Arizona and Mexico), Arizona-Sonora Desert Museum, Tucson.

1977
Field Archaeologist, Arizona State Museum, Tucson.

1974
Field and Laboratory Assistant (volunteer) (processed and collected plants; conducted field work on sea turtles in Northern Mexico) for Dr. R. S. Felger, University of Arizona Herbarium, Tucson.

GRANTS AND AWARDS

1980
U.S. Forest Service three-year grant to conduct research on mammals in chaparral vegetation, Rocky Mountain Forest and Range Experiment Station.

1975-1976
Comins Fund Grant, Department of Anthropology, University of Arizona.

1975
Bicentennial Grant to write a research paper on the DeAnza Expedition.

PUBLICATIONS

In progress
Ethnobotany in the Southwest, an annotated bibliography (with R. S. Felger).

In press
The Papago Indians, an annotated bibliography (with B. L. Fontana). Metuchen, New Jersey: Scarecrow Press.

1983
Ecology of Mammals in Chaparral Vegetation, Yavapai County, Arizona. MS, master's thesis, Department of Wildlife Ecology, University of Arizona, Tucson.

PROJECT BIOLOGIST

ARCHIE M. DICKEY

Assignment:	Biological Assessments
Education:	B.A, Biology and Earth Science, Adams State College M.S, Botany, Northern Arizona University Ph.D, Botany and Plant Ecology, Arizona State University
Registration:	None
Office Location:	Prescott, Arizona

Experience: Dr. Dickey is an Associate Biologist for Water Resources Associates, Inc. During his professional career, Dr. Dickey has conducted numerous biological and ecological investigations throughout the western United States. Dr. Dickey acted as Biologist of a series of multi-disciplinary studies of the geology, energy and mineral resources of Study Areas of Arizona, Colorado and Utah.

- Newsboy Gold Mine Geological-Environmental-Hydrological-Archaeological Baseline Study, Morristown, Arizona
  (1991-on-going)
  Associate Biologist
  A member of a multi-disciplinary team of Geologists, Hydrologists, Archaeologists, Biologists and Permitting Specialists to perform all tasks associated with the preparation of complete Baseline Studies for the design and permitting of a 1200 TPD open pit gold mine on a combination of State, Federal and Private lands.

- Bureau of Land Management - City of Prescott-Paulden
  Drill Site Baseline Environmental/Archaeological Study, Paulden, Arizona
  (October, 1991)
  Project Biologist
  Conducted a Baseline Biological Survey of an area to be used as a drill site. Researched various government data bases (U.S. Forest Service, U.S. Fish and Wildlife Service, Arizona Game and Fish Department, and State Land Department) for site-specific information on threatened or endangered plant or animal species. Prepared categorical exclusion and biological evaluation documentation for use of the proposed drill site.

- Tonopah Area Material Source Investigations/Biological Assessments, Tonopah - Wintersberg Area, Arizona.
  (November 1991-on-going)
  Associate Biologist
  Conducted a series of Baseline Biological Surveys of areas to be used as a material source. Research various governmental data bases (U.S. Forest Service, U.S. Fish and Wildlife Service, Arizona Game and Fish Department, and State Land Department for site-specific information on threatened or endangered plant or animal species.pepared Biological Evaluation documentation for use of the proposed material survey. Prepared portions of NEPA & CWA standard environmental analysis/assessments.

PROJECT ARCHAEOLOGIST/MATERIALS SPECIALIST

RICHARD J. LUNDIN

Assignment:	Cultural Resource Assessments
Education:	B.A, Anthropology and Geology, Beloit College Graduate Studies in anthropology and Geology, University of the Americas, Mexico and University of Arizona
Registration:	None
Office Location:	Prescott, Arizona

Experience: Mr. Lundin is a Geologist and Archaeologist for Water Resources Associates, Inc. During his professional career, Mr. Lundin has conducted numerous geological and archaeological investigations throughout the Western United States and in Florida. As Owner and General Manager of Wallaby Enterprises, Inc. and Wombat Mining and Exploration, he conducted over 100 geological, geophysical, geotechnical and cultural resource investigations for a variety of major corporate and governmental clients. Mr. Lundin acted as principal investigator of a series of multi-disciplinary studies of the geology, energy and mineral resources of Wilderness Study Areas of Arizona, Colorado and Utah. Mr. Lundin has directed major base and precious metal exploration programs for several mining companies.

- Santa Cruz Borrow Pit Archaeological Survey and Test Pit Program, Maricopa, Arizona
  (1991-on-going)
  Project Manager/Sr. Archaeologist - Geologist
  Supervised a 35 hole test program designed to document and describe the material characteristics of a Borrow source on the Gila River Indian Community. Management and supervision of a Class III Archaeological Survey of adjacent undisturbed lands in the Hohokam homeland.

- Newsboy Gold Mine Geological-Environmental-Hydrological-Archaeological Baseline Study, Morristown, Arizona
  (1991-on-going)
  Project Manager/Sr. Archaeologist-Geologist
  Supervised a multi-disciplinary team of Geologists, Hydrologists, Archaeologists, Biologists and Permitting Specialists to perform all tasks associated with the preparation of complete Baseline Studies for the design and permitting of a 1200 TPD open pit gold mine on a combination of State, Federal and Private lands.

- Cyprus Copper Company Material Source Investigation, and Baseline Environmental/Archaeological Study, Golden Valley, Arizona
  (March, 1990 - May, 1990)
  Principal Investigator/Archaeologist/Environmental
  Performed Class I-III Archaeological Surveys over several parcels that were considered as plant sites or aggregate sources.

  Monitored and sampled test pits that were designed to test the viability of a potential material source.

- Cyprus-Miami Material Source Investigation, and Baseline Environmental/Archaeological Study, Globe, Arizona
  (April, 1991 - June, 1991)
  Project Manager and Principal Investigator/Archaeologist
  Performed a series of Class I-II Archaeological/Environmental Surveys with the production of a comprehensive report that characterizes the prehistoric and historic cultural history and potential for sites in an area of the prehistoric Salado culture and the historic Apache.

  Monitored and sampled test pits that were designed to test the viability of a potential material source.

  Prepared a comprehensive report that discusses potential permitting and environmental problems associated with commercial sand and gravel mining operations.

APPENDIX D

WESTERN ECONOMIC ANALYSIS CENTER'S SOCIOECONOMIC REPORT

THE SOCIOECONOMIC IMPACT OF THE NEWSBOY GOLD MINE, MORRISTOWN, ARIZONA

Prepared by

George F. Leaming, Ph.D.

WEAC

WESTERN ECONOMIC ANALYSIS CENTER

Marana, Arizona

April 20, 1992

CONTENTS

THE NEWSBOY GOLD MINE

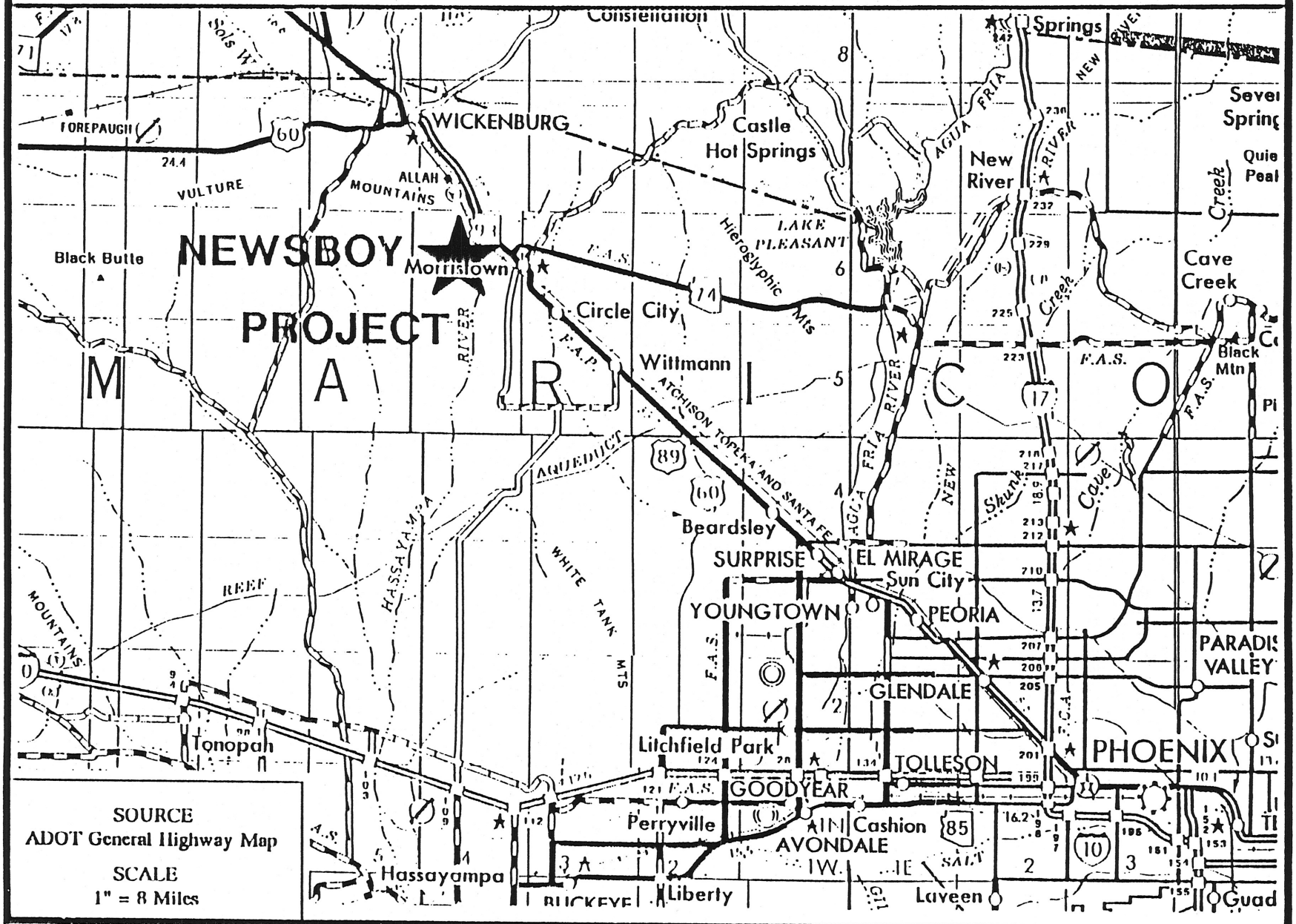
The proposed Newsboy Gold Mine will consist of an open pit mine, crusher, processing plant, and ancillary facilities including shops, storage buildings, offices, waste dumps, and a tailings impoundment area. The project has been designed to mine and process about 600,000 tons of gold ore per year, yielding an average of about 27,000 ounces of gold and 150,000 ounces of silver per year.

