



CONTACT INFORMATION

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Arizona Department of Mines and Mineral Resources Mining Collection

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PRINTED: 01/27/2003

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES AZMILS DATA

PRIMARY NAME: DEFIANCE LEAD

ALTERNATE NAMES:

APACHE VANADIUM
RUBY RED
VANADIUM SHAFT

GILA COUNTY MILS NUMBER: 152

LOCATION: TOWNSHIP 1 N RANGE 15 E SECTION 2 QUARTER NW
LATITUDE: N 33DEG 27MIN 45SEC LONGITUDE: W 110DEG 48MIN 25SEC
TOPO MAP NAME: GLOBE - 7.5 MIN

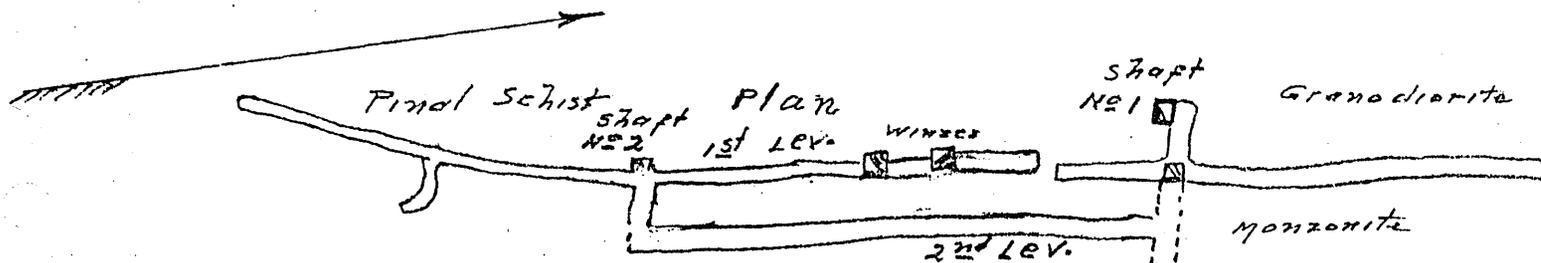
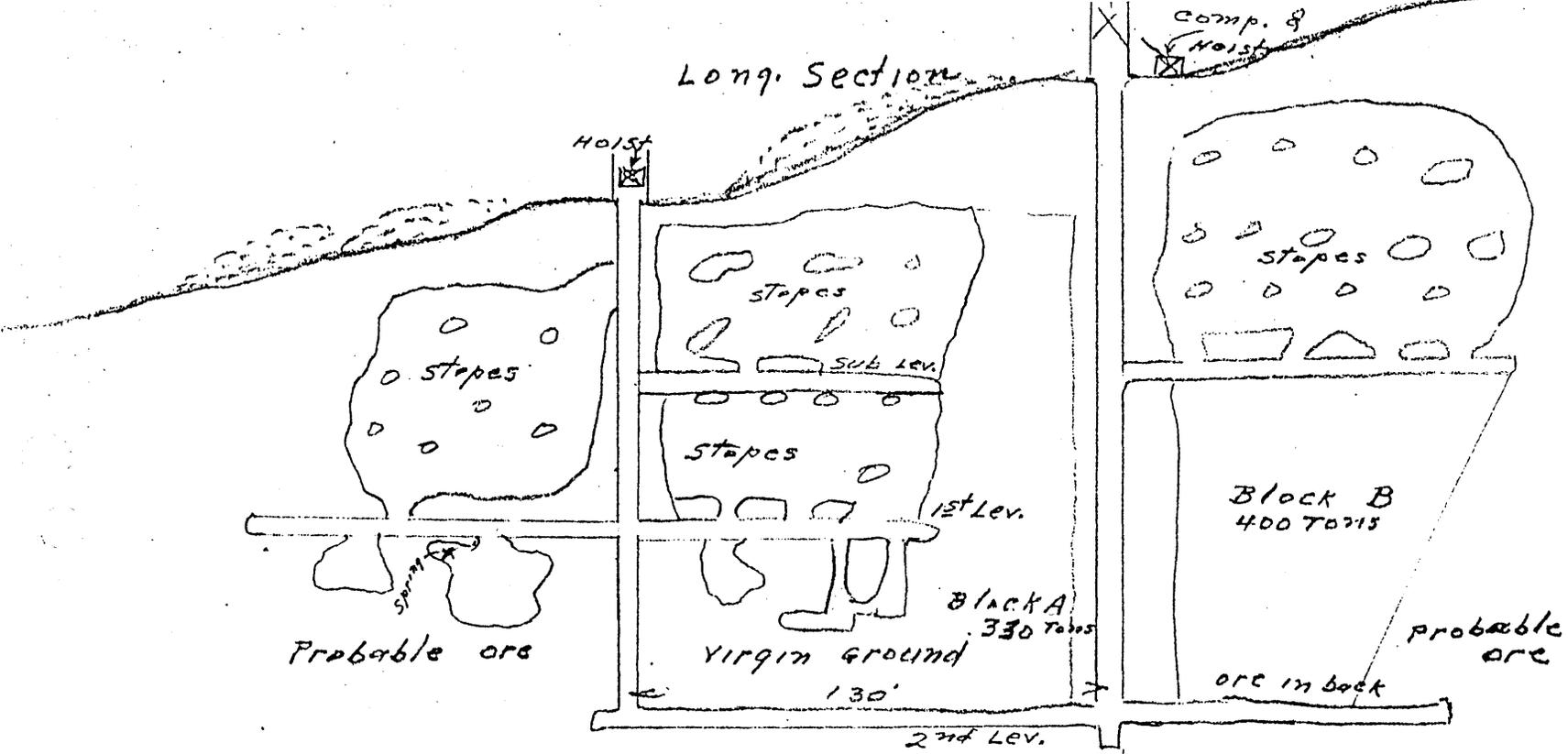
CURRENT STATUS: PAST PRODUCER

COMMODITY:

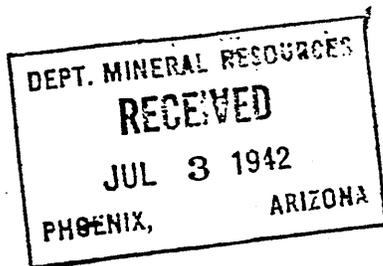
LEAD
ZINC
GOLD
COPPER
VANADIUM
TUNGSTEN

BIBLIOGRAPHY:

USGS GLOBE QUAD
AZBM BULL 156 AZ ZINC & LEAD DEPTS PT 1 1950
P 101-105
A L FLAGG VANADIUM REPTS BOOKS 2,3 & 8 ADMMR
FILES
TENNEY J B 2ND REP MIN IND AZBM BULL 129 1930
P 89-90
ADMMR DEFIANCE LEAD MINE FILE
PETERSON N P GEOL & ORE DEPTS GLOBE-MIAMI
DIST USGS PP 342 1962 P 126-127
USAEC PRELIM RECONN REPT 172-480 P 1, 24



Sketch of
DEFIANCE LEAD MINE
 Radium Sta. Globe, Arizona
 Notes of Field Engr
 Department of Mineral Resources
 Oct. 20th 1943
 Approx. Scale 1" To 50'



P. H. LUND ENGINEERING CORPORATION

MINING ENGINEERING AND PETROLEUM GEOLOGY
REPORTS ON OIL, GAS AND MINING PROJECTS

SUPERVISORS OF MINING, OIL AND GAS FIELD DEVELOPMENT

Globe, Arizona Office
Terminal Hotel.

P. H. LUND, PRESIDENT
PETROLEUM GEOLOGIST
AND MINING ENGINEER

ASSOCIATED OFFICES AND
CORRESPONDENTS IN
PRINCIPAL MINING
CENTERS AND OIL AND
GAS PRODUCING
LOCALITIES

July 1, 1942.

Mr. J. S. Coupal, Director
Department of Mineral Resources,
413 Home Builders Bldg.,
Phoenix, Arizona.

Dear Mr. Coupal:

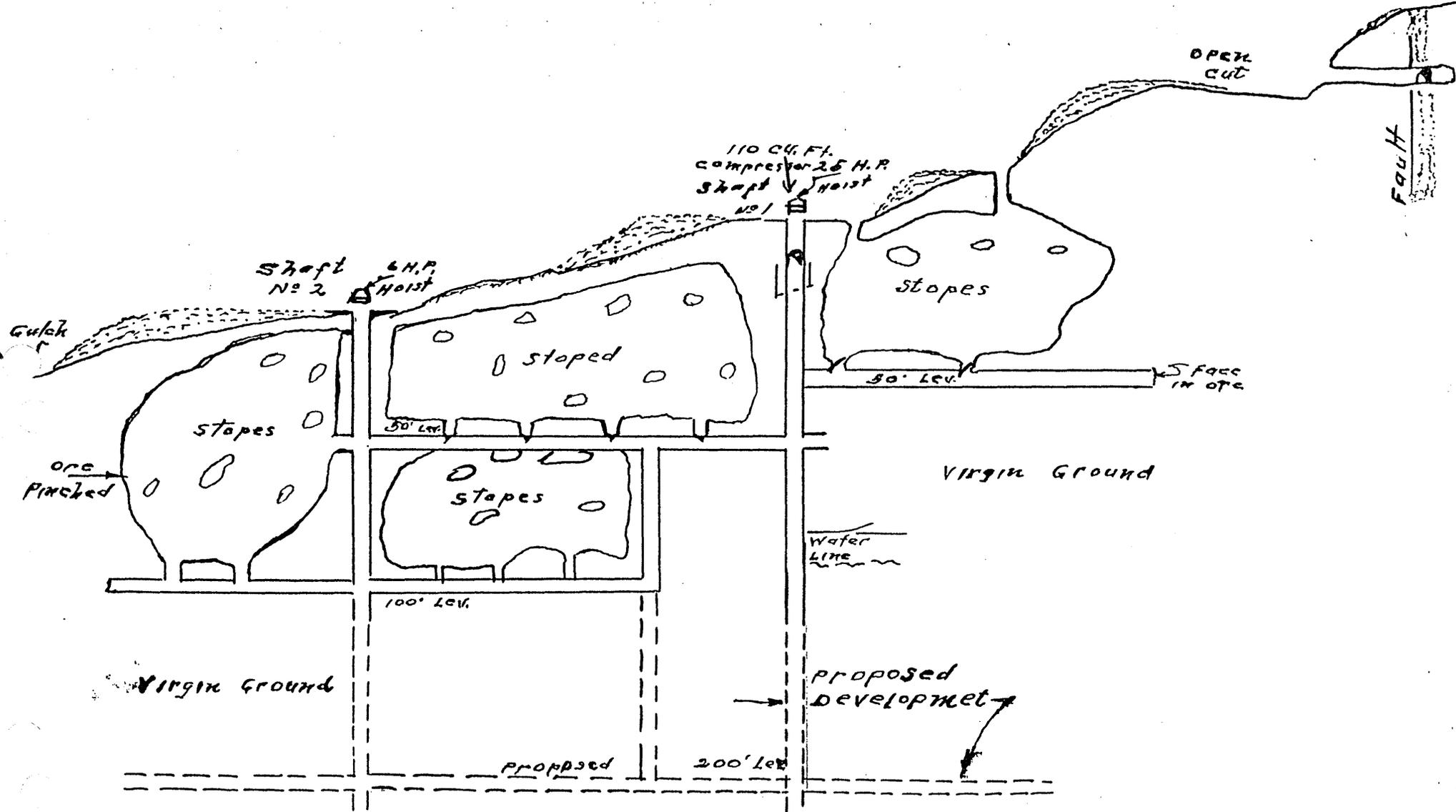
Your letter of June 20th received in reply to my letter to you of June 19th regarding my mining loan application Docket No. ND-5123. The property involved is the Definace' mining claims formerly operated by the Apache Vanadium Corp.,

I am in receipt of letter from my Washington correspondent that the application has been rejected on the grounds that the ore was too low grade to be worked profitably, and inasmuch as there is no reopening a rejected application I suppose there is nothing further we can do about it.

