Bureau of Mines
Report of Investigations 4678

INVESTIGATION OF NIGHTINGALE TUNGSTEN DEPOSIT, PERSHING COUNTY, NEV.

BY J. H. EAST, JR., AND RUSSELL R. TRENGOVE

United States Department of the Interior — April 1950

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J. H. East, Jr.[1/] and Russell R. Trengove[2/]

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ILLUSTRATIONS

1/ Mining engineer, Bureau of Mines, Denver, Colo.
2/ Mining engineer, Bureau of Mines, Reno, Nev.

INTRODUCTION AND SUMMARY

The Bureau of Mines conducted an investigation of the Nightingale tungsten deposit about 38 miles north of Fernley, Nev., from September 1939 to March 1940, to determine possible resources of tungsten ore. The property was owned by the Gold, Silver & Tungsten, Inc., which maintained its offices in Boulder, Colo.

Ore was discovered in 1917, and some ore was mined in 1918 and treated in a mill at Toulon, a station on the Southern Pacific Railroad, 40 miles east. Some shipments were made since 1918, but no production figures are available.

The ore is mined from nearly vertical tactite bodies at the limestone-granite contact.

The Bureau of Mines excavated 944 linear feet of trenches, drifted 52 linear feet, sunk a shaft 20 feet in depth, sampled the underground workings by cutting 743 linear feet of channels, sampled the surface trenches by cutting 415 linear feet of channels, and drilled 9 diamond-drill holes, totaling 3,000 feet.

The ensuing sections note the location and physical features of the district and specify the property and ownership. The history of the mine is briefed, and the geology and mine workings are described.

The work done by the Bureau of Mines is summarized and supplemented in detail by assay maps, logs of diamond-drill holes in appendix A, and a table of sample analyses in appendix B.

ACKNOWLEDGMENTS

Acknowledgment is made to the late Charles F. Jackson, chief of the former Mining Division, E. D. Gardner, superv ising engineer for the Western States, and W. O. Vanderburg, under whom the work was started.

Acknowledgment is also made to P. W. Guild of the U. S. Geological Survey, who prepared detailed geologic maps of the surface and underground workings and examined diamond-drill cores.

Samples were analyzed under direction of the late E. S. Leaver, supervising engineer of the Rare and Precious Metals Station, Reno, Nev.

LOCATION AND PHYSICAL FEATURES

The Nightingale mine is in Pershing County, Nev., about 21 miles from Hot Springs Station on Highway U. S. 40, between Reno and Lovelock. (Fig. 1.)

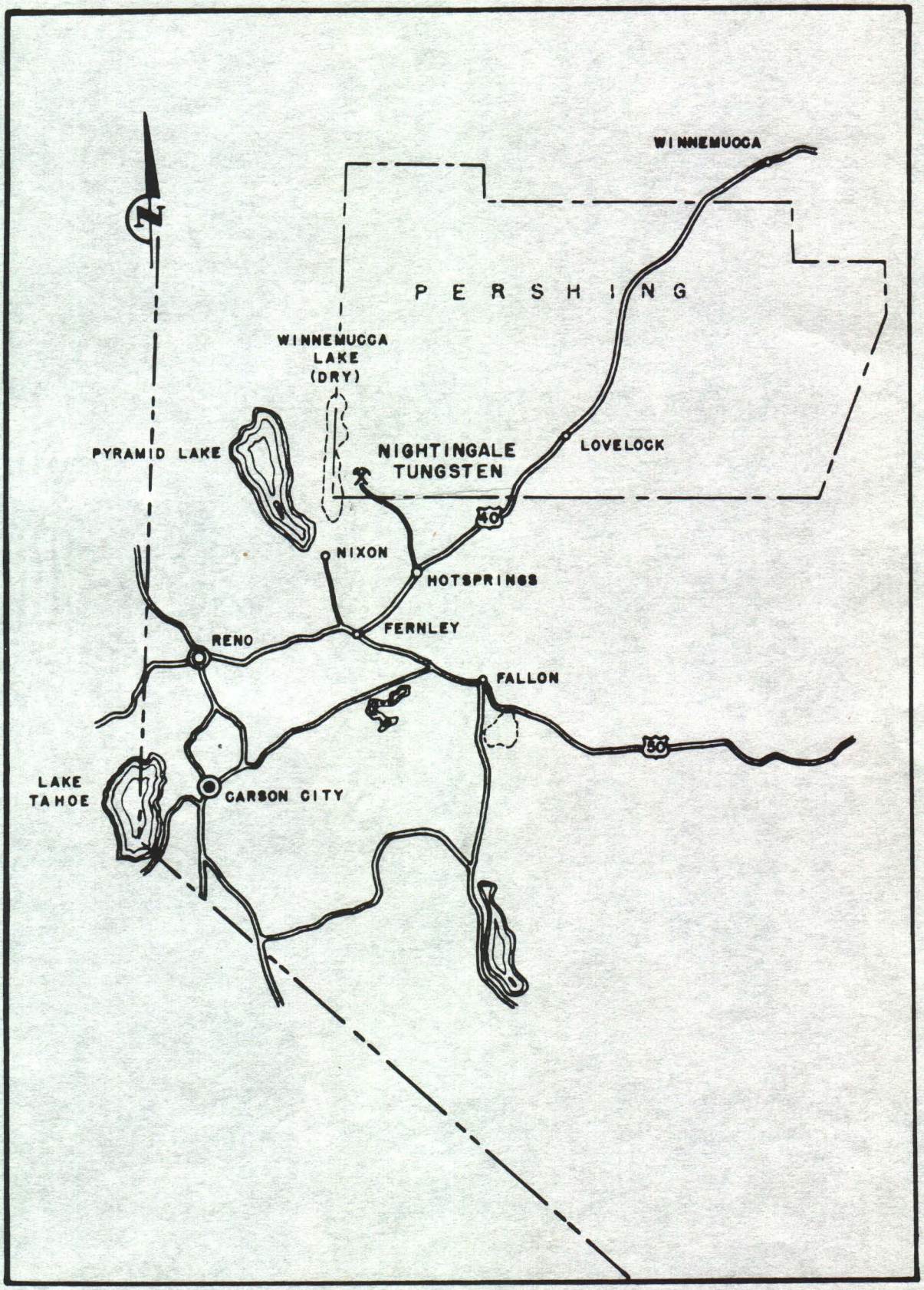

Figure 1. - Location map, Nightingale tungsten deposit, Pershing County, Nev.

