AER/AGS Open File Report 2018-14

Alberta Energy Regulator

Gold Grain, Kimberlite Indicator Mineral, Magmatic Massive Sulphide Indicator Mineral, and Heavy Mineral Analyses from Till Sampling in Northern Alberta (2011, 2012, 2016)

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ALBERTA GEOLOGICAL SURVEY

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Utting, D.J., Pawley, S., Atkinson, N., Pawlowicz, J.G., and Weiss, J.A.

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Summary of sample collection and analyses

Samples were collected from hand-dug pits, auger holes and existing exposures of diamict (till) and sand and gravel (glaciofluvial) in 2011, 2012 and 2017 (Appendix 1). Heavy mineral sample analysis including counts of gold grains (GG), kimberlite indicator minerals (KIM) and magmatic massive sulphide indicator minerals (MMSIM) was performed by Overburden Drilling Management (ODM). Results from these analyses are presented in Appendix 2–11.

Four samples (5336, 5337, 5338, and 5339) were submitted with known amounts of indicator minerals (aka “spikes”) to ensure laboratory quality control (QC). The original material for the spiked samples was derived from Brownvale till collected by AGS geologists from an exposure where no previous KIM results were identified. All of the garnet, olivine (forsterite) and chromite grains used for the spikes originated from samples picked at ODM, and were collected in 2003 from a stream in the southeastern Buffalo Head Hills within an area of known kimberlites (‘K4’ stream).

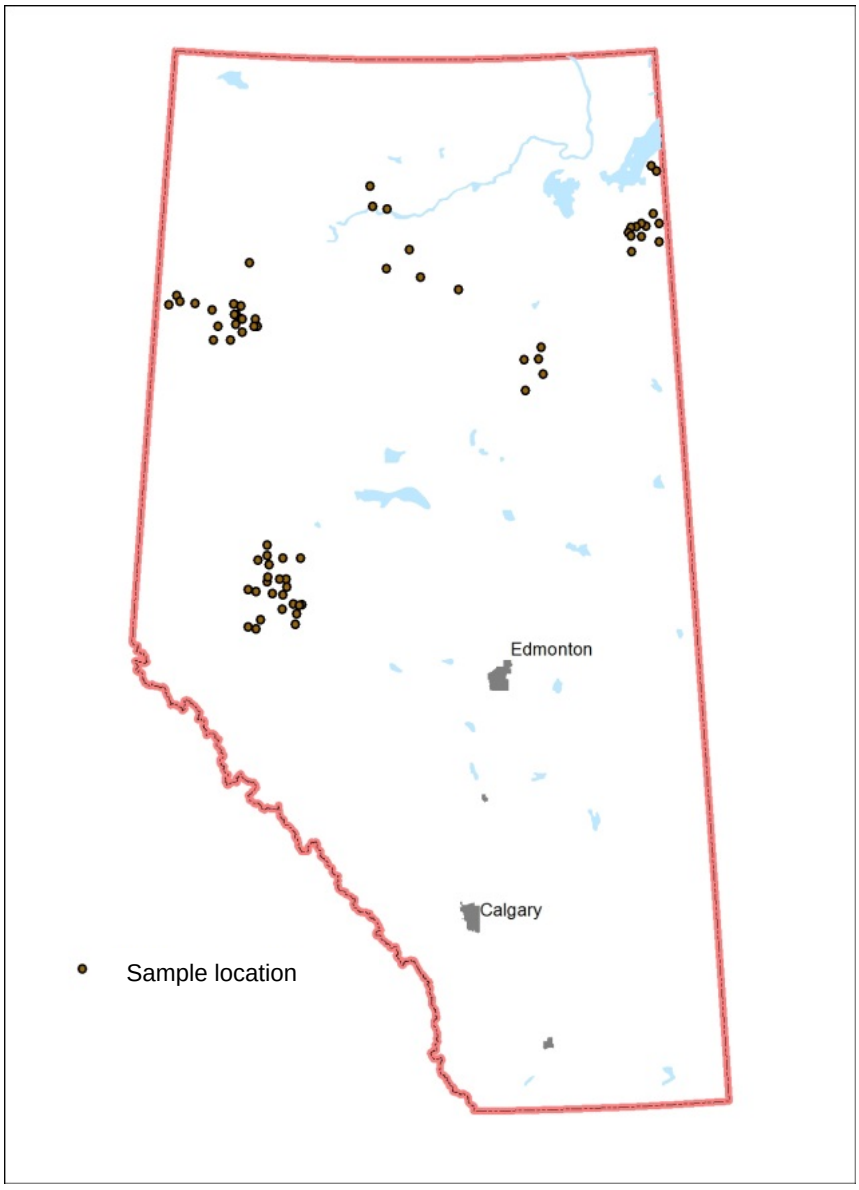

Figure 1: Location of samples. See Appendix 1 for sample site information.

Figure 2: Example of a sample site. This sample, DU16-234, contained 20 gold grains. The diamict at this locality was oxidized and contained a relatively low fine-grained component.

Summary of results

The highest number of gold grains was identified in sample DU16-234 (Figure 2) from northeast Alberta (Figure 3). These 20 grains were reshaped, suggesting they were transported and modified from their source. Comparatively, sample DU16-221 contained 8 grains, two of which were pristine, suggesting a more proximal source of the grains.

Low to null values were identified in all the KIM samples, except those that were intentionally spiked (5336, 5337, 5338, and 5339).

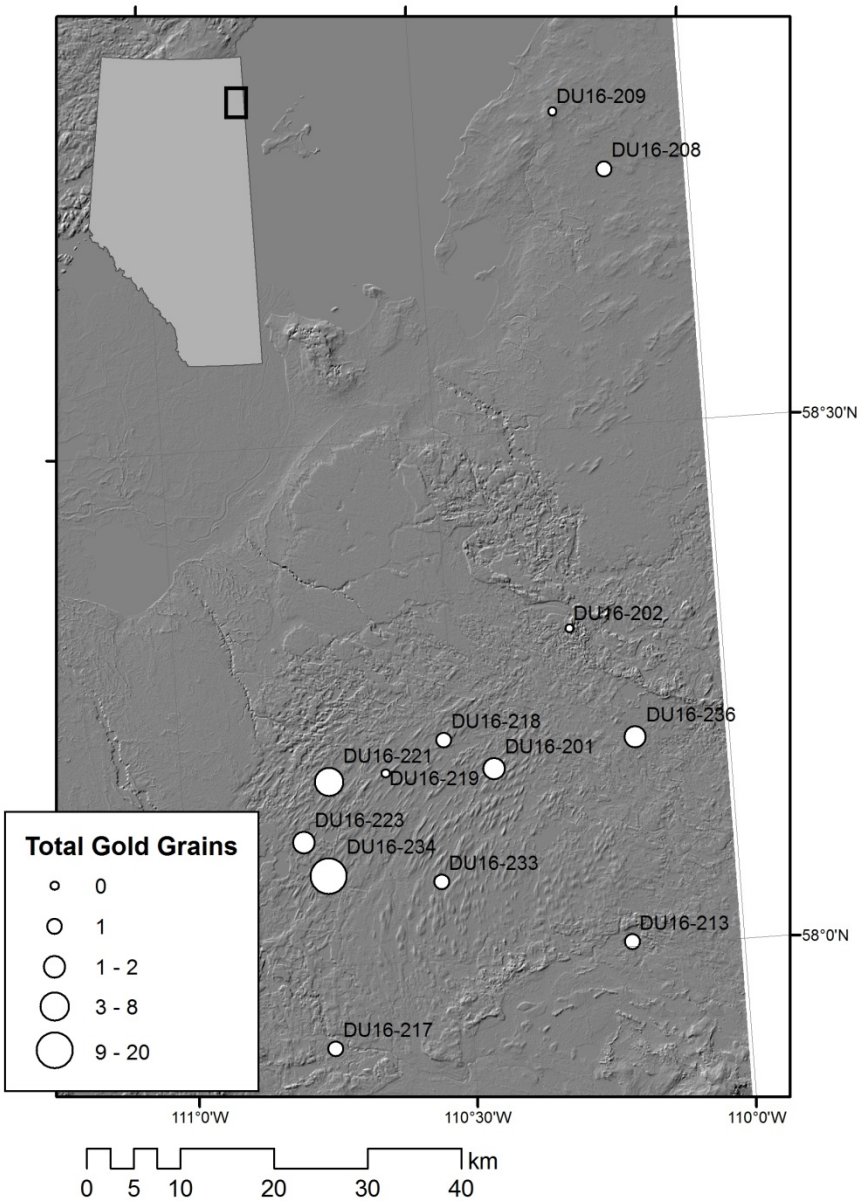

Figure 3: Total gold grain counts for northeast Alberta where two samples contained the highest values (DU16-243: twenty reshaped grains, and DU16-221: two pristine grains and six reshaped grains).

Appendix 1 – Sample Site Information

Sample Number	Latitude	Longitude	Year	Travel method	Source	Lithology	Genesis	Matrix texture	Color	HCl Reaction	Sample depth top (m)	Sample depth bottom (m)	Oxidation	Site Description
DU16-201	58.179579	-110.431324	2017	Helicopter	Soil pit	Diamict	Till	Sand	Light orange	None	0	1	Slight	Dug pit on top of ridge. Numerous Athabasca sandstone boulders
DU16-202	58.308616	-110.276685	2017	Helicopter	Soil pit	Sand & gravel	Uncertain	Sand	Light orange	None	0	1	Slight	Landed at keane fire tower, abandoned
DU16-208	58.745871	-110.153541	2017	Helicopter	Soil pit	Sand	Uncertain	Sand	Light grey	None	0	1	Slight	Glade, pine trees, large 2 m + erratics of Athabasca sandstaone
DU16-209	58.804122	-110.241148	2017	Helicopter	Soil pit	Sand & gravel	Uncertain	Sand	Orangey	None	0	1	Slight	Soil pit in an area of de geer moraines, sampled in between these
DU16-213	58.005026	-110.203329	2017	Helicopter	Soil pit	Sand	Glaciofluvial	Sand	Orange and light grey layering	None	0	1	Slight	Archer lake
DU16-217	57.921479	-110.750188	2017	Helicopter	Soil pit	Sand	Glaciofluvial	Sand	Light grey	None	0	1	None	Sandy ridge.
DU16-218	58.21002	-110.519162	2017	Helicopter	Soil pit	Diamict	Till	Sand	Light grey at surface, orangey at depth	None	0	1	Slight	Burn scar on fluting, lots of boulders at surface. All on the ground appear to be Athabasca sandstone .
DU16-219	58.18184	-110.628166	2017	Helicopter	Soil pit	Diamict	Till	Sand	Orange, light grey in soil horizon	None	0	1	Strong	Landed on side of fluting, numerous Athabasca sandstone boulders at surface, many are white
DU16-221	58.177279	-110.731954	2017	Helicopter	Soil pit	Diamict	Till	Sand	Light grey	None	0	1		Walked along quad trail from previous site to where it is stonier
DU16-223	58.121014	-110.784148	2017	Helicopter	Soil pit	Diamict	Till	Sand	Orangey	None	0	1	Slight	Landed on road, near a cabin
DU16-233	58.074466	-110.53977	2017								0	1	Slight	
DU16-234	58.087004	-110.743091	2017	Helicopter	Soil pit	Diamict	Till	Sand	Orangey	None	0	1	Slight	Walked up to flat topped fluting
DU16-236	58.200319	-110.171469	2017	Helicopter	Soil pit	Diamict	Till	Silty sand	Orangey	None	0	0		Walked through new pine forest to side of drumlin, noted erratic boulders at surface
5278	56.6898359	-112.574259	2011	AIR	Augered	Diamict	Till	Sandy silt		Strong	0.6	1	Moderate	
5280	56.8463449	-112.922624	2011	AIR	Soil pit	Diamict	Till	Sandy silt	Dark greyish brown	None	0.6	1.2	Slight	
5281	56.9695957	-112.593928	2011	AIR	Soil pit	Diamict	Till	Clayey silt	Pinkish brown	None	0.6	1	Slight	
5282	56.8507798	-112.653803	2011	AIR	Soil pit	Diamict	Till	Sandy silt	Pinkish brown	None	0.7	0.9	Slight	
5283	56.5278952	-112.911975	2011	AIR	Soil pit	Diamict	Till	Sandy silt	Dark greyish brown 10YR 4/2	Strong	0.6	1	Slight	
5284	54.7728933	-117.077548	2011	Land	Auger	Diamict	Till	Sandy silt	Brown		0.7	0.9	Moderate	Augered and dug till pit in forest adjacent to cultivated area. Adjacent fields have lots of piles of rounded quartzite cobbles cleared from surface.
5287	54.8999017	-117.68898	2011	Land	Auger	Diamict	Till	Sandy silt	Dark greyish brown	Moderate	0.8	0.9	Moderate	Site situated on very western edge of a streamlined tract.
5289	54.4099317	-117.850963	2011	Land	Road cut	Diamict	Till	Sandy silt	Dark greyish brown	n/a	1.4	1.5	Moderate	Road cut section - poorly exposed and required considerable time to remove slumped debris.
5292	54.392195	-117.559025	2011	Land	Road cut	Diamict	Till	Clayey silt	Brown		1	1	Moderate	Small road cut on Tory Tower road.
5294	54.5172983	-117.654432	2011	Land	Section	Diamict	Till	Silty clay	Dark grey 2.5Y 4/1	None	4	4	Slight	Sampled near new lease site.
5297	54.3836033	-117.36359	2011	Land		Diamict	Till	Sandy silt	Olive brown		0.7	0.9	Moderate	Dug KIM pit on hill Haut, close to new lease site. Pit was situated beneath fallen tree stump, therefore we were already 30cm beneath ground level.
5298	54.4661417	-117.307747	2011	Land	Section	Diamict	Till	Sandy silt	Olive brown	None	1.2	1.2	Moderate	Section sampled at edge of new access road, not yet completed.
5300	54.016505	-117.824205	2011	Land	Road cut	Diamict	Till	Silty sand		None	2	2	Slight	Good road-cut section immediately before Alberta Environment control gate
5301	54.7631283	-117.395635	2011	Land	Section	Diamict	Till	Sandy silt	Dark brown 10YR3/3	Slight	0	0		On western flank of local N-S oriented upland. Surface incised by small creek along which till is exposed
5302	54.7907767	-117.67291	2011	Land	Burrow pit	Diamict	Till	Sandy silt	Greyish brown	Strong	2.7	3	Slight	Sample taken from an active burrow pit, supplying new road construction.
5303	54.6921783	-117.640475	2011	Land	Auger	Diamict	Till	Sandy silt	Dark greyish brown 2.5Y3/2	None	0.7	1	Slight	On eastern flank of Ante Creek, on slow undulating slope which rises to the east

