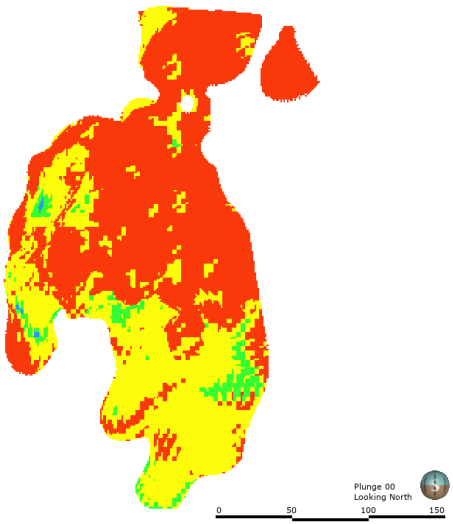
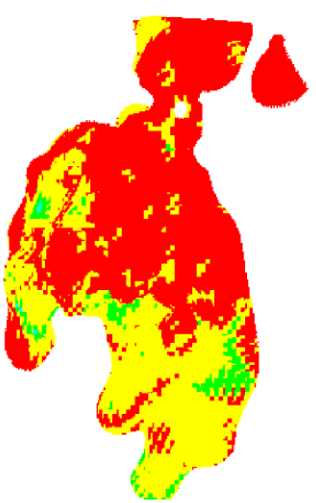


VS



Leapfrog Edge Estimation Testing

Comparison with Datamine Studio RM

Presented by Alexander Mitrofanov (Senior Resource Geologist, SRK Toronto)

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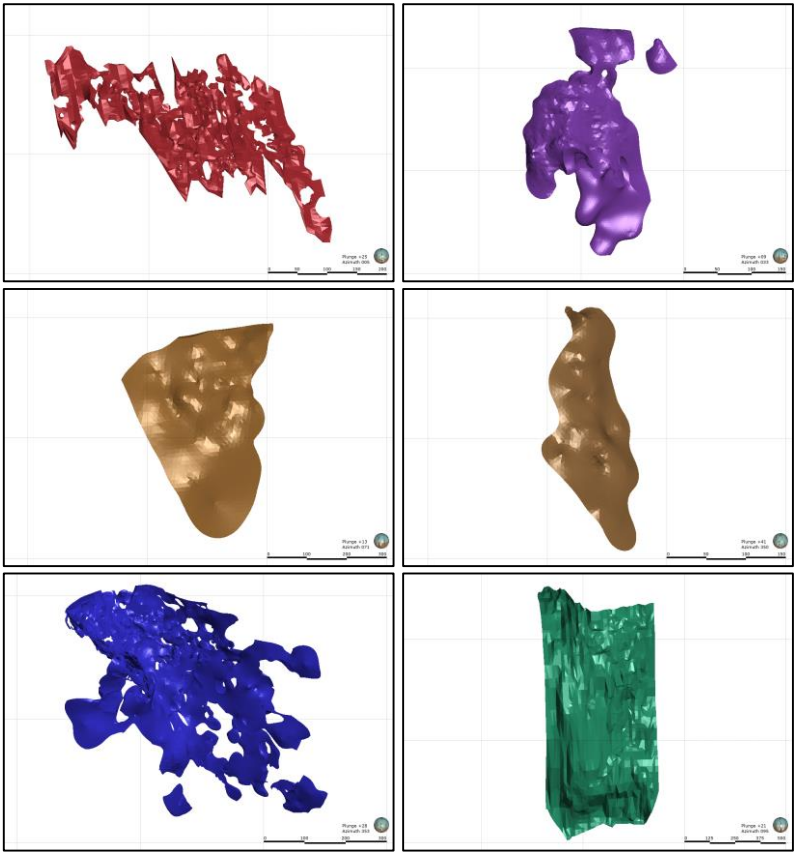
Introduction

- The scope of the current work is to compare the estimation results obtained from Leapfrog Edge (LF Edge) with those from Datamine (DM) software using the same initial dataset
- The conclusions made are limited by the set of the domains used for comparison and may not be used as a comprehensive study of the estimation process of LF Edge software

Domains

- Comparison based on set of 20 estimation domains from different projects
- Domains have different orientations, coordinate systems, and block and sub-block sizes (m and ft)
- Different capping applied to each domain
- 17 gold, 2 silver, and one uranium domain used



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Estimation Parameters

- The variogram model used for each domain was the same GSLib model used for the original project estimation. Variogram modelling in LF Edge was not checked or compared to GSLib. The focus was on comparing and checking estimation rather than variogram modelling.
- All the variogram models were spherical; the exponential and gaussian models will be checked during future studies.

				Structure 1				Structure 2			
Domain	Azimuth	Dip	Nugget	X Range	Y Range	Z Range	Sill	X Range	Y Range	Z Range	Sill
1	175	55	0.35	17	17	6	0.50	40	40	11	0.15
2	160	55	0.30	20	15	5	0.55	50	50	10	0.15
3	80	80	0.15	6	8	2	0.45	20	20	5	0.40
4	80	70	0.20	15	15	3	0.40	25	25	10	0.40
5	205	80	0.20	16	30	5	0.60	30	30	10	0.20
6	215	80	0.30	35	50	12	0.50	50	50	16	0.20
7	175	55	0.20	35	23	3.5	0.70	40	40	10	0.10
8	175	55	0.20	23	50	6	0.50	60	60	15	0.30
9	0	90	0.15	30	15	10	0.35	40	40	40	0.50
10	310	80	0.10	20	10	30	0.60	100	55	40	0.30
11	0	0	0.20	8	20	30	0.55	50	50	50	0.25
12	255	20	0.20	210	210	19	0.60	400	400	50	0.20
13	120	45	0.10	9	12	3	0.80	25	25	10	0.10
14	140	10	0.10	35	50	17	0.10	70	100	20	0.80
15	140	10	0.10	50	40	12	0.65	60	60	18	0.25
16	310	45	0.40	5	5	4	0.35	30	30	10	0.25
17	0	0	0.40	50	50	50	0.60	-	-	-	-
18	265	80	0.30	14	14	3	0.55	50	50	50	0.15
19	30	85	0.20	50	50	20	0.80	-	-	-	-
20	195	80	0.20	50	50	20	0.80	-	-	-	-

Estimation Parameters

- The search volume for the first run was determined by the variogram range, for the second was increased by a factor of 2, and for the third by a factor of 10.
- OK, ID2, and NN estimators were used for comparison.
- The orientation of the search volumes corresponds with that of the domain and variogram model.
- The min/max and max key parameters used were similar to the original estimation parameters.
- Octants were not used because of the different octant treatment in DM and LF Edge software.

Domain	Ellipse Size			Azimuth	Dip	First Run		Second Run			Third Run			Max Key
	X	Y	Z			Min	Max	Expansion	Min	Max	Expansion	Min	Max	
1	40	40	11	175	55	7	12	2	4	15	10	2	18	3
2	50	50	10	160	55	7	12	2	4	15	10	2	18	3
3	20	20	5	80	80	6	15	2	6	15	10	2	20	5
4	25	25	10	80	70	6	15	2	6	15	10	2	20	5
5	30	30	10	205	80	7	12	2	4	15	10	4	18	3
6	50	50	16	215	80	7	12	2	4	15	10	4	18	3
7	40	40	10	175	55	7	12	2	4	15	10	2	18	3
8	60	60	15	175	55	7	12	2	4	15	10	2	18	3
9	40	40	40	0	90	7	15	2	7	15	10	4	20	6
10	100	55	40	310	80	7	15	2	7	15	10	4	20	6
11	50	50	50	0	0	7	15	2	7	15	10	4	20	6
12	400	400	50	255	20	5	10	2	5	12	10	3	16	2
13	25	25	10	120	45	6	12	2	6	16	10	1	20	5
14	70	100	20	140	10	7	12	2	5	15	10	2	15	3
15	60	60	18	140	10	7	12	2	5	15	10	2	15	3
16	30	30	10	310	45	7	10	2	6	12	10	4	16	3
17	50	50	50	0	0	7	12	2	4	16	10	1	20	3
18	50	50	50	265	80	7	12	2	4	16	10	2	16	3
19	50	50	20	30	85	7	12	2	4	16	10	2	20	3
20	50	50	20	195	80	7	12	2	4	16	10	2	20	3

Checklist

The following comparisons were made

1. Model filling

2. Estimation
   - Global tonnage and grade report
   - Tonnage and grade reports by run
   - Grade-tonnage curves
   - SWATH plots against the composite data
   - Scatter plots of the estimated blocks

Model Filling

- Model filling is almost identical in both versions and corresponds well with the original wireframe volume.

Domain	Wireframe Volume	LF Edge Filling	Difference to Wireframe	DM Filling	Difference to Wireframe	LF vs DM Filling
1	692,320	692,338	0.0%	692,339	0.0%	0.00%
2	335,990	335,913	0.0%	335,911	0.0%	0.00%
3	1,316,100	1,316,227	0.0%	1,316,218	0.0%	0.00%
4	1,370,100	1,369,966	0.0%	1,369,970	0.0%	0.00%
5	774,820	774,720	0.0%	774,719	0.0%	0.00%
6	4,953,100	4,952,855	0.0%	4,952,865	0.0%	0.00%
7	976,900	976,918	0.0%	976,922	0.0%	0.00%
8	976,900	976,918	0.0%	976,922	0.0%	0.00%
9	4,745,800	4,746,368	0.0%	4,746,392	0.0%	0.00%
10	2,671,700	2,671,912	0.0%	2,671,896	0.0%	0.00%
11	85,622,000	85,622,616	0.0%	85,623,096	0.0%	0.00%
12	866,810,000	866,776,600	0.0%	866,776,800	0.0%	0.00%
13	196,270	196,255	0.0%	196,255	0.0%	0.00%
14	766,880	767,760	0.1%	767,777	0.1%	0.00%
15	766,880	767,760	0.1%	767,777	0.1%	0.00%
16	298,280	298,291	0.0%	298,292	0.0%	0.00%
17	1,645,100	1,644,678	0.0%	1,644,593	0.0%	-0.01%
18	2,822,300	2,821,670	0.0%	2,821,684	0.0%	0.00%
19	167,770	167,741	0.0%	167,745	0.0%	0.00%
20	151,490	151,435	0.0%	151,438	0.0%	0.00%

Global Tonnage and Grade Report

- The global results vary by less than 0.1%.

Domain	LF Edge Results				Datamine Results				Difference						
	Volume	Grade			Volume	Grade			Volume	Grade			Metal Amount		
		OK	ID2	NN		OK	ID2	NN		OK	ID2	NN	OK	ID2	NN
1	692,338	3.69	3.60	4.32	692,339	3.69	3.60	4.32	0.00%	0.00%	0.01%	0.01%	0.00%	0.01%	0.01%
2	335,913	2.43	2.38	2.37	335,911	2.43	2.38	2.37	0.00%	0.00%	-0.01%	-0.02%	0.00%	-0.01%	-0.02%
3	1,316,227	1.94	1.96	1.93	1,316,218	1.94	1.96	1.93	0.00%	0.01%	0.00%	0.01%	0.01%	0.00%	0.01%
4	1,369,966	3.33	3.36	3.33	1,369,970	3.33	3.36	3.33	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
5	774,720	3.65	3.66	3.64	774,719	3.65	3.66	3.64	0.00%	-0.01%	-0.01%	0.00%	-0.01%	-0.01%	0.00%
6	4,952,855	0.38	0.37	0.36	4,952,865	0.38	0.37	0.36	0.00%	0.01%	0.01%	0.00%	0.01%	0.01%	0.00%
7	976,918	0.53	0.53	0.49	976,922	0.53	0.53	0.49	0.00%	-0.01%	0.01%	-0.01%	-0.01%	0.01%	-0.01%
8	976,918	3.41	3.38	4.10	976,922	3.41	3.38	4.10	0.00%	0.01%	-0.01%	0.00%	0.01%	-0.01%	0.00%
9	4,746,368	0.34	0.35	0.38	4,746,392	0.34	0.35	0.38	0.00%	-0.01%	0.01%	0.04%	-0.01%	0.01%	0.04%
10	2,671,912	0.64	0.63	0.61	2,671,896	0.64	0.63	0.61	0.00%	0.03%	0.08%	-0.03%	0.03%	0.08%	-0.03%
11	85,622,616	0.24	0.24	0.26	85,623,096	0.24	0.24	0.26	0.00%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%
12	866,776,600	1.17	1.28	1.22	866,776,800	1.17	1.28	1.22	0.00%	0.03%	0.01%	-0.01%	0.03%	0.01%	-0.01%
13	196,255	1.08	1.13	0.95	196,255	1.08	1.13	0.95	0.00%	-0.02%	-0.01%	0.02%	-0.02%	-0.01%	0.02%
14	767,760	0.10	0.10	0.09	767,777	0.10	0.10	0.09	0.00%	0.00%	0.00%	0.01%	0.00%	0.01%	0.01%
15	767,760	18.72	20.67	21.22	767,777	18.72	20.67	21.22	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
16	298,291	3.45	3.28	3.80	298,292	3.45	3.28	3.80	0.00%	0.00%	-0.01%	-0.01%	0.00%	-0.01%	-0.01%
17	1,644,678	2.62	2.54	2.55	1,644,593	2.62	2.54	2.55	-0.01%	0.00%	0.01%	0.02%	-0.01%	0.00%	0.01%
18	2,821,670	1.57	1.52	1.56	2,821,684	1.57	1.52	1.56	0.00%	0.00%	-0.02%	0.02%	0.00%	-0.02%	0.02%
19	167,741	3.64	3.78	3.61	167,745	3.64	3.78	3.61	0.00%	0.01%	-0.01%	-0.01%	0.01%	-0.01%	0.00%
20	151,435	5.66	5.62	5.22	151,438	5.66	5.62	5.22	0.00%	-0.02%	-0.01%	-0.02%	-0.01%	-0.01%	-0.01%

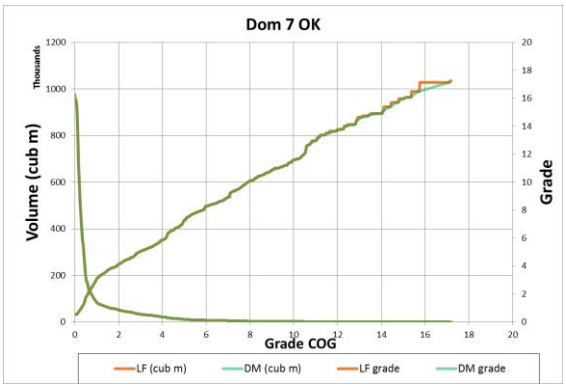
Tonnage and Grade Reports by Run

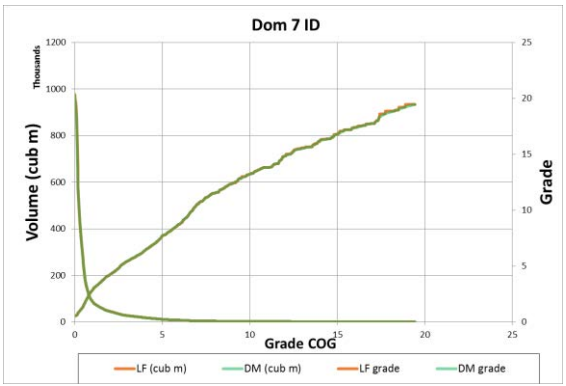
- The estimation results for each run vary by less than 0.1%.
- A full comparison table is available in Appendix I.