The proposed project is located in the northwestern part of Maricopa County, Arizona, approximately 40 miles northwest of Phoenix, about 10 miles southeast of Wickenburg, and about 3 miles west of Morristown. The entire project lies within the Morristown School District.

The proposed project is expected to require about a year of actual on-site construction and development, with full scale mining and processing operations continuing for a possible total of 10 years. At full production, the proposed project will require the services of 40 employees, 24 of whom will be employed by the Newsboy Gold Mining Company and 16 of whom will be employeed by the earth-moving contractor that is expected to be involved in the mining operations. The mine and plant will consume about 18,000,000 kwh per year in electrical energy with a service requirement of 3,000 kilowatts.

The Newsboy Gold Mine will be owned and operated by the Newsboy Gold Mining Company, a subsidiary of Pima Mining NL of Sidney, New South Wales, Australia, with offices in Tucson, Reno, and London, England.

FIGURE 1 **PROJECT LOCATION MAP**



THE EXISTING SOCIOECONOMIC ENVIRONMENT

Population

In 1990, the United States Bureau of the Census determined the population of Maricopa County, Arizona, to be 2,122,101 persons, the vast majority of whom were residents of the Greater Phoenix urban area. Another 4,515 persons were counted as residents of the Town of Wickenburg, located about 30 miles from the northwest edge of the Greater Phoenix urban area. It is estimated that another approximately 500 people currently reside in the unincorporated area of Maricopa County within the Morristown and Wickenburg school districts. That represents a total population of about 5,000 people in the immediate Wickenburg economic area (the Wickenburg and Morristown school districts), with more than two million people living in the Greater Phoenix urban area, within from 30 to 60 miles of the local community.

The population of both Wickenburg and Maricopa County have grown rather steadily over the past 20 years, as shown in Tables 1 and 2. The population of Wickenburg has grown by about two-thirds since 1970, and by about 28% since 1980. Both figures represent growth rates about half that of Maricopa County as a whole.

Table 1

POPULATION IN MARICOPA COUNTY, ARIZONA
1970-1991

Year	Population	Year	Population
1970	971,228	1981	1,568,700
1971	1,026,400	1982	1,612,000
1972	1,087,200	1983	1,642,300
1973	1,156,700	1984	1,718,700
1974	1,217,400	1985	1,814,700
1975	1,253,900	1986	1,881,900
1976	1,280,000	1987	1,976,600
1977	1,329,800	1988	2,032,000
1978	1,388,900	1989	2,089,900
1979	1,456,800	1990	2,122,101
1980	1,509,262	1991	2,175,600

Source of data: United States Bureau of the Census and the Arizona Department of Economic Security.

Table 2

POPULATION IN WICKENBURG, ARIZONA
1970-1990

Year	Population	Year	Population
1970	2,698	1981	3,570
1971	2,700	1982	3,600
1972	2,800	1983	3,700
1973	2,800	1984	3,800
1974	2,900	1985	3,900
1975	2,908	1986	4,000
1976	3,100	1987	4,100
1977	3,200	1988	4,100
1978	3,300	1989	4,200
1979	3,400	1990	4,515
1980	3,535		

Source of data: United States Bureau of the Census and the Arizona Department of Economic Security.

Employment and Unemployment

In 1991, the civilian labor force in Maricopa County, Arizona, averaged 1.055 million, while the number of employed persons averaged 1.003 million, for an average unemployment rate in the county of 4.9%. That rate of unemployment was somewhat higher than in the two previous years but still well below the decade high of 7.9% reached in 1982. The total number of unemployed persons in the county in 1991 was more than 51,000.

As shown in Table 3, the Maricopa County labor force decreased in 1991, after more than a decade of steady increases. The number of employed persons also declined, likewise after more than a decade of steady inceases. The abnormally high rate of unemployment in 1982 was the result of an unusually high increase in the labor force, not of a decrease in jobs. Last year, the number of jobs in Maricopa County actually declined for the first time in more than a decade, but the number of persons actively seeking work also fell, to keep the official unemployment rate well below those experienced by the county's economy in the early 1980s.

The unemployment rate in the Wickenburg, Arizona, labor market has been substantially less than in Maricopa County as a whole, as shown in Table 4. In 1991, the number of unemployed in

the Wickenburg labor market averaged 2.6% of the labor force. This was a little more than in the previous two years but still slightly less than in most of the latter half of the 1980s. The total labor force in the Wickenburg labor market in 1991 averaged a little more than 1,600, with employment averaging 1,565. Both were less than in the previous two years.

The tendency of the number of unemployed to closely parallel the total labor force, with a resulting comparatively low level of unemployment, reflects the proximity of the local labor market to the much larger urban Phoenix labor market. When jobs are not available in Wickenburg, the labor force tends to move to the larger nearby labor market where jobs may be more readily available, even if the overall unemployment rate for the entire metropolitan region (Maricopa County) is greater. The low unemployment rate in the Wickenburg labor market in fact reflects, not the ready availability of jobs, but the lack of job opportunities and the small population relative to the much larger population and number of jobs available only 30 miles away. Unemployed people do not remain where the job opportunities are scarce, they move elsewhere, thereby decreasing the total labor force. Similarly, those seeking jobs do not migrate to areas where job opportunities are scarce, thereby preventing the total labor force from increasing.

Table 3

LABOR FORCE, EMPLOYMENT, AND UNEMPLOYMENT
IN MARICOPA COUNTY, ARIZONA
1980-1991

Year	Labor Force	Employment	Unemployment Rate
1980	752,900	708,300	5.9%
1981	772,800	733,200	5.1%
1982	806,600	743,200	7.9%
1983	833,000	772,700	7.2%
1984	886,700	852,600	3.8%
1985	914,800	868,200	5.1%
1986	973,300	919,000	5.6%
1987	1,000,700	948,400	5.2%
1988	1,031,500	978,900	5.1%
1989	1,062,500	1,017,000	4.3%
1990	1,074,500	1,028,100	4.3%
1991	1,054,900	1,003,400	4.9%

Source of data: Arizona Department of Economic Security.

Table 4

LABOR FORCE, EMPLOYMENT, AND UNEMPLOYMENT
IN THE WICKENBURG, ARIZONA, LABOR MARKET
1983-1991

Year	Labor Force	Employment	Unemployment Rate
1983	1,240	1,192	3.9%
1984	1,377	1,350	2.0%
1985	1,391	1,354	2.7%
1986	1,492	1,448	2.9%
1987	1,522	1,480	2.8%
1988	1,569	1,527	2.7%
1989	1,619	1,583	2.2%
1990	1,640	1,603	2.3%
1991	1,606	1,565	2.6%

Source of data: Arizona Department of Economic Security.

The residents of Maricopa County have access to a large variety of jobs in virtually all of the major industrial sectors except mining. More than half of the county's employment is accounted for by jobs in trade and services, as shown in Table 5, with manufacturing and government also providing employment for large shares of the county's working population. Mining, mostly in sand and gravel operations producing materials for the county's construction industry, accounted for fewer than a thousand of the nearly a million employed people in Maricopa County in 1991.

The residents of the Wickenburg economic area also are heavily dependent upon the trade and service sectors for jobs, but unlike the county as a whole, they do not have substantial additional employment opportunities in federal, state, or local government, or in manufacturing. Furthermore, many of the service sector jobs in the Wickenburg economy are provided by enterprises that serve seasonal (winter) tourist activity. As a result, that employment is highly seasonal. Although Wickenburg has a substantial employment base in tourism, it has virtually no other significant source of basic (money importing) employment other than agriculture. Both industries tend to be highly seasonal, and both tend to provide comparatively low levels of wages. This dependence on tourism and a very limited agricultural sector severely limits the diversity of employment in the Wickenburg economy and makes local employment extremely sensitive to changes in winter visitor propensities.

Table 5

COVERED WAGE AND SALARY EMPLOYMENT
IN MARICOPA COUNTY, ARIZONA
SECOND QUARTER, 1991
(by place of work)

Industry	Number of Employees	Percent
Agriculture(1)	15,708	1.6
Mining	762	0.1
Manufacturing	132,521	13.5
Construction	49,858	5.1
Transportation and Public Utilities	53,403	5.5
Wholesale and Retail Trade	246,512	25.2
Finance, Insurance, and Real Estate	73,356	7.5
Services	264,426	27.0
Federal Government(2)	18,436	1.8
State and Local Government	124,311	12.7
TOTAL	979,293	100.0

Includes only employees covered by the employment security laws of Arizona. Does not include self-employed persons, most of whom are found in trade, services, and agriculture.

