August 9, 1951

Memorandum

To: Louden Sherbik, Executive Secretary
Defense Minerals Administration

From: DMA Field Team, Region IV

Subject: DMA Project XIII, St. Christopher Silver-Lead Mines,
Potosi Mining District, Ste Genevieve County, Mo Region

Enclosed herewith are original and two copies of the report as indicated above.

We concur with the findings of the attached team and recommend that the application for a development loan be denied.

F. T. Allison, Alternate

A. H. Koschmann

Enclosures
One copy by Air Mail
Two copies by Regular Mail

Ed

cc: DMA
Washington

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

Mining Division
Region IV

224 NEW CUSTOMHOUSE
DENVER 2, COLORADO

August 8, 1951

Memorandum

To: DMA Field Team, Region IV

From: Chief, Mining Division, Region IV

Subject: DMA Docket 1113, St. Christopher Columbite Placer, Petaca Mining District, Rio Arriba County, New Mexico

The examining team recommends denial of the above application for a development loan of $34,000 because the quantity of placer material is small and the chances of increasing the reserves are remote.

We concur with the examining team and recommend that the loan be denied.

Paul T. Allsman

Paul T. Allsman

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
Defense Minerals Administration
200 New Customhouse
Denver 2, Colorado

August 3, 1951

Memorandum

To: DMA Field Team, Region IV

From: A. H. Koschmann

Subject: DMA Docket 1113, St. Christopher Columbite Placer, Petaca Mining District, Rio Arriba County, New Mexico

Enclosed are the original and 7 copies of the geologic report by J. N. Faick of the U. S. Geological Survey, covering the above docket.

A. H. Koschmann
A. H. Koschmann
Supervising Geologist
Colorado-Wyoming

Enclosures (8)

Mining Division
Date Rec'd.
AUG 7 1951
BUREAU OF MINES
Denver, Colorado

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

Arizona-New Mexico Branch
[redacted]
Box 4097
UNIVERSITY STATION
TUCSON, ARIZONA

MINING DIVISION
REGION IV

August 3, 1951

Memorandum

To : Paul T. Allsman, Denver, Colorado

From : Chief, Arizona-New Mexico Br., Mining Div., Region IV

Subject : Final Report, DMA Docket 1113, St. Christopher Columbite Placer, Petaca Mining District, Rio Arriba County, N. Mex.

Enclosed are original and 7 copies of the section on Summary, Conclusions and Recommendations by John H. Soule' of the Bureau of Mines and John N. Faick of the Geological Survey, and the section on Engineering by Soule' of the above report.

The report has my approval.

Walter R. Storms

Walter R. Storms

CC P. T. Allsman (7)
C. A. Anderson
DMA 113
DF

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
P.O. Box 4126, University Station
Tucson, Arizona

July 31, 1951

Memorandum

To: Mr. A. H. Koschmann, Denver, Colorado

From: Mr. A. F. Shride, Tucson, Arizona

Subject: Geologic Report, DMA 1113, St. Christopher Columbite Placer, Petaca Mining District, Rio Arriba County, New Mexico

Enclosed are the original and 7 copies of the above geologic report by J. N. Faick of the Geological Survey. This report and the recommendation in the joint report that a production loan be denied because reserves are small and of too low a grade to be mined profitably have my approval.

A. F. Shride
Acting District Supervisor
Arizona-New Mexico

Enclosures 8

AUG 1951
RECEIVED
U.S. Geological Survey
Mineral Deposits Branch
Denver

UNITED STATES
DEPARTMENT OF THE INTERIOR
OSCAR L. CHAPMAN, SECRETARY

DEFENSE MINERALS ADMINISTRATION

REPORT OF EXAMINATION BY FIELD TEAM
REGION IV

DMA-1113, St. Christopher Mining & Milling Co. of America, St. Christopher Columbite Placer, Petaca Mining District, Rio Arriba County, New Mexico

John H. Soule', Mining Engineer
U. S. Bureau of Mines

John M. Faick, Geologist
U. S. Geological Survey

August 1951

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

By John H. Soule[1] and John N. Faick[2]

The St. John and St. Christopher tantalite-columbite placer claims, located by the St. Christopher Mining & Milling Co. of America, are in the Petaca Mining District, Rio Arriba County, N. Mex. Considerable test pitting has been done on these claims and small amounts of tantalite-columbite, as well as some monazite, have been developed. The St. Christopher Mining & Milling Co. of America made application to the Defense Minerals Administration for a loan of $34,973 under the Defense Production Act of 1950. This loan was to purchase equipment and services to mine and wash placer material to produce tantalite-columbite and rare earth concentrates.

The placer deposits consist largely of unclassified eluvial gravels, detritus and residual soils derived from deeply eroded pegmatites enclosed in a country rock of schist and gneiss. The valuable minerals found in the placers are columbite and tantalite in sands, grains and nuggets. It is probable that other similar placers, as yet undiscovered, may exist in vicinity of other deeply eroded pegmatites containing relatively abundant accessory minerals. Probably none of the placers can be worked economically.

Minable ore reserves are estimated at 5,799 tons of material containing 50,847 pounds of concentrates. These concentrates should contain

---

1/ Mining Engineer, Bureau of Mines
2/ Geologist, Geological Survey

1,150 pounds of combined tantalum-columbium pentoxides, as well as a small amount of monazite and other pegmatite minerals.

The amount of tantalite-columbite is limited and is valued at only $4,796. This sum is insufficient to repay a loan of $34,973.

Recommendations are made that the application of the St. Christopher Mining & Milling Co. of America, Docket BMA-1113, be denied.

