Nugget Mines Ltd. - Sheep Creek Gold Camp

Nelson Mining Division - British Columbia

Lat. 49 degrees 10 minutes North

Long. 117 degrees 07 minutes West

N.T.S. 82 F/3

for

Assessment for Funding Under Financial Assistance for Mineral Exploration Grant Indentification Number 10963 M-16

by

G. M. Allen, P. Eng., Ontario December 8, 1987 GEOLOGICAL BRANCH ASSESSMENT REPORT

16,704

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#### SUMMARY:

Gunsteel Resources Incorporated holds a joint venture exploration agreement with Nugget Mines Ltd., owners of a gold property in the Sheep Creek mining camp of southeastern British Columbia. The Sheep Creek camp ranks sixth in the province in terms of gross gold production -741,515 ounces from 1,715,875 tons of ore.

At least 20 veins are known on the Nugget Mines property. Most production has come from three veins (the Reno, Nugget and Motherlode veins) which up to December 31, 1950 had produced 427,000 tons of ore containing 230,590 ounces of gold. This is 32% of the recorded gold production of the Sheep Creek camp.

The Nugget Mines property is situated 39 km south of Nelson, 45 km east of Trail and 12 km southeast of Salmo. Access is by road, about an hour's drive from Salmo to the principal workings. The property is conveniently situated near the Norquest's custom mill on Sheep Creek, and Cominco's smelter in Trail.

The Sheep Creek camp is underlain by late Proterozoic to Cambrian argillite, argillaceous quartzite and limestone that have been folded into two tight northerly-trending anticlines with an intervening syncline. Gold-quartz veins with minor sulphides occur in northeasterly-trending faults where they intersect certain stratigraphic units (notably Upper Navada and Upper Nugget quartzite) near the crest of the western anticline and western limb of the eastern anticline.

In 1982, a program of underground rehabilitation and sampling, 1278 feet of surface diamond drilling in two holes, road construction and preliminary geochemical sampling was carried out by Carl Creek Resources Ltd. on the Nugget Mines property.

In 1986, Nugget Mines Ltd. started an extensive program of underground exploration, sampling, diamond drilling and surface exploration with financing provided by Gunsteel Resources Inc. From Jan. 1 to Oct. 31, 1987, 150m of exploration diamond drilling was completed. The purpose

of the program was to outline further ore reserves. Previous reserve assessment indicated proven and probable reserves of 17,000 tons grading 0.35 oz/ton Au and 20,000 tons of possible reserves grading 0.33 oz/ton Au from the Nugget and Calhoun veins. 1987 reserve estimates are 73,380 tons at 0.445 oz/ton Au on the Nugget Mines claims, see B. James report dated June 1, 1987. This tonnage is based upon a mining width of one meter.

Extensive sections of the vein systems remain untested. Additional reserves of 12,000 tons @ 0.30 oz/ton proven - probable and 1000 tons of 0.32 oz/ton possible are found in the Reno, Motherlode and Golden Belle veins.

#### CONCLUSION:

Exploration potential is considered excellent for establishing a desired objective of 75,000 to 100,000 tons of mineable ore on the Nugget Mines properties. Results of the 1986 program on the Nugget-Calhoun vein system indicate that ore can be projected down-dip and that echelon veining can occur parallel to known existing vein structures. Work on the Fawn vein structure with diamond drilling has shown that mineralization occurs down-dip from previously known high grade sections.

Veins in the Motherlode, Nugget and Reno mines sometimes locally split into branches, as did the Nugget-Calhoun, and appear as parallel or echelon veins, as in the lower Nugget. Such parallel veins may be more prevalent than previously expected. In the past, these veins have been neglected as exploration targets. Drilling from the main workings, especially in the areas where there is mineable ore and the main vein appears to be weaker, should be carried out routinely at right angles to the existing ore to check adjacent wall rock.

Additionally, potential exists for establishing further mineable reserves on the Fawn vein. Diamond drilling has traced the high grade zone in the main adit down-dip and more drilling down-dip will undoubtedly discover other extensions both horizontally and vertically.

Diamond drilling to date has outlined several zones which warrant further drilling and/or exploration drifting. A zone on the 200 sublevel was defined which was previously not known, and the down-dip extension of the Calhoun was outlined 30 meters below the Nugget 4 level. Other potential exists for establishing mineable reserves on the Golden Belle vein (below the No. 2 level), the Upper and Lower Bonanza and the O'Donnell veins.

Favorable ore bearing rock units covered by Nugget Mines claims extend over a strike length of 7.8 km on the eastern anticline and 3.4 km on the western anticline. These units are covered by overburden on the Bonanza claim groups, on the lower slopes of Sheep Creek, and on the slopes north and southeast of Reno Mountain. Productive veins on the western anticline off the Nugget claims, such as the Bluestone, 5700, 6400, 6800, 8000, and 8200 veins, can be projected onto Nugget claims covering the eastern anticline. Geochemical and geophysical surveys coupled with geological mapping and float prospecting are warranted in these areas.

Further geological mapping should be carried out throughout the entire length of the property to define structures similar to the Crescent, Lake, Clarence - 1500, etc. veins and any other northeast trending structures that may be found.

The property is favorably situated in terms of access and proximity to a labor force and conveniences. A custom mill is situated on Lower Sheep Creek Valley and the Cominco smelter is located about 60 km away, by road, at Trail. The Nugget Mines ores contain high silica and the smelter has provided very favorable smelting rates.

#### **RECOMMENDATIONS:**

A two phase exploration program is recommended to evaluate targets on the Nugget Mines property. Phase I will explore known targets which have the highest possibility of showing favorable results. Phase II will be contingent upon results of Phase I but will also explore for and evaluate new targets. The Phase I program will include:

- 1) Rehabilitate the Motherlode No. 5 level and open up the Motherlode 4900 level and Reno No. 5 level. With access to the 4900 level mapping, sampling and diamond drilling can be carried out. Access to the east cross-cut off the No. 5 level will provide an opportunity to check the extensions of the Calhoun at depth. Opening up the Reno will allow geological mapping and sampling as well as diamond drilling. Work on the 4900 level of the Motherlode will involve underground diamond drilling and opening up some of the old workings.
- 2) Drift and sample on the 200 and 400 sublevels of the Nugget and Calhoun vein system.
- 3) Diamond drill from the Nugget and Motherlode veins to test for possible underground extensions such as the O'Donnell and Ridge veins.
- 4) Surface diamond drill to test the Ridge vein and the Golden Belle veins.
- 5) Map surface outcrops and float and continue geochemical sampling and geophysical surveying to further define potential surface drill targets.
- 6) Drift on North Motherlode Vein and drive towards the Fawn and O'Donnell Veins from the No. 5 level.
- 7) Upgrade access road to the property.

A program of proposed exploration and development is shown on Figures 7-11.

### A follow-up Phase II would then:

- 1) Develop further the reserves outlined in Phase I.
- Diamond drill surface and underground targets to further outline the Phase I program.
- 3) Provide access to the Lower Golden Belle, the Nugget 2 and 3 levels and possibly the Upper Bonanza vein.
- 4) Rehabilitate selected workings to provide access for further development and diamond drilling.

Anytime during the first two phases, when sufficient tonnage and grade (i.e. 100,000 tons of greater than 0.3 oz/ton Au) are outlined, a decision will be made to put in a mill to recover the gold.

An estimate of the costs associated with the above program follows.

Costs associated with the Phase I program are:

\$120,000/mo. or \$1,440,000/year. This would include 12-20 men, underground and surface diamond drilling, and materials and supplies necessary for exploration drifting and rehabilitation work.

For the Phase II program it is recommended that the exploration continue at the same rate as in Phase I even though a production program is started. Because of the significant number of targets that must be checked out the exploration should be ongoing.

#### INTRODUCTION:

Gunsteel Resources Incorporated holds a joint venture exploration agreement on the Nugget Mines Ltd. property in the Sheep Creek gold camp. The purpose of the agreement is to explore and delineate the ore on Nugget and Bonanza group of claims. The Nugget group consists of 90 claim units and the Bonanza consists of 30 claim units.

This report is a summary of work up to November 1987; including results of underground diamond drilling, development and sampling. It is based upon operations by Nugget Mines Ltd.

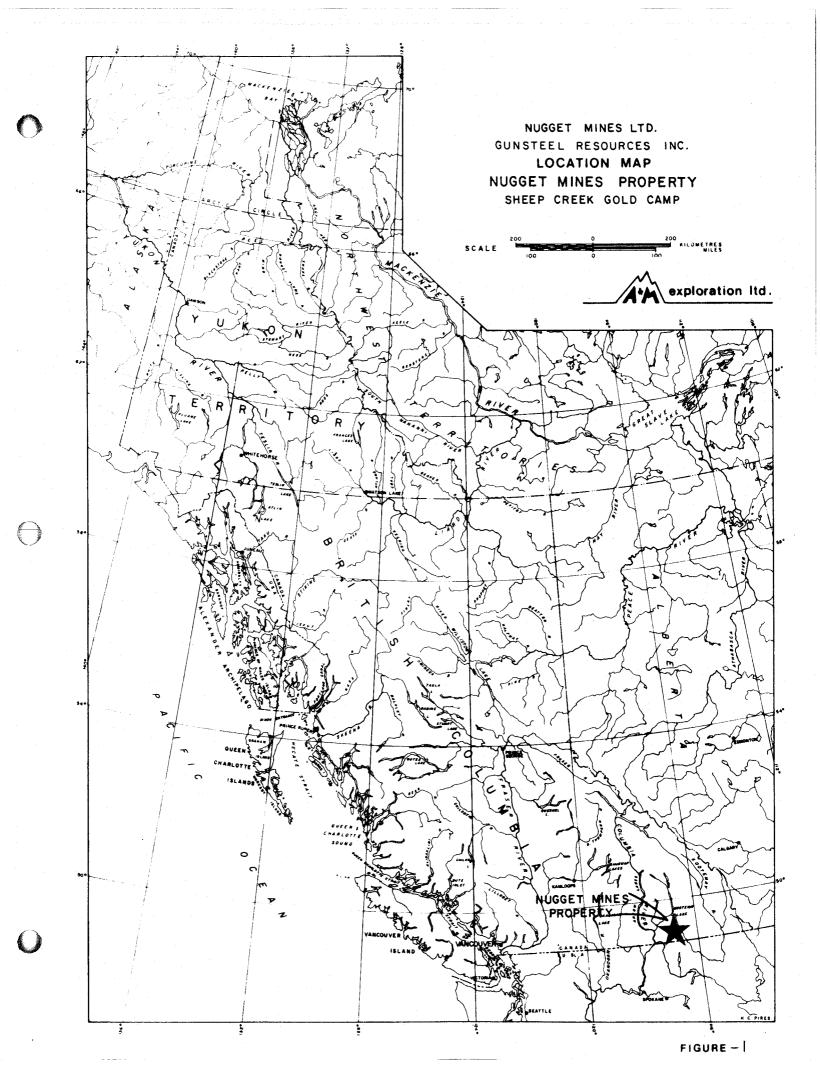
The Sheep Creek gold camp has a recorded production of 727,000 ounces of gold from 1,744,000 tons of ore from 32 veins which at current gold prices (\$450 Canadian per ounce) would have a value of \$327,150,000. As such the camp ranks sixth among gold producers in British Columbia.