5304	54.564045	-117.65668	2011	Land	Auger	Diamict	Till	Clayey silt	Dark greyish brown 2.5Y3/2	None	0.7	1	Slight	Area of low undulations to west of likely bedrock ridge
5305	54.4233333	-117.9938	2011	Land	Auger	Diamict	Till	Silty sand	Dark greyish brown 2.5Y4/2	None	0.7	1	Slight	On undulating upland surface
5306	54.5459833	-117.319735	2011	Land	Auger	Diamict	Till	Sandy silt	Dark greyish brown 10YR4/2	None	0.8	1.2	Moderate	On local upland surface, within moderately undulating terrain
5307	54.54486	-117.437467	2011	Land	Burrow pit	Diamict	Till	Silty clay	Black 2.5Y2.5/1	Strong	5	5	None	Brand new well site of western flank of small creek
5309	54.2909433	-117.176342	2011	Land	Auger	Diamict	Till	Sandy silt	Olive brown 2.5Y4/3	None	0.7	1.2	Moderate	Low relief, streamlined till plain
5310	54.0773	-117.128088	2011	Land	Auger	Diamict	Till	Sandy silt	Dark greyish brown 2.5Y4/2	Strong	0.8	1.2	Moderate	In clear cut on area of fluted terrain, in which fluting noses suggest a NE ice flow
5313	54.22958	-117.373953	2011	Land	Auger	Diamict	Till	Sandy silt	Olive brown 2.5Y5/4	None	0.7	1.2	Moderate	Fluted till on the northern flank of the Little Smoky River
5314	54.28422	-117.02495	2011	Land	Burrow pit	Diamict	Till	Sandy silt	Dark greyish brown 2.5Y3/2	Moderate	4	4	None	Construction zone in fluted tract. Two tills exposed in pit; an upper oxidized sandy silt till and a lower unoxidized one. Analysis was performed on the unoxidized till
5315	54.036283	-117.96714	2011	Helicopter	Section	Diamict	Till	Sandy silt	Olive brown		1	1	Moderate	Small section at edge of well site
5316	54.73416	-117.83427	2011	Helicopter	Burrow pit	Diamict	Till	Sandy silt	Olive brown 2.5Y 4/4		2	2	Slight	Sampled the edge of a large, water filled burrow pit.
5318	54.1177967	-117.747842	2011	Land	Road cut	Diamict	Till	Silty sand	Yellowish brown 10YR 5/6	None	1	1	Moderate	
5320	54.2806733	-117.069487	2011	Land	Burrow pit	Diamict	Till	Clayey silt	Olive brown 2.5Y 4/3	None	0.7	0.9	Slight	Dug till pit beneath up-rooted tree next to a relatively new lease site. Local terrain is finely fluted.
5324	54.19015	-117.11741	2011	Land	Burrow pit	Diamict	Till	Silty sand	Olive brown 2.5Y 4/3	None	1.1	1.3	Moderate	Dug soil pit on top of small but very pronounced drumlin.
12553	57.8357125	-118.248709	2012	Land	Burrow pit	Diamict	Till	Sandy silt	Dark greyish brown	None	0.7	0.85	Moderate	Dug soil pit
12558	57.184585	-118.448882	2012	Land	Road cut	Diamict	Till	Sandy silt	Brown		1	1	Moderate	Hilltop site. Had to cut down tree to reach the top of the road
12560	57.2505483	-118.362968	2012	Land	Burrow pit	Diamict	Till	Sandy silt	Brown		1	1	Moderate	Area of crevasse-fill ridges exposed in a cutblock
12563	57.2516533	-118.082363	2012	Land	Auger	Diamict	Till	Sandy silt	Dark greyish brown		0.8	1.2	Moderate	Augered in stand of poplar trees with very minor white spruce.
12565	57.39979	-118.511467	2012	Land	Burrow pit	Diamict	Till	Sandy silt	Dark greyish brown		1.5	1.5	Slight	Collected sample from section along the wall of an old sump. Clearly the sediment was in situ as there was a well developed soil on top.
12569	57.2888967	-118.4524	2012	Land	Burrow pit	Diamict	Till	Clayey silt	Dark grey	None	4	4	None	Examined large burrow pit, dug to about 6 metres.
12571	57.4525	-119.629527	2012	Land	Road cut	Diamict	Till	Clayey silt	Brownish grey 5Y 3/2	None	1.7	1.7	Slight	Road cut close to Ring Border
12573	57.3928783	-119.557707	2012	Land	Road cut	Diamict	Till	Sandy clay	Dark greyish brown	None	2	2	Moderate	At least 2m of till present across top of flute. Walked further up slope to check and more till present, no bedrock exposed.
12576	57.3255283	-118.925378	2012	Land	Road cut	Diamict	Till	Sandy silt	Dark greyish brown		2	2	Moderate	Good road cut on western edge of upland.
12603	57.1081133	-118.325808	2012	Land	Road cut	Diamict	Till	Clayey silt	Dark greyish brown		1.6	1.7		Road cut till geochem and KIM samples
12605	57.1796667	-118.03552	2012	Land	Road cut	Diamict	Till	Clayey silt	Olive brown		1.4	1.6	None	Road cut.
12607	57.1737288	-118.093976	2012	Land	Section	Diamict	Till	Clayey silt	Dark grey		1.2	1.5	None	Till section along stream, about 3m high.
12609	57.2477771	-118.339064	2012	Land	Auger	Diamict	Till	Clayey silt	Greyish brown		1	1.2		Pit sample next to junction in road, where we got locked out of our truck.
12611	57.2922933	-118.48957	2012	Land	Road cut	Diamict	Till	Clayey silt	Bluish grey		1.8	2	Slight	Road cut near overhead powerlines
12616	57.3500394	-119.759254	2012	Land	Section	Diamict	Till	Silty clay	Dark grey		1	1.2	None	Exposure 30-40 m long by Chin Inn
12621	57.3800917	-119.257698	2012	Land	Probe	Diamict	Till	Clayey silt	Olive brown		1.2	1.6		Upper 20 cm of grey clayey silt without clasts, potentially lacus-trine.
12641	57.020975	-118.534102	2012	Helicopter	Section	Diamict	Till	Sandy silt	Dark grey	None	1.8	2	None	2m high section at edge of well site. White spruce present on upslope side of lease, black spruce tall form present on downslope side passing into a swamp
12642	57.15887	-118.786993	2012	Helicopter	Section	Diamict	Till				0	0		Section on relatively new road. Contains sandstone, overlain by gravel and till with deformation structures including open folds and irregular mixtures of gravel into the till.
12643	57.0107219	-118.866596	2012	Helicopter	Section	Diamict	Till	Sandy silt	Dark grey	None	10	10	None	Examined c. 10 m high section on northern river bank.
5341	57.3847467	-118.376473	2012	Land	Auger	Sandstone	Bedrock	n/a		n/a	0.8	1	Moderate	Strongly fluted upland surface
5336	n/a	n/a	2011								0	0		Brownvale Till with Spike I

5337	n/a	n/a	2011								0	0		Brownvale Till with Spike J
5338	n/a	n/a	2011								0	0		Brownvale Till with Spike K
5339	n/a	n/a	2011								0	0		Brownvale Till with Spike L
7551	58.6800331	-115.9100045	2017				Till							grey till, 5m from top of section
7556	58.4394529	-115.5582004	2017				Till							pink till
7557	58.4633180	-115.8525935	2017				Till							grey till, 18-20m, high percent of local bedrock clasts
7558	58.0124886	-115.1166125	2017				Till							very strong HCL rx, till from just above boulder pavement, sampled approximately 2m from top
7563	57.7293515	-114.8912070	2017				Till							from 2m above river, dark unoxidized till
7567	57.5943188	-114.1530516	2017				Till							0-5m till
7568	57.8186964	-115.5681340	2017				Till							4-5m till, no carbonate clasts.

Appendix 2 – Gold Grain Summary

Sample Number	Year	*Number of Visible Gold Grains*				Nonmag HMC Weight (g)*	*Calculated PPB Visible Gold in HMC*			
		Total	Reshaped	Modified	Pristine		Total	Reshaped	Modified	Pristine
DU16-201	2017	2	2	0	0	60.0	6	6	0	0
DU16-202	2017	0	0	0	0	56.0	0	0	0	0
DU16-208	2017	1	1	0	0	62.4	30	30	0	0
DU16-209	2017	0	0	0	0	40.0	0	0	0	0
DU16-213	2017	1	1	0	0	87.2	4	4	0	0
DU16-217	2017	1	1	0	0	127.2	3	3	0	0
DU16-218	2017	1	1	0	0	46.0	<1	<1	0	0
DU16-219	2017	0	0	0	0	48.0	0	0	0	0
DU16-221	2017	8	6	2	0	45.6	152	136	16	0
DU16-223	2017	2	2	0	0	50.8	2	2	0	0
DU16-233	2017	1	1	0	0	78.4	7	7	0	0
DU16-234	2017	20	20	0	0	46.8	217	217	0	0
DU16-236	2017	2	1	1	0	70.8	8	8	<1	0
5278	2011	1	1	0	0	100.4	<1	<1	0	0
5280	2011	0	0	0	0	123.2	0	0	0	0
5281	2011	0	0	0	0	85.6	0	0	0	0
5282	2011	0	0	0	0	96.4	0	0	0	0
5283	2011	0	0	0	0	101.2	0	0	0	0
5284	2011	0	0	0	0	78.8	0	0	0	0
5287	2011	1	1	0	0	91.2	16	16	0	0
5289	2011	0	0	0	0	93.2	0	0	0	0
5292	2011	1	1	0	0	100.8	6	6	0	0
5294	2011	1	1	0	0	91.2	42	42	0	0
5297	2011	3	3	0	0	108.0	13	13	0	0
5298	2011	1	1	0	0	100.8	10	10	0	0
5300	2011	3	3	0	0	106.0	15	15	0	0
5301	2011	1	1	0	0	107.2	3	3	0	0
5302	2011	1	1	0	0	121.6	<1	<1	0	0
5303	2011	1	1	0	0	107.2	3	3	0	0
5304	2011	3	3	0	0	110.8	15	15	0	0
5305	2011	0	0	0	0	97.2	0	0	0	0
5306	2011	1	1	0	0	120.8	12	12	0	0
5307	2011	3	3	0	0	141.2	3	3	0	0
5309	2011	5	5	0	0	91.6	53	53	0	0
5310	2011	2	2	0	0	118.8	4	4	0	0
5313	2011	6	6	0	0	103.6	16	16	0	0
5314	2011	4	4	0	0	136.0	12	12	0	0
5315	2011	6	6	0	0	120.0	5	5	0	0
5316	2011	1	1	0	0	95.2	1	1	0	0
5318	2011	9	8	1	0	99.6	37	36	1	0
5320	2011	1	1	0	0	132.4	1	1	0	0
5324	2011	0	0	0	0	156.0	0	0	0	0
5336	2011	0	0	0	0	78.4	0	0	0	0
5337	2011	1	0	1	0	124.4	<1	0	<1	0
5338	2011	0	0	0	0	124.8	0	0	0	0
5339	2011	0	0	0	0	129.6	0	0	0	0
12553	2012	0	0	0	0	41.6	0	0	0	0
12558	2012	0	0	0	0	54.4	0	0	0	0
12560	2012	0	0	0	0	60.8	0	0	0	0
12563	2012	0	0	0	0	47.2	0	0	0	0
12565	2012	0	0	0	0	44.4	0	0	0	0
12569	2012	0	0	0	0	50.8	0	0	0	0
12571	2012	0	0	0	0	55.2	0	0	0	0
12573	2012	0	0	0	0	51.6	0	0	0	0
12576	2012	1	1	0	0	50.8	20	20	0	0
12603	2012	0	0	0	0	52.0	0	0	0	0
12605	2012	0	0	0	0	45.6	0	0	0	0
12607	2012	0	0	0	0	47.6	0	0	0	0
12609	2012	0	0	0	0	56.4	0	0	0	0
12611	2012	0	0	0	0	53.2	0	0	0	0
12616	2012	0	0	0	0	53.6	0	0	0	0
12621	2012	0	0	0	0	42.8	0	0	0	0
12641	2012	0	0	0	0	50.0	0	0	0	0
12642	2012	0	0	0	0	52.0	0	0	0	0
12643	2012	0	0	0	0	53.6	0	0	0	0
7551	2017	0	0	0	0	75.2	0	0	0	0
7556	2017	1	1	0	0	79.6	<1	<1	0	0
7557	2017	1	1	0	0	100.8	<1	<1	0	0
7558	2017	0	0	0	0	76.8	0	0	0	0
7563	2017	0	0	0	0	81.2	0	0	0	0
7567	2017	2	2	0	0	90.8	2	2	0	0
7568	2017	0	0	0	0	48.4	0	0	0	0

* Calculated PPB Au based on assumed nonmagnetic HMC weight equivalent to 1/250th of the table feed.

