SUPPORTING DOCUMENT 4b

GIANT MINE
TAILINGS BACKFILL

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MEMORANDUM

DATE: July 10, 2002

TO: File

FROM: Kelly Sexsmith

RE: Tailings Backfill in the Giant Mine

This memo summarizes the available information on tailings backfill in the Giant Mine. The information was obtained from annual reports dating back to 1954, monthly records from 1944, and the stope records maintained on site. Most of the information was compiled by Manuel Lim of the Giant Mine Project Team (DIAND). The geochemical testing program described in Supporting Document 4 also provides valuable information on the backfilled tailings, and is briefly reviewed.

Annual reports from 1966 to 1978 were initially used to identify stopes that were mined using cut and fill methods. Records prior to this period were not available until after this initial phase of work was completed. The individual stope records (from the black stope books) were then reviewed to determine the location, the approximate period of mining and backfilling, and the total tonnes of ore broken in each stope. The results of the compilation are provided in Table 1. Several of the stope books were missing plans. Therefore, it was not possible to obtain this information for all of the stopes. Where possible, the center point of each stope was then input into Autocad and used to generate a long section of the mine showing the relative locations of all the stopes that are known to contain backfill (Figure 1).

Annual reports from 1954 to 1965 were located by Tim Canam in November 2001, approximately one year following the initial data compilation. The data was compiled in a slightly different format, which includes the amount of ore broken in each stope on an annual basis. This data is provided in Table 2. It should be noted that the records did not always distinguish "cut and fill stopes" from "tailings cut and fill stopes", and that the sum of the amount of ore recorded as being in individual tailings cut and fill stopes was typically much less than the reported total of ore actually broken in the tailings cut and fill stopes. In some cases, the annual reports could be used to determine when piping was extended to an area and to confirm that tailings would have been present in these

stopes. However, many of the stopes identified as “cut and fill” are likely to contain some tailings backfill.

The 1954 to 1965 records from Table 2 were used to identify some additional tailings backfilled stopes, which have been added to Table 1 (shaded). However, the detailed records for these new stopes will need to be reviewed to fill in the more detailed information on the locations and amounts of ore from each of these stopes. Once this information has been compiled, Figure 1 will be updated to include those stopes.

The 1954 to 1965 annual reports also provided some additional information on tailings backfill, including the quantity of ore broken in tailings cut and fill stopes, the tailings backfill placed each year, and general information on changes and improvements to the backfill system. This information was also available for 1966, and 1973 to 1978. This information was used to prepare a summary of the backfill production rates, as shown in Table 3. The records indicate:

- Tailings backfill was used in the mine from 1957 to 1978.

- Approximately 2.5 million tons of backfilled tailings were accounted for in the records. This corresponds closely to the estimate of 2.7 million tonnes provided in the final abandonment and reclamation plan (G. Halverson 1984, *referenced in* Golder 2001).

- There were changes to the plant noted in the annual reports for 1959 (an increase in the storage tank size), 1965 (increase in storage tank size), 1966 (construction of a cement/tailings plant), and 1967 (new tailings/cement plant commissioned).

- The backfill comprised 69 to 84% of the volume of the tailings cut and fill stopes. Mine personnel have indicated that waste rock was periodically used to supplement the tailings backfill.

- There are several cut and fill stopes that may not contain tailings backfill. Former mine personnel have indicated that development waste rock was placed in these stopes. From 1950 to 1957, gravel mixed with development waste was used for backfill.

Results of the geochemical testing program (see Supporting Document 4) have indicated that there are two distinct types of backfilled tailings in the underground workings, including brown tailings with elevated sulphide and metal levels and mineralogically distinct iron oxides from the roasting process, and grey tailings with low sulphide and metal concentrations, and no traces of roaster products. Most of the brown tailings samples were from stopes completed before 1967, and most of the grey tailings samples were from stopes completed after 1967. Approximately 40% of the tailings backfill samples were brown roaster tailings, while approximately 60% were grey flotation tailings.

The presence of roaster products in the older tailings is consistent with a 1960 flowsheet (Tait 1960) which shows blending of calcine residues with the flotation tailings, cyanidation of the blended tailings, and then deposition of the coarse sands to the mine backfill. Monthly reports indicate that, in June 1967, they eliminated the tailings cyanidation circuit, which would mean it would be no longer necessary to blend the calcine residues with the flotation tailings. A former metallurgist with the mine also indicated that the change may have occurred following implementation of a territorial regulation which prohibited deposition of cyanide tailings underground (*pers. comm*, Bryan Cross), which would have necessitated the exclusive use of flotation tailings as backfill. We have not been able to determine the timing of this regulation.

