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1981/44. Bulk sampling of diamond drill core, All Nations mine, Moina.

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Abstract

The veined (and altered) porphyry intersected in diamond drill holes AN3 and AN4 generally contains less than 100 g/t Sn, W, and Mo, and less than 10 g/t Bi, but is locally and irregularly enriched with up to 345 g/t Sn, 2113 g/t W, and 2772 g/t Mo. A 1.5 m interval in AN3 contains 0.12 mass% WO_3 and 0.46 mass% MoS_2 .

INTRODUCTION

This report presents the results of analyses (Sn, W, Mo, Bi) of bulk sampling of drill core from diamond drill holes AN3 and AN4, at the All Nations mine, Moina. Details of the drilling, geological logs, and mineralisation intersected in the drill holes are given in a previous report (Collins, 1981). The information in this report is supplementary to, and should be read in conjunction with the abovementioned report.

SAMPLING PROCEDURE

The drill core was cut by diamond saw, and half-core samples collected for analysis. Drill hole AN3 was mainly sampled over intervals of 1.5 m, and in AN4 over intervals of 3.0 m. In addition to the half-core, the saw cuttings and slurry were also collected and analysed to ascertain whether there was any major loss of minerals or metals, particularly molybdenite, during sampling.

ANALYTICAL DATA

CORE SAMPLES

Diamond drill hole AN3

Analytical results are listed in Table 1, which also includes analytical results of the two quartz vein intersections (812220, 812221) to enable calculation of weighted means for the appropriate bulk sample intervals.

Tin values range from 24 g/t to 300 g/t, with only four samples containing more than 100 g/t Sn.

Most of the tungsten results range between 30 g/t and 410 g/t, with one high value of 954 g/t W (0.12 mass% WO_3) at 145.15-146.65 m which is due to 1200 g/t W in veined porphyry adjacent to one of the quartz veins (812975).

Molybdenum ranges from <3 g/t to 845 g/t (most less than 100 g/t), with one interval at 145.15-146.65 m containing 2772 g/t Mo (0.46 mass% MoS_2), which is due mainly to 1.15 mass% Mo in a quartz vein in this interval.

All bismuth values are less than 10 g/t, except for the two sections containing the quartz veins.

Results indicate that tin, tungsten, and bismuth in the veined and altered porphyry are generally low (*i.e.* less than 100 g/t), but are locally and irregularly high. There is no extensively enriched section, though

high values tend to occur between 121.15 m and 146.65 m. The best values are in the 1.5 m interval at 145.15-146.65 m which includes one of the quartz veins, and contains 0.12 mass% WO₃ and 0.46 mass% MoS₂.

Diamond drill hole AN4

Analytical results are listed in Table 2, and include analysis of a short intersection of skarn-type alteration at 192.35-194.55 m.

Tin values range from <5 g/t to 345 g/t, though only five samples have more than 100 g/t Sn.

Tungsten values range from <15 g/t to 250 g/t (most <100 g/t) with one sample (813664) containing 2113 g/t W (0.27 mass% WO₃).

The molybdenum results range from 3 g/t to 479 g/t, with one sample (813672) containing 1141 g/t Mo (0.19 mass% MoS₂). High molybdenum values tend to occur between 140.55 m and 170.55 m.

Bismuth results are all less than 10 g/t, except sample 813667 with 67 g/t Bi.

As in AN3, the results for hole AN4 are generally low, but are locally and irregularly high. The high values tend to be restricted to the zone between 140.55 m and 170.55 m. However, the high values are inconsistent, and average only 126 g/t Sn, 266 g/t W, and 282 g/t Mo for this zone.

The skarn intersection has slightly higher tin and tungsten than most of the veined porphyry, but similar molybdenum and bismuth.

SAW CUTTINGS AND SLURRY

To test whether there is any significant loss of metals (particularly Mo) during core cutting and sampling, the saw cuttings and slurry were collected, generally over intervals of 12 m, then divided into three size ranges and analysed for Sn, W, Mo, and Bi (Tables 3 and 4). For drill hole AN4, only two size fractions (±2 mm) were collected for analysis.

In general, the values are higher than those in the core over the same intervals, but when a weighted mean is calculated for the cutting and slurry samples there does not appear to be any major loss during sampling, as shown by the following examples.

