ALROSA GROUP OF COMPANIES

SUMMARY OF THE

INDEPENDENT EXPERT REPORT ON

THE RESERVES AND RESOURCES

OF THE DIAMOND ASSETS

Prepared By

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Signed on behalf of Micon International Co Ltd.

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1.0 SUMMARY

1.1 INTRODUCTION

This summary of the Independent Expert Report (Report) has been prepared by Micon International Co Limited (Micon) and was commissioned by the Public Joint Stock Company ALROSA (ALROSA). The Report comprises a summary of the independent review and valuation of the ALROSA Group of Companies' principal diamond assets in the Russian Federation. These assets include operating mines and processing plants, and projects at various stages of development. Specifically, the Report includes an evaluation of the deposits developed by the Company's four principal divisions, the Udachny, Aikhal, Mirny and Nyurba mining and processing divisions (GOK's), and also by the subsidiary mining companies, PAO Severalmaz (for which Lomonosov GOK is the production division), and AO Almazy Anabara. In agreement with ALROSA the operations of the Catoca Ltd. Mining Co. in Angola, in which ALROSA has a 32.8% share, have been excluded from this Report

Micon is an independent firm of geologists, mining engineers, metallurgists and environmental consultants, all of whom have extensive experience in the mining industry. The firm operates from integrated offices in Norwich and Cornwall, United Kingdom and Toronto and Vancouver, Canada.

The principal consultants responsible for the preparation of this Report are listed below:

- Stanley Bartlett, P.Geo., Vice President, Senior Geologist and Managing Director of Micon's UK office;
- Michael Khoudine, M.Sc., Micon Senior Mining Engineer;
- Bruce Pilcher, B.E., EurIng., C.Eng., FIMMM, FAusIMM(CP), Micon Senior Mining Engineer;
- James Turner, B.Sc., M.Sc., CEng., MIMMM, Micon Senior Processing Engineer;
- Mark Dodds-Smith, Ph.D., Environment, Health and Safety Specialist, Associate Consultant;
- Christopher Routh, B.Sc., MRSB, CBiol., MCMI, Environment, Health and Safety Specialist, Associate Consultant; and,
- Sandra Stark, B.Sc., Micon Geologist, Micon.

The Micon project team did not visit the company's assets contained within the scope of the present study and this current Report, however Micon has previously conducted a series of site visits to various ALROSA sites. The most recent site visit was to inspect PAO Severalmaz and AO Almazy Anabara in August and September 2016. Other recent site visits to Aikhal GOK and Mirny GOK were completed in December 2015. Before this Micon had visited all the mining assets of ALROSA and the Micon team is familiar with all of the assets. This Report includes actual production data and economic parameters supplied by the ALROSA Group of Companies for 2017 and the first half of 2018. This Report also provides a statement of the mineral resources and ore reserves estimated in accordance with the guidelines of the JORC Code (2012) as at 1st July 2018.

Basic sources of information used by Micon for the Independent Expert Report preparation are listed below:

- Official engagements and informal interviews conducted during the preparation of this Report with the management and senior staff of ALROSA, its subsidiaries and associated organisations;
- Reports submitted by ALROSA to the regulatory authorities of the Russian Federation in accordance with routine statutory requirements;
- Electronic exploration databases of deposits, wireframes of ore bodies and reserve calculation blocks, solid block models, digital data defining the current status of mining, topographic surfaces and final positions of mining excavations. Data were provided for all deposits of the company for which such data were available;
- Periodic management production and cost reports prepared by ALROSA for use internally and/or for distribution to shareholders and other interested parties;
- Russian TEO (feasibility study) reports outlining the cut-off criteria parameters and reserve calculations, prepared either internally by ALROSA personnel, or externally by specialist organisations under contract to ALROSA;
- Annual mining plans for ALROSA's companies for 2018;
- Corporate Long-Term Development Programme prepared by ALROSA for the period 2016 to 2035; and,
- Projected capital cost schedules of ALROSA and its subsidiaries.

1.2 ALROSA GROUP OVERVIEW

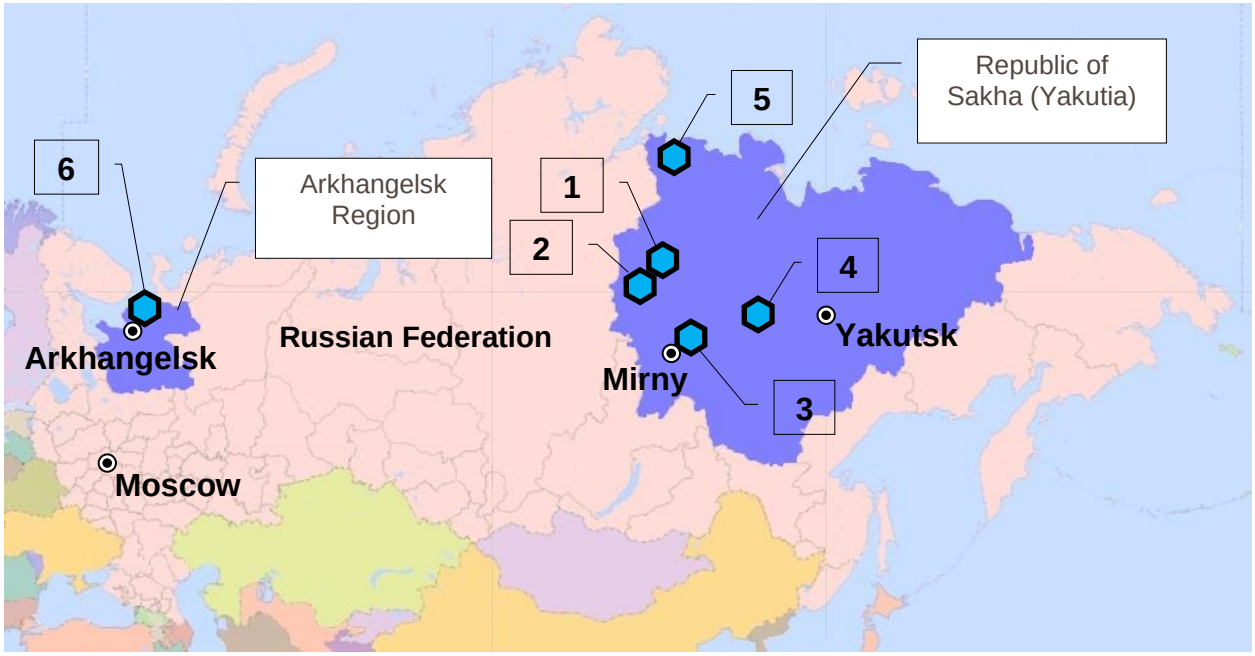
Public Joint Stock Company ALROSA was established pursuant to the decree of the President of the Russian Federation No.158C of 19th February 1992. The Company became the legal successor to a number of organisations incorporated into its structure, including Yakutalmaz Scientific and Production Association (the State-owned diamond mining company in the former USSR), some departments of the Committee for Precious Metals and Gems under the Ministry of Finance of the Russian Federation (involved in sorting, pre-sale preparation and sale of diamonds) and the Almazyuvelirexport Foreign Trade Organisation.

The principal shareholders of ALROSA are the Russian Federation with 33.0256% of the shares owned by the Federal Agency for State Property Management of Russian Federation, the Republic of Sakha (Yakutia) with 25.0002% of the shares owned by the Ministry of Property Matters of the Republic of Sakha (Yakutia), eight regions (ulus) of the Republic of Sakha (Yakutia) with 8.0003% of the shares, as well as other legal entities and individuals owing 33.9739% of the shares.

Within its structure, ALROSA incorporates all the technological elements and process components of diamond mining and beneficiation. The AO Almazy Anabara was registered on 13th August 1992 in Mirny (Republic of Sakha (Yakutia) by Resolution No.554 issued by the Mirny Administration District. The official business start-up date was 1st January 1993.