The production records in Table 3 indicate that approximately 50% of the backfill production occurred prior to or during 1967, while 50% occurred after 1967. Therefore, it is reasonable to assume that half of the backfill contains roaster products.

References:

Annual Reports (1954 to 1978)

G. Halverson 1984 (complete reference could not be located, cited in Golder, 2001).

Monthly Reports (1944 to 1999).

Stope Books (Geology Vault)

Tait, R.J.C., 1960. Recent Progress in Milling and Gold Extraction at Giant Yellowknife Gold Mines Limited. C.I.M. Annual General Meeting, Toronto, April 1960, and Transactions, Volume LXIV, 1961, pp. 204-216

Table 1

Giant Mine Underground Tailings Backfill 1966-1977

Stope No.	Access Level	Northing	Easting	Bottom Elevation	Back(top) Elevation	Tons of Ore Broken	Date Stope Started (month/year)	Last Survey (month/year)	Comments
B3 131	B3, 1st	3225N	850W	5845	5980	59,217	Apr '68	Apr '74	
B3 233	B3, 1st	3300N	900W	5810	5900	43,958	May '67	Nov '70	
B3 237						12,194			MISSING PLANS
B4 143	B3, 1st	4300N	1300W	5850	5900	133,197	Sep '72	Jan '74	
B4 245						81,571			MISSING PLANS
B4 245 S						549			MISSING PLANS
B 205 Pillar						9,467			MISSING PLANS
445						53,765			MISSING PLANS
450	575	4800N	1300W	5460	5640	97,619	Jul '71	Feb '77	
452						5,575			MISSING PLANS
464						17,675			MISSING PLANS
715	750	1625N	700E	5292	5340	1,986	Nov '70	Mar '71	
717	750	1675N	580W	5310	5440	118,260	Nov '57	Mar '58	
719	750	13740N	7670E	5260	5480	4,914	Jul '54	Feb '60	
723	750	2100N	250W	5290	5310	10,418	Jun '74	May '76	
737	750	3700N	240W	5265	5310	3,966	Feb '64	Feb '70	
738	750	3775N	250W	5330	5440	35,689	Dec '73	Oct ' 77	
742	750	2200N	600E	5270	5430	114,044	Nov '67	Aug '72	
742 #17	750	2425N	550E	5200	5270	2,317	Dec '66	Feb '68	
742 H.W.	750	2100N	500E	5292	5335	6,305	Mar '68	Apr '68	
742 HW #2						5,213			MISSING PLANS
746	750	4650N	1150E	5305	5345	8,401	Jun '67	Dec '68	
747	750	4900N	1300W	5340	5440	23,821	Apr '70	Feb '72	
748	750	4850N	1160W	5310	5350	5,916	Jan '69	OCT '71	
749	750	4900N	1260W	5340	5380	5,273	Jun '70	Jan '71	
750 H.W.	750	5120N	1250W	5390	5570	147,299	Feb '67	Nov '77	
750 F.W.	750	4900N	1300W	5312	5442	23,122	Jun '70	Jan '73	
906	950	550N	850E	5060	5095	14,952	Aug '71		
907	950	850N	850E	5180	5230	75,958	Feb '72	Feb '73	
910	950	1000N	50E	5080	5160	46,618	Dec '64	Sep '67	
911	950	1125N	70E	5030	5060	2,071	Jun '72	Aug '72	
914 H.W.	950	1575N	20W	5080	5200	30,220	Aug '64	Mar '68	