ST. CHRISTOPHER MINING & MILLING CO. OF AMERICA,
ST. CHRISTOPHER COLUMBITE PLACER, PETACA MINING DISTRICT
RIO ARRIBA COUNTY, NEW MEXICO
BMA DOCKET 1113

Engineering

Engineering Report

By John H. Soule'
Mining Engineer
U. S. Bureau of Mines

August 1951

ST. CHRISTOPHER MINING & MILLING CO. OF AMERICA
ST. CHRISTOPHER COLUMBITE PLACER, PETACA MINING DISTRICT
RIO ARRIBA COUNTY, NEW MEXICO
DMA DOCKET 1113

CONTENTS

Engineering report — Page

Introduction..... 1
Location, Topography and Physical Features.. 1
History and Production..... 2
Ownership and Extent..... 2
Description of the Deposits..... 3
Minable Ore Reserves..... 3
Present status..... 12
Summary Cost of Project..... 12
Conclusions..... 12
Recommendations..... 13

TABLES

1. Concentration of Samples..... 5
2. Analyses of concentrates..... 6
3. Average depth of placer areas..... 8
4. Tonnages of placer areas..... 9
5. Concentrates in placer areas..... 10
6. Pounds of pentoxides in placer areas.... 11

ILLUSTRATIONS

Fig. — Follows page

1. Location map..... 1
2. Claim map and placer areas..... 2
3. Pit locations, sampling and ore blocks..... 3

INTRODUCTION

The St. Christopher Mining and Milling Co. of America applied to the Defense Minerals Administration for a development loan of $34,973 to install equipment, and to mine and produce tantalite-columbite and rare earth concentrates from placer ground in the Petaca Mining District, Rio Arriba County, N. Mex. Because of the appreciable amount of columbite that was indicated in application (Docket DMA-1113), the docket was referred to the field for examination.

This examination was completed during the latter part of May 1951. The area was mapped and 40 samples obtained from test pits dug in three localities in which the eluvial material contained heavy concentrates.

LOCATION, TOPOGRAPHY AND PHYSICAL FEATURES

The St. Christopher and St. John placer claims of the St. Christopher Mining and Milling Co. of America are located in the western part of adjoining sections 6, T. 26 N., R. 9 E., and 31, T. 27 N., R. 9 E., in the Petaca Mining District, Rio Arriba County, N. Mex. (see Figure 1).

The property is reached by taking the Jarita Mesa road west then northwest from Petaca, N. Mex., for 2.7 miles. At that point, also the top of the grade, tracks leave the main road to the right, or north. These tracks are followed for about one-fourth mile to the central area and one-half mile to the north area. The south area is a little northeast of the point where the tracks leave the main road and is accessible by car although there is no road.

The terrain is not rugged in the vicinity of the deposits. It is at a mean altitude of a little over 8,500 feet. Abundant forest covers

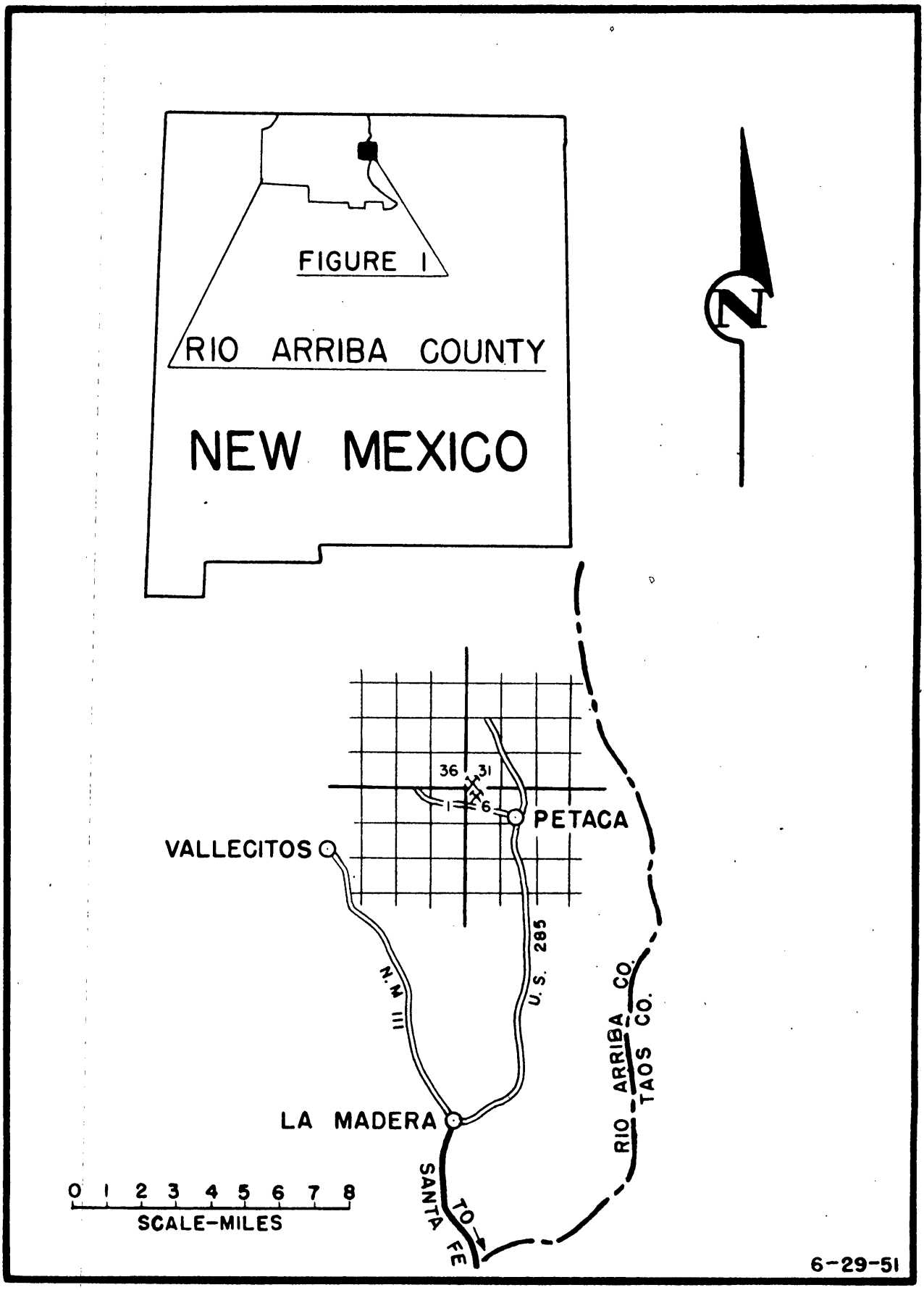

FIGURE 1-LOCATION MAP,
ST. CHRISTOPHER PLACER DEPOSITS, RIO ARRIBA CO., NEW MEXICO

much of the area. Ponderosa pine is the predominant tree. Rainfall averages a little over 20 inches a year. Winter snows and cold can hamper transportation considerable. Summer rains can make the roads slippery for short periods of time.