Domain	Run	Datamine Results				LF Edge Results				Difference					
		Volume OK	Grade OK	Volume ID	Grade ID	Volume OK	Grade OK	Volume ID	Grade ID	Volume OK	Grade OK	Metal OK	Volume ID	Grade ID	Metal ID
1	1	672,563	3.66	672,563	3.55	672,562	3.66	672,562	3.55	0.00%	-0.01%	-0.01%	0.00%	0.01%	0.01%
1	2	19,776	4.74	19,776	5.18	19,776	4.74	19,776	5.18	0.00%	-0.01%	-0.01%	0.00%	-0.01%	-0.01%
1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	1	335,911	2.43	335,911	2.38	335,913	2.43	335,913	2.38	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%
2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	1	708,864	2.00	708,864	1.98	708,871	2.00	708,871	1.98	0.00%	0.01%	0.01%	0.00%	0.01%	0.01%
3	2	522,053	1.91	522,053	1.93	522,049	1.91	522,049	1.93	0.00%	0.01%	0.01%	0.00%	0.01%	0.01%
3	3	85,301	1.58	85,301	1.85	85,307	1.58	85,307	1.85	0.01%	-0.01%	0.00%	0.01%	-0.01%	0.00%
4	1	1,139,417	3.51	1,139,417	3.53	1,139,412	3.51	1,139,412	3.53	0.00%	0.01%	0.01%	0.00%	0.01%	0.01%
4	2	211,888	2.56	211,888	2.62	211,888	2.56	211,888	2.62	0.00%	-0.02%	-0.02%	0.00%	-0.02%	-0.02%
4	3	18,665	1.63	18,665	1.19	18,666	1.63	18,666	1.19	0.01%	0.00%	0.01%	0.01%	0.02%	0.03%
5	1	678,922	3.80	678,922	3.82	678,922	3.80	678,922	3.83	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%
5	2	95,797	2.54	95,797	2.51	95,798	2.54	95,798	2.51	0.00%	-0.01%	-0.01%	0.00%	0.01%	0.01%
5	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Grade-Tonnage Curves

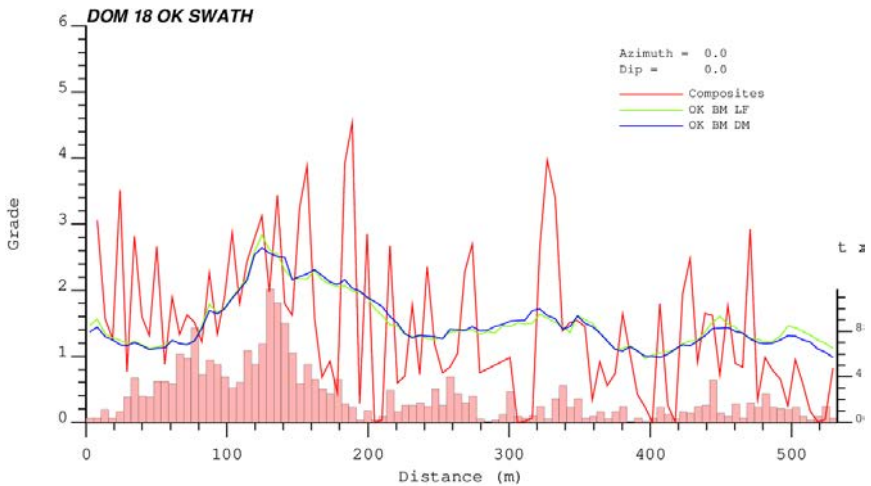
- The grade-tonnage curves for OK and ID2 estimators are almost identical.
- The gaps in the LF curve are attributed to the GTC calculation differences between LF Edge and DM:
  - LF Edge calculates the results with the fixed short grade lag (like 0.01 g/t) whereas DM calculates only those lags that have differences in the GTC results. For example, if there are no blocks in the 10 g/t to 11 g/t interval, LF Edge will report the same numbers for every lag between 10 and 11 but DM will report only one value – above 11 g/t. The actual numbers will match but LF Edge will create artifacts on the curve.
- Other grade-tonnage curves are available in Appendix II.





SWATH Plots

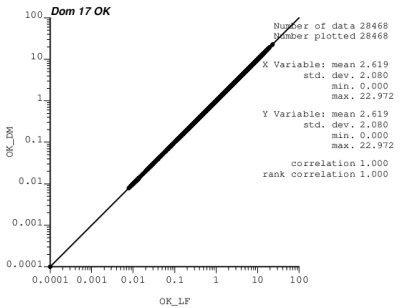
- The SWATH plots look similar for both estimation results. The insignificant deviations may be attributed to the different sub-blocking algorithms used by LF Edge and DM:
  - The sub-blocking in LF allows only two block sizes: the parent block and the minimum sub-block. DM allows the block to have an intermediate size between the parent and smallest sub-block. The difference in the position of the block centroid in each type of software causes the slight deviations observed in SWATH plot.
- Other SWATH plots are available in Appendix III.

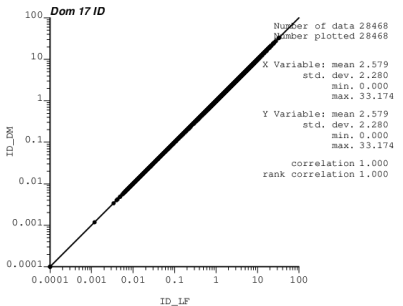


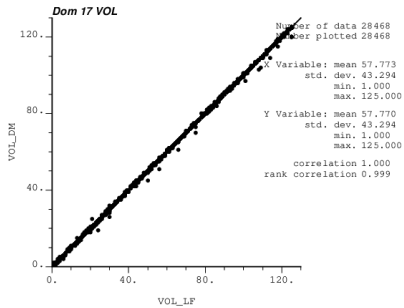
Scatter Plots of the Estimated Blocks

- The average grade and total volume filled were calculated for each parent block and were then overlapped and compared.
- The OK and ID2 estimation results were compared with the volume filled within the parent cell.
- The results demonstrate good reproduction of the estimation and model filling comparison in the two software applications.
- Other scatter plots are available in the Appendix IV.

Scatter Plots Dom 17







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Conclusions

- The results of the estimations conducted for 20 test domains in LF Edge can be reproduced in DM with very close global and local results.

- The following options and modules were not tested:
  - Octant search (since octants are treated differently in LF and DM)
  - Variogram models other than spherical
  - Variogram modelling

- Future testing will address the identified gaps.

Presenter

Aleksandr Mitrofanov PhD, PGeo
Senior Consultant (Resource Geology)

Over 11 years of employment in the geological sector; major experience lies within complex geologic modelling, geostatistics and resource estimation. Major commodities include precious and base metals in North and South America, Europe and Russia

Tel: +1-416-601-1445
Fax: +1-416-601-9046
Email: amitrofanov@srk.com

SRK Consulting (Canada) Inc.
Suite 1500, 155 University Avenue, Toronto, Ontario, M5H 3B7, Canada

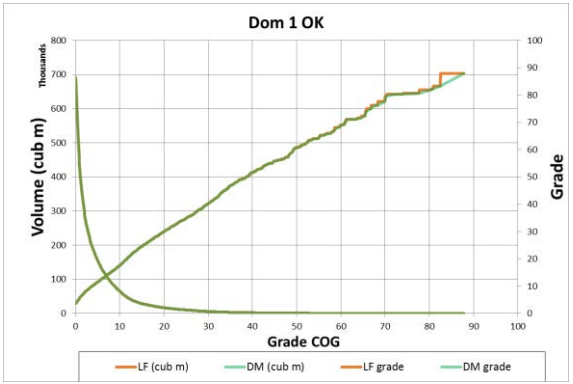
Appendix I – Reports by Runs

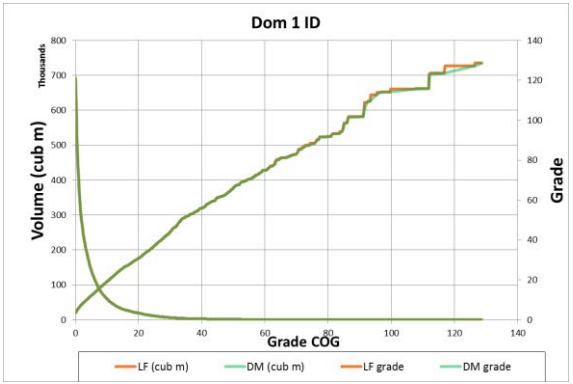
		Datamine Results				LF Edge Results				Difference					
Domain	Run	Volume OK	Grade OK	Volume ID	Grade ID	Volume OK	Grade OK	Volume ID	Grade ID	Volume OK	Grade OK	Metal OK	Volume ID	Grade ID	Metal ID
1	1	672,563	3.66	672,563	3.55	672,562	3.66	672,562	3.55	0.00%	-0.01%	-0.01%	0.00%	0.01%	0.01%
1	2	19,776	4.74	19,776	5.18	19,776	4.74	19,776	5.18	0.00%	-0.01%	-0.01%	0.00%	-0.01%	-0.01%
1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	1	335,911	2.43	335,911	2.38	335,913	2.43	335,913	2.38	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%
2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	1	708,864	2.00	708,864	1.98	708,871	2.00	708,871	1.98	0.00%	0.01%	0.01%	0.00%	0.01%	0.01%
3	2	522,053	1.91	522,053	1.93	522,049	1.91	522,049	1.93	0.00%	0.01%	0.01%	0.00%	0.01%	0.01%
3	3	85,301	1.58	85,301	1.85	85,307	1.58	85,307	1.85	0.01%	-0.01%	0.00%	0.01%	-0.01%	0.00%
4	1	1,139,417	3.51	1,139,417	3.53	1,139,412	3.51	1,139,412	3.53	0.00%	0.01%	0.01%	0.00%	0.01%	0.01%
4	2	211,888	2.56	211,888	2.62	211,888	2.56	211,888	2.62	0.00%	-0.02%	-0.02%	0.00%	-0.02%	-0.02%
4	3	18,665	1.63	18,665	1.19	18,666	1.63	18,666	1.19	0.01%	0.00%	0.01%	0.01%	0.02%	0.03%
5	1	678,922	3.80	678,922	3.82	678,922	3.80	678,922	3.83	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%
5	2	95,797	2.54	95,797	2.51	95,798	2.54	95,798	2.51	0.00%	-0.01%	-0.01%	0.00%	0.01%	0.01%
5	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	1	1,420,881	0.47	1,420,881	0.47	1,420,882	0.47	1,420,882	0.47	0.00%	0.01%	0.01%	0.00%	0.01%	0.01%
6	2	2,662,691	0.32	2,662,691	0.31	2,662,681	0.32	2,662,681	0.31	0.00%	0.00%	0.00%	0.00%	0.02%	0.02%
6	3	869,293	0.43	869,293	0.41	869,292	0.43	869,292	0.41	0.00%	0.01%	0.01%	0.00%	-0.01%	-0.01%
7	1	162,114	0.83	162,114	0.75	162,113	0.83	162,113	0.75	0.00%	-0.02%	-0.02%	0.00%	0.05%	0.05%
7	2	597,173	0.51	597,173	0.52	597,171	0.51	597,171	0.52	0.00%	-0.04%	-0.04%	0.00%	0.03%	0.03%
7	3	217,635	0.35	217,635	0.39	217,634	0.35	217,634	0.39	0.00%	0.05%	0.05%	0.00%	0.02%	0.02%
8	1	371,662	3.85	371,662	3.86	371,660	3.85	371,660	3.86	0.00%	-0.01%	-0.01%	0.00%	0.00%	0.00%
8	2	546,728	3.13	546,728	3.10	546,727	3.13	546,727	3.11	0.00%	0.01%	0.01%	0.00%	0.01%	0.01%
8	3	58,532	3.26	58,532	2.93	58,531	3.26	58,531	2.93	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%
9	1	2,958,472	0.34	2,958,472	0.34	2,958,448	0.34	2,958,448	0.34	0.00%	0.00%	0.00%	0.00%	-0.01%	-0.01%
9	2	1,504,232	0.33	1,504,232	0.31	1,504,232	0.33	1,504,232	0.31	0.00%	0.06%	0.06%	0.00%	-0.01%	-0.01%
9	3	283,688	0.47	283,688	0.55	283,688	0.47	283,688	0.55	0.00%	-0.06%	-0.06%	0.00%	0.01%	0.01%
10	1	2,383,376	0.68	2,383,376	0.66	2,383,392	0.68	2,383,392	0.66	0.00%	-0.01%	-0.01%	0.00%	0.00%	0.00%
10	2	262,520	0.28	262,520	0.28	262,520	0.28	262,520	0.28	0.00%	0.00%	0.00%	0.00%	-0.01%	-0.01%
10	3	26,000	0.43	26,000	0.55	26,000	0.43	26,000	0.55	0.00%	0.10%	0.10%	0.00%	0.00%	0.00%