The ALROSA asset portfolio includes primary hardrock and placer diamond deposits located in both the Republic of Sakha (Yakutia) and the Arkhangelsk region of the Russian Federation, as shown in Figure 1.1, as well as 32.8% stock in Catoca Ltd. Mining Co. (Angola), which operates the Catoca deposit, being one of the largest kimberlite pipes in the world.

Figure 1.1: Location of Principal Mining Divisions



Source: Micon ALROSA Technical Report 2013

Legend:

Headquarters of PJSC ALROSA are located in Moscow and Mirny.
Headquarters of AO Almazy Anabara is in Yakutsk.
Head office of PAO Severalmaz is in Arkhangelsk.
1 – Udachny GOK;
2 – Aikhal GOK;
3 – Mirny GOK;
4 – Nyurba GOK;
5 – Deposits of 'Almazy Anabara';
6 – M. V. Lomonosov Deposit.

Data for the individual diamond deposits currently being mined, or being planned for mining, by ALROSA are summarised in Table 1.1.

Table 1.1: ALROSA Group of Companies - List of Assets Covered by the Micon Assessment

Asset	Company		Company
	Operating	Holding	
Udachnaya Pipe	PJSC ALROSA, Udachny GOK	PJSC ALROSA	Underground Mining
Zarnitsa Pipe	PJSC ALROSA, Udachny GOK	PJSC ALROSA	Open Pit Mining
Verkhne-Munskoe Deposit	PJSC ALROSA, Udachny GOK	PJSC ALROSA	Prepared for Development
Kluch Piropovy Placer	PJSC ALROSA, Udachny GOK	PJSC ALROSA	Open Pit Mining
Zakonturnaya Deluvial Placer (Udachnaya Pipe)	PJSC ALROSA, Udachny GOK	PJSC ALROSA	Open Pit Mining
Jubilee Pipe	PJSC ALROSA, Aikhal GOK	PJSC ALROSA	Open Pit Mining
Aikhal Pipe	PJSC ALROSA, Aikhal GOK	PJSC ALROSA	Underground Mining
Komsomolskaya Pipe	PJSC ALROSA, Aikhal GOK	PJSC ALROSA	Open Pit Mining
Zaria Pipe	PJSC ALROSA, Aikhal GOK	PJSC ALROSA	Prepared for Development
Mir Pipe	PJSC ALROSA, Mirny GOK	PJSC ALROSA	Underground Mining
International Pipe	PJSC ALROSA, Mirny GOK	PJSC ALROSA	Underground Mining
Irelyakh Placer	PJSC ALROSA, Mirny GOK	PJSC ALROSA	Open Pit Mining / Dredging
Gornoye Placer	PJSC ALROSA, Mirny GOK	PJSC ALROSA	Dredging
Vodorazdelnye Galechniki Placer	PJSC ALROSA, Mirny GOK	PJSC ALROSA	Open Pit Mining
Solur-Vostochnaya Placer	PJSC ALROSA, Mirny GOK	PJSC ALROSA	Prepared for Development
Nyurbinskaya Pipe	PJSC ALROSA, Nyurba GOK	PJSC ALROSA-NYURBA	Open Pit Mining
Nyurbinskaya Placer	PJSC ALROSA, Nyurba GOK	PJSC ALROSA-NYURBA	Open Pit Mining
Botuobinskaya Pipe	PJSC ALROSA, Nyurba GOK	PJSC ALROSA-NYURBA	Open Pit Mining
Botuobinskaya Placer	PJSC ALROSA, Nyurba GOK	PJSC ALROSA-NYURBA	Open Pit Mining
Maiskoye Kimberlite Body	PJSC ALROSA, Nyurba GOK	PJSC ALROSA-NYURBA	Prepared for Development
Arkhangelskaya Pipe, Lomonosov Deposit	Lomonosov GOK	PAO Severalmaz	Open Pit Mining
Karpinskogo-1 Pipe, Lomonosov Deposit	Lomonosov GOK	PAO Severalmaz	Open Pit Mining

Table 1.1: ALROSA Group of Companies - List of Assets Covered by the Micon Assessment continued

Asset	Company		Company
	Holding	Operating	
Pionerskaya Pipe, Lomonosov Deposit	Lomonosov GOK	PAO Severalmaz	Prepared for Development
Lomonosov Pipe, Lomonosov Deposit	Lomonosov GOK	PAO Severalmaz	Prepared for Development
Ebelyakh River Placer	AO Almazy Anabara	AO Almazy Anabara	Open Pit Mining
Gusiny Stream Placer	AO Almazy Anabara	AO Almazy Anabara	Open Pit Mining
Istok Plot of Ebelyakh River Placer	AO Almazy Anabara	AO Almazy Anabara	Open Pit Mining
Right Bank Morgogor Placers	AO Almazy Anabara	AO Almazy Anabara	Open Pit Mining
Kholomolokh Stream Placer	AO Almazy Anabara	AO Almazy Anabara	Open Pit Mining
Area of Uchakh-Ytybat and Khara-Mas Rivers	AO Almazy Anabara	AO Almazy Anabara	Open Pit Mining
Bolshaya Kuonamka River Placer	AO Almazy Anabara	AO Almazy Anabara	Open Pit Mining
Tributaries of the Billyakh River Placers	AO Almazy Anabara	AO Almazy Anabara	Open Pit Mining
Molodo River Placer	AO Almazy Anabara	AO Almazy Anabara	Open Pit Mining
Balaganakh and Kumakh-Yuryakh Stream Placers	AO Almazy Anabara	AO Almazy Anabara	Prepared for Development
Ochous Placer	AO Almazy Anabara	AO Almazy Anabara	Prepared for Development
Lyaseger-Yuryakh Stream Placer	AO Almazy Anabara	AO Almazy Anabara	Prepared for Development

1.3 MINERAL RESOURCES AND RESERVES

1.3.1 Russian Reserve Statements

All mineral resources and reserves in the Russian Federation are formally classified according to an established system developed and administered by the Russian State Commission for Mineral Reserves (Gosudarstvennaya Komissia po Zapasam - GKZ). The GKZ applies strict control over the estimation and reporting of mineral reserves and utilises a prescribed protocol for their calculation that is usually based upon standard sectional methods.

1.3.2 JORC Code (2012) Mineral Resource and Ore Reserve Estimates

The mineral resources and ore reserves contained within this Report have been classified following the definitions of the JORC Code (the Joint Ore Reserve Committee of the Australasian Institute of Mining and Metallurgy, the Australian Institute of Geoscientists and the Minerals Council of Australia, 2012). Similar to the system followed by the GKZ, the JORC Code relies upon an increased level of geological knowledge and the application of mining and other modifying factors to elevate categories of mineral resources to ore reserves.

1.3.2.1 Mineral Resources in Accordance with the JORC Code (2012)

The mineral resources estimate produced by Micon and following the guidelines of the JORC Code (2012) for the ALROSA Group of Companies, subdivided by resource category, and for each of the deposits, is summarised in Tables 1.2 for diamond mineral resources hosted by kimberlite or similar hardrock, and in Table 1.3 for diamond mineral resources that occur in the form of placer deposits, resulting from the erosion of hardrock kimberlite deposits and concentration in river valleys.

All of the mineral resources of the ALROSA Group of Companies included in the assessment were classified as either Measured, Indicated or Inferred. The mineral resources were classified following the guidelines of the JORC Code (2012) in accordance with the quantity, quality and spacing of the mineralisation, as well as the level of data validity on the diamond tonnages and grades. The mineral resources were audited and categorised by Micon registered professional geologists, all of whom qualify as Competent Persons, as defined by the JORC Code (2012).

The mineral resources are stated inclusive of the ore reserves for all the deposits evaluated. In other words, the mineral resources do not enlarge the reserves stated in the current report.