Appendix 3 – Gold Grain Detailed

Sample Number	Dimensions (µm)				Number of Visible Gold Grains				Nonmag HMC Weight* (g)	Calculated V.G. Assay in HMC (ppb)	Metallic Minerals in Pan Concentrate
	Thickness		Width	Length	Reshaped	Modified	Pristine	Total			
DU16-201	5	C	25	25	1			1		<1	~100 grains pyrite (25-75µm).
	13	C	50	75	1			1		6	
								2	60.0	6	
DU16-202	No visible gold										~50 grains pyrite (25-150µm).
DU16-208	22	C	75	150	1			1		30	~30 grains pyrite (25-250µm).
								1	62.4	30	
DU16-209	No visible gold										~10 grains pyrite (25-100µm).
DU16-213	13	C	50	75	1			1		4	~20 grains pyrite (25-100µm).
								1	87.2	4	
DU16-217	13	C	50	75	1			1		3	~10 grains pyrite (25-75µm).
								1	127.2	3	
DU16-218	3	C	15	15	1			1		<1	~10 grains pyrite (25-100µm).
								1	46.0	0	
DU16-219	No visible gold										No sulphides.
DU16-221	10	C	50	50	1			1		4	No sulphides.
	13	C	50	75	1		2	3		24	
	15	C	75	75	1			1		14	
	18	C	75	100	2			2		43	
	27	C	75	200	1			1		67	
								8	45.6	152	
DU16-223	5	C	25	25	1			1		<1	No sulphides.
	8	C	25	50	1			1		1	
								2	50.8	2	
DU16-233	15	C	50	100	1			1		7	No sulphides.
								1	78.4	7	
DU16-234	5	C	25	25	3			3		2	~10 grains pyrite (25-75µm).
	8	C	25	50	4			4		6	
	10	C	50	50	2			2		8	
	13	C	50	75	5			5		38	
	15	C	50	100	1			1		12	
	15	C	75	75	2			2		27	
	18	C	75	100	2			2		42	
	27	C	125	150	1			1		81	
								20	46.8	217	
DU16-236	5	C	25	25		1		1		<1	No sulphides.
	15	C	50	100	1			1		8	
								2	70.8	8	
5278	5	C	25	25		1		1			
								1	100.4	<1	
5280	No visible gold										
5281	No visible gold										
5282	No visible gold										
5283	No visible gold										
5284	No visible gold										
5287	20	C	100	100		1		1			
								1	91.2	16	
5289	No visible gold										
5292	15	C	75	75		1		1			
								1	100.8	6	
5294	27	C	100	175		1		1			
								1	91.2	42	

5297	5	C	25	25	1		1		
	13	C	50	75	1		1		
	18	C	75	100	1		1		
							3	108.0	13
5298	18	C	75	100	1		1		
							1	100.8	10
5300	5	C	25	25	1		1		
	8	C	25	50	1		1		
	20	C	100	100	1		1		
							3	106.0	15
5301	13	C	50	75	1		1		
							1	107.2	3
5302	5	C	25	25	1		1		
							1	121.6	<1
5303	13	C	50	75	1		1		
							1	107.2	3
5304	5	C	25	25	1		1		
	15	C	50	100	1		1		
	18	C	75	100	1		1		
							3	110.8	15
5305	No visible gold								
5306	20	C	75	125	1		1		
							1	120.8	12
5307	5	C	25	25	1		1		
	8	C	25	50	1		1		
	13	C	50	75	1		1		
							3	141.2	3
5309	8	C	25	50	1		1		
	10	C	50	50	1		1		
	15	C	75	75	1		1		
	18	C	75	100	1		1		
	25	C	125	125	1		1		
							5	91.6	53
5310	8	C	25	50	1		1		
	13	C	50	75	1		1		
							2	118.8	4
5313	3	C	15	15	1		1		
	5	C	25	25	2		2		
	10	C	50	50	1		1		
	13	C	50	75	1		1		
	18	C	75	100	1		1		
							6	103.6	16
5314	5	C	25	25	1		1		
	10	C	50	50	1		1		
	13	C	50	75	1		1		
	18	C	75	100	1		1		
							4	136.0	12
5315	5	C	25	25	2		2		
	8	C	25	50	2		2		
	10	C	25	75	1		1		
	10	C	50	50	1		1		
							6	120.0	5
5316	8	C	25	50	1		1		
							1	95.2	1
5318	3	C	15	15	1		1		
	5	C	25	25	2		2		
	8	C	25	50	3	1	4		
	13	C	50	75	1		1		
	25	C	75	175	1		1		
							9	99.6	37
5320	8	C	25	50	1		1		
							1	132.4	1
5324	No visible gold								
5336	No visible gold								
5337	5	C	25	25		1	1		
							1	124.4	<1
5338	No visible gold								

5339	No visible gold										
12553	No visible gold										SEM check 1 of ~200 loellingite versus tungsten carbide candidates = 1 loellingite (25-50µm).
12558	No visible gold										No sulphides.
12560	No visible gold										No sulphides.
12563	No visible gold										No sulphides.
12565	No visible gold										No sulphides.
12569	No visible gold										No sulphides.
12571	No visible gold										No sulphides.
12573	No visible gold										No sulphides.
12576	18	C	75	100	1		1				SEM check: 2 sperrylite versus pyrite candidates = 2 pyrite (50µm).
							1	50.8	20		
12603	No visible gold										No sulphides.
12605	No visible gold										No sulphides.
12607	No visible gold										No sulphides.
12609	No visible gold										No sulphides.
12611	No visible gold										No sulphides.
12616	No visible gold										No sulphides.
12621	No visible gold										No sulphides.
12641	No visible gold										No sulphides.
12642	No visible gold										No sulphides.
12643	No visible gold										~200 grains pyrite (25-125µm). ~6000 grains marcasite (15-75µm).
7551	No visible gold										2 grains arsenopyrite (250-500µm). ~1000 grains pyrite (25-1000µm). 1% marcasite (25-500µm).
7556	5	C	25	25	1		1		<1		2 grains scheelite (100-250µm).
							1	79.6	0		~50 grains pyrite (25-50µm). Gold grain vialed.
7557	5	C	25	25	1		1		<1		~2000 grains pyrite (25-150µm).
							1	100.8	0		~2000 grains marcasite (25-50µm). Gold grain vialed.
7558	No visible gold										~20 grains pyrite (25µm). SEM checks: 3 of 8 arsenopyrite candidates = 3 NiCo-loellingite (25-50µm).
7563	No visible gold										~2000 grains pyrite (25-100µm). ~1000 grains marcasite (25-50µm).
7567	3	C	15	15	1		1		<1		~100 grains pyrite (25-50µm).
	10	C	25	75	1		1		2		Gold grains vialed.
							2	90.8	2		
7568	No visible gold										~50 grains pyrite (25-50µm).

Appendix 4 - Weights

Sample Number	Weight (kg wet)					Screening and Shaking Table Sample Descriptions												
						Clasts (+2.0 mm)					Matrix (-2.0 mm)							
						Size	Percentage				Distribution					Colour		Class
	Bulk Rec'd	Archived Split	Table Split	+2.0 mm Clasts	Table Feed		V/S	GR	LS	OT*	S/U	SD	ST	CY	ORG	SD	CY	
DU16-201	28.1	0.3	27.8	12.8	15.0	P	Tr	Tr	0	100	U	+	-	N	N	LOC	NA	TILL
DU16-202	16.5	0.3	16.2	2.2	14.0	P	Tr	Tr	0	100	S	MC	-	N	N	LOC	NA	SAND + GRAVEL
DU16-208	16.1	0.3	15.8	0.2	15.6	P	Tr	Tr	0	100	S	FM	-	N	N	PB	NA	SAND
DU16-209	19.6	0.3	19.3	9.3	10.0	P	Tr	Tr	0	100	S	MC	-	N	N	LOC	NA	SAND + GRAVEL
DU16-213	22.7	0.3	22.4	0.6	21.8	P	Tr	Tr	0	100	S	MC	-	N	N	LOC	NA	SAND
DU16-217	32.1	0.3	31.8	0.0	31.8	No Clasts					S	FM	N	N	N	BE	NA	SAND
DU16-218	16.2	0.3	15.9	4.4	11.5	P	Tr	Tr	0	100	U	+	-	N	N	OC	NA	TILL
DU16-219	17.8	0.3	17.5	5.5	12.0	P	Tr	Tr	0	100	U	+	Y	-	N	OC	OC	TILL
DU16-221	22.8	0.3	22.5	11.1	11.4	P	Tr	Tr	0	100	S	MC	-	N	N	PB	NA	SAND + GRAVEL
DU16-223	17.9	0.3	17.6	4.9	12.7	P	Tr	Tr	0	100	S	MC	-	N	N	OC	NA	SAND + GRAVEL
DU16-233	29.2	0.3	28.9	9.3	19.6	P	Tr	Tr	0	100	U	+	Y	-	N	OC	OC	TILL
DU16-234	16.8	0.3	16.5	4.8	11.7	P	Tr	Tr	0	100	S	MC	-	N	N	OC	NA	SAND + GRAVEL
DU16-236	22.0	0.3	21.7	4.0	17.7	P	Tr	Tr	0	100	U	+	Y	-	N	OC	OC	TILL
5278	26.1		25.6	0.5	25.1	P	10	30	30	30	U	-	Y	+	N	LOC	LOC	TILL
5280	32.3		31.8	1.0	30.8	P	10	30	30	30	U	-	Y	+	N	LOC	LOC	TILL
5281	22.4		21.9	0.5	21.4	P	10	50	Tr	40	U	-	Y	+	N	LOC	LOC	TILL
5282	26.2		25.7	1.6	24.1	P	20	50	Tr	30	U	-	Y	+	N	LOC	LOC	TILL
5283	26.2		25.7	0.4	25.3	P	10	50	Tr	40	U	-	Y	+	N	OC	OC	TILL
5284	21.3		20.8	1.1	19.7	P	10	60	Tr	30	U	-	Y	+	N	LOC	LOC	TILL
5287	23.9		23.4	0.6	22.8	P	Tr	60	20	20	U	-	Y	+	N	OC	OC	TILL
5289	24.3		23.8	0.5	23.3	P	80	20	0	Tr	U	-	Y	+	N	OC	OC	TILL
5292	25.9		25.4	0.2	25.2	P	20	40	Tr	40	U	-	Y	+	N	OC	OC	TILL
5294	24.0		23.5	0.7	22.8	P	10	40	10	40	U	-	Y	+	N	LOC	LOC	TILL
5297	28.0		27.5	0.5	27.0	P	5	40	0	55	U	-	Y	+	N	OC	OC	TILL
5298	25.9		25.4	0.2	25.2	P	70	20	0	10	U	Y	Y	+	N	OC	OC	TILL
5300	31.1		30.6	4.1	26.5	P	45	5	0	50	U	Y	Y	Y	N	OC	OC	TILL
5301	27.7		27.2	0.4	26.8	P	20	40	0	40	U	-	Y	+	N	LOC	LOC	TILL
5302	31.8		31.3	0.9	30.4	P	5	40	15	40	U	-	Y	+	N	OC	OC	TILL
5303	27.9		27.4	0.6	26.8	P	10	50	0	40	U	-	Y	+	N	LOC	LOC	TILL
5304	28.5		28.0	0.3	27.7	P	5	50	0	45	U	-	-	+	N	OC	OC	TILL
5305	25.6		25.1	0.8	24.3	P	Tr	20	0	80	U	-	Y	+	N	OC	OC	TILL
5306	30.8		30.3	0.1	30.2	P	5	30	0	20	U	-	Y	+	N	OC	OC	TILL
5307	36.7		36.2	0.9	35.3	P	25	30	5	40	U	-	Y	+	N	GB	GB	TILL
5309	24.2		23.7	0.8	22.9	C	Tr	Tr	0	100	U	-	Y	+	N	OC	OC	TILL
5310	31.0		30.5	0.8	29.7	P	5	5	0	90	U	-	Y	+	N	OC	OC	TILL
5313	28.4		27.9	2.0	25.9	P	0	10	0	90	U	-	Y	+	N	OC	OC	TILL
5314	36.4		35.9	1.9	34.0	C	Tr	Tr	0	100	U	-	Y	+	N	GB	GB	TILL
5315	34.9		34.4	4.4	30.0	C	30	10	0	60	U	-	Y	+	N	OC	OC	TILL
5316	25.0		24.5	0.7	23.8	P	Tr	40	10	50	U	-	Y	+	N	OC	OC	TILL
5318	27.4		26.9	2.0	24.9	C	Tr	Tr	0	100	U	Y	Y	Y	N	OC	OC	TILL
5320	33.7		33.2	0.1	33.1	G	0	5	0	95	U	-	+	+	N	OC	OC	SILT + CLAY
5324	39.7		39.2	0.2	39.0	P	5	20	10	65	U	-	Y	+	N	OC	OC	TILL
5336	21.2		20.7	1.1	19.6	P	10	20	0	70	U	-	Y	+	N	OC	OC	TILL
5337	33.3		32.8	1.7	31.1	C	5	15	Tr	80	U	-	Y	+	N	OC	OC	TILL
5338	33.4		32.9	1.7	31.2	P	10	20	Tr	70	U	-	Y	+	N	OC	OC	TILL
5339	34.6		34.1	1.7	32.4	P	5	20	Tr	75	U	-	Y	+	N	OC	OC	TILL
12553	11.2		10.7	0.3	10.4	P	20	60	0	20	U	-	-	+	N	OC	OC	CLAY TILL
12558	14.2		13.7	0.1	13.6	P	5	10	0	85	U	-	-	+	N	OC	OC	CLAY TILL
12560	16.1		15.6	0.4	15.2	C	50	10	0	40	U	-	-	+	N	OC	OC	CLAY TILL
12563	12.4		11.9	0.1	11.8	P	60	10	20	10	U	-	-	+	N	OC	OC	CLAY TILL
12565	11.8		11.3	0.2	11.1	P	45	45	Tr	10	U	-	-	+	N	OC	OC	CLAY TILL
12569	13.5		13.0	0.3	12.7	P	30	20	15	35	U	-	-	+	N	OC	OC	CLAY TILL
12571	14.5		14.0	0.2	13.8	G	Tr	100	0	0	U	-	-	+	N	OC	OC	SHALE RUBBLE + TILL
12573	13.8		13.3	0.4	12.9	P	70	10	0	20	U	-	-	+	N	OC	OC	CLAY TILL
12576	13.4		12.9	0.2	12.7	P	50	10	0	40	U	-	-	+	N	OC	OC	CLAY TILL
12603	13.6		13.1	0.1	13.0	P	60	10	0	30	U	-	-	+	N	OC	OC	CLAY TILL
12605	12.2		11.7	0.3	11.4	P	30	30	10	30	U	-	-	+	N	OC	OC	CLAY TILL
12607	12.7		12.2	0.3	11.9	P	20	50	10	20	U	-	-	+	N	OC	OC	CLAY TILL
12609	14.7		14.2	0.1	14.1	P	50	20	0	30	U	-	-	+	N	OC	OC	CLAY TILL
12611	14.0		13.5	0.2	13.3	P	30	30	10	30	U	-	-	+	N	OC	OC	CLAY TILL
12616	14.1		13.6	0.2	13.4	P	60	20	Tr	20	U	-	-	+	N	OC	OC	CLAY TILL
12621	11.5		11.0	0.3	10.7	P	30	30	10	30	U	-	-	+	N	OC	OC	CLAY TILL
12641	13.0		12.5	<0.1	12.5	P	20	30	20	30	U	-	-	+	N	DOC	DOC	CLAY TILL
12642	14.1		13.6	0.6	13.0	P	10	40	40	10	U	-	-	+	N	DOC	DOC	CLAY TILL
12643	14.2		13.7	0.3	13.4	P	10	40	40	10	U	-	-	+	N	DOC	DOC	CLAY TILL
7551	20.0	0.3	19.7	0.9	18.8	P	20	30	5	45	U	Y	Y	Y	N	OC	OC	TILL
7556	21.5	0.3	21.2	1.3	19.9	P	20	20	20	40	U	Y	+	-	N	OC	OC	TILL
7557	26.3	0.3	26.0	0.8	25.2	P	10	20	25	45	U	Y	Y	Y	N	OC	OC	TILL
7558	20.9	0.3	20.6	1.4	19.2	P	10	30	30	30	U	Y	Y	Y	N	OC	OC	TILL
7563	21.1	0.3	20.8	0.5	20.3	P	20	30	10	40	U	Y	Y	Y	N	OC	OC	TILL
7567	23.9	0.3	23.6	0.9	22.7	P	15	30	15	40	U	Y	Y	Y	N	OC	OC	TILL
7568	12.7	0.3	12.4	0.3	12.1	P	20	30	10	40	U	Y	Y	Y	N	OC	OC	TILL

*Clasts listed as "OT" are buff to red Sandstone.