However, I have an application filed with the RFC for a development loan under Docket No. B-ND-4087. That application was filed on May 22nd and we haven't heard from it since. I wish you would call Mr. Broadgate's attention to that and urge him to find out why so much delay with actions on that class of loans.

Yours very truly

 P. H. Lund,



Longitudinal Sketch
Looking N.W. "DEFIANCE Mine"
Globe Mining District Gila Co. Arizona
Approx. Scale 1" to 50'
Field Notes of Globe Office
Department of Mineral Resources
August 16th 1944 A.Masf.
--- Proposed New Development
For Frank E. Chisum Globe, Arizona.

DEPARTMENT OF MINERAL RESOURCES

REPORT TO OPA ON ACTIVE MINING PROJECT

Date June 7th 1945
 Name of Mine Dominion
 Owner or Operator Chisum and Morton
 Address 1405 Democrat
 Mine Location Redwin area Globe

Filing Information

File System.....
 File No.....
 This chart to be used for gallons of gasoline required per month.

DEPT. OF MINERAL RESOURCES
 RECEIVED
 JUN 2 1945
 PHG:GX, 101

PRESENT OPERATIONS: (check X)

Production ; Development ; Financing.....; Sale of mine.....
 Experimental (sampling) ; Owner's occasional trip.....
 Other (specify).....

PRODUCTION: Past and Future. Tons

Approx. tons last 3 months part time in operation
 Approx. present rate per 3 months Tons 50 per mo.
 Anticipated rate next 3 months 4-100
 If in distant future check (X) here

EQUIPMENT OPERATED:

Type	Quantity or Horse Power	Miles or Hours Per Month	Gallons Required Per Month
Personal Cars	.....	.....	.....
Light or Service Trucks	.....	.....	.....
Ore Hauling Trucks	.....	.....	.....
Compressors	<u>80 HP 320</u>	<u>360</u>	<u>1000</u>
Other Mine or Mill Eqpt.	<u>Hoist</u>	.....	.....

PRODUCT PRODUCED OR CONTEMPLATED: Name metals or minerals.
Reconnaissance for the 1000

REMARKS:
Stoppage & dismantling mine

ARIZONA DEPARTMENT OF MINERAL RESOURCES

By A. MacFarlane

DEPT. MINERAL RESOURCES
 RECEIVED
 FEB 13 1945
 TOLSON

DEPARTMENT OF MINERAL RESOURCES

REPORT TO OPA ON
 ACTIVE MINING PROJECT

Date Friday Feb 20th 1945
 Name of Mine Defiance
 Owner or Operator Frank Chisum
 Address Colebe Ariz.
 Mine Location Radium Sta. Colebe

Filing Information
 File System Lead Ores
 File No. _____
 This chart to be used for gallons of gasoline required per month.

PRESENT OPERATIONS: (check X)

Production ; Development ; Financing _____; Sale of mine _____;
 Experimental (sampling) _____; Owner's occasional trip ;
 Other (specify) Operating Unit & Compressor

PRODUCTION: Past and Future.

	Tons
Approx. tons last 3 months	<u>200 Lead</u>
Approx. present rate per 3 months	<u>200</u>
Anticipated rate next 3 months	<u>250</u>
If in distant future check (X) here	_____

EQUIPMENT OPERATED:

Type	Quantity or Horse Power	Days or Hours Per Month	Gallons Required Per Month
Personal Cars	_____	_____	_____
Light or Service Trucks	_____	_____	_____
Ore Hauling Trucks <u>Pump</u>	<u>12</u>	<u>30 days</u>	<u>225</u>
Compressors <u>cut</u>	<u>325</u>	<u>160</u>	<u>350</u>
Other Mine or Mill Eqpt. <u>Unit</u>	<u>12 = 25</u>	<u>160</u>	<u>350</u>
			<u>925</u>

PRODUCT PRODUCED OR CONTEMPLATED: Name metals or minerals.

Reserve supply for 3 months of 3,000 Gals

REMARKS:

Legitimate mining of lead ores carried on steadily for past years.

By A. Macfarlane

413 Home Builders Bldg.
~~XXXXXXXXXXXXXXXXXXXX~~

June 20, 1942

Mr. P. H. Lund
Terminal Hotel
Globe, Arizona

MINE LOAN
Lund Property

Dear Mr. Lund:

Your letter of June 19 received, and am forwarding copy of it to our representative in Washington, asking that he give it his attention. I suggest that you forward to me a report on the property, with name of the mine and location, and other pertinent information so that I may forward this also to Mr. Broadgate.

As soon as you hear from Washington regarding the loan I would appreciate hearing from you.

Yours very truly,

J. S. Coupal,
Director

JSC:GS
CC to W. C. Broadgate

C O P Y

ELECTRO METALLURGICAL COMPANY
30 East Forty-second St.
New York

August 9, 1929.

Mr. Edward C. O'Brien,
% Edward C. O'Brien & Company,
147 E. Mesquite Street,
Globe, Arizona.

Dear Mr. O'Brien:

Our laboratory reports the following analysis on
vanadium ore, Sample No. 12, recently submitted by you:

V ₂ O ₅	16.95%
Vanadium	9.48
Lead	70.70
Copper	0.17
Phosphorous	0.136

Very truly yours,

(signed) W. C. REED,

Assistant Works Manager.

WCR:BY

C O P Y

ELECTRO METALLURGICAL COMPANY

NIAGARA WORKS
Niagara Falls, New York.

CERTIFICATE OF ANALYSIS AND WEIGHT

No. 1545

Niagara Falls, Jan. 17, 1930.

The sample of vanadium concentrates:

From: 465 bags received January 5, 1930, in car SP 23869

Marked: Our lot No. 511

As weighed and sampled by the Electro Metallurgical Co., at Niagara Falls, N. Y.

Moisture 0.30%

After Drying:

Vanadic Oxide	14.08%
Equivalent to vanadium	7.89
Lead	61.00
Zinc	2.69
Phosphorus	0.245
Sulphur	0.15

And weighs	Gross weight	40,134 pounds
	Tare "	406 "
	Net "	39,728 "
	Dry "	39,809 "

Note: Material shipped from Globe, Arizona by Edward C. O'Brien & Company

Sampled: 100%

(signed) W. Johnson,
Weigher.

(signed) F. R. McNeill,
Chief Chemist.

C O P Y

Philadelphia Office
Bullitt Bldg.

Cable Address, Electrozet
Codes: Western Union & Liebers

ELECTROMETALLURGICAL COMPANY
30 East 42nd Street,
New York

January 21, 1930.

Edward C. O'Brien & Company,
1237 Arthur Avenue,
Chicago, Illinois.

Gentlemen:

We are attaching hereto our check for \$5074.49, in final settlement of car SP 23869, containing lead vanadate concentrates shipped to our Niagara Plant.

There are also enclosed a copy of our Weight & Analysis Certificate and our calculation in connection with this settlement.

We trust you will find these all in order.

Very truly yours,

ELECTRO METALLURGICAL COMPANY

BY

(signed) Geo. W. Bishop.

CJE:NY
Encl.

C O P Y

SUBSTITUTE FOR VENDOR'S INVOICE.

Reason for necessity of making this substitute is:

Payment made on our figures.

Vendor's Name: Edward C. O'Brien & Co.,

Date: January 21, 1930

Street and Number: 1237 Arthur Avenue,

Town and State: Chicago, Illinois.

SOLD TO (Company) Electro Metallurgical Co (Works) Division EY
F.O.B. Niagara Falls, Terms: Net cash.

Quantity	Description	Amount
Final settlement for one car of lead vanadate concentrates shipped to our Niagara Plant		
		\$5074.49
Car SP 23889		
Gross	40,134 pounds	
Tare	408 "	
Net	39,728	
Lo	119	at 0.30%
Dry	39,609	
V ₂ O ₅	5576.95 at 14.08%	
5576.95# V O	at 66¢ per pound	\$3680.79
Less freight		606.30
		\$3074.49

(Substitute)

COPY

THE HUMPHREYS INVESTMENT COMPANY
First National Bank Bldg
Denver 2, Colorado.

April 16, 1948

Mr. Edwin J. Sikes,
180 E. Bailey, Globe, Arizona.

Re: H.I. Lot #389/ Spiral Test Report.

Dear Mr. Sikes:

The following report summarizes the final results obtained in the Humphreys Spiral Concentrator tests made on a sample of your lead carbonate ore.

On the sample of ore crushed to -10 mesh we recovered in one stage of concentration, 69.0% of the lead in a concentrate assaying 11.05% Pb, and in two stages of concentration 58.8% of the lead in a concentrate assaying 17.95% Pb. On the sample of ore crushed to -20 mesh we recovered in one stage of concentration 75.4% of the lead in a concentrate assaying 8.63% lead, and in two stages of concentration 81.8% of the lead in a concentrate assaying 15.65% Pb.

All tests were made in a Humphreys Spiral Concentrator closed circuit test unit. Both the series and batch methods of testing were used, the method being dependent on the amount of sample available as spiral feed. The test unit is illustrated and the test procedures are described on page 5 of our Bulletin 5, a copy of which is enclosed.

Complete test data is given in the following tables:

Lot #389, 1st stage series test B. Feed to spiral is ore received-crushed to - 10 mesh.

Spl. No.	Products	Wgt. Dist.	%	Pb Dist.
B-2	1st stage concentrate	82.6	11.05	69.0
B-4	1st stage tailings	67.4	2.40	31.0
	Calculated head	100.0	5.22	100.00
A-1	Assay Head (Spiral Feed)		5.13	
B-3	Circulating middlings		2.84	

Rate of dry feed to spiral -22.4 short tons at approximately 20% solids. Circulating middling load -0.66 short tons per 24 hours.

To determine if principal lead losses were occurring as slimes or as locked particles we split the tailings stream as it was discharged from the spiral, taking samples of the inner and outer fractions. The inner tail is largely coarse material and any lead present is probably in locked particles. The outer tail is largely extreme fines and slimes and any lead present is probably slimed.

Lot #389, 1st stage series B test. Splits of tailings discharge

<u>Spl. No.</u>	<u>Products</u>	<u>Wgt. Dist.</u>	<u>Pb %</u>	<u>Dist.</u>
B-5	Inner tailings	62.1	1.50	52.7
B-6	Outer tailing	37.9	5.05	67.3
	Calculated Head	100.0	2.84	100.0
B-4	1st stage tailing		2.40	

This test indicates that, at the -10 mesh grind 67.3% of the lead being lost in spiral tails is in the extreme fine or slime sizes not readily recoverable by usual gravity methods. In the spiral, this higher grade slime fraction, assaying approximately the same as the head, can be split out, thickened and shipped if its recovery is warranted.