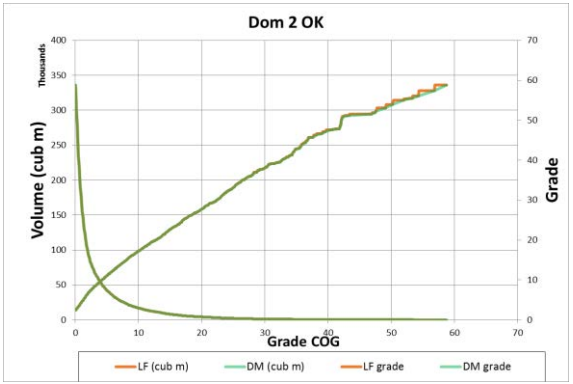
Appendix I – Reports by Runs

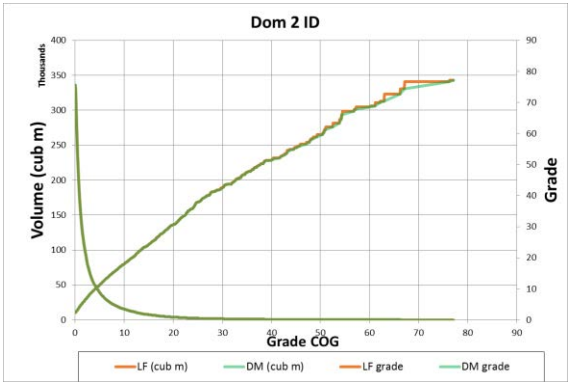
		Datamine Results				LF Edge Results				Difference					
Domain	Run	Volume OK	Grade OK	Volume ID	Grade ID	Volume OK	Grade OK	Volume ID	Grade ID	Volume OK	Grade OK	Metal OK	Volume ID	Grade ID	Metal ID
11	1	25,595,336	0.30	25,595,336	0.30	25,595,248	0.30	25,595,248	0.30	0.00%	-0.06%	-0.06%	0.00%	0.03%	0.03%
11	2	41,091,816	0.22	41,091,816	0.22	41,091,408	0.22	41,091,408	0.22	0.00%	-0.05%	-0.05%	0.00%	0.03%	0.03%
11	3	18,935,944	0.20	18,935,944	0.21	18,935,960	0.20	18,935,960	0.21	0.00%	-0.10%	-0.10%	0.00%	-0.04%	-0.04%
12	1	148,437,800	1.25	148,437,800	1.27	148,437,800	1.25	148,437,800	1.27	0.00%	0.03%	0.03%	0.00%	0.02%	0.02%
12	2	582,010,400	1.11	582,010,400	1.12	582,010,200	1.11	582,010,200	1.12	0.00%	-0.01%	-0.01%	0.00%	0.00%	0.00%
12	3	136,328,600	1.37	136,328,600	2.00	136,328,600	1.37	136,328,600	2.00	0.00%	-0.01%	-0.01%	0.00%	0.01%	0.01%
13	1	132,769	1.29	132,769	1.37	132,769	1.30	132,769	1.37	0.00%	0.01%	0.01%	0.00%	-0.01%	-0.01%
13	2	56,333	0.69	56,333	0.65	56,333	0.69	56,333	0.65	0.00%	0.07%	0.07%	0.00%	0.01%	0.01%
13	3	7,153	0.23	7,153	0.40	7,153	0.23	7,153	0.40	0.00%	0.03%	0.03%	0.00%	-0.04%	-0.04%
14	1	241,646	0.09	241,646	0.09	241,647	0.09	241,647	0.09	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
14	2	461,584	0.11	461,584	0.10	461,566	0.11	461,566	0.10	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
14	3	64,547	0.09	64,547	0.08	64,547	0.09	64,547	0.08	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
15	1	69,240	14.76	69,240	14.97	69,240	14.76	69,240	14.97	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
15	2	562,342	20.04	562,342	22.07	562,324	20.04	562,324	22.08	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
15	3	136,195	15.29	136,195	17.75	136,195	15.29	136,195	17.75	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
16	1	183,365	3.75	183,365	3.71	183,365	3.75	183,365	3.71	0.00%	0.00%	0.00%	0.00%	0.01%	0.01%
16	2	103,414	3.03	103,414	2.61	103,414	3.03	103,414	2.61	0.00%	0.01%	0.01%	0.00%	-0.01%	-0.01%
16	3	11,513	2.37	11,513	2.57	11,513	2.37	11,513	2.57	0.00%	-0.02%	-0.02%	0.00%	0.02%	0.01%
17	1	1,404,102	2.68	1,404,102	2.61	1,404,183	2.68	1,404,183	2.61	0.01%	0.02%	0.02%	0.01%	-0.02%	-0.01%
17	2	236,090	2.21	236,090	2.06	236,091	2.21	236,091	2.06	0.00%	0.00%	0.00%	0.00%	-0.01%	-0.01%
17	3	4,401	4.82	4,401	6.20	4,404	4.82	4,404	6.20	0.07%	-0.01%	0.06%	0.07%	0.00%	0.07%
18	1	1,470,126	1.73	1,470,126	1.73	1,470,115	1.73	1,470,115	1.73	0.00%	0.02%	0.01%	0.00%	-0.02%	-0.02%
18	2	1,160,354	1.43	1,160,354	1.33	1,160,351	1.43	1,160,351	1.33	0.00%	-0.03%	-0.03%	0.00%	0.02%	0.02%
18	3	191,204	1.25	191,204	1.09	191,204	1.25	191,204	1.09	0.00%	-0.03%	-0.03%	0.00%	0.04%	0.04%
19	1	163,774	3.70	163,774	3.84	163,774	3.70	163,774	3.84	0.00%	0.01%	0.01%	0.00%	0.00%	-0.01%
19	2	3,970	1.32	3,970	1.28	3,968	1.32	3,968	1.28	-0.07%	0.09%	0.02%	-0.07%	0.09%	0.02%
19	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20	1	151,416	5.66	151,416	5.62	151,413	5.66	151,413	5.62	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
20	2	22	1.37	22	1.53	22	1.37	22	1.53	0.00%	0.02%	0.02%	0.00%	0.02%	0.02%
20	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix II – Grade-Tonnage Curves









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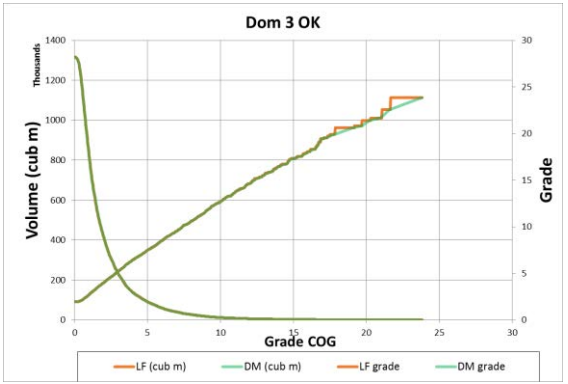

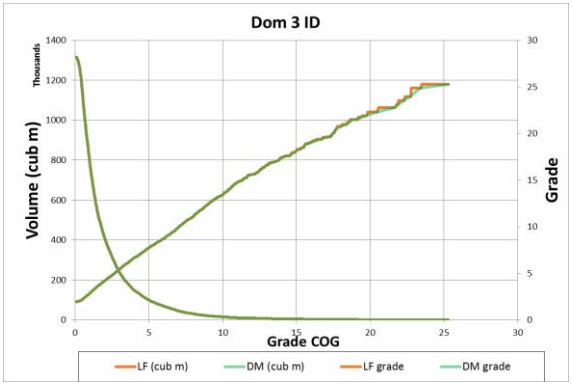

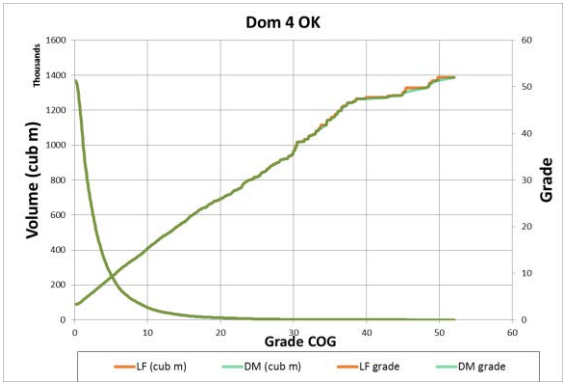

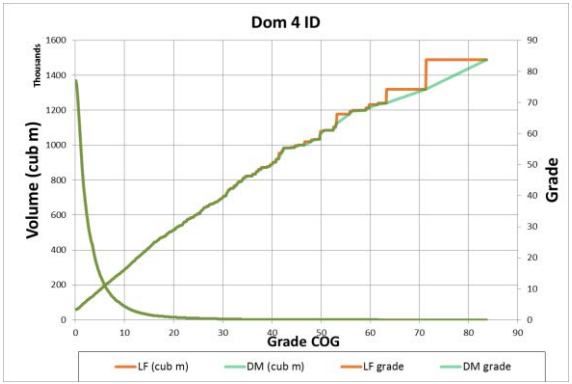

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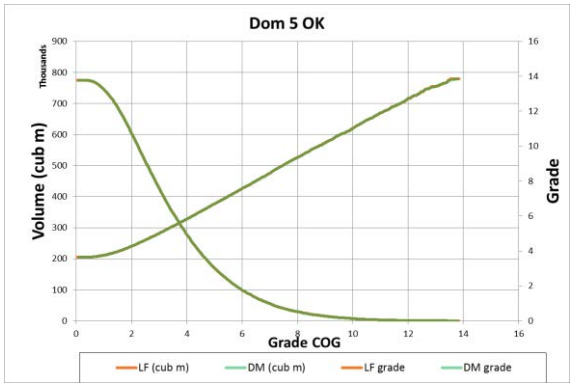