Table 1.2: ALROSA Group of Companies - Summary of Kimberlite Mineral Resources **as at 1st July 2018**

Deposit	JORC Category	Tonnage (kt)	Diamond Grade (ct/t)	Contained Diamonds (kct)
Udachny GOK				
Udachnaya Pipe	Measured	2,879	1.30	3,745
	Indicated	91,156	1.48	134,843
	Inferred	53,991	1.28	68,978
Zarnitsa Pipe	Measured	983	0.30	293
	Indicated	20,792	0.24	5,060
Verkhne-Munskoe Deposit	Indicated	46,839	0.65	30,542
	Inferred	17,168	0.57	9,857
Aikhal GOK				
Jubilee Pipe	Measured	7,712	0.69	5,360
	Indicated	86,355	1.18	102,191
	Inferred	8,173	1.33	10,829
Aikhal Pipe	Measured	9,929	5.76	57,227
	Indicated	1,559	6.72	10,480
	Inferred	561	0.58	325
Komsomolskaya Pipe	Indicated	2,079	0.39	811
Zaria Pipe	Indicated	12,392	0.28	3,515
	Inferred	27,347	0.13	3,583
Mirny GOK				
Mir Pipe	Measured	19,088	3.71	70,867
	Indicated	16,535	3.36	55,525
	Inferred	1,072	3.11	3,339
International Pipe	Measured	2,861	7.05	20,157
	Indicated	3,939	7.52	29,608
Nyurba GOK				
Nyurbinskaya Pipe	Measured	2,383	4.24	10,109
	Indicated	4,534	4.29	19,448
	Inferred	1,217	5.56	6,767
Botuobinskaya Pipe	Measured	3,000	5.58	16,733
	Indicated	10,139	5.90	59,814
	Inferred	2,762	5.71	15,778
Maiskoye Kimberlite Body	Indicated	1,231	6.03	7,426
	Inferred	1,768	2.99	5,278
Lomonosov GOK (PAO Severalmaz)				
Arkhangelskaya Pipe	Measured	14,663	1.04	15,272
	Indicated	29,689	1.08	32,184
	Inferred	39,407	1.24	48,941
Karpinsky-1 Pipe	Measured	3,609	1.27	4,592
	Indicated	15,529	1.41	21,886
	Inferred	8,615	1.16	9,993
Pionerskaya Pipe	Indicated	58,330	0.47	27,530
	Inferred	42,875	0.52	22,502
Lomonosov Pipe	Indicated	32,523	0.50	16,230
	Inferred	42,250	0.46	19,530
Total Kimberlite for ALROSA Group of Companies				
All Deposits Covered by the Report	**Measured**	**67,106**	**3.05**	**204,354**
	Indicated	**433,621**	**1.28**	**557,093**
	Measured + Indicated	**500,727**	**1.52**	**761,447**
	Inferred	**247,204**	**0.91**	**225,699**

Note: Totals may vary due to rounding.

Table 1.3: ALROSA Group of Companies - Summary of Placer Mineral Resources as at 1st July 2018

Deposit	Resource Category	Sands Volume (k m^3)	Diamond Grade (ct/m^3)	Contained Diamonds (kct)
Udachny GOK				
Kluch Piropovy Placer	Measured	123	0.49	61
	Indicated	149	0.74	110
	Inferred	29	1.54	45
Zakonturnaya Deluvial Placer	Indicated	102	0.73	75
Verkhne-Munskoe Deposit	Inferred	405	0.68	277
Mirny GOK				
Vodorazdelnye Galechniki Placer	Indicated	4,809	0.96	4,611
	Inferred	305	0.36	110
Irelyakh Placer	Measured	2,192	0.38	842
	Indicated	8,416	0.15	1,244
Gornoye Placer	Measured	5,396	0.33	1,807
Solur-Vostochnaya				
Solur-Vostochnaya Placer	Indicated	2,991	1.97	5,903
	Inferred	479	1.80	865
Nyurba GOK				
Nyurbinskaya Placer	Measured	736	10.00	7,366
	Indicated	3,108	3.94	12,249
	Inferred	5,302	1.68	8,889
Botuobinskaya Placer	Indicated	215	0.91	195
AO Almazy Anabara				
Total Deposits of Almazy Anabara	Indicated	**22,008**	**1.11**	**24,477**
	Inferred	**11,748**	**0.66**	**7,717**
Total Placer for ALROSA Group of Companies				
All Deposits Covered by the Report	**Measured**	**8,448**	**1.19**	**10,076**
	Indicated	**41,797**	**1.17**	**48,864**
	Measured + Indicated	**50,245**	**1.17**	**58,940**
	Inferred	**18,268**	**0.98**	**17,902**

Note: Totals may vary due to rounding.

Table 1.4 presents the grand total for both kimberlite and placer diamond mineral resources for the ALROSA Group of Companies. Volumes of placer sand in cubic metres have been converted into tonnages using a volumetric weight of dry material equal to 2.0 t/m^3.

Table 1.4: ALROSA Group of Companies - Summary of Diamond Mineral Resources **as at 1st July 2018**

JORC Category	Tonnage (kt)	Diamond Grade (ct/t)	Contained Diamonds (kct)
Measured	84,001	2.55	214,430
Indicated	517,215	1.17	605,957
Measured + Indicated	**601,216**	**1.37**	**820,387**
Inferred	283,740	0.86	243,601
Grand Total	**884,957**	**1.20**	**1,063,987**

Micon notes that there is excellent potential to increase the mineral resources at a number of the ALROSA deposits covered by this assessment. Further growth can be achieved by additional exploration of mineralised target areas with demonstrated potential to contain diamonds. Currently, a number of such targets have been identified by ALROSA but, as of 1st July 2018, they are not sufficiently explored to be classified as mineral resources or ore

reserves in accordance with the guidelines of the JORC Code (2012). Considering the high quality of the local geologists, Micon considers it reasonable to assume that exploration success will yield new mineral resources and ore reserves.

1.3.2.2 Ore Reserves in Accordance with the JORC Code (2012)

Ore reserve estimates for each of the deposits are summarised in Table 1.5 (kimberlite deposits), and Table 1.6 (placer deposits). The ore reserve estimates are based on the Measured and Indicated mineral resources presented in Tables 1.2 and 1.3. They have been classified into either the Proved or Probable categories following the guidelines of the JORC Code (2012).

Table 1.5: Summary of Proved and Probable Ore Kimberlite Ore Reserves as at 1st July 2018

Deposit	JORC Category	Tonnage (kt)	Diamond Grade (ct/t)	Contained Diamonds (kct)
Udachny GOK				
Udachnaya Pipe	Proved	2,958	1.17	3,475
	Probable	93,691	1.33	125,000
Zarnitsa Pipe	Proved	983	0.30	293
	Probable	20,841	0.24	5,058
Verkhne-Munskoe deposit	Probable	46 683	0.65	30,391
Aikhal GOK				
Jubilee Pipe	Proved	7,925	0.68	5,358
	Probable	89,288	1.12	99,579
Aikhal Pipe	Proved	11,324	4.95	56,077
	Probable	1,778	5.78	10,269
Komsomolskaya Pipe	Probable	2,139	0.38	809
Zaria Pipe	Probable	12,333	0.28	3,469
Mirny GOK				
International Pipe	Proved	3,097	6.48	20,077
	Probable	4,264	6.92	29,489
Nyurba GOK				
Nyurbinskaya Pipe	Proved	2,483	4.06	10,074
	Probable	4,753	4.08	19,372
Botuobinskaya Pipe	Proved	3,131	5.33	16,674
	Probable	10,629	5.61	59,580
Maiskoye Kimberlite Body	Probable	1,327	5.46	7,242
Lomonosov GOK (PAO Severalmaz)				
Arkhangelskaya Pipe	Proved	14,861	1.03	15,265
	Probable	30,132	1.07	32,168
Karpinskogo-1 Pipe	Proved	3,682	1.25	4,589
	Probable	15,928	1.37	21,868
Total ALROSA Group of Companies				
All Deposits covered by the Report	**Proved**	**50,443**	**2.61**	**131,882**
	Probable	**333,785**	**1.33**	**444,294**
	Grand Total	**384,229**	**1.50**	**576,176**

Note: Totals may vary due to rounding.