Appendix 5 - Magmatic Massive Sulphide Indicator Minerals

Sample Number	0.25 to 0.5 mm Nonferromagnetic Heavy Mineral Fraction																	Remarks	Picked Grains		
	Sulphide/Arsenide + Related Minerals				Mg/Mn/Al/Cr Minerals											Phosphates					
	>1.0 amp			<1.0 amp	>1.0 amp							<1.0 amp				>1.0 amp					
	% Cpy	Misc. Prime MMSIMs	% Py	% Gth	# Grains + Colour Spinel	Misc. Prime MMSIMs*	% Red Rutile	% Ky	% Sil	% Tm	% St	% Sps	Olivine % Fo*	Olivine % Fay	% Opx	% Cr*	% Ap	% Mz			INPUT ASSEMBLAGE	INPUT REMARKS
DU16-201	0	0	Tr (10 gr)	Tr	2 blue	0	Tr (10 gr)	Tr	70	Tr	Tr	0	0	0	Tr	0	5	1	Almandine-ilmenite/sillimanite-diopside-epidote assemblage.	0.25-0.5 mm fraction: 2 spinel 10 red rutile	Almandine-ilmenite/sillimanite-diopside-epidote	
DU16-202	0	0	0	Tr	0	0	Tr (2 gr)	Tr	80	1	Tr	0	0	0	Tr	0	5	2	Almandine/sillimanite assemblage.	0.25-0.5 mm fraction: 2 red rutile	Almandine/sillimanite	
DU16-208	0	0	0.5 (1 gr)	Tr	0	0	0	0.5	50	Tr	Tr	0	0	0	Tr	0	1	2	Almandine/sillimanite-epidote-diopside assemblage.		Almandine/sillimanite-epidote-diopside	
DU16-209	0	0	0	Tr	1 blue	0	Tr (3 gr)	Tr	30	Tr	0	0	0	0	Tr	0	2	0	Almandine-hornblende/epidote-sillimanite-diopside assemblage.	0.25-0.5 mm fraction: 1 spinel 3 red rutile	Almandine-hornblende/epidote-sillimanite-diopside	
DU16-213	0	0	Tr (1 gr)	15	0	Tr low-Cr diopside (1 gr)	Tr (3 gr)	1	80	1	0	0	0	0	Tr	0	1	2	Almandine-goethite/sillimanite assemblage.	0.25-0.5 mm fraction: 1 low-Cr diopside 3 red rutile	Almandine-goethite/sillimanite	
DU16-217	0	0	0	2	7 blue	Tr low-Cr diopside (1 gr)	Tr (10 gr)	Tr	30	Tr	Tr	0	0	0	Tr	0	Tr	Tr	Almandine/epidote-diopside-sillimanite assemblage. SEM checks from 0.25-0.5 mm fraction: 1 sphalerite versus rutile candidate = 1 rutile; and 1 monazite versus florencite candidate = 1 florencite.	0.25-0.5 mm fraction: 1 rutile resembling sphalerite 7 spinel 1 low-Cr diopside 10 red rutile 1 florencite resembling monazite	Almandine/epidote-diopside-sillimanite	SEM checks from 0.25-0.5 mm fraction: 1 sphalerite versus rutile candidate = 1 rutile; and 1 monazite versus florencite candidate = 1 florencite.
DU16-218	0	0	Tr (2 gr)	Tr	2 blue-grey	0	Tr (2 gr)	1	80	1	Tr	0	0	0	Tr	0	5	1	Almandine/sillimanite assemblage.	0.25-0.5 mm fraction: 2 spinel 2 red rutile	Almandine/sillimanite	
DU16-219	0	0	Tr (1 gr)	1	0	0	Tr (3 gr)	1	60	1	0	0	0	0	Tr	0	Tr	2	Almandine-hornblende/sillimanite-epidote assemblage.	0.25-0.5 mm fraction: 3 red rutile	Almandine-hornblende/sillimanite-epidote	
DU16-221	0	0	Tr (3 gr)	2	1 blue-green Zn-hercynite; 4 blue-grey, grey spinel	0	Tr (11 gr)	Tr	60	Tr	Tr	0	0	0	Tr	0	2	1	Almandine/sillimanite-epidote-diopside assemblage. SEM check from 0.25-0.5 mm fraction: 1 blue-green gahnite versus spinel candidate = 1 Zn-hercynite.	0.25-0.5 mm fraction: 1 Zn-hercynite 4 spinel 11 red rutile	Almandine/sillimanite-epidote-diopside	SEM check from 0.25-0.5 mm fraction: 1 blue-green gahnite versus spinel candidate = 1 Zn-hercynite.
DU16-223	0	0	0	4	0	0	Tr (1 gr)	Tr	40	Tr	0	0	0	0	Tr	0	Tr	Tr	Almandine-hornblende/sillimanite-epidote-diopside assemblage.	0.25-0.5 mm fraction: 1 red rutile	Almandine-hornblende/sillimanite-epidote-diopside	
DU16-233	0	0	Tr (4 gr)	2	1 blue	0	Tr (3 gr)	Tr	80	Tr	Tr	0	0	0	Tr	0	1	1	Almandine-ilmenite/sillimanite assemblage.	0.25-0.5 mm fraction: 1 spinel 3 red rutile	Almandine-ilmenite/sillimanite	
DU16-234	0	0	Tr (8 gr)	Tr	0	0	Tr (9 gr)	Tr	70	Tr	Tr	0	0	0	Tr	0	Tr	Tr	Almandine/sillimanite assemblage.	0.5-1.0 mm fraction: 1 blue-grey spinel 0.25-0.5 mm fraction: 9 red rutile	Almandine/sillimanite	

DU16-236	0	0	Tr (4 gr)	3	0	0	Tr (1 gr)	Tr	70	Tr	0	0	0	0	Tr	Tr	Tr	Tr	Almandine/sillimanite-epidote-diopside assemblage.	0.25-0.5 mm fraction: 1 red rutile		Almandine/sillimanite-epidote-diopside	
5278	0	0	0		0	0	Tr (3 gr)	70	Tr	0	Tr	0		0	Tr	Tr (1 gr; see KIM data)	Tr	0	Almandine-hornblende-goethite/kyanite- epidote-diopside assemblage.	0.25-0.5 mm fraction: 3 red rutile 1 chromite (picked as KIM)		Almandine-hornblende-goethite/kyanite- epidote-diopside	
5280	0	0	0		0	0	Tr (5 gr)	60	Tr	0	Tr	0		0	0	0	Tr	Tr	Almandine-hornblende/kyanite-epidote-diopside assemblage. SEM checks from 0.25-0.5 mm fraction: 4 barite versus kyanite candidates = 4 kyanite.	0.25-0.5 mm fraction: 4 kyanite resembling barite 5 red rutile		Almandine-hornblende/kyanite-epidote- diopside	SEM checks from 0.25-0.5 mm fraction: 4 barite versus kyanite candidates = 4 kyanite.
5281	0	0	0		0	0	0	95	Tr	0	Tr	0		0	0	0	Tr	0.5	Almandine/kyanite assemblage.			Almandine/kyanite	
5282	0	0	0		0	0	Tr (2 gr)	20	Tr	0	Tr	0		0	0	0	Tr	Tr	Almandine-hornblende/diopside-kyanite- epidote assemblage.	0.25-0.5 mm fraction: 2 red rutile		Almandine-hornblende/diopside-kyanite- epidote	
5283	0	Tr sphalerite (1 gr)	0		2 pale pink	0	0	25	Tr	0	Tr	0		0	Tr	0	Tr	1	Almandine-goethite-hornblende/epidote- diopside-kyanite assemblage. SEM checks from 0.25-0.5 mm fraction: 4 blue-green gahnite versus spinel candidates = 4 kyanite.	0.25-0.5 mm fraction: 1 sphalerite 4 kyanite resembling gahnite 2 spinel		Almandine-goethite-hornblende/epidote-diopside-kyanite	SEM checks from 0.25-0.5 mm fraction: 4 blue-green gahnite versus spinel candidates = 4 kyanite.
5284	0	Tr barite (1 gr)	0		0	Tr ruby corundum (4 gr)	Tr (3 gr)	20	Tr	0	1	0		0	Tr	Tr (2 gr; see KIM data)	Tr	Tr	Almandine-hornblende-goethite/epidote- kyanite-diposide assemblage.	0.25-0.5 mm fraction: 1 barite 4 ruby corundum 3 red rutile 2 chromite (picked as KIMs)		Almandine-hornblende-goethite/epidote- kyanite-diposide	
5287	0	0	0		0	0	Tr (4 gr)	40	Tr	Tr	1	0		0	Tr	0	Tr	Tr	Almandine-goethite/kyanite-epidote- diopside assemblage.	0.25-0.5 mm fraction: 4 red rutile		Almandine-goethite/kyanite-epidote- diopside	
5289	0	0	0		0	0	Tr (3 gr)	40	Tr	Tr	1	0		0	Tr	0	Tr	Tr	Goethite-almandine/kyanite-epidote- diopside assemblage.	0.25-0.5 mm fraction: 3 red rutile		Goethite-almandine/kyanite-epidote- diopside	
5292	0	0	0		0	0	Tr (4 gr)	40	Tr	Tr	2	0		0	Tr	0	Tr	Tr	Goethite-almandine-hornblende/kyanite- epidote-diopside assemblage.	0.25-0.5 mm fraction: 4 red rutile		Goethite-almandine-hornblende/kyanite-epidote-diopside	
5294	0	0	Tr (1 gr)		0	Tr Mn-epidote (1 gr) Tr low-Cr diopside (1 gr)	Tr (10 gr)	40	Tr	Tr	2	0		0	Tr	0	Tr	Tr	Almandine-goethite-hornblende/kyanite- epidote-diopside assemblage.	0.25-0.5 mm fraction: 1 Mn-epidote 1 low-Cr diopside 10 red rutile		Almandine-goethite-hornblende/kyanite-epidote-diopside	

5297	0	0	0		0	0	Tr (1 gr)	40	Tr	Tr	2	0		0	Tr	Tr (1 gr; see KIM data)	Tr	Tr	Goethite-almandine-hornblende/kyanite- epidote-leucoxene assemblage.	0.25-0.5 mm fraction: 1 red rutile 1 chromite (picked as KIM)		Goethite-almandine-hornblende/kyanite-epidote-leucoxene	
5298	0	5% barite (~30 gr)	0		1 blue-grey	0	Tr (1 gr)	40	1	Tr	3	0		0	Tr	0	Tr	Tr	Almandine-goethite-hornblende/kyanite- epidote assemblage. SEM check from 0.25-0.5 mm fraction: 1 blue-grey gahnite versus spinel candidate = 1 spinel.	0.5-1.0 mm fraction: 19 barite 0.25-0.5 mm fraction: 20 representative barite 1 spinel 1 red rutile		Almandine-goethite-hornblende/kyanite-epidote	SEM check from 0.25-0.5 mm fraction: 1 blue-grey gahnite versus spinel candidate = 1 spinel.
5300	0	0	0		0	Tr sapphire corundum (1 gr)	0	0	Tr	Tr	1	0		0	Tr	Tr (3 gr; see KIM data)	Tr	1	Goethite/leucoxene-epidote assemblage.	0.25-0.5 mm fraction: 1 sapphire corundum 3 chromite (picked as KIMs)		Goethite/leucoxene-epidote	
5301	0	0	0		0	0	Tr (5 gr)	2	Tr	Tr	2	0		0	Tr	0	Tr	Tr	Almandine-hornblende/diopside-epidote assemblage.	0.25-0.5 mm fraction: 5 red rutile		Almandine-hornblende/diopside-epidote	
5302	0	40% barite (~2000 gr)	Tr (3 gr)		0	0	Tr (11 gr)	2	Tr	Tr	2	0		0	Tr	0	Tr	Tr	Almandine-goethite/barite-epidote- diopside assemblage. 0.5-1.0 mm fraction contains 3% (~50 grains) barite.	1.0-2.0 mm fraction: 7 barite 0.5-1.0 mm fraction: 10 representative barite 0.25-0.5 mm fraction: 20 representative barite 11 red rutile		Almandine-goethite/barite-epidote- diopside	0.5-1.0 mm fraction contains 3% (~50 grains) barite.
5303	0	30% barite (~800 gr)	Tr (2 gr)		0	Tr low-Cr diopside (1 gr)	Tr (4 gr)	10	Tr	Tr	2	0		0	Tr	0	Tr	Tr	Goethite-almandine/barite-epidote- diopside assemblage. SEM checks from 0.5-1.0 mm fraction: 2 fibrous barite candidates = 2 barite. 0.5-1.0 mm fraction contains 4% (~60 grains) barite.	1.0-2.0 mm fraction: 8 barite 0.5-1.0 mm fraction: 12 representative barite 0.25-0.5 mm fraction: 20 representative barite 1 low-Cr diopside 4 red rutile		Goethite-almandine/barite-epidote- diopside	SEM checks from 0.5-1.0 mm fraction: 2 fibrous barite candidates = 2 barite. 0.5-1.0 mm fraction contains 4% (~60 grains) barite.
5304	0	0	0		0	Tr sapphire corundum (1 gr)	Tr (5 gr)	30	1	0	Tr	0		0	Tr	0	Tr	Tr	Almandine-hornblende-goethite/kyanite- epidote assemblage.	0.25-0.5 mm fraction: 1 sapphire corundum 5 red rutile		Almandine-hornblende-goethite/kyanite- epidote	
5305	0	0	0		0	0	Tr (4 gr)	30	1	Tr	2	Tr		0	Tr	0	Tr	Tr	Almandine-hornblende/kyanite-epidote-diopside assemblage.	0.25-0.5 mm fraction: 4 red rutile		Almandine-hornblende/kyanite-epidote- diopside	
5306	0	0	Tr (1 gr)		0	Tr low-Cr diopside (1 gr)	Tr (6 gr)	30	Tr	Tr	1	Tr		0	Tr	0	Tr	Tr	Almandine-hornblende/epidote-kyanite-diopside assemblage.	0.25-0.5 mm fraction: 1 low-Cr diopside 6 red rutile		Almandine-hornblende/epidote-kyanite- diopside	