Lot #389, Second Stage Batch Test C. Feed to spiral is first stage concentrate B-2.

<u>Spl. No.</u>		<u>Wgt. Test C</u>	<u>Dist Overall</u>	<u>Assay %</u>	<u>Pb Distribution</u>	
					<u>Test C</u>	<u>Overall</u>
C-2	2nd stage conc.	38.3	12.6	17.95	82.3	56.3
C-3	" " mids.	14.9	4.9	2.58	4.5	3.1
C-4	" " tails.	46.3	15.1	2.48	13.2	9.1
	Calculated head	100.0	32.6	8.46	100.0	69.0
B-2	1st stage conc (spiral feed)		32.6	11.05		69.0

Rate of dry feed to spiral - 26.5 short tons per 24 hours at approximately 24% solids. Being a batch test, no circulating middling load was carried.

Lot #389, 1st stage series test D. Feed to spiral is ore received-crushed to - 20 mesh.

<u>Spl. No.</u>	<u>Products</u>	<u>Wgt. Dist.</u>	<u>Pb %</u>	<u>Dist.</u>
D-2	1st stage concs.	52.2	8.63	73.4
D-4	" " tailings	47.8	3.07	24.6
	Calculated head	100.0	5.97	100.00
A-1	Assay head (Spiral feed)		5.13	
D-3	1st stage, circulating middling		1.92	

Rate of dry feed to spiral - 20.7 short tons per 24 hours at approximately 18% solids. Circulating middlings load 1.2 short tons per 24 hours. No split was made into sand and slime fractions on this tailing; however, the fact that D-4 tailing assays higher in lead than the B-4 tailing, despite the fact that D-4 contains a smaller weight percent, is indication of increased slime losses at the finer grind used for the D test.

Lot #389, 2nd stage batch test E. Feed to spiral is 1st stage concentrate, D-2.

Spl. No.	Products	Weight Dist.		Assay %	Pb Dist. %	
		Test E	Overall		Test E	Overall
E-2	2nd stage Conc.	36.7	19.2	13.55	52.0	61.8
E-3	" " Mid.	8.0	4.2	2.08	2.8	2.1
E-4	" " Tailing.	55.3	28.8	1.67	15.2	11.5
Calculated head		120.0	52.2	6.06		75.4
D-2 1st stage Conc. (Spiral feed)			52.2	8.63		75.4

Rate of dry feed to spiral - 12.2 short tons per 24 hours at approximately 11% solids. Being a batch test, no circulating middlings was carried.

Some difficulty has been experienced in obtaining satisfactory lead analyses, in part at least, due to the presence of barium in the ore. Barium, if not completely removed will tie up lead and result in low lead assays. Although most analyses reported here have been repeated, we suspect that barium is the cause of low calculated heads in both the C and E 2nd stage tests. We are mailing for your examination representative samples of all test products; if your analyses of any of these show marked variation from results reported here, please advise us.

In accord with our agreement we are enclosing our invoice to cover cost for grinding and assaying on these last tests.

Although grade of products made are not as high as you had hoped for they indicate approximately the maximum grade that can be expected by gravity methods without incurring excessive metal losses either as slined or locked minerals.

We will appreciate your comment on the test results after you have had an opportunity to study the report and examine the products.

Yours very truly,

JSH/jl

Note: No signature on the copy loaded. Presume the JSH is Judson S. Hubbard, V. Pres and Treas.

A.L.F.

UNIVERSITY OF ARIZONA
Tucson

College of Mines
Arizona Bureau of Mines.

January 12, 1948

Mr. Edwin Sikes,
180 E. Bailey Street,
Globe, Arizona.

Dear Mr. Sikes:

A table concentration test was made on the sample you sent to the Arizona Bureau of Mines to determine if the lead could be concentrated by a Humphrey spiral concentrator. The material was crushed to minus 10 mesh and sized by screening into two products, minus 10 on 20-mesh and minus 20-mesh. Each sized product was tabled which gave the following results:

	Tons per 100 tons of heads	Lead percent	Distribution percent lead
Heads	100.0	3.5*	100.0
Plus 20-mesh concentrate	4.1	42.7	18.3
Minus 20-mesh concentrate	10.9	48.0	54.8
Combined concentrate	15.0	46.6*	73.1
Combined tailing	85.0	3.0	26.9

(* Calculated)

The plus 20-mesh concentrate amounted to 4.1 tons per 100 tons of heads, assayed 42.7 percent lead and contained 18.3 percent of the total lead. The minus 20-mesh concentrate amounted to 10.9 tons per 100 tons of heads, assayed 48.0 percent lead, and contained 54.8 percent of the total lead.

The combined tailings assayed 3.0 percent lead.

The crushing was done by rolls to produce as much coarse table feed as possible and the table feed sized which would give the most ideal table operation. Under these conditions the combined concentrates amounted to 15 tons per 100 tons of heads, assayed 46.6 percent lead and contained 73.1 percent of the total lead.

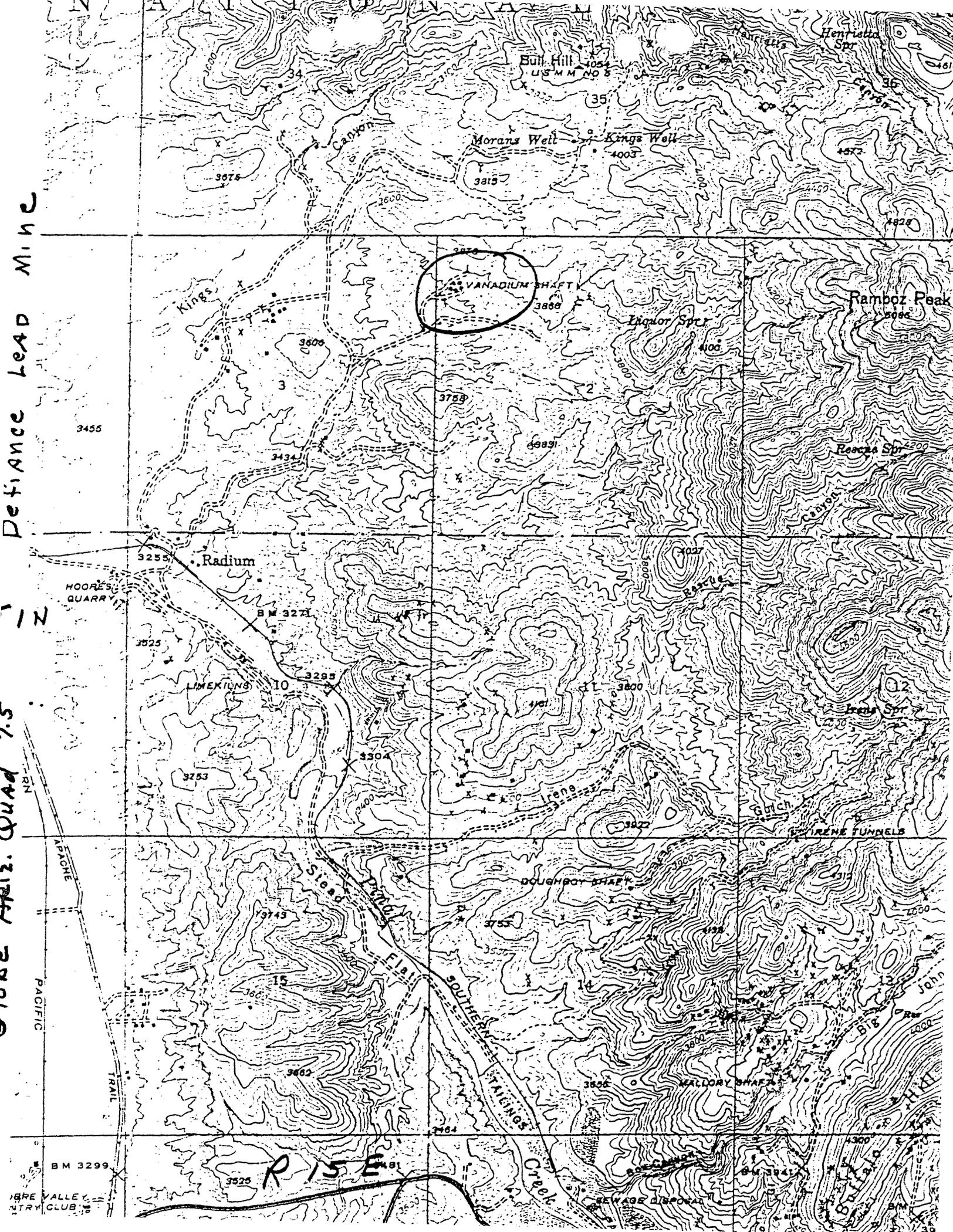
The spiral concentrator would give about 60 percent recovery instead of 73.1 percent obtained on the table.

The smelter would return \$14 per ton of original mine ore on the table concentrate less freight. If 80 percent recovery and 45 percent lead were obtained on this same ore with a spiral concentrator the smelter would pay \$11.80 less freight based on original mine ore. This would leave only \$11.30 to pay for mining, milling and freight as well as charges for capital expenditures.

Sincerely yours,

(signed) Geo. Rosevare
G. H. Rosevare,
Metallurgist, Arizona Bureau of Mines.