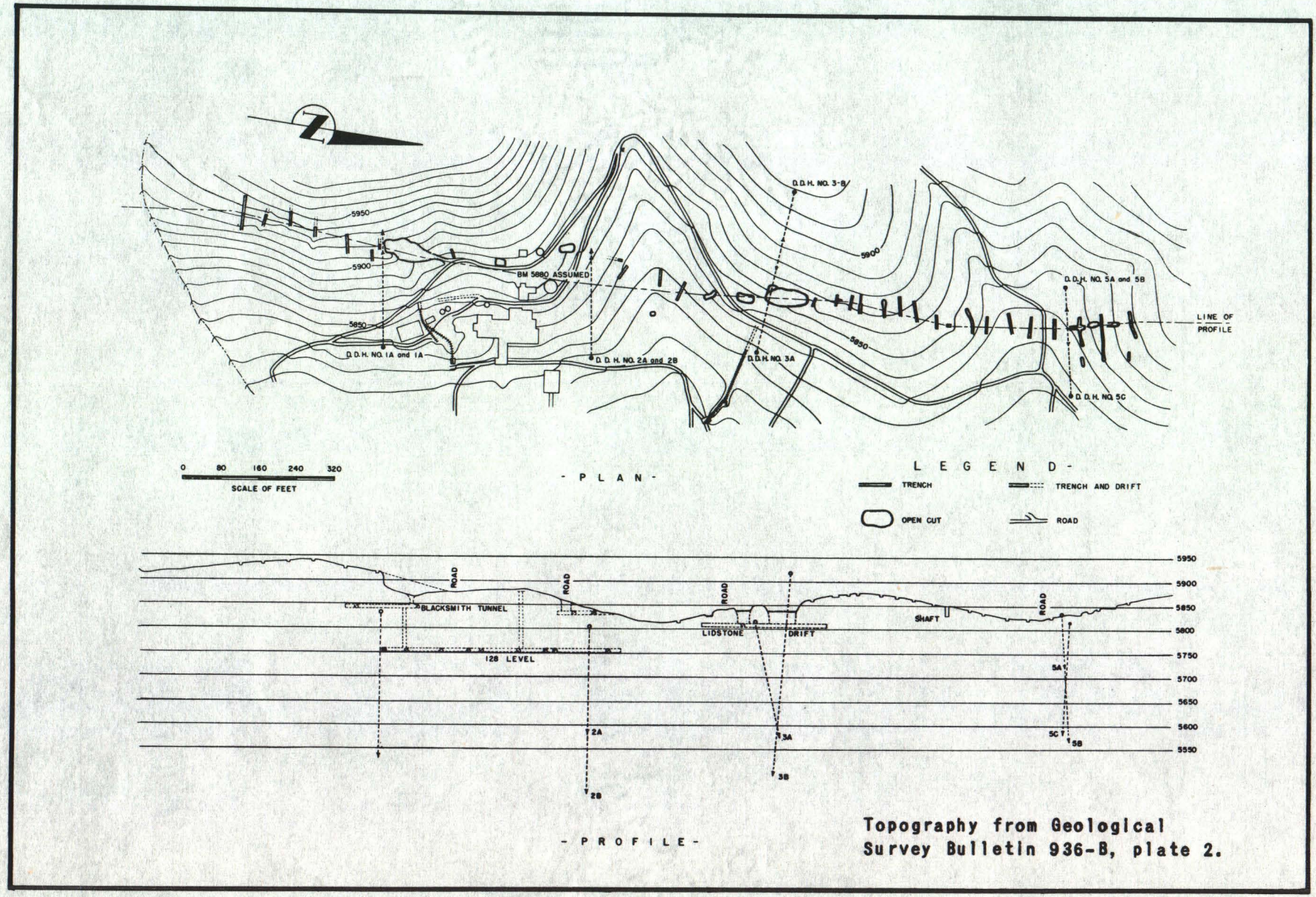

Figure 2. - Topographic map with profile.

The nearest town and post office is Fernley, Nev., about 17 miles south of Hot Springs Station. Bureau exploration was confined to the most important portion of the company holdings, the E. 1/2 of N. E. 1/4 of sec. 25, T. 25 N., R. 24 E.

The property is usually accessible throughout the year. The road leading from Hot Springs is unimproved and sandy most of the distance. The last mile of road before the campsite is reached is steep and very slippery when wet.

The nearest railroad, the Susanville Branch of the Southern Pacific Railroad is at Nixon, 18 miles southwest of the property.

The mine is at an altitude of about 5,800 feet on the east slope of the Nightingale Range. Water for domestic use and for milling was obtained from Linton's Well, about 3/4 of a mile east from the camp and several hundred feet lower in elevation. Water was pumped by gasoline-driven pumps through a 3-inch pipe to large storage tanks above the mill. Drinking water was hauled to the camp in barrels.

