

Appendix E Red Dog One Year Mine Plan 2013





Red Dog Operations

Alaska, USA

ONE YEAR MINE PLAN – 2013

January 2013

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1. SUMMARY

1.1. Introduction

The 2013 mine plan was completed in June 2012. The following initial assumptions of the 2013 mine plan have changed dramatically during this several month period of mine development:

- 1) Change in 2012 final pit status from EOY 2012 predictions made in June. The 850, 875, 1075 and 1050 benches were all behind the EOY predictions. The 950 bench was behind on the east side, while the west side of the bench had already removed shots planned for Q1 2013.
- 2) Water issues have required the dumping sequence be modified to delay waste dumping into the flooded Main Pit. There is uncertainty about where waste dump locations will be for Q2 to Q4 2013. All options will increase the cycle time for haul trucks.
- 3) Capping the Main Waste Dump to prevent water infiltration requires additional "sponge" type waste in Q1 and Q2, and additional loader and haul truck hours.
- 4) Three 777s that were scheduled to be decommissioned have been kept on site to support additional capital projects, primarily the MWD capping and the main dam/back dam/wing wall raises. The decommissioning of the 7th and 8th operating 777s will also be delayed, because the longer waste hauls require more truck hours to achieve production.
- 5) The Aqqaluk block model has been updated from Red 2010D to Red 2012. The Red 2012 model does not currently incorporate data from the blasthole assays of previously drilled shots.

This 2013 Mine Plan Addendum is a collection of revised monthly 2013 mine production plans, equipment forecasts, dumping plans and other major changes.

1.2. Mine Production

The production target forecast has been reset to 11,746 kt of total mine production from the Aqqaluk Pit (Table 1-1). The 3,620 kt of ore at 17.3% Zn and 4.1% Pb is from Aqqaluk Pit throughout 2013. There are 8,126 kt of waste scheduled from the Aqqaluk Pit.

Table 1-1 2013 Mine Plan Summary

	Aqqaluk Pit	Total
Total (t)	11,746,244	11,746,244
Ore (t)	3,619,752	3,619,752
Zn (%)	17.3	17.3
Pb (%)	4.1	4.1
Waste (t)	8,126,492	8,126,492
SR	2.25	2.25

The comparison between the Amended Plan, 2013 Budget and 5-year mine plan are in Table 1.2.

Table 1-2 Comparison to Budget and 5-Year Plan

Item	1-Year Mine Plan	1-Year Mine Plan vs. 5-Year Plan			1-Year Mine Plan vs. 2013 Budget		
	2013	5-Year (2013)	Difference	% Variance	Budget (2013)	Difference	% Variance
Ore (t)	3,619,752	3,590,028	29,724	0.8%	3,590,028	29,724	0.8%
Zn (%)	17.3	17.5	-0.16	-0.9%	17.5	-0.16	-0.9%
Pb (%)	4.1	4.4	-0.28	-6.3%	4.4	-0.28	-6.3%
Waste (t)	8,126,492	7,941,110	185,382	2.3%	7,941,110	185,382	2.3%
Total Production	11,746,244	11,531,138	215,106	1.9%	11,531,138	215,106	1.9%
Stripping Ratio	2.25	2.21	0.03	1.5%	2.21	0.03	1.5%
Zn/Pb tot	4.2	3.9	0.3	6.8%	4.0	0.2	5.1%
Zn/TOC	83.3	79	4	5.6%	79	4	5.4%
Zn conc (t)	957,468	945,103	12,365	1.3%	945,500	11,968	1.3%
Pb conc (t)	174,296	185,580	-11,284	-6.1%	186,080	-11,784	-6.3%
Total conc (t)	1,131,764	1,130,683	1,081	0.1%	1,131,580	184	0.0%

* 5-Year Plan: 5-Year Plan, Oct-2012
* 2013 Mine Budget: 2013 Budget, Oct-2012
* 2013 Mine Plan: 1 Year Mine Plan 2013, Jan-2013

1.3. Equipment Fleets

The adjusted 2013 equipment schedule is shown in Table 1-2. The fleet size for the blasthole drills, productions loaders and dozers remains the same throughout 2013. The overall fleet size for operating 777 haul trucks will remain at 8 through 2013. One operating 777 will be parked from April to October while haul truck hours shift to capital 777 trucks, primarily utilized by the dam raising project. The capital haul trucks were scheduled to be decommissioned and shipped off site in 2012, but were kept on site to provide equipment for the new and expanding projects related to tailings and water management. These trucks can only be used on capital projects.