Defiance Lead Mine
1 IN
STORE APRIL QUAD 7.5



RECNO M002970
 REC TYPE S
 USER FIELD *U94/11
 REP DATE 83 06
 FIL LINK USBM-004007 0281, CIMRI
 REP PETERSON, JOCELYN A.
 REP AFF USGS
 SYN DEFIANCE MINE, VANADIUM SHAFT, DEFIANCE LEAD, VANADIUM
 SHAFT, DEFIANCE LEAD
 DIST GLOBE HILLS DISTRICT
 COUNTY GILA
 STATE CODE AZ
 CTRY CODE US
 PHYS 12 BASIN AND RANGE
 DRAIN 15060103
 LAND ST 41
 ELEV 3600 FT
 UTM N 3703150
 UTM E 517220
 UTM Z +12
 ACC ACC
 TOWNSHIP 001N
 RANGE 015E
 SECTION 02
 SECT FRACT NW/4 OF NW/4
 MERIDIAN GILA AND SALT RIVER
 POSITION 5 MI NW OF GLOBE AND ABOUT 1.25 MI NE OF RADIUM ON PINAL
 CREEK AND 1.25 MI NE OF RADIUM ON PINAL CREEK.
 LOCATION VANADIUM SHAFT IS IN SEC 2. OTHER CLAIMS CONTINUE INTO SEC
 34 . CLAIMS EXTEND INTO SEC 34, T02N, R15E.
~~SITE APACHE MINE~~
 LAT 33.4694
 LONG -110.8147
 CTRY NAME UNITED STATES
 COMMOD V PB MO ZN CU AG AU COLL
 ORE_MAT VANADINITE, CERUSSITE, ANGLESITE, MATLOCKITE, BROCHANTITE,
 BOLEITE, DESCLOIZITE, MOTTRAMITE, WILLEMITE, GALENA,
 WULFENITE, MALACHITE, CHRYSOCOLLA, COVELLITE
 GAD 14% V2O5, 0.17 OZ/T AU, 3.7 OZ/T AG, 19% PB, 3.7% ZN, 0.55%
 CU
 COMMOD_COM VANADINITE CRYSTALS ARE SOMETIMES RECOVERED AS COLLECTIBLES.
 MAJOR V PB
 MINOR MO ZN CU AG AU COLL
 CLH USE 95/04/07
 PROD S
 LOC_STRUCT BOTTOM LIMIT OF ORE IS BEDDING PLANE FAULT WHICH POSSIBLY
 OBSTRUCTED MINERALIZING SOLUTIONS
 STATUS 4
 YR_DISC LATE 1800'S
 YRFST_PROD 1929
 YRLST_PROD 1957
 OWNER WORLEY, SPRIK, HUNTER (1974)
 EXPL_COM PROPERTY INCLUDES 8 CLAIMS AND 2 FRACTIONS, PREVIOUS
 OWNERS/OPERATORS INCLUDE PFEISTER BROS (1913), D.S. MCDONALD
 AND FRANK CHISUM (1943) E.J. SIKES, J. RAGGIO, FRED GOAT
 (1973), MERCUR-KING CONSOLIDATED MINES LTD (1953).
 DEP_TYPE FISSURE VEIN
 MAX_LEN 1500
 M_L_U FT
 MAX_WID 10

USGS MRDS
 From D03 20
 PRINTED 9/98

M W U FT
DĒP SIZE S
STRĪKE N35E
DIP 80 SE
DDESC_COM VEIN IS BOUNDED ON TOP BY DIABASE FLOW AND ON BOTTOM BY A
BEDDING PLANE FAULT.
QUAD250 MESA
DEPTH WK 150
D W U FT
LEN WK 1400
L W U FT
DWORK_COM 2 SHAFTS & 1400 FT OF DRIFTS, CROSSCUTS, RAISES; VANADIUM
SHAFT (NO. 1) IS 150 FT DEEP WITH LEVELS AT 50 FT AND 150
FT; SHAFT NO. 2 IS 110 FT DEEP WITH LEVELS AT 30, 65, AND
110 FT BUT IS FILLED WITH WASTE ROCK TO 65 FT LEVEL; VEIN
EXPLORED FOR 550 FT ALONG STRIKE AND PARTIALLY BACKFILLED .
2 SHAFTS WITH DRIFTS, CROSSCUTS, & RAISES.
MIN AGE LCRET-TERT
NORĒ_MINS CALCITE, QUARTZ, LIMONITE, MN OXIDES, QUARTZITE FRAGMENTS,
DIABASE
ORE_CNTL NARROW BAND IN MIDDLE PART OF FAULT ZONE WHERE QUARTZITE &
DIABASE GOUGE ARE ALTERED TO A WHITE POROUS MASS OF CLAY,
SERICITE, AND CALCITE
ADMIN_AREA TONTO NATIONAL FOREST
ALTER CHLORITIZATION, CLAY-SERICITE-CALCITE
HRU_AGE PREC
HRU_NAME PIONEER QUARTZITE (APACHE GROUP)
NAME PETERSON, JOCELYN A. |ORRIS, GRETA J.
DATE 6/1/83|4/1/93
ED_COM |
CONT_CODE NA
GEOL_COM MINERALIZATION ASSOCIATED WITH LCRET-TERT INTRUSIVE PERIOD.
GEN_COM THIS REPORT REPRESENTS A MERGER OF ORIGINAL RECORD M002970
WITH RECORD M030444 OF JAN WILT IN MOLYBDENUM FILE, CONTACT
PERSON T.G. THEODORE, USGS. ; INFO.SRC : 1 PUB LIT; 2 UNPUB
REPT
REF PETERSON, 1950, ABM BULL 156, P. 101. |PETERSON, 1962, USGS
PP 342, P. 126. |WILSON, 1971, MINERAL. RECORD, V. 2, NO. 6,
P. 252-258. |ADMR DEFIANCE FILE, |ABGMT CLIPPINGS FILES
(DEFIANCE, APACHE), |ABGMT-USBM DATA, |BLAIR, GERRY, 1992, THE
ROCKHOUND'S GUIDE TO ARIZONA: HELENA, MONTANA, FALCON
PRESS, 165 P.
CONT_NAME NORTH AMERICA
STATE_NAME ARIZONA
WORK_TYPE U
AP_ITEM V
AP_ACC ACC
AP_AMT 5.57700
AP_U LBS
AP_YEAR 1930
CP_ITEM ORE|PB|AG|ORE
CP_ACC ACC|ACC|ACC|ACC
CP_AMT 1.30000|424.637|3.75500|1.30000
CP_U TONS|LBS|OZ|TONS
CP_YEAR 1936-1948|1936-1948|1936-1948|1936-1948
CP_GRADE |||
AP_SOURCE WILSON, 1971, P. 253
AP_COM FIRST KNOWN PRODUCTION IN 1930 BY EDWARD C. O'BRIEN CO.
SHIPPED 20 TONS VANADIUM CONCENTRATES (MOSTLY VANADINITE
CRYSTALS)

UPD DATE 93 04
UPDATER ORRIS, GRETA J.
COMMOD TYP B
QUAD24 GLOBE
DATE ISSUE 95/5/18
UPD AFF USGS
PROF ID 100
PROF LOC 100
PF COMMOD 100
PROF EXPL 100
PFDESC DEP 25
PFDESC WRK 100
PROF GEOL 71
PROF REF 100
PPROD RESV 33
PROF ALL 81
HR AGE MV PREC
HR TYPE MV QUARTZITE, DIABASE
HR NUMBER 1
AR AGE MV PREC
AR TYPE MV DIABASE
AR NUMBER 1
TYPE R|U
AFFIL USGS|USGS
DEP CODE 11100
HUC 15060103

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES

INFORMATION FROM MINE CARDS IN MUSEUM

ARIZONA

GILA COUNTY

APACHE VANADIUM

MILS #152

Defiance Lead (file)

3-AKA's

MM	297	Vanadinite
	298	Vanadinite concentrates
	1030	Vanadinite
	1328	Vanadinite & Descloizite
	1677	Vanadinite
	2162	Vanadinite
	5681	Vanadinite on quartz
	5682	Vanadinite on quartz
	5683	Vanadinite on quartz
	5684	Vanadinite with calcite on quartz
	3692	Vanadinite
	6691	Vanadinite
	7630	Vanadinite
K	770	Vanadinite
N	148	Vanadinite

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES

INFORMATION FROM MINE CARDS IN MUSEUM

ARIZONA

MM M 790 Vanadinite

Gila Co.

Globe dist.

Radium landmark

Apache mine / Radium

MILS # 152

3. AKA's

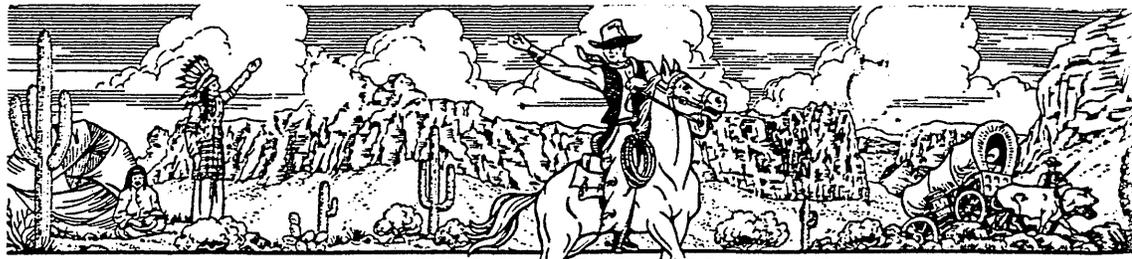
~~Distance left~~

DEFIANCE LEAD
(formerly APACHE)

GILA COUNTY

REFERENCES:

see: APACHE MINE V-II A.L. Flaggs vanadium reports
V-VII " " " "
V-VIII " " " "
ABM Bull. 156, p. 101-105
AEC 172-480, p. 1 AEC (file)
ABM Bull. 129, pp 89,90
ABM Bull. 180, p 295
USGS P.P. #342 - p 126
Mineralogical Record (LP office) p 252



DOMINION HOTEL

GLOBE, ARIZONA

CHAS. A. O'HERTY
MANAGING OWNER

Defiance

formerly Apache vacation

(8)

11000 sq ft unpatented.

Sikes Bond & Lease

sale price

2 next shafts

150' x 150' 1/2 cor

corner 150' level

0/1a Pb Ag Au Ca
190

1/2 N. Globe

2 Buyers

wont make offer
without plat.

Tony Bennett

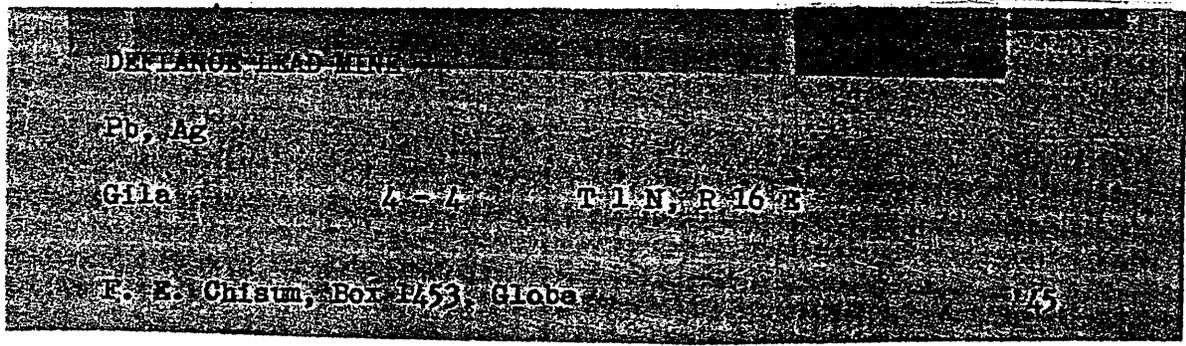
Moore sanitary

C

NAME OF MINE: DEFIANCE		COUNTY: GILA
OWNER: D.S. McDonald, Box 1452, Globe		DISTRICT: ✓
OPERATOR AND ADDRESS:		METALS: PB, AU, AG
MINE STATUS		
DATE:		DATE:
5/1/44	Frank Chisum, Box 1453, Globe, Arizona	5/1/44 Shipping to El Paso
		4/46 Idle
		6/46 Shipping

CHISUM, Frank E., Box 1453
 Globe, Arizona
 140 South Devereaux St. 8-16-44

See DEFIANCE LEAD MINE - Re field eng. report.
 See DEFIANCE - re gas application 2-2-45
 " " " mine loan application 2-23-45



DEFIEANCE LEAD MINE

GILA COUNTY

NJN WR 4/17/87: Dick Morris (card) reports that the Defiance Lead Mine (file) Gila County has been sold by John Mediz of Copper City Rock Shop to an unidentified party from New York state who plans to work it for vanadinite specimens.