(1) Excludes seasonal farm workers not covered by the employment security laws of Arizona.

(2) Excludes some federal government workers not covered by the employment security laws of Arizona.

Workers who live in Maricopa County but work outside the county are also excluded.

Source of data: Arizona Department of Economic Security.

Personal Income

Total personal Income received by residents of Maricopa County has risen substantially over the past decade. As shown in Table 6, the total amount of personal income received by those living in Maricopa County has more than doubled since 1981 to exceed $36.8 million in 1989, the latest year for which reliable estimates are available. The same rate of growth has been achieved for wages and salaries received by persons working in

the county. In 1989, the total wages and salaries of all those employed in Maricopa County approached $22.4 million, more than twice what had been paid to workers in the county in 1981. In 1991, such earned income was slightly above the 1989 level, despite decreases in employment. Only two-thirds of the personal income of county residents, however, comes from wages and salaries. The other third is received in the form of pensions and other retirement benefits, dividends, interests, and rents, as shown in Table 7.

As shown in Table 7, the total of over $36.8 billion in personal income received by residents of Maricopa County in 1989 came from a wide variety of sources. The largest source was government, including federal, state, and local governments, and including both transfer payments (social security, military and other retirement benefits, and welfare payments) and the wages and salaries paid by government agencies. Dividends, interest, and rents were also a large source of personal income in Maricopa County in 1989, but much of such personal income involved payments made by local businesses and residents of the county to other residents of the county, as basic income brought in from outside circulated within the local economy. The sources of this basic income, from which all other income is derived by local circulation, are shown in Table 8.

Table 6

PERSONAL INCOME RECEIVED BY
RESIDENTS OF MARICOPA COUNTY, ARIZONA
1981-1989

Year	Wages and Salaries(1)	Total Personal Income(2)
1981	$10,817,871,000	$17,555,654,000
1982	11,414,536,000	18,583,583,000
1983	12,673,780,000	20,676,917,000
1984	14,592,891,000	23,492,809,000
1985	16,575,239,000	26,490,527,000
1986	18,262,497,000	29,063,680,000
1987	19,785,340,000	31,774,221,000
1988	21,291,546,000	34,125,929,000
1989	22,363,160,000	36,803,975,000

(1) Earned by place of work.
(2) Received by place of residence.

Sources of data: Bureau of Economic Analysis, United States Department of Commerce.

Table 7

PERSONAL INCOME OF MARICOPA COUNTY RESIDENTS, 1989

Source of Income	Amount of Personal Income
Earnings by industry	
Agriculture and related	$ 380,578,000
Mining	73,356,000
Construction	1,860,110,000
Manufacturing	4,560,781,000
Transportation and Public Utilities	1,715,758,000
Wholesale and Retail Trade	4,742,559,000
Finance, Insurance, and Real Estate	2,315,201,000
Services	7,234,760,000
Federal Government	852,431,000
State and Local Government	2,864,963,000
Dividends, Interest, and Rent	7,099,094,000
Net Transfer Payments (1)	3,108,917,000
TOTAL	$36,803,975,000

(1) Total transfer payments minus personal contributions for social insurance.

Source of data: Western Economic Analysis Center, based on data from the Bureau of Economic Analysis, United States Department of Commerce.

Table 8

BASIC PERSONAL INCOME RECEIVED BY RESIDENTS OF MARICOPA COUNTY, ARIZONA, 1989

Source of Income	Amount of Income	Percent
Agriculture and related	$ 380,578,000	4.0
Wholesale trade (non-local)	675,038,000	7.0
Manufacturing for export	3,345,789,000	34.9
Tourism	582,398,000	6.1
Federal Government employment	852,431,000	8.9
State Government employment	636,480,000	6.6
Retirement and Welfare	3,108,917,000	32.5
TOTAL	$9,581,631,000	100.0

Source: Western Economic Analysis Center, based on data from the United States Department of Commerce and the State of Arizona.

Housing

In 1991, nearly 22,000 new housing units with a total value of more than $1.6 billion were built in Maricopa County. The total of new homes built in 1991 was 18% more than in the previous year, which saw the fewest number of new housing units built in more than a decade. The total value of new homes built last year in the county was up about a third over 1990, likewise reflecting a reversal of the housing construction slump that has beset Maricopa County since 1987. Much of that new building in Maricopa County in recent years has taken place in the northwest part of the Greater Phoenix urban area.

Table 9

HOUSING CONSTRUCTION IN MARICOPA COUNTY, ARIZONA
1981-1991

Year	Value of Residential Building	New Housing Units
1981	$ 616,843,000	23,609
1982	594,300,000	22,641
1983	1,158,298,000	31,995
1984	1,454,174,000	30,480
1985	1,664,439,000	33,438
1986	1,788,918,000	33,055
1987	1,754,155,000	28,486
1988	1,534,463,000	23,004
1989	1,262,290,000	18,999
1990	1,218,025,000	18,496
1991	1,613,885,000	21,796

Sources of data: Center for Business Research, Arizona State University, and the Economic and Business Research Program, the University of Arizona.

In the Wickenburg community, new housing construction, as shown in Table 10, was down slightly in 1991, but the number of new units was still well above lows reached in 1986 and 1988. The value of new homes built in the Wickenburg community in 1991 was more than double the value of new homes built in 1988. Since 1980, a total of about 340 housing units have been added to the community at an average rate of about 31 per year.

Table 10

HOUSING CONSTRUCTION IN WICKENBURG, ARIZONA
1981-1991

Year	Value of Residential Building(1)	New Housing Units(1)
1981	$ 496,000	15
1982	247,000	14
1983	744,000	31
1984	1,049,000	34
1985	1,354,000	40
1986	1,003,000	25
1987	1,159,000	30
1988	692,000	26
1989	928,000	30
1990	1,594,000	53
1991(2)	1,515,000	39

(1) Including mobile homes.
(2) For 11 months only.

Sources of data: Center for Business Research, Arizona State University, and the Economic and Business Research Program, the University of Arizona.

Utilities

Electrical energy is provided to the residents of the Wickenburg economic area by the Town of Wickenburg and by the Arizona Public Service Company of Phoenix. Natural gas is provided by Southwest Gas Corporation of Las Vegas, Nevada. Telephone communications service is provided in the Wickenburg area by US West Communications of Denver, Colorado.

Domestic water is provided in Wickenburg and in immediately adjacent unincorporated areas by the Town of Wickenburg's municipal water utility. In some unincorporated parts of the local economic area, domestic water is provided by small private water systems and by private wells.

Sewer service is provided by the Town of Wickenburg for the town and some immediately adjacent unincorporated areas. Most of the rural parts of the local economic area are served by individual septic systems.

Education

Primary and secondary education in the Wickenburg economic area are provided by the Morristown School District and the Wickenburg Unified School District. Students of high school age who live in the Morristown School District may attend the high school of their choice with their tuition paid by the Morristown School District. Most attend the nearby Wickenburg High School, within the local economic area, but some attend high school in other districts outside of the immediate area, particularly the Peoria High School in the northwest part of the Greater Phoenix urban area. The number of those who leave the local economic area to attend high school, however, is relatively small.

The proposed Newsboy Gold Mine is located within the Morristown School District, although some of the additional property held by the Newsboy Gold Mining Company lies within the adjacent Wickenburg School District. The Morristown School District served 49 elementary and 24 high school students in 1990-91, with all 24 high school students actually attending school in other districts. The Wickenburg Unified School District served 723 elementary and 384 high school students, with 128 of the elementary school students and 139 of the high school students coming from outside of the Wickenburg School District. The number of students in the Morristown School District in 1990-91 was down about 11% from the previous year, while the number attending Wickenburg schools was up about 1%.

The Wickenburg economic area is also served by the Maricopa County Community College District, with its nearest permanent facilities at Glendale, about 35 miles southeast of Morristown. Residents of the Wickenburg area also have access to some services of Yavapai Community College on a cost basis.

In 1990-91, the Morristown School District had total revenues of $518,262. Of that total, $278,049 (53.7%) came from local sources, mostly the property tax, and another $206,602 (39.9%) came from state aid, mostly through the direct distribution of state sales and severance tax receipts. Almost equal amounts of approximately $16,800 each (3.2%) came from Maricopa County and from federal aid.

The Wickenburg Unified School District had total revenues of $4,965,175 in 1990-91, with 62.2% coming from local sources, mostly the property tax and tuition payments from other school districts, and 31.1% coming from state aid, mostly through the direct distribution of state sales and severance tax receipts. Another 3.6% of the Wickenburg Unified School District's funds in 1990-91 came from Maricopa County, while 3.1% was federal aid.

Public Safety

Law enforcement is provided in the unincorporated portions of the Wickenburg economic area by the Maricopa County Sheriff's Department, with a complement of about 12 deputies stationed in Wickenburg. Law enforcement within the Town of Wickenburg is provided by the Wickenburg Police Department, with a staff of about 15. In addition, the Arizona Department of Public Safety maintains patrols on state highways in the area.

Fire protection is provided in Wickenburg and much of the Morristown School District by the Wickenburg Fire District, with a staff of 26 volunteer firefighters. The Wittman Fire District also provides fire protection in the easternmost portion of the Morristown School District. Both fire districts are financed by property taxes on property within the respective districts and by the county fire district contributions levied on all property in Maricopa County.