Table 1-3 2013 Equipment Schedule

Equipment	Description	Jan. to Mar.	April	May. to Aug.	Sep.	Q4
Drills	DML	3	3	3	3	3
Operating Trucks	777	8	7	7	7	8
Capital Trucks	777	1	2	3	1	0
Loaders	992/993	5	5	5	5	5
Dozers	D9/D10	4	4	4	4	4

1.4. Haul Access

The overall goal for access is to have full width (90 ft.) two lane 777 haul roads, with reasonable grades (10-12%) on the most direct route possible between the active mining benches and the haul destinations, the ore stockpile and the waste dumps. Two access points to each mining bench are preferred, though benches may have a single access in the short term while mining is progressing towards an area that will provide additional access.

For drop cuts, three of which are planned in 2013, the increased size of the 993 loaders has increased the required width to approximately 135 ft. For a 14 equilateral ore pattern, the closest match to this is a 133 ft. blast perimeter width.

1.5. Risks and Opportunities

1) Aqqaluk Pit Ore Reserves and Block Model Accuracy

The challenges of modeled ore tonnage and grade deviation will continue throughout 2013, but the block model update should reduce this deviation, particularly once blasthole assays are incorporated. There is a risk this update to Red 2012 model will cause significant changes to the ore/waste cutoff and ore grades. To mitigate this, the mine plan has shots planned on multiple benches, as well as different geologically similar areas, in each period. This strategy, combined with blasted inventory of at least 500 kt, maximizes flexibility for stockpile planning when blasthole assays vary from model predictions.

2) Type 8 Fine Grained Ore

The same strategy as above is used to mitigate the risk to metal recovery from Type 8 fine grained ore. While RDO geology does not have precise data on the location of this fine grained ore, the analysis of results from past stockpiles combined with geological observations in the field have identified a general area stretching diagonally through Aqqaluk pit from at least 950 bench to 875 bench. To minimize the negative effects of this ore, it is blended with other ore types in the stockpile.

3) Production Blasting

There are both risks and opportunities with mine blasting in 2013.

- There is an opportunity to improve ore fragmentation to improve mill throughput and decrease rock breaker hours. The target for 2013 is a 20% reduction in boulder management.
- The practice of double boosting each blasthole has eliminated hotholes in the pit.
- There is an opportunity with the change to the Orica blasting system to improve blast crew productivity, especially once we receive the Logger 500 that can log two and a half times as many holes as the current model.

4) MWD Capping

The required timeline for capping the MWD storage pile is aggressive, and there is a risk of not achieving established deadlines because of issues with weather, equipment, manpower, or design.

5) Dam Lifts

The mining equipment hours required for the main dam, back dam, and wing wall raise projects are not precisely forecasted. For this plan, the hours projected for the original raise of just the main dam have been doubled. If the equipment hours increase significantly, there is a risk of insufficient equipment to complete the project while achieving planned mine production.

6) Major Haul Truck Maintenance

From April to August, when only 7 operating haul trucks are required to achieve the mine plan, there is an opportunity to complete major maintenance work on the extra haul truck.