Example 1: DDH AN3, 133.15 m-145.15 m

	Sn (g/t)	W (g/t)	Mo (g/t)
Core (weighted average of samples 812968-973, and 812220)	107	65	232
Saw cuttings and slurry (weighted average of 812988-990, and 813000)	178	191	192

Example 2: DDH AN4, 164.55 m-176.55 m

	Sn (g/t)	W (g/t)	Mo (g/t)
Core (average of 813671-674)	69	35	329
Saw cuttings and slurry (sample 813690 only)	44	39	477

The coarse fraction (+2 mm) is probably not representative of the sample, and samples generally are small in mass (less than 100 g) which would account for the erratic values. The finer fractions are more representative of the sample and generally are of a larger mass. The results of the -2 mm fraction are less erratic and are more consistent with the core samples (see Example 2 above).

The sampling is subject to numerous problems, such as loss of material in suspension, and flaking, chipping, or breaking of core (particularly at veins) which would result in unrepresentative samples. Thus, the use of saw cuttings and slurry is not recommended as a means of sampling, but in this case has shown that there is no significant loss of metallic minerals during core cutting and sampling.

CONCLUSIONS

Bulk sampling and analysis of veined and altered sections of the quartz-feldspar porphyry in diamond drill holes AN3 and AN4 indicate low values (generally less than 100 g/t) of Sn, W, Mo, and Bi, with irregular, localised sections of higher values up to 345 g/t Sn, 2113 g/t W, 2772 g/t Mo, and 67 g/t Bi. The best intersection is a 1.5 m interval in AN3 containing 0.12 mass% WO₃ and 0.46 mass% MoS₂.

REFERENCE

COLLINS, P.L.F. 1981. Progress report on exploratory drilling at the All Nations mine, Moina. *Unpubl.Rep.Dep.Mines Tasm.* 1981/38.

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Table 1. ANALYSES OF VEINED AND ALTERED PORPHYRY AND QUARTZ VEINS⁽⁺⁾ IN DIAMOND DRILL HOLE AN3, ALL NATIONS MINE, MOINA

Sample	Depth (m)	Sn (g/t)	W (g/t)	Mo (g/t)	Bi (g/t)	
812963	114.0 -116.0	120	200	75	<10	
964	121.15-124.15	100	130	80	<10	
965	124.15-127.15	90	410	145	<10	
966	127.15-130.15	95	90	90	<10	
967	130.15-133.15	120	45	55	<10	
968	133.15-136.15	300	60	75	<10	
969	136.15-139.15	100	95	80	<10	
970	139.15-140.65	80	80	845	<10	
971	140.65-142.15	75	80	140	<10	
972	142.15-142.62	50	45	80	<10	
220 ⁽⁺⁾	142.62-142.87	140	9	110	32	Quartz vein
973	142.87-143.65	45	50	140	<10	
	142.15-143.65	62	42	116	13	Weighted mean
974	143.65-145.15	24	30	135	<10	
975	145.15-146.33	65	1200	405	<10	
221 ⁽⁺⁾	146.33-146.65	29	50	1.15 ^(*)	0.21 ^(*)	Quartz vein
	145.15-146.65	57	954	2772	456	Weighted mean
976	146.65-148.15	32	75	24	<10	
977	148.15-151.15	40	30	85	<10	
978	151.15-154.15	60	40	30	<10	
979	154.15-157.15	40	32	5	<10	
980	157.15-160.15	70	60	85	<10	
981	160.15-163.15	140	50	30	<10	
982	163.15-166.15	55	30	6	<10	
983	166.15-169.15	25	38	<3	<10	
984	190.15-194.65	30	40	110	<10	

(+) More complete analyses of the quartz veins are given in Collins (1981, Table 2).

(*) mass%.