DEFIANCE LEAD MINE

GILA COUNTY

Fred Harris called about Apache Vanadium near Globe (about 6½ miles N, close to Radium) He wanted Vanadinite material and was referred to Harold Johnson. The Apache was reportedly sold about 2 years ago, but Harris did not know who was involved.

LAS WR 9/30/66

Stopped at the Copper City Rock & Gift Shop, 566 Ash Street, Highway 60 & 70, Globe, Arizona, to verify rumor that John Mediz has leased the Apache Mine near Globe to produce mineral specimens of vanadinite. Mr. Mediz has a written agreement with the mine owner, Fred Goat, to produce specimen vanadinite from open cuts on the property. Mediz is not working the underground portions of the mine. Excellent quality mineral specimens are being produced. KAP Report 5/3,4/73

A Mr. and Mrs. Worley were in for some collecting information for rock and mineral specimens. Mr. Worley also explained that he, Kenneth Sprik and John Hunter have located the Apache Mine, also known as the Defiance Lead and/or Vanadium Shaft in the Globe District. The previous owner, Mr. Coats (Goats), abandoned the property according to Mr. Worley. Mr. Worley stated the subsequent legal action established the claim as belonging to him and his partners. His primary interest is in producing vanadinite mineral specimens and he is willing to lease the property to any mining or exploration company under the conditions that he may continue to recover the mineral specimens until actual mining or development is started. KAP WR 5/20/74

12/29/77 Office Visit: Mr. Kenneth Sprik - developed 30 ft. on the claim in 1975. Mr. Sprik stated there was no official legal action involved on above statements. JHJ/pp

KAP WR July 3, 1978 - Andy Clark, P. O. Box 354, Superior, is engaged in full time recovery of the vanadinite mineral specimens from the Apache Mine (Defiance Lead Mine) in the Globe District, Gila County. He has leased the property from Mrs. K. Sander and Mr. Fred Coates. He is going to mine the upper portions of the old vein system by open cuts and trenches and has or will have in the immediate future filed operating plans with the U. S. Forest Service. 10-20-78 bh

KAP/WR 11/2/79 - Mrs. John Mediz reported that she and her husband have relocated the Apache Vanadium (also called the Defiance Lead) in the Globe Dist. Gila Co. They have 5 lode claims, The Defiance 1 & 2 and the Time 1, 2 & 3. The Time #1 covers the old Ruby Red Mine and the Defiance 1 covers the Apache Vanadium Mine. She reported they also bought a Quit Claim Deed from Fred Goates Covering the property.

KAP WR 6/20/80: Mrs John Mediz of Copper City Rock Shop reported that they are in the process of obtaining a patent on the Apache Mine (Defiance Vanadium Mine). They have the Times and Ruby Red Claims on the Apache Mine.

APACHE MINE

Gila county, Arizona.

Copies of data loaned by owner, including maps and sections made by persons not identified.

Copy of report by Walter X. Osborn was made from the original.

Tabulation of ore shipments made by A.L. Flagg, direct from original smelter sheets.

Data concerning earliest ore shipments made prior to 1936 not available.

Unbound plan of principal workings and sections through lead stope and vanadium stope based on preliminary examination by A.L. Flagg in 1942.

APACHE VANADIUM CORPORATION

Mining Report of

ROBERT MORGAN
Mining Engineer

LOCATION:

In the Radium Mining District, Gila County, Arizona, about six miles in a northerly direction from the mining Town of Globe, and $1\frac{1}{4}$ miles from Radium Station on the Southern Pacific R.R. between Globe and Miami.

PROPERTY:

Consists of eight claims and two fractional claims or approximately 180 acres unpatented, held under location under the mining code of the United States and the State of Arizona. All assessment work for the current year has been completed and is of record. Title rests with the Apache Vanadium Corporation.

TOPOGRAPHY:

The company's holdings are grouped on the various principal vein system of the district, of parallel northeast, southwest strike, along a low range of steep hills which form the foothills of the Final Mountain Range.

CLIMATE:

Conditions are those prevalent in the mountainous regions of the southwest. Year around sunshine; very little snow and light rainfall. Conductive to healthful and successful year around operations. Altitudes range about 5,000 feet above sea level.

WATER:

For mining and milling purposes is available within the mine; should additional water be necessary Queen Creek runs within less than a mile of the property. Adequate water for all purposes can be developed along this creek by shallow wells and pumped to the mine at a moderate cost and only a slight lift.

12-30-R.M.

GEOLOGY:

The oldest formation in the district is a dark gneissoid granite of undetermined age. The granite has been intruded by a brown iron stained diabase causing zones of crushing and parallel faulting, latter intrusions of unaltered darker diabase along fault lines and small areas in the crushed zone. Later intrusions of quartz, calcite, and other vein forming material along lines of faulting, forming parallel veins, showing values in gold, silver, lead and vanadium. On the north end of the company's property there

remain remnants of a deposit of quartzite which overlaid the entire district, probably several hundred feet thick. The quartzite has no apparent relation to the mineralization other than it formed a blanket through which the ascending ore solutions could not penetrate causing them to deposit along the veins and in the crushed wall rock. There has been some latter faulting at right angles to the original faults. These faults are post mineral and owing to the surface of the ground being covered with soil and gravel several feet thick the nature of this movement is unknown, but where they have been encountered under ground the veins show slight displacement.

ORE DEPOSITS:

Ore deposits are of magmatic origin deposited from rising solutions cooling as they neared the surface. The vanadium in the form of lead vanadate being a high temperature mineral and more fluid and more volatile than the slower rising lead ores rose along the parallel fault lines until striking the blanket of quartzite through which it was unable to penetrate and being under great pressure was forced out into the crushed wall rock where it deposited on the fractures forming far the most important orebodies in the property. The crushed wall rock along the veins show in places complete replacement by galena, much of which especially near the surface has been altered to lead carbonates by the oxidizing action of surface waters. As depth is reached copper makes its appearance until in the south drift in the No. 2 level at the water line there is coming in what appears to be a large body of disseminated copper ore. As this property is only a few miles from the Inspiration and the Miami Copper Company's immense holdings and in the same zone of mineralization, copper ore at depth is to be expected. On the company's holdings the zone of crushing is about 1500 feet wide in which there are seven parallel fissure veins. It is evident that the bodies of vanadium ore will be limited more with the size and shape of these zones of intense crushing than by the length or width of the veins themselves.

12-30-R.M.

DEVELOPMENT WORK:

On the property is confined to one vein on the Defiance No. 1 claim. The main shaft has been sunk to a depth of 150 feet. On this level drifts have been carried on the vein 61 feet north of the shaft and 70 feet south. A cross cut driven west 75 feet and another easterly 62 feet as shown by the map of No. 2 level accompanying this report are still in ore. The No. 1 level which is at 50 foot depth at the shaft due to the rapid rise of ground gains depth rapidly as it is driven northerly from the shaft a distance of 260 feet. Above the No. 1 level there is a sub level in which considerable stoping has been done by former operators in search of lead ores as these stopes are back filled and not accessible. Their extent is unknown but there has apparently been a considerable tonnage of lead ore removed by these operations. Cross cuts on these levels have proven the ore body to be at least 75 feet wide with the faces of all drifts and cross cuts still in ore, showing that the limits of the orebody have not been reached. About 2,000 feet of development work consisting of sinking, drifting, cross cutting, and raising has been done. These various developments have proven tonnage of ore available for immediate mining and are so located geologically as to be attractively indicative of developing a much larger tonnage at a moderate cost.

TONNAGE ESTIMATES:

Developed Ore:

The developed portion of this property is estimated to contain a minimum of 50,000 tons in place having an average vanadium content of 1.15% or 23 pounds of vanadium pent-oxide per ton, and also carrying additional values in gold, silver and lead. Broken ore on surface dumps is estimated at a minimum of 2,000 tons. Much of the fill material in the old lead stopes is milling ore, but the amount of this ore is unknown.

Probable Ore:

Probabilities for the further development of ore are based upon the physical, geological and metalliferous conditions of the orebody immediately adjacent to the zones of actual development. Open cuts and shallow surface workings show the orebody to extend 500 feet northerly from the shaft. At this point the vein dips beneath the quartzite and does not show on the surface and is impossible to tell how much farther the ore will continue, southerly from the shaft, surface indications show the orebody to probably extend 1,000 feet in this direction. The original discovery of vanadium ore in this district was made in a shallow shaft over 600 feet west of the present workings. In the west cross cut in the lower level if extended on its present present course will come under this original strike. About 250 feet easterly of the present workings the largest vein on the property paralleling the one on which development has been carried out this vein is locally called the "mother-lode" of the district and is traceable on the surface for several miles. While no work has been done on the Company's holdings commercial ore has been mined from it in several places; no cross cutting has been done to the east of the present workings but where the wall have been broken into they show the same crushed and fractured condition and about the same values in vanadium as the explored ground to the west. The crushed condition extends easterly to the "mother-lode" giving the crushed zone an area of about 1500 feet in width and from 1500 to 2000 feet in length. Shallow surface workings show vanadium values over this entire area. While it is not expected that all of this large area will prove to be commercial ore, but where the ground is sufficiently fractured for the vanadium solutions to have penetrated, then good bodies of ore will undoubtedly be found, giving probable additional ores running into hundreds of thousands of tons.

ESTIMATED OPERATING COSTS:

The character, formation and position of the orebody and the simplicity of mill and mine plant should make possible a very reasonable production cost. Comprehensive estimates place the anticipated costs of production per ton with the following limits.

Mining and Milling

Labor.....	\$	.70
Power plant supplies.....		.33
Blasting supplies, steel and sharpening.....		.33
Maintenance and repair.....		.15
Hoisting other than labor.....		.03

(continued)

Milling.....	\$.50
Assay office supplies.....	.08
Timber and emergencies.....	.50
Hauling concentrates and loading to cars....	.21
Administration.....	.43
Office supplies, legal & traveling expenses.	.05
Compensation insurance.....	.14
Road maintenance and repair.....	<u>.04</u>
Total production cost per ton	\$3.49

Contingent charges to be added before positive cost is established or improvement insurance, state, county and federal income taxes and depreciation.

RECOVERABLE VALUES:

During development work more than 1,000 tons of ore were mined from various parts of the orebody and milled in a small mill by the Edward C. O'Brien Co. at Globe. This mill was designed for handling tungsten ore and with dry grinding with our classification and with only one sand table, approximately a 70% recovery was made, making a concentrate which carried 17% vanadium pent-oxide per ton. With the installation of a modern mill even of moderate capacity instituting wet grinding and classification and with the addition of slime tables or flotation to handle the fines of the classifier over-flow, an 85% recovery is practical, giving a concentration ratio of 20 tons of ore to 1 ton of concentrates. Giving the recoverable values and the concentration ratio above shown, a ton of concentrates from the Apache Property would have a recoverable vanadium value of \$117.30 produced at a total cost of \$69.80, leaving a net profit of \$47.50 per ton of concentrates, equivalent to a net profit of \$2.37 per ton against the ore in place. These figures do not take into consideration the gold, silver and lead values for which we also would be paid. Shipments of ore from this property to a custom smelter have shown gold values of \$4.00 to \$6.00, silver \$2.00 and lead 18 to 38%, and if mined separately ore of this grade is available but mining in a wide orebody as will eventually be done in a larger scale operation, the gold, silver, and lead values of a ton of concentrates are as yet undetermined, but will prove more than sufficient to pay all mining and milling costs, also as additional ore is developed the milling capacity is increased until 100 to 150 tons of ore are being handled per day. By mining by the caving system in use in the larger copper mines of this district mining and milling costs can be cut approximately 50% below the figures shown above, thus increasing net profits appreciably.