Table 1.6: Summary of Proved and Probable Placer Ore Reserves as at 1st July 2018

Deposit	JORC Category	Tonnage (k m^3)	Diamond Grade (ct/t)	Contained Diamonds (k m^3)
Udachny GOK				
Kluch Piropovy Placer	Proved	123	0,49	61
	Probable	178	0.62	110
Zakonturnaya Deluvial Placer	Probable	113	0.66	75
Mirny GOK				
Vodorazdelnye Galechniki Placer	Probable	5,375	0.81	4,380
Irelyakh Placer	Proved	2,585	0.33	842
	Probable	8,980	0.14	1,228
Gornoye Placer	Proved	5,828	0.30	1,762
Nyurba GOK				
Nyurbinskaya Placer	Proved	748	9.85	7,365
	Probable	3,164	3.87	12,249
Botuobinskaya Placer	Probable	226	0.87	195
AO Almazy Anabara				
All Deposits of Almazy Anabara	Probable	25,810	0.91	23,533
Total ALROSA Group of Companies				
All Deposits Covered by the Report	**Proved**	**9,284**	**1.08**	**10,031**
	Probable	**43,846**	**0.95**	**41,770**
	Grand Total	**53,130**	**0.97**	**51,801**

Note: Totals may vary due to rounding.

Table 1.7 provides a summary of the total diamond ore reserves of the kimberlite and placer deposits of the ALROSA Group of companies. Volumes of placer sand in cubic metres have been converted into tonnages using a volumetric weight of dry material equal to 2.0 t/m^3.

Table 1.7: Summary of Diamond Ore Reserves as at 1st July 2018

JORC Category	Tonnage (kt)	Diamond Grade (ct/t)	Contained Carats (kct)
Proved	69,012	2.06	141,913
Probable	421,477	1.15	486,064
Grand Total	**490,489**	**1.28**	**627,977**

Under the JORC Code guidelines, the classification of ore reserves is predetermined by the category of mineral resource that forms the basis of the ore reserve. The mineral resources of the ALROSA Group of Companies were assigned to the Measured, Indicated and Inferred categories and therefore, diamond ore reserves must be assigned to either the Proved or Probable categories. Generally, by definition, Measured mineral resources once adequately engineered and demonstrated to be economically viable to exploit, are assigned to the Proved category. Indicated mineral resources with demonstrated feasibility may be assigned to the Probable category, but cannot be assigned to the higher category of Proved. Inferred resources cannot be included in the ore reserves.

The confidence level attributed to the Proved ore reserve category is higher than that attributed to the Probable ore reserve category. Actual production data resulting from the Proved reserve mining and processing shall, in general, match the exploration data closer

than those obtained from the Probable ore category. Ore reserves from both the Proved and Probable categories are sufficiently well defined to conduct economic evaluations and to make decisions related to the deposits future development.

1.4 OPERATIONS AND PROJECTS

1.4.1 Udachny GOK

The Udachny mining and processing division (Udachny GOK) is based in the town of Udachny, located 550 km north of the city of Mirny. Currently, Udachny GOK mines the Udachnaya and Zarnitsa kimberlite pipes and the Kluch Piropovy and Zakonturnaya deluvial placers. Preparation for the development of the Verkhne-Munskoe deposit has been initiated. The first ore and sand will be mined from the Zapolarnaya open pit from one of the deposit pipes in the fourth quarter of 2018.

The Udachnaya pipe is located in the Daldyn-Alakit diamondiferous district. It can be traced as a consistent ore body to a depth of 250 m, below which it divides into Eastern and Western ore bodies separated by a block of Upper Cambrian sedimentary rock.

The Udachny open pit commenced production in 1971 and the reserves were depleted in 2016. The pit is currently 640 m deep.

Access to the reserves of the Udachnaya pipe below an elevation of -320 m is provided by three vertical shafts located south of the open pit. Mining of underground reserves of the Udachnaya pipe commenced from the -260/-320 m level. The reserves on this level are contained in the pillars left in the pit walls. The mining method used for excavation of these reserves is longhole retreat stoping. The level caving method has been proposed to mine the reserves localised under the pit bottom. Diesel load-haul-dump (LHD) units will be used on draw levels and electric units will be used on the main haulage levels. The production target for the Udachny underground mine for 2018 is 2.7 Mt/a of ore. It is expected that the mine will reach its full capacity of 4.0 Mt/a during 2019.

The Zarnitsa pipe belongs to the same kimberlite field as the Udachnaya pipe and lies 18 km east of Udachny. Commercial operations at the Zarnitsa open pit commenced in 1999. Currently, the pit is 110 m deep and there are plans to mine it to a depth of 200 m. The open pit utilises conventional truck and shovel equipment, and material is prepared for excavation by drilling and blasting. According to the existing mining schedule production is planned to reach a rate of 3.25 Mt/a in 2018.

The Piropovy Stream erodes the Udachny kimberlite pipe and as a result it has produced the Kluch Piropovy diamond-bearing placer deposit. The remaining fragment of the Zakonturnaya deluvial placer is located in the middle reaches of the left bank of the Piropovy Stream, adjacent to the north and northeast limits of the Udachnaya kimberlite pipe. Mining of both placers started in 1967 and has been carried out intermittently until 1989. In 2014, the deposits reserves were re-evaluated and mining resumed in 2015. Extraction is carried out by open pit methods and, given the high water content of the placers, the operations are run seasonally i.e. during the winter only. According to the current reserve declaration sand production from these deposits is planned to cease in 2019.

The Verkhne-Munskoe deposit is composed of five pipes belonging to the Verkhne-Munsky kimberlite field: Zapolarnaya, Deimos, Novinka, Komsomolskaya-Magnitnaya, and Poiskovaya. According to the actual production schedule ALROSA commenced mining

these deposits in the second half of 2018. The operation mines two open pits: Zapolarnaya (for the Zapolarnaya pipe and Deimos pipe) and Magnitny (for the Novinka and Komsomolskaya-Magnitnaya pipes). The ROM ore will be hauled to Udachny for processing at Plant No. 12. The haul distance is around 170 km and it is proposed to use SCANIA line-haul trains with a capacity of 90 t.

Ore and sands from all the deposits of the Udachny GOK are processed using the same flowsheet at Plant No. 12, located in Udachny. The plant was commissioned in 1976. The Udachny open pit was depleted in 2016 and ore feed will be replaced by the Udachny underground ore (to a maximum of 4 Mt/a) and ore from Zarnitsa, as well as by sands extracted from the Kluch Piropovy and Zakonturnaya deluvial placers. It is anticipated that the processed ore tonnage will also contain a proportion from the Verkhne-Munskoe deposit. The projected tonnage to be processed in 2018 is 7,500 t. When the Udachny underground mine reaches the full design production rate of 4 Mt/a, together with the Zarnitsa open pit production of 3.5 Mt/a and the Verkhne-Munskoe open pit production of 3.0 Mt/a, the total output of the Plant No. 12 should exceed 10 Mt/a.

1.4.2 Aikhal GOK

The Aikhal mining and processing division (Aikhal GOK) is based close to the town of Aikhal, 65 km southwest of Udachny and some 485 km north of the city of Mirny. Aikhal GOK was established in 1986 and currently mines the Jubilee, Aikhal and Komsomolskaya pipes, with planned development of the Zaria pipe. The Aikhal pipe has been mined by underground methods since 1997. The Jubilee and Komsomolskaya pipes are mined as open pits. Processing of ore from the Aikhal and Komsomolskaya operations is currently undertaken at a central processing plant, Plant No. 8, located close to the Aikhal mine and around 17.6 km from the Komsomolskaya pipe. Since 1996, ore from the Jubilee pit has been processed at Plant No. 14, located 4.5 km to the northeast.