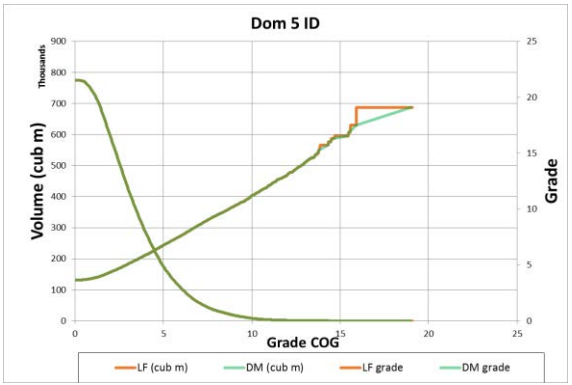

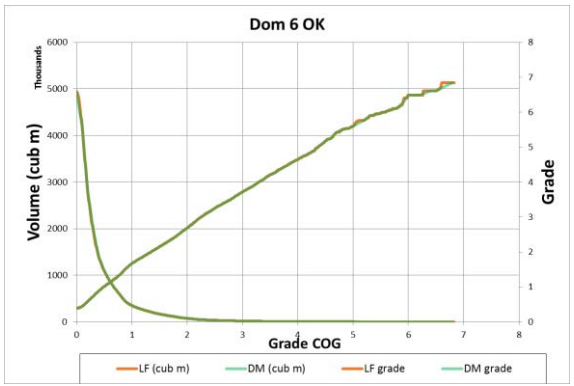

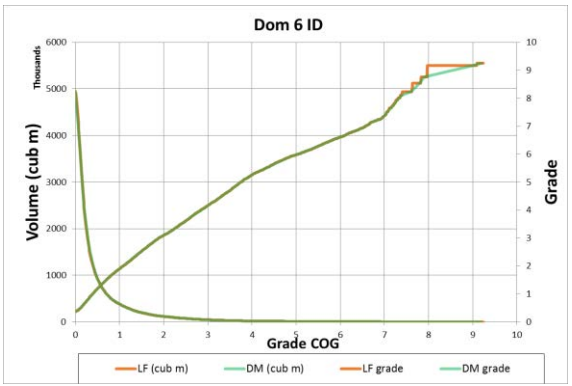

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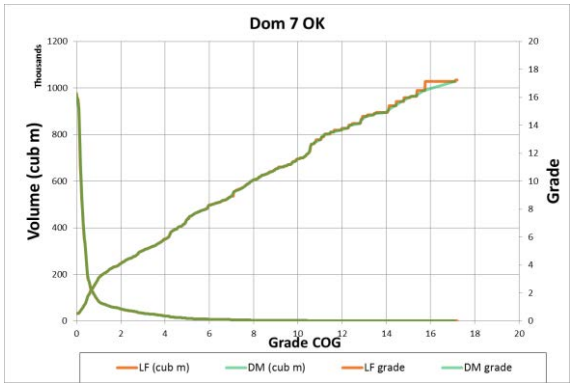
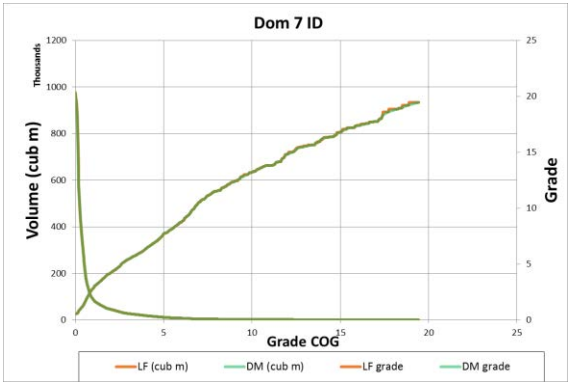
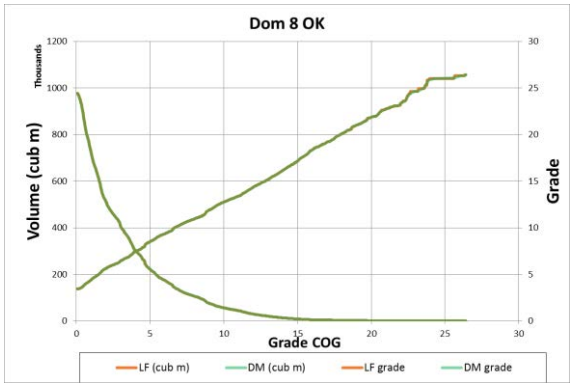
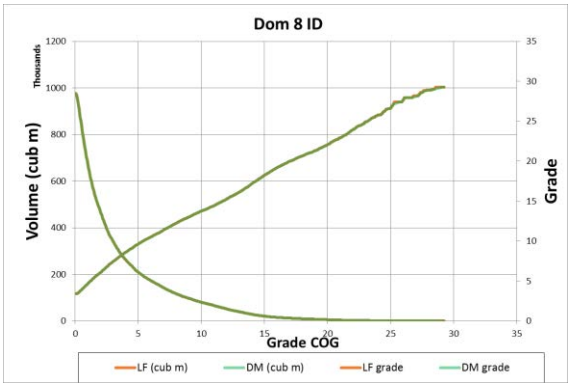
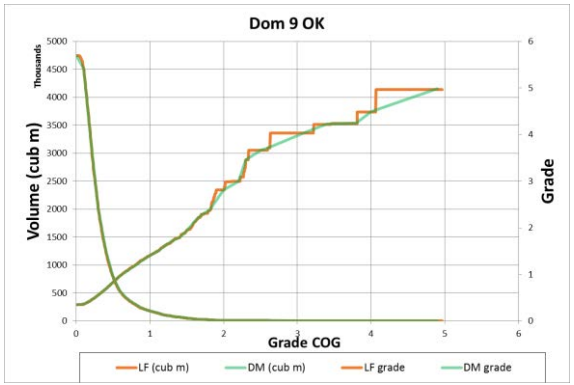