5307	0	Tr sphalerite (5 gr) 1% barite (~300 gr)	90 ~30,000 gr)		1 pale blue-green gahnite; 1 pale blue-green spinel	Tr Mn-epidote (1 gr) Tr sapphire corundum (1 gr)	0	Tr	Tr	Tr	3	0		0	0	0	Tr	Tr	Almandine-siderite-hornblende/marcasite assemblage. SEM checks from 0.5-1.0 mm fraction: 2 brown sphalerite versus staurolite candidates = 2 sphalerite; and 1 barite candidate = 1 barite. SEM checks from 0.25-0.5 mm fraction: 3 brown-orange sphalerite versus staurolite candidates = 2 sphalerite and 1 monazite; 5 barite candidates = 5 barite; 2 pale blue-green gahnite versus spinel candidates = 1 gahnite and 1 spinel; and 1 pale purple spinel versus corundum candidate = 1 sapphire corundum. 0.5-1.0 mm fraction contains 1% (~50 grains) barite.	1.0-2.0 mm fraction: 9 barite 0.5-1.0 mm fraction: 2 sphalerite 11 representative barite 0.25-0.5 mm fraction: 5 sphalerite 1 monazite resembling sphalerite 25 representative barite 1 gahnite 1 spinel 1 Mn-epidote 1 sapphire corundum		Almandine-siderite-hornblende/marcasite	SEM checks from 0.5-1.0 mm fraction: 2 brown sphalerite versus staurolite candidates = 2 sphalerite; and 1 barite candidate = 1 barite. SEM checks from 0.25-0.5 mm fraction: 3 brown-orange sphalerite versus staurolite candidates = 2 sphalerite and 1 monazite; 5 barite candidates = 5 barite; 2 pale blue-green gahnite versus spinel candidates = 1 gahnite and 1 spinel; and 1 pale purple spinel versus corundum candidate = 1 sapphire corundum. 0.5-1.0 mm fraction contains 1% (~50 grains) barite.
5309	0	0	0.5 (5 gr)		0	0	Tr (3 gr)	15	2	0	Tr	0		0	Tr	0	Tr	0	Goethite-almandine/leucoxene-epidote- kyanite assemblage.	0.25-0.5 mm fraction: 3 red rutile		Goethite-almandine/leucoxene-epidote- kyanite	
5310	0	0	0		0	0	0	1	2	Tr	3	0		0	Tr	0	Tr	Tr	Goethite/leucoxene-epidote assemblage.			Goethite/leucoxene-epidote	
5313	0	0	Tr (2 gr)		0	Tr low-Cr diopside (1 gr)	Tr (2 gr)	20	1	Tr	Tr	Tr		0	Tr	0	Tr	Tr	Almandine-goethite-hornblende/epidote- kyanite-diopside assemblage. SEM check from 0.25-0.5 mm fraction: 1 green malachite candidate = 1 fuchsite (S.G. 2.9).	0.25-0.5 mm fraction: 1 fuchsite resembling malachite 1 low-Cr diopside 2 red rutile		Almandine-goethite-hornblende/epidote-kyanite-diopside	SEM check from 0.25-0.5 mm fraction: 1 green malachite candidate = 1 fuchsite (S.G. 2.9).
5314	0	0	0.3 (5 gr)		0	0	Tr (1 gr)	30	1	Tr	2	0		0	Tr	Tr (1 gr; see KIM data)	2	Tr	Almandine-goethite-hornblende/ leucoxene-kyanite-epidote assemblage.	0.25-0.5 mm fraction: 1 red rutile 1 chromite (picked as KIM)		Almandine-goethite-hornblende/ leucoxene-kyanite-epidote	
5315	0	0	0		0	0	Tr (1 gr)	3	Tr	Tr	Tr	0		0	Tr	0	Tr	Tr	Goethite/leucoxene-epidote assemblage.	0.25-0.5 mm fraction: 1 red rutile		Goethite/leucoxene-epidote	
5316	0	20% barite (~800 gr)	0.2 (8 gr)		0	0	Tr (5 gr)	5	Tr	Tr	3	0		0	Tr	0	Tr	Tr	Almandine-hornblende-goethite/epidote- diopside-barite-titanite assemblage. 0.5-1.0 mm fraction contains 3% (~40 grains) barite.	0.5-1.0 mm fraction: 10 representative barite 0.25-0.5 mm fraction: 20 representative barite 5 red rutile		Almandine-hornblende-goethite/epidote- diopside-barite-titanite	0.5-1.0 mm fraction contains 3% (~40 grains) barite.
5318	0	0	0.1 (2 gr)		0	0	Tr (2 gr)	Tr	Tr	1	3	0		0	0	0	Tr	Tr	Goethite/epidote-leucoxene assemblage.	0.25-0.5 mm fraction: 2 red rutile		Goethite/epidote-leucoxene	

5320	0	0	0		0	0	0	5	1	Tr	1	0		0	Tr	0	Tr	Tr	Undersized concentrate; therefore not electromagnetically separated and mineral assemblage not listed. Main minerals are goethite and almandine.			Undersized concentrate; therefore not electromagnetically separated and mineral assemblage not listed. Main minerals are goethite and almandine.	
5324	0	0	0		0	0	0	40	1	Tr	2	0		0	Tr	0	Tr	Tr	Hornblende-almandine-goethite/epidote- kyanite assemblage.			Hornblende-almandine-goethite/epidote- kyanite	
5336	0	10% barite (~400 gr)	5 (~200 gr)		1 black hercynite	Tr Mn-epidote (3 gr)	Tr (8 gr)	3	Tr	Tr	5	0		0	Tr	Tr (2 gr; see KIM data)	Tr	Tr	Goethite-almandine-hornblende/epidote assemblage. SEM check from 1.0-2.0 mm fraction: 1 barite candidate = 1 barite. SEM checks from 0.5-1.0 mm fraction: 16 barite candidates = 16 barite. SEM checks from 0.25-0..5 mm fraction: 2 brown sphalerite versus staurolite candidates = 2 staurolite.	1.0-2.0 mm fraction: 1 barite 0.5-1.0 mm fraction: 42 barite 2 forsterite (see KIM data; picked as KIMs) 0.25-0.5 mm fraction: 2 staurolite resembling sphalerite 20 representative barite 1 hercynite (see KIM notes) 3 Mn-epidote 8 red rutile 2 chromite (picked as KIMs)		Goethite-almandine-hornblende/epidote	SEM check from 1.0-2.0 mm fraction: 1 barite candidate = 1 barite. SEM checks from 0.5-1.0 mm fraction: 16 barite candidates = 16 barite. SEM checks from 0.25-0..5 mm fraction: 2 brown sphalerite versus staurolite candidates = 2 staurolite.
5337	0	5% barite (~500 gr)	1 (~100 gr)		1 black hercynite	Tr Mn-epidote (2 gr)	Tr (6 gr)	2	Tr	Tr	3	0		0	Tr	Tr (3 gr; see KIM data)	Tr	Tr	Goethite-almandine/epidote assemblage. 0.5-1.0 mm fraction contains 1% (~200 grains) barite.	1.0-2.0 mm fraction: 4 barite 0.5-1.0 mm fraction: 10 representative barite 1 chromite (see KIM data; picked as KIM) 3 forsterite (see KIM data; picked as KIMs) 0.25-0.5 mm fraction: 10 representative barite 1 hercynite (see KIM notes) 2 Mn-epidote 6 red rutile 3 chromite (picked as KIMs) 2 forsterite (see KIM data; picked as KIMs)		Goethite-almandine/epidote	0.5-1.0 mm fraction contains 1% (~200 grains) barite.

5338	0	Tr sphalerite (5 gr) 20% barite (~2000 gr)	Tr (2 gr)		0	Tr low-Cr diopside (6 gr)	Tr (3 gr)	2	Tr	Tr	4	0		0	0	Tr (2 gr; see KIM data)	Tr	0	Goethite-almandine/epidote-barite assemblage. 0.5-1.0 mm fraction contains 0.5% (~50 grains) barite.	1.0-2.0 mm fraction: 6 barite 0.5-1.0 mm fraction: 2 sphalerite 10 representative barite 0.25-0.5 mm fraction: 5 sphalerite 10 representative barite 6 low-Cr diopside 3 red rutile 2 chromite (picked as KIMs)		Goethite-almandine/epidote-barite	0.5-1.0 mm fraction contains 0.5% (~50 grains) barite.
5339	0	Tr sphalerite (4 gr) 4% barite (~200 gr)	0.2 (10 gr)		0	Tr Mn-epidote (2 gr) Tr low-Cr diopside (2 gr)	Tr (4 gr)	10	Tr	0	4	0		0	Tr	Tr (6 gr; see KIM data)	0	Tr	Goethite-almandine/epidote assemblage. 0.5-1.0 mm fraction contains trace (~30 grains) barite.	1.0-2.0 mm fractin: 6 barite 0.5-1.0 mm fraction: 1 sphalerite 10 representative barite 0.25-0.25 mm fraction: 4 sphalerite 10 representative barite 2 Mn-epidote 2 low-Cr diopside 4 red rutile 6 chromite (picked as KIMs)		Goethite-almandine/epidote	0.5-1.0 mm fraction contains trace (~30 grains) barite.
12553	0	30% barite (~600 gr)	Tr (3 gr)	30	0	0	Tr (1 gr)	0	2	Tr	Tr	0		0	2	0	Tr	0	Almandine-goethite/epidote-barite assemblage. SEM check from 0.25-0.5 mm fraction: 1 black hercynite versus tourmaline candidate = 1 tourmaline. 0.5-1.0 mm fraction contains 5% (~50 grains) barite.	1.0-2.0 mm fraction: 4 barite 0.5-1.0 mm fraction: 10 representative barite 0.25-0.5 mm fraction: 20 representative barite 1 tourmaline resembling hercynite 1 red rutile		Almandine-goethite/epidote-barite	SEM check from 0.25-0.5 mm fraction: 1 black hercynite versus tourmaline candidate = 1 tourmaline. 0.5-1.0 mm fraction contains 5% (~50 grains) barite.
12558	0	0	0	60	0	0	0	0	0	0	0	0		0	0	0	0	0	Goethite-almandine/epidote assemblage.			Goethite-almandine/epidote	
12560	0	0	0	90	1 black hercynite	0	0	0	20	Tr	0	0		0	0	0	0	0	Goethite/epidote-sillimanite assemblage. SEM checks from 0.25-0.5 mm fraction: 5 black hercynite versus tourmaline candidates = 1 hercynite and 4 tourmaline.	0.25-0.5 mm fraction: 1 hercynite 4 tourmaline resembling hercynite		Goethite/epidote-sillimanite	SEM checks from 0.25-0.5 mm fraction: 5 black hercynite versus tourmaline candidates = 1 hercynite and 4 tourmaline.
12563	0	10% barite (~200 gr)	0.1 (3 gr)	40	0	0	Tr (1 gr)	0	5	0	0	0		0	Tr	0	0	Tr	Almandine-goethite/epidote assemblage.	1.0-2.0 mm fraction: 2 barite 0.5-1.0 mm fraction: 22 barite 0.25-0.5 mm fraction: 20 representative barite 1 red rutile		Almandine-goethite/epidote	
12565	0	Tr loellingite (1 gr) 0.5% barite (8 gr)	0	60	0	0	Tr (1 gr)	0	2	0	0	0		0	0	0	0	0	Goethite-almandine/epidote assemblage. SEM check from 0.25-0.5 mm fraction: 1 arsenopyrite versus loellingite candidate = 1 loellingite.	0.25-0.5 mm fraction: 1 loellingite 8 barite 1 red rutile		Goethite-almandine/epidote	SEM check from 0.25-0.5 mm fraction: 1 arsenopyrite versus loellingite candidate = 1 loellingite.