FUTURE EXPECTANCIES:

In dealing with the future expectancies of a property of this nature, it must be borne in mind that in addition to the considerable tonnage of the orebody as developed, the limits of which have not been reached in any direction. There is within the boundaries of the company's holdings a large area of undeveloped ground showing intense mineralization, a crushed zone approximately 15,000 feet in width by at least 2,000 feet in length, in which there are 7 parallel veins totaling about 17,000 feet of apex control. While it would be absurd to anticipate commercial enrichment of ore approaching in any degree the total length or width of the apex controls, the recurrence of ore shoots at numerous locations on the various vein

systems as yet unexplored and additional ore bodies in the zones of crushing is an entirely reasonable expectancy.

12-30-R.M.

Underground development may also effect the discovery of other orebodies now covered by overburden and not showing on the surface. Additional work in depth stands an excellent chance to prove a large body of copper ore so that when the vanadium is mined out the property will still have a long life as a copper producer.

CONCLUSION:

Owing to this property's favorable location in reference to water, transportation, etc., and in a district that has a history of many large producing mines, being in a vicinity of such well known producers as the Miami Copper Co., the Inspiration and the Old Dominion, this engineer advances the sound personal conviction that the property of the Apache Vanadium Corporation offers an excellent opportunity for a safe legitimate mining operation. Sufficient ore is already developed to make practical the installation of a milling plant of moderate capacity. Considering the amount of development work that has been done and the tonnage of ore proven by this work, together with the physical and geological conditions immediately adjacent to the developed portion make the possibilities for future development excellent. The tapping of a body of copper ore in the bottom of the shaft adds additional attraction and opens vast possibilities for development in depth.

All theories advanced, opinions rendered and estimates made herein are based upon my findings during my examination of this property and the situation as I see it and I believe them to be reasonably sound and competent. They are offered in complete good faith and in the firm belief that with the beginning of active operation and development the property of the Apache Vanadium Corporation will steadily advance to a position of genuine importance as a contributor to the supply of vanadium in this country, and maintain that standing through a long and profitable life.

Respectfully submitted,

/S/ ROBERT MORGAN

Robert Morgan
Mining Engineer

GLOBE, ARIZONA
Dec. 1930

REPORT ON APACHE VANADIUM CORPORATION

RADIUM PROPERTIES

PROPERTY

The Apache Vanadium Corporation, of Globe, Arizona, holds under lease and option of purchase, two groups of mineral claims situated in the Radium district, about six miles north of the town of Globe and one and a quarter miles from Radium Station on the Southern Pacific Railroad between Globe and Miami.

The claims embodied in these two groups are known as: Defiance No. 1, Defiance No. 2, Quartzite Nos. 1, 2, 3, 4, 5 and 6, Carnotite No. 6 and the North East half of Ophir No. 5. The total area of the two groups is about one hundred and eighty acres, more or less. All of the claims of these two groups are contiguous.

GEOLOGY

The surface rocks comprising this entire area, consist of a brown iron stained diabase, with small areas of comparatively unaltered darker diabase. There are two hills on the north end of the property that contain fragments of quartzite, and the remains of a bed of quartzite that at some time overlaid the diabase. This quartzite has no apparent relation to the mineralization found in the diabase. The diabase is cut by a number of veins or fault fissures or zones, having a strike approximately north east by south west and a dip that is almost vertical. There are four of these large veins on the property, parallel to each other, at distances of one hundred and fifty to several hundred feet apart, and a large number of smaller parallel faults that are not always clearly defined on the surface. The larger veins appear on the surface simply as a zone of crushed diabase, showing mineral values, while the smaller veins show a quartz filling, containing iron and values in gold, silver and lead.

There are also large cross faults cutting these northeast and south-west faults at almost right angles. The entire area is apparently a mass of crushed and fractured diabase of unknown thickness. The deepest development on these groups shows this same crushed and fractured diabase of unknown thickness. The deepest development on these groups shows this same crushed and fractured condition. Many areas show the diabase broken into small fragments that resemble broken filling, cemented together with calcite, and in many places with vanadium and lead minerals. Wherever the north-east major fault zones have been developed, they show gold, silver, lead, copper and vanadium values.

DEVELOPMENT AND ORE

This property has been developed by one main shaft on the Defiance No. 1 claim, and smaller shafts and open cuts on the other properties. The Defiance mine was originally worked for its gold, silver, lead and copper values, and a shaft was sunk about 110 feet on the main vein, with drifts extending several hundred feet north-east and south-west along the vein, on the 50 and 90 foot levels. Owing to the fact that the ground rises rapidly on the north side of the shaft, the 50 foot level increases in depth as it is driven ahead and its present face is about one hundred feet below the surface.

A considerable quantity of ore containing gold, silver, copper, lead and some vanadium, having a value of approximately forty dollars per ton has been mined and shipped in recent years. The writer has no knowledge of the amount of this ore, but when the

the property was leased to Messrs. McDonald and O'Brien, early this year, there were filled and open stopes aggregating two hundred feet in length, fifty to sixty feet in height and about four feet in width. These are approximate measurements as the stopes are irregular and several of them filled with waste.

Owing to inability to market the vanadium ores, the former operators of this property disregarded them, and while the main drifts showed high grade vanadium ores along a length of over a hundred feet, no attempt was made by crosscutting, to ascertain the width of this ore.

The property was leased and optioned in March of this year by Messrs. McDonald & O'Brien, who have recently transferred their interest to the Apache Vanadium Corporation, and mining was started with a view of obtaining vanadium ore. In the course of preparation some lead-silver ore containing both copper and gold values was mined and shipped to the El Paso Smelting Works of the American Smelting and Refining Company. Two small shipments were made, one in June and the other in August of this year. Smelter assays on one of these lots gave Gold \$4.20, Silver \$2.19, Lead 24%, Copper 5.51%. Another lot assayed Gold \$6.00, Silver, per ton, \$2.89, Lead 38.5% and copper 1.1%. In the main workings of the mine there is a well defined vein containing ore of about this grade, from which regular shipments could be made if desirable. In order to develop the vanadium ore body it was crosscut in several places and found to be of extensive but unknown width. At the present writing five crosscuts have been driven into this ore body, the longest of which is about forty feet. All of these crosscuts are in ore their entire length and all present faces are still in ore. This ore is of the same general average grade throughout these workings. At no point in the mine where development has been carried on this year, has the limit of the vanadium body been reached,

In the month of August, approximately six hundred tons of vanadium ore were mined from different parts of the ore body, most of which came from crosscuts and raises. This ore was passed through a revolving screen and about 90 tons of screenings produced. These screenings were treated in a small mill at Globe and were carefully sampled daily. The average daily value for the month was 2.0% V_2O_5 or 23 pounds of Vanadium pent-Oxide per ton of ore. It is probable that this represents a fair average of the ore body as developed thus far.

The ore body has been developed on the fifty foot level, which is really the seventy to one hundred foot level at the point of development, and in the stopes above this level, for a horizontal length of about one hundred and fifty feet, to a height of about fifty feet and to a width of forty feet. Ore of this character also shows on the lower level of the mine, forty feet lower than present workings, its extent being unknown on account of the old stopes and drifts having been filled with waste by former lessors.

On the surface, about three hundred feet north of the present face on the fifty foot level, and on the same vein or fault, there is an extensive showing of vanadium ore of the same character as that developed underground. The face of the north main drift is also in similar ore. There are no evidences underground that would indicate in any manner the ultimate limits of this ore body. The ground everywhere is a mass of crushed, faulted and broken diabase and the vanadium is ~~the~~ deposited on the faces of the broken rock and fills the crevices between the fragments and open fractures. It is self evident that the vanadium was deposited after this faulting and crushing took place and its extent is probably limited by the extent of the fault movement itself.

Vanadium was first discovered in this district, on the ground of the Apache Vanadium Corporation, at a point over six hundred feet west of the main ore body in the Defiance mine, and the cross fractures underground, if continued six hundred feet in their present direction would connect with this original vanadium ore body. There is another large fault parallel to the main Defiance fault, that is situated over a hundred feet west of the present workings. In all probability the crushed and faulted condition will continue to this vein and may possibly extend to the original strike. The entire surface area, between the Defiance mine and the original vanadium strike has the same general characteristics and shows a lot of iron and evidences of alteration and mineralization. So far development has proven the ore body underground to exceed forty feet in width, with the face of every crosscut still in ore. Several hundred feet to the east of the main workings there is another very large vein that is generally considered to be the main vein of the entire district and is known locally as the "Mother Lode". This vein can be traced on the surface for several miles. While no development has been done on it, on the property of the Apache Vanadium Corporation, it is the intention of the company to crosscut over to it from a lower level in the Defiance mine. This vein occurs for a length of forty-five hundred feet on the corporation holdings.

In this district the Vanadium occurs in the form of lead Vanadates. Until this present deposit was opened up and tested, lead vanadates were not seriously considered as a source of vanadium by the large refiners for several reasons. Among these was the fact that practically all the known deposits could not make a vanadium concentrate that would assay over 10% to 11% V_2O_5 ; also that the ore was usually in a hard gangue that made a difficult milling problem with large slime losses, and the known deposits were usually small and irregular, thus making supply uncertain, combined with a high mining cost; and finally, some rather large deposits that might prove to have a dependable supply of vanadium, were badly contaminated with molybdenum, which made the concentrate very undesirable from a metallurgical standpoint. For these reasons, although vanadium products have been sold for several years at a higher price than either tungsten or molybdenum, no commercial deposits of lead vanadates have been developed to a point of steady production in the United States and the bulk of all vanadium ore and concentrates is imported from South America.

The deposit at Radium, which is the subject of this report, has none of these objections. Its vanadium ores are remarkably free from impurities and the concentrates now being produced every day at Globe, from its ore, averages about 17% V_2O_5 and command a price materially above published market quotations. These are the highest grade vanadium lead concentrates ever produced in commercial quantities, to the knowledge of the writer, in fact certain refiners who were trying to produce vanadium from concentrates running less than 10% V_2O_5 intimate that it would be impossible to produce concentrate that would assay over 15% V_2O_5 in commercial lots.

In order to check its work, the milling company handling this ore sends samples of the concentrates produced, every few days to the eastern refinery that has contracted for the vanadium. The following assays were made in the New York laboratories of these refiners.

Lot No.	Vanadium Pent-Oxide	Lot No.	Vanadium Pent-Oxide
12	16.95%	18	16.26%
13	16.58%	19	16.93%
14	17.97%	20	16.89%
15	12.24%	21	16.79%
16	16.98%	22	16.76%
17	17.29%		

Lot. No. 15, which shows 12.2% Pb was made from screenings taken from old fills in the lead stopes and contained an excess of lead. Concentrates made from ore mined in the main vanadium ore body run very uniform from day to day.