PROPERTY AND OWNERSHIP

The Nightingale mine was owned by the Gold, Silver & Tungsten, Inc., with offices in Boulder, Colo. The property comprised the E. 1/2 of the N. E. 1/4 of sec. 25, T. 25 N., R. 24 E; two patented claims, the Marvelous and Marvelous No. 1; and numerous claims held by location. The more important holdings are indicated on figure 2, which also shows the campsite and mine roads.

HISTORY AND PRODUCTION

Tungsten deposits were discovered at Nightingale in 1917 by Alex Ransome and his associates,[3] who sold the property in 1929 to the Gold, Silver & Tungsten, Inc., of which the late J. G. Clark of Boulder, Colo., was president. This company built a mill designed to treat 100 tons of ore a day; but, except for short experimental runs, it has never been operated. The first shipments of ore from the property were made in 1918, when the ore was treated in a mill at Toulon, a station on the Southern Pacific Railroad. Some small shipments were made since 1918. No production figures are available, but according to Clark[4] $200,000 worth of concentrates have been produced from the district.

Ward Smith and George P. Sopp of the U. S. Geological Survey surveyed the topography and areal geology of the district in 1938, and Philip W. Guild of the survey studied the details of geology as shown by diamond-drill cores, trenches, and other mine workings, while the Bureau of Mines exploration was in progress.

W. O. Vanderburg[5] and J. H. East, Jr.,[5] started Bureau of Mines exploration in 1939. Since completion of this work in 1940, the property has been inactive.

3/ Hess, F. L., and Larsen, E. S., Contact-Metamorphic Tungsten Deposits of the United States: Geol. Survey Bull. 725-D, 1921, p. 282.

4/ Vanderburg, W. O., Reconnaissance of Mining Districts in Pershing County, Nev.: Bureau of Mines Inf. Circ. 6902, 1936, p. 24.

5/ Mining engineers, Bureau of Mines.

GEOLOGY

The Nightingale tungsten-ore bodies are typical contact-metamorphic deposits. They are found in nearly vertical tactite bodies along a northward-trending grandiorite-limestone contact for approximately 1,800 feet.

Frank L. Hess and Esper S. Larsen have described contact metamorphism and the Nightingale Range, Nev., in Bulletin 725-D entitled "Contact-Metamorphic Tungsten Deposits of the United States," published by the U. S. Geological Survey in 1921. The general features of the process, size, and form of the deposits are described on pages 248-250.

Ward C. Smith and Philip W. Guild have described the geology and the ore deposits of the Nightingale area in the U. S. Geological Survey Bulletin 936-B, entitled "Tungsten Deposits of the Nightingale District, Pershing County, Nev." This bulletin was published in 1942 after the Bureau development work was completed, and illustrations in it show the relationship of tungsten-bearing tactite and other geologic units to the drill holes, trenches, and mine workings.

MINE WORKINGS.

The principal tonnage mined at this property was derived from disconnected ore lenses at or near the surface. Drifts were driven under the lenses and the ore mined by "glory-holes" method of mining.

Several rather large ore lenses have been mined (fig. 2.) No records are available of the production either in tons of ore tons mined or of concentrates recovered.

The Lidstone drift is reached through an adit 150 feet long, at an elevation of 5,803 feet. The ore from the glory hole was trammed through this drift, dumped into a loading bin, then hauled to the mill in trucks. The drift extends 125 feet north from the adit and 160 feet south (fig. 3). The south end of the drift contains the highest-grade ore found in any of the underground workings. Former company employees said that this ore assayed 3 percent tungsten. The extension of the adit west beyond the drift shows that the mining was not carried to the limit of the mineralization (fig. 7), and the width of the metamorphism was not determined on this level.

The collar of the main shaft, elevation 5,880 feet, is directly above the mill and is reached by a fair truck road. This 4- by 5-foot single-compartment shaft was sunk 178 feet in granite. A level was cut 128 feet below the collar. The workings north of the shaft were driven along the contact. South of the shaft the drift is in granite. Crosscuts have been driven from this drift to the contact. Virtually no mining has been done from this level. An ore raise to the Blacksmith tunnel level is at crosscut No. 3.

The Blacksmith tunnel, elevation 5,843, was driven under the glory hole farthest south. Many of the workings are caved and inaccessible. The ore above this level is believed to be mined out. Mine workings are visible below the glory hole but were considered too dangerous to examine and sample (fig. 2)