The Jubilee kimberlite pipe is in the Daldyn-Alakit diamondiferous district. The morphology of the Jubilee pipe is close to a classic caldera with the remnant of a cone funnel at the top. The inherent structure of the pipe, predetermined by multi-phase kimberlite intrusions, is quite complex and consists of three morphologically independent ore shoots: Central, Western and Eastern.

The Jubilee open pit is currently being worked to a depth of 390 m and the current mine design gives an ultimate pit depth of 720 m. The open pit utilises traditional mining technology, including drilling, blasting, loading of ore and waste by shovels and hauling by dump trucks. The open pit produced 5.45 Mt of ore in 2017.

The Aikhal pipe is situated in a zone underlain by Lower Palaeozoic carbonate rocks, the majority of which are overlain by Upper Palaeozoic terrigenous formations intercalated with trappean rocks. In form it is an inclined dyke composed of three ore shoots, each having its own feeder.

Open pit mining of the Aikhal pipe began in 1961 and, by 1997 the open pit had reached the bottom of the design level at elevation +230 m and open pit mining at the deposit ceased. Underground mining first commenced in 1997, with the mine reaching the full design capacity of 0.5 Mt/a in 2012. The underground mine utilises the cut-and-fill mining method with the use of continuous miners. It is planned to extract reserves down to an elevation of -100 m via two inclined shafts and one vertical shaft.

A pilot operation of longhole open stoping with backfilling is nearing completion and mine management has accepted this proposed mining method. Therefore in the future an increasing proportion of the ore will be mined utilising this method.

The Komsomolskaya kimberlite pipe lies within the Alakit-Markha kimberlite field. It is a dyke-shaped ore body with a north-easterly orientation and is intruded by a dolerite dyke that separates the main ore body into two major blocks. The pipe is composed of two types of kimberlite rock: an autholitic kimberlite breccia and a porphyry kimberlite, which differ from each other by texture, structure, elementary composition and diamond grade. The central part of the diatreme (the central ore shoot) is a typical volcanic pipe, tapering with depth and it is composed of autholitic kimberlite breccia. The eastern and western flanges of the pipe (dyke-shaped ore bodies) are composed of porphyry kimberlite.

The open pit at the Komsomolskaya pipe deposit has been in production since 1992. The latest version of the open pit design envisages the pit bottom to be stopped at an elevation of -460 m. Conventional open pit mining methods are used at the deposit. No ore mining occurred during 2013 and 2014, as operations were focused on waste stripping for the last pushback. Mining is planned to reach 1.01 Mt/a in 2018, with the project life scheduled into 2020.

The Zaria kimberlite pipe was discovered in 1974. It is located 2 km southeast of the Aikhal pipe and 3 km SSE of Plant No. 8. Morphologically, the Zaria pipe is close to a classic funnel-shaped volcanic pipe. The total thickness of the overlying rock varies from 85 m in the north-eastern flank of the deposit to 144 m in the south-eastern flank, averaging 103 m. The diamond grade is low, though the available crystal evaluation demonstrates high quality diamonds.

The Zaria deposit will be mined by open pit methods with processing of ROM ore at Plant No. 8. The final depth of the open pit is designed to be around 300 m. Selective mining is proposed to be used to excavate the reserves from the central ore shoot. Stripping was initiated in 2016 with the mine to be commissioned shortly and commercial ore mining is scheduled to commence in 2021.

Plant No. 8 was modified in 1980 in order to process ores from the Sytykanskaya pipe, but in 2001 the Sytykansky open pit was withdrawn from production. In the same year, production mining began at the Komsomolskaya pipe. The ROM ore mined from the Aikhal underground mine and the Komsomolsky open pit mine are processed separately. The ore from the Zaria open pit should replace the ore from the Komsomolskaya pipe in the plant feed soon, as the Komsomolskaya deposit is forecasted to be depleted in the near future. The current annual production capacity of Plant No. 8 is 1.7 Mt/a.

The Plant No. 14 was designed in 1989 to process 10 Mt/a of ore. The only ROM ore processed by the plant is from the Jubilee pipe.

1.4.3 Mirny GOK

The Mirny mining and processing division (Mirny GOK) is based in the city of Mirny and was founded in 1957 as a result of extensive mining at the Mir kimberlite deposit. Mirny GOK currently mines the hardrock deposits of the Mir and International pipes, the Irelyakh,

Gornoye and Vodorazdelnye Galechniki placer deposits, and historic tailings from Plant No. 5. The processing of diamond-bearing materials from all the mining operations is currently undertaken at the central processing plant, Plant No. 3.

The Mir pipe is located in the Malo-Botuobinsky diamondiferous district. The kimberlite pipe is a steeply dipping ore body, which is cone-shaped down to a depth of 300 m (+30 m elevation). The kimberlite was formed as a result of three intrusion phases. The physical and mechanical properties of the intruded rocks vary slightly, as well as the diamond content.

Petroleum, bitumen and gas occurrences are associated with highly porous layers within the surrounding carbonate strata and, to a lesser degree in the kimberlite, resulting in a 'hazardous' categorisation for the mine.

The Mir open pit closed in 2001 and underground mining operations commenced in 2009. An accident occurred in the mine on 4th August 2017 due to host rock removal in the bottom of the southern pit wall leading to an uncontrolled water discharge from the pit basin into the underground mine workings. The total volume of water discharge was estimated to be around 250,000 m^3; consequently the mine was flooded which unfortunately led to fatalities. ALROSA has completed a large scale investigation into compiling engineering proposals and technologies targeted at designing a reliable mine water control system and rock mechanics related to the Mir deposit operation.

The International pipe is also located within the Malo-Botuobinsky diamondiferous district. Down to a depth of 125 m the pipe has a funnel shape, changing to almost circular at deeper levels and producing the ore body, which dips steeply to the southeast. The ore body is composed of autolith kimberlite breccia and porphyritic kimberlite. Both rock types are characterised by similar diamond grades with a slightly higher crystal concentration in the porphyritic kimberlite. The average diamond grade decreases with depth.

The International mine reached its full production rate of 500 kt/a in 2002, and open pit mining ceased in 2011 with the pit bottom in its final position at an elevation of +85 m. Underground mining has been designed to proceed in three phases. The first phase involves mining between the -200 m and -560 m levels. The second phase includes excavation of the ore reserve left under the pit bottom within the intervals of +155 m to -200 m together with mining at deeper levels between the -560 m and -820 m elevations. The third phase should provide extraction of ore reserves within the elevations of +85 m to -155 m. Currently, the first phase of production has been depleted and the second phase reserves are being excavated. Two shafts provide access to the first and second phase reserves with the lowest shaft points matching the main haulage drift at the -560 m level. A third shaft has been constructed for the extraction of the third phase reserves within the elevations of +85 m and -155 m. This shaft extends to the 347.4 m elevation, as designed, and mining is currently being undertaken to connect the ventilation shaft, the production skip shaft and the cage shaft together.

The mining method used is mechanised cut-and-fill. Drifts are driven with continuous miners. Ore is hauled by LHDs to ore passes, and transferred by train along the haulage level to a second ore pass that feeds the production shaft for hoisting to the surface. Backfill is placed on retreat in the drifts. Backfill material is fed from the surface via two pipelines mounted in the production shaft to the -200 m level, from where it is transported to open stopes for backfilling.

Currently, Plant No. 3 is undergoing modification. It has already been upgraded by the installation of high pressure grinding rolls (HPGR) and two 150 t/h dense medium separation (DMS) plants. Additional modifications include the upgrading of plant automation, the fines recovery circuit and the final recovery section. Throughput capacity of the plant amounts to 2.0 Mt/a.

Diamond production at Mirny GOK is supplemented by sands mined from the Irelyakh, Gornoye and Vodorazdelnye Galechniki placer operations.