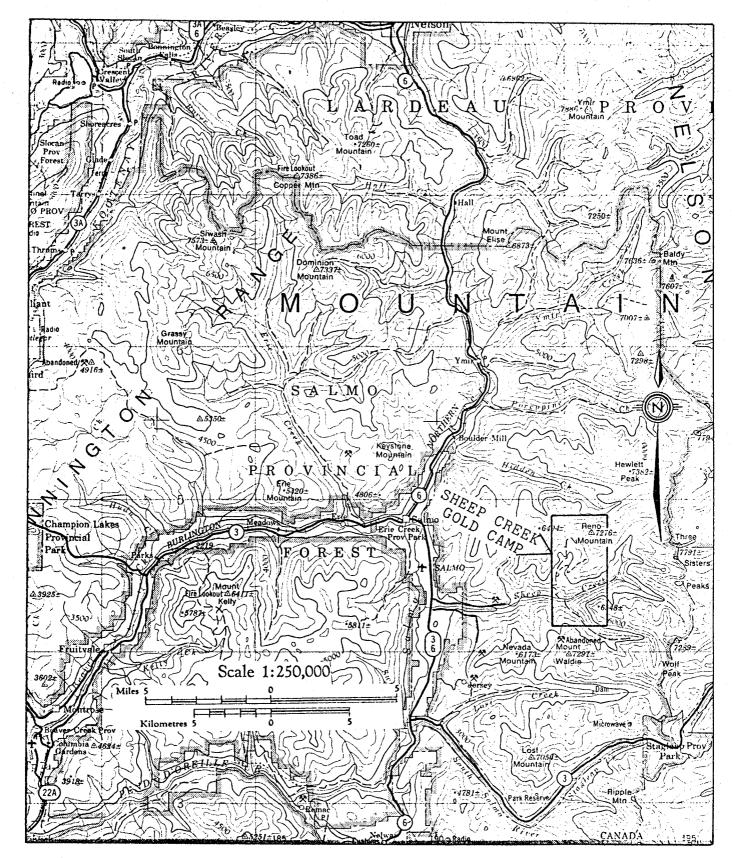
A total of 427,000 tons with an average recovered grade of 0.54 ounces per ton gold has been mined from the Nugget Mines property. Most production has come from the Reno Mine (261,500 tons), Motherlode Mine (108,000 tons) and the Nugget Mine (57,500 tons). Gold produced from these mines represents 32% of the total production of the camp. In the

Sheep Creek gold mining camp, mineable reserves have been outlined on the Nugget property as 73,380 tons at 0.445 oz/ton Au and Goldbelt reported proven ore reserves of 40,000 tons grading 0.50 ounces per ton gold (1981 Annual Report, Goldbelt Mines Inc.). Most of the camp is held by Nugget Mines Ltd., Goldrich Resources Inc., and Amore Resources Ltd. Significant additions to the ore reserves on the Nugget property are anticipated with increased exploration and development.

#### LOCATION AND ACCESS:

The Nugget Mines property is situated in southeastern British Columbia 12 km southeast of Salmo, 39 km south of Nelson, and 45 km east of Trail (Figure 1). The Nugget claim group lies on the north side of Sheep Creek between elevations 1,128 and 2,218 metres. The Bonanza claim group lies between elevations 914 and 1,829 metres on the southeast side of Waldie Creek, a tributary of Sheep Creek. Access is by Highways 3 and 6 to Lower Sheep Creek and thence by good gravel road up Sheep Creek to Nugget (Fawn) Creek (Figure 2). The Nugget 4 level, Motherlode 5 level, and Reno 5 level mine workings are accessible by 2 or 4 wheel drive vehicles from the Sheep Creek road.





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# ACCESS MAP

NUGGET MINES PROPERTY

Nelson Mining Division - British Columbia



#### PROPERTY OWNERSHIP:

The Nugget Mines property comprises 120 claims and claim units, the details of which are tabulated on Table 1 and shown on Figure 3.

#### HISTORY:

The earliest discoveries in the Sheep Creek camp were the Yellowstone and Queen veins, staked in 1896. Numerous other veins were discovered and production undertaken during the period 1900 to 1916.

The Motherlode vein was developed between 1906 and 1910, after which a 100 ton cyanide mill was installed (the first of its kind in B. C.). Production continued until 1915. The Nugget Mine was worked continuously until 1910 from 4 upper levels - a stamp mill was used to In 1918 the Nugget Mine and Motherlode Mine were process the ore. organized under a new company and some development carried out until 1922. The properties were acquired by Reno Gold Mines in 1932. Work on the Reno veins was continuous on a small scale from 1912 to 1927. was processed by a 30 ton cyanide mill built in 1927 near the Reno 5 Reno Gold Mines acquired control of the Motherlode and Nugget Mines in 1932, rehabilitated the Motherlode mill and constructed a tramline from Reno 5 portal to the mill. Production from the Reno mine was continuous until 1939 and the Motherlode and Nugget until 1941. A. Endersby leased the Nugget and Motherlode veins in 1938 and purchased these and the Reno Mine in 1941. The Endersby family have held the claims since that time and have carried out mining operations from 1938 to 1958, and exploration, rehabilitation and development work from 1970 to 1973, and 1980 to 1985. They formed Nugget Mines Ltd. in 1973 and work since then has been on its behalf. Part of the work since 1973 was financed by shipping about 5,000 tons of low grade ore and tailings from the dump to the Cominco smelter.

In 1982 Carl Creek Resources Ltd. funded a work program comprising geological, geochemical and geophysical surveys, diamond drilling and rehabilitation of selected underground workings on the Motherlode, Nugget and Golden Belle veins.

TABLE 1: Claim Data
RENO Group

CLAIM NAME	RECORD NO	LOT NO	GROUP	ЕХРІ	RY DATE	SIZE	(units)	OWNER	
Mountain View	486	12494	Reno	98 0	8 02		1	Nugget	Mines Ltd.
Empress	487	12496	Reno	98 0	8 02		1 -	Nugget	Mines Ltd.
Golden Eagle	493	9926	Reno	98.0	8 04		1	Nugget	Mines Ltd.
Searchlight	494	12704	Reno	98 0	8 04		1	Nugget	Mines Ltd.
Donnybrook	495	12685	Reno	98 0	8 04		1	Nugget	Mines Ltd.
Clarence Fr.	496	13041	Reno	98 0	B 04		<b>i</b>	Nugget	Mines Ltd.
Clarence	497	13042	Reno	98 0	8 04		1	Nugget	Mines Ltd.
Red Rock	571	12680	Reno	98 0	2 17		1	Nugget	Mines Ltd.
Gartan	572	13040	Reno	98 0	2 17		1	Nugget	Mines Ltd.
Triune	573	13043	Reno	98 0	2 17		1	Nugget	Mines Ltd.
Buck	1225	No	Reno	98 0	9 13		1	Nugget	Mines Ltd.
Lynx	1260	13039	Reno	98 0	9 11		1	Nugget	Mines Ltd.
Peak	1276	No	Reno	98 10	0 01		2	Nugget	Mines Ltd.
Utah	1620	9335	Reno	98 0	4 29		1	Nugget	Mines Ltd.
Lone Star	1621	10023	Reno	98.0	4 29		1	Nugget	Mines Ltd.
Marie	1622	10371	Reno	98.0	4 29		1	Nugget	Mines Ltd.
Buck Fr.	2736	No	Reno	98 0	9 10		1	Nugget	Mines Ltd.
Peak Fr.	2737	No	Reno	98 09	9 10		1	Nugget	Mines Ltd.
Gem	2793	No	Reno	98 0	9 28	1	15	Nugget	Mines Ltd.
Hay #1	3164	No	Reno	98 0	5 06		20	Nugget	Mines Ltd.
Hay #2	3165	No	Reno	98 00	6 06		6	Nugget	Mines Ltd.
Gem Fr.	3941	No	Reno	98 1:	1 08		i	Nugget	Mines Ltd.
Virginia	4030	8348	Reno	98 0	2 13		1		Mines Ltd.
Mother Lode Fr.	4042	8819	Reno	98 0	2 14		1	Nugget	Mines Ltd.
Silver Bell	4509	14683	Reno	98 11	1 26		1	Nugget	Mines Ltd.
Nug Fr.	?	?	Reno	98 11	1 26		1	Nugget	Mines Ltd.
Nugget	No	8341	Reno	No			1		Mines Ltd.
Bonanza	No	8342	Reno	No			1	Nuonet	Mines Ltd.
Nugget Fr.	No	10405	Reno	No			1.		Mines Ltd.
Minoru	No	12073	Reno	No			1		Mines Ltd.
Golden Fawn	No	12493	Reno	No			1		Mines Ltd.
Mint	No	12495	Reno	No			1		Mines Ltd.
Latham	No	12683	Reno	No			1 .		Mines Ltd.

TABLE 1: Claim Data (continued)

NUGGET-GOLDRICH SOUTH Group

CLAIM NAME	RECORD NO	LOT NO	GROUP	EXPIRY DATE	SIZE (units)	OWNER
Daisy	512	9919	Nugget-Goldrich South	97 08 25		Nugget Mines Ltd.
Dip	658	No	Nugget-Goldrich South	88 06 05	4	Nugget Mines Ltd.
Teapot	771	13052	Nugget-Goldrich South	88 80 88	1	Nugget Mines Ltd.
Snowstorm	965	10018	Nugget-Goldrich South	89 02 19	1	Nugget Mines Ltd.
Dome Fract.	966	13051	Nugget-Goldrich South	89 02 19	1	Nugget Mines Ltd.
Teapot No.2 Fract.	967	15016	Nugget-Goldrich South	89 02 19	· <b>1</b>	Nugget Mines Ltd.
Sunshine Fract.	1259	1259	Nugget-Goldrich South	97 09 11	1	Nugget Mines Ltd.
Dip Fr.	2871	No	Nugget-Goldrich South	88 11 04	i	Nugget Mines Ltd.
Eldorado	4029	8346	Nugget-Goldrich South	97 02 13	1	Nugget Mines Ltd.
Lodestone	4031	9916	Nugget-Goldrich South	97 02 13	1	Nugget Mines Ltd.
Beaver	4032	9920	Nugget-Goldrich South	97 02 13	1	Nugget Mines Ltd.
Daisy Fr.	4033	9922	Nugget-Goldrich South	97 02 13	1	Nugget Mines Ltd.
King	4034	14931	Nugget-Goldrich South	90 02 13	1	Nugget Mines Ltd.
King Fraction	4035	14932	Nugget-Goldrich South	90 02 13	1	Nugget Mines Ltd.
Emperor	4036	14934	Nugget-Goldrich South	90 02 13	1	Nugget Mines Ltd.
President	4037	14935	Nugget-Goldrich South	90 02 13	1	Nugget Mines Ltd.
Alturas	4043	9915	Nugget-Goldrich South	97 02 14	1	Nugget Mines Ltd.
King No.1	4044	14933	Nugget-Goldrich South	89 02 20	1	Nugget Mines Ltd.
Mag Fr.	4053	4053	Nugget-Goldrich South	97 04 15	1	Nugget Mines Ltd.
Jig Fr.	4054	No	Nugget-Goldrich South	97 04 15	1	Nugget Mines Ltd.
Trojan	4100	No	Nugget-Goldrich South	88 05 28	16	Nugget Mines Ltd.
King No.3	4561	14930	Nugget-Goldrich South	88 02 18	i	Nugget Mines Ltd.
Independence	No	8817	Nugget-Goldrich South	No	1	Nugget Mines Ltd.
Motherlode	No	8818	Nugget-Goldrich South	No	i	Nugget Mines Ltd.
Golden Belle	No	9917	Nugget-Goldrich South	No	1	Nugget Mines Ltd.