Table 2. ANALYSES OF VEINED PORPHYRY AND SKARN IN DIAMOND DRILL HOLE AN4, ALL NATIONS MINE, MOINA

Sample	Depth (m)	Sn (g/t)	W (g/t)	Mo (g/t)	Bi (g/t)	
813659	128.55-131.55	37	222	250	<10	
660	131.55-134.55	60	244	40	<10	
661	134.55-137.55	6	87	33	<10	
662	137.55-140.55	13	38	84	<10	
663	140.55-143.55	23	250	479	<10	
664	143.55-146.55	179	2113	134	<10	
665	146.55-149.55	19	55	250	<10	
666	149.55-152.55	51	58	141	<10	
667	152.55-155.55	278	48	275	67	
668	155.55-158.55	345	22	16	<10	
669	158.55-161.55	87	35	169	<10	
670	161.55-164.55	110	<15	146	<10	
671	164.55-167.55	72	36	69	<10	
672	167.55-170.55	99	29	1141	<10	
673	170.55-173.55	50	31	60	<10	
674	173.55-176.55	55	44	46	<10	
675	176.55-179.55	35	17	30	<10	
676	179.55-182.55	<5	22	35	<10	
677	182.55-185.55	47	21	7	<10	
678	185.55-188.55	38	35	37	<10	
679	188.55-191.55	29	32	9	<10	
680	191.55-192.35	24	<15	3	<10	
681	192.35-194.55	160	221	40	<10	Skarn
	191.55-194.55	123	166	30	<10	Weighted mean
682	194.55-197.55	33	88	27	<10	
683	197.55-200.55	22	20	17	<10	
684	200.55-203.55	24	138	19	<10	
685	203.55-206.55	28	40	90	<10	
686	206.55-209.55	21	65	153	<10	

Table 3. ANALYSES OF DIAMOND SAW CUTTINGS AND SLURRY SAMPLES FROM DIAMOND DRILL HOLE AN3, ALL NATIONS MINE, MOINA

Sample	Depth (m)	Mass (g)	Sn (g/t)	W (g/t)	Mo (g/t)	Bi (g/t)	Description(+)
812985	121.15-133.15	105.1	105	350	130	<10	Coarse cuttings
986	121.15-133.15	34.8	230	930	145	<10	Medium cuttings
987	121.15-133.15	29.6	530	1100	125	<10	Fine slurry
988	133.15-145.15	66.6	80	200	400	<10	Coarse cuttings
989	133.15-145.15	46.2	305	1250	755	<10	Medium cuttings
990	133.15-145.15	293.7	190	125	140	<10	Fine slurry
991	145.15-157.15	127.5	50	270	960	11	Coarse cuttings
992	145.15-157.15	50.3	560	2250	630	<10	Medium cuttings
993	145.15-157.15	320	135	395	100	<10	Fine slurry
994	157.15-169.15	34.4	95	1100	35	<10	Coarse cuttings
995	157.15-169.15	22.0	300	800	255	<10	Medium cuttings
996	157.15-169.15	292	90	70	50	<10	Fine slurry
997	190.15-194.65	18.9	230	65	30	<10	Coarse cuttings
998	190.15-194.65	14.7	225	765	155	<10	Medium cuttings
999	190.15-194.65	169.0	90	55	130	<10	Fine slurry
813000	133.15-145.15	300	170	90	110	<10	Fine slurry
001	145.15-157.15	292	110	240	60	<10	Fine slurry
002	157.15-169.15	317	90	70	50	<10	Fine slurry
003	190.15-194.65	98.7	75	50	120	<10	Fine slurry

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(+) Coarse cuttings = +2 mm size fraction; Medium cuttings = -2 mm to +0.005 mm size fraction; Fine slurry = -0.005 mm size fraction.

Samples 813000-813003 are duplicate samples of 812988, 812993, 812996, and 812999 respectively.

Table 4. ANALYSES OF DIAMOND SAW CUTTINGS AND SLURRY FROM DIAMOND DRILL HOLE AN4, ALL NATIONS MINE, MOINA

Sample	Depth (m)	Mass (g)	Sn (g/t)	W (g/t)	Mo (g/t)	Bi (g/t)	Description
813687	128.55-140.55	613	90	131	128	<10	-2 mm fraction
688	140.55-152.55	970	132	491	277	<10	-2 mm fraction
689	152.55-164.55	580	99	44	268	32	-2 mm fraction
690	164.55-176.55	634	44	39	477	<10	-2 mm fraction
691	176.55-188.55	844	20	36	42	<10	-2 mm fraction
692	188.55-198.4	888	34	86	85	<10	-2 mm fraction
693	198.4 -209.55	740	55	93	83	<10	-2 mm fraction
694	128.55-176.55	58	53	479	2634	<10	+2 mm fraction
695	176.55-209.55	50	52	84	142	<10	+2 mm fraction

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