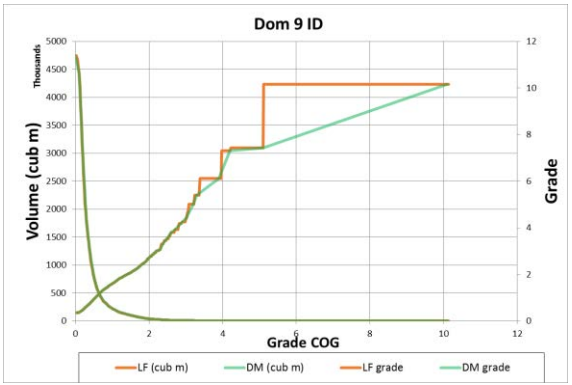


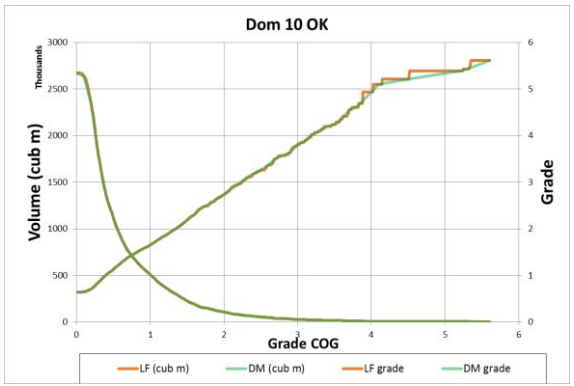


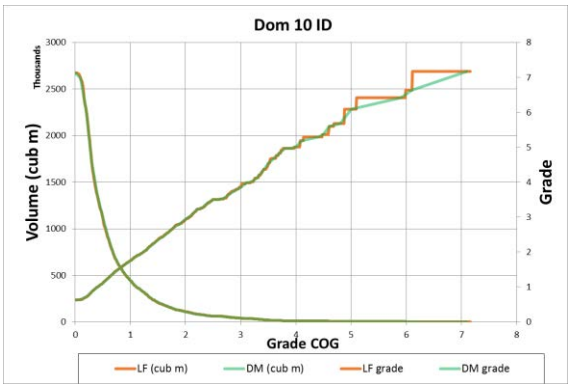


Appendix II – Grade-Tonnage Curves

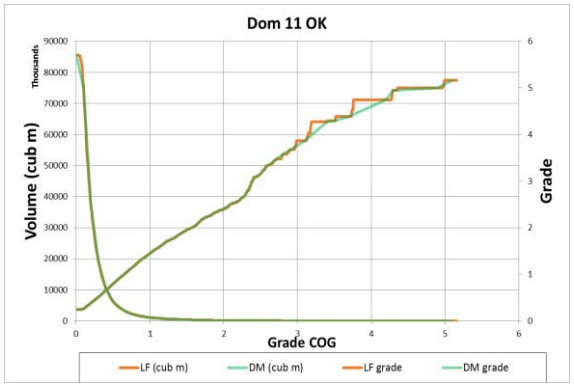


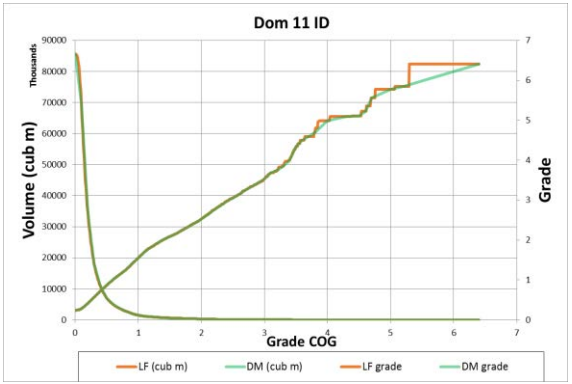


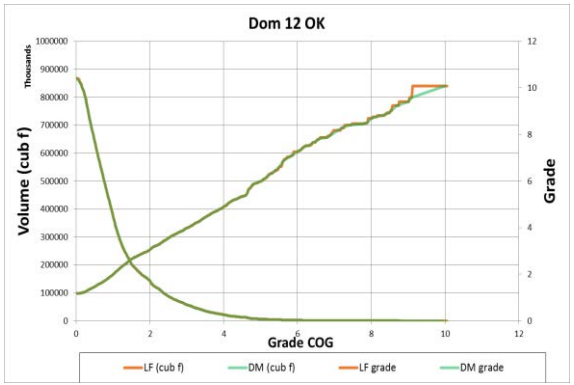


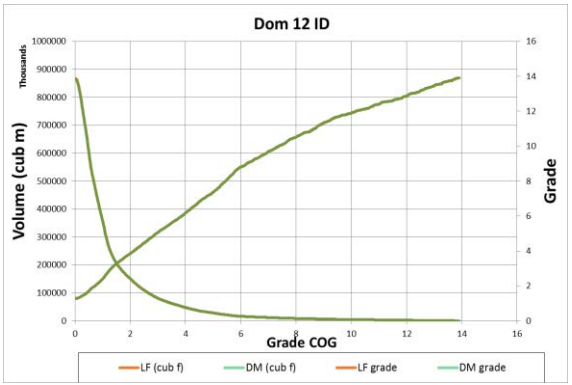


Appendix II – Grade-Tonnage Curves

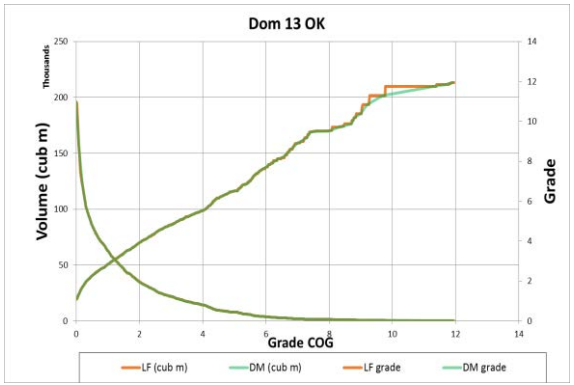


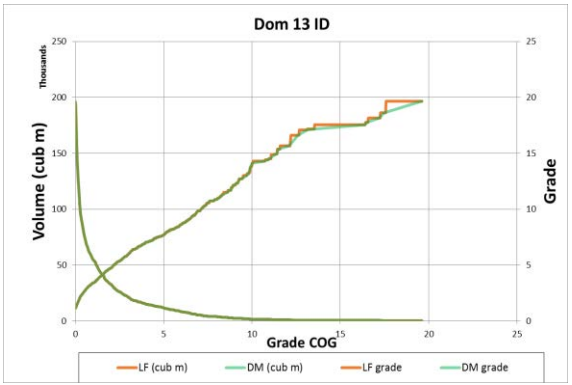


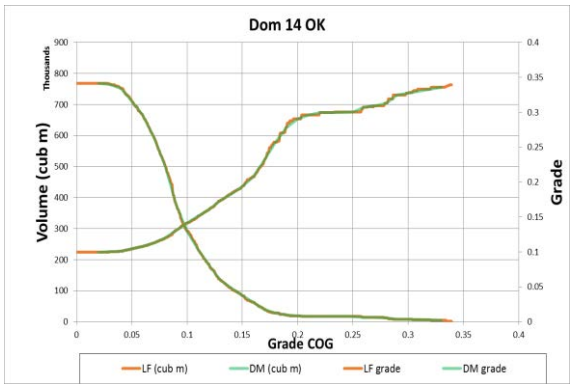


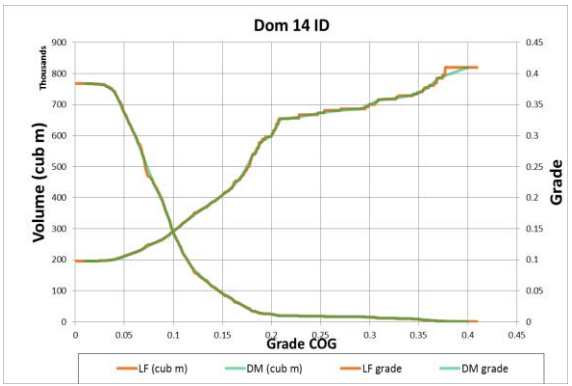


Appendix II – Grade-Tonnage Curves

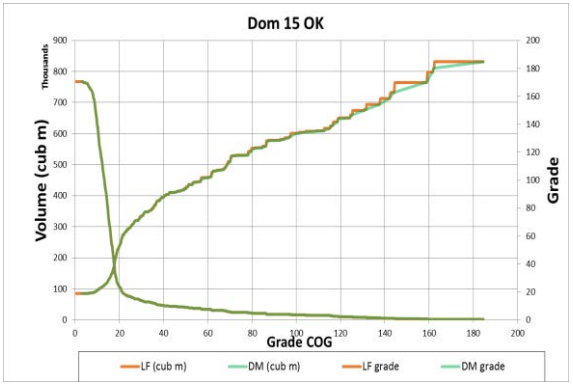


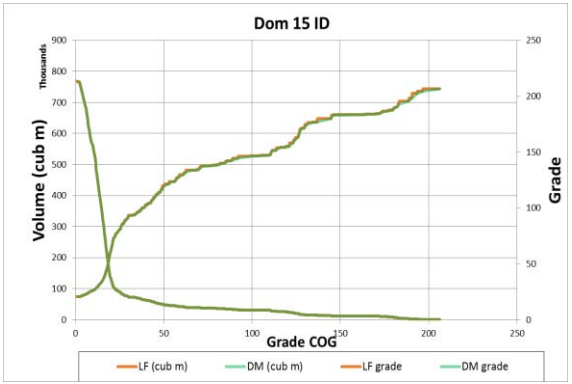


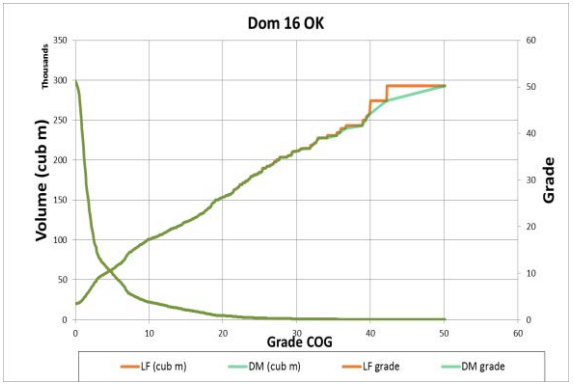


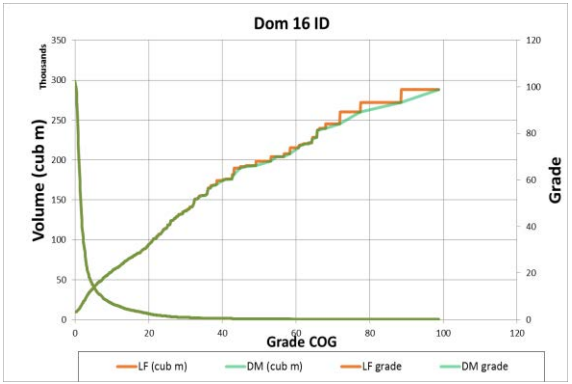


Appendix II – Grade-Tonnage Curves

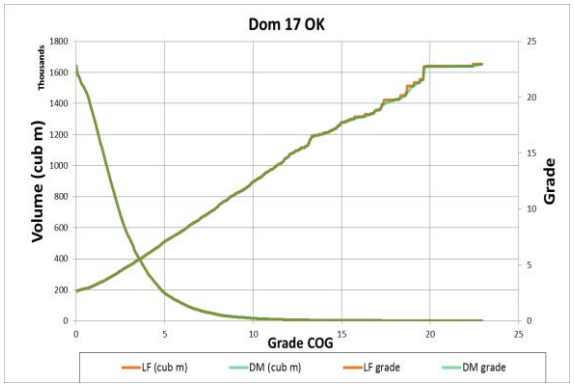


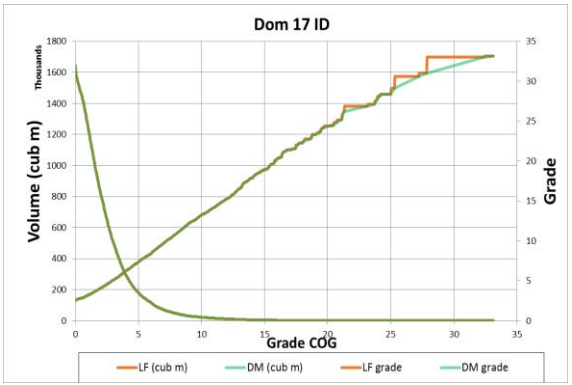


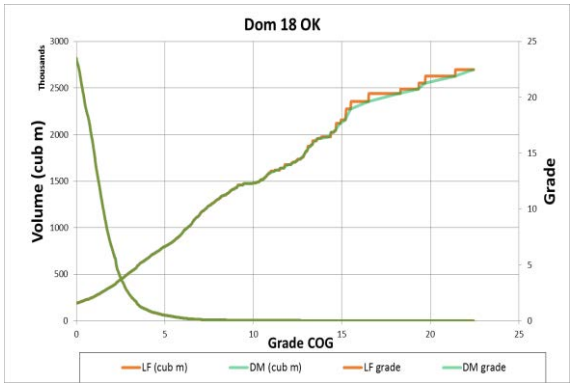


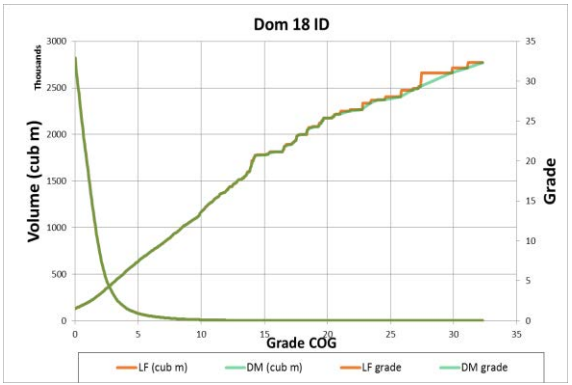


Appendix II – Grade-Tonnage Curves