914 L.P.	950	1200N	00E	5055	5130	8,280	Nov '68	Apr '71	
918 W						13,744			MISSING PLANS
918	950	1800N	70W	5060	5220	172,335	Jul '56	Oct '65	
918 #7	950	1675N	00E	5080	5120	2,450	Oct '68	Feb '69	
919	950	2000N	00E	5080	5190	100,143	Nov '58	Apr '63	
920	950	2000N	80W	5110	5270	142,889	Feb '57	May '68	
921						112,000	1958	1964	MISSING PLANS
925	950	13910N	8680E	5200	5294	10,400	Jun '61	Mar' 63	
89E / 92-93	750	1800N	500E	5270	5310	94,961	Dec '63	Oct '68	
94	750	1800N	600E	5170	5345	11,779	Jun '61	Mar '71	
95	750	2025N	560E	5200	5265	32,871	Mar '65	Feb '67	
96	950	2200N	400E	5160	5240	60,318	Jan '62	Nov '68	
97	750	1950N	460E	5154	5295	64,542	APR '67		
98	950	1650N	580E	5210	5260	19,229	DEC '62		
98 E	750	2300N	600E	5260	5280	3,840	JAN '67		
99 N.W.						873			Layout has no survey shown.
11-10	1100	1000N	80E	4920	5090	66,680	Jun '60	Dec'64	
11-10 E&W						30,005			MISSING PLANS
11-13	1100	12920N	8060E	4985	5040	3,600	Dec '65	May '66	
11-15 E&W	1100	1500N	00E	4940	5070	43,876	May '62		
11-16	1100	100S	750E	4900	4930	13,340	Jan '83	Feb '83	1983? could be waste fill.
11-17 E	1100	1700N	300E	4900	5000	82,186	Apr '68	Jun '70	
11-17 W						8,987			MISSING PLANS
11-18						14,200	1960	1964	MISSING PLANS
11-20 Cr.	950	2000N	50E	5080	5100	2,033	Feb '67	Feb '69	
11-20	1150	1900N	100E	4920	5080	184,982	Jan '58	Feb '67	
11-21	1100	13500N	8460E	4905	5082	59,700	Dec '60	May '68	
11-22	1100	1800N	300E	4910	4985	17,571	Feb '73	Mar '76	
11-81						5,783			No survey shown on the plan
12-6 & 12-6 LP						92,636			MISSING PLANS
12-6 N	1100	500N	40E	4830	4895	2,830	Jul '67	Nov '68	
12-10	1250	1050N	120E	4830	4900	51,024	Jul '63	Sep '66	
12-12	1100	1100N	180E	4825	4892	22,685	May '65	Jul '67	
12-13	1100	1350N	175E	4840	4870	20,670	Feb '66	Dec '66	
12-13 N	1100	1400N	120E	4820	4920	32,837	Mar '66	Sep '69	
12-15	1000	1250N	225E	4800	4935	13,625	Jun '69	Nov '71	
12-17	1100	1700N	170E	4840	4950	60,180	Oct '63	Jun '68	
12-17 E						1,494			Sub drift only, no fill shown.
12-18						927			MISSING PLANS
12-19	1100	1500N	200E	4840	4920	19,108	May '65	Feb '69	
12-21	1150	2000N	200E	4935	4960	1,939	Mar '60	April '60	
12-24	1250	1925N	280E	4808	4850	22,507	Mar '75	Nov '76	
12-25	1250	2150N	300E	4760	4840	27,530	Mar '76	Dec '78	
C 2-27						7,055			MISSING PLANS
7-4	750	400S	220E	5260	5330	20,737	Sep '54	May '73	
7-26	750	2700S	140E	5260	5340	33,456	Oct '67	Dec '70	
9-4 / 9-4S	950	550S	200E	5060	5165	49,741	Jul '67	Oct '69	
9-12 S	950	1400S	200E	5170	5270	241,393	Mar '61	May '66	