Emergency services are provided by Maricopa County, the Town of Wickenburg, and the fire districts. The Town of Wickenburg operates an ambulance service with two vehicles, emergency medical technicians and paramedics. Two helicopter ambulance services also are readily available in the area. A small (34-bed) hospital is located in Wickenburg.

Transportation

U.S. Highways 60 and 89 traverse the Wickenburg economic area and provide access to its major communities. U.S. Highway 60 runs generally west from Wickenburg to the Colorado River and points west, while U.S. Highway 89 runs generally northwest from Wickenburg to Prescott, in Yavapai County, and connecting with U.S. Highway 93, to Kingman, in Mohave County, and points beyond in Nevada. Southeast of Wickenburg, and through the Morristown community, Highways 60 and 89 coincide to form the major route connecting the Wickenburg-Morristown area with the Greater Phoenix urban area. Routes 89 and 93 form the major highway link between the Greater Phoenix urban area and Las Vegas and Laughlin, Nevada. Arizona State Highway 74 also extends eastward from Morristown to link the community with Lake Pleasant, Interstate 17, and the northern part of the Geater Phoenix urban area. The site of the proposed Newsboy Gold Mine is served by a largely unpaved county road, Gates Road, that extends west from Morristown, where it connects with U.S. Highway 60-89 between Wickenburg and Phoenix.

A branch line of the Atchison, Topeka, and Santa Fe Railroad provides freight service to the Wickenburg economic area. The

line extends from the mainline of the Santa Fe at Ash Fork in Northern Arizona and extends into the Greater Phoenix area. It also provides connections to other Santa Fe branch lines in Southern California through Parker, Arizona, to the west. Between Wickenburg and Phoenix, the railroad passes through Morristown and generally parallels the alignment of U.S. Highway 60-89.

The Town of Wickenburg operates a municipal airport with a 5,050 ft. paved and lighted runway. Paved parking, hangars, repair services, and both regular aviation and jet fuel are available at the airport. The facility is capable of handling some corporate jets. The airport is located just west of Wickenburg on U.S. Route 60 and is within the town limits.

Other Community Services

The Town of Wickenburg operates five parks within the town with two public tennis courts and a public swimming pool. The community also possesses a community center, a youth center, two golf courses, a public library, and a significant museum, the Desert Caballeros Western Museum, emphasizing western art and history. Consistent with its economic role as a tourist haven, the Wickenburg community also has a substantial number of private tennis facilities and private art galleries as well as other private recreational facilities.

The Tax Base

Maricopa County gets part of its revenues from property taxes and part from the disbursement of sales and severance taxes from the State of Arizona under a formula established by legislation and based on local property taxes levied and local collections of state sales and other taxes. In Fiscal 1991, Maricopa County government got $159.6 million from the State through such disbursements and collected $242.4 million in county property taxes. The various classifications of taxable property in Maricopa County and the assessed valuations of each class in 1991 are shown in Table 11.

School districts get their revenues from the taxes levied on the property within their jurisdictions and through the distribution of state sales and severance taxes, including mining severance taxes, according to a formula established by law and based essentially on average daily student membership. In 1990-91, the Morristown School District got a little over half of its revenues from the property tax and a little under 40% of its revenues from the distribution of state taxes. The composition of the Morristown School District tax base is shown in Table 12.

Table 11

THE PROPERTY TAX BASE OF MARICOPA COUNTY, ARIZONA
1991

Class of Property	Net Assessed Valuation Primary	Secondary
Agricultural, vacant land	$ 1,283,304,069	$ 1,472,912,942
Livestock	497,811	497,811
Producing mines and timber	772,805	772,805
Railroads	19,870,391	21,834,234
Public Utilities	2,447,993,416	2,447,993,416
Other commercial, industrial	4,787,495,934	4,909,059,619
Rented residential	1,000,505,134	1,024,755,960
Owner-occupied residential	4,332,913,313	4,355,111,441
Historic property	2,262,818	2,237,647
TOTALS	$13,875,615,691	$14,235,175,875

Source of data: Arizona Department of Revenue.

Table 12

THE PROPERTY TAX BASE OF THE
MORRISTOWN SCHOOL DISTRICT
1991

Class of Property	Net Assessed Valuation Primary	Secondary
Agricultural property, vacant land	$3,094,110	$3,918,209
Livestock	-0-	-0-
Producing mines and standing timber	-0-	-0-
Railroads	243,416	264,364
Public utilities	728,471	728,471
Other commercial, industrial property	628,511	704,156
Rented residential property	266,881	110,201
Owner-occupied residential property	1,383,568	1,526,846
Historic property	-0-	-0-
TOTALS	$6,344,957	$7,252,247

Source of data: Arizona Department of Revenue

Incorporated muncipalities such as Wickenburg get their revenues from local sales taxes, local property taxes, and through the disbursement of state sales, severance, and corporate income taxes according to a formula established by law and based essentially on population in the latest official census. Property taxes provide a relatively small part of governmental revenues in municipalities. The proposed Newsboy Gold Mine is located outside of the town limits of Wickenburg and would not form a part of the property tax base for the municipality. Nor would purchases of electric power or communications services made by the mine be subject to municipal sales taxes.

Health Care

Primary health care is provided in the Wickenburg economic area by six physicians, one opthamalogist, one optometrist, one optician, and four dentists, all in private practice. Hospital care is provided by a 34-bed hospital located in Wickenburg. The community is also served by a 40-bed nursing home and a custodial care center.

DIRECT IMPACT ON THE SOCIOECONOMIC ENVIRONMENT

Employment and Personal Income

The proposed Newsboy Gold Mine is expected to employ a total of 40 persons when operating at full production levels. This represents a direct addition of 40 jobs to the Maricopa County economy and to the economy of the Wickenburg-Morristown area. The company expects to fill as many of these 40 positions as possible with local hires, but since the total number of unemployed persons in the immediate Wickenburg labor market is only about 40, it is most likely that a significant portion of these new employees will be residents of other parts of Maricopa County. It is also likely that those new employees who now live in the northwest part of the Greater Phoenix urban area will continue to do so and commute to work in Morristown, at least initially. Others, particularly those filling skilled positions, who now reside more than 30 miles away, will probably move to the Wickenburg area, thereby increasing both the local labor force and the number of employed.

Based on the Wickenburg community's past record and the extent of frictional unemployment in Arizona labor markets, it is not likely that the percentage of unemployed in the Wickenburg labor market will drop much below 2%, even when the Newsboy Gold Mine is in full production. Therefore, it is most likely that a total of about 30 of the proposed gold mine's new employees will have to be hired outside of the immediate community. If all of those new employees move to the Wickenburg-Morristown area, that will increase the local labor force to 1,636 and employment to 1,605, representing a net gain in total employment of about 2.5% over the 1991 level and dropping the unemployment rate to 1.9%.

The direct addition of 40 jobs to the employment level in Maricopa County is not likely to have any measureable effect on the county's unemployment rate.

Total wages and salaries paid to employees of the Newsboy Gold Mine are expected to average about $1,200,000 per year during the life of the mine. A contribution of this amount of personal income to an economy the size of the Maricopa County economy would not be noticeable, but it would represent a significant contribution to the economy of the Wickenburg-Morristown area. Assuming that the local economy, with about 0.2% of the county's population, has about the same proportion of the county's total personal income, then the payroll of the Newsboy Gold Mine would amount to about 1.4% of the personal

income received by all residents of the Wickenburg economic area, and 3.4% of all wages and salaries paid to workers in the local economy.

The addition of 40 new mining jobs and $1,200,000 per year of mining payrolls to the Wickenburg-Morristown economy would reduce the local economy's reliance on retirement, tourism, and agriculture by adding a significant new sector to the local economic base. In addition, the presence of an active gold mine in an area historically founded on gold mining could measureably enhance the local tourism industry.

Local Purchases of Products and Services

It is expected that the Newsboy Gold Mine will incur costs for equipment, spare parts, operating supplies, electrical energy, motor fuel, and other products and services. During each year of full production, about $4,000,000 of these purchases from other businesses will be made from businesses located in Arizona. Of that total, some $3,768,000 will go to businesses located in Maricopa County, but only about $130,000 per year will go to firms located in the local Wickenburg-Morristown economy. That will be the result of the community's proximity to the larger urban economy and by the established base of mining suppliers already located in the Greater Phoenix area.

State and Local Taxes Paid Directly

Based on its expected rate of production, 1991 gold and silver prices, and existing Arizona tax rates, it is expected that the Newsboy Gold Mine will pay an average of $245,000 per year in severance taxes to the State of Arizona. Part of this annual severance tax payment will be retained by the State, but part will be distributed to county, municipal, and school district governments throughout Arizona, including those in the Wickenburg economic area.

Based on the expected rate of production and the life of the property, and upon existing assessment practices of the Arizona Department of Revenue with respect to gold mines, it is expected that the Newsboy Gold Mine will be assigned an assessed valuation of about $2,370,000. Applying the appropriate property tax rates existing in 1991 to that valuation yields an estimated average annual property tax payment by the project of about $210,000, to be paid to Maricopa County as collector for the State of Arizona, the county itself, the Morristown School District, the Maricopa County Community College District, and the Wickenburg Fire District. This represents a combined effective property tax rate of $8.85 per $100 of assessed valuation.