12569	0	5% barite (~120 gr)	90 (~2500 gr)	90	0	0	0	0	Tr	0	Tr	0		0	0	0	0	0	Goethite/marcasite assemblage. SEM checks from 1.0-2.0 mm fraction: 1 brown sphalerite versus barite candidate = 1 barite. SEM check from 0.5-1.0 mm fraction: 1 brown sphalerite versus barite candidate = 1 barite. SEM checks from 0.25-0.5 mm fraction: 5 grey and brown sphalerite versus barite candidates = 5 barite.	1.0-2.0 mm fraction: 7 barite 0.5-1.0 mm fraction: 11 representative barite 0.25-0.5 mm fraction: 25 representative barite		Goethite/marcasite	SEM checks from 1.0-2.0 mm fraction: 1 brown sphalerite versus barite candidate = 1 barite. SEM check from 0.5-1.0 mm fraction: 1 brown sphalerite versus barite candidate = 1 barite. SEM checks from 0.25-0.5 mm fraction: 5 grey and brown sphalerite versus barite candidates = 5 barite.
12571	0	50% barite (~50 gr)	1 (1 gr)	30	0	0	0	0	0	0	0	0		0	0	0	0	0	Undersized concentrate; therefore not electromagnetically separated and mineral assemblage not listed. Main minerals are barite, goethite and almandine.	0.5-1.0 mm fraction: 1 barite 0.25-0.5 mm fraction: 20 representative barite			
12573	0	60% barite (~300 gr)	0	60	0	0	Tr (1 gr)	Tr	20	0	0	0		0	Tr	0	0	0	Goethite-almandine/barite-sillimanite assemblage.	0.5-1.0 mm fraction: 11 barite 0.25-0.5 mm fraction: 20 representative barite 1 red rutile		Goethite-almandine/barite-sillimanite	
12576	0	0	0	90	0	0	0	0	10	0	2	0		0	0	0	0	0	Goethite/epidote assemblage.			Goethite/epidote	
12603	0	5% barite (8 gr)	0	90	0	0	0	0	15	0	0	0		0	0	0	0	0	Goethite/epidote-sillimanite assemblage.	1.0-2.0 mm fraction: 2 barite 0.5-1.0 mm fraction: 2 barite 0.25-0.5 mm fraction: 8 barite		Goethite/epidote-sillimanite	
12605	0	30% barite (~800 gr)	Tr (2 gr)	50	0	0	0	0	5	0	Tr	0		0	0	0	Tr	0	Goethite-almandine/epidote-barite assemblage.	1.0-2.0 mm fraction: 2 barite 0.5-1.0 mm fraction: 14 barite 0.25-0.5 mm fraction: 20 representative barite		Goethite-almandine/epidote-barite	
12607	0	25% barite (~600 gr)	50 (~1200 gr)	50	0	0	0	0	1	0	Tr	0		0	0	0	Tr	0	Goethite-almandine/marcasite-barite assemblage. 0.5-1.0 mm fraction contains 5% (~40 grains) barite.	1.0-2.0 mm fraction: 5 barite 0.5-1.0 mm fraction: 10 representative barite 0.25-0.5 mm fraction: 20 representative barite		Goethite-almandine/marcasite-barite	0.5-1.0 mm fraction contains 5% (~40 grains) barite.
12609	0	1% barite (3 gr)	0	60	0	0	0	0	15	0	0	0		0	0	0	0	0	Goethite-almandine-hematite/epidote- sillimanite assemblage.	0.25-0.5 mm fraction: 3 barite		Goethite-almandine-hematite/epidote- sillimanite	
12611	0	20% barite (~400 gr)	1 (~20 gr)	80	0	0	0	0	Tr	0	Tr	0		0	0	0	Tr	0	Goethite-almandine/epidote-barite assemblage. 0.5-1.0 mm fraction contains 2% (~30 grains) barite.	1.0-2.0 mm fraction: 2 barite 0.5-1.0 mm fraction: 10 representative barite 0.25-0.5 mm fraction: 20 representative barite		Goethite-almandine/epidote-barite	0.5-1.0 mm fraction contains 2% (~30 grains) barite.

12616	0	60% barite (~1000 gr)	Tr (1 gr)	80	1 blue	0	Tr (2 gr)	0	Tr	0	Tr	0		0	0	0	0	0	Goethite-almandine/barite-epidote assemblage. 0.5-1.0 mm fraction contains 2% (~25 grains) barite.	1.0-2.0 mm fraction: 4 barite 0.5-1.0 mm fraction: 10 representative barite 0.25-0.5 mm fraction: 20 representative barite 1 spinel 2 red rutile		Goethite-almandine/barite-epidote	0.5-1.0 mm fraction contains 2% (~25 grains) barite.
12621	0	30% barite (~300 gr)	0.8 (8 gr)	50	0	0	Tr (1 gr)	0	Tr	0	Tr	0		0	0	0	Tr	0	Goethite-almandine/epidote-barite assemblage. SEM check from 0.25-0.5 mm fraction: 1 brown sphalerite versus barite candidates = 1 barite. 0.5-1.0 mm fraction contains 4% (~40 grains) barite.	1.0-2.0 mm fraction: 4 barite 0.5-1.0 mm fraction: 10 representative barite 0.25-0.5 mm fraction: 21 representative barite 1 red rutile		Goethite-almandine/epidote-barite	SEM check from 0.25-0.5 mm fraction: 1 brown sphalerite versus barite candidates = 1 barite. 0.5-1.0 mm fraction contains 4% (~40 grains) barite.
12641	0	50% barite (~300 gr)	5 (~30 gr)	50	1 black hercynite	0	0	0	0	Tr	Tr	0		0	0	0	0	0	Goethite-almandine-hornblende/barite- epidote assemblage. 0.5-1.0 mm fraction contains 7% (~25 grains) barite.	1.0-2.0 mm fraction: 2 barite 0.5-1.0 mm fraction: 10 representative barite 0.25-0.5 mm fraction: 20 representative barite 1 hercynite (see KIM notes)		Goethite-almandine-hornblende/barite-epidote	0.5-1.0 mm fraction contains 7% (~25 grains) barite.
12642	0	40% barite (~800 gr)	Tr (1 gr)	40	0	0	Tr (2 gr)	0	Tr	0	0	0		0	0	0	Tr	Tr	Goethite-almandine-hornblende/epidote- barite assemblage. 0.5-1.0 mm fraction contains 7% (~80 grains) barite.	1.0-2.0 mm fraction: 9 barite 0.5-1.0 mm fraction: 1 chalcopyrite 10 representative barite 0.25-0.5 mm fraction: 20 representative barite 2 red rutile		Goethite-almandine-hornblende/epidote-barite	0.5-1.0 mm fraction contains 7% (~80 grains) barite.
12643	0	0.1% sphalerite (17 gr) 0.5% barite (~100 gr)	90 (~20,000 gr)	25	0	0	0	0	Tr	0	Tr	0		0	0	0	0	0	Siderite-goethite/marcasite assemblage. SEM checks from 0.25-0.5 mm fraction: 3 brown sphalerite versus rutile candidates = 1 sphalerite, 1 rutile and 1 staurolite.	1.0-2.0 mm fraction: 4 barite 0.5-1.0 mm fraction: 10 barite 0.25-0.5 mm fraction: 17 sphalerite 1 rutile resembling sphalerite 1 staurolite resembling sphalerite 20 representative barite		Siderite-goethite/marcasite	SEM checks from 0.25-0.5 mm fraction: 3 brown sphalerite versus rutile candidates = 1 sphalerite, 1 rutile and 1 staurolite.

7551	Tr (1 gr)	Tr sphalerite (6 gr) 3% barite (~1500 gr)	95 (~50,000 gr)	10	0	0	0	0	0	Tr	0	0	0	0	0	0	0	0	Almandine-siderite/marcasite assemblage. SEM check from 0.5-1.0 mm fraction: 1 scheelite candidate = 1 barite. SEM checks from 0.25-0.5 mm fraction: 7 sphalerite candidates = 6 sphalerite and 1 barite. 1.0-2.0 mm and 0.5-1.0 mm fractions contain 3% (~30 grains and ~200 grains, respectively) barite.	1.0-2.0 mm fraction: 10 representative barite 0.5-1.0 mm fraction: 11 representative barite 0.25-0.5 mm fraction: 1 chalcopyrite 6 sphalerite 21 representative barite		Almandine-siderite/marcasite	SEM check from 0.5-1.0 mm fraction: 1 scheelite candidate = 1 barite. SEM checks from 0.25-0.5 mm fraction: 7 sphalerite candidates = 6 sphalerite and 1 barite. 1.0-2.0 mm and 0.5-1.0 mm fractions contain 3% (~30 grains and ~200 grains, respectively) barite.
7556	0	Tr scheelite (1 gr) 70% barite (~3000 gr)	2 (~100 gr)	Tr	0	0	Tr (2 gr)	Tr	0	Tr	0	0	0	0	0	0	3	Tr	Almandine/barite assemblage. SEM checks from 0.25-0.5 mm fraction: 2 sphalerite versus rutile candidates = 1 red rutile and 1 monazite; and 7 scheelite candidates = 1 scheelite, 1 diopside and 5 barite. "Pyrite" is mostly marcasite. 1.0-2.0 mm and 0.5-1.0 mm fractions contain 40% (~40 grains) and 15% (~200 grains) barite, respectively.	1.0-2.0 mm fraction: 10 representative barite 0.5-1.0 mm fraction: 10 representative barite 0.25-0.5 mm fraction: 1 scheelite 1 diopside resembling scheelite 25 representative barite 2 red rutile 1 monazite		Almandine/barite	SEM checks from 0.25-0.5 mm fraction: 2 sphalerite versus rutile candidates = 1 red rutile and 1 monazite; and 7 scheelite candidates = 1 scheelite, 1 diopside and 5 barite. "Pyrite" is mostly marcasite. 1.0-2.0 mm and 0.5-1.0 mm fractions contain 40% (~40 grains) and 15% (~200 grains) barite, respectively.
7557	0	Tr sphalerite (1 gr) 2% barite (~800 gr)	95 (~40,000 gr)	2	0	0	Tr (1 gr)	0	Tr	Tr	Tr	0	0	0	0	0	Tr	0	Almandine/marcasite assemblage. SEM check from 1.0-2.0 mm fraction: 1 sphalerite candidate = 1 sphalerite. SEM check from 0.5-1.0 mm fraction: 1 scheelite versus barite candidate = 1 barite. SEM checks from 0.25-0.5 mm fraction: 5 sphalerite candidates = 1 sphalerite, 1 staurolite, 2 titanite and 1 andradite; and 3 scheelite versus barite candidates = 3 barite; and 1 topaz versus sillimanite candidate = 1 sillimanite. 0.5-1.0 mm fraction contains 10% (~50 grains) barite.	1.0-2.0 mm fraction: 1 sphalerite 4 barite 0.5-1.0 mm fraction: 11 representative barite 0.25-0.5 mm fraction: 1 sphalerite 1 staurolite resembling sphalerite 2 titanite resembling sphalerite 1 andradite resembling sphalerite 13 representative barite 1 sillimanite 1 red rutile		Almandine/marcasite	SEM check from 1.0-2.0 mm fraction: 1 sphalerite candidate = 1 sphalerite. SEM check from 0.5-1.0 mm fraction: 1 scheelite versus barite candidate = 1 barite. SEM checks from 0.25-0.5 mm fraction: 5 sphalerite candidates = 1 sphalerite, 1 staurolite, 2 titanite and 1 andradite; and 3 scheelite versus barite candidates = 3 barite; and 1 topaz versus sillimanite candidate = 1 sillimanite. 0.5-1.0 mm fraction contains 10% (~50 grains) barite.
7558	0	60% barite (~2000 gr)	15 (~500 gr)	3	0	0	0	Tr	0	Tr	Tr	0	0	0	0	0	2	Tr	Almandine/barite-marcasite-epidote assemblage. 1.0-2.0 mm and 0.5-1.0 mm fractions contain 25% (~40 grains) and 20% (~250 grains) barite, respectively.	1.0-2.0 mm fraction: 10 representative barite 0.5-1.0 mm fraction: 10 representative barite 0.25-0.5 mm fraction:		Almandine/barite-marcasite-epidote	1.0-2.0 mm and 0.5-1.0 mm fractions contain 25% (~40 grains) and 20% (~250 grains) barite, respectively.

																			10 representative barite			
7563	0	5% barite (~2500 gr)	90 (~40,000 gr)	2	0	0	0	0	Tr	Tr	0	0	0	0	Tr	0	0	Tr	Almandine/marcasite assemblage. SEM checks from 1.0-2.0 mm fraction: 5 grey granular massive barite candidates = 5 barite. SEM checks from 0.25-0.5 mm fraction: 6 sphalerite candidates = 1 barite, 1 titanite, 2 rutile, 1 diopside and 1 monazite; 5 scheelite versus barite candidates = 5 barite; and 2 corundum versus sillimanite candidates = 2 sillimanite. 1.0-2.0 mm and 0.5-1.0 mm fractions contain 10% (~60 grains) and 5% (~350 grains) barite, respectively.	1.0-2.0 mm fraction: 20 representative barite 0.5-1.0 mm fraction: 10 representative barite 0.25-0.5 mm fraction: 1 titanite resembling sphalerite 2 rutile resembling sphalerite 1 diopside resembling sphalerite 26 representative barite 2 sillimanite 1 monazite		Almandine/marcasite	SEM checks from 1.0-2.0 mm fraction: 5 grey granular massive barite candidates = 5 barite. SEM checks from 0.25-0.5 mm fraction: 6 sphalerite candidates = 1 barite, 1 titanite, 2 rutile, 1 diopside and 1 monazite; 5 scheelite versus barite candidates = 5 barite; and 2 corundum versus sillimanite candidates = 2 sillimanite. 1.0-2.0 mm and 0.5-1.0 mm fractions contain 10% (~60 grains) and 5% (~350 grains) barite, respectively.
7567	0	30% barite (~1500 gr)	50 (~2500 gr)	5	0	0	Tr (6 gr)	0	Tr	Tr	Tr	0	0	0	0	0	1	Tr	Almandine/marcasite-barite-epidote assemblage. 0.5-1.0 mm fraction contains 4% (~50 grains) barite.	1.0-2.0 mm fraction: 5 barite 0.5-1.0 mm fraction: 10 representative barite 0.25-0.5 mm fraction: 10 representative barite 6 red rutile		Almandine/marcasite-barite-epidote	0.5-1.0 mm fraction contains 4% (~50 grains) barite.
7568	0	1% barite (15 gr)	20 (~300 gr)	3	1 blue-green gahnite; 2 blue-green spinel	Tr low-Cr diopside (2 gr)	Tr (3 gr)	10 (~150 gr)	25 (~400 gr)	Tr	Tr	0	0	0	0	0	2	Tr	Almandine-hornblende/epidote-sillimanite-marcasite assemblage. SEM checks from 0.25-0.5 mm fraction: 3 blue-green gahnite versus spinel candidates = 1 gahnite and 2 spinel.	0.5-1.0 mm fraction: 1 barite 0.25-0.5 mm fraction: 15 barite 1 gahnite 2 spinel 2 low-Cr diopside 3 red rutile		Almandine-hornblende/epidote-sillimanite-marcasite	SEM checks from 0.25-0.5 mm fraction: 3 blue-green gahnite versus spinel candidates = 1 gahnite and 2 spinel.