9-16 N	750	1850S	230E	5270	5315	231,523	Dec '66	Aug '67	
9-16 SW	750	2000S	250E	5230	5310	14,150	Nov '64	Aug '67	
11-3 N	1100	400S	250E	4940	5090	79,269	Nov '63	Sep '68	
11-3 S	1100	600S	220E	4900	4934	50,636	May '65	Dec' 66	
11-9	1100	10800N	7000E	4896	4920	120,000	1958	1964	
11-14	1100	1450S	280E	4980	5010	2,707	Jul '68	Jan '70	
12-4	1250	11300N	7300E	4812	4960	24,700	Feb '61	Apr '64	
12-7									MISSING PLANS
12-8	1250	10825N	7120E	4748	4911	235000	Aug '58	Jan '65	
12-9 N&S									MISSING PLANS
12-20									MISSING PLANS
15-8	1500	850S	400E	4680	4825		Mar '61	Feb '68	
15-8 Cr.	1250	1000S	350E	4738	4748	1,336	Dec '67	Feb '68	
15-9	1500	950S	560E	4600	4640	1,758	Jan '69	Feb '69	
15-10	1500	1150S	670E	4540	4600	140,826	Jun '66	Aug '77	
15-13	1500	1330S	625E	4540	4650	95,301	Aug '70	Nov '74	
15-14	1500	1200S	600E	4560	4600	8,766	Nov '74	Jun '76	
15-18	1500	1820S	580S	4560	4595	18,194	Oct '75	Jun '76	
15-20	1500	275S	565S	4650	4700	4,299	Aug '71	May '72	
16-5 N	1500	350S	550E	4600	4690	15,133	Sep '64	Jun '70	
16-5 E						3,280			
16-5 S	1250	550S	615E		4690	5,430		May '70	Incomplete
16-4-5-6	1500	650S	500E	4520	4590	186,727	April '64	Oct '66	
16-6 N	1500	325S	450E	4500	4555	3,207	Dec '72	Apr '73	
16-8	1500	800S	600E	4480	4595	72,944	Feb '64	Apr '69	
16-8 S	1500	1000S	600E	4520	4580	7,534	Sep '65	Dec '68	
16-9	1500	850S	520E	4505	4605	42,282	Mar '64	Jan '70	
16-11	1500	1050S	550E	4540	4625	150,175	Sep '69	Dec '73	
L 94	575	1850N	750E	5340	5375	822	Aug '72	Aug '72	
4-43	575	2100N	800E	5470	5540	89,620	Nov '71	Jul '73	
7-15	750	1600N	800E	5270	5290	1,045	Dec '77	Mar '78	
7-42	750	2400N	600E	5270	5320	76,327	May '68	May '69	
7-42 #17						11,903			MISSING PLANS
7-42 F.W.	750	2200N	700E	5240	5460	132,583	Dec '68	Aug '75	
7-43	750	1850N	750E	5300	5380	73,753	Jun '71	Nov '71	
9-17									MISSING PLANS
S 4-74	575	7350N	2200W	5460	5485	8,154	Oct '70	Jun '78	
7-69	750	6900N	2050W	5360	5470	6,467	Jan '68	Nov '69	
7-71	750	7100N	2050W	5305	5475	21,614	Jan '68	May '70	
7-74	750	7400N	2100W	5320	5475	36,457	Mar '67	Oct '70	
7-76	750	7600N	2140W	5310	5440	7,985	Jul '67	Apr '70	
9-72	950	7200N	1920W	5110	5270	23,323	May '72	Aug '76	
9-73	950	7300N	1940W	5140	5310	32,043	Dec '71	Oct '78	
9-75	950	7500N	1925W	5100	5215	12,970	Jun '73	Feb '78	
9-76	950	7750N	2070W	5225	5305	19,563	Nov '73	Dec '74	
9-78	950	7775N	2050W	5200	5230	14,511	July '75	Nov '77	
11-77	950	8150N	1850W	5090	5130	134,893	Oct '73	Apr '75	
11-83	1100	8175N	1860W	5020	5190	45,311	Mar '72	Dec '77	