COMMERCIAL POSSIBILITIES

Thus far, the development work, milling and other operations done in connection with the property have been on a very small scale, of the nature of testing operations in order to determine the possibilities of the property as a source of vanadium. The property is equipped with a small gasoline bucket hoist, suitable for prospecting operations and all drilling is done by hand. About fifteen men are regularly employed at the mine and the daily tonnage mined averages about twenty tons.

At the time Messrs. McDonald & O'Brien took over the property, there was no indication of the extent of the ore bodies and it was expected that they would develop into ore bodies a few feet in width, similar to other known vanadium deposits, the type that would justify a small mill and rather limited operations. The development of an ore body that exceeds forty feet in width, with probabilities that will ultimately prove to be very much larger than this, presents engineering and commercial problems that make it necessary that the early plans of development ~~and~~ and equipment be discarded and an extensive program of development outlined which will determine the real extent and value of the vanadium deposit, before any permanent mine or mill equipment is installed. The present developments all indicate the possibility of large scale operations, ultimate mining by caving methods, which in turn insures the low costs of the larger copper mines of this district. It is necessary that the present shaft be enlarged and equipment of greater hoisting capacity be installed; that a modern air compressor, air drills and other necessary equipment be supplied, so that present costs can be reduced and faster progress made, and that for the present time ore milling should be confined to a quantity of the ore at a high cost, as is inevitable on smallscale operations, where large scale operation undertaken later would more than halve these costs, would simply be a waste of the company assets.

At the present time there is fully twenty thousand tons of ore developed above the first level of the mine. In the course of development over one thousand tons of ore has been mined from drifts, crosscuts and raises in different parts of the ore body and from ore and mill samples taken daily, it has been found that the average vanadium content of this ore is 1.15% V_2O_5 , or 23 pounds of vanadium pent-oxide per ton. Tests have shown that these values can be saved by flotation, and in the mill with one table only and without classification or slime tables. Over 60% of the total values have been saved. With a combination of water concentration and flotation, a saving of 75% to 80% of the values can be expected.

It has been demonstrated to the Company that a very simple chemical treatment of the vanadium concentrates will reduce them to vanadic acid and lead compounds that have a higher market value than metallic lead or lead ore. In order to get the greatest benefit from this process, the production should be such that it is of sufficient amount to warrant chemical reduction at the milling plant. On this basis, the increased value of the lead by-products and the recovery of the gold and silver values will be sufficient to pay mining, milling, and reduction costs. If the vanadium is reduced to vanadic acid it will be worth one dollar per pound on present vanadium prices. While it is expected that total recovery of vanadium in the form of vanadic acid will not be less than fifteen pounds per ton of ore, even if this

~~figures based on the above~~ it gives a net value of two hundred thousand dollars to the ore thus far developed above the first level.

The writer has estimated that if the present ore continues 100 feet below its present level and continues to the limit of the ore bearing zone indicated by surface outcrops and developments, which expectation is a reasonable one in view of the size, continuity and persistence of the ore body thus far developed, that work now planned will develop a body of ore exceeding 150,000 tons in amount and that will justify milling operations on a scale of at least 150 tons daily such a quantity insuring low mining and milling costs. The company is now working the mine in accordance with a definite plan of development with this end in view.

While it is impossible to predict the results of development on deeper levels, the fact that the ore body is now proven to exceed forty feet in width and that every face, crosscut, raise and drift made by the present operators of the property is still in ore of about the same average value as the balance of the entire ore body, with no limits to the ore yet found at any point, and that all of the ore thus far developed will show large profits if mined and milled with modern efficient methods, speaks for itself.

SUMMARY

The Apache Vanadium Corporation is developing in its properties at Radium, what is apparently a large body of disseminated vanadium ore in the form of lead vanadate. Both surface and underground indications point to the probability of developing a very large and dependable source of vanadium, found in an ore body of such size and character as will permit of its mining and milling operations to be carried on a scale large enough to insure very low costs and enable it to produce vanadium products profitably in competition with other sources of metal. It has already proven by mining and milling several hundred tons of ore taken from all parts of its body, that it is able to produce vanadium concentrate of a grade and purity that is readily marketable and desired by vanadium refiners.

It seems very probable from present developments that the company will develop a vanadium ore body of such magnitude that the United States will no longer be dependent on foreign sources of supply for its vanadium requirements.

Respectfully submitted,

WALTER K. OSBORN

Globe, Arizona
September 25, 1929

DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA
FIELD ENGINEERS REPORT

Mine Defiance Lead Mine
District Globe Mining District
Subject: Report

Date August 16, 1944
Engineer Andrew Macfarlane

Lessee: Frank E. Chisum, Globe, Arizona.

Mine Location: Within the Globe mining belt approximately 2-1/2 miles northerly from the main shaft of the Old Dominion Copper Mine and on the western slope of the series of high hills extending northeasterly from the Dominion Mine.

Roads: The Defiance property is fortunate in its proximity to rail transportation, the siding called Radium is about 1-1/4 miles westerly from the Defiance ore bins, an easy down grade from mine to rail where a privately owned truck ramp, at frequent intervals, is obtainable, and facilitates the shipment of the lead ores to El Paso lead smelter.

Rock Structures: A fault fissure having a course of about north 38° east, visible by croppings for 1,000' along this course. This fissure apparently made by a rhyolite flow intruding the older Pinal schist, the rock stresses being nearly vertical or dipping about 80° towards the east, the body of igneous intrusions forming the hanging wall of the mineralization.

The matrix of the fissure composed of thin bands of quartz, fluorspar, calcite and selvage in all a vein gangue material within a fissure of 5' to 15' thick.

The northwest casing or footwall has the appearance of a quartzite altered and to some extent monzonitic.

A distinct fault cutting the entire fissure and its walls at a right angle to the vein strike was encountered at the northeast end of a short tunnel driven on the main fissure as an extension to an open cut. No ore has yet been found beyond the fault along the northeast trend of the vein, and only very limited prospecting has been done in this direction.

The partly mined and prospected portion of the vein extending southwesterly from the mine shaft shows no fault but is locally pinched and sparingly mineralized in the southwesterly course.

Mine Workings: Have prospected the vein for a total length of about 600' along its course and to a depth of 100' through shaft No. 2. A block of vein 400' long by 100' in depth being from northeast end of stope to southwest end of stoped area is 90% mined. The vein fracture may be from 5' to 15' in width but payable ores were found in bands of 1' to 4' thick only.

History of Defiance Mine: Dates back to about 1920 and during the first few years was opened as a prospect by hand tools and an occasional car lot of cerussite of lead ores were sold to El Paso smelter.

As the prospecting proceeded, appreciable quantities of lead vanadate and vanadium ores were found and the property optioned to a company interested in production of vanadium.

This company continued the development, deepening the shafts 1 & 2, thence drifting and stoping principally from shaft No.2.

As the quantity of vanadium proved minor, the option after some few years was vacated and Mr. Dan McDonald of Globe, Arizona acquired the mine and is the present owner. Mr. Frank E. Chisum of Globe has been the lessee for the past year.

The principal ores being lead low in other pay values, and as no working capital was secured other than grub stake money from Mr. McDonald the owner, and now Mr. Chisum, the operation of the mine largely depended on the market price of lead, and as this was mostly under 5 cents per pound during those years the mine development and ore shipments were slow and spread over several years.

Mine Production: Records of ore sales prior to Mr. McDonald's acquiring the property are not available and I can only make a rough estimate now based on the stoped area and the settlement sheets in hands of McDonald and the last few months production made by Chisum. In all I estimate 7,500 tons of 15% lead and 5 ozs. of silver per ton as a fair production estimate for the Defiance Mine. This gives a total of 225,000 lead pounds; 37,500 ozs. silver; plus a little gold and vanadium.

Mine Possibilities: The property should be developed to the 200 foot level of shaft No. 1 where now a competent 25 H.P. hoist is installed. The total depth of this shaft now is 150 feet, and a drift extends northeasterly about 150 feet from the 50 foot level below the shaft collar.

A good shoot of ore has been mined from the back of this drift. The vein and mineral deposition is virgin beneath this 50' level stope. I would expect a drift extended from both ends of shaft No. 1 on the 200' level will open and make available a substantial tonnage of ore which may have an increased copper content in addition to the lead.

A long drift on vein extension to the southwest will prospect the ledge in that direction and while this development work proceeds, the block of vein the northeast of shaft No. 1 and beneath the 50' level drift can be mined thru shaft No. 1 and yield immediate lead shipments.

The Defiance Mine, if amply developed, has a legitimate right of expectancy that similar ores in payable quantity will be made available thru the proposed further development, as have been mined during the past discovery period.

The lessee, Mr. Frank E. Chisum, is a hard working economical miner and an excellent manager of any small mine operation. Mr. Chisum bears a good reputation in his locality.

Recently this mine has been given a B premium for lead. This price for the lead product will substantially enhance the dollar grade of the ore output.

① Shipments from Apache (Klyperner)
 W.S. Mc Donald 10 1-31-36 to 1-26-43
 Frank Chasum 14 11-17-43 to 8-6-47

E.J. Siler 4 10-31-
 ✓ ✓ ✓

0203 THE MANUFACTURING STATISTICIANS INC. - PHOENIX, ARIZONA

Date	Supplier		Net Weight		Material		Wgt. Wt.	Subst		Total
	Dr.	Cr.	Dr.	Cr.	Dr.	Cr.		Dr.	Cr.	
1	31.36	146		81740	32	79124	30		8.40	32.9
10	8.40	3254		92960	1.8	91287	510.5		980	304
12	2340	4097		93400	2.7	90878	39		340	26.2
3	1541	563		113040	4.6	107840	255		630	28.7
7	1.41	1734		102680	1.0	101653	165		6.40	35.1
19	2741	2711		104880	2.1	102678	34		11.90	32.0
2	1842	419		112980	3.5	109020	095		5.30	38.8
5	442	1127		99040	2.2	96861	105		4.70	38.6
7	1742	1771		97940	1.0	96961	065		350	24.6
1	2643	149		94600	1.6	93686	095		330	23.7
11	1743	2623		112500	4.2	107775	075		26	16.3
12	1743	2889		72140	3.6	69593	05		1.5	11.3
1	2844	16		102640	5.7	96790	19		3.11	14.9
2	2444	483		91080	2.2	89076	185		350	20.0
8	3044	1939		101500	2.3	99166	047		140	9.4
2	1944	359		109920	5.2	104094	12		160	13.3
5	2244	1200		77780	1.6	76536	11		100	8.0
10	2444	2074		104640	4.5	99931	25		215	15.3
11	846	2183		86640	6.1	81355	16		170	8.9
12	2346	2527		88600	3.3	85676	22		270	16.7
4	1447	709		101560	2.5	99021	13		15	11.5
5	1447	1075		91860	1.0	90941	40		44	27.0
7	147	1573		104960	3.3	101496	182.5		31	10.0
7	2447	1855		99200	1.7	97514	06		145	7.5
10	2147	2730		105480	4.2	101050	06		155	6.59
11	447	2804		64600	4.3	61822	08		100	12.00
6	1048	1181		106380	2.4	103827	09		265	6.5
7	648	1386		96640	1.9	94804	165		435	10.00