Mining equipment and supplies are available no closer than Santa Fe, N. Mex., about 70 miles to the south. A limited quantity of primitive dwellings may be obtained at Petaca. A limited supply of largely unskilled labor is available at Petaca and nearby villages.

HISTORY AND PRODUCTION

Small amounts of tantalite and columbite have been produced in New Mexico. This production is estimated at 11,500 pounds of concentrates mined furing the 1930's, most of which is presumed to have been obtained from the Petaca district. There is evidence of very small scale placer operations near Petaca that probably date back 15 to 20 years.

Recently, the St. Christopher Mining and Milling Co. of America relocated some of this ground and dug nearly 200 shallow test pits to test the ground. No production was reported.

In May 1951, a Defense Minerals Administration team examined the area and sampled 40 selected pits.

OWNERSHIP AND EXTENT

From the posted location notices, the claim boundaries in the area are plotted in Figure 2. These show some overlap and conflict in that a St. Joseph Mining and Milling Co. located some of the area claimed by the St. Christopher Mining and Milling Co. of America. However, the locating representatives are the same so it is assumed that the later locations were made to cover the area more in accord with regulations, i.e., conforming to legal subdivisions, and that the placer ground is

held under location by the St. Christopher Mining and Milling Co. of America. The locations were all dated in 1950.

There seems to be another and more serious conflict. There is undoubtedly an overlap on older lode locations which were made on the pegmatites by other individuals. The extent of the conflict and status of these prior lode locations could not be determined in the field. It is suspected that the owners of the lode claims would probably contest any mining on the portions where the placer claims overlap the prior lode claims.

DESCRIPTION OF THE DEPOSITS

The St. Christopher placer deposits, which lie in three small separate areas, are derived from deeply eroded pegmatites. The placer deposits consist largely of unclassified eluvial gravels, detritus and residual soils, often with large boulders. Concentration of the Heavy minerals has been largely by mechanical means, with water having played a very minor part. The valuable minerals, columbite and tantalite, occur in these placers in small irregular grains, but occasionally are found in pieces as large as one inch in maximum dimension. These heavy minerals are distributed throughout the relatively small thin deposits.

MINABLE ORE RESERVES

Minable ore reserves are based on the sampling of three areas as shown in Figure 3. All samples were panned to give a rough concentrate containing considerable of the lighter material. These rough concentrates then were treated with heavy liquid, (acetelene tetrabomide, sp. gr. 2.97), to separate the desired heavy concentrates from the lighter waste portions. The concentrates were dried and a magnetic separation

made to determine the amount of non-magnetic concentrate in the sample. All samples containing more than a pound per ton of non-magnetic concentrate were sent for analysis of the tantalum-columbium content after being re-combined with the magnetic portion. Five of the samples were sent to Ledoux and Co. of New York, 30 were sent to the Bureau of Mines laboratory at Salt Lake City, and five were rejected.

In addition, all samples of concentrates were tested for radioactivity and selected ones were examined under the microscope. Most of the samples indicated slight radioactivity which was pronounced in the very high grade samples. Microscopic examination of the non-magnetic portion revealed considerable garnet, some monazite, some unidentified light mineral, and considerable black mineral of which part was probably tantalite-columbite.

Most of the concentrate was fairly fine-grained but there were a few nuggets up to one-half inch in size. Some of these nuggets were magnetic or slightly so, being magnetite or ilmenite.

The results of work on the samples are shown in the following tables.

Table 1.--Concentration of Samples

Test Pit Number	Sample Weight Grams	Concentrates Weight in Grams Total	Magnetic	Non-Magnetic	Concentrates Percent of Sample Total	Magnetic	Non-Magnetic
North Area							
10	7,145	12.320	2.160	10.160	0.172	0.030	0.142
11	5,518	5.590	1.060	4.530	0.101	.019	.082
12	7,725	11.620	1.920	9.700	.150	.025	.125
13	5,785	28.200	2.485	25.715	.487	.043	.444
14	6,420	3.610	.595	3.015	.056	.009	.047
38	7,390	10.685	1.430	9.255	.144	.019	.125
36	4,290	8.300	1.835	6.465	.193	.043	.150
33	6,810	9.705	1.615	8.090	.143	.024	.119
31	5,030	11.325	1.880	9.445	.225	.037	.188
55	7,040	8.695	1.330	7.365	.124	.019	.105
57	10,470	17.890	2.505	15.385	.171	.024	.147
60	8,065	13.115	2.565	10.550	.163	.032	.131
65	10,040	28.185	3.340	24.845	.281	.033	.248
63	15,560	44.790	5.445	39.345	.288	..035	.253
92	7,710	39.145	6.645	32.500	.508	.086	.422
90	6,945	3,420	.740	2.680	.049	.011	.038
88	8,490	4.485	1.260	3.225	.053	.015	.038
86	6,910	8.510	2.910	5.600	.123	.042	.081
84	5,360	1.970	.865	1.105	.037	.016	.021
104	6,950	5.565	2.025	3.540	.080	.029	.051
105	8,815	8.075	1.680	6.395	.092	.019	.073
106	7,700	17.235	1.850	15.385	.224	.024	.200
107	5,910	6.620	2.420	4.200	.112	.041	.071
108	7,830	35.420	4.815	30.605	.452	.061	.391
South Area							
44	5,040	79.445	50.335	29.110	1.576	1.000	.576
43	6,605	21.465	14.340	7.125	.325	.217	.108
42	7,285	105.225	69.495	35.730	1.444	.954	.490
31	5,660	8.050	5.115	2.935	.142	.090	.052
30	7,560	24.150	13.990	10.160	.319	.185	.134
29	6,975	11.175	5.450	5.725	.160	.078	.082
28	7,025	37.670	9.980	27.690	.536	.142	.394
9	9,860	21.595	9.980	11.615	.219	.101	.118
10	9,035	9.990	2.670	7.320	.111	.030	.081
11	5,535	49.460	13.845	35.615	.894	.250	.644
12	4,040	7.620	3.975	3.645	.189	.099	.090
1	5,325	34.270	17.170	17.100	.644	.323	.321
Central Area							
3	3,995	11.645	9.070	2.575	.291	.227	.064
11	6,010	32.855	21.590	11.265	.547	.359	.188
8	6,905	131.420	74.700	56.720	1.903	1.082	.821
4	8,535	22.290	13.600	8.690	.261	.159	.102