The Irelyakh placer is confined to the stream bed and terrace deposits of the Irelyakh River. The placer is located from the Khabardin Log 26.5 km downstream to the river mouth. Since 1960 the deposit has been mined by dredging and most of the alluvial placers are depleted to date. Further open pit mining operations are connected with the second, third and fourth river terraces. Dredges No. 201 and No. 202 operate on the Irelyakh River, processing material from the first and second phases of the reserve extraction, with 839 k m^3 of sands mined and washed in 2017. Sands mined by open pit methods are treated by mobile sorting units. Concentrates from the mobile sorting units are sent to Plant No. 3 for diamond recovery. A total of 511 k m^3 was mined by open pit methods in 2015.

The Gornoye placer deposit is located on the left bank of the Irelyakh River, and at the junction of the top river terraces of the Irelyakh and the Malaya Botuobiya Rivers. The deposit is being mined by Dredge No. 20, which excavated and processed 497 k m^3 of sands in 2017.

The Vodorazdelnye Galechniki placer deposit is located in close proximity to the Mir pipe. It is an ancient buried placer with diamonds sourced principally from the Mir kimberlite pipe, the Sputnik kimberlite pipe and the kimberlite vein confined to the Mir pipe. The Vodorazdelnye Galechniki deposit is mined by open pit methods with the sands being processed at Plant No. 3. In 2017 the operation washed 82 k m^3 of sands and this level of production is expected to be maintained for a long period.

1.4.4 Nyurba GOK

The principal offices of the Nyurba mining and processing division (Nyurba GOK) are in the city of Mirny, although the operations are based around the drive-in/drive-out settlement of Nakyn, some 200 km northwest of Nyurba and 320 km northeast of Mirny. The Nakyn settlement was founded in 2000 to support the development of the diamond deposits located within the Nakyn kimberlite field.

The Nyurbinskaya pipe and placer deposits are currently being mined and development of the Botuobinskaya pipe began in 2014 with extraction of 250 kt of ore in 2015. Plans to develop the Maiskoye kimberlite body deposit are also in place. Processing of ore from all the mining operations is currently undertaken at two central processing plants, Plant No. 15 and Plant No. 16, which were commissioned in 1999 and 2003, respectively.

The Nyurbinskaya and Botuobinskaya pipes and their associated placer deposits, as well as the Maiskoye kimberlite body, are located in the Sredne-Markhinsky Region of the Nakynsky kimberlite field. The stratigraphic profile of the area includes Upper Cambrian and Lower Ordovician rocks that host the kimberlite bodies, with overlying Triassic, Lower and Middle Jurassic sediments.

The Nyurbinskaya pipe is elongated north-eastwards and is an ellipsoid in plan view. The pipe gets thinner with depth and at a depth of 280 m to 320 m below the surface it is divided by a basite intrusion into two separate ore bodies. Three types of kimberlite are recognised in the Nyurbinskaya pipe: autholitic kimberlite breccia, kimberlite breccia and porphyritic kimberlite. The majority of the pipe is composed of autholitic kimberlite breccias and kimberlite breccias, with porphyritic kimberlite occurring in the deeper levels to a lesser extent.

The Nyurbinskaya placer deposit is located close to the Nyurbinskaya kimberlite pipe, partially overlapping the pipe which is the source of the diamond-bearing material.

Open pit mining operations at the Nyurbinskaya pipe commenced in 2000. The open pit mines both the ore of the Nyurbinskaya pipe and the overlying sands of the Nyurbinskaya placer deposit. To date, the pit bottom is around 345 m deep with a designed depth of 750 m. The Nyurbinskaya open pit ore production for 2018 is scheduled to be 1,050 kt and sand production 700 kt.

The Botuobinskaya pipe is located within the Nakyn kimberlite field, approximately 3 km southwest of the Nyurbinskaya pipe, and is characterised by an irregular elongated shape which dips steadily with depth. The first intrusion phase is represented by porphyritic kimberlite and the second phase is composed of autholitic kimberlite breccias and kimberlite tuff-breccias. The Botuobinskaya placer deposit is closely associated with the Botuobinskaya kimberlite pipe; it adjoins the pipe on the southwestern flank.

The Botuobinskaya pipe and the associated placer deposits are in the initial phases of exploitation. Overburden was removed in 2014 and production commenced in 2015. The mining capacity was planned to reach 300 kt/a of ore and 190 kt of sands in 2016.

The Maiskoye kimberlite dyke is located 3 km southwest of the Botuobinskaya pipe. The dyke body is elongated with thicknesses varying from 15 m to 40 m. The dyke can be traced along the strike for approximately 340 m and 400 m along the dip.

Detailed exploration of the deposit was completed in 2015 and ore reserves were assessed in the same year. According to ALROSA's strategic plan, the Maiskoye kimberlite dyke development is scheduled for 2022. The deposit will be operated by open pit methods with the use of the same types of mining and haulage equipment as used currently at the operational Nyurbinskaya and Botuobinskaya open pits.

Processing Plant No. 15 was constructed as a pilot bulk sampling facility adjacent to the Botuobinskaya and Nyurbinskaya kimberlite pipes. It operates on a seasonal basis processing the sands from the placers being mined by the Nyurba GOK. The scheduled throughput of the plant is 500 kt/a.

Processing Plant No. 16 was commissioned in 2003 at a design capacity of 1.35 Mt/a ore. The flowsheet includes HGPR and DMS separation and it is a very modern plant. The plant plans to process 1,570 kt of ore in 2018.

1.4.5 Solur-Vostochnaya Placer Deposit

The Solur-Vostochnaya placer deposit is comprised of two spatially separated buried placers, the Solur and the Vostochnaya, and is located 25 km northwest of Mirny, between the

Irelyakh and Chuonalyr Rivers. The deposit lies within the Mirny Ulus (District) in the Republic of Sakha (Yakutia), which covers the Malo-Botuobinsky diamondiferous district. This deposit is explored, but has not been developed yet.

The Vostochnaya placer, a proluvial deposit in origin, has a straight length of 4.6 km. The thickness of its productive seam varies from 0.1 m to 1.9 m, with 0.68 m as the average for the deposit. The Solur is a deluvial-proluvial deposit in origin; its thickness ranges between 0.5 m and 5.1 m, with an average of 2.35 m.

The thickness of overlapping sedimentary rocks in the Vostochnaya placer varies from 12 m to 58 m, averaging 47.7 m, while the rock overburden of the Solur deposit varies from 5 m to 54 m, averaging 41.7 m.

1.4.6 Lomonosov GOK

The Lomonosovsky mining and processing division (Lomonosov GOK) is an operating facility of the ALROSA subsidiary company PAO Severalmaz. It was created in 1992 to develop the M.V. Lomonosov deposit, which is the largest hardrock diamond deposit in Europe. The deposit is 100 km northeast of Arkhangelsk, the headquarters of the Lomonosov GOK.

Two of the six kimberlite pipes in the area are currently being mined, the Arkhangelskaya and Karpinskogo-1 pipes. Processing of ore from all the mining operations is currently undertaken at the centralised processing facilities consisting of Processing Plant No. 1 (pilot plant) and the adjacent Processing Plant No. 2, which was commissioned in 2014.

The Karpinskogo-1 pipe is located approximately 2 km northwest of the Arkhangelskaya pipe and the geological and mining conditions are similar. Open pit mining at the Arkhangelskaya pipe has been underway since 2005, using conventional truck and shovel methods without drilling and blasting. Ore and waste loading is provided by crawler excavators which haul the material to the trucks.

Overburden stripping commenced at the Karpinskogo-1 mine in 2009, with mining operations beginning in 2014. The mining method and production parameters are very similar to those employed at the Arkhangelskaya mine.

In 2018, the Arkhangelskaya open pit plans to mine 2,000 kt of the balance reserve ore; the Karpinskogo-1 open pit production for the same period is also 2,000 kt of balance reserve ore.

A comprehensive dewatering system is utilised at the deposit, including mine water pumping and a system of dewatering holes drilled around both operating open pits. In 2018, this system consisted of 71 holes. The use of dewatering holes not only reduces the amount of water pumped from the pits, but also improves the ground conditions and the stability of the open pit benches. The total pumping capacity of the dewatering system is sufficient to provide dewatering of both open pits even in periods of peak water inflow.