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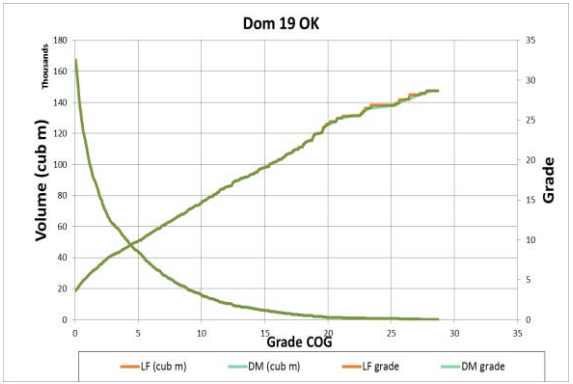
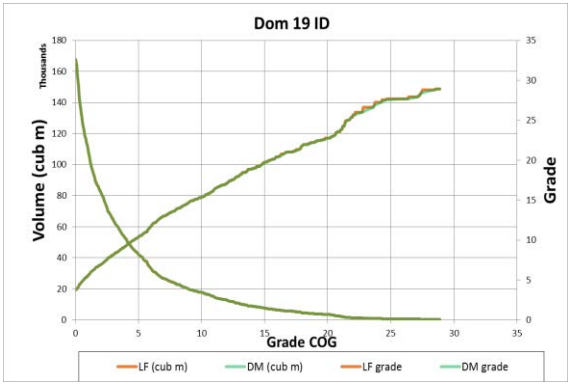
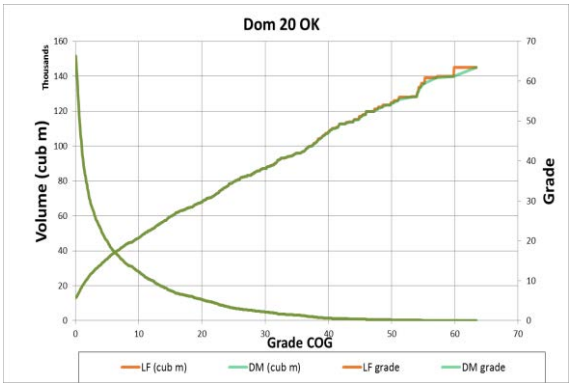
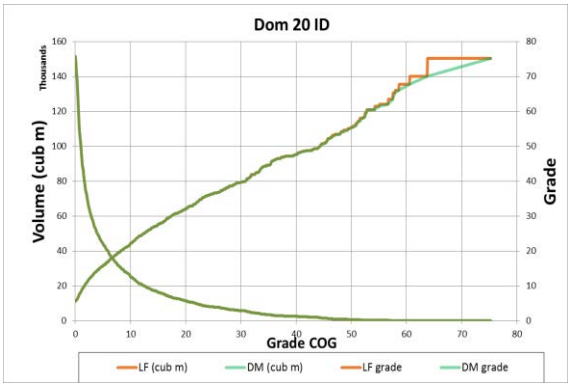
Appendix II – Grade-Tonnage Curves









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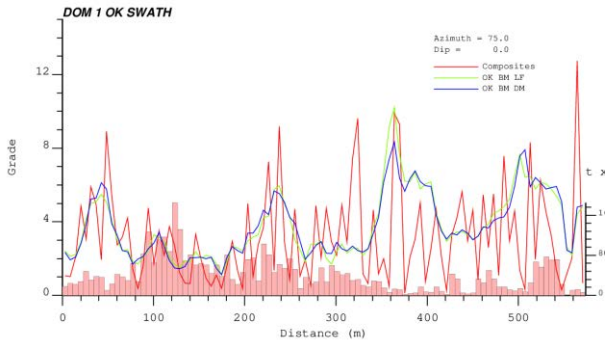

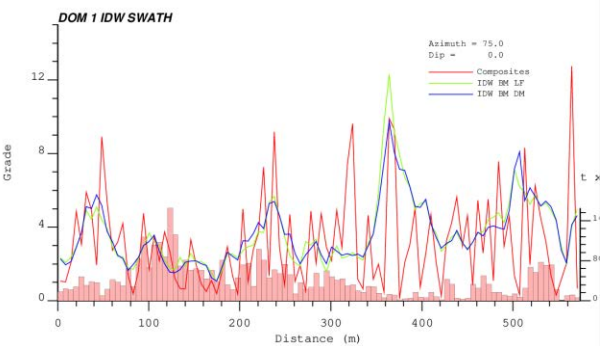

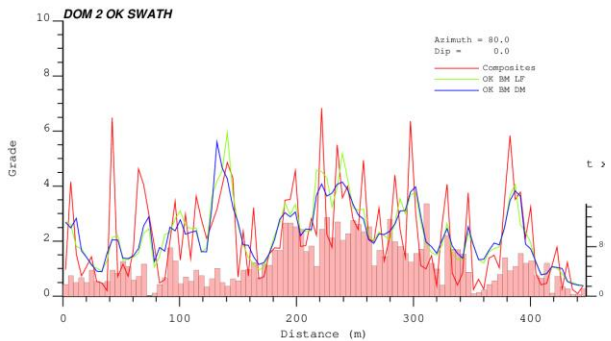

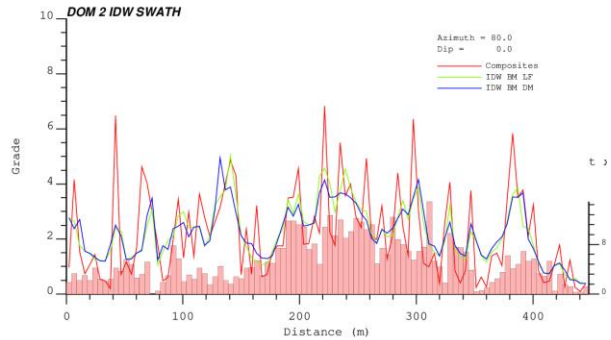

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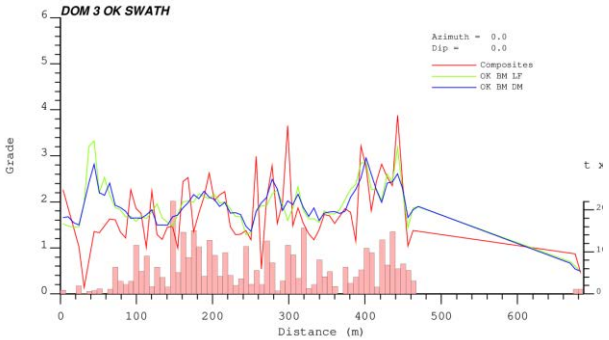

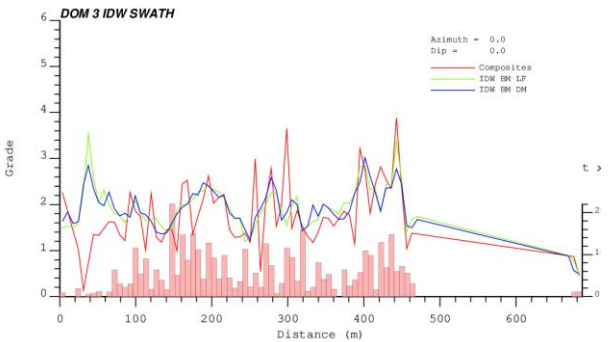

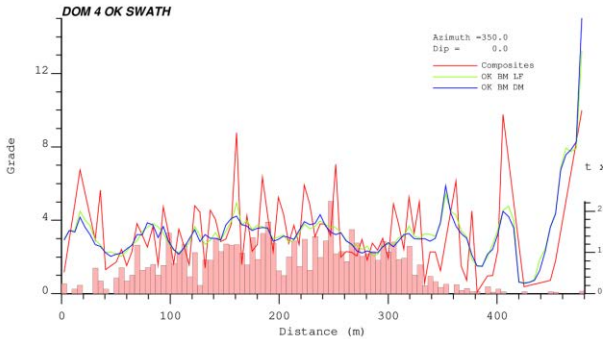

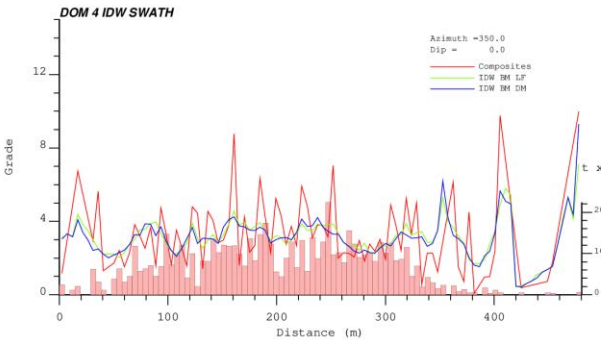

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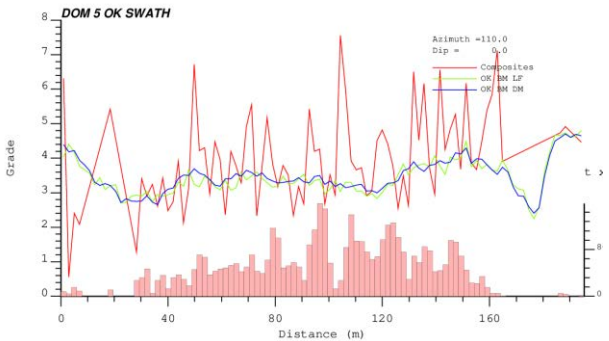

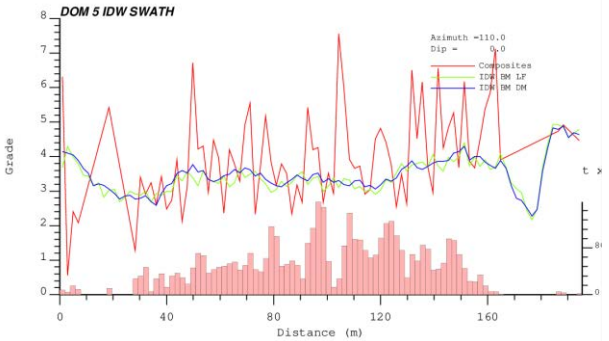

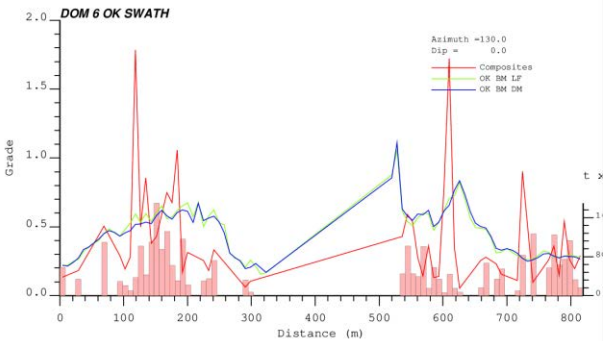

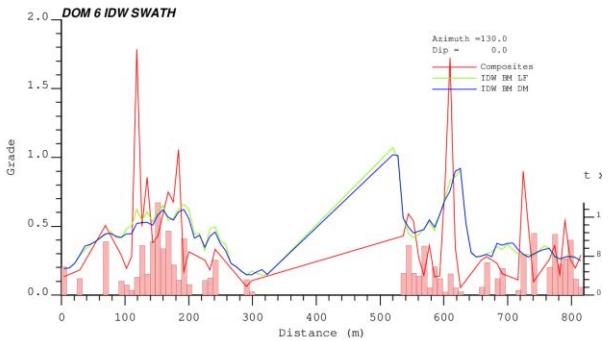

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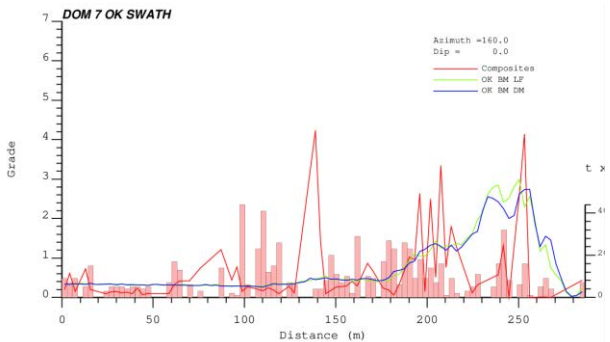