Table 2.--Analyses of Concentrates

Test Pit Numbers	Concentrates: Pounds per ton of Sample: Total	Magnetic	Non-Magnetic	Analyses: Percent Pentoxides in Concentrates: Ta	Cb	Ta+Cb	Analyses: Pound Pentoxide per ton of Sample: Ta	Cb	Ta+Cb
North Area									
10	3.44	.60	2.84			-0.2			
11	2.02	.38	1.64			-0.1			
12	3.00	.50	2.50			-0.1			
13	9.74	.86	8.88			0.30			0.03
14	1.12	.18	.94	Not analysed					
38	2.88	.38	2.50			-0.1			
36	3.86	.86	3.00	0.3	0.4	0.7	0.01	0.02	0.03
33	2.86	.48	2.38	6.4	3.4	9.8	0.18	0.10	0.28
31	4.50	.74	3.76			0.2			
55	2.48	.38	2.10			0.2			
57	3.42	.48	2.94	0.5	0.8	1.3	0.02	0.03	0.05
60	3.26	.64	2.62	0.2	0.4	0.6	0.01	0.01	0.02
65	5.62	.66	4.96	1.2	1.9	3.1	0.07	0.11	0.18
63	5.76	.70	5.06			-0.1			
92	10.16	1.72	8.44			-0.1			
90	.98	.22	.76	Not analysed					
88	1.06	.30	.76	Not analysed					
86	2.46	.84	1.62			-0.1			
84	.74	.32	.42	Not analysed					
104	1.60	.58	1.02			-0.1			
105	1.84	.38	1.46	2.1	3.0	5.1	0.04	0.05	0.09
106	4.48	.48	4.00	13.43	28.19	41.62	0.60	1.26	1.86
107	2.24	.82	1.42			-0.1			
108	9.04	1.22	7.82	2.90	10.28	13.18	0.26	0.93	1.19
South Area									
44	31.52	20.00	11.52			-0.1			
43	6.50	4.34	2.16			-0.1			
42	28.88	19.08	9.80	0.9	1.4	2.3	0.26	0.40	0.66
31	2.84	1.80	1.04	Not analysed					
30	6.38	3.70	2.68	0.3	0.5	0.8	0.02	0.03	0.05
29	3.20	1.56	1.64	0.4	0.7	1.1	0.01	0.02	0.03
28	10.72	2.84	7.88			-0.1			
9	4.38	2.02	2.36	1.9	2.8	4.7	0.08	0.12	0.21
10	2.22	.60	1.62			-0.1			
11	17.88	5.00	12.88			0.40			0.07
12	3.78	1.98	1.80			-0.1			
1	12.88	6.46	6.42	0.4	0.6	1.0	0.05	0.08	0.13
Central Area									
3	5.82	4.54	1.28			-0.1			
11	10.94	7.18	3.76			-0.1			
8	38.06	21.64	16.42			0.20			0.06
4	5.22	3.18	2.04			-0.1			

Minable ore reserves were calculated from the results shown in preceeding tables. Two grade cutoffs were used, one where the sample contained over 0.1 pounds per ton of combined tantalum-columbium pentoxides, and one where it contained over 0.01 pounds of the combined pentoxides. In the following tables sample numbers preceeded with H indicate those with the higher cutoff, and those preceeded by L indicate those with a lower cutoff.

The pits from which the samples were obtained were marked and areas drawn around those pits showing ore (Figure 3). The areas were measured by planimeter, and the volume determined by multiplying with an arithmetical average of the depth of all pits located within the area. Conversion was made to tons by using a tonnage factor of 20. Note the following tables, 3 and 4, showing average depths and tonnages of placer areas.

Table 3--Average Depths of Placer Areas

Area Figure 3	Pit Number	Pit Depth	Average Depth
H1	27	1.0	
	NN10	1.2	
	NN 9	1.0	
	34	1.3	
	33	1.1	
	32	1.6	
	46	1.0	
	47	1.0	1.15
H2	48	1.0	
	66	1.5	
	65	1.3	
	64	1.2	1.25
H3	96	1.5	
	101	1.0	
	106	1.0	1.17
H4	108	0.8	0.8
H5	45	1.2	
	42	2.0	
	NN23	1.6	
	38	1.3	1.52
H6	17	3.3	
	13	1.2	
	9	3.5	
	8	2.5	2.62
H7	5	1.4	
	1	3.0	
	2	1.7	
	A	1.2	1.82
L1	11	0.6	
	19	1.5	1.05
L2	26	1.0	
	35	1.2	
	36	0.8	
	37	1.2	
	43	1.0	
	44	2.4	
	45	1.0	1.23
L3	52	1.4	
	51	1.2	
	57	2.2	1.60
L4	49	1.5	
	50	1.6	
	58	1.4	
	59	1.0	
	60	2.3	
	61	1.8	
	62	2.6	
	NN13	2.3	
	73	2.7	
	NN14	2.0	
	NN15	2.5	
	75	1.8	1.96
L5	105	1.0	
	103	1.3	
	NN 19	1.0	1.10
L6	NN24	1.0	
	35	3.0	
	36	1.0	
	30	1.2	
	NN27	1.4	
	23	3.5	1.85
L7	NN25	1.0	
	37	1.4	
	20	2.0	
	24	2.0	1.60
L8	11	1.0	1.0
L9	8	2.2	
	9	1.5	
	10	2.5	2.07