If the Newsboy Gold Mine is as profitable on the average as other Arizona gold mines have been during the past two years, then the operation will pay corporate income taxes to the State of Arizona averaging $45,000 per year. Most of this will be retained by the State, but a portion will be distributed each year to muncipal governments throughout Arizona, essentially on the basis of population.

Many of the purchases of products and services made by the Newsboy Gold Mine in Arizona will be subject to the state sales tax. Based on the expected volume of such purchases by the mine, and based on the effective sales tax rates paid by other Arizona metal mining companies, it is estimated that the Newsboy Gold Mine will pay an average of $103,000 each year in sales taxes to the State of Arizona. Much of this will be paid on purchases of electrical energy and communications services. Like the firm's severance tax payments, part of these sales tax payments will be retained by the State and part will be distributed to county, municipal, and school district governments throughout the state.

The Newsboy Gold Mine also will be required to pay unemployment and workers' compensation taxes to the State of Arizona based on its payrolls. It is estimated that such taxes will average $9,000 per year during the life of the mine.

In addition, the Newsboy Gold Mine will be required to make other payments of taxes and fees, including motor vehicle license fees, primarily to the State of Arizona. Based on the level of such miscellaneous taxes and fees paid by other Arizona metal mines, it is expected that the Newsboy Gold Mine will pay about $4,000 per year in such taxes and fees.

The average annual direct contributions of the Newsboy Gold Mine to state and local government revenues by type of tax are listed in Table 13.

Governments Gaining Revenues Directly from the Newsboy Gold Mine

Local governments within Maricopa County will receive a total of $366,000 each year directly from the Newsboy Gold Mine. Of that amount, Maricopa County government will receive $104,000, about half from the county property tax and about half from the distribution of sales and severance taxes paid to the State of Arizona. The county's 24 municipal governments will receive a total of $42,000 per year, all through the automatic distribution of sales, severance, and corporate income taxes paid by the mine. The amount of this revenue received by the Town of Wickenburg will be negligible because of its small population compared to other municipalities in the county.

The school districts of Maricopa County will get a total of $195,000 per year from the taxes paid by the Newsboy Gold Mine. Of this total, $122,000 will go directly to the Morristown School District in property tax payments. The remainder will derive from the allocation to schools of a share of sales and severance tax payments made to the State of Arizona. Very little of that amount, however, will go to either Morristown or Wickenburg schools because of their small size compared to other school districts in Maricopa County.

Other local government jurisdictions, including the Maricopa Community College District and the Wickenburg Fire District, will receive a total of $25,000 each year from the Newsboy Gold Mine. All of this will be from property taxes paid by the firm. Other areas of Arizona also will receive significant amounts of revenue from the Newsboy Gold Mine as a result of the way that sales, severance, and corporate income taxes are distributed throughout the state. Local governments outside of Maricopa County will receive a total of $108,000 each year from the proposed gold mine, as shown in Table 14.

Table 13

DIRECT CONTRIBUTIONS
TO STATE AND LOCAL GOVERNMENT REVENUES
(in 1991 dollars at 1991 tax rates)

Type of Contribution		Annual Amount
Severance tax		$245,000
Property taxes		210,000
State of Arizona	$ 11,000	
Maricopa County	52,000	
Morristown Schools	122,000	
Maricopa County Community Colleges	20,000	
Other jurisdictions	5,000	
Corporate income tax		45,000
Sales taxes on purchases		103,000
State payroll taxes		9,000
Miscellaneous taxes and fees		4,000
TOTAL		$616,000

Source: Western Economic Analysis Center, based on data from the Arizona Department of Revenue, the Arizona Tax Research Foundation, the Newsboy Gold Mining Company, and existing Arizona gold producers.

Table 14

STATE AND LOCAL GOVERNMENTS RECEIVING REVENUES
FROM THE NEWSBOY GOLD MINE
(based on 1991 conditions)

Government Unit		Annual Revenue
State of Arizona		$142,000
In Maricopa County:		366,000
County government	$104,000	
Municipalities	42,000	
School Districts	195,000	
Other jurisdictions	25,000	
All other local governments in Arizona		108,000
TOTAL		$616,000

Source: Western Economic Analysis Center, based on data from the Arizona Department of Revenue, the Arizona Tax Research Foundation, the Newsboy Gold Mining Company, and existing Arizona gold producers.

Direct Impacts on Population and Housing

The operation of the Newsboy Gold Mine will most probably require the importation of 30 employees from outside of the immediate Wickenburg-Morristown area, probably from elsewhere in Maricopa County. These new employees are likely to be heads of households, and therefore, their addition to the local population will result in the addition of about 75 more people to the number of local residents. That represents an increase of about 1.5% over the 1990 Census count.

If under the most extreme conditions, all 40 employees of the project are hired outside of the Wickenburg economic area, then the net addition to the local population will be about 100, an increase of 2% over the 1990 Census count. Over the past two decades, the population of the Wickenburg community has been growing at an average rate much greater than that.

The most probable case of 30 outside new hires and 75 new residents resulting from the operation of the Newsboy Gold Mine will result in a demand for 30 new housing units. This is slightly less than the average number of new homes added to the local housing supply each year over the past decade and well

below the peak of 53 units added in 1990. It is also well below the more than 40 single family homes listed for sale in the Wickenburg real estate market in the first quarter of 1992. The new residents would thus tend to soak up some of the vacant homes in the current real estate market in the Wickenburg community and would tend to stimulate, rather than burden the local residential construction industry.

Increased employment created directly by the operation of the Newsboy Gold Mine, therefore, would provide a significant stimulus to the construction and real estate sectors of the Wickenburg-Morristown economy. The number of new residents brought into the community by the project's development and operation would not place an undue burden on the community's existing housing supply, even under maximum immigration conditions. The increased employment would not have any appreciable direct impact on the residential construction or real estate sectors of the Maricopa County economy.

Direct Impacts on Local Schools

The most probable increase of 30 new households in the Wickenburg-Morristown area caused by the opening of the Newsboy Gold Mine would add about 12 new school-age children to the existing population. This amounts to 16% of those served by the Morristown School District, but only 1% of the nearly 1,200 students attending Morristown and Wickenburg schools, those that would be directly affected by the increase. Even under the most extreme condition of 40 new households, the 16 new school-age children added to the area's population would amount to only 1.4% of those attending the two local school systems.

In 1990-91, the Morristown Elementary School operated with 8 fewer students than in the year before and 17 fewer than in the 1988-89 school year, reflecting sharply declining enrollment in the district and the presence of excess capacity at the school. Even the most extreme situation in which all new students were to attend the Morristown Elementary School, therefore, would not put an undue strain on existing school facilities. Furthermore, the addition of the Newsboy Gold Mine to the existing tax base of the Morristown School District would increase that base by 35% and generate more than enough additional revenues therefrom to pay for any needed increase in operating expenses. In fact, at the rate of expenditure per student in 1990-91, the Newsboy Gold Mine will provide the Morristown School District directly with enough additional revenue to cover the maintenance and operation expenditures for 21 students. The presence of the mine, however, is not likely to provide any significant amount of new revenues directly to the Wickenburg Unified School District. Of course,

the residential real estate taxes paid by new mine employees who choose to reside in the Wickenburg School District would go directly to that jurisdiction, and the children of those new employees, by attending Wickenburg schools, would increase the amount of state-aid revenues received by the Wickenburg Unified School District, by about $1,800 per student at 1990-91 levels.

Direct Impact on Other Local Government Services

The most probable addition of 30 new households to the population of the Wickenburg economic area resulting from the opening of the Newsboy Gold Mine would not place any undue burden on existing public safety services in the community. The addition of a new industrial activity with its potential for industrial accidents, however, could cause some potential strain on emergency services in the county. To mitigate this potential adverse impact, the mining company could train a sufficient number of its own employees as Emergency Medical Technicians to have at least one such trained person on each work shift to augment existing community personnnel.

Since other local government services provided in the Wickenburg economic area are basically adequate to serve the existing population, the small expected increase in the local population resulting from the opening of the Newsboy Gold Mine would have no significant adverse impact on such local government activity. In fact, the direct increase in the population could serve to lower the unit costs of local government services by using currently unused infrastructure.

Direct Impact on Local Transportation Facilities

The Newsboy Gold Mine is expected to cause a significant increase in traffic on Gates Road, from Morristown to the mine site, and some slight increase on Grand Avenue (U.S. Highway 60-89) between the Gates Road intersection and residential areas in Wickenburg. Any traffic increase on U.S. Highway 60-89 southeast of Morristown caused initially by workers commuting from the Greater Phoenix urban area is likely to be negligible compared to existing traffic on that highway.

Gates Road from Morristown to the mine site is not adequate to serve the mine and its workers. The road is largely unpaved, and its current gravel surface and existing curves could make it extremely dangerous for commuting workers. Furthermore, the Santa Fe Railroad crossing on Gates Road just southwest of the Morristown intersection could be dangerous, particularly if commuting workers take for granted the relatively light train traffic at that crossing and do not stop and look before

proceeding to cross the tracks. These adverse conditions, however, could be alleviated by paving the full length of Gates Road from Morristown to the mine site, installing a suitable low-water crossing where the road crosses the Hassayampa River, and installing an automatic signal and gate at the Santa Fe Railroad crossing in Morristown. The expected contribution of the Newsboy Gold Mine of $52,000 each year in property taxes to Maricopa County should be more than enough to adequately upgrade and maintain the county road from Morristown to the mine site.

The presence of the Newsboy Gold Mine in the Wickenburg economic area could provide some stimulus to activity at the Wickenburg Municipal Airport, thereby creating greater use for the airport's excess capacity and lowering unit operating costs for the town.