Prepared by: KSS
Checked by: DBM

Table 2
Giant Mine Stoping Summary - 1954 to 1965

		Tons Broken												
Stopes	**Stoping Method**	**1954**	**1955**	**1956**	**1957**	**1958**	**1959**	**1960**	**1961**	**1962**	**1963**	**1964**	**1965**	**Total**
A-201	Open	7,018	1,399	4,296	2,353									**15,066**
A-201	Cut & Fill		4,329											**4,329**
A-202	Open	409	775											**1,184**
A-202 E&W	Cut & Fill			4,481	10,698									**15,179**
A-203	Cut & Fill			336	6,224									**6,560**
A-269 A	Cut & Fill		6,152	24,947	8,207									**39,306**
A-269 B	Cut & Fill		4,746	26,300	14,205									**45,251**
A-269 C	Cut & Fill				941									**941**
A-West Zone	Cut & Fill	797												**797**
A-301	Cut & Fill	5,120	12,298											**17,418**
A-301 S&N	Cut & Fill			12,306	8,291									**20,597**
A-302	Cut & Fill	6,852	16,398											**23,250**
A-302 E&W	Cut & Fill			14,769	14,666									**29,435**
B-114	Open				307									**307**
B-118	Open	553	803		445									**1,801**
B-118	Cut & Fill			1,132										**1,132**
B-2-02	Open									1,686	174			**1,860**
B-202	Cut & Fill			2,932	5,251									**8,183**
B-204	Open										250			**250**
B-207L Pillar	Open										1,747	2,029	3,164	**6,940**
B-2-08 ADsub	Open									1,004	1,030			**2,034**
B-208	Shrinkage						312	1,534	1,916					**3,762**
B-211	Shrinkage					1,223	7,346		500					**9,069**
B-212	Shrinkage					3,000			3,265	2,893	156			**9,314**
B-212-218	Shrink. & Open							219	2,138	4,091	1,793			**8,241**
B-212-4	Shrinkage							260						**260**
B-213-214	Shrinkage								2,305	46				**2,351**
B-214	Shrinkage					56	865	717						**1,638**
B-221	Cut & Fill	1,358												**1,358**
B-306 A	Cut & Fill	9,860	2,462											**12,322**
B-310	Cut & Fill	11,899	9,293	7,649	1,533									**30,374**
B-310	Shrinkage		1,460											**1,460**
B-312	Cut & Fill	15,845												**15,845**
B-314	Cut & Fill	4,575												**4,575**
B-3-233	Cut & Fill												294	**294**
B-3-234	Cut & Fill											100	5,549	**5,649**
B-3-235	Cut & Fill											1,436	10,509	**11,945**
B-3-236	Cut & Fill											931	6,324	**7,255**
B-3-238	Shrinkage											1,503		**1,503**
B-3-238	Cut & Fill												6,667	**6,667**
B-3-4-36 #3	Cut & Fill											2,297		**2,297**
B-3-4-36 HW	Cut & Fill											5,611		**5,611**
B-404	Cut & Fill					1,029								**1,029**
B-4-04	Shrinkage												2,339	**2,339**
B-404 S	Cut & Fill		160	5,357	1,115									**6,632**
B-407	Cut & Fill										145			**145**
B-4-07	Shrinkage											4,004		**4,004**
B-408	Cut & Fill	18,434	7,901	2,371	1,030									**29,736**
B-409	Cut & Fill	7,136	4,608											**11,744**
B-4-29	Cut & Fill					4,695						478	2,291	**7,464**
B-4-36	Cut & Fill					1,186	15,375	16,260	28,221	18,205	13,023		1,170	**93,440**
B-4-36 HW	Cut & Fill										229		14,115	**14,344**
B-712 A	Cut & Fill	29,674	39,859	35,729	12,966					586	206			**119,020**
B-712 B	Cut & Fill	20,888	33,197	9,391	1,425									**64,901**
B-712 C	Cut & Fill	7,503	2,923											**10,426**
B-712 E	Cut & Fill	568												**568**
B-7-12 W	Cut & Fill		2,004	7,520	6,487	194								**16,205**
B-7-16	Cut & Fill		3,857	2,998										**6,855**
B-7-17	Cut & Fill	12,244	22,346	26,459	23,167		4,902	1,743	3,234	136				**94,231**
B-7-17 E	Cut & Fill			1,105	138	5,200								**6,443**
B-7-17 Pillar	Tailings C&F									60	3,196		3,049	**6,305**