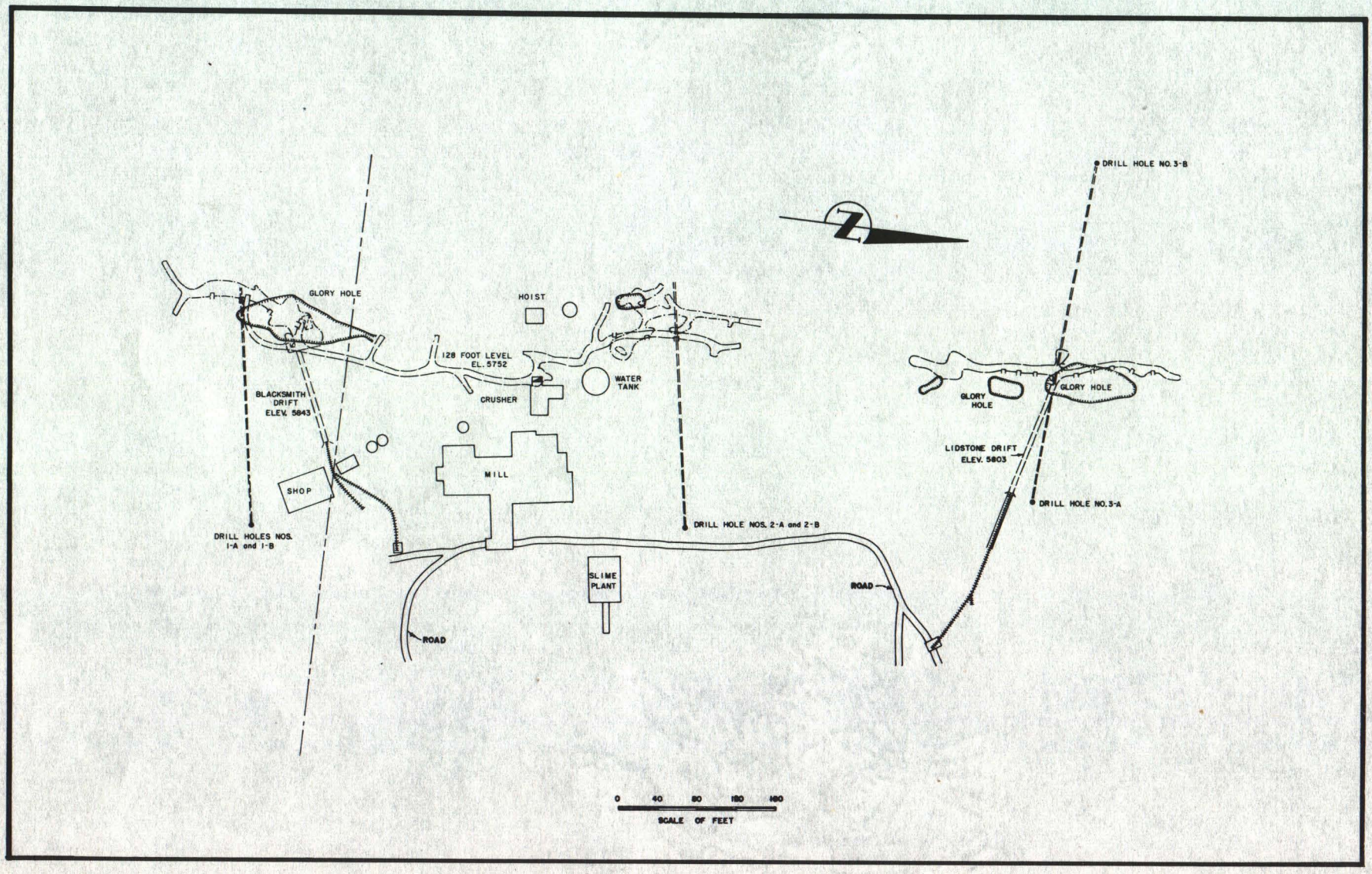

Figure 3. - Map of underground workings.