Direct Impacts on Other Local Service Sectors

The opening and operation of the Newsboy Gold Mine and its resulting probable small increase in the local population is not likely to have any significant impact on local health care facilities. The addition to the community of a significant worker base with health care insurance and benefits typical of the Arizona metal mining industry could, in fact, provide a stronger economic base to the operation of the local community hospital and local primary care providers.

The Newsboy Gold Mine will be a significant user of electric power. This will probably require some extension of transmission facilities in and near the proposed mine, but these will be paid for by the mining company in negotiating power rates with the supplier. Excess electrical generating capacity already exists in Arizona and the Southwest, so that the demands of the Newsboy Gold Mine for power will not place an undue burden on existing electrical generating capacity in the region. To the contrary, the operation of the mine could absorb some of the existing excess capacity and help to lower unit costs and rates for other electric power users in the area.

Table 15

DIRECT IMPACT OF THE NEWSBOY GOLD MINE
ON THE ECONOMY OF THE WICKENBURG ECONOMIC AREA

During each year of full production, spending by the Newsboy Gold Mining Company will provide directly an average of:	Annual Amount
PERSONAL INCOME FOR RESIDENTS OF THE WICKENBURG ECONOMIC AREA(1) OF:	$1,200,000
and	
SALES FOR OTHER BUSINESSES IN THE WICKENBURG ECONOMIC AREA(1) OF:	130,000
and	
LOCAL GOVERNMENT REVENUES IN THE WICKENBURG ECONOMIC AREA(1) OF:	127,000
for a:	
TOTAL DIRECT ECONOMIC IMPACT OF:	$1,457,000

Annual amounts are at full production levels in 1991 dollars.

(1)The Wickenburg Economic Area is defined as the area within the Wickenburg and Morristown school districts and includes the Town of Wickenburg.

Source: Western Economic Analysis Center.

Table 16

DIRECT IMPACT OF THE NEWSBOY GOLD MINE
ON THE ECONOMY OF MARICOPA COUNTY, ARIZONA

During each year of full production, spending by the Newsboy Gold Mining Company will provide directly an average of:	Annual Amount
PERSONAL INCOME FOR MARICOPA COUNTY RESIDENTS OF:	$1,200,000
and SALES FOR OTHER BUSINESSES IN MARICOPA COUNTY OF:	3,768,000
and LOCAL GOVERNMENT REVENUES IN MARICOPA COUNTY OF:	366,000
for a TOTAL DIRECT ECONOMIC IMPACT ON THE COUNTY OF:	$5,334,000

Annual amounts are at full production levels in 1991 dollars.

Source: Western Economic Analysis Center.

Table 17

DIRECT IMPACT OF THE NEWSBOY GOLD MINE
ON THE ECONOMY OF ARIZONA

During each year of full production, spending by the Newsboy Gold Mining Company will provide directly an average of:	Annual Amount
PERSONAL INCOME FOR ARIZONA RESIDENTS OF:	$1,200,000
and SALES FOR OTHER ARIZONA BUSINESSES OF:	4,000,000
and STATE AND LOCAL GOVERNMENT REVENUES OF:	616,000
for a TOTAL DIRECT ECONOMIC IMPACT ON THE STATE OF:	$5,816,000

Annual amounts are at full production levels in 1991 dollars.

Source: Western Economic Analysis Center.

INDIRECT, INDUCED, AND ACCUMULATED IMPACTS ON THE SOCIOECONOMIC ENVIRONMENT

Indirect and Accumulated Impacts on Personal Income

The full economic impact of the Newsboy Gold Mine will not be limited to the direct contributions of the enterprise to personal, business, and government incomes through the mine's own payrolls, purchases, and tax payments. The money received by the mine's employees as wages and salaries, by local, county, and statewide businesses as sales receipts, and by local and state governments as taxes and fees, will circulate and recirculate a number of times within the community, the county, and the state economies before being dissipated through leakages or outflows from these economies to other states and the national economy. As this money circulates and recirculates, it creates additional indirect personal, business, and government income in a ripple or multiplier effect. As a result of this ripple effect, the gains from any new enterprise such as the Newsboy Gold Mine are multiplied well beyond the direct impacts of payrolls, purchases, and taxes paid directly by the enterprise itself.

In the case of the Newsboy Gold Mine, its operation at full scale production will create an indirect economic gain of $235,000 each year in added personal income for residents of the Wickenburg economic area, as shown in Table 18. The economy of Maricopa County will gain even more indirectly from the operation of the Newsboy Gold Mine, as shown in Table 19. During each year of full production, an added $2.3 million of personal income for Maricopa County residents will be created indirectly by the circulation and recirculation of the mine's payroll, purchase, and tax payment dollars. The state's economy will gain still more, as shown in Table 20. During each year of full production of the Newsboy Gold Mine, residents of Arizona will receive almost $4.2 million in personal income in addition to the $1.2 million mine payroll as a result of the multiplier effect acting on the mine's direct contributions of payroll, purchase, and tax dollars.

The full economic gains to be realized by the residents of the Wickenburg-Morristown community, Maricopa County, and Arizona from the operation of the Newsboy Gold Mine near Morristown are, of course, the accumulated direct and indirect economic impacts resulting from the mine's presence. The accumulated direct and indirect gains in personal income received by residents of the Wickenburg economic area during each year of full production will amount to more than $1.4 million, as shown in Table 18. That represents about 1.6% of the personal income received by all

residents of the Wickenburg economic area and about 4% of all wages and salaries earned by those employed in the community. It is equivalent to the addition of about 50 new jobs, including the 40 new jobs to be provided directly by the Newsboy Gold Mine.

The accumulated gains in personal income received by residents of Maricopa County will amount to more than $3.5 million during each year of full production of the Newsboy Gold Mines, as shown in Table 19. That is equivalent to the addition of 140 new jobs to the county's economy, including the 40 new jobs to be provided directly by the proposed gold mine.

For the economy of the entire state, the accumulated direct and indirect contributions to personal income during the life of the Newsboy Gold Mine will be much more than in either Wickenburg or Maricopa County alone, reaching almost $5.4 million, as shown in Table 20. That is equivalent to the addition of about 230 new jobs to the state's economy, including the 40 new jobs provided directly by the Newsboy Gold Mine.

Indirect and Accumulated Impacts on Employment and Unemployment

The creation of $1,435,000 of added personal income directly and indirectly in the Wickenburg-Morristown economy from the operation of the Newsboy Gold Mine is the equivalent of adding 50 new jobs to the local employment figures. That could eliminate all unemployment in the community at current levels if all of those jobs were to be filled by current local residents. It is much more likely, however, that 30 of those jobs will be filled by people hired outside of the immediate local area who will then move to the community. If the remaining 20 new jobs go to local residents, that would cut the current level of unemployment in half. Since it is unlikely that the local unemployment rate will go much below 2%, however, it is more likely that the availability of new jobs will result in a significant upgrading of employment by some of those already employed in the community, either by increasing hours worked or by advancing to higher paying positions.

The creation of $3,536,000 of added personal income directly and indirectly in the Maricopa County economy from the operation of the Newsboy Gold Mine is equivalent to adding 140 new jobs to the county's employment figures. That is not likely to have any significant impact on the rate of unemployment in the county. Nor is the addition of $5,394,000 of personal income and 230 new jobs directly and indirectly to the state's total employment likely to have any significant impact on the statewide rate of unemployment.

Table 18

COMBINED DIRECT AND INDIRECT IMPACTS OF
THE NEWSBOY GOLD MINE
ON THE ECONOMY OF THE WICKENBURG ECONOMIC AREA(1)

		Annual Contribution During Average Year of Full Production
The operation of the Newsboy Gold Mine will create for the Wickenburg area economy a:		
TOTAL DIRECT CONTRIBUTION OF:		$1,457,000
including direct gains in:		
Personal Income of:	$1,200,000	
Business Income of:	130,000	
Local Government Revenues of:	127,000	
which, because of the circulation and recirculation of income through the local economy, will result in a:		
TOTAL INDIRECT CONTRIBUTION OF:		$ 794,000
including indirect gains in:		
Personal Income of:	$235,000	
Business Income of:	525,000	
Local Government Revenues of:	34,000	
to create an:		
ACCUMULATED ECONOMIC GAIN OF:		$2,251,000
including combined direct and indirect gains in:		
Personal Income of:	$1,435,000	
Business Income of:	655,000	
Local Government Revenues of:	161,000	

Amounts are in 1991 dollars.

(1) The Wickenburg Economic Area is defined as the area within the Wickenburg and Morristown school districts.

Source: Western Economic Analysis Center.

Table 19

COMBINED DIRECT AND INDIRECT IMPACTS OF
THE NEWSBOY GOLD MINE
ON THE ECONOMY OF MARICOPA COUNTY, ARIZONA

	Annual Contribution During Average Year of Full Production
The operation of the Newsboy Gold Mine will create for the Maricopa County economy a:	
TOTAL DIRECT CONTRIBUTION OF:	$5,334,000
including direct gains in:	
Personal Income of:	$1,200,000
Business Income of:	3,768,000
Local Government Revenues of:	366,000
which, because of the circulation and recirculation of income through the county's economy will result in a:	
TOTAL INDIRECT CONTRIBUTION OF:	$8,355,000
including indirect gains in:	
Personal Income of:	$2,336,000
Business Income of:	5,720,000
Local Government Revenues of:	299,000
to create an:	
ACCUMULATED ECONOMIC GAIN OF:	$13,689,000
including combined direct and indirect gains in:	
Personal Income of:	$3,536,000
Business Income of:	9,488,000
Local Government Revenues of:	665,000

Amounts are in 1991 dollars.