B-7-19	Cut & Fill	15,712	36,775	34,780	44,097	8,812	6,204		545	1,945	5,665	22		**154,557**
B-7-19 Pillar	Tailings C&F									1,297	3,617			**4,914**
B-7-19 Pillar	Timber C&F												1,669	**1,669**
B-7-20 A	Cut & Fill	664	5,464	9,977	8,715									**24,820**
B-7-20 B	Cut & Fill	1,198	5,308	3,471	508									**10,485**
B-7-20 C	Cut & Fill	313	3,617	7,133	7,446	1,897	391							**20,797**
B-7-21	Cut & Fill		5,554	10,833										**16,387**
B-7-27	Cut & Fill								4,463	3,694	11,890	11,015	5,433	**36,495**
B-7-28	Cut & Fill										412		7,654	**8,066**
B-7-29	Cut & Fill						204	1,461	343	1,923	3,203	4,211		**11,345**
B-7-37	Open											161		**161**
B-9-10	Cut & Fill				82									**82**
B-9-10	Tailings C&F										686		17,380	**18,066**
B-9-14	Cut & Fill					36,867	40,583	14,932	32,230					**124,612**
B-9-14	Tailings C&F									22,679	24,800			**47,479**
B-9-14 HW	Cut & Fill													**0**
B-9-14 HW	Tailings C&F											9,063	3,587	**12,650**
B-9-14 E	Cut & Fill			1,563	1,882									**3,445**
B-9-14 W	Open & C&F				7,163									**7,163**
B-9-18	Cut & Fill				11,121		14,643	6,707	14,929	22,089	16,701	10,004	5,493	**101,687**
B-9-18 HW	Cut & Fill					29,097	2,787	1,136						**33,020**
B-9-19	Cut & Fill					20,420	21,482	6,686	15,426					**64,014**
B-9-19	Tailings C&F									20,371	5,454			**25,825**
B-9-19/9-20	Tailings C&F											5,253	2,657	**7,910**
B-9-20	Cut & Fill				2,424	30,755	36,599	15,933	23,526					**109,237**
B-9-20	Tailings C&F									8,577				**8,577**
B-9-21	Cut & Fill					5,654	4,873	1,022	12,683					**24,232**
B-9-21	Tailings C&F									37,205	50,550			**87,755**
B-9-21: B89	Cut & Fill											1,471		**1,471**
....B89/92/93	Tailings C&F											24,412	13,719	**38,131**
.....B94	Cut & Fill											3,301		**3,301**
.....B95	Tailings C&F											4,101	7,795	**11,896**
.....B96	Cut & Fill											2,809		**2,809**
.....B96	Tailings C&F												4,036	**4,036**
.....B97/99	Tailings C&F											8,744	33,632	**42,376**
.....B98	Tailings C&F											8,899	1,338	**10,237**
.....B98E	Tailings C&F												256	**256**
.....B99	Cut & Fill											213		**213**
B-9-25	Tailings C&F								2,773	6,119	1,450			**10,342**
B-9-71	Cut & Fill											2,365		**2,365**
B-9-73	Cut & Fill											3,344		**3,344**
B-11-10	Cut & Fill						4,617							**4,617**
B-11-10	Tailings C&F							6,079	16,287	13,476	14,897	25,871		**76,610**
B-11-13	Tailings C&F											200	3,422	**3,622**
B-11-15	Cut & Fill							746	1,539					**2,285**
B-11-15	Tailings C&F									7,203	9,261	8,360		**24,824**
B-11-15 E&W	Tailings C&F												6,835	**6,835**
B-11-16	Tailings C&F												2,779	**2,779**
B-11-18	Cut & Fill							1,468						**1,468**
B-11-18	Tailings C&F								7,840	1,867	2,591	385		**12,683**
B-11-19	Cut & Fill							1,623	12,938					**14,561**
B-11-20	Cut & Fill				1,281	31,883								**33,164**
B-11-20	Tailings C&F						24,798	11,472	20,616	25,073	19,697	16,077	5,228	**122,961**
B-11-21	Cut & Fill					423								**423**
B-11-21	Tailings C&F						5,693	5,539	8,972	14,960	18,788	18,507		**72,459**
B-11-21 FW	Open												437	**437**
B-12-6	Tailings C&F										531	11,210	14,904	**26,645**
B-12-10	Tailings C&F									167	2,515	7,367	13,881	**23,930**
B-12-12	Cut & Fill											300	19,899	**20,199**
B-12-13	Cut & Fill											589		**589**
B-12-17	Cut & Fill				1,925	250	196		823					**3,194**
B-12-17	Tailings C&F										2,453	14,551	14,451	**31,455**