Appendix 6 – Heavy Mineral Fractions

Sample Number	Weight of -2.0 mm Table Concentrate (g)													
	Total	-0.18 mm	0.18 to 2.0 mm Heavy Liquid Separation S.G. 3.20											
			Total	Lights S.G. <3.2	HMC S.G.>3.20									
					Total	-0.18 mm (wash)	Mag	Nonferromagnetic HMC						
								Total	Processed Split					
									Total		0.18 to 0.25 mm	0.25 to 0.5 mm	0.5 to 1.0 mm	1.0 to 2.0 mm
									%	Weight				
DU16-201	937.4	404.6	532.8	520.3	12.5	1.4	1.0	10.1	100	10.1	2.6	4.2	2.0	1.3
DU16-202	790.2	482.4	307.8	302.0	5.8	0.6	0.4	4.8	100	4.8	1.9	2.3	0.5	0.1
DU16-208	712.7	654.6	58.1	57.5	0.6	0.1	0.02	0.5	100	0.5	0.2	0.2	0.08	0.01
DU16-209	1001.4	63.6	937.8	935.6	2.2	0.2	0.2	1.8	100	1.8	0.5	0.7	0.1	0.5
DU16-213	940.9	255.4	685.5	681.1	4.4	0.6	0.2	3.6	100	3.6	1.4	1.2	0.3	0.7
DU16-217	950.3	878.4	71.9	59.0	12.9	0.6	0.6	11.7	100	11.7	6.8	4.7	0.2	0.01
DU16-218	894.8	624.4	270.4	267.9	2.5	0.3	0.2	2.0	100	2.0	0.7	1.1	0.2	0.04
DU16-219	747.5	421.8	325.7	323.3	2.4	0.3	0.2	1.9	100	1.9	0.6	0.9	0.3	0.1
DU16-221	907.9	573.9	334.0	318.5	15.5	1.3	1.5	12.7	100	12.7	4.1	6.6	1.7	0.3
DU16-223	867.9	552.7	315.2	308.1	7.1	1.3	0.5	5.3	100	5.3	2.1	2.0	0.7	0.5
DU16-233	906.5	497.0	409.5	405.8	3.7	0.3	0.2	3.2	100	3.2	1.2	1.6	0.3	0.07
DU16-234	905.4	693.2	212.2	204.4	7.8	0.5	0.7	6.6	100	6.6	2.7	3.0	0.7	0.2
DU16-236	841.6	456.3	385.3	381.3	4.0	0.3	0.5	3.2	100	3.2	1.2	1.4	0.4	0.2
7551	1280.7	529.1	751.6	726.7	24.9	6.1	0.3	18.5	100	18.5	4.6	6.7	4.4	2.8
7556	716.9	501.2	215.7	205.0	10.7	2.1	0.8	7.8	100	7.8	3.2	3.1	1.0	0.5
7557	605.0	452.7	152.3	131.2	21.1	5.0	0.3	15.8	100	15.8	5.7	5.9	3.0	1.2
7558	785.2	603.6	181.6	173.4	8.2	1.2	0.5	6.5	100	6.5	2.9	2.2	0.9	0.5
7563	766.9	585.4	181.5	159.8	21.7	5.8	0.2	15.7	100	15.7	3.7	5.6	4.7	1.7
7567	783.3	588.2	195.1	186.6	8.5	2.0	0.3	6.2	100	6.2	2.4	2.4	1.0	0.4
7568	645.2	493.2	152.0	147.2	4.8	1.1	0.2	3.5	100	3.5	1.9	1.2	0.3	0.1

Sample Number	Weight (g)										
	<2.0 mm Table Concentrate										
	Total	-0.25 mm	0.25-2.0 mm Heavy Liquid Separation S.G 3.20								
			Heavy Liquid Lights	Mag HMC	Nonferromagnetic HMC						
					Total	Processed Split					
						Total					
						%	Weight	<0.25 mm (wash)	0.25 to 0.5 mm	0.5 to 1.0 mm	1.0 to 2.0 mm
5278	1,119.1	743.2	373.3	0.10	2.5	100	2.5	0.4	1.30	0.60	0.20
5280	989.9	688.3	297.5	0.30	3.8	100	3.8	0.7	1.90	0.80	0.40
5281	1,068.9	759.3	298.4	0.20	11.0	100	11.0	1.4	4.20	4.00	1.40
5282	908.3	587.3	319.0	0.10	1.9	100	1.9	0.5	1.00	0.30	0.08
5283	1,013.8	516.4	488.6	0.50	8.3	100	8.3	1.6	3.60	2.10	1.00
5284	987.2	684.8	298.1	0.20	4.1	100	4.1	0.9	2.00	0.80	0.40
5287	744.0	464.3	274.9	0.30	4.5	100	4.5	1.1	2.00	1.00	0.40
5289	682.1	447.3	230.9	0.07	3.8	100	3.8	1.1	1.70	0.80	0.20
5292	573.5	415.1	156.1	0.10	2.2	100	2.2	0.7	1.10	0.40	0.01
5294	810.9	623.9	182.6	0.20	4.2	100	4.2	0.7	2.00	1.00	0.50
5297	1,086.2	757.7	323.5	0.30	4.7	100	4.7	0.9	2.20	0.90	0.70
5298	929.4	571.7	355.1	0.08	2.5	100	2.5	0.7	1.10	0.50	0.20
5300	660.1	497.2	157.5	0.10	5.3	100	5.3	0.6	2.40	1.10	1.20
5301	1,077.6	746.4	327.4	0.20	3.6	100	3.6	0.8	1.70	0.70	0.40
5302	764.8	525.4	233.6	0.40	5.4	100	5.4	0.9	2.60	1.20	0.70
5303	1,043.2	735.5	301.2	0.40	6.1	100	6.1	1.1	2.80	1.40	0.80
5304	1,012.9	698.5	311.9	0.10	2.4	100	2.4	0.6	1.10	0.50	0.20
5305	676.3	512.3	161.6	0.10	2.3	100	2.3	0.4	0.90	0.50	0.50
5306	1,125.7	939.0	184.7	0.08	1.9	100	1.9	0.5	0.90	0.40	0.10
5307	942.1	583.6	341.9	0.50	16.1	100	16.1	4.5	5.20	4.00	2.40
5309	1,003.2	715.9	286.0	0.10	1.2	100	1.2	0.3	0.50	0.30	0.10
5310	1,328.0	1,020.9	305.1	0.10	1.9	100	1.9	0.6	0.70	0.40	0.20
5313	862.4	644.7	212.9	0.30	4.5	100	4.5	1.1	2.00	1.00	0.40
5314	1,439.3	1,165.8	272.8	0.10	0.6	100	0.6	0.1	0.40	0.09	0.01
5315	1,221.9	973.3	245.5	0.30	2.8	100	2.8	0.6	1.00	0.80	0.40
5316	1,115.8	831.4	279.1	0.20	5.1	100	5.1	2.3	1.90	0.74	0.20
5318	1,096.3	953.7	138.4	0.10	4.1	100	4.1	1.2	2.30	0.50	0.10
5320	1,025.8	898.2	127.5	0.01	0.1	100	0.1	0.1	0.04	0.01	0.00
5324	1,293.7	1,049.0	243.4	0.03	1.3	100	1.3	0.5	0.50	0.20	0.10
5336	655.6	428.0	217.9	0.50	9.2	100	9.2	2.2	3.60	2.20	1.20
5337	1,595.7	813.2	761.7	0.80	20.0	100	20.0	4.5	9.00	5.10	1.40
5338	937.8	589.0	334.9	0.70	13.2	100	13.2	2.1	5.90	3.40	1.80
5339	1,095.4	704.5	376.0	0.70	14.2	100	14.2	3.2	5.80	3.50	1.70
12553	603.4	441.2	158.7	0.20	3.30	100	3.3	0.8	1.50	0.80	0.20
12558	526.2	414.2	110.6	0.60	0.80	100	0.8	0.2	0.20	0.20	0.20
12560	708.4	616.2	87.1	0.60	4.50	100	4.5	1.1	1.80	0.80	0.80
12563	954.5	790.6	161.0	0.10	2.80	100	2.8	0.9	1.20	0.60	0.10
12565	1,036.2	886.3	147.0	0.10	2.80	100	2.8	0.7	0.90	0.60	0.60
12569	994.6	807.3	183.3	0.10	3.90	100	3.9	0.9	1.40	1.10	0.50
12571	1,016.5	252.0	764.4	0.01	0.07	100	0.1	0.1	0.01	<0.01	0.01
12573	1,411.8	1,182.3	227.1	0.10	2.30	100	2.3	0.6	1.00	0.50	0.20
12576	767.8	708.6	57.9	0.04	1.30	100	1.3	0.4	0.40	0.30	0.20
12603	688.0	557.4	127.2	0.10	3.30	100	3.3	1.2	1.30	0.50	0.30
12605	697.2	490.1	203.3	0.20	3.60	100	3.6	1.2	1.50	0.70	0.20
12607	877.1	621.6	251.8	0.30	3.40	100	3.4	1.0	1.30	0.70	0.40
12609	1,005.0	863.1	135.9	0.80	5.20	100	5.2	1.1	1.90	1.10	1.10
12611	893.5	676.4	210.4	0.20	6.50	100	6.5	1.4	2.80	1.50	0.80
12616	761.9	556.8	199.3	0.10	5.70	100	5.7	1.6	2.50	1.20	0.40
12621	755.9	535.8	215.8	0.30	4.00	100	4.0	1.1	1.60	0.90	0.40
12641	522.8	385.0	136.7	0.10	1.00	100	1.0	0.3	0.40	0.20	0.10
12642	1,176.6	802.4	369.8	0.20	4.20	100	4.2	0.8	1.90	1.10	0.40
12643	788.6	519.5	257.0	0.20	11.90	100	11.9	2.9	4.40	3.00	1.60

* Values greater than 0.1 g were weighed only to one decimal place; the zero was added in the second decimal position to facilitate column alignment.

Appendix 7 – Kimberlite Indicator Minerals

Sample Number	Number of Grains																																			
	Pseudo-KIMs						KIMs																															
	1.0 to 2.0 mm		0.5 to 1.0 mm		0.25 to 0.5 mm		1.0 to 2.0 mm												0.5 to 1.0 mm												0.25 to 0.5 mm						Total (KIMs)	
	Low-Cr diopside		Low-Cr diopside		Low-Cr diopside		GP		GO		DC		IM		CR*		FO*		GP		GO		DC		IM		CR*		FO*		GP		GO		DC		IM		CR*		FO*			
	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P	T	P
DU16-201	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DU16-202	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DU16-208	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DU16-209	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DU16-213	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DU16-217	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DU16-218	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DU16-219	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DU16-221	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DU16-223	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DU16-233	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DU16-234	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
DU16-236	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5278	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		1		0		1	
5280	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
5281	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
5282	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
5283	0		0		0		0		0		0		0		0		0		0		0		0		1		0		0		0		0		0		0		1		1	
5284	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		2		0		2	
5287	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
5289	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
5292	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
5294	0		0		1		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
5297	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		1		0		1	
5298	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
5300	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		3		0		3	
5301	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
5302	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
5303	0		0		1		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
5304	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
5305	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
5306	0		0		1		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
5307	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
5309	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
5310	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
5313	0		0		1		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
5314	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		1		0		1	
5315	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
5316	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
5318	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
5320	No Sample		0		0		No Sample												0		0		0		0		0		0		0		0		0		0		0		0	
5324	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
5336	0		0		0		0		0		0		0		0		0		4		0		2		0		0		2		2		0		4		0		2		0		16	
5337	0		0		0		0		0		0		0		0		0		3		0		3		0		1		3		5		0		10		0		3		2		30	
5338	0		0		6		0		0		0		0		0		0		1		0		0		0		0		0		1		0		0		0		2		0		4	
5339	0		0		2		0		0		0		0		0		0		0		0		0		0		0		0		2		0		0		0		6		0		8	
12553	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
12558	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	

12560	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
12563	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
12565	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
12569	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
12571	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
12573	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
12576	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
12603	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
12605	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
12607	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
12609	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
12611	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
12616	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
12621	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
12641	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
12642	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
12643	0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0		0	
7551	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7556	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7557	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7558	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7563	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7567	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7568	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

T = Total number of grains in sample. Total is estimated if number is greater than number of picked grains.
P = Number of picked grains in sample. Field left blank if not report-
ed.

* Low-Cr diopside, forsteritic olivine and chromite also referenced on MMSIMs data.