Source: Western Economic Analysis Center.

Table 20

COMBINED DIRECT AND INDIRECT IMPACT
OF THE NEWSBOY GOLD MINE
ON THE ARIZONA ECONOMY

	Annual Contribution During Average Year of Full Production
The operation of the Newsboy Gold Mine will create for the Arizona economy a:	
TOTAL DIRECT CONTRIBUTION OF:	$5,816,000
including direct gains in:	
Personal Income of:	$1,200,000
Business Income of:	4,000,000
State and Local Government Revenues of:	616,000
which, because of the circulation and recirculation of income through the state's economy, will result in a:	
TOTAL INDIRECT CONTRIBUTION OF:	$15,754,000
including indirect gains in:	
Personal Income of:	$ 4,194,000
Business Income of:	10,841,000
State and Local Government Revenues of:	719,000
to create an:	
ACCUMULATED ECONOMIC GAIN OF:	$21,570,000
including combined direct and indirect gains in:	
Personal Income of:	$ 5,394,000
Business Income of:	14,841,000
State and Local Government Revenues of:	1,335,000

Amounts are in 1991 dollars.

Source: Western Economic Analysis Center.

Indirect and Accumulated Impacts on Business Income

As a result of the full scale operation of the Newsboy Gold Mine, local businesses in the Wickenburg economic area will receive an extra $525,000 each year as an indirect result of the project's direct contributions to personal, business, and government income in the community, as shown in Table 18. The accumulated direct and indirect contributions of the Newsboy Gold Mine to the sales of non-mining business firms in the community will amount to about $655,000 during each year of full scale production. That is equivalent to about 1% of taxable business sales in the Town of Wickenburg in 1990.

For Maricopa County as a whole, the full scale operation of the Newsboy Gold Mine will provide an extra $5.7 million in sales for county business firms each year as an indirect result of the mine's direct contributions to personal, business, and government income in the county. The accumulated direct and indirect contributions of the Newsboy Gold Mine to the sales of non-mining business firms in Maricopa County will approach $9.5 million during each year of full production, as shown in Table 19. Total taxable sales by Maricopa County businesses in Fiscal 1991 were nearly $24.7 billion.

Arizona businesses will receive an additional $10.8 million in sales revenues each year indirectly as a result of the Newsboy Gold Mine's operations. The accumulated direct and indirect contributions of the mine to the sales of non-mining businesses in the state will exceed $14.8 million during each year of full production, as shown in Table 20.

Indirect and Accumulated Impacts on State and Local Governments

Local governments in the Wickenburg economic area will see an indirect increase in their tax revenues of about $34,000 per year as a result of the direct payments of the Newsboy Gold Mine to local residents, business firms, and government units, as shown in Table 18. That is equivalent to an increase of 14% in the annual property tax revenues of the Town of Wickenburg. The accumulated direct and indirect gain in local government revenues will be about $161,000 annually, an amount equivalent to almost 5% of the locally generated revenues of the area's two school districts.

Local governments in Maricopa County will obtain an indirect increase in their tax revenues of $299,000 each year as a result of the direct payments of the Newsboy Gold Mine to its employees, county business firms, and government units in the county, as

shown in Table 19. The accumulated direct and indirect gain in local government revenues will amount to $665,000 annually.

Arizona's state government and local governments throughout the state, including those in Maricopa County, will gain about $719,000 indirectly each year as a result of the circulation and recirculation of Newsboy Gold Mine direct payroll, purchase, and tax dollars, as shown in Table 20. The accumulated direct and indirect increase in state and local tax revenues will be more than $1.3 million each year that the mine is in full production.

Indirect and Accumulated Impacts on Population and Housing

Any prolonged decrease in the unemployment rate in the Wickenburg economic area substantially below the average for the Phoenix Metropolitan Region (Maricopa County), such as would be caused by the direct and indirect impacts of the Newsboy Gold Mine, is likely to result in some inflow of population from elsewhere in Maricopa County and possibly from nearby areas of Yavapai County. This would increase, not only the population of the community, but also the labor force and the number of those employed in the local labor market. Because of the small size of the local labor market, however, such an inflow of population is likely to occur only in response to specific job vacancies in the community. The fact that the unemployment rate in the Wickenburg labor market has been significantly below the Maricopa County average for many years is evidence of this.

With the accumulated direct and indirect increase in Wickenburg area employment expected from the impact of the Newsboy Gold Mine, it can be expected that a corresponding increase in the community's population between 75 and 100 people will occur. This represents a growth of from 1.5% to 2.0% in the community's population over 1990.

An increase in the Wickenburg-Morristown area population of as much as 100 people (as many as 40 new households) as an accumulated direct and indirect effect of increased employment opportunities in the community resulting from the presence of the Newsboy Gold Mine, will increase the demand for housing by as much as 40 new units. That increase is about one-third more than the average number of new housing units put in place in the area over the past decade, but is still well below the maximum number put in place during the peak construction year of 1990, and is less than the number put in place in 1991. This magnitude of demand for new housing would allow the local construction industry to sustain its recent level of activity but would not exceed its capacity.

The operation of the Newsboy Gold Mine is not expected to have any significant impact on the population of Maricopa County nor on the demand for housing in the county.

Indirect and Accumulated Impacts on Government Services

The Wickenburg area's school districts would be most affected by the accumulated direct and indirect increase in population envisioned as a result of the opening of the Newsboy Gold Mine. The growth of from 1.5% to 2.0% in the total population and the expected comparable increase in the number of school-age children requiring education would not put undue stress on existing educational facilities, particularly in light of the increased school district revenues that would be made available at the same time.

The same is true for public safety and other local government services. The increased demand for such services resulting from the expected population increase is well within the pattern of recent growth and would not place undue stress on existing government facilities or services.

Indirect and Accumulated Impacts on Other Service Sectors

A population increase of from 1.5% to 2.0%, combined with the expected direct and indirect increases in personal income, business income, and local government revenues in the Wickenburg economic area as a result of the operation of the Newsboy Gold Mine, is most likely to stimulate activity in the non-government service sectors of the local economy. At the same time, the direct and indirect economic contributions of the mine to the local economy, as shown in Table 18, will provide, almost immediately, the means to finance the resultant growth in those affected sectors.

Induced Impacts

In addition to the direct and indirect contributions of personal, business, and government income to the economies of the Wickenburg area, Maricopa County, and Arizona to be made by the development and operation of the Newsboy Gold Mine, other economic benefits may be induced in the local, county, and state economies as residents, businesses, and governments react to the new source of income. One of these that could result from the addition of the Newsboy Gold Mine to the tax base is the reduction of property tax rates for existing property owners in

the Morristown School District. The extent of such reductions in the existing tax rate of the local taxing jurisdiction, however, will also depend on the spending levels approved by the school district's governing board.

A major, but not quantifiable, economic benefit created by the development and operation of the Newsboy Gold Mine will be the added strength provided to the Wickenburg area economy by the entry of another strong basic (money importing) economic enterprise. This will tend to diversify the local economic base and reduce the present dependency on a limited number of economic sectors, namely tourism, retirement, and livestock raising. The local economy's tourist activity is highly seasonal in nature and tends to depend heavily on what has been cyclical winter visitor activity in the nearby Greater Phoenix urban area. In effect, the Wickenburg tourist industry is a satellite of Greater Phoenix, and as such is dependent upon conditions in that market. The raising of livestock has not been a very prosperous activity for many years and forms a relatively small and weak part of the Wickenburg economic base. Furthermore, conditions affecting that industry's health are also made elsewhere, giving those in the Wickenburg economy very little control over their own situation. Gold mining as an addition to the local economic base would also be subject to outside market influences but those markets tend to follow different patterns than those for beef and recreational travel, providing some countervailing balance for the local economic base.

The creation of a new industry in the Wickenburg-Morristown economy, and the consequent increase in employment and decrease in unemployment, are likely to have a positive impact on local property values, particularly the values of commercial property along Grand Avenue between Wickenburg and Morristown. The full extent of that impact will depend largely upon the reactions of the local business community to the new opportunities created by the presence of a new economic entity providing both jobs and sales opportunities. The induced impacts created by local business response to the presence of a new industrial buyer in the midst of the community may also be replicated by the reactions of the local high school and community college operations with regard to the opportunity for and perhaps need for expanded technical training. Similarly, the community hospital may be able to upgrade some facilities and services as a result of the potential new source of patients and revenues, thereby inducing the primary health care community to expand and improve. Such induced impacts will depend almost entirely on the reactions of the existing community to the entry of the new industry, its jobs, and its money.