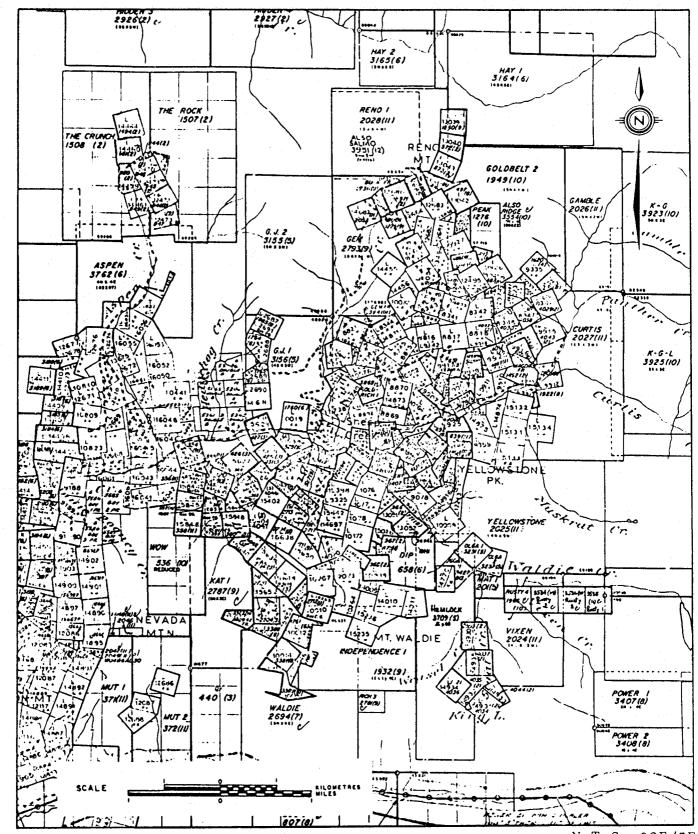
TABLE 1: Claim Data (continued)
RIVERSIDE Group

	CLAIM NAME	RECORD NO	LOT NO	GROUP	EXPIRY DATE	SIZE (units)	OWNER	
	Golden Belle Fr.	490	9907	Riverside	97 08 04	1	Nugget Mines Ltd.	
	Caledonian Fr.	491	9908	Riverside	97 08 04	1	Nugget Mines Ltd.	
	Riverside Fr.	492	9925	Riverside	97 08 04	1	Nugget Mines Ltd.	
	Cedar Fract	657	No	Riverside	97 05 25	1	Nugget Mines Ltd.	
	Riverside	3678	9906	Riverside	97 03 28	1	Nugget Mines Ltd.	
	Hillside	3679	9909	Riverside	97 03 28	1	Nugget Mines Ltd.	

TABLE 1: Claim Data (continued)

RENO CLAIM (Not Grouped)

CLAIM NAME	RECORD NO	LOT NO	GROUP	EXPIRY DATE	SIZE (units)	OWNER
Reno	No	12684	No	No No	1	Nugget Mines Ltd.



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# CLAIM MAP

NUGGET MINES PROPERTY

Nelson Mining Division - British Columbia



In 1984 and 1985 Nugget Mines Ltd. shipped to Cominco's smelter at Trail, B. C., about 2,000 tons of low grade material mainly derived from an exploration raise on the Calhoun vein and broken muck from old stopes.

Gunsteel Resources Inc. signed a joint venture agreement with Nugget Mines Ltd. in 1985 to explore and further define ore reserves. In 1986 \$377,588 was spent on diamond drilling, underground rehabilitation and development. Further expenditures have occurred in 1987 and are continuing as of the time of writing this report, November 1987. \$854,027.41 was spent on the Nugget property from January 1, 1987 to October 31, 1987.

#### GEOLOGY:

### Regional Geology:

The Sheep Creek gold camp lies in the Kootenay Arc, a narrow arcuate belt of folded and faulted miogeoclinal sedimentary rocks of Late Proterozoic to Early Cambrian age. These sediments are intruded by intrusive rocks of the Nelson Plutonic suite (Middle to Upper Jurassic) and alkalic to acid plutons of the Coryell Intrusions (Eocene).

The Sheep Creek gold deposits occur in quartzites and argillites. Limestones in the area host important lead-zinc deposits (H.B., Jersey and Remac Mines) and tungsten deposits (Feeney, Invincible and Dodger Mines of Emerald Tungsten).

### Local Geology:

Geology of the Sheep Creek area was first described by Walker (1943). Local geology was further described by McGuire (1942) and a detailed study of the camp carried out by Mathews (1953).

The Sheep Creek area as underlain by metamorphosed sedimentary rocks of Eocambrian to Cambrian age. Rock types include argillites, quartzites and schists of the Quartzite Range and Reno Formations, and limestones of the Laib group. The Quartzite range formation has been subdivided into three readily identifiable units, the Motherlode, Nugget and Navada members (see Table 2 and Figure 4). These units are intruded by several stocks of granite, an elongated swarm of quartz porphyry sills, and lamprophyre dikes.

# TABLE 2 SEDIMENTARY UNITS

## Correlation of Sedimentary Rocks

Walker (1934)	McGuire (1942)	Mathews (1950)	Park and Cannon (1943)
Pend d'Oreille series: Lower part.	Pend d'Oreille series:	Laib Group (1,000 ft.+).*	
Reno formation.	Reno series: Reno argillite.	Reno formation (50 to 900 ft.).* Upper Reno. Lower Reno.	Maitles phylite.
Quartzite Range formation. <sup>1</sup> (Quartzite 2,600 ft.)	Reno quartzite. Reno argillaceous quartzite.	Quartitle Range formation (2,000 ft. ±).* Navada member: Upper Navada. Lower Navada.	
(Argillaceous member 200 ft.) <sup>1</sup>	Nugget series: Nugget quartzita. Nugget argillita.	Nugget momber (540 to 900 ft.): Upper Nugget. Middle Nugget. Lower Nugget.	Gypsy quartzite.
(Massive white quartzite 1,600 ft.) <sup>1</sup>	Motheriode series: Motheriode quartzite, "Basal" argillites.	Motheriode member (1,000 to 1,100 ft.): Upper Motheriode. Middle Motheriode. Lower Motheriode.	
Three Sisters formation.	44	Three Sisters formation (500 ft.+).*	

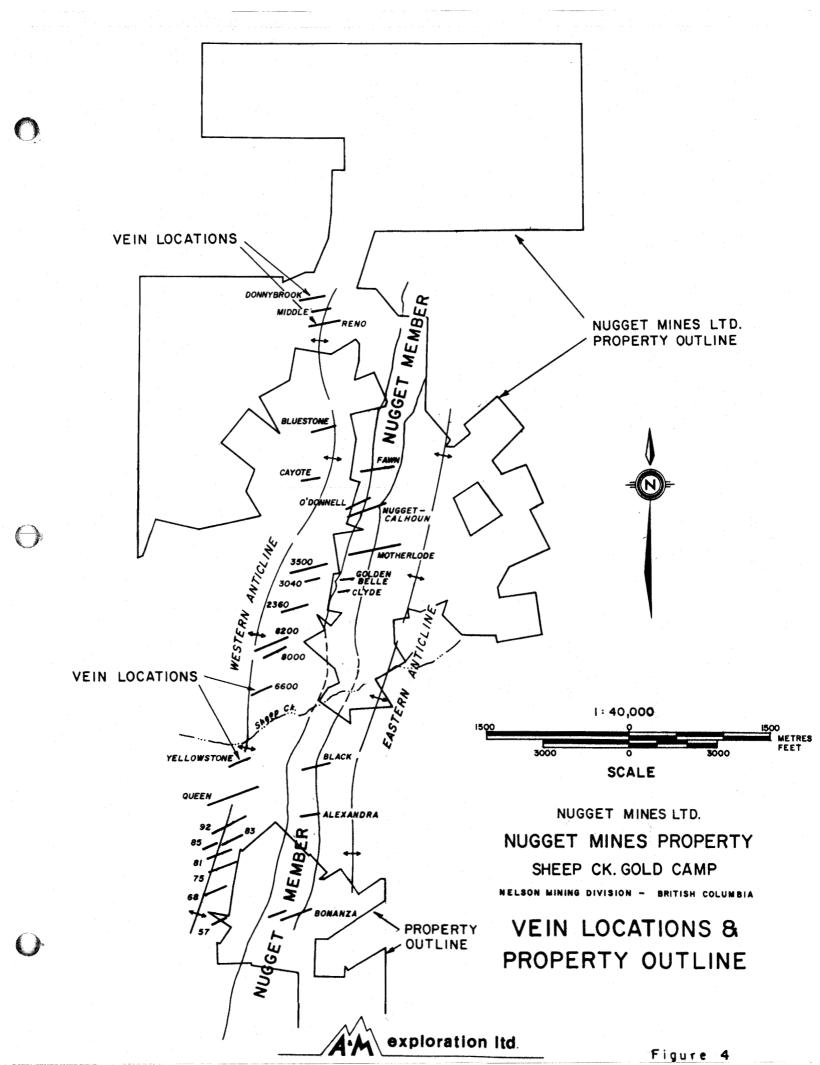
## Table of Formations

Age	Pormation .			Lithology	Thickness in Foot		
				Argilka.	2004	•	
				Grey limestone.	1501		
				Argifactors in some localities, else- where dominantly calcareous.	300-500 <sup>1</sup>	1,000+1	
Lower Cambrian	,	Lafb Group		Limestone and argillita.	150-3004		
				Argillaceous beds, biotitic and amphi- bolitic schiefs.	100-3004	•	
1				Limestone.	6-60s		
	Reno	Uppe	r Reno	Impure dark bluish or greanish quartite with some grit beds.	1259	50-900 <sup>4</sup>	
	Pormation	Lowe	r Reso	Argilite, argillectous quartzite.	450士*		
		Navada	Upper Navada	Massive white quartrits.	20-160	120-300	
	Quarteite Range	Member	Lower Navada	Dark, this-bodded quartrites and ar- gillacooms quartrites.	100-140		
Precambrian (7)	Formation		Upper Nugat	Massive white quartrite.	135–375		
		Nugget Member	Middle Nugert	White, grey and dark quartition, dark argillaceous quartition, and argillite.	175–300	540 <del>-900</del>	
			Lower Nugget	Argillie and dark argillaceous:	150-225		
			Upper Motheriode	Massive white quartific.	370-450		
		Motherlode Member	Middle Motheriode	Argiline, grey grit and green schiet.	50	1,000-1,100	
			Lower Motheriode	Manive white quartrits.	500-700		
	Three Sisters Formation			Groy grit, white quartists and grit and grown schists.		300+1	

Thickness or range in thickness for the northwest
 Average thickness from measurements near Res

4

Thickness in the type locality, 3 miles east of the Shoep Creek camp.
 Thickness or range of thickness in or adjacent to the Shoep Creek mines.