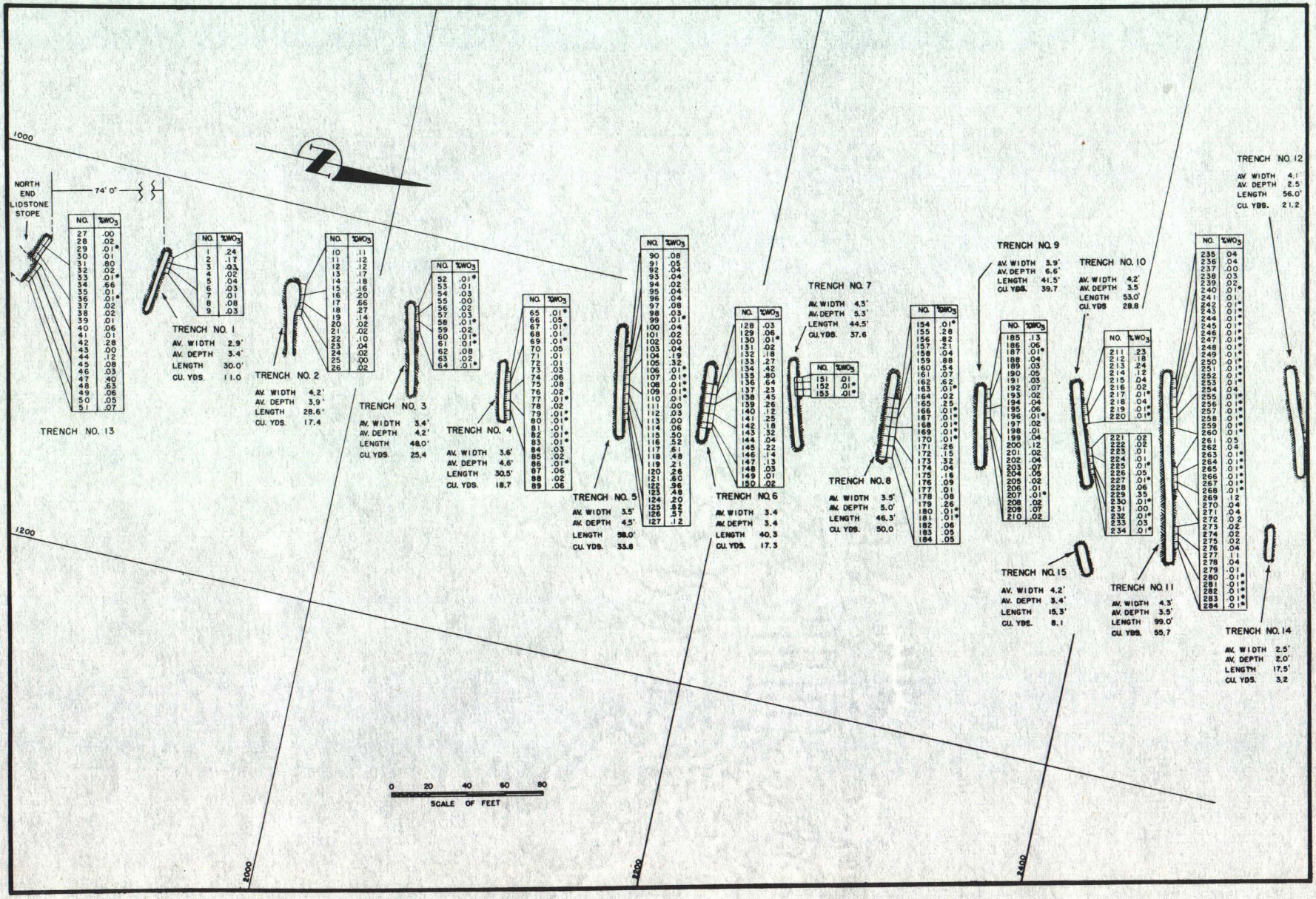

Figure 4. - Plan and sample analyses of north-end trenches.

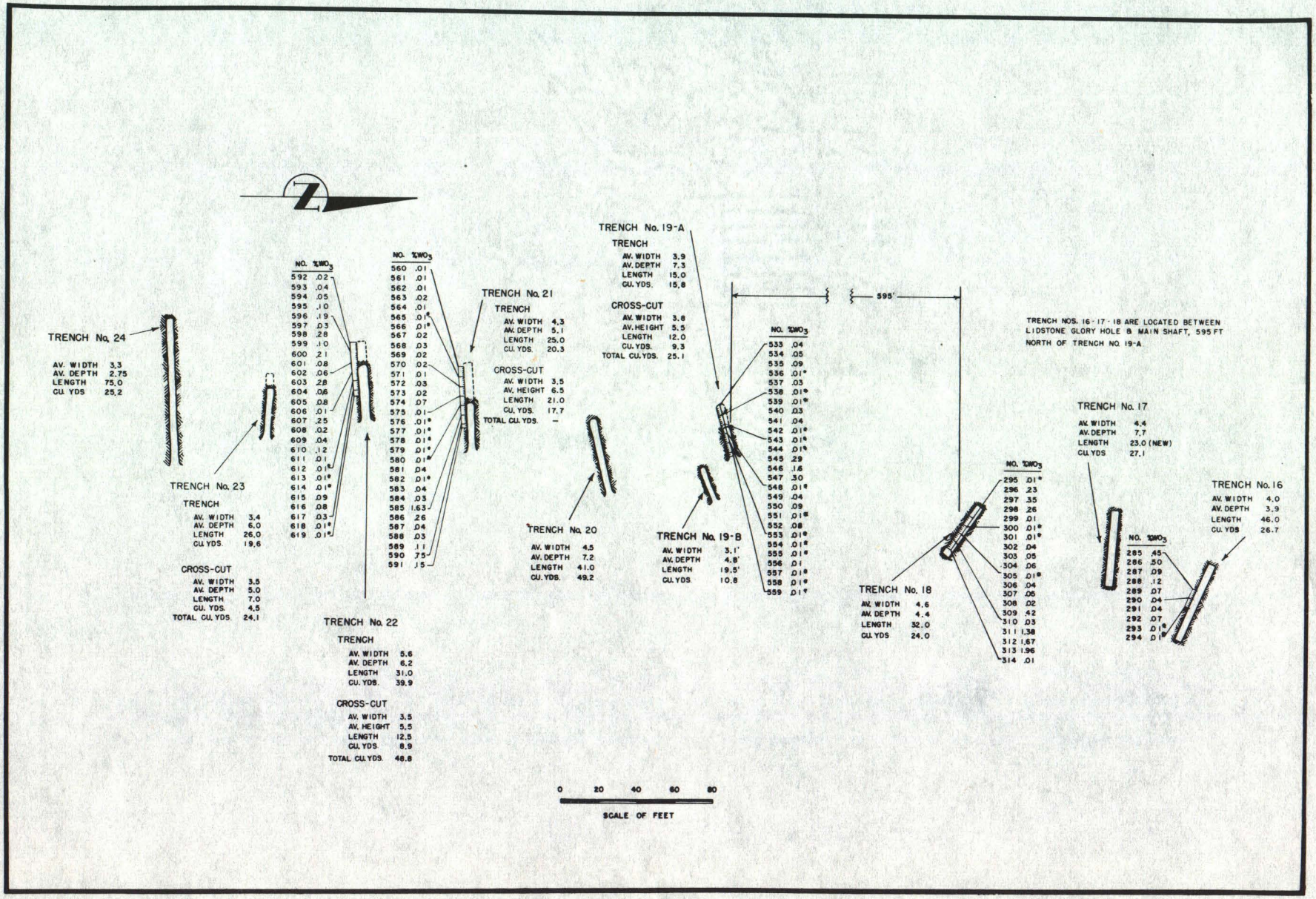

Figure 5. - Plan and sample analyses of south-end trenches.