Note: NN - No Number

Table 4—Tonnages of Placer Areas

Area Figure 3	Average Depth Pits Table 3	Planimeter Areas Sq. Ins.	Area Sq.Ft.	Volume Cu. Ft.	Volume Cu. Yds.	Tons factor-20
Cutoff, 0.1 lbs. combined pentoxides						
H1	1.15	6.24	9,984	11,482	425	574
H2	1.25	3.78	6,048	7,560	280	378
H3	1.17	2.44	3,904	4,568	169	228
H4	0.8	0.82	1,312	1,050	39	53
H5	1.52	2.10	3,360	5,107	189	255
H6	2.62	2.43	3,888	10,187	377	509
H7	1.82	1.18	1,888	3,436	127	172
Total				43,390	1,606	2,169
Cutoff, 0.01 lbs. combined pentoxides						
L1	1.05	2.03	3,248	3,410	126	171
L2	1.23	6.83	10,928	13,441	498	672
L3	1.60	2.90	4,640	7,424	275	371
L4	1.96	6.08	9,728	19,067	706	953
L5	1.10	1.89	3,024	3,326	123	166
L6	1.85	2.41	3,856	7,134	264	357
L7	1.60	2.69	4,304	6,886	255	344
L8	1.0	0.76	1,216	1,216	45	61
L9	2.07	3.23	5,168	10,698	396	535
Total				72,602	2,688	3,630
Grand Total				115,992	4,294	5,799

The concentrates and the metal content of the area was determined from the one sampled ore pit within each area. These were all weighted by areas for the final results, which are shown in tables 5 and 6 (concentrates and pounds of pentoxides in placer areas.)

Table 5—Concentrates in Placer Areas

Area Figure 3	Tons Table 4	Pit Sampled	Concentrates Pounds Per Ton (Table 2) Total	Magnetic	Non-Magnetic	Concentrates Total Pounds Total	Magnetic	Non-Magnetic
H1	574	33	3.86	0.48	2.38	1,642	276	1,366
H2	378	65	5.62	.66	4.96	2,124	249	1,875
H3	228	106	4.48	.48	4.00	1,021	109	912
H4	53	108	9.04	1.22	7.82	479	65	414
H5	256	42	28.88	19.88	9.00	7,364	4,865	2,499
H6	509	9	4.38	2.02	2.36	2,229	1,028	1,201
H7	178	1	12.88	6.46	6.42	2,215	1,111	1,104
Total						17,074	7,703	9,371
L1	171	13	9.74	0.86	8.88	1,666	147	1,519
L2	672	36	3.86	.86	3.00	2,594	578	2,016
L3	371	57	3.42	.48	2.94	1,269	178	1,091
L4	953	60	3.26	.64	2.62	3,107	610	2,497
L5	166	105	1.84	.38	1.46	305	63	242
L6	357	38	6.38	3.70	2.68	2,278	1,321	957
L7	344	29	3.20	1.56	1.64	1,101	537	564
L8	61	11	17.88	5.00	12.88	1,051	305	786
L9	535	8	38.06	21.64	16.42	20,352	11,577	8,785
Total						33,773	15,316	18,457
Grand Total - All grades and areas						50,847	23,019	27,828

Table 6—Pounds of Pentoxides in Placer Areas

Area Fig. 3	Tons Table 4	Pit Sampled	Assays (Table 2) Pounds Pentoxide Per Ton Sample Ta	Cb	Ta+Cb	Tons x Assays Total Pounds Pentoxide Ta	Cb	Ta+Cb
Cutoff, 0.1 lbs. combined pentoxides								
H1	574	33	0.18	0.10	0.28	103	57	160
H2	378	65	0.07	0.11	0.18	26	42	68
H3	228	106	0.60	1.26	1.86	137	287	424
H4	53	108	0.26	0.93	1.19	14	49	63
H5	255	42	0.26	0.40	0.66	66	102	168
H6	509	9	0.08	0.12	0.20	41	61	102
H7	172	1	0.05	0.08	0.13	9	14	23
Total						396	612	1,008
Cutoff, 0.01 lbs. combined pentoxides								
L1	171	13	-	-	0.03	-	-	5
L2	672	36	0.01	0.02	0.03	7	13	20
L3	371	57	0.02	0.03	0.05	7	11	18
L4	953	60	0.01	0.01	0.02	10	10	20
L5	166	105	0.04	0.05	0.09	7	8	15
L6	357	30	0.02	0.03	0.05	7	11	18
L7	344	29	0.01	0.02	0.03	3	7	10
L8	61	11	-	-	0.07	-	-	4
L9	535	8	-	-	0.06	-	-	32
Total						41	60	142
Grand Total						437	672	1,150

Summarizing the above tales, there are 5,799 tons (4,294 cubic yards) of minable placer material containing 50,847 pounds of concentrates that contain 1,150 pounds of combined tantalum-columbium pentoxides. Of the combined pentoxides, 45 percent is Ta_2O_5 and 55 percent is Cb_2O_5. Based on a 0.1 pound per ton cutoff, there are 2,169 tons of placer material containing 17,074 pounds of concentrates. These concentrates contain 1,008 pounds of combined pentoxides. The remainder of the material is based on a cutoff of 0.01 to 0.1 pounds of pentoxides per ton.

PRESENT STATUS

The St. Christopher placer deposits are not being worked at present. Exploitation is being withheld pending the results of the examination reported herein. There is no equipment of any kind on the property.