The sedimentary rocks have been folded into a major northerly-trending anticline paralleled on its west by a smaller anticline and intervening tight syncline.

Four well defined sets of faults are recognized in the camp. Gold mineralization is confined mainly to the northeasterly-trending set. Displacement on the mineralized veins ranges from 3 to 25 meters (right lateral movement) although two veins, the Queen and Yellowstone, have displacements of up to 35 to 70 meters respectively. Where the faults intersect argillaceous or limestone members they are irregular and discontinuous, i.e., a considerable amount of movement is distributed across a zone of dragged beds. Where they cut quartzite members, they deflect slightly to the east, movement is concentrated along a single fracture, and veining is more pronounced.

## Mineralization:

Gold mineralization in the Sheep Creek camp is concentrated in quartz veins occupying northeasterly-trending steeply-dipping faults. They are productive where they cross the axis of two anticlines (the western anticline and western limb of the eastern anticline — see Figure 4) particularly where they coincide with quartzitic members (notably the Upper Nugget and Upper Navada members and locally in the Motherlode member). Although the Reno formation is dominantly argillaceous, it carries ore in the Reno Mine where it is conspicuously metamorphosed. Within quartzites, ore shoots make up varying proportions of the veins.

Vein widths range from 0 to about 1 meter or more. The veins in places, a short distance from a stope, can become narrow, inconspicuous, and difficult to recognize.Branching veins are common in the camp. The Reno and Nugget-Calhoun veins are examples. Both branches contain ore but those of a more easterly trend tend to carry the best ore. En echelon veins are known in the lower Nugget workings.

The vertical range through which the vein fractures occur exceeds 1400 meters (4,700 feet) and individual veins extend to depths of up to 600 meters (2,000 feet) (Figure 5). Although the proportion of ore decreases with depth, the vein fissures are strong and vein widths are

reported to be as great as in higher levels. The productive horizon appears to decrease in elevation from north to south for unknown reasons.

Vein material consists dominantly of quartz with minor amounts of pyrrhotite, pyrite, sphalerite, galena, scheelite, chalcopyrite and rare visible gold. The vein quartz is generally milky white, but in places is difficult to distinguish from enclosing quartzite. One wall of the vein is usually well defined by a fault surface.

#### Vein Descriptions:

A total of 20 veins are known on the Nugget Mines property. The Lake, Donnybrook, Middle, Reno, Crescent and Clarence veins occur in the western anticline and the remainder in the eastern anticline.

Information from underground plans, sections and progress reports from Reno Gold Mines Ltd., where relevant to outlining potential reserves, has been summarized and presented on vertical sections of the veins (Figures 6a to 6i). Also plotted are sample sites from previous work and from work completed from 1983 to present. Ore zones are outlined in a brief description and notes on exploration potential for each vein follows.

## Bonanza Veins:

The Bonanza north and south veins are developed by four adits, three of which are in good condition (Figure 6a). Results of preliminary sampling in 1982 and 1987 confirmed those results reported in previous government reports and indicate an ore shoot above and below the 2 level on the north vein, and extending down to and below the Main adit. Further potential is indicated at depth as the Bonanza veins are well above the elevations of the known oreshoots in the comparable part of the Western anticline (Figure 5). The movement along the Bonanza veins is large and because of this they can be expected to extend to considerable depth, possibly well into the productive zone as projected from the other workings to the north.

### Clyde Vein:

The Clyde vein is accessible by two adits. Results of preliminary sampling are negative but additional sampling is warranted to check the 1910 B. C. Minister of Mines Annual Report mention of gold in payable quantities across 24 inches of this vein.

### Golden Belle Vein:

The Golden Belle vein is developed by 3 adits. The upper two adits were rehabilitated in 1982 and sampled. Results confirmed the presence of an ore shoot near the junction of two vein structures. A limited tonnage in the probable and possible catagories is outlined. Diamond drilling has tested the downward projection of this ore shoot. Results are forthcoming. Further sampling is warranted to check results from the 1 level reported in the Minister of Mines Annual Report. Bulldozer trenching across the vein on the Motherlode formation was carried out in October 1987.

#### Ridge Vein:

The Ridge vein is partly exposed in a trench on the surface between the Motherlode and Nugget veins. The trenches are filled with rubble, however, vein material lying in and around the trench was sampled and found to grade 0.56 oz/ton Au (2Na 72). Reno Gold Mines records indicate a 6 to 8 inch vein in this area. Trenching and three to four diamond drill holes are recommended in the favorable horizons to test this vein. Diamond drilling from underground and surface is recommended

### Motherlode Vein:

Past production amounted to 51,475 oz. Au from 108,000 tons of ore up to December 31, 1950. Rehabilitation of the Motherlode No. 5 level has allowed access to several areas which may be diamond drilled from the level. Ore reserves on the Motherlode are limited but other possible

zones must be resampled. These potential reserves include the down-dip portion of the zones mined up-dip from the No. 5 Motherlode. Surface exposures indicate ore grade material east of the stopes which come to surface. Calculated reserves are 2320 tons of 0.33 probable, and 2080 tons of 0.41 oz/ton possible. Diamond drilling has started to test the down-dip extension of the stopes in the Motherlode formation.

### North Motherlode Vein:

A well defined fault cuts across the Motherlode No. 5 cross cut to the Nugget vein. Possible ore reserves occur in the Middle and Upper Nugget and in the Motherlode formations. Trenching on surface by the oldtimers has outlined a narrow but mineralized zone. Drifting is continuing from the No. 5 level cross cut into the Motherlode formation and diamond drilling from the Motherlode vein is planned for in the near future. See figure 8. Similar exploration targets occur on the 4900 level.

#### Nugget Vein:

The Nugget vein is accessible from the 4 and 5 levels; and, the No. 10 level (4900 Motherlode level) when it is opened up. Past production amounted to 57,500 oz. of gold from 32,250 tons of material (0.56 oz/ton Au) up to December 31, 1950. In 1986 and continuing in 1987 samples were taken on the 100, 200 and 400 sublevels; and diamond drilling from the 200 sublevel showed a possible branching vein (see Figure 9 and 10)), drifting and/or drilling is necessary to further delineate this vein. Drifting on the 100 and 200 sublevels confirmed the down-dip extension of the material mined previously above the No. 4 level. Calculated reserves are 30,186 tons grading 0.47 oz/ton Au. The Calhoun vein is the north split of the Nugget vein. The trace of their junction is plotted on Figure 7f. The lower levels of the Nugget vein are developed on two veins, one of which may be an en echelon vein or it may

be the Calhoun vein. Additional drifting to the west of the raise on 100 and 200 sublevels is required to further define the limits of the Nugget vein.

Work on the east cross cut of the Motherlode No. 5 level is necessary. A caved area at the junction of the Motherlode No. 5 cross cut and the Nugget vein needs to be cleaned up. This will allow access into the Motherlode formation and will allow for diamond drilling to the north and south.

### Calhoun Vein:

The Calhoun vein is an off shoot from the Nugget vein and is accessed from the Nugget No. 4 level. Past mining concentrated on the No. 2 and 3 levels. Considerable potential exists for the down-dip extension of the Calhoun vein to the lower levels which have not been fully explored. Drifting on the Calhoun No. 4 level delineated the down-dip extension of the No. 3 level workings which proved to be worthwhile. Drifting on the 400 sublevel followed a fracture to the east paralleling the Nugget Vein, but the part of the vein that was checked did not yield mineable material.

Access in the eastern cross cut on the No. 5 level is necessary to check out the potential of the Calhoun vein paralleling the Nugget vein to this depth. To explore this potential, drifting and diamond drilling will be necessary. Also, further drifting is required on the Calhoun on the 100 and 200 sublevels.

#### Fawn Vein:

The Fawn veins have been explored by six adits. A small tonnage of high grade ore (75 tons containing 175 ounces gold) was reported to have been produced from the upper levels. The main portal was opened in 1986 and in early 1987 diamond drilling commenced to check the up-dip and

down-dip extensions of the mineralized sections outlined in old sections and plans. Deep diamond drill holes have confirmed the potential for the Fawn vein structure to be a major ore bearing zone, (See Figure 11). An exploration drift is being driven from the Motherlode No. 5 level to the Fawn to check the assay results which were intersected by diamond drilling.

## O'Donnell Vein:

The O'Donnell vein is accessible from the Nugget No. 4 level cross cut. The drift on the O'Donnell vein did not reach the favorable quartzites of the Upper Nugget Member. The strong fissure observed in the drift and low gold values obtained suggested that good ore potential should exist where the fissure intersects quartzite of the Nugget Member. Three drill holes intersected the O'Donnell Vein but the intersections did not show mineralization. Further testing by exploration drifting and diamond drilling on this vein is warranted from the lower levels of the mine. Exploration drifting from the Motherlode No. 5 level is continuing toward the O'Donnell vein. Plans are to drive along the vein at this elevation.

#### Reno Vein:

Except for scattered blocks of low grade ore (block A) and relatively inaccessible ore (blocks B to G, Figure 7i), the Reno vein would appear to be essentially mined out. A total of 6380 tons of material grading 0.14 oz/ton Au (block A-not included in ore reserves) probably exists between 4 and 5 level. The grades reported from the stope above this block (above 4 level) were erratic but locally high grade. The zone could be tested and sampled by driving a raise and the 5 level should be rehabilitated (at least 2 caved areas are known) to provide access to block A and to the cross cut to the Donnybrook and Middle veins.

#### Middle Vein:

The Middle vein was encountered by Reno Mines while driving a cross cut from the Reno 5 level to the Donnybrook vein. Drifting on the vein over

a length of 350 meters indicated erratic grades and narrow vein widths. However, no testing has been undertaken at lower elevations.

#### Donnybrook Vein:

The Donnybrook vein was explored from the surface, by drilling and drifting and by a raise from the 5 level of the Reno Mine. Grades are interesting although the vein, where intersected, is narrow (0.3 meters or less). However, work to date has tested only a small portion of the vein in favorable host rocks.