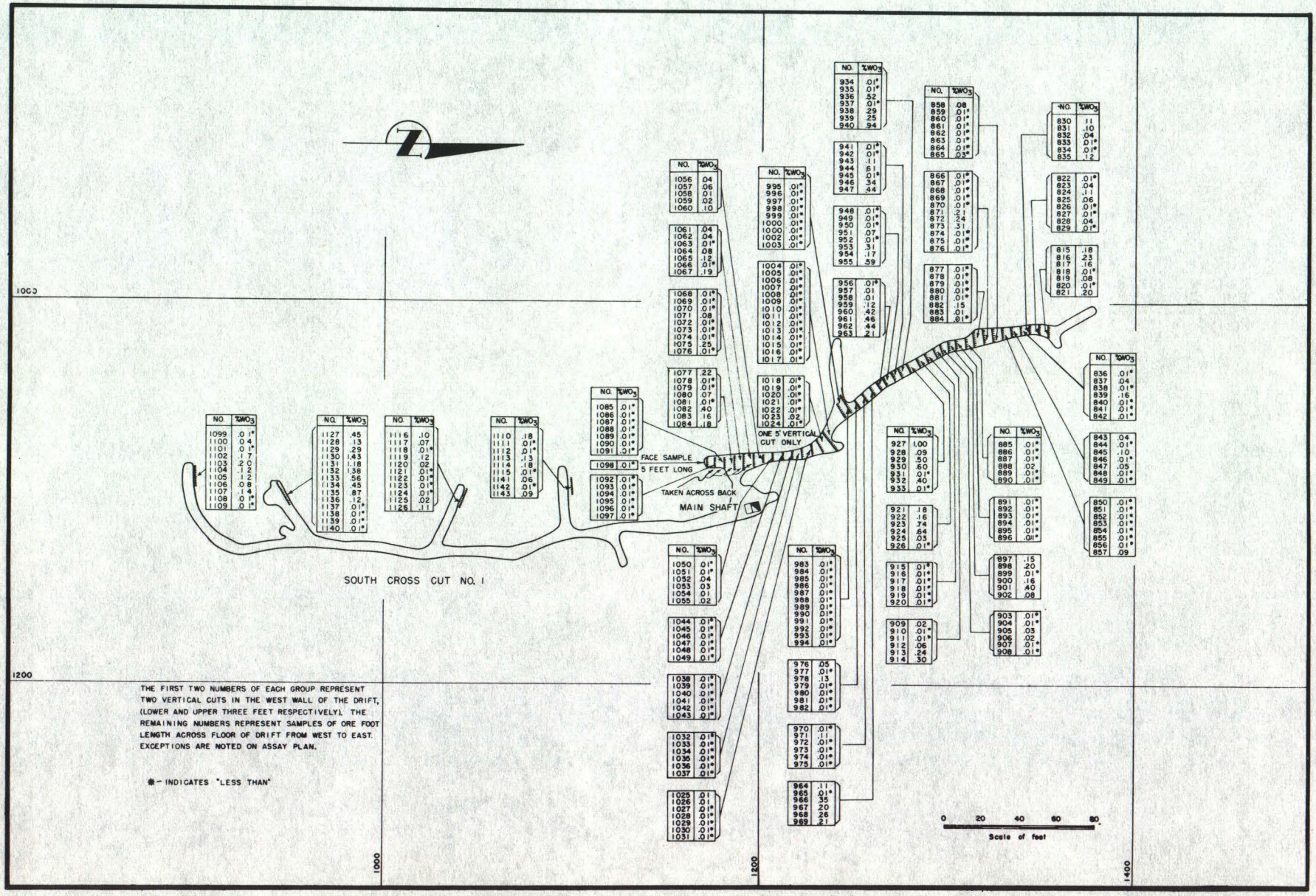

Figure 6. - Plan and sample analyses of 128-foot level.