SUMMARY COST OF PROJECT

Based on the minable ore reserves reported in a previous section, there are a total of 1,150 pounds of combined tantalum-columbium pentoxides available in 50,847 pounds of concentrates to be obtained from 5,799 tons (or 4,294 cubic yards) of placer. At $4.17 per pound of contained pentoxides (based on $2.50 per pound of 60 percent concentrates), there is $4,796 from which to pay off a $14,973 loan. It is unlikely that the reserves of placer material can be greatly increased.

CONCLUSIONS

The following conclusions are based on an examination of St. John and St. Christopher placer claims of the St. Christopher Mining and Milling Co. of America:

1. The quantity of placer material is small;

2. The chances of increasing these reserves are remote;

3. The tantalite-columbite content of the placers is very low and only in one or two very small areas can it be considered commercial;

4. Only 50,847 pounds of concentrates are available for recovery, which contain 1,150 pounds of combined tantalum-columbium pentoxides;

5. The value of the tantalum-columbium pentoxides is $4,796, which is not sufficient to repay a loan of $34,973.

RECOMMENDATIONS

Based on the conclusions listed in the previous section, it is recommended that the application, Docket EMA-1113, of the St. Christopher Mining and Milling Co. of America be denied.

ST. CHRISTOPHER COLUMBITE PLACER
PETAGA MINING DISTRICT
RIO ARRIBA COUNTY, NEW MEXICO

Geology

By John N. Faick
Geologist, U. S. Geological Survey

Geology

ST. CHRISTOPHER COLUMBITE PLACER
PETACA MINING DISTRICT
RIO ARRIBA COUNTY, NEW MEXICO

CONTENTS

Geology	Page
General Geology	1
Pegmatite Dikes	1
Placer Deposits	2
Ore Reserves	4
Other Exploration Possibilities	5
Conclusions	5

ILLUSTRATIONS

Fig. 3 Locations, sampling and ore blocks, St. Christopher Placer Deposits. — See Engineering Report

GENERAL GEOLOGY

The columbite-tantalite placer deposits controlled by the St. Christopher Mining and Milling Corporation are about 2 miles west of Petaca, New Mexico. The mine is at an altitude of approximately 8300 feet and is on Jarita Mesa, a part of a deeply dissected plateau surface which is regarded as the Santa Fe peneplain. The mine is situated on the gentle slopes of a broad northwesterly trending ridge between Jarita Canyon and Apache Canyon both tributary to the Tusas River which flows southeasterly through Petaca.

An excellent background of the general geology of the district has been provided by Just.[1] The plateau area is underlain by a wide variety of pre-Cambrian rocks consisting largely of quartzites, gneisses and schists that have developed by metamorphism of sedimentary rocks and both intrusive and extrusive igneous rocks. A silver-gray micaceous schist resting on a medium gray granite gneiss underlies the area in vicinity of the columbite-tantalite placers. The banding and schistosity at this locality strikes N. 25° W. and dips 35° SW.

PEGMATITE DIKES

According to Just[2] there are many pegmatites on the Jarita Mesa along a belt extending southward from Kiawa Mountain nearly to Ojo Caliente. These pegmatites are as large as 100 feet wide and several hundred feet long. They are composed essentially of albite, microcline, quartz, dark-gray perthite and muscovite. Just[3] reports the accessory minerals to be monazite, columbite-tantalite, samarskite,

1/ Just, Evan, Geology and Economic Features of the Pegmatites of Taos and Rio Arriba Counties, New Mexico: N. Mex. School of Mines, State Bureau Mines and Min. Bull. 13, pp. 9-14, 40-50, 1937.

2/ Op. cit., p. 46

3/ Op. cit., p. 46

fluorite, garnet, ilmenite, bismutite, beryl, uraninite, roscoelite, pyrite and molybdenite. Only a few of these accessory minerals were observed in the placers.

Thorough studies of the pegmatites of the Petaca district were made by Jahns[4], who studied many of the deposits in detail. Two of these, the Etter and Werner deposits, have been described in considerable detail by Irwin[5] and the Mary deposit has been described likewise by Jahns.[6] These are of particular importance to this discussion as they were the sources of the rare earth minerals found in the St. Christopher placer deposits. The Mary pegmatite is the northernmost of the three; the Etter and Werner pegmatites are a short distance southeast of the Mary pegmatite and form part of the ridge along which the dikes crop out (see fig. 3).

These pegmatite dikes are composed largely of microcline, quartz, albite, and muscovite but columbite, tantalite, monazite, bismutite, garnet, and beryl are reported as accessory minerals. The dikes have been mined for muscovite and a little columbite and beryl were produced as by-products of the mica operations.

PLACER DEPOSITS

The columbite-tantalite placers of the St. Christopher Mining and Milling Corporation have resulted from erosion of the Mary, Etter and Werner pegmatites. The eroded materials have not been water transported

4/ Jahns, Richard H., Mica Deposits of the Petaca District, Rio Arriba County, N. Mex., N. Mex. Sch. of Mines, State Bur. of Mines and Min. Res. Bull. 13, pp. 1-261, 1946.

5/ Irwin, W. P. in Jahns, Richard H.,Op. cit. pp. 146-151.

6/ Jahns, Richard H., Op. cit., p. 146.

to any extent but have been concentrated more by mechanical action aided by the limited hydraulic action provided by rains and melting snows.

The placers occur in 3 areas and are composed of hillside eluvial gravels and residual soils. The columbite and tantalite occur in these placers in small irregular grains usually less than 3/8 of an inch across. Larger pieces are found occasionally, the largest seen being about 1 inch in maximum dimension. Some of the material is radioactive.

The most southerly placer occupies the upper drainage of a small arroyo sloping southward from the Werner pegmatite. The columbite-tantalite bearing eluvial gravel appears to be about 100 feet wide and 500 feet long and varies in depth from a few inches to about 4 feet. The bedrock is micaceous schist and the eluvium is composed of this material and fragments of the Werner pegmatite. The placer has been tested with many pits and the samples from these show that the eluvium contains more or less of the rare-earth minerals.