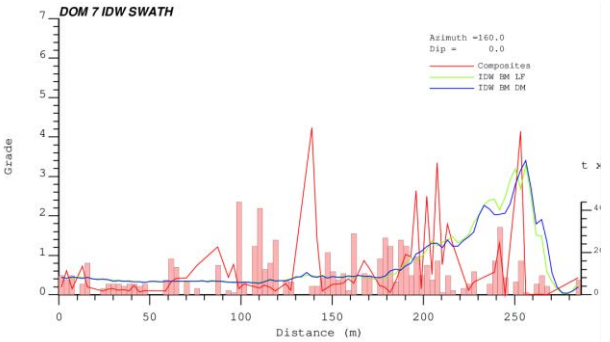

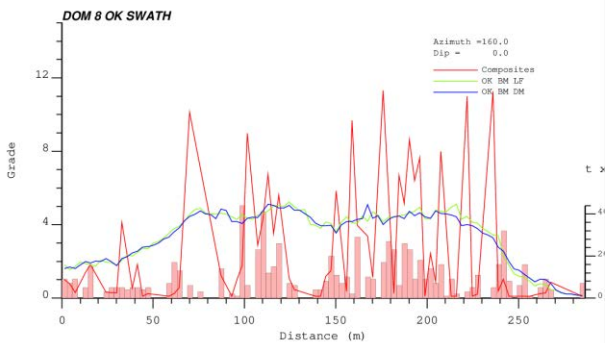

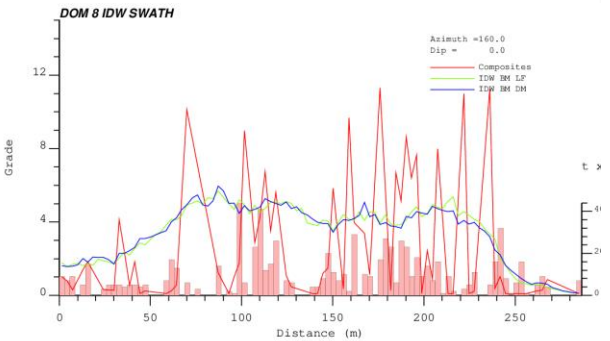

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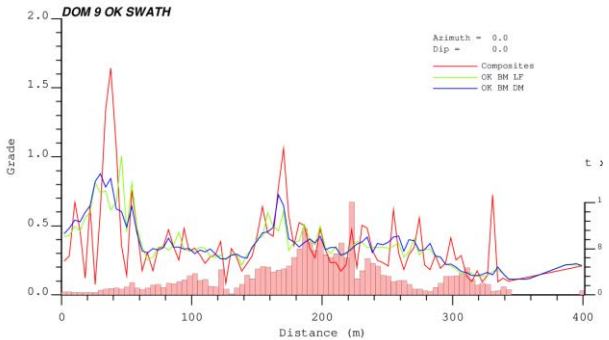

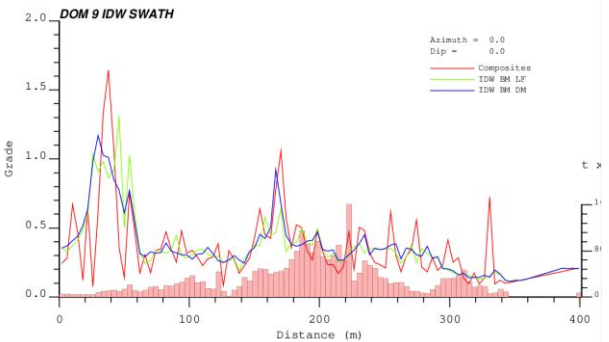

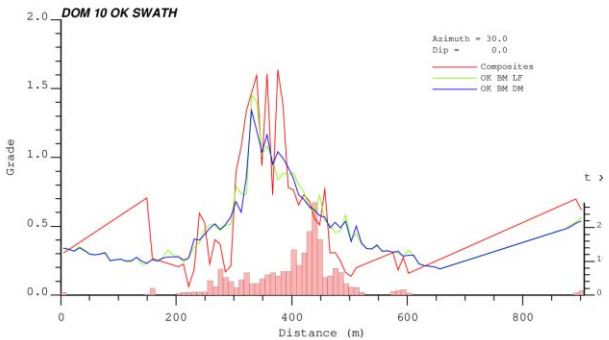

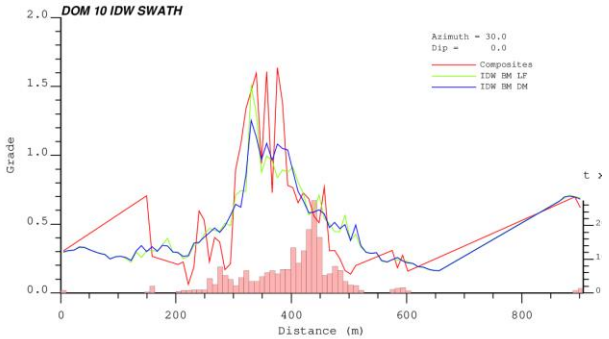

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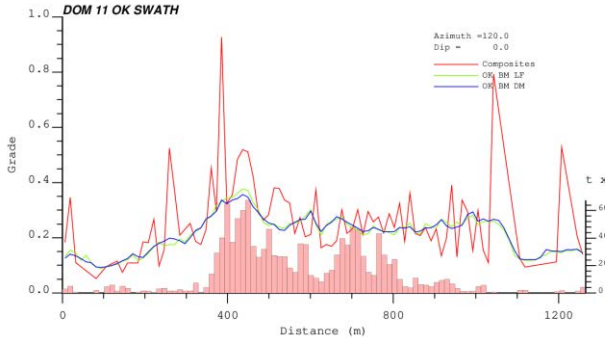

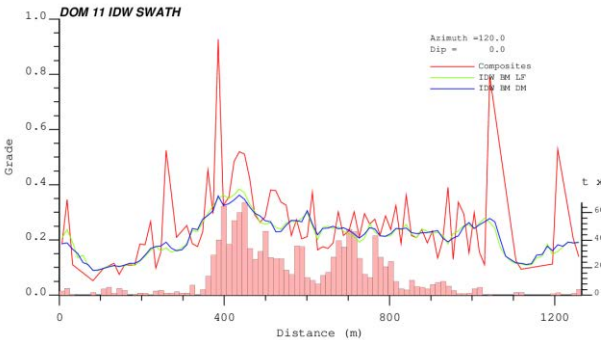

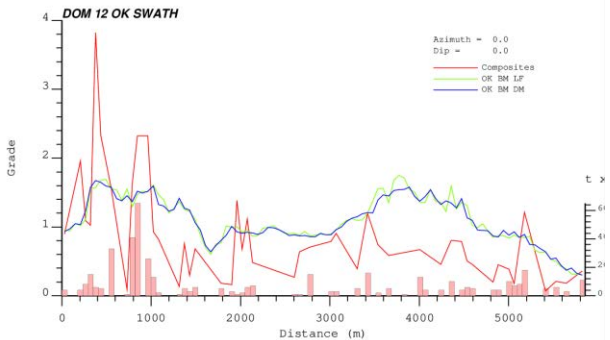

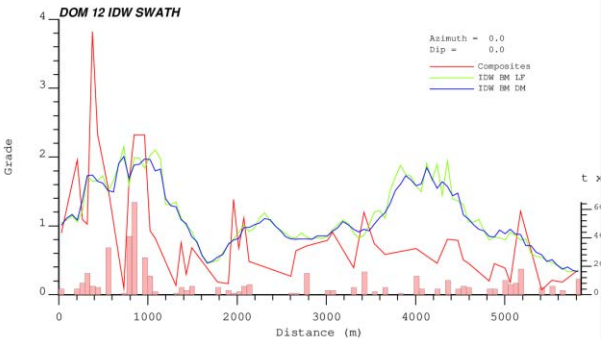

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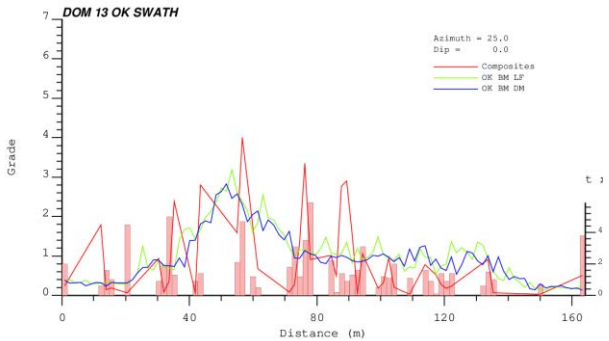

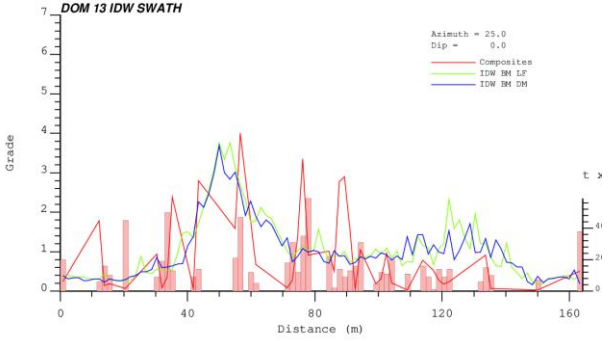

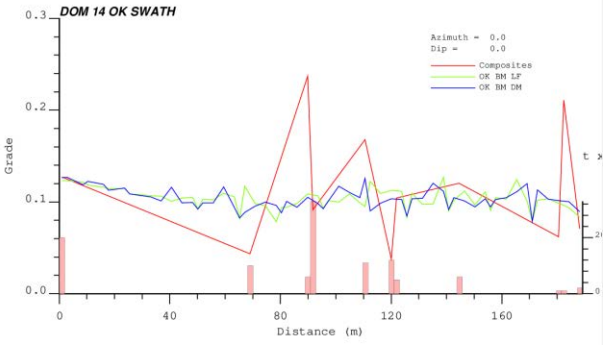

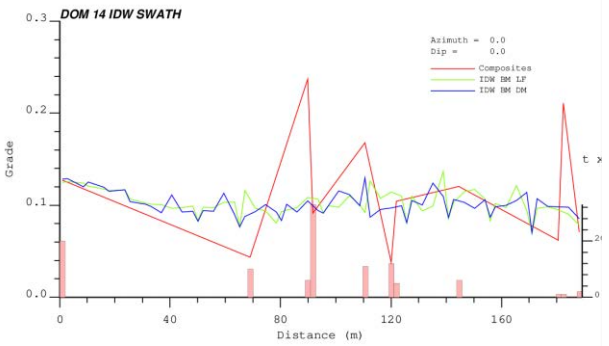

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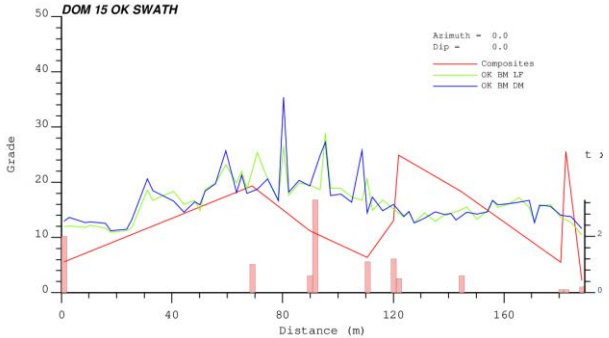
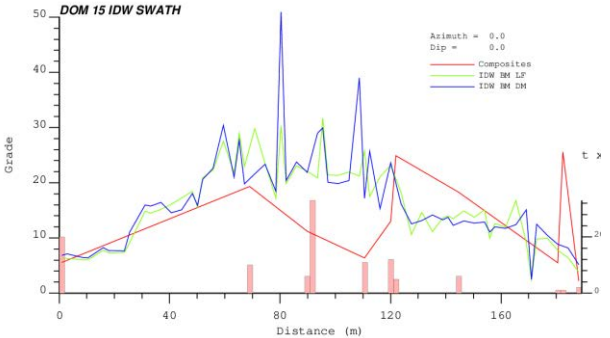
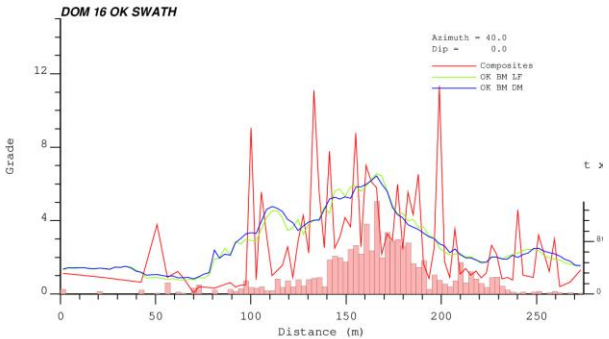
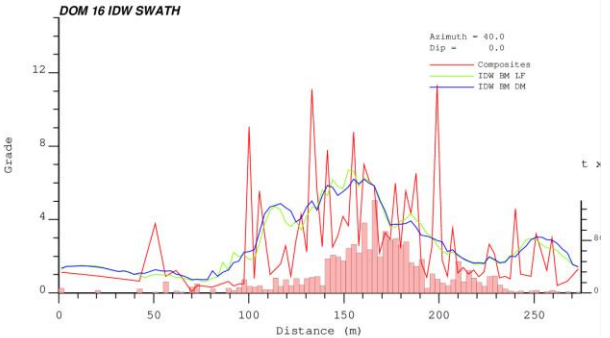
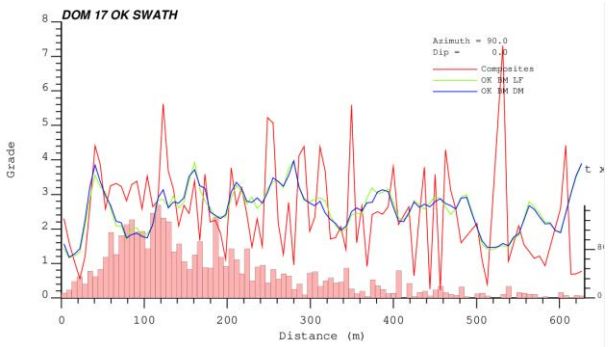