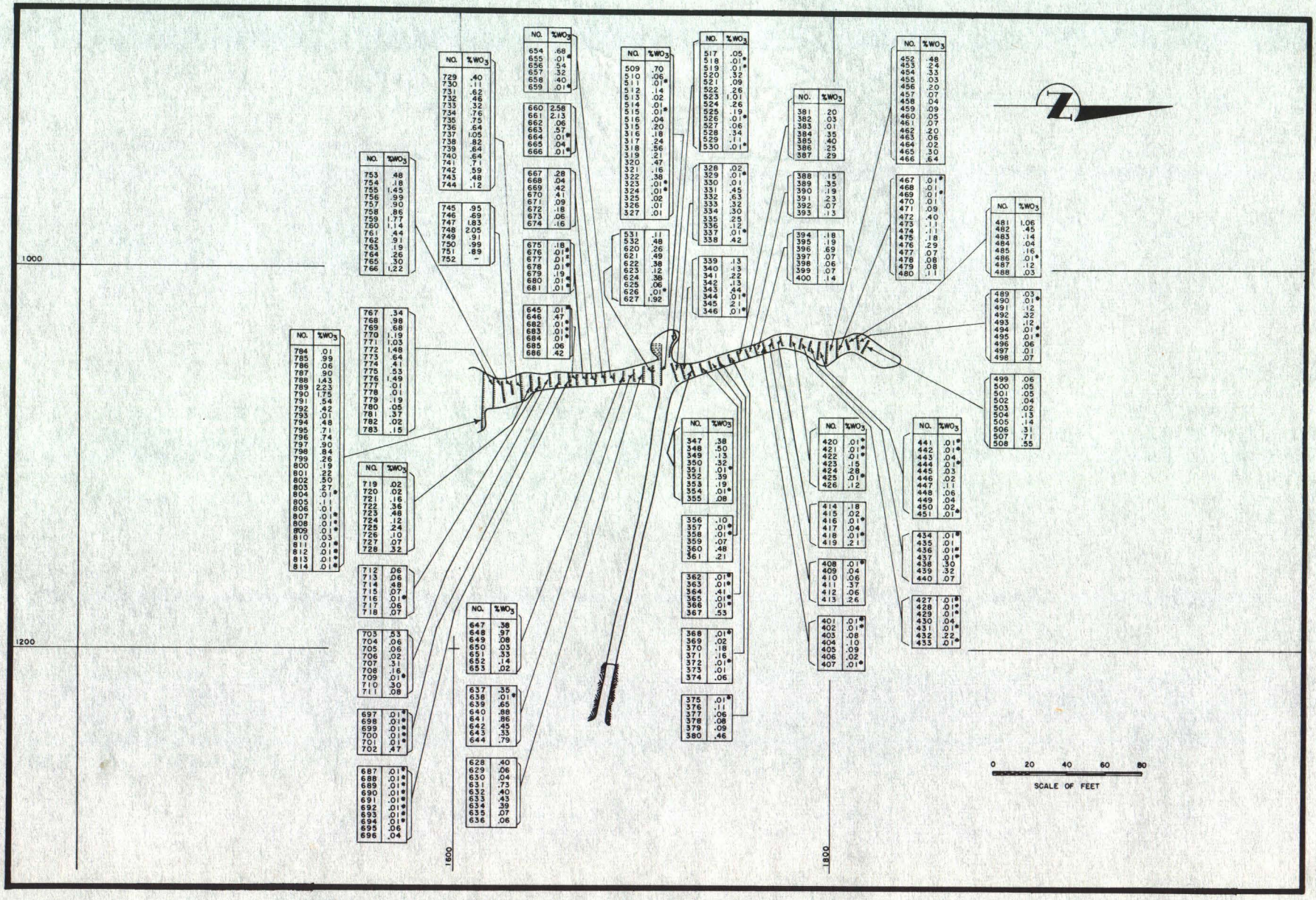

Figure 7. - Plan and sample analyses of Lidstone workings.

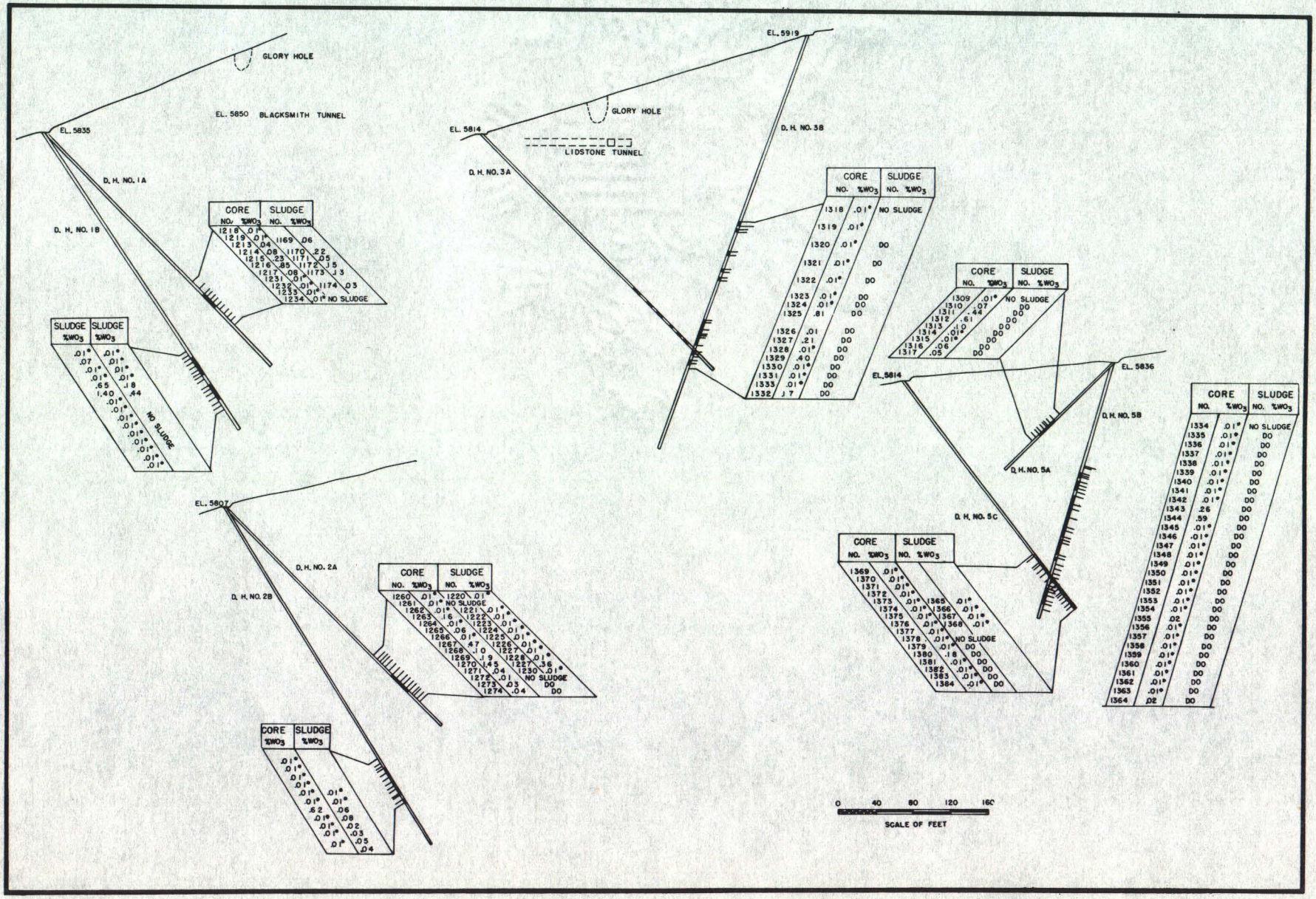

Figure 8. - Cross-sections and assays of diamond drill holes.

An unnamed tunnel is driven under a small glory hole between the Main shaft and the Lidstone drift. This lens is worked out.

WORK BY THE BUREAU OF MINES

Trenching

The contact was exposed 700 feet north of the Lidstone glory hole by trenches. (Fig. 4.) In all, 15 trenches were excavated, averaging 4 feet wide by 5 feet deep and as much as 96 feet long. The trenches exposed the contact of the granite and limestone and the width of the tactite. The banded structure of the ore formation is plainly visible in this area, with a few granite and quartz monzonite dikes cutting the limestone parallel to the main granite contact.