Ore is processed at Plant No. 1 and Plant No. 2. Plant No. 1 has a capacity of 1 Mt/a and has processed ore since 2005. Plant No. 2 has a design capacity of 3 Mt/a, which was achieved in 2015.

1.4.7 Almazy Anabara

AO Almazy Anabara operates in several uluses or districts of the Republic of Sakha (Yakutia). Its main office is located in the capital of the Sakha Republic, Yakutsk.

The first group of deposits managed by Almazy Anabara include the Anabar River placer deposits located in the north-western area of the Republic of Sakha (Yakutia) within the Anabarsky National Ulus (Dolgano-Evenkiysky) and the Oleneksky Evenkiysky National Ulus territories. These deposits are confined to the Anabar diamondiferous area.

The second group of deposits include the Molodo deposits and these administratively belong to the Bulunsky Ulus, Republic of Sakha. These are geologically confined to the Prilensky diamondiferous area.

The diamond deposits of both these regions operated by Almazy Anabara include the Ebelyakh River placer, Gusiny Stream placer, Right Bank of the Morgogor River placer, Kholomolokh Stream placer, the area within the Uchakh-Ytyrbat River and Khara-Mas River basins, the Bolshoy Kuonamka placer and the Talakhtakh River placer, as well as the Kumakh-Yuryakh Stream placer, the Billyakh River placers, and the Molodo River placers. All these placer deposits are covered by this Report. In addition, Almazy Anabara is currently exploring a series of different potential targets.

No permanent settlements are located in close proximity to the deposits. Accommodation is provided by the use of drive in/out camps, constructed in close proximity to the areas of mining.

The Ebelyakh diamondiferous area is located in a region comprised of three large structures from the Siberian Platform: the Anabar anticline, the Udzhinsk dormant rift system and the Lena-Anabar trough. All the earlier formations in the region are overlapped by loose Quaternary sediments from various sources.

The Ebelyakh River placer deposit is a large placer deposit that includes sediments from the river bed, lower and upper floodplains, four floodplain terraces and re-deposited portions of the weathered surface layers. The commercial part of the deposit is 82 km in length with the width varying from 50 m to 345 m, averaging 80 m. The deposit has been exploited by Almazy Anabara since 2014.

The Gusiny Stream placer is alluvial in origin. There are three zones in the stream valley with commercial diamond grades: Upper Quaternary sediments, Neogene-Late Quaternary formations, and re-deposited weathering crusts. The commercial portion of the deposit is 8.7 km long with the width varying from 42 m to 262 m, averaging 130 m. The deposit has been mined since 2014.

The area of the Right Bank of the Morgogor River includes three separate placers, localised along the tributaries of the river, including the Hotugu-Balagannakh, the Kamenisty and the Bystry. The commercial layers of the three placers are confined to the channel facies of Upper Quaternary alluvial rocks, and to a much lesser extent to the first flood plain terrace. Exploitation of the Right Bank of the Morgogor River placer has been conducted since 2014.

The Kholomolokh placer deposit is confined to the Upper Quaternary U-shaped valley of the Kholomolokh Stream which is a left tributary for the Ebelyakh River. There is a detached re-deposited weathering crust, in-channel eroded alluvial material and recent beds within the placer reserve outline. The commercial section of the deposit is 8.8 km in length within the overall placer length of 17.6 km. Its width varies from 20 m to 260 m along the exploration profiles with an average of 109 m for the entire placer. The thickness of the productive seam is even, averaging approximately 2.38 m. Between 2004 and 2007 the deposit had been operated by the Anabar GOK of ALROSA, currently it is operated by Almazy Anabara.

The regional geology of the area within the Uchakh-Ytyrbat River and the Khara-Mas River basins is similar to the geological structure of the Ebelyakh River basin. All the placer deposits are comprised of rocks from the Anabar suite (including Middle to Upper Cambrian deposits), Ebelyakh Pliocene sequences, paleo valley alluvial sediments, Upper Quaternary relict valley deposits and recent slope detritus, in addition to recent channel sediments and floodplain deposits.

The placer deposits of the Kumakh-Yuryakh Stream, the Labazny Stream, the Bolotisty Stream, the Balaganakh Stream, and the Yras-Sala Stream all belong to the Ebelyakh River basin. The diamond placers of the Kumakh-Yuryakh Stream, the Lobazny Stream, the Bolotisty Stream and the Balaganakh Stream are shallow alluvial deposits of Upper Quaternary age. They are confined to the existing stream valleys and occur in the paleo valley floors. The length of the streams varies from 0.5 km to 27 km.

The Lyaseger-Yuryakh Stream is a left tributary for the Mayat River, which is around 60 km from head to river mouth. Geologically, the Lyaseger-Yuryakh placer is composed of the Anabar suite (Middle to Upper Cambrian rocks), Onkuchakh suite (Lower Permian), younger deep valley alluvium, the upper layer of the Mayat suite (Upper Quaternary), Upper Quaternary to recent slope sediments and recent alluvium from the existing channels. The commercial placer in the Lyaseger-Yuryakh stream consists of Upper Quaternary deep valley sediments. These sediments line the stream valley floor throughout the entire length overlying the bedrock or the re-deposited weathering crusts.

The geology of the Ochous Stream is comprised of the Anabar suite (Middle to Upper Cambrian rocks), Upper Quaternary alluvial rocks from the relict (buried) valley which forms the commercial placer, Upper Quaternary to recent slope sediments and recent floodplain deposits. The Ochous Stream placer is entirely composed of diamondiferous alluvial sediments of Upper Quaternary age. Within the placer outline there are individual thin layers and lenses containing 0.75 ct/m^3 to 1.0 ct/m^3, and additional layers with diamond grades varying from 0.25 ct/m^3 to 0.60 ct/m^3 that contrast with the general surrounding low productive sediments. The crystal morphology and quality is fairly homogenous throughout the entire deposit.

The Talakhtakh River, a tributary of the Bolshaya Kuonamka River, hosts the Talakhtakh diamond-bearing placer. The placer is comprised of Quaternary alluvial sediments from the top river terraces, as well as the floodplain and recent channel sediments. Exploitation of the placer began in 2015.

The Bolshaya Kuonamka alluvial placer covers the valley of the lower and middle reaches of the Bolshaya Kuonamka River, a left tributary of the Anabar River. The deposit is a long alluvial placer, with the commercial contour including sediments from the channel bed, the

lower floodplain terrace, top floodplain terrace and the first terrace above the floodplain. The deposit is distinguished from the other northern Yakutia placers by its high average weight of diamonds and high diamond value. The exploitation of the deposit began in 2016.

The Molodo River placer is associated with the left tributary valley of the Lena River. The diamond content is associated with the Quaternary alluvial rocks within a long stretch of the mid reaches of the river valley. However, commercial diamond concentrations have been found in several other separate areas of the placer. The deposit has been exploited since 2002.

The mining operations at all the AO Almazy Anabara deposits utilise open pit methods and similar techniques.

Overburden stripping and sand mining are performed during the spring and winter seasons using bulldozers, or drilling and blasting if needed. Loosened waste is then pushed by bulldozers to waste piles directly, or it is loaded by front loaders to trucks and hauled to the waste piles.

From March until late May the frozen sands are loosened and loaded to dump trucks and then transported to stockpiles (thawing areas) located at the mobile sorting and processing complexes for treatment during the summer period from mid-June to mid-September.

Primary treatment of the sands is performed at the mobile sorting and DMS units. The concentrate is transported to seasonal processing plants for final diamond recovery, which is performed with the help of X-ray sorters.