Appendix 8 – Remarks

Sample Number	Remarks
DU16-201	No KIM remarks.
DU16-202	SEM checks from 0.25-0.5 mm fraction: 3 IM versus crustal ilmenite candidates = 3 crustal ilmenite.
DU16-208	No KIM remarks.
DU16-209	No KIM remarks.
DU16-213	No KIM remarks.
DU16-217	SEM checks from 0.25-0.5 mm fraction: 10 CR versus tourmaline candidates = 10 tourmaline.
DU16-218	No KIM remarks.
DU16-219	No KIM remarks.
DU16-221	SEM checks from 0.25-0.5 mm fraction: 1 GO versus grossular candidate = 1 Mn-almandine; and 1 IM versus crustal ilmenite candidate = 1 crustal ilmenite.
DU16-223	No KIM remarks.
DU16-233	No KIM remarks.
DU16-234	No KIM remarks.
DU16-236	No KIM remarks.
5278	SEM check from 0.25-0.5 mm fraction: 1 CR versus crustal ilmenite candidate = 1 CR.
5280	No KIM remarks.
5281	No KIM remarks.
5282	No KIM remarks.
5283	SEM check from 0.5-1.0 mm fraction: 1 IM versus CR candidate = 1 IM.
5284	SEM checks from 0.25-0.5 mm fraction: 2 CR versus crustal ilmenite candidates = 2 CR.
5287	No KIM remarks.
5289	No KIM remarks.
5292	No KIM remarks.
5294	No KIM remarks.
5297	SEM checks from 0.25-0.5 mm fraction: 2 CR versus crustal ilmenite candidates = 1 CR and 1 allanite.
5298	No KIM remarks.
5300	SEM checks from 0.25-0.5 mm fraction: 3 CR candidates = 3 CR.
5301	No KIM remarks.
5302	No KIM remarks.
5303	No KIM remarks.
5304	No KIM remarks.
5305	No KIM remarks.
5306	No KIM remarks.
5307	No KIM remarks.
5309	No KIM remarks.
5310	No KIM remarks.
5313	No KIM remarks.
5314	SEM check from 0.25-0.5 mm fraction: 1 CR candidate = 1 CR.
5315	No KIM remarks.
5316	No KIM remarks.
5318	No KIM remarks.
5320	No KIM remarks.
5324	No KIM remarks.
5336	SEM checks from 0.5-1.0 mm fraction: 2 FO candidates = 2 FO. SEM checks from 0.25-0.5 mm fraction: 3 CR versus hercynite candidates = 2 CR and 1 hercynite. 3 GP from 0.5-1.0 mm fraction have partial alteration mantles.
5337	SEM checks from 0.25-0.5 mm fraction: 4 CR candidates = 3 CR and 1 hercynite.
5338	SEM check from 0.25-0.5 mm fraction: 1 CR versus hercynite candidate = 1 CR. Sole GP from 0.25-0.5 mm fraction has a partial alteration mantle.

5339	SEM checks from 0.25-0.5 mm fraction: 2 CR versus crustal ilmenite candidates = 1 CR and 1 crustal ilmenite. 1 GP from 0.25-0.5 mm fraction has a partial alteration mantle.
12553	No KIM remarks.
12558	No KIM remarks.
12560	No KIM remarks.
12563	No KIM remarks.
12565	No KIM remarks.
12569	No KIM remarks.
12571	No KIM remarks.
12573	No KIM remarks.
12576	No KIM remarks.
12603	No KIM remarks.
12605	No KIM remarks.
12607	No KIM remarks.
12609	No KIM remarks.
12611	No KIM remarks.
12616	No KIM remarks.
12621	No KIM remarks.
12641	SEM check from 0.25-0.5 mm fraction: 1 CR versus hercynite candidate = 1 hercynite.
12642	No KIM remarks.
12643	No KIM remarks.
7551	No KIM remarks.
7556	No KIM remarks.
7557	SEM check from 0.5-1.0 mm fraction: 1 CR versus tourmaline candidate = 1 tourmaline.
7558	No KIM remarks.
7563	No KIM remarks.
7567	No KIM remarks.
7568	No KIM remarks.

Appendix 9 – Paramagnetic Weights

Sample Number	Weight of 0.25-0.5 mm Nonferromagnetic Heavy Mineral Fractions (g)					
	Total	Paramagnetic			Nonparamagnetic	
		Strongly (<0.6 amp)	Moderately (0.6-0.8 amp)	Weakly (0.8-1.0 amp)	>1.0 amp	>1.0 amp Lights*
DU16-201	4.18	0.33	2.95	0.74	0.14	0.02
DU16-202	2.27	0.16	1.75	0.24	0.11	0.01
DU16-208	0.16	0.02	0.08	0.04	0.01	0.01
DU16-209	0.74	0.07	0.49	0.13	0.04	0.01
DU16-213	1.18	0.12	0.89	0.11	0.05	0.01
DU16-217	4.70	0.30	3.05	0.97	0.36	0.02
DU16-218	1.08	0.12	0.75	0.15	0.05	0.01
DU16-219	0.89	0.09	0.60	0.14	0.05	0.01
DU16-221	6.62	0.84	4.89	0.66	0.21	0.02
DU16-223	2.01	0.14	1.55	0.24	0.07	0.01
DU16-233	1.63	0.16	1.24	0.16	0.06	0.01
DU16-234	2.98	0.20	2.36	0.31	0.10	0.01
DU16-236	1.42	0.11	0.97	0.26	0.07	0.01
7551	6.68	0.52	0.76	0.38	4.90	0.12
7556	3.10	0.45	1.84	0.36	0.40	0.05
7557	5.92	0.14	0.87	0.83	4.03	0.05
7558	2.18	0.22	1.28	0.25	0.39	0.04
7563	5.64	0.09	0.49	0.45	4.59	0.02
7567	2.39	0.15	1.21	0.49	0.48	0.06
7568	1.24	0.10	0.70	0.26	0.15	0.03

*SG <3.20 heavy liquid separation clean up of >1.0 amp fraction.

Appendix 10 – Platinum Group Minerals Summary

PLATINUM GROUP MINERALS SUMMARY

Client: Alberta Geological Survey

File Name: 20177487 - AGS - Pawlowicz - (7 for KIM/MMSIM) - June 2017

Total Number of Samples in this Report: 7

ODM Batch Number(s): 7487

	Observed PGMs*		
Sample Number	**Mineral**	**Number of Grains**	**Total Grains**
7551	None Observed	0	0
7556	None Observed	0	0
7557	None Observed	0	0
7558	None Observed	0	0
7563	None Observed	0	0
7567	None Observed	0	0
7568	None Observed	0	0

*All samples are oxidized; therefore only native PGE minerals and the most resistant PGE arsenide and antimonide grains (no PGE sulphides or tellurides) are likely to be preserved.

Appendix 11 – Abbreviations

Overburden Drilling Management Limited - Abbreviations Table

Raw Sample Weights and Descriptions Log

Largest Clast Size Present:

- G: Granules
- P: Pebbles
- C: Cobbles

Clast Composition:

- V/S: Volcanics and/or sediments
- GR: Granitics
- LS: Limestone, carbonates
- OT: Other lithologies (refer to footnotes)
- TR: Only trace present
- NA: Not applicable
- OX: Very oxidized, undifferentiated

Matrix Grain Size Distribution:

- S/U: Sorted or unsorted
- SD: Sand (F: Fine; M: Medium; C: Coarse)
- ST: Silt
- CY: Clay
- Y: Fraction present
- +: Fraction more abundant than normal
- -: Fraction less abundant than normal
- N: Fraction not present

Matrix Organics:

- ORG: Y: Organics present in matrix
  N: Organics absent or negligible in matrix
  +: Matrix is mainly organic

Matrix Colour:

Primary:

BE:	Beige	GG:	Grey-green
BR:	Brick Red	PP:	Purple
GY:	Grey	PK:	Pink
GB:	Grey-beige	PB:	Pink-beige
GN:	Green	MN:	Maroon

Secondary (soil):

- OC: Ochre
- BN: Brown
- BK: Black

Secondary Colour Modifier:

- L: Light
- M: Medium
- D: Dark

Detailed Gold Grain Log

- VG: Visible gold grains

Thickness:

- M: Actual measured thickness of grain (µm)
- C: Thickness of grain (µm) calculated from measured width and length

Kimberlite Indicator Mineral (KIM) Log

- GP: Purple to red peridotitic garnet (G9/10 Cr-pyrope)
- GO: Orange mantle garnet; includes both eclogitic pyrope-almandine (G3) and Cr-poor megacrystic pyrope (G1/G2) varieties; may include unchecked (by SEM) grains of common crustal garnet (G5) lacking diagnostic inclusions or crystal faces
- DC: Cr-diopside; distinctly emerald green (paler emerald green low-Cr diopside picked separately)
- IM: Mg-ilmenite; may include unchecked (by SEM) grains of common crustal ilmenite lacking diagnostic inclusions or crystal faces
- CR: Chromite
- FO: Forsterite

Metamorphosed/Magmatic Massive Sulphide Indicator Mineral (MMSIM) and Porphyry Cu Indicator Mineral (PCIM) Logs

Adr:	Andradite	Cpx:	Clinopyroxene	Gth:	Goethite	PGM:	Platinum group-bearing mineral	Spi:	Spinel
Ap:	Apatite	Cpy:	Chalcopyrite	Ilm:	Ilmenite			Sps:	Spessartine
Ase:	Anatase	Cr:	Chromite	Ky:	Kyanite	Py:	Pyrite	St:	Staurolite
Aspy:	Arsenopyrite	Fay:	Fayalite	Mz:	Monazite	REM:	Rare earth-bearing mineral	Tm:	Tourmaline
Ax:	Axinite	Gh:	Gahnite	Ol:	Olivine			Ttn:	Titanite
		Gr:	Grossular	Opx:	Orthopyroxene	Sil:	Sillimanite	Zir:	Zircon

Other

HMC:	Heavy mineral concentrate	EPD:	Electric-pulse disaggregation
UV:	Ultra-violet	PGE:	Platinum group element

Appendix 12 – Kimberlite Indicator Minerals Spiked Samples

KIM Spiked Samples

All of the garnet, olivine (forsterite), and chromite grains used to spike the QC samples were picked at ODM from samples collected in 2003 from a stream in the southeastern Buffalo Head Hills within an area of known kimberlites (‘K4’ stream).

The selected grains were counted within their sample vials to confirm grain counts. The spiked grains were added to a hole created within the bulk sediment sample and then the hole was covered over so that the grains were positioned in the central part of the bulk sample. The vials were examined after spiking to confirm that all of the grains had been transferred to the bulk sample.

QC Sample “I” – 5336

Prepared:

- KIM’s selected and photographed by Jill Weiss, 2011-Nov-30

Blank:

- Brownvale till (~30 kg) - collected in 2007

Spike:

- 0.5–1.0 mm: 5 GP from sample 03-MPB-004 (sampled by Beth McClenaghan, K4 area, picked by ODM)
- 0.25–0.5 mm: 5 GP from sample 03-MPB-004 (sampled by Beth McClenaghan, K4 area, picked by ODM)

——

- 0.5–1.0 mm: 3 CR [1 CR from sample 03-MPB-004 (sampled by Beth McClenaghan, K4 area, picked by ODM) plus 2 CR from sample 03–MPB–004 (sampled by Beth McClenaghan, K4 area, picked by ODM)]
- 0.25–0.5 mm: 7 CR from sample 03-MPB-004 (sampled by Beth McClenaghan, K4 area, picked by ODM)

——

- 0.5–1.0 mm: 4 FO from sample 84B-03-BS-3005
- 0.25–0.5 mm: 0 FO

——

- 0.5–1.0 mm: 3 DC from K6 mantle xenolith (sampled by Glen Prior; picked, tumbled and sieved by Dianne Goulet; verified by Glen Prior)
- 0.25–0.5 mm: 8 DC from K6 mantle xenolith (sampled by Glen Prior; picked, tumbled and sieved by Dianne Goulet; verified by Glen Prior)

——

- 0.5–1.0 mm: 0 SPH
- 0.25–0.5 mm: 0 SPH

QC Sample “J” – 5337

Prepared:

- KIM’s selected and photographed by Jill Weiss, 2011-Nov-30

Blank:

- Brownvale till (~30 kg) - collected in 2007

Spike:

- 0.5–1.0 mm: 3 GP from sample 84B-03-BS-3004
- 0.25–0.5 mm: 7 GP from sample 03-MPB-004 (sampled by Beth McClenaghan, K4 area, picked by ODM)

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- 0.5–1.0 mm: 4 CR from sample 03-MPB-004 (sampled by Beth McClenaghan, K4 area, picked by ODM)
- 0.25–0.5 mm: 7 CR from sample 03-MPB-004 (sampled by Beth McClenaghan, K4 area, picked by ODM)

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- 0.5–1.0 mm: 5 FO from sample 84B-03-BS-3005
- 0.25–0.5 mm: 0 FO

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- 0.5–1.0 mm: 5 DC from K6 mantle xenolith (sampled by Glen Prior; picked, tumbled and sieved by Dianne Goulet; verified by Glen Prior)
- 0.25–0.5 mm: 7 DC from K6 mantle xenolith (sampled by Glen Prior; picked, tumbled and sieved by Dianne Goulet; verified by Glen Prior)

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- 0.5–1.0 mm: 0 SPH
- 0.25–0.5 mm: 0 SPH

QC Sample “K” – 5338

Prepared:

- KIM’s selected and photographed by Jill Weiss, 2011-Nov-30

Blank:

- Brownvale till (~30 kg) - collected in 2007

Spike:

- 0.5–1.0 mm: 0 GP
- 0.25–0.5 mm: 0 GP

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- 0.5–1.0 mm: 0 CR
- 0.25–0.5 mm: 0 CR

  ——
- 0.5–1.0 mm: 0 FO
- 0.25–0.5 mm: 0 FO

  ——
- 0.5–1.0 mm: 0 DC
- 0.25–0.5 mm: 0 DC

  ——
- 0.5–1.0 mm: 7 SPH from sample Paulen 2930 (picked by ODM)
- 0.25–0.5 mm: 6 SPH from sample Paulen 2933 (picked by ODM)

QC Sample “L” – 5339

Prepared:

- KIM’s selected and photographed by Jill Weiss, 2011-Nov-30

Blank:

- Brownvale till (~30 kg) - collected in 2007

Spike:

- 0.5–1.0 mm: 0 GP
- 0.25–0.5 mm: 0 GP

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- 0.5–1.0 mm: 0 CR
- 0.25–0.5 mm: 0 CR

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- 0.5–1.0 mm: 0 FO
- 0.25–0.5 mm: 0 FO

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- 0.5–1.0 mm: 0 DC
- 0.25–0.5 mm: 0 DC

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- 0.5–1.0 mm: 5 SPH from sample Paulen 2930 (picked by ODM)
- 0.25–0.5 mm: 8 SPH from sample Paulen 2933 (picked by ODM)