2. MONTHLY MINE PRODUCTION

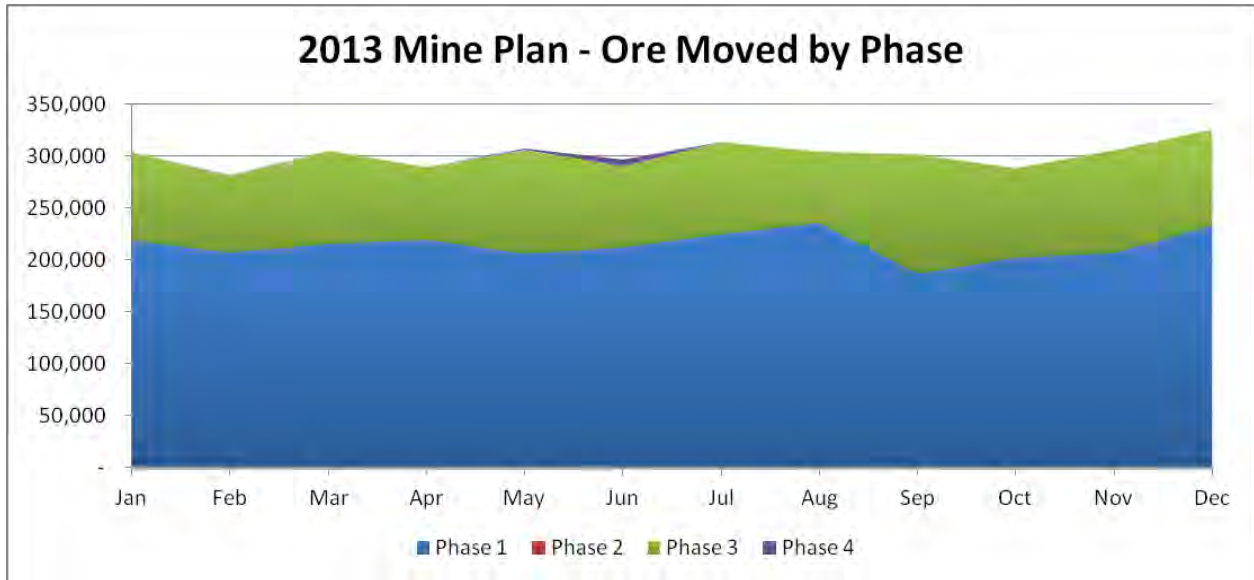


Figure 2-1 Ore Moved by Phase



Figure 2-2 Waste Moved by Phase

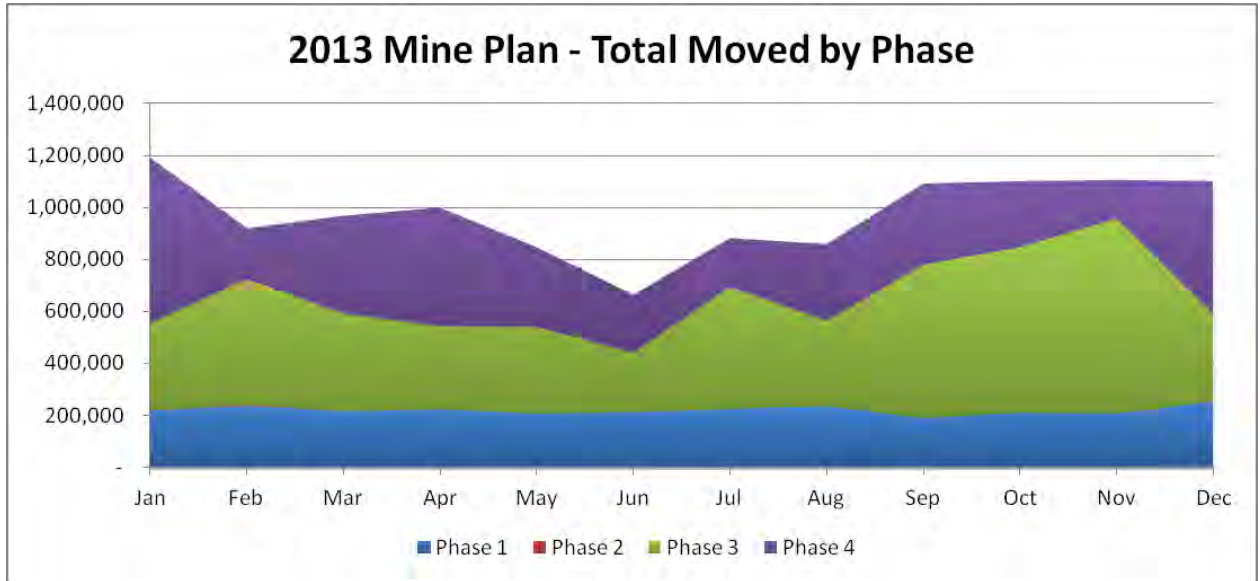


Figure 2-3 Total Moved by Phase



Figure 2-4 Material Movement Split Per Month

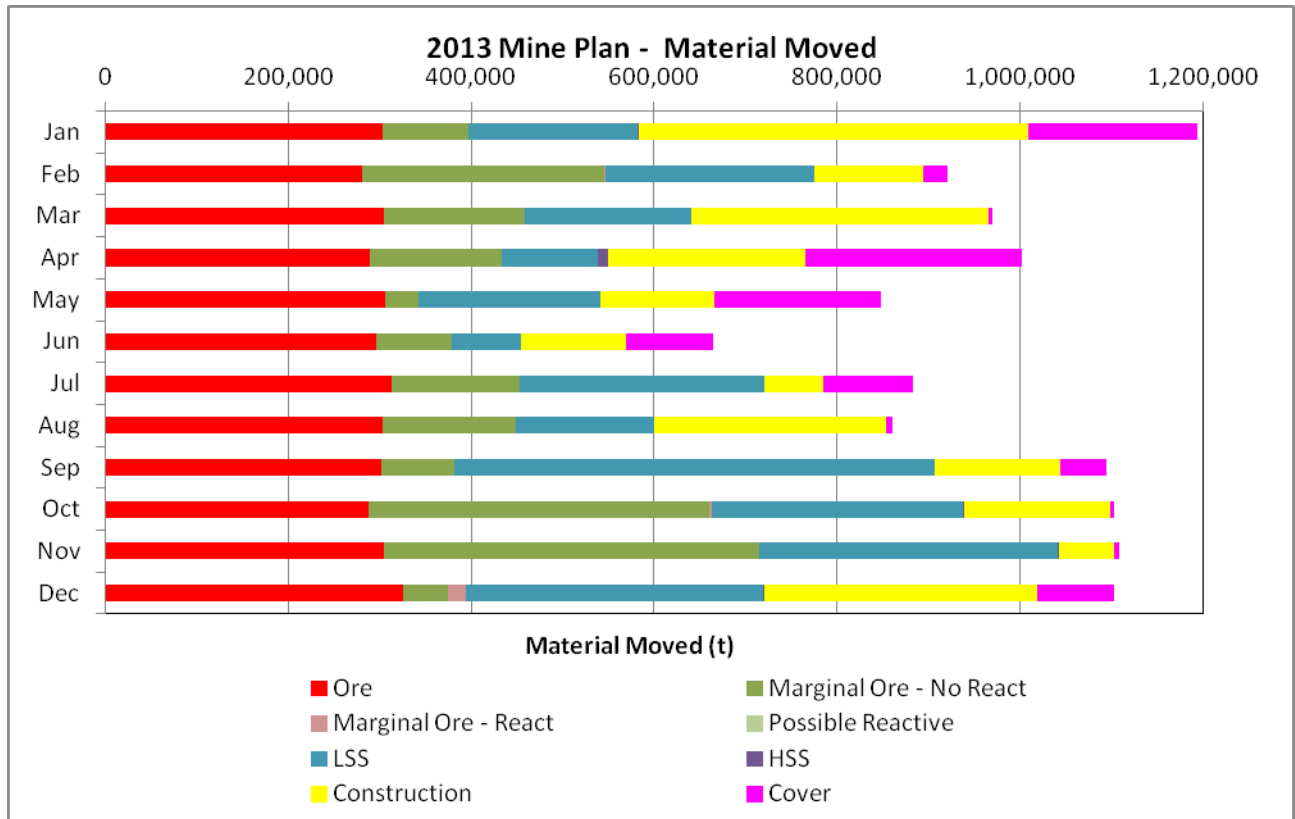


Figure 2-5 Material Types Moved by Month

Table 2-1 Tentative Waste Dumping Schedule

Waste Dumping Schedule													
(tonnes unless noted)	Jan-13	Feb-13	Mar-13	Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13	
Total Waste, no react	886,957	637,611	664,381	701,292	540,587	368,000	569,620	555,729	792,039	811,549	799,947	756,413	8,084,126
Cover to MWD Planned	55,000	-	-	55,000	55,000	55,000	-	-	-	-	-	-	220,000
Total Waste to Non Pit Dumps	831,957	637,611	664,381	646,292	485,587	313,000	569,620	555,729	792,039	811,549	799,947	756,413	7,864,126
SEP 904+975	609,792	166,411	119,970	219,053	-	-	118,560	346,089	251,401	-	17,372	17,794	-
SEP 1050	72,165	-	-	35,418	145,587	-	-	-	-	-	-	-	-
MWD "Ramp to Nowhere"	150,000	471,200	544,411	-	-	-	-	-	-	-	-	-	-
West Aqqaqalik Spur	-	-	-	391,821	340,000	313,000	451,060	209,640	64,018	-	-	-	-
SEP 1050 extension	-	-	-	-	-	-	-	-	476,620	811,549	770,540	738,619	-
Reactive or ARD Generating Waste	2,673	2,148	-	10,546	-	-	-	-	427	3,039	2,650	20,884	42,366
Tonnes below 850 in Main Pit	2,673	2,148	-	10,546	-	-	-	-	214,906	368,236	349,393	353,262	-
Approx. Volume below 850 (yd3)	1,550	1,246	-	6,117	-	-	-	-	124,646	213,577	202,648	204,892	-
Total Waste: 8,126,492													