The central placer zone was derived from the Werner and Etter pegmatites. The deposit consists largely of fine residual soils derived from the erosion of micaceous schist country rock but also containing some material eroded from the pegmatite dikes. Small grains and fragments of columbite and tantalite can be found in ant hills and lying scattered around on the surface. This is ample proof that the rare minerals exist in the residual soil, however the amount appears to be relatively small.

The most northerly placer deposit controlled by the St. Christopher Mining and Milling Corporation is the largest. It has been derived from the Mary pegmatite and occupies an incipient drainage channel developed

on the Jarita Mesa. The deposit consists of soils and gravels and large boulders resting on a bedrock of micaceous schist and gneissoid granite. The deposit ranges in depth from a few inches to a maximum of about 4 feet. The deposit is roughly 300 feet wide and 800 feet long. The banding of the schist and gneiss bedrock at this locality strikes about N. 25° W. and dips about 35° SW. The bedrock erodes to surfaces determined by the banding and jointing. As a result of erosion the bedrock surface is extremely irregular and occurs in a series of steps or benches dipping westerly into the hill toward the sources of the placer. These steps and benches form traps for the collection of soils and gravels containing the rarer minerals. Because of the uneven character of the bedrock and the prevalence of large boulders, this thin deposit would prove to be difficult and expensive to mine.

ORE RESERVES

Reserve estimates on small, shallow irregular placer deposits such as those owned by the St. Christopher Mining and Milling Corporation are difficult to determine accurately. The table below gives the reserves for the three areas, the probable recoverable concentrates and the amount of columbium and tantalum pentoxides contained therein.

Area	Tons of Placer Material	Total Lbs 7/ Concentrate	Lbs. Contained Pentoxides 8/ Ta_2O_5	Cb_2O_5	Combined Ta_2O_5 & Cb_2O_5	Total Lbs. Pentoxides
North	3,566	14,207	311	477	5	793
South	1,698	16,278	126	195	4	325
Central	535	20,362	—	—	32	32
Totals	5,799	50,847	437	672	41	1,150

7/ Gravity concentrates will include the heavy minerals such as magnetite, ilmenite and garnet.

8/ For some samples only combined assays were made.

OTHER EXPLORATION POSSIBILITIES

The three areas of placer gravel controlled by the St. Christopher Mining and Milling Corporation are definitely limited and it appears unlikely that worthwhile extensions of these deposits will be found. It is reasonable to assume that other similar deposits exist in the Petaca area but remain undiscovered. Jarita Mesa has been subjected to Tertiary peneplanation and the numerous pegmatites have been deeply eroded. Most of the products of erosion have undoubtedly been removed, but there remains the possibility that some of the heavy minerals may have been concentrated into workable placers on the old land surface. As shown by Jahns[9] the rare earth minerals have been relatively abundant in the Globe, Fridlund, Alamos, Lonesome and several other deposits. Areas surrounding these pegmatites should be fertile places in which to seek additional placers similar to those derived from the Werner, Etter, and Mary pegmatites. However, if the 3 placers examined are typical of those that may be discovered, it is doubtful that tantalite and columbite can be extracted profitably from one or any combination of several such deposits.

CONCLUSIONS

The small shallow placer deposits belonging to the St. Christopher Mining and Milling Corporation of America consist mostly of eluvial soils, sands and gravels derived from the Werner, Etter, and Mary pegmatites and surrounding country rock. There are about 5800 tons of this material available in 3 separate areas and the estimated combined columbium-tantalum pentoxides amounts ot 1150 pounds, valued at slightly less than $5,000.

9/ Jahns, Richard H., Op. cit., p. 264.

Other similar deposits, as yet undiscovered, may exist in the same general area. Exploitation of these small low grade deposits is uneconomic and it is therefore recommended that the application for a loan by the St. Christopher Mining and Milling Company be denied.