1.5 ENVIRONMENTAL, HEALTH AND SAFETY AND SOCIAL ISSUES

ALROSA has developed a strong centralised organisational structure for the management of environmental and health and safety aspects of the group's operations. Based in Mirny, this centralised management group is responsible for all of the ALROSA activities (excluding Severalmaz and Almazy Anabara, which operate independently), including not only the mining operations, but also the other subsidiary companies involved in areas such as transport, public utilities, construction, media and agriculture. At the corporate level, the management of these diverse operations is undertaken in an integrated manner. Micon notes that the widely different impacts and risks associated with these diverse activities impose a significant burden on corporate management.

Micon has visited key sites described in Table 1.1 of this Report, has held interviews with key ALROSA personnel at both a corporate and operational level, including both management and technical specialists, and has reviewed documents and data supplied by ALROSA.

Using the data obtained, Micon has assessed the risks and liabilities associated with the current and/or proposed operations.

Micon has reviewed the following key environmental and safety issues at each of the operations:

- Inflows from groundwater and rainfall;
- Air quality;

- Waste rock management;
- Tailings and water management;
- Management of hazardous substances;
- Dust control;
- Safety management; and,
- Mine closure and rehabilitation.

The safety performance, regulatory compliance and permits for nature use were also reviewed. Micon did not identify significant breaches of the conditions attached to the operating permits and, where limits were exceeded, these were covered by excess fee payments, as is standard Russian practice. The management of waste facilities including tailings dams and waste rock dumps from an environmental perspective is undertaken in accordance with federal laws and as such are subject to regular environmental monitoring and inspection. Micon has not assessed the geotechnical aspects of the design or operation of the tailings management facilities.

Environmental management within ALROSA is driven largely by the need to comply with the Federal law on environmental protection, and associated legislation at both the Federal and Regional levels. In order to achieve this objective, ALROSA has developed an environmental management system that was first certified in 2014 to the Russian standard GOST R 14001-2007. The system was recertified in 2017 to the international standard ISO14001:2015 and the national standard GOST R ISO 14001-2016.

Historically, health and safety management by ALROSA has been strongly influenced by the need to comply with statutory requirements, such as the *Unified Safety Rules for Open Pit Mining* (PB 03-498-02) and *Safety Rules for Blasting Operations* (PB 13-407-01). More recently, however, there has been increasing acceptance within ALROSA that this approach alone is unlikely to achieve the best possible safety outcomes. Consequently, ALROSA has developed a health and safety management system that combines accepted Russian practice and regulatory requirements with the key elements of international practice.

This approach had resulted in a much-improved safety performance over time, with recorded incidents per 1,000 employees declining from 1.2 in 2006 to an all-time low of 0.3 in 2015. There has, however, been a noticeable increase in recorded incidents in 2016 and 2017; with recorded incidents per 1,000 employees reaching 1.1 in 2017 (Table 1.9). The recent increase in safety incidents can be traced primarily to the development of underground mining, particularly at Mirny GOK, where a major incident occurred in 2017 that resulted in eight fatalities (four employees of ALROSA and four contractors) and resulted in the underground operations at Mirny remaining closed to date; but similar trends can be seen where other underground operations have been developed. It remains to be seen whether this deterioration in safety performance is short-term or is indicative of a longer-term problem with the operation of underground mines.

Table 1.8: ALROSA Safety Performance
Number of Incidents (Number per 1,000 Employees)

Index	2006	2008	2010	2012	2013	2014	2015	2016	2017
Recorded Incidents									
Mining Operations	17 (1.17)	9 (0.63)	9 (0.68)	6 (0.46)	13 (0.98)	4 (0.31)	3 (0.23)	11 (0.84)	15 (1.14)
Key Support Functions	15 (1.42)	13 (1.28)	8 (0.97)	12 (1.45)	7 (0.84)	4 (0.49)	3 (0.36)	3 (0.38)	7 (0.96)
Total	**32 (1.28)**	**22 (0.90)**	**17 (0.79)**	**18 (0.84)**	**20 (0.92)**	**8 (0.38)**	**6 (0.28)**	**14 (0.67)**	**22 (1.08)**
Fatal Incidents									
Mining Operations	2 (0.14)	0 (0.0)	2 (0.15)	3* (0.23)	3 (0.23)	2 (0.15)	0 (0.00)	0 (0.00)	6** (0.46)
Key Support Functions	2 (0.19)	1 (0.10)	1 (0.12)	1 (0.12)	1 (0.12)	0 (0.00)	1 (0.12)	1 (0.13)	1 (0.14)
Total	**4 (0.16)**	**1 (0.04)**	**3 (0.14)**	**4 (0.19)**	**4 (0.18)**	**2 (0.09)**	**1 (0.05)**	**1 (0.05)**	**7 (0.34)**

Notes:

1. "Mining operations" includes data from Aikhal GOK, Mirny GOK, Nyurba GOK and Udachny GOK; data from Almazy Anabara and Severalmaz is not included due to the incompatibility of the data;
2. The "Key Ancillary Companies" include the subsidiaries, which deal with diamonds sorting, maintenance and repair, construction, purchasing, and exploration.
3. The safety statistics for other ALROSA companies/divisions, including the airline company, entertainment and sport complexes, leisure centres, mass media, agricultural companies, diamonds selling companies and municipal services have not been included, as far as they do not belong to the principal business and are beyond the framework of the present Report.
4. * Includes one group incident at Udachny; total five fatalities recorded for Alrosa employees in 2012.
5. ** Includes one group incident at Mirny; total eight fatalities, four Alrosa employees plus four contractors in 2017.

ALROSA fully acknowledges the responsibilities that its status confers in the regions in which it operates and acknowledges, also, that the development of a favourable socio-economic climate in the region is fundamental to the ability of ALROSA to attract and retain a high quality, well-motivated workforce. Total social funding by ALROSA between 2016 and 2017 was some 11,208 million roubles with a further 5,400 million roubles budgeted for 2018. Additional funding was allocated independently by Almazy Anabara and Severalmaz.

As a result of its review of environmental, health and safety risks, Micon concluded that while the operations of Lomonosov GOK carry low risk (i.e. the risk is no greater than that normally associated with mining operations of a similar size and type, worldwide), all of the other operations carry low to moderate or moderate risk (i.e. the risk is considered greater than that normally associated with such operations, largely due to the environmental context of the operations, but is manageable with the application of good practice without unduly constraining the operations).

1.6 RISKS AND MITIGATION

ALROSA operates a highly diverse collection of hardrock and placer diamond deposits of which 36 were reviewed by Micon for the current report. Of these 26 are in production including seven open pits, three underground mines and sixteen placer operations. Of the remaining deposits five open pits and four placer operations are planned and one underground mine, Mir is suspended awaiting a revised mining and water treatment plan. Micon has assessed the risks and mitigating measures adopted by ALROSA that impact the Company's ongoing operations. The considered risks can be subdivided into the following technical domains:

- Mineral resources and ore reserves;
- Operations; and,
- Diamond market.

1.6.1 Mineral Resources and Ore Reserves

The development of diamond mineral reserves in the Russian Federation is administered by the Russian State Commission for Mineral Reserves (Gosudarstvennaya Komissia po Zapasam or GKZ). The GKZ applies strict control over the estimation and reporting of mineral reserves and utilises a prescribed protocol for their calculation that is usually based upon standard methods. The standard methods approved include sample size and spacing, sample quality control/ quality assurance procedures, methodology for diamond valuation and specific measures for estimating the volume of resources and contained quantity and quality of diamonds. A systematic approach has been developed for the classification of mineral reserves, which ensures a constant reliability of estimates across the mineral reserve base. The fact that the GKZ is closely involved in all aspects of the mineral reserve estimation process ensures that the protocols developed are consistently applied. This systematic approach has evolved over time to produce a methodology that is conservative in approach and is supported by a long history of reconciliation of production results versus planned production.

The occurrence of a valuable diamond remains a rare phenomenon. The formation of large special diamonds is extremely difficult to predict and there is always a risk that special diamonds may or may not be realised. To mitigate this risk ALROSA estimates of diamond quantity and quality are based upon averages derived from the analysis of large batches of diamonds. These batches cover