#### Other Veins:

The Crescent vein is reported by O'Grady (1927) to lie 120 meters to the south of the Reno vein. Stripping and trenching is reported to have revealed similar vein filling and mineralization. O'Grady reports the presence of "rich float" over a considerable area south of the Crescent vein, indicating the presence of another vein or veins. Other veins undoubtedly are located beneath the overburden covered zones on the Nugget property. Random diamond drilling in the favorable geological zones may be warranted.

In addition, references to the Lake, Clarence, 1500 vein and Golden West veins are found in Reno Gold Mines and B. C. Minister of Mines reports but no data is available.

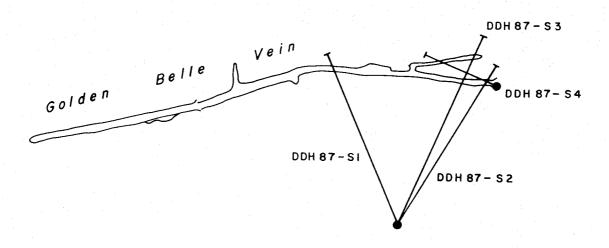
The North Fawn vein lies about 200 meters north of the upper Fawn workings. Surface trenching and sampling followed by drifting north is warranted.

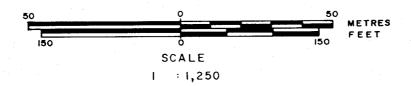
#### Mine Dumps:

The Nugget Mines property has numerous waste dumps which contain ore grade material. Tonnages from dumps needs to be varified.

The old stopes in the Nugget vein system between No. 5 level and 400 sublevel contain sluffed wall rock and marginal grade material. This too may be worthwhile to remove.







## LEGEND

Proposed underground work



Diamond drill hole collar, proposed hole.

Mine shaft: up, down.

Note: Some workings are presently being surveyed and plotted by U.T.M. coordinates.

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NUGGET MINES PROPERTY SHEEP CREEK GOLD CAMP NELSON MINING DIVISION - BRITISH COLUMBIA

PLAN OF THE GOLDEN BELLE MINE

#### REFERENCES

ALLEN, D.G., (1985): Summary Report on the Nugget Mines Property. (Nugget Joint Venture), Nelson Mining Division, B. C., Report for Prospectus dated December, 1985.

ALLEN, GARY, (1987): Nugget Mines Property, Nelson Mining Division, B.C., Review of Work in Progress. Private report to Gunsteel Resources Inc., May 29, 1987.

ALLEN, GARY, (1987): Personal Communication.

FYLES, JAMES T., and HEWLETT C.G., (1959). Stratigraphy and Structure of the Salmo Lead Zinc Area. B.C. Department of Mines Bulletin No. 41.

MATHEWS, W.H., (1953): Geology of the Sheep Creek Camp. B.C. Department of Mines Bulletin 31.

WALKER, J.F., (1934): Geology and Mineral Deposits of Salmo Map Area. Geological Survey of Canada, Memoir 172.

PRICE, B.J., (1987): Geological Summary Report, Nugget Property, Sheep Creek Area, Nelson Mining Division, B.C. Report for Gunsteel Resources Inc.

## STATEMENT OF QUALIFICATIONS

- I, Gary M. Allen, of 1715 Berkley Road, North Vancouver, B.C., do hereby certify that:
  - 1. I am a Mining Engineer of Gunsteel Resources Inc., with offices at 501 850 W. Hastings Street, Vancouver, B. C.
  - 2. I am a graduate of the Provincial Institute of Mining in Haileyburg, Ontario and of the South Dakota School of Mines and Technology in Rapid City, South Dakota with degrees in Mining Engineering, B.Sc. 1968, M.Sc. 1970.
  - 3. I have been practising my profession since 1970 and have been active in the Mining industry since 1962.
- 4. I am an active member in the American Institute of Mining Engineers and a member of the Association of Professional Engineers of Ontario.
- 5. This report is based upon work carried out on the Nugget Mines property from June 1976 to the present while I was employed by Nugget Mines Ltd. in the capacity of Mine Manager, and upon information listed under References.

December 8, 1987

Gary M. Allen

P.Eng., Ontario

## CERTIFICATE OF EXPENSES

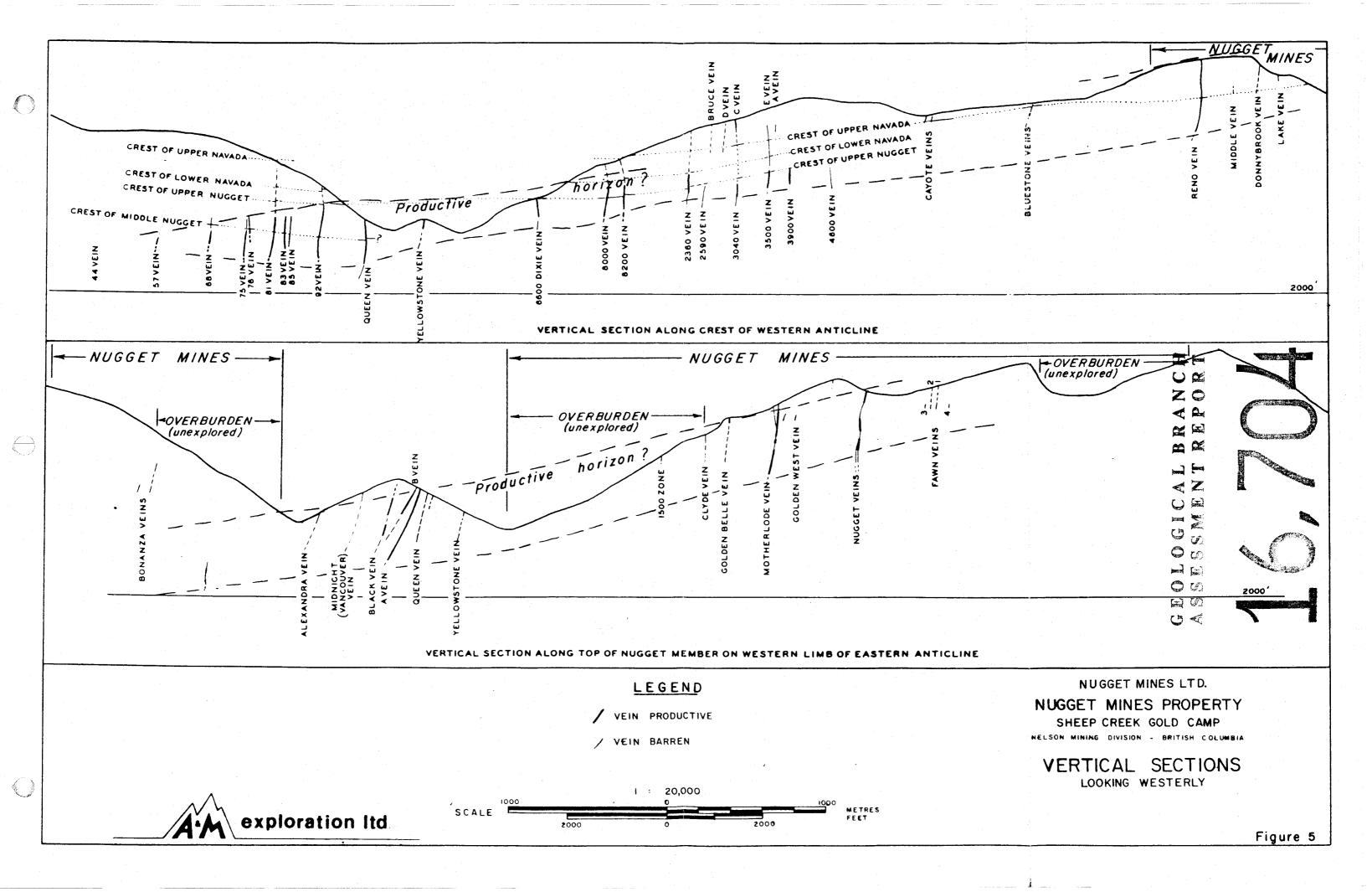
The following is a list of expenses incurred on the Nugget Mines Property at Salmo, Sheep Creek Gold Camp:

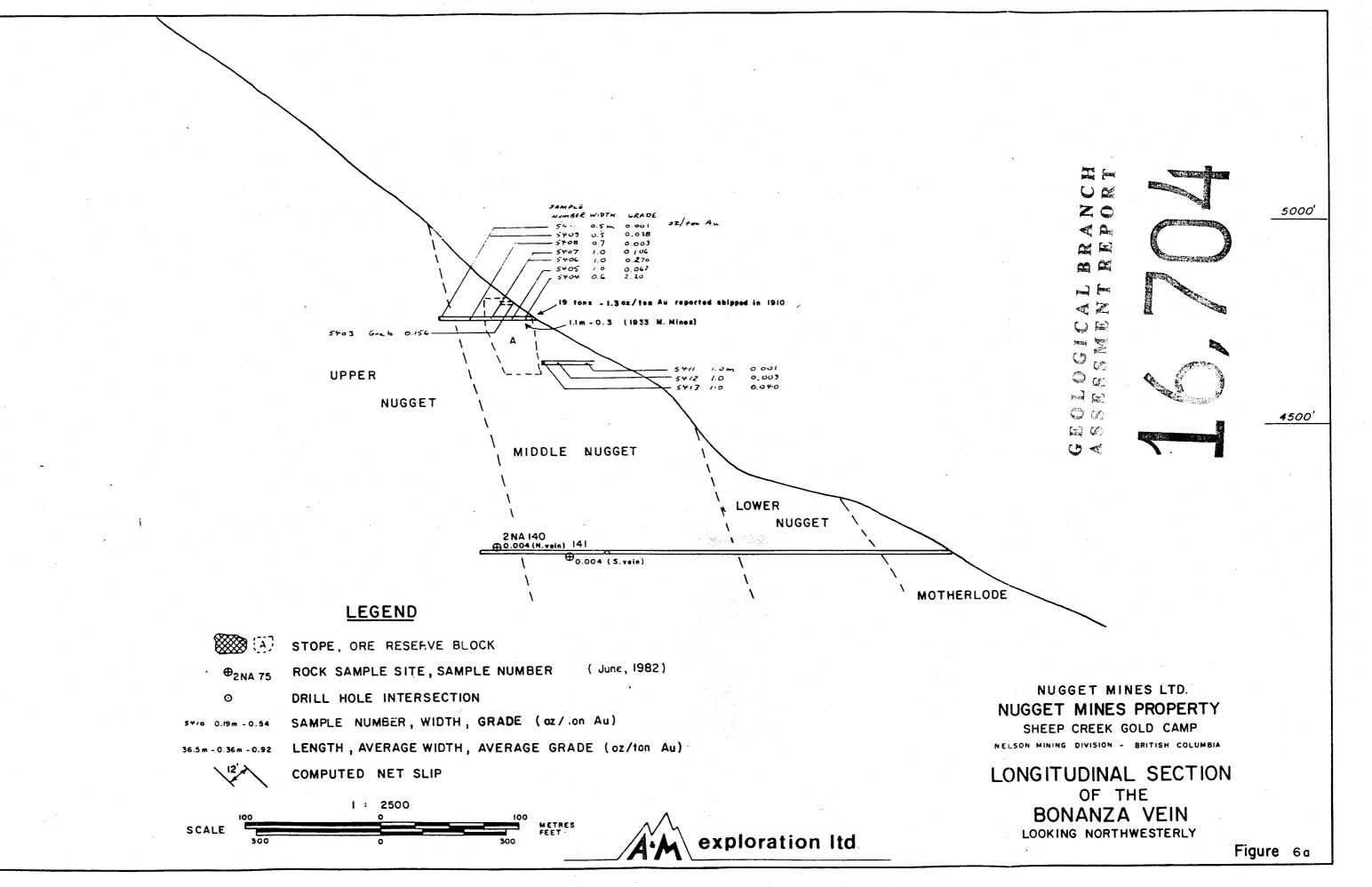
## Nugget Mines Ltd. Expenses Jan '87 to Oct.'87