②
5-7-6-98

Copper		Zinc		Iron		Lead		Aluminum	
Cr.	Dr.	Cr.	Dr.	Cr.	Dr.	Cr.	Dr.	Cr.	Dr.
.46	32.91	38.8	35.4	62		0.10	3.20	0.90	2.00
.54	40.51	472	444	49		0.10	1.80	0.60	.80
.57	32.50	53.2	48.0	38		0.10	2.50	0.50	1.30
.55	32.56	368	34.4	76		0.10	8.00	0.50	2.20
.52	35.44	24.2	23.0	85		0.20	11.00	1.20	.90
.58	42.48	35.0	33.0	82		0.50	5.70	0.80	.50
.77	39.21	28.0	27.0	65		0.20	5.50	1.40	1.00
.90	38.67	31.0	29.4	72		0.10	4.70	1.60	.80
1.14	24.36	44.0	42.2	70		0.10	6.60	.60	.20
1.00	24.24	41.6	39.2	85		0.10	7.20	.50	1.40
52	16.58	56.0	48.6	77		.80	4.0	.40	2.5
.40	10.53	65.2	53.0	61		.20	6.5	.60	5.7
.34	19.42	64.6	52.8	3.1		.60	2.9	.30	3.6
.33	24.03	59.8	50.9	21		.70	5.0	.50	7.0
17	8.77	66.2	55.0	6.6		1.0	4.2	.80	6.3
.50	14.70	74.0	61.0	35		1.0	2.8	.40	5.7
.71	9.29	78.2	70.6	29		1.0	1.7	.88	1.6
.79	28.62	63.8	58.6	40		.70	3.9	.10	.8
.60	14.63	71.2	64.4	39		.70	6.00	.10	1.50
.90	36.52	64.8	60.8	26		.20	3.00	.20	1.10
.30	28.56	73.0	64.2	30		.70	2.3	.50	7.00
.77	76.94	53.8	50.0	36				.70	1.00
.30	28.09	67.2	53.4	46		.30	3.2	.10	1.16
.30	16.81	66.8	52.6	58		.80	1.8		1.14
20	14.61	71.2	53.6	54		.20	4.3		1.09
.68	27.57	70.2	64.0	36			3.2	.10	.66
.20	18.60	72.0	58.4	53		.10	2.4	.10	1.23
.25	32.23	68.0	55.2	50		.12	3.1	.20	1.20

3

MONTH OF

192

Antimony		Bromine		Total Alkalinities		Total Vol. H ₂ O		Sulphur		Misc. (Unperf)	
Dr.	Cr.	Dr.	Cr.	Dr.	Cr.	Dr.	Cr.	Dr.	Cr.		
				6.43		2648	14713	225	791.73	6.00	
15	10			497		3579	18127	248	1436.59	(Final ptm)	
17				591		2659	16812	248	1031.62	6.00	
17	10			616		2640	20347	248	1210.01	6.00 + 1.53	
42	15			515		3029	18482	248	1346.23	6.00	
				441		3807	20452	248	1741.53	6.00	
75	42			442		3479	22031	248	1673.72		
15				429		3438	20452	263	1457.89		
17				512		1924	17140	263	758.72		
27	22			524		1900	16516	271	716.45		
10	17			451		1207	15064	255	497.23		
15	25			524		529	9659	255	84.80		
17	17			522		1420	14801	255	536.66		
07	12			546		1857	15010	255	669.42	5.00	
10	12			484		393	14636	255	31.38	5.00	
06	09			524		946	14719	255	335.12	7.50	
10	11			543		386	15216	255	25.50	7.50	
10	10			580		1982	18268	271	797.43	7.50	
15	10			509		956	12315	271	252.48	7.50	
25	17			629		3023	16923	271	1115.50	7.50	
17	17			755		2107	22595	319	799.46	7.50 4.12	
10				680		7014	27258	319	2881.56	7.50 24.55	
12	20			721		2088	23351	319	1114.38	7.50	
25	30			605		1076	17766	319	336.43	7.50	
15	20			702		757	18253	319	329.25	7.50	
27	19			730		2024	13175	351	178.76	7.50 NiO.00	
07	20			703		1157	15737	383	401.94	7.50	
12	35			1069		2154	22396	383	785.75	7.50	

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	Date		Smelter Cost		A New Loans		B Total Pay		C AND Net Val		D Net val		E Reductions		A
	Dr.	Cr.	Dr.	Cr.	Dr.	Cr.	Dr.	Cr.	Dr.	Cr.	Dr.	Cr.	Dr.	Cr.	
	1	31 36	146		395620		3291		2648					643	
	10	8 40	3254		456435		4051		3579					497	
	12	23 40	4097		45439		3250		2659					591	
	3	15 41	563		53920		3256		2640					616	
	6	21 41	1734		508265		3544		3029					515	
	9	27 41	2711		51339		4248		3867					441	
	2	18 42	419		54573		3921		3479					442	
	5	4 42	1127		484305		3867		3438					429	
	7	17 42	1771		484805		2436		1924					512	
	1	26 43	149		46543		2424		1900					524	
X	11	17 43	2623		538875		1658		1207					451	
	12	17 43	3889		347715		1053		529					524	
	1	26 43	16		48395		1942		1420					522	
	2	24 44	483		44538		2403		1857					546	
	8	30 44	1939		49583		877		393					484	
	2	19 44	359		53047		1470		946					524	
	5	22 44	1200		38268		929		386					543	
	10	24 44	2074		499655		2562		1982					580	
	11	8 46	2183		406775		1463		956					509	
	12	23 46	2527		42838		3652		3023					629	
	4	16 47	709		495105		2856		2110					725	
	5	14 47	1075		454705		7694		7014					680	
	7	1 47	1573		50748		2809		2088					721	
	7	24 47	1855		48757		1681		1076					605	
X	10	31 47	2730		50525		1461		1759					702	
	11	4 47	2804		30911		2754		2024					730	
	6	10 48	1181		519135		1860		1157					703	

RECORD OF SHIPMENTS, APACHE MINE, GILA COUNTY, ARIZONA										1936	1940	1941	1942	1943	1944	1946	1947	1948			
Date	Dry Wt,	Gold	Silver	Lead	Copper	Insol.	Silica	Iron	Lime	Zinc	Sulphur	Alumina	Arsenic	Antimony	Total.Ded.	Net Val.	Bal.to Shipper				
1-31-36	79124	.30	8.40	32.40	.46	38.8	35.4	6.8	0.10	3.20	0.40	2.00			6.43	26.48	791.73				
10- 8-40	91287	.5105	9.80	30.45	.54	47.2	44.4	4.9	0.10	1.80	0.60	0.80	1.15	.10	4.97	35.79	1456.59				
12-23-40	90878	.39	3.40	26.20	.57	53.2	43.0	3.8	0.10	2.50	0.50	1.30	.17		5.91	26.59	1031.62				
3-15-41	107840	.255	6.30	23.70	.55	36.8	34.4	7.6	0.10	8.00	0.50	2.20	.17	.10	6.16	26.40	1210.01				
7- 1-41	101653	.165	6.40	35.10	.52	24.2	23.0	8.5	0.20	11.00	1.20	.90	.42	.15	5.15	30.29	1346.23				
9-27-41	102678	.34	11.90	32.00	.58	35.0	33.0	8.2	0.50	5.70	0.80	.50			4.41	38.07	1741.52				
2-18-42	109026	.095	5.30	33.80	.77	28.0	27.0	6.5	0.20	5.50	1.40	1.00	.75	.42	4.42	34.79	1673.72				
5- 4-42	96861	.105	4.70	38.60	.90	31.0	29.4	7.2	0.10	4.70	1.60	.80	.15		4.29	34.38	1457.89				
7-17-42	96961	.065	3.50	24.60	1.14	44.0	42.2	7.0	0.10	6.60	.60	.20	.17		5.12	19.24	758.73				
1-26-43	93086	.095	3.30	23.70	1.00	41.6	39.2	3.5	0.10	7.20	.50	1.40	.27	.22	5.24	19.00	716.45				
11-17-43	107775	.075	2.6	16.30	.52	56.0	46.6	7.7	0.30	4.00	.40	2.50	.10	.17	4.51	12.07	497.23				
12-17-43	69543	.05	1.5	11.2	.40	65.2	53.0	6.1	0.20	6.50	.60	5.40	.15	.25	5.24	5.29	84.80				
1-28-44	96790	.19	3.11	14.9	.54	64.6	52.8	3.1	0.60	2.90	.30	3.60	.17	.17	5.22	14.20	536.66				
2-24-44	89076	.185	3.50	20.0	.33	59.8	50.9	2.1	0.70	5.00	.50	7.00	.07	.12	5.46	18.57	669.42				
8-30-44	99166	.047	1.40	9.4	.17	66.2	55.0	6.6	0.10	4.20	.80	6.30	.10	.12	4.84	3.93	31.38				
2-19-44	104094	.12	1.60	13.3	.50	74.0	61.0	3.5	0.10	2.50	.40	5.70	.06	.09	5.24	9.46	355.12				
5-22-44	76536	.11	1.00	8.0	.71	78.2	70.6	2.9	0.10	1.70	.30	1.60	.10	.11	5.43	3.86	25.50				
10-24-44	99931	.25	2.15	15.3	.79	65.8	58.6	4.0	0.70	3.90	.10	.80	.10	.10	5.80	19.82	797.43				
11- 8-46	81355	.16	1.70	8.9	.60	71.2	64.4	3.9	0.70	0.60	.10	1.50	.15	.10	5.09	9.56	252.48				
12-23-46	85676	.22	2.70	16.7	.90	64.3	60.8	2.6	0.20	3.00	.20	.10	.25	.17	6.29	30.23	1115.50				
4-16-47	99021	.13	1.50	11.5	.30	73.0	64.2	3.0	0.70	2.30	.50	7.00	.17	.17	7.55	21.07	799.46				
5-14-47	90941	.40	4.4	27.0	.775	53.8	50.0	3.6		3.20	.70	1.00	.40		6.80	70.14	2381.56				
7- 1-47	101496	.1825	3.1	10.0	.50	67.2	53.4	4.6	0.30	3.20	.10	1.16	.12	.20	7.21	20.88	1111.38				
7-24-47	97514	.06	1.45	7.55	.30	66.8	52.6	5.8	0.80	1.80		1.15	.25	.30	6.05	10.76	336.43				
10-31-47	101050	.06	1.55	6.59	.20	71.2	53.6	5.4	0.20	4.30		1.09	.15	.20	7.02	7.59	329.25				
11- 4-47	61822	.08	1.00	12.00	.68	70.2	64.0	3.6		3.20	.10	6.60	.27	.19	7.30	20.24	478.76				
6-10-48	103827	.09	2.65	6.65	.20	72.0	58.4	5.3	0.10	2.40	.10	12.30	.07	.20	7.03	11.57	401.94				
7- 6-48	94804	.165	4.35	10.00	.25	68.0	55.2	5.0	0.12	3.10	.20	12.0	.12	.35	10.69	21.54	785.75				