C-5-8	Cut & Fill	1,436												**1,436**
C-5-9	Cut & Fill	10,013												**10,013**
C-5-9/5-11	Cut & Fill		8,263											**8,263**
C-5-11	Cut & Fill	20,263												**20,263**
C-7-4	Open	410	1,579											**1,989**
C-7-6	Cut & Fill							1,234	6,156	6,108	4,125	4,794		**22,417**
C-7-6	Shrinkage	6,099	10,692			2,839	7,057							**26,687**
C-7-12	Cut & Fill	1,299												**1,299**
C-7-26	Cut & Fill				511									**511**
C-9-4	Cut & Fill			204										**204**
C-9-12	Cut & Fill			5,447	40,501	28,520	19,667	10,720	34,298					**139,153**
C-9-12	Shrinkage											9,553		**9,553**
C-9-12	Tailings C&F									19,104				**19,104**
C-9-12N	Tailings C&F										3,231			**3,231**
C-9-12L Pillar	Tailings C&F										376			**376**
C-912S	Tailings C&F										8,653		7,910	**16,563**
C-9-16	Cut & Fill					8,020	25,118	14,213	30,590					**77,941**
C-9-16	Tailings C&F									47,707	41,120	31,996	20,358	**141,181**
C-9-26	Cut & Fill			1,808	13,808	21,320	14,925	9,351	1,958					**63,170**
C-11-3	Cut & Fill			1,793		3,665								**5,458**
C-11-3	Tailings C&F						16,418	10,882	17,981	361		13,840		**59,482**
C-11-3S	Tailings C&F										2,479		4,884	**7,363**
C-11-3N	Tailings C&F										2,734		18,884	**21,618**
C-11-9	Shrinkage				9,727									**9,727**
C-11-9	Cut & Fill					53,101	47,260	6,133						**106,494**
C-11-9	Tailings C&F									1,749	6,225	6,031		**14,005**
C-12-4	Cut & Fill			2,699				472	6,986					**10,157**
C-12-4	Tailings C&F									9,547	5,045			**14,592**
C-12-8	Cut & Fill					8,944	41,123	22,063	43,025					**115,155**
C-12-8	Tailings C&F									51,333	51,750	14,310	2,985	**120,378**
C-12-9	Cut & Fill			216										**216**
C-15-8	Tailings C&F								4,776	10,469	22,815	27,529		**65,589**
C-15-10	Tailings C&F									417				**417**
C-16-4	Tailings C&F									2,034	9,702	23,784	41,887	**77,407**
C-16-5	Cut & Fill											1,749		**1,749**
C-16-6	Tailings C&F									1,113	8,200	25,650		**34,963**
C-16-8	Tailings C&F										1,405	9,336	16,003	**26,744**
C-16-9	Cut & Fill											2,944	6,714	**9,658**
C-16-11	Tailings C&F										666			**666**
Total Cut & Fill (unspecified)		**203,651**	**237,514**	**265,706**	**250,645**	**301,932**	**300,949**	**133,903**	**273,913**	**54,686**	**55,599**	**59,984**	**93,781**	**2,232,263**
Total Tailings Cut and Fill		**0**	**0**	**0**	**0**	**0**	**46,909**	**33,972**	**79,245**	**302,888**	**324,887**	**315,476**	**261,860**	**1,365,237**
Total Open and Shrinkage		**14,489**	**16,708**	**4,296**	**19,995**	**7,118**	**15,580**	**2,730**	**10,124**	**9,720**	**5,150**	**17,250**	**5,940**	**129,100**
Total Ore Broken		**218,140**	**254,222**	**270,002**	**270,640**	**309,050**	**363,438**	**170,605**	**363,282**	**367,294**	**385,636**	**392,710**	**361,581**	**3,726,600**
Tones Broken in Tailings Fill Stoping		**na**	**na**	**na**	**na**	**199,715**	**281,341**	**140,500**	**276,735**	**302,888**	**324,867**	*315,476*	**304,516**	**2,146,038**
Amount of unspecified CF that is tailings						**199,715**	**234,432**	**106,528**	**197,490**	**0**	**-20**	**0**	**42,656**	
Tonnes Backfill Placed		**na**	**na**	**na**	**na**	**80,508**	**118,478**	**65,889**	**123,605**	**143,402**	**155,175**	*144,220*	**155,158**	**986,435**
% of Tailings Stope Volume as Backfill		**na**	**na**	**na**	**na**	**69.5%**	**77.4%**	**82.4%**	**76.4%**	**82.0%**	**84.0%**	*80%*	**78.5%**	