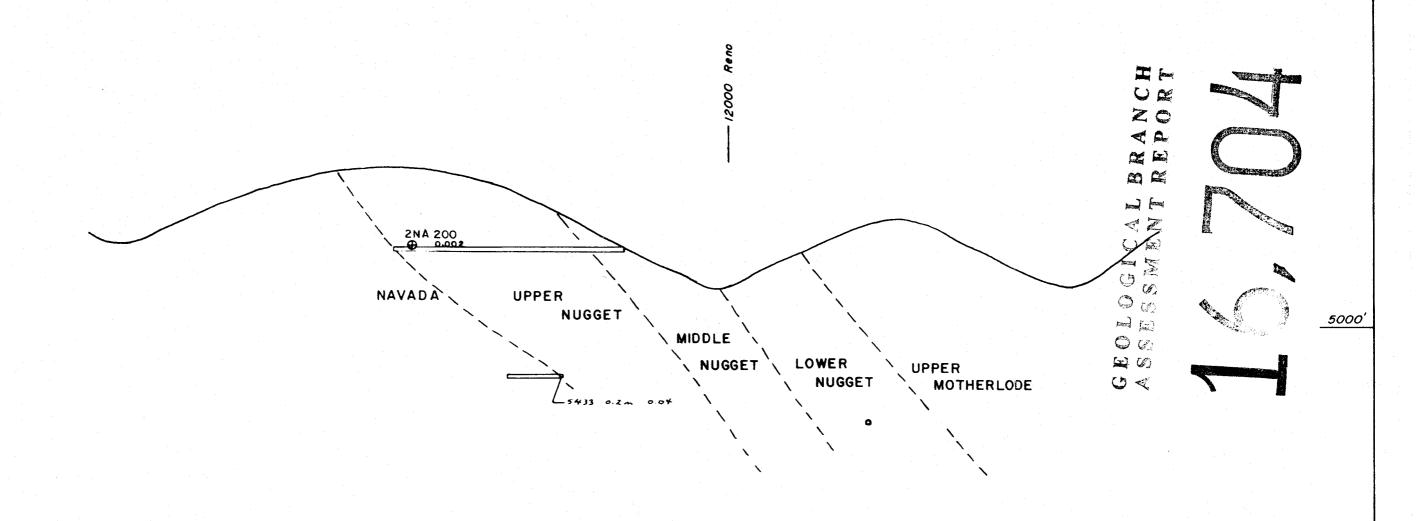
	1987 TOTALS
Mine Supplies	\$106,966.92
Equipment - Gas, Oil & Diesel	\$35, 243. 52
Equipment - Insurance	\$7,109.50
Equipment - Rental	\$196,623.15
Equipment - Repair & Maintenance	\$30,231.05
Assaying	\$20,838.55
Field Office Rental	\$3,507.83
Communications & Telephone	\$7,616.12
Consulting Fees	\$891.69
Courier & Postage	\$2,904.11
Diamond Drilling	\$121,689.50
Employees Clothing	\$374.67
Engineering & Surveying	\$6,677.92
Consulting Engineer's Fee	\$5,418.75
Licences, Fees, & Dues	\$617.00
Maps & Charts	<b>\$51.67</b>
Meals & Lodging	\$2,478.70
Medical	\$304.00
Office, Printing & Stationery	\$1,068.94
Shipping & Freight	\$6,718.30
Soil Sampling	\$3,748.05
Sundry	\$105.90
Travel & Mileage	\$3,365.95
Contract Services - Labour	\$1,200.00
Contract Services - Professional	\$200.00
Field Office Supplies	\$1,742.57
Labour	\$271,370.66
Employee Benefits	\$12,364.57
Workers Compensation	\$2,597.82
그 회교가 되는 사람들은 그는 하고 말음을 받는다는 그렇게 하다	
a <u>nna an air</u> ann an an Cairlean ann an Cairlean ann an Airlean an Cairlean ann an Airlean ann an Airlean an Airlean	まりだん べつフ んじ

TOTAL

\$854,027.41







# LEGEND

STOPE, ORE RESERVE BLOCK

⊕<sub>2NA 75</sub>

ROCK SAMPLE SITE, SAMPLE NUMBER (July, 1982)

0

DRILL HOLE INTERSECTION

5433 C.19m . 0.54

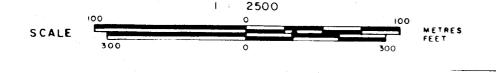
SAMPLE NUMBER, WIDTH, GRADE (oz/ton Au)

36 5 m - 0 36 m - 0.92

LENGTH, AVERAGE WIDTH, AVERAGE GRADE (oz/ton Au)



COMPUTED NET SLIP



A.M.

exploration Itd

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# NUGGET MINES PROPERTY

SHEEP CREEK GOLD CAMP

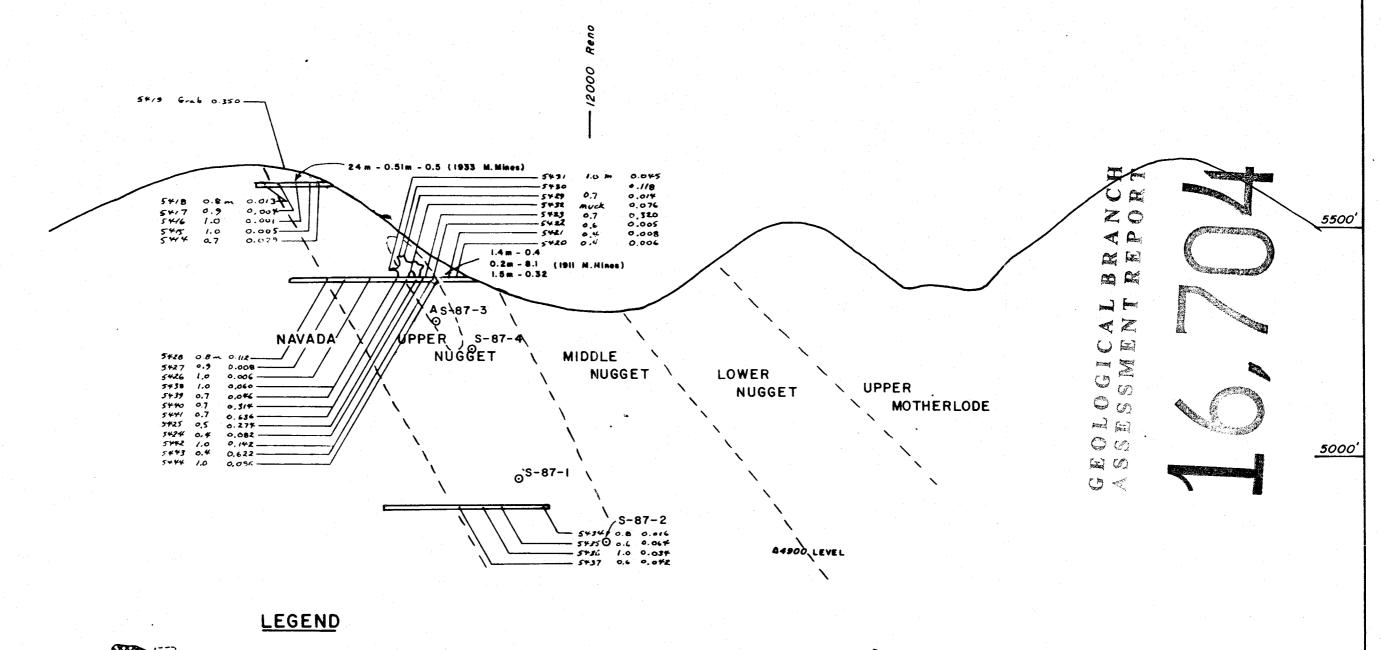
NELSON MINING DIVISION - BRITISH COLUMBIA

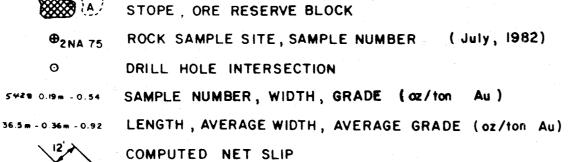
OF THE

CLYDE VEIN LOOKING NORTHWESTERLY

Figure 6b

4500





1: 2500

exploration Itd

NUGGET MINES LTD.