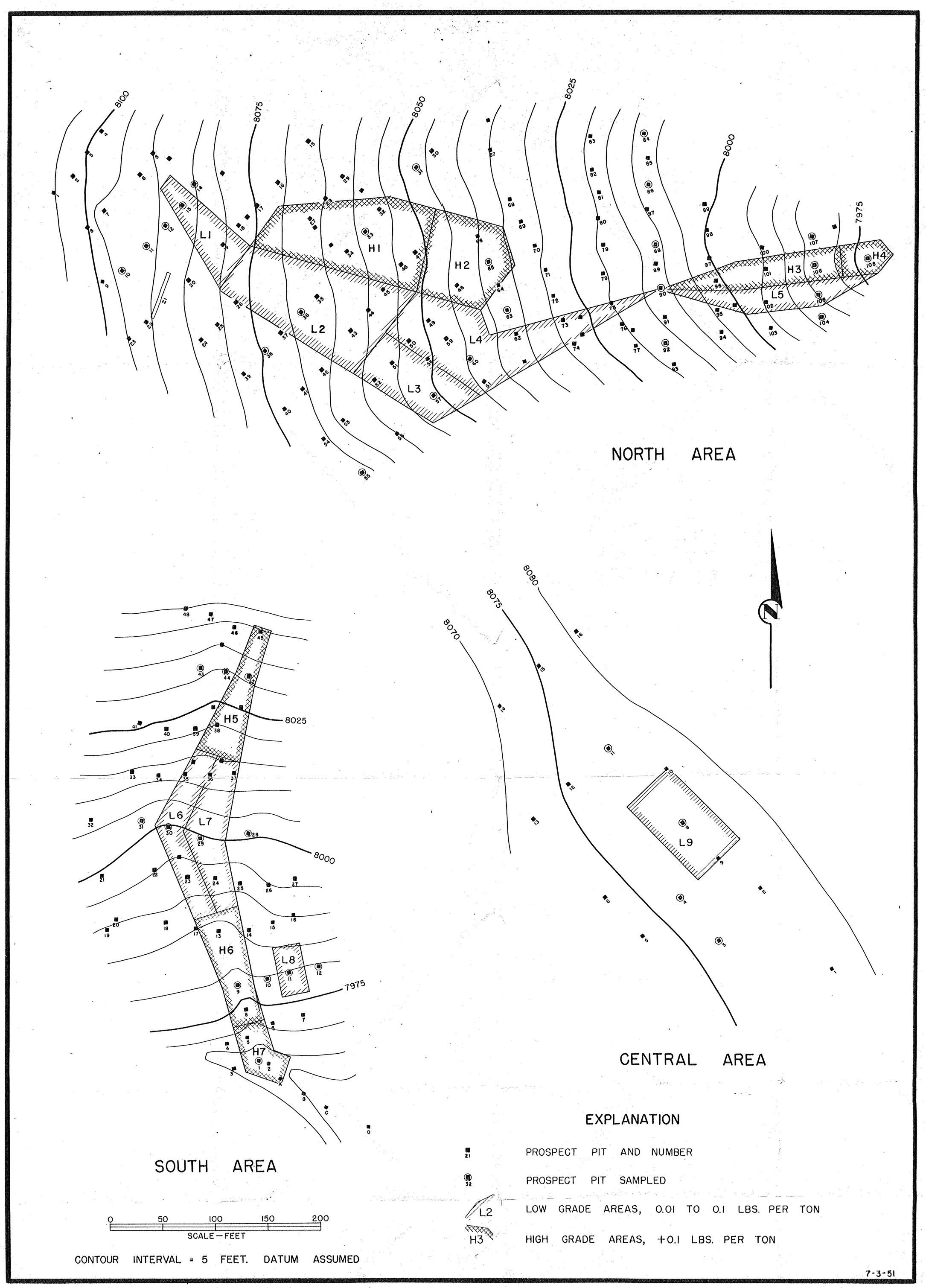

FIGURE. 3-PIT LOCATIONS, SAMPLING, AND ORE BLOCKS, ST. CHRISTOPHER TA-CB PLACER DEPOSITS

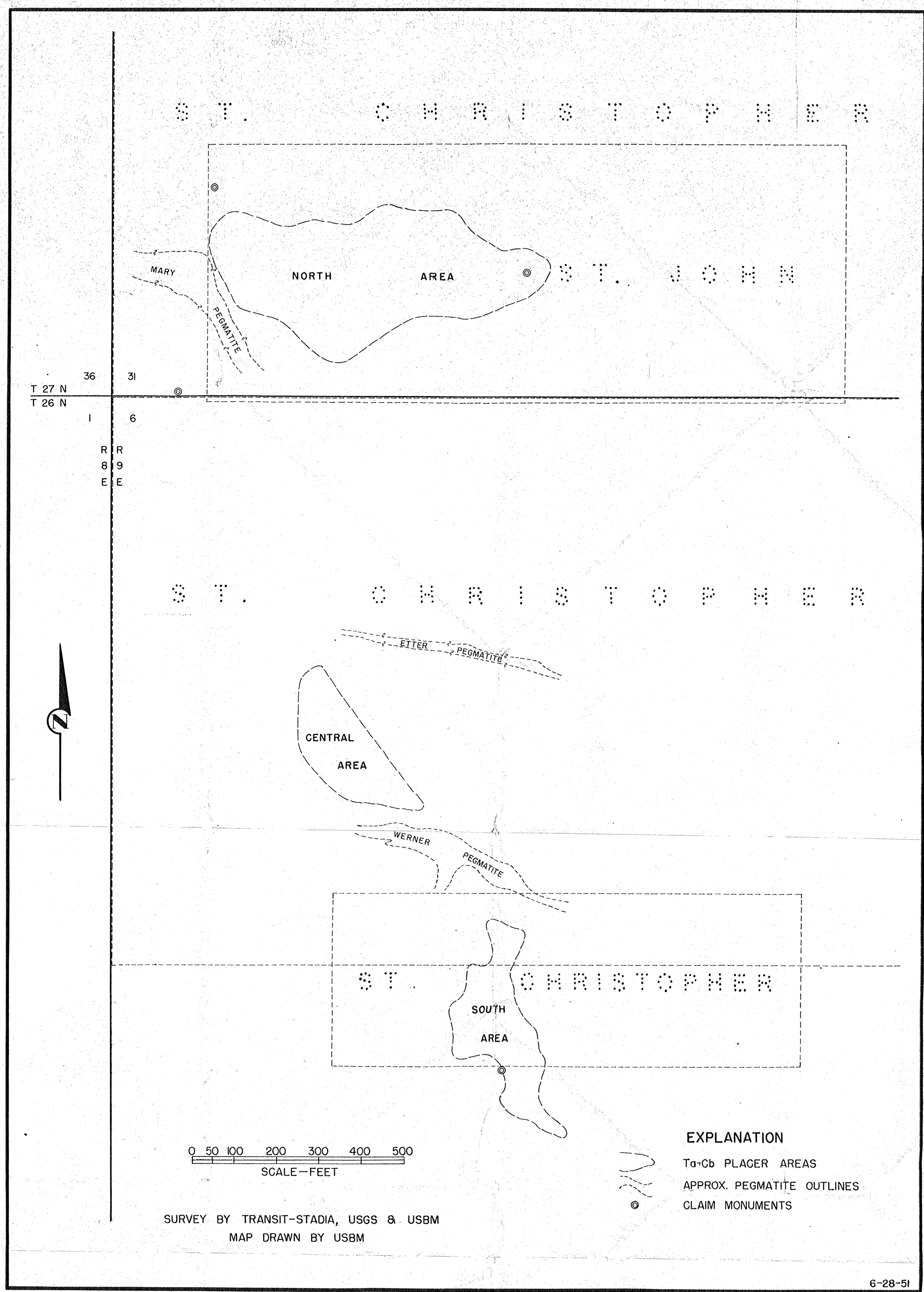

FIGURE 2-CLAIM MAP & PLACER AREAS OF ST. CHRISTOPHER TANTALUM-COLUMBIUM DEPOSITS