Prepared by: KSS
Checked by: DBM

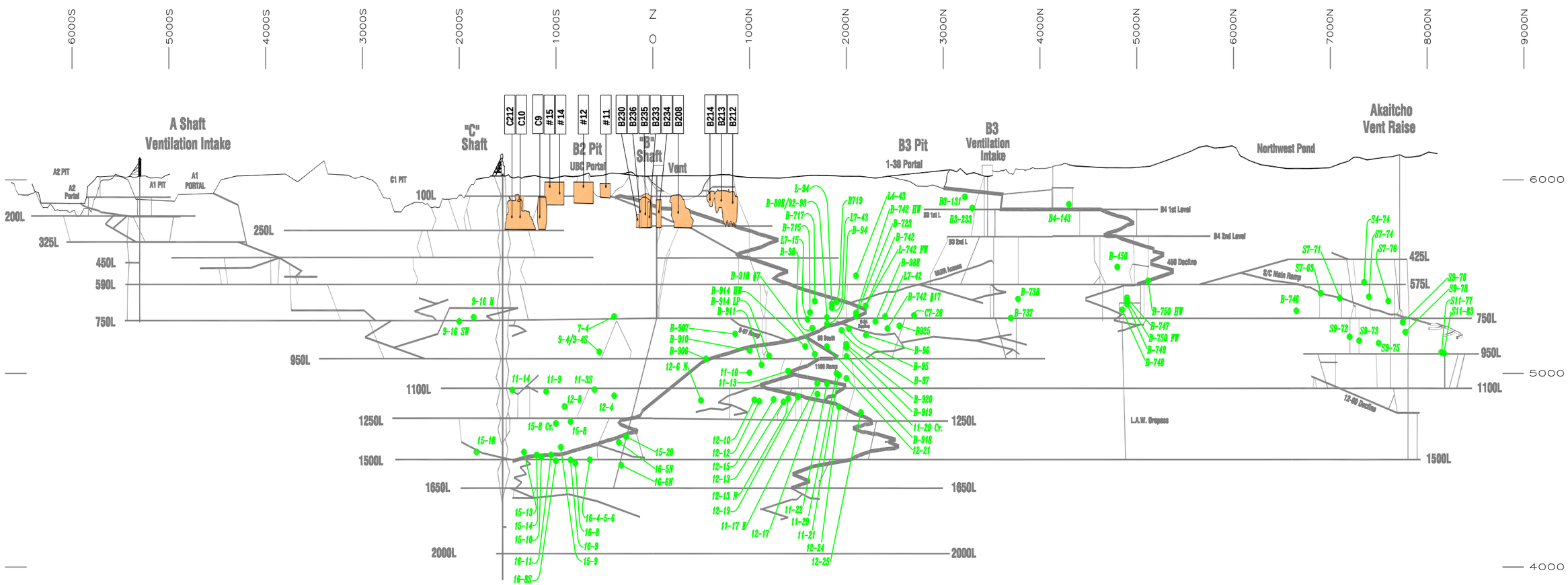
TABLE 3
Summary of Tailings Backfill Records

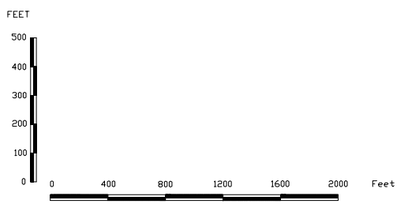
Year	Ore Production Rate (tpd)	Ore Production Rate (tpy)	Annual Rep. Actual Ore Broken	DIAND Records	Backfill Poured	Backfill as % Total Ore	Comments
1954	700	255500	218,140	275,985	0	0	
1955	700	255500	254,222	286,742	0	0	
1956	700	255500	270,002	297,582	?	?	
1957	700	255500	270,640	309,673	?	?	
1958	700	255500	309,050	289,220	80,508	26%	First record of backfill production
1959	700	255500	363,438	321,002	118,478	33%	
1960	900	328500	170,605	181,101	65,889	39%	
1961	900	328500	363,282	366,515	123,605	34%	
1962	900	328500	367,294	375,820	143,402	39%	
1963	900	328500	385,636	388,190	155,175	40%	
1964	900	328500	392,710	400,606	*144,220*	37%	Backfill amount not specified
1965	900	328500	361,581	395,001	155,158	43%	
1966	900	328500		386800	152,006	*46%*	
1967	900	328500		331922	*152,006*	*46%*	Backfill amount not specified
1968	900	328500		374717	*152,006*	*46%*	Backfill amount not specified
1969	900	328500		399647	*152,006*	*46%*	Backfill amount not specified
1970	900	328500		424774	*152,006*	*46%*	Backfill amount not specified
1971	900	328500		403819	*152,006*	*46%*	Backfill amount not specified
1972	900	328500		401272	*152,006*	*46%*	Backfill amount not specified
1973	900	328500		389460	133,700	*41%*	
1974	900	328500		328099	99,643	*30%*	
1975	900	328500		391969	80,213	*24%*	
1976	900	328500		428154	*65,505*	*20%*	
1977	900	328500		445672	50,797	*15%*	
1978	900	328500		396656	1,200	*0%*	Last record of backfill production
Total					2,481,535		

Prepared by: KSS

Notes: *Italics* indicates the amount is an estimate

Checked by: DBM





SCALE

NOTE: 2:1 VERTICAL EXAGERATION

LEGEND

15-18 – LOCATION OF TAILINGS BACKFILLED STOPES (approximately the centre of the stope opening)

– LOCATION OF ARSENIC CHAMBERS

NOTE: Data compiled by DIAND Royal Oak Project Team.

SRK Consulting
Engineers and Scientists

Indian and Northern Affairs Canada

Giant Mine

LOCATIONS OF BACKFILLED STOPES

PROJECT NO.	DATE	APPROVED	FIGURE
1CI001.07	July 2002		1

File Ref: Backfill_11X17.dwg