# NUGGET MINES PROPERTY

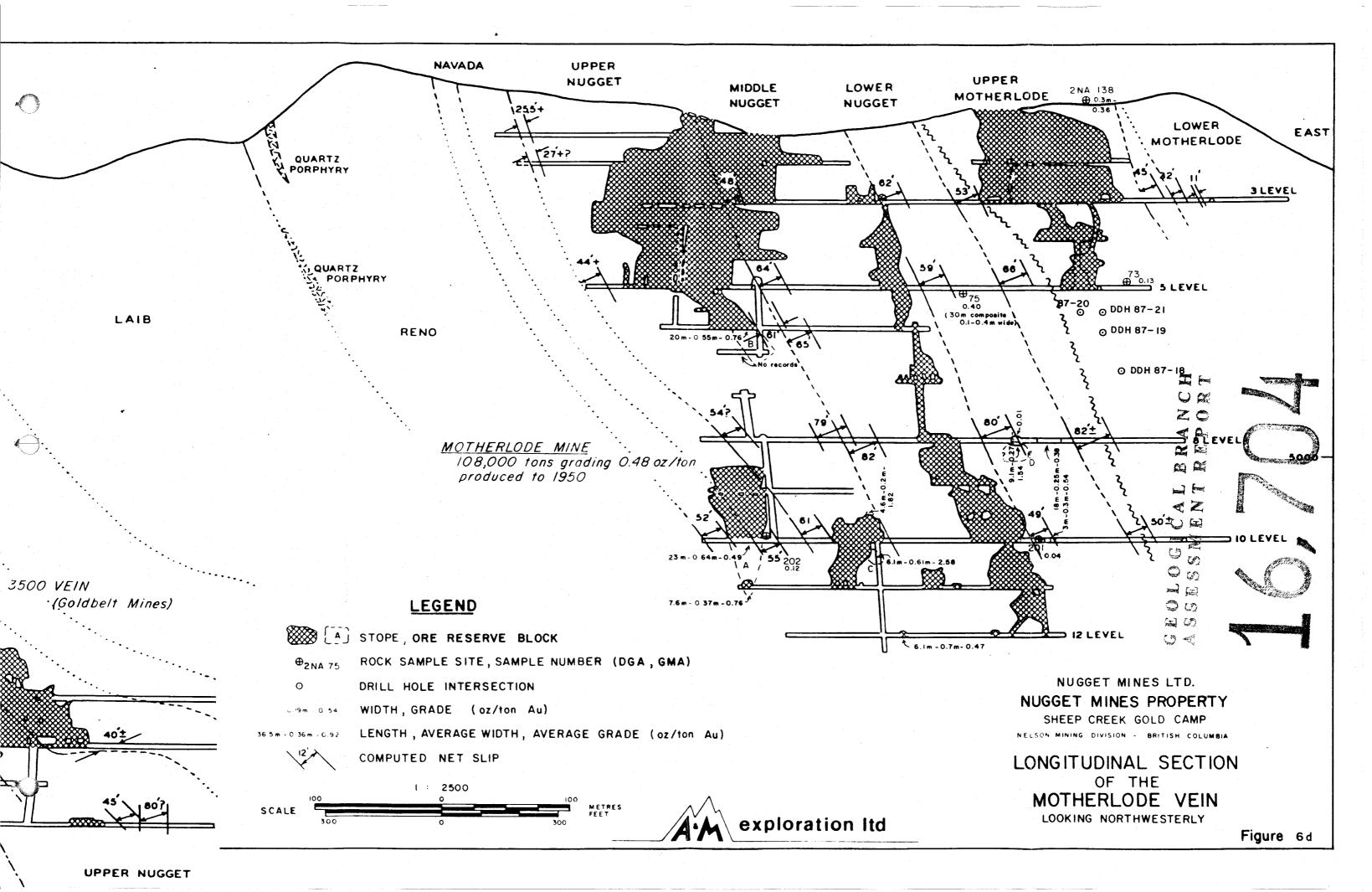
SHEEP CREEK GOLD CAMP

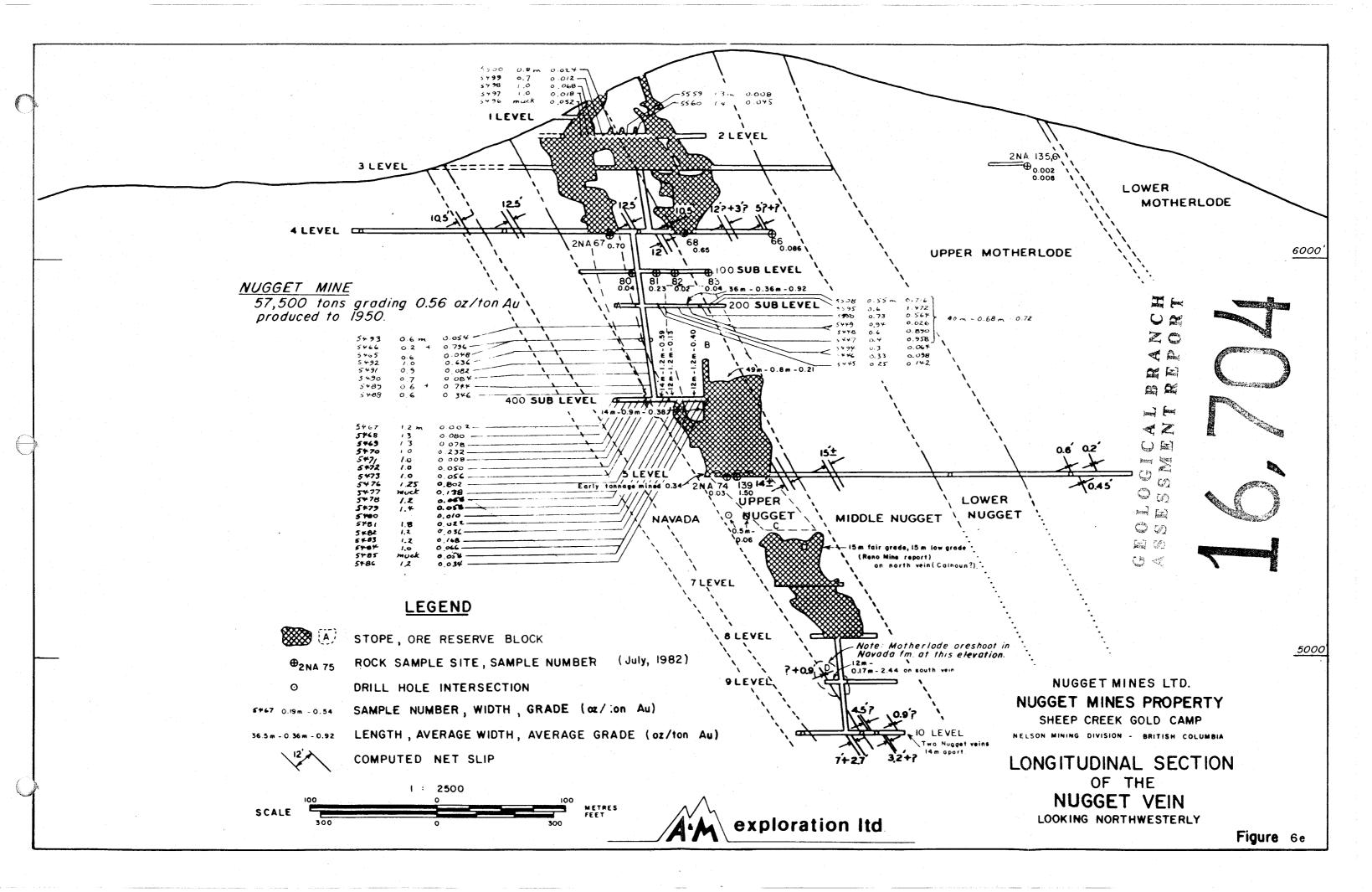
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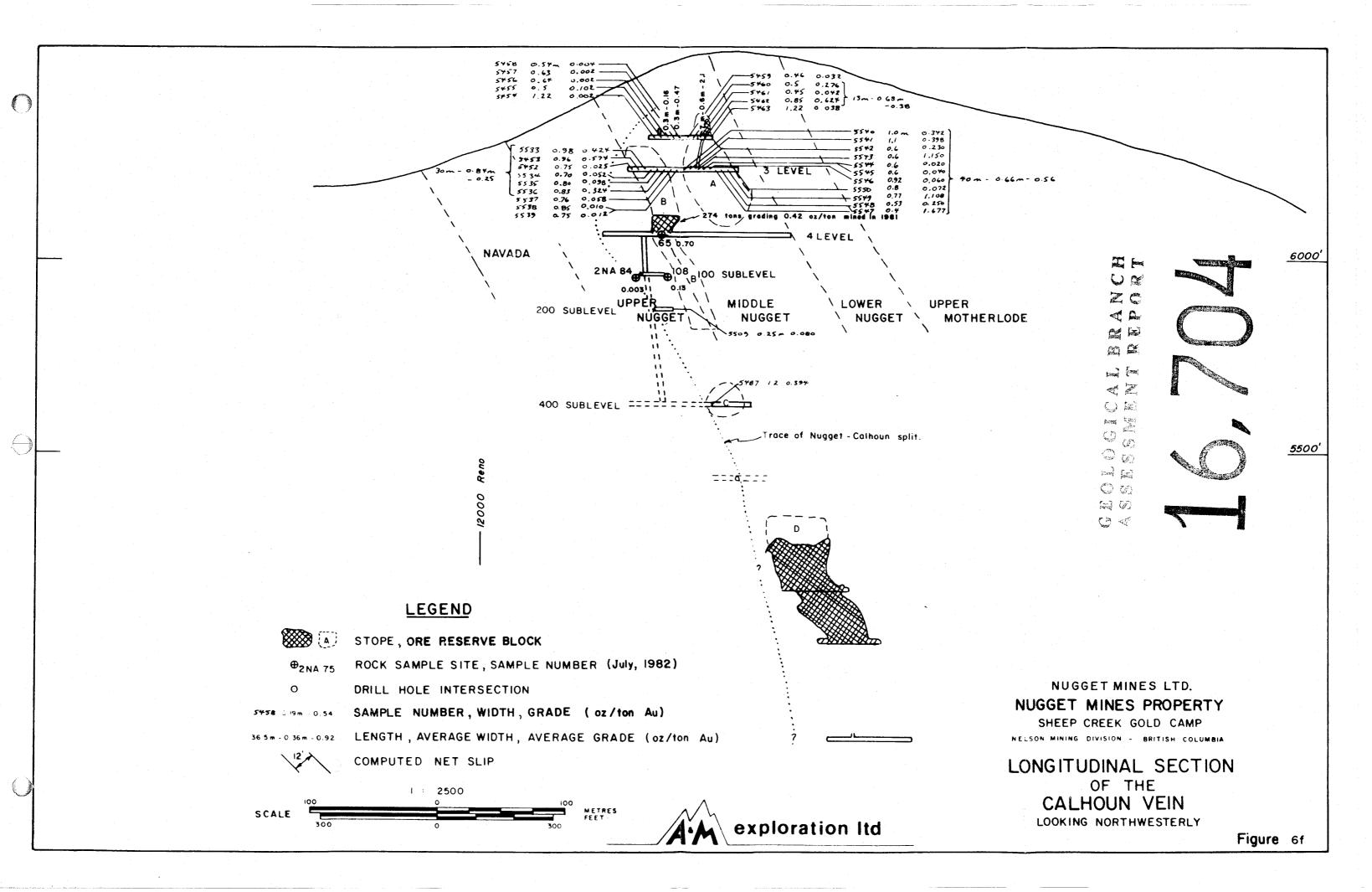
OF THE GOLDEN BELLE VEIN