Direct and indirect impact of
THE NEWSBOY GOLD MINE
on the economy of
THE WICKENBURG AREA
under
1991 CONDITIONS

IMPACTS (amounts in dollars)

	DIRECT IMPACT	INDIRECT ECONOMIC IMPACT		
		PERSONAL	BUSINESS	GOVERNMENT
PERSONAL	1,200,000	135,170	472,954	30,098
BUSINESS	130,000	57,965	29,404	3,345
GOVERNMENT	127,000	41,785	22,788	1,022
TOTAL DIRECT	1,457,000			
TOTAL INDIRECT	794,530	234,920	525,145	34,465
COMBINED	2,251,530	1,434,920	655,145	161,465

MULTIPLIERS

	PERSONAL	BUSINESS	GOVERNMENT
PERSONAL INCOME	0.1126	0.3941	0.0251
BUSINESS INCOME	0.4459	0.2262	0.0257
GOVERNMENT REVENUES	0.3290	0.1794	0.0080

COMBINED IMPACT MATRIX

Direct and indirect impact of
THE NEWSBOY GOLD MINE
on the economy of
MARICOPA COUNTY
under
1991 CONDITIONS

IMPACTS (amounts in dollars)

	DIRECT IMPACT	INDIRECT ECONOMIC IMPACT		
		PERSONAL	BUSINESS	GOVERNMENT
PERSONAL	1,200,000	431,759	1,767,644	70,973
BUSINESS	3,768,000	1,647,787	3,521,492	213,740
GOVERNMENT	366,000	256,882	430,645	14,046
TOTAL DIRECT	5,334,000			
TOTAL INDIRECT	8,354,968	2,336,428	5,719,781	298,759
COMBINED	13,688,968	3,536,428	9,487,781	664,759

MULTIPLIERS

	PERSONAL	BUSINESS	GOVERNMENT
PERSONAL INCOME	0.3598	1.4730	0.0591
BUSINESS INCOME	0.4373	0.9346	0.0567
GOVERNMENT REVENUES	0.7019	1.1766	0.0384

APPENDIX E

WESTECH LABORATORIES' METALS ANALYSIS

Westech Laboratories
3737 East Broadway Road
Phoenix, Arizona 85040
602 437 1080 • fax 437 8706

CLIENT NEWSBOY GOLD MINING COMPANY
ATTN: B. RIEDERER
P. O. BOX 279
MORRISTOWN, AZ 85342

SAMPLE NO. : 9107727
INVOICE NO.: 22111928
REPORT DATE: 08-01-91
REVIEWED BY: MMG.
PAGE : 1 OF 1

CLIENT SAMPLE ID : TAIL 12702ADUP
SAMPLE TYPE .....: SLUDGE
SAMPLED BY .....: --
SUBMITTED BY ....: T. ALBERT
SAMPLE SOURCE ...: --

AUTHORIZED BY : B. RIEDERER
CLIENT P.O. : --
SAMPLE DATE ...: --
SUBMITTAL DATE : 07-24-91
EXTRACTION DATE: --

TCLP Metals

D A T A T A B L E

Parameter	Result	Unit	Detection Limit	Analysis Date
Arsenic (TCLP)	<0.05	mg/L	0.05	07-31-91
Barium (TCLP)	0.73	mg/L	0.10	07-31-91
Cadmium (TCLP)	<0.05	mg/L	0.05	07-31-91
Chromium (TCLP)	<0.05	mg/L	0.05	07-31-91
Lead (TCLP)	<0.10	mg/L	0.10	07-31-91
Mercury (TCLP)	<0.01	mg/L	0.01	07-30-91
Selenium (TCLP)	<0.05	mg/L	0.05	07-31-91
Silver (TCLP)	<0.05	mg/L	0.05	07-31-91

(1) Copy to Client

Westech Laboratories
3737 East Broadway Road
Phoenix, Arizona 85040
602 437 1080 • fax 437 8706

CLIENT NEWSBOY GOLD MINING COMPANY
ATTN: B. RIEDERER
P. O. BOX 279
MORRISTOWN, AZ 85342

SAMPLE NO. : 9107727
INVOICE NO.: 22111928
REPORT DATE: 08-01-91
REVIEWED BY: [illegible]
PAGE : 1 OF 1

CLIENT SAMPLE ID : TAIL 12702ADUP
SAMPLE TYPE .....: SLUDGE
SAMPLED BY .....: --
SUBMITTED BY ....: T. ALBERT
SAMPLE SOURCE ...: --

AUTHORIZED BY : B. RIEDERER
CLIENT P.O. : --
SAMPLE DATE ...: --
SUBMITTAL DATE : 07-24-91
EXTRACTION DATE: --

8 EP-Tox Metals

D A T A T A B L E

Parameter	Result	Unit	Detection Limit	Analysis Date
EP-Tox Arsenic	0.06	mg/L	0.05	07-31-91
EP-Tox Barium	1.0	mg/L	0.10	07-31-91
EP-Tox Cadmium	0.16	mg/L	0.05	07-31-91
EP-Tox Chromium	<0.05	mg/L	0.05	07-31-91
EP-Tox Lead	<0.10	mg/L	0.10	07-31-91
EP-Tox Mercury	<0.01	mg/L	0.01	07-30-91
EP-Tox Selenium	<0.05	mg/L	0.05	07-31-91
EP-Tox Silver	<0.05	mg/L	0.05	07-31-91

(1) Copy to Client

Westech Laboratories
3737 East Broadway Road
Phoenix, Arizona 85040
602 437 1080 • fax 437 8706

LABORATORY REP

NEWSBOY GOLD MINING COMPANY
ATTN B. RIEDERER
P.O. BOX 279
MORRISTOWN, AZ 85343

SAMPLE NO. : 9106760
INVOICE NO.: 22111726
REPORT DATE: 07-11-91
REVIEWED BY:
PAGE : 1 OF 1

CLIENT SAMPLE ID : WAST101
SAMPLE TYPE .....: ROCK
SAMPLED BY .....: NGMC/PERSONNEL
SUBMITTED BY ....: NGMC/B. RIEDERER
SAMPLE SOURCE ...: --

AUTHORIZED BY : B. RIEDERER
CLIENT P.O. : --
SAMPLE DATE ...: 07-01-91
SUBMITTAL DATE : 07-01-91
EXTRACTION DATE: 07-05-91

8 EP-Tox Metals

D A T A T A B L E

Parameter	Result	Unit	Detection Limit	Analysis Date	Test Method	Anal
Arsenic .....:	0.33	mg/L	0.05	07-08-91	6010	J OLMSTEA
Barium .....:	0.12	mg/L	0.10	07-08-91	6010	J OLMSTEA
Cadmium .....:	<0.05	mg/L	0.05	07-08-91	6010	J OLMSTEA
Chromium .....:	<0.05	mg/L	0.05	07-08-91	6010	J OLMSTEA
Lead .....:	<0.10	mg/L	0.10	07-08-91	6010	J OLMSTEA
Mercury .....:	<0.01	mg/L	0.01	07-08-91	7471	F STRUTTO
Selenium .....:	<0.05	mg/L	0.05	07-08-91	6010	J OLMSTEA
Silver .....:	<0.05	mg/L	0.05	07-08-91	6010	J OLMSTEA

() Copy to Client

Westech Laboratories
3737 East Broadway Road
Phoenix, Arizona 85040
602 437 1080 • fax 437 8706

LABORATORY REPO

NEWSBOY GOLD MINING COMPANY
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P.O. BOX 279
MORRISTOWN, AZ 85343

SAMPLE NO. : 9106760
INVOICE NO.: 22111726
REPORT DATE: 07-11-91
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PAGE : 1 OF 1

CLIENT SAMPLE ID : WAST101
SAMPLE TYPE .....: ROCK
SAMPLED BY .....: NGMC/PERSONNEL
SUBMITTED BY ....: NGMC/B. RIEDERER
SAMPLE SOURCE ...: --

AUTHORIZED BY : B. RIEDERER
CLIENT P.O. : --
SAMPLE DATE ...: 07-01-91
SUBMITTAL DATE : 07-01-91
EXTRACTION DATE: 07-05-91

TCLP Metals

D A T A T A B L E

Parameter	Result	Unit	Detection Limit	Analysis Date	Test Method	Analy
(TCLP) .....:	0.09	mg/L	0.05	07-08-91	6010	J OLMSTEAI
(TCLP) .....:	0.14	mg/L	0.10	07-08-91	6010	J OLMSTEAI
(TCLP) .....:	<0.05	mg/L	0.05	07-08-91	6010	J OLMSTEAI
m (TCLP) .....:	0.18	mg/L	0.05	07-08-91	6010	J OLMSTEAI
CLP) .....:	<0.10	mg/L	0.10	07-08-91	6010	J OLMSTEAI
(TCLP) .....:	<0.01	mg/L	0.01	07-08-91	7471	F STRUTTOI
m (TCLP) .....:	0.05	mg/L	0.05	07-08-91	6010	J OLMSTEAI
(TCLP) .....:	<0.05	mg/L	0.05	07-08-91	6010	J OLMSTEAI

) Copy to Client

Westech Laboratories
3737 East Broadway Road
Phoenix, Arizona 85040
602 437 1080 • fax 437 8706

NT NEWSBOY GOLD MINING COMPANY
ATTN B. RIEDERER
P.O. BOX 279
MORRISTOWN, AZ 85343

SAMPLE NO. : 9106760
INVOICE NO.: 22111726
REPORT DATE: 07-11-91
REVIEWED BY:
PAGE : 1 OF 1

LIENT SAMPLE ID : WAST101
AMPLE TYPE .....: ROCK
AMPLED BY .....: NGMC/PERSONNEL
SUBMITTED BY ....: NGMC/B. RIEDERER
SAMPLE SOURCE ...: --

AUTHORIZED BY : B. RIEDERER
CLIENT P.O. : --
SAMPLE DATE ...: 07-01-91
SUBMITTAL DATE : 07-01-91
EXTRACTION DATE: 07-05-91

Inorganic Non-Metals

D A T A T A B L E

Parameter	Result	Unit	Detection Limit	Analysis Date
Acid Generation Potential .....:	<0.50	%	N/A	07-10-91

(1) Copy to Client