Bench	Ore	Marginal		Waste		Total
		Not Reactive	React	Excluding Marginal	Total	
1225	-	-	-	-	-	-
1200	-	-	-	-	-	-
1175	-	-	-	29	29	29
1150	-	-	-	122	122	122
1125	-	-	-	89	89	89
1100	-	-	-	-	-	-
1075	-	-	-	142	142	142
1050	-	53	-	1,119	1,173	1,173
1025	-	19	-	1,505	1,524	1,524
1000	7	305	-	1,276	1,581	1,588
975	2	0	-	225	225	227
950	48	153	2	196	351	398
925	635	453	-	343	797	1,432
900	806	466	-	260	726	1,532
875	969	366	-	479	845	1,813
850	925	120	1	316	437	1,362
825	229	23	18	45	86	315
800	-	-	-	-	-	-
775	-	-	-	-	-	-
750	-	-	-	-	-	-
Total	3,620	1,959	21	6,146	8,126	11,746

Figure 2-6 Material Split Per Bench

Bench	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1225	-	-	-	-	-	-	-	-	-	-	-	-	-
1200	-	-	-	-	-	-	-	-	-	-	-	-	-
1175	-	-	-	-	26	-	-	-	-	-	-	-	26
1150	-	-	-	-	90	15	-	-	-	-	-	-	106
1125	-	-	-	-	-	66	-	-	-	-	-	-	66
1100	-	-	-	-	-	-	-	-	-	-	-	-	-
1075	142	-	-	-	-	-	-	-	-	-	-	-	142
1050	296	124	374	314	-	-	-	-	-	-	-	-	1,107
1025	119	-	97	19	322	102	370	191	118	88	-	-	1,424
1000	-	-	-	-	-	-	-	166	384	429	543	280	1,802
975	-	-	-	-	-	-	-	-	-	-	-	261	261
950	103	272	-	-	-	-	-	-	-	-	-	-	374
925	81	166	359	331	152	81	146	-	-	-	-	-	1,315
900	53	106	-	-	64	362	225	94	206	305	45	-	1,459
875	324	171	43	75	-	-	99	384	163	145	351	148	1,903
850	77	82	97	263	193	38	44	25	126	32	132	280	1,389
825	-	-	-	-	-	-	-	-	98	104	36	134	372
800	-	-	-	-	-	-	-	-	-	-	-	-	-
775	-	-	-	-	-	-	-	-	-	-	-	-	-
750	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	1,193	921	969	1,001	848	664	883	860	1,094	1,103	1,108	1,103	11,746

Figure 2-7 Benches Mined (Total Material)

3. EQUIPMENT FLEETS

Table 3-1 Monthly Non-production Projects Hours

Projects	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Tailings dam													
Drill hours	0	0	0	0	0	0	0	0	0	0	0	0	0
Loader hours	0	0	0	0	198	397	397	397	29	0	0	0	1418
Haultruck hours	0	0	0	0	472	944	944	944	70	0	0	0	3374
Dozer hours	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-Capital Project													
Drill hours	0	0	0	0	0	0	0	0	0	0	0	0	0
Loader hours	0	0	0	0	40	40	40	40	40	0	0	0	200
Haultruck hours	0	0	0	0	95	95	95	95	95	0	0	0	476
Dozer hours	74	67	74	72	74	72	74	74	72	74	72	74	876
MWD 3:1 reslope													
Dozer hours	31	28	31	30	31	30	31	31	30	31	30	31	365
quarries													
Drill hours	0	0	0	0	140	140	140	130	0	0	0	0	550
Loader hours	0	0	0	0	0	0	0	0	0	0	0	0	0
Haultruck hours	0	0	0	0	0	0	0	0	0	0	0	0	0
Dozer hours	0	0	0	0	30	30	30	30	0	0	0	0	120
Infill drilling pad preparation													
Dozer hours	31	28	31	30	31	30	31	31	30	31	30	31	365
MWD Capping Project													
Drill hours	0	0	0	0	0	0	0	0	0	0	0	0	0
Loader hours	30	30	40	250	250	234	0	0	0	0	0	0	834
Haultruck hours	110	110	130	300	300	300	0	0	0	0	0	0	1250
Dozer hours	0	0	0	0	0	0	0	0	0	0	0	0	0
MWD Capping Haul													
Drill hours	0	0	0	0	0	0	0	0	0	0	0	0	0
Loader hours	0	0	0	0	0	0	0	0	0	0	0	0	0
Haultruck hours	367	0	0	367	367	367	0	0	0	0	0	0	1467
Dozer hours	31	28	31	30	31	30	31	31	30	31	30	31	365
Total													
Drill hours	0	0	0	0	140	140	140	130	0	0	0	0	550
Loader hours	30	30	40	250	488	671	437	437	69	0	0	0	2452
Haultruck hours	477	110	130	667	1234	1706	1039	1039	165	0	0	0	6567
Dozer hours	167	151	167	162	197	192	197	197	162	167	162	167	2091