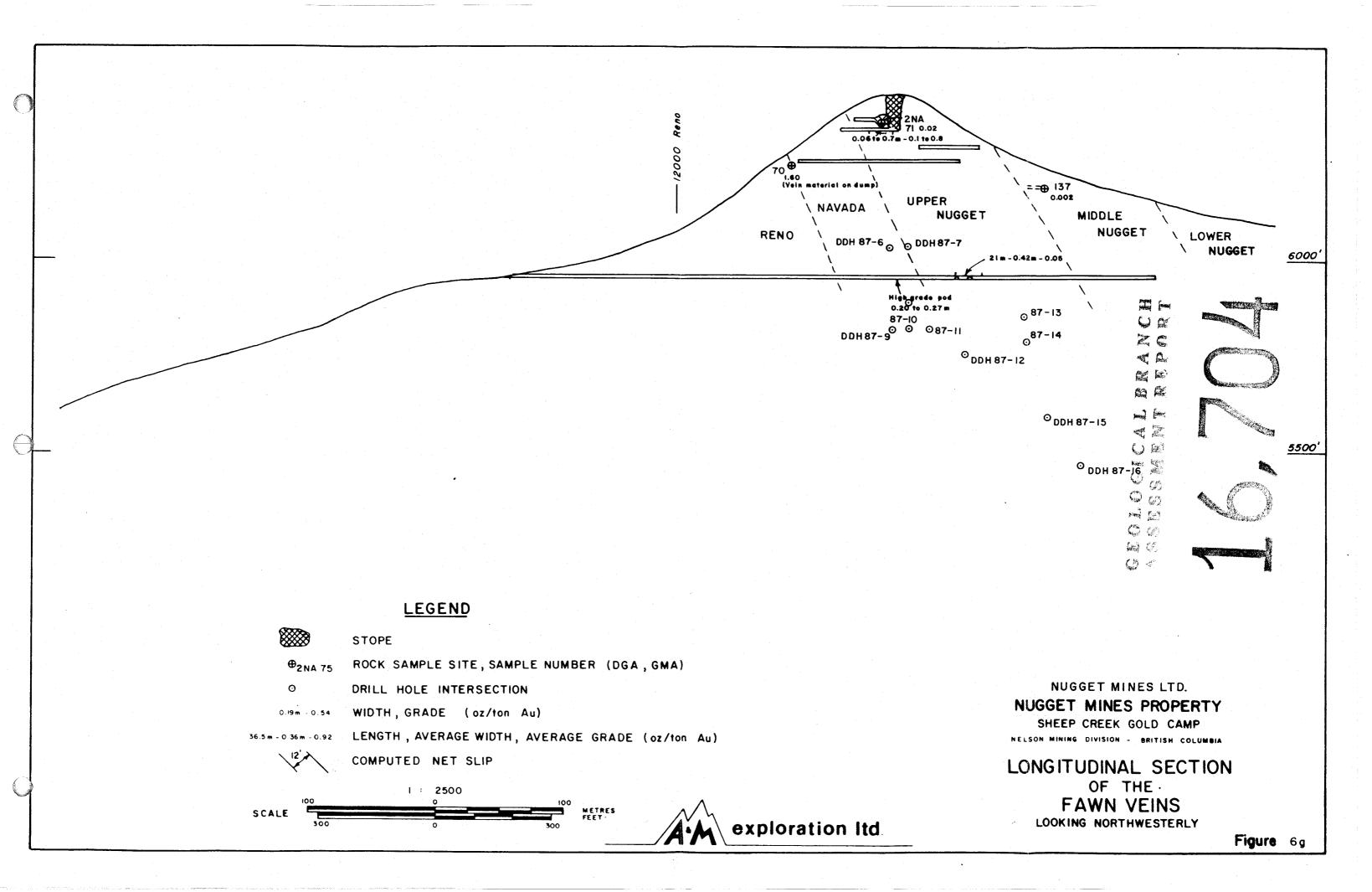
LOOKING NORTHWESTERLY

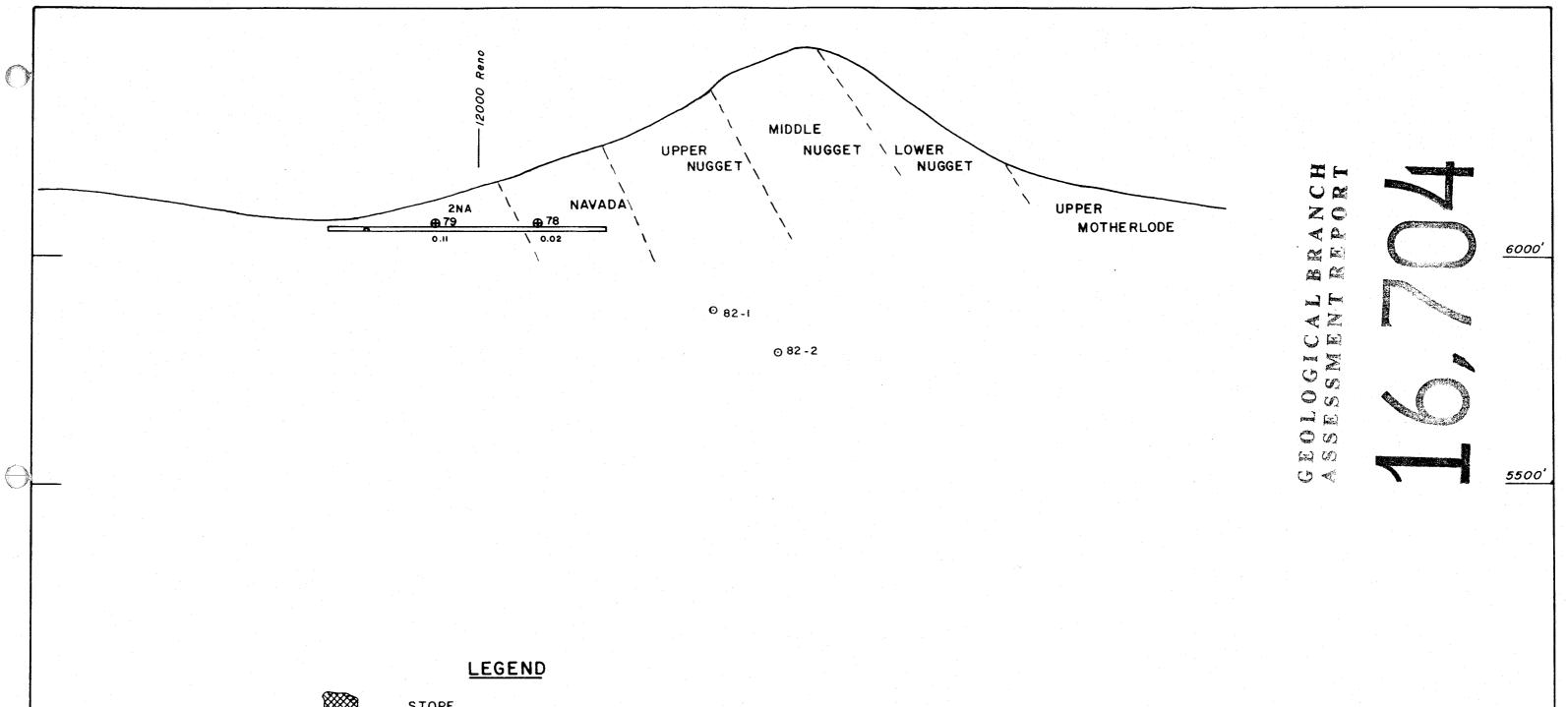
Figure 6c













STOPE

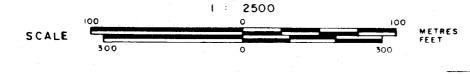
ROCK SAMPLE SITE, SAMPLE NUMBER (DGA, GMA)

0 DRILL HOLE INTERSECTION WIDTH, GRADE (oz/ton Au) Ú.19 m = 0.54

LENGTH, AVERAGE WIDTH, AVERAGE GRADE (oz/ton Au) 36 5 m - 0 36 m - 0.92



COMPUTED NET SLIP



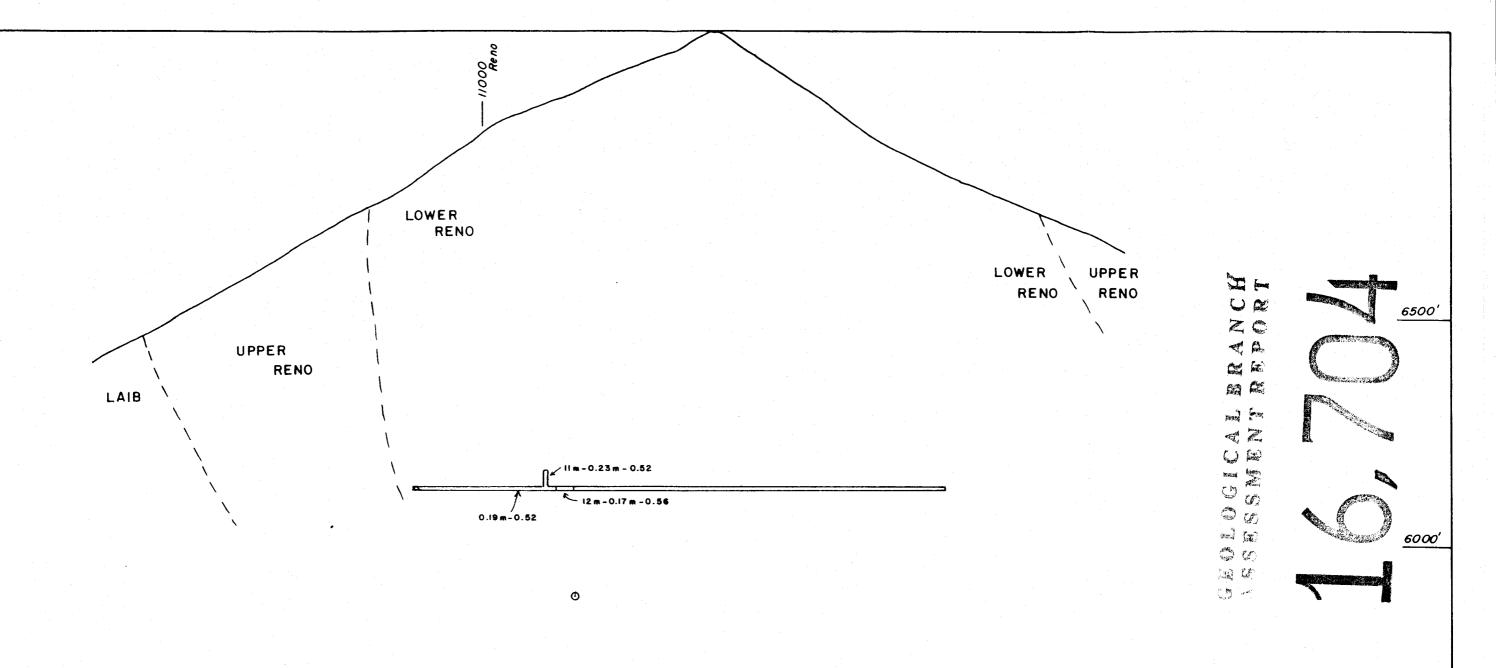


NUGGET MINES LTD. NUGGET MINES PROPERTY SHEEP CREEK GOLD CAMP

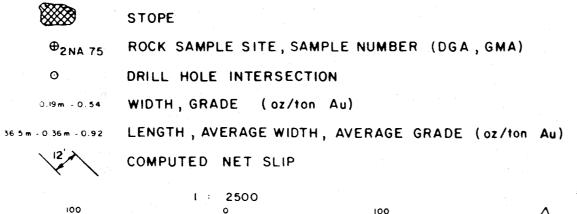
NELSON MINING DIVISION - BRITISH COLUMBIA

LONGITUDINAL SECTION OF THE O'DONNELL VEIN LOOKING NORTHWESTERLY

Figure 6h



# LEGEND



exploration Itd

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NUGGET MINES PROPERTY

SHEEP CREEK GOLD CAMP

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LONGITUDINAL SECTION
OF THE
MIDDLE VEIN
LOOKING NORTHWESTERLY

Figure 6i