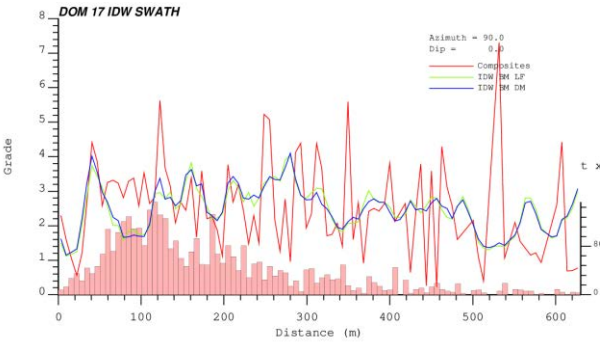


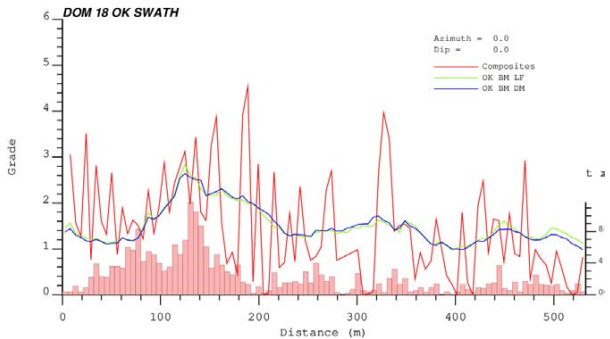


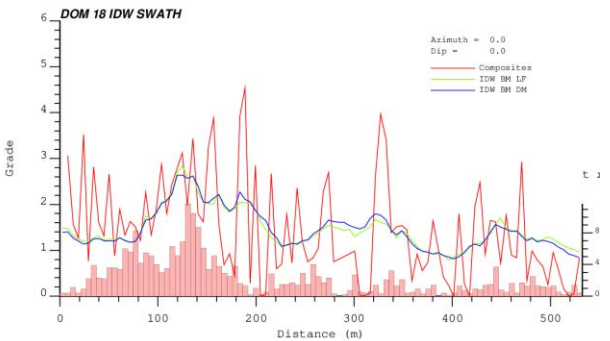


Appendix III – SWATH Plots

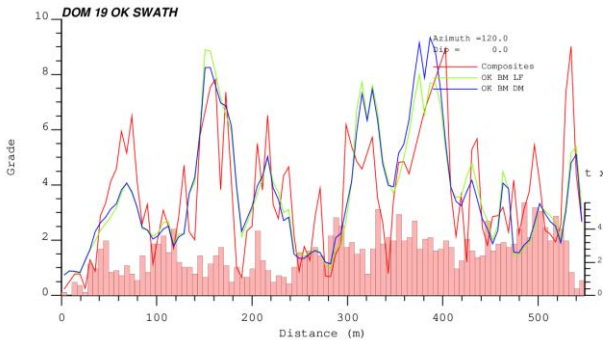


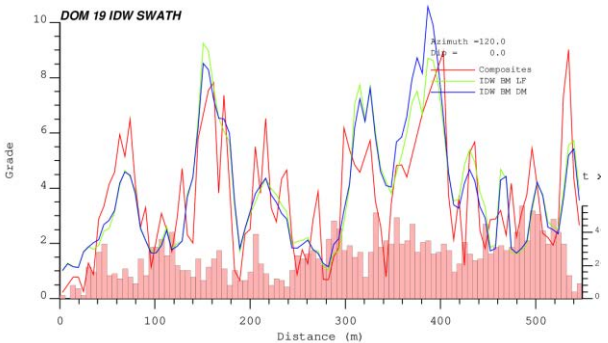


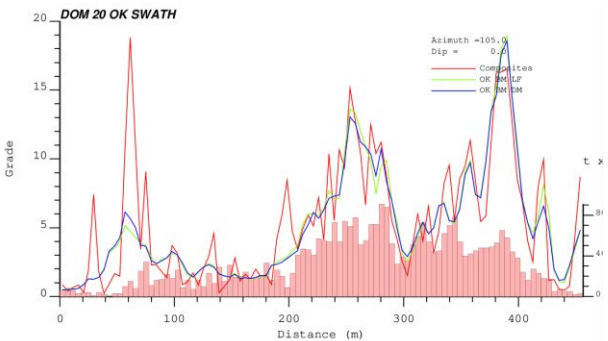


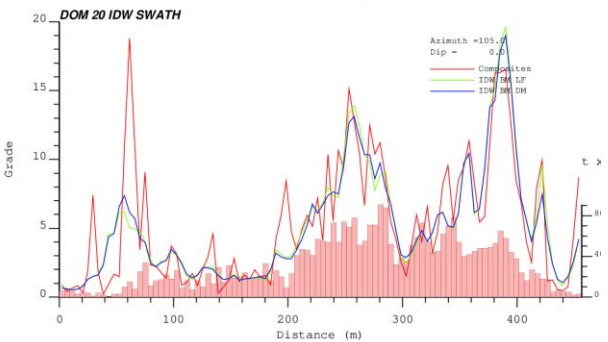


Appendix III – SWATH Plots

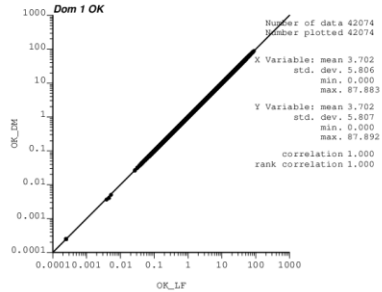


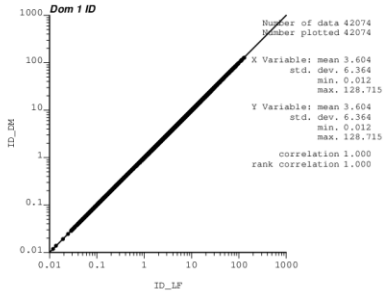


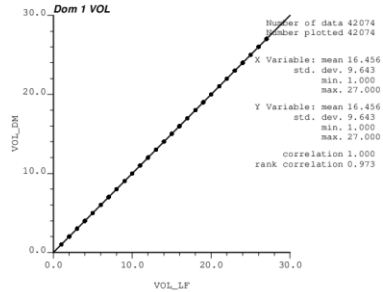


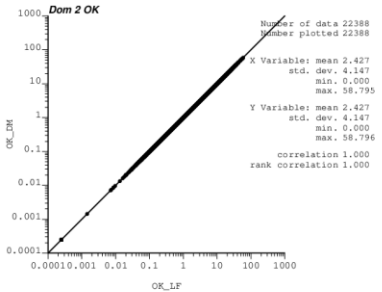


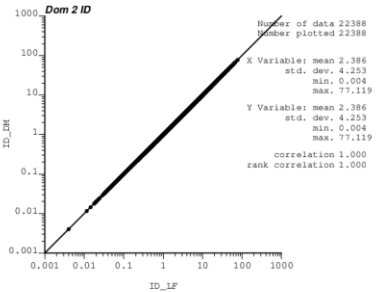
Appendix IV – Scatter Plots

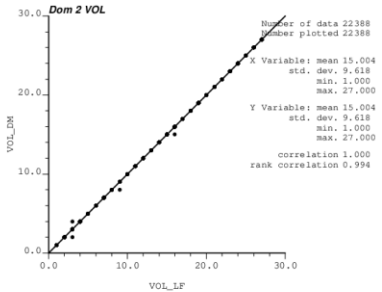




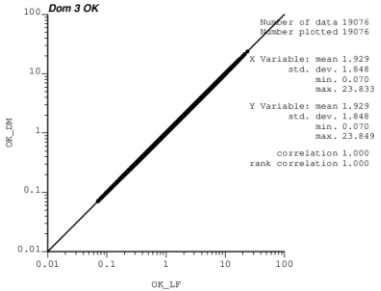


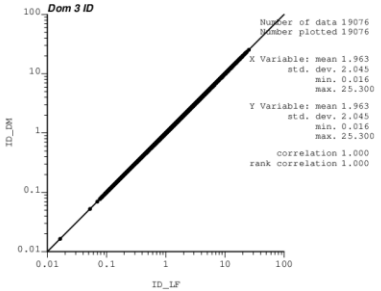


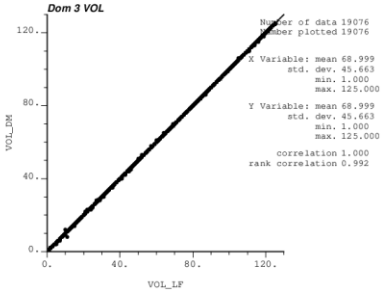


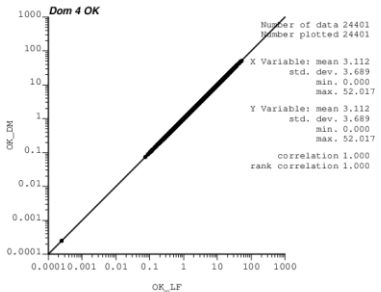


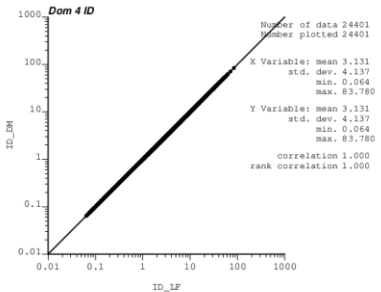
Appendix IV – Scatter Plots

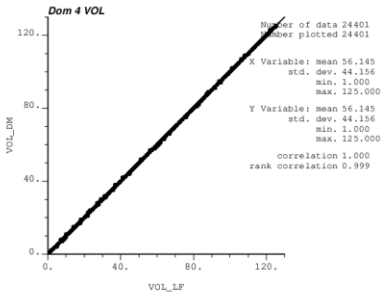




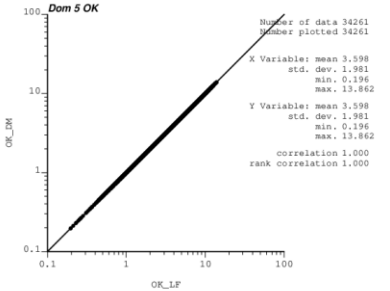


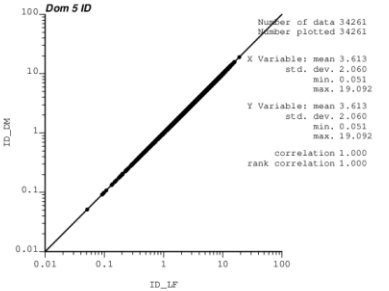


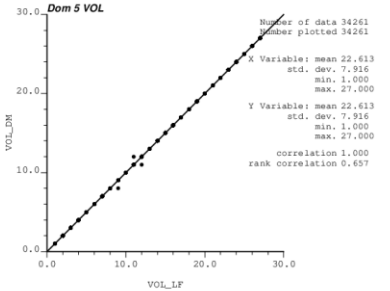


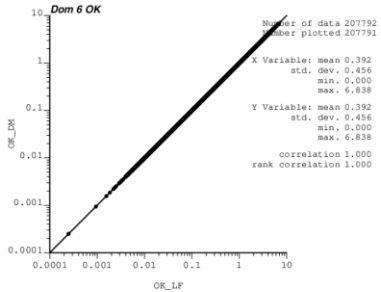


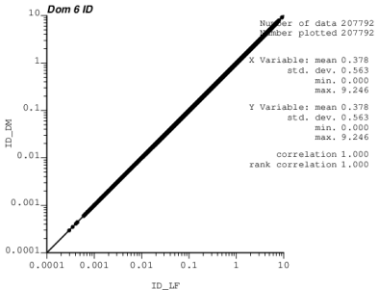
Appendix IV – Scatter Plots

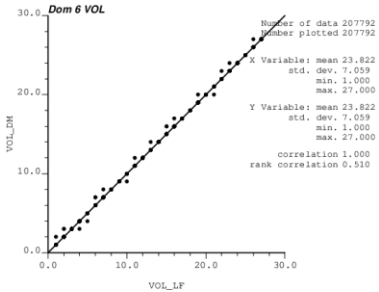




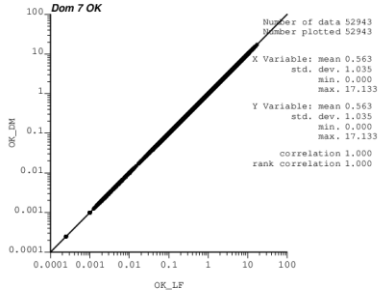


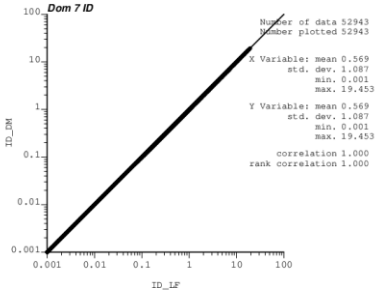


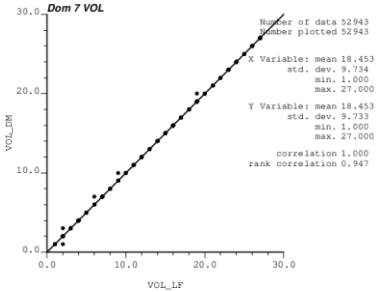


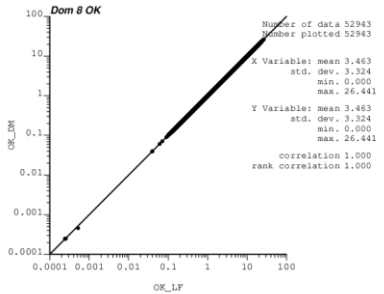


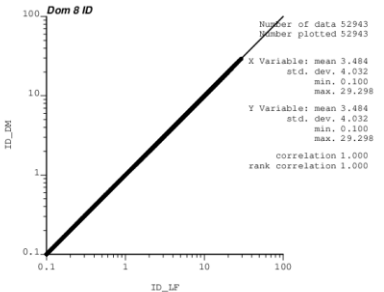
Appendix IV – Scatter Plots

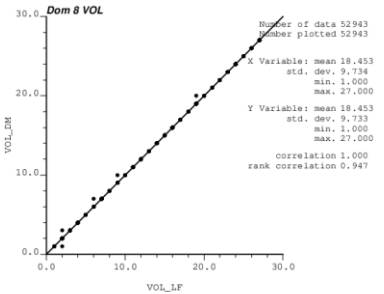




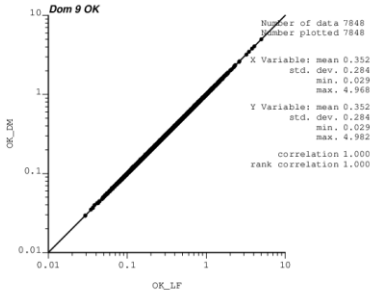


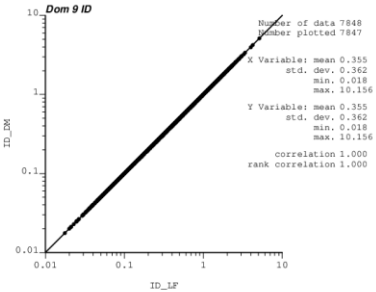


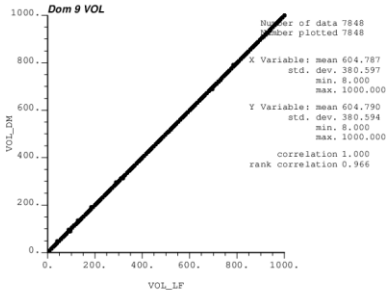


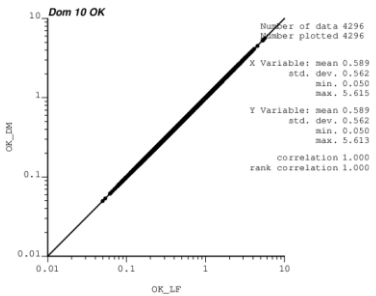


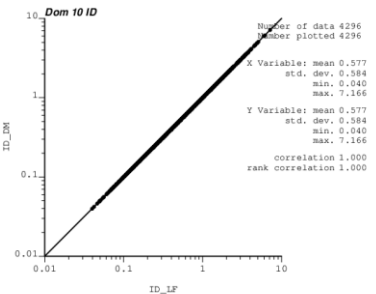
Appendix IV – Scatter Plots

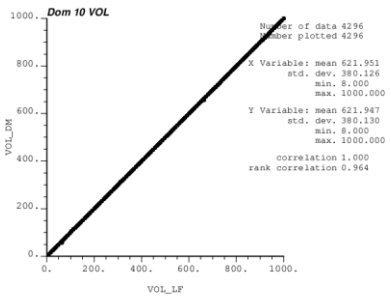




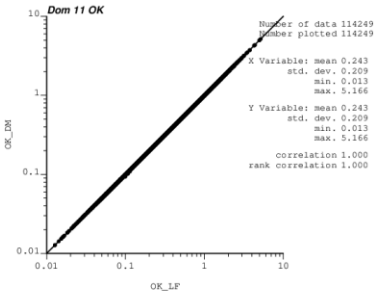


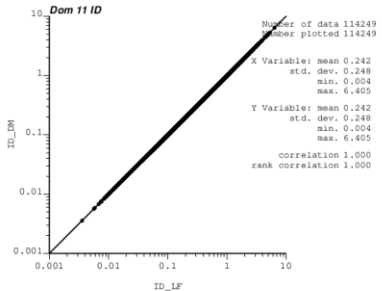


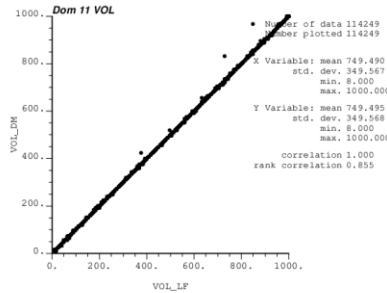


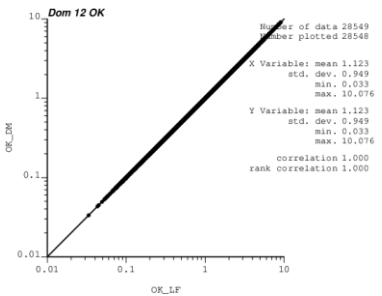


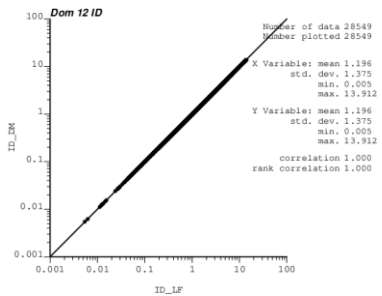
Appendix IV – Scatter Plots

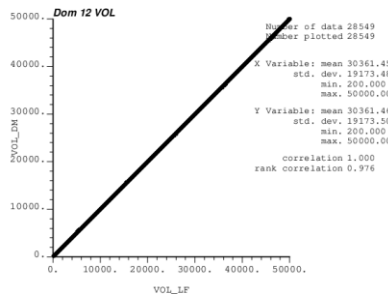












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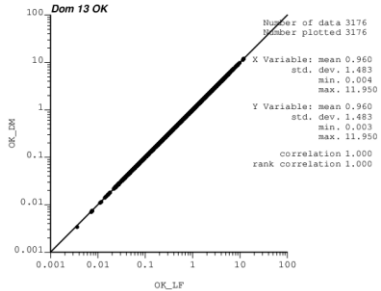
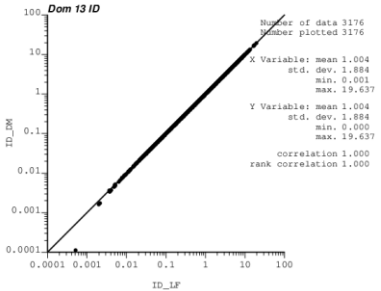
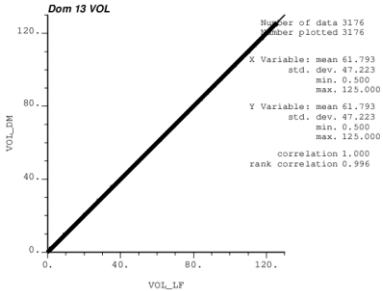
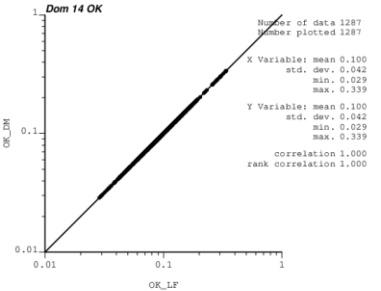
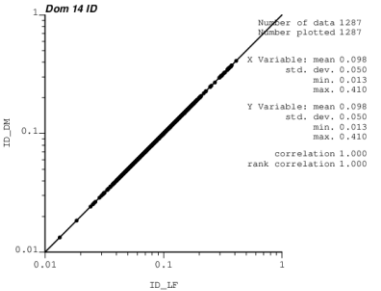
Appendix IV – Scatter Plots

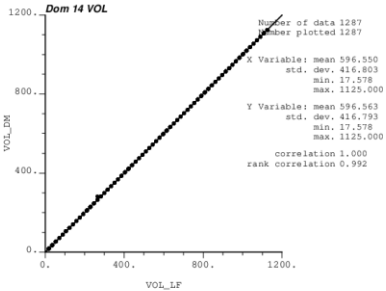












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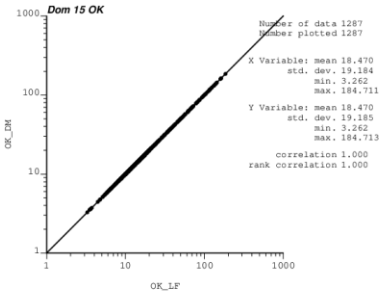

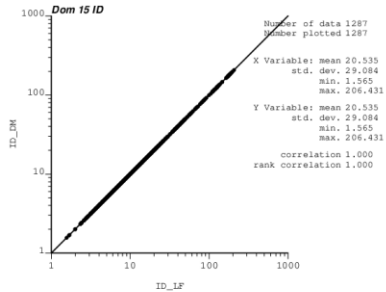

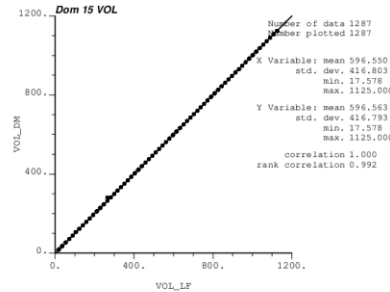

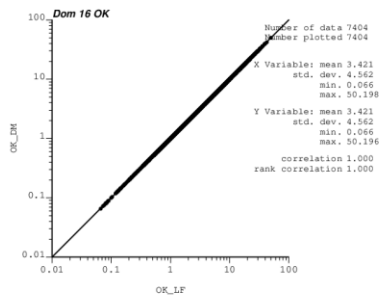

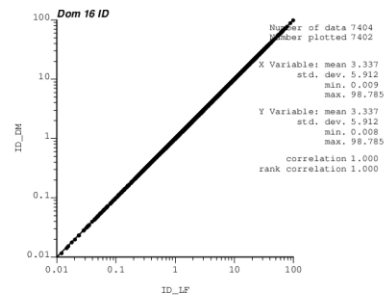

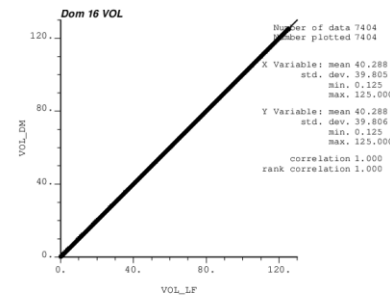

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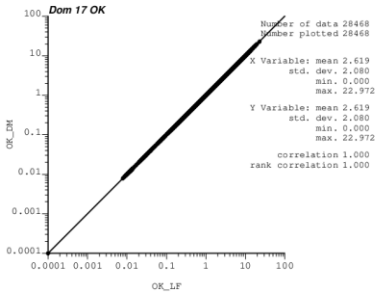

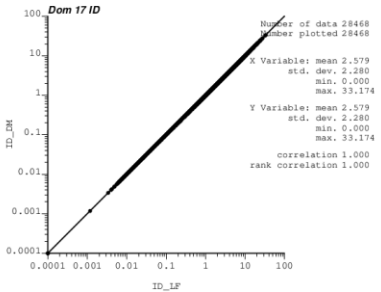

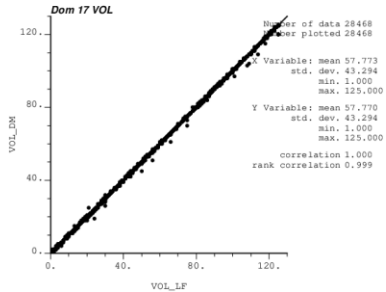

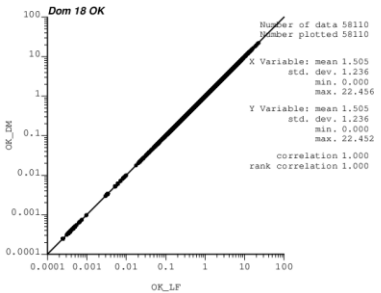

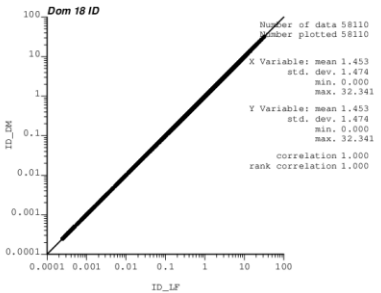

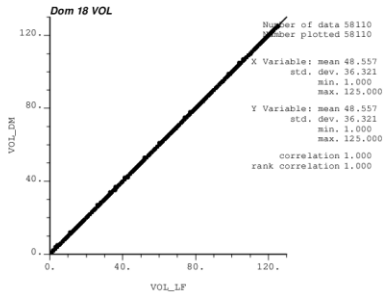

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