Trenches 16, 17, and 18 (fig. 5) were located between the Main shaft and the Lidstone workings. Trenches 19 through 24 were south of the main shaft shown in figure 6.

A total of 944 linear feet of trenching was done from which about 700 cubic yards of material was removed.

Underground Sampling

The underground workings (figs. 6 and 7) were examined with an ultraviolet lamp, and the areas to be sampled were marked at 5-foot intervals. Channel samples were cut across the floor of the drift 12 inches wide by 6 inches deep. 741 samples were cut.

Diamond Drilling

Nine holes, aggregating 3,000 linear feet, were drilled from the surface. The locations are shown on figure 2 and cross sections and analyses on figure 8.

Core and sludge samples totaling 229 were taken, of which 188 were selected for sampling.

Drill logs are incorporated in appendix A, and analyses of diamond-drill-hole samples in appendix B.

APPENDIX A

Diamond-drill-hole logs

Hole 1A

Elevation at collar: 5,836 feet Depth: 340 feet
Dip: -44° Core size: EX

Footage From-	Footage To-	Feet	Description
0	240	240	Altered granite
240	255	15	Tactite
255	340	85	Limestone

Hole 1B

Elevation at collar: 5,836 feet Depth: 370.5 feet
Dip: -56° Core size: EX

0	279.5	279.5	Altered granite
279.5	313.5	34	Tactite
313.5	351.5	38	Limestone
351.5	366	15.5	Limestone and tactite
366	370.5	4.5	Limestone

Hole 2A

Elevation at collar: - Depth: 323 feet
Dip: -45° Core size: EX

0	249	249	Altered granite
249	272	23	Tactite
272	323	51	Limestone

Hole 2B

Elevation at collar: - Depth: 414.5 feet
Dip: -58° Core size: EX

0	330.5	330.5	Altered granite
330.5	350	19.5	Tactite
350	414.5	64.5	Limestone

Hole 3A

Elevation at collar: 5,822 feet Depth: 348 feet
Dip: -45° Core size: EX

0	227	227	Altered granite
227	237	10	Tactite and limestone
237	284	47	Limestone
284	295.5	11.5	Tactite
295.5	300	4.5	Tactite and limestone
300	348	48	Limestone

Hole 3B

Elevation at collar: 5,919 feet
Dip: -70°

Depth: 459 feet
Bearing: S. 86° E.
Core size: EX

Footage From-	Footage To-	Feet	Description
0	310.5	310.5	Limestone
310.5	335	24.5	Tactite
335	364.5	29.5	Tactite and granite
364.5	459	94.5	Altered granite

Hole 5A

Elevation of collar: 5,837 feet
Dip: -45°

Depth: 162.5 feet
Bearing: N. 78° E.
Core size: EX

0	99.5	99.5	Limestone
99.5	108	8.5	Tactite
108	162.5	54.5	Altered granite

Hole 5B

Elevation of collar: 5,837 feet
Dip: -74°

Depth: 281.5 feet
Bearing: N. 78° E.
Core size: EX

0	125	125	Limestone
125	134	9	Sandstone
134	208	74	Tactite
208	210.5	2.5	Dike
210.5	214	3.5	Limestone
214	225	11	Sandstone
225	243	18	Granodiorite
243	249	6	Sandstone
249	265	16	Tactite
265	281.5	16.5	Granodiorite

Hole 5C

Elevation of collar: 5,814 feet
Dip: -51°

Depth: 301 feet
Bearing: N. 78° E.
Core size: EX

0	52	52	Altered granite
52	81	29	Granite and aplite
81	146	65	Granite
146	213	67	Granodiorite
213	229.5	16.5	Aplite
229.5	238	8.5	Tactite
238	241	3	Sandstone
241	301	60	Tactite

APPENDIX B

Analyses of diamond-drill-hole samples (figs. 2 and 8)

Note:- Core size - all holes EX

Footage			Sample No.		Core		Sludge	
From-	To-	Feet	Core	Sludge	Recovery, percent	WO_3, percent	Recovery, percent	WO_3, percent
					Hole 1A			
240	245	5	1214	1170	94.6	0.08	97.7	0.22
245	250	5	1215	1171	100.0	.23	110.5	.05
250	255	5	1216	1172	83.6	.85	102.4	.15
					Hole 1B			
289.5	294.5	5	1279	1206	100.4	0.65	84.5	0.18
294.5	298	3.5	1280	1207	90.0	1.40	74.2	.44
					Hole 2A			
254	259.5	5.5	1267	1226	85.6	0.47	74.0	0.01
259.5	264	4.5	1268	1227	71.2	.10	81.8	.01
264	269	5	1269	1228	85.0	.19	99.5	.01
269	272	3	1270	1229	76.5	1.45	74.5	.36
					Hole 2B			
336	341	5	1304	1292	48.5	0.62	83.6	0.06
					Hole 3A Less than .01% WO_3			
					Hole 3B			
362.5	330.5	4	1325	-	-	0.81	-	-
335	343	8	1327	-	-	.21	-	-
351.5	352.5	1	1329	-	-	.40	-	-
364	369	5	1332	-	-	.17	-	-
					Hole 5A			
95	97	2	1311	-	-	0.44	-	-
97	99.5	2.5	1312	-	-	.61	-	-
					Hole 5B			
146.5	156	9.5	1343	-	93.3	0.26	-	-
156	160	4	1344	-	77.5	.59	-	-
					Hole 5C			
279	282	3	1380	-	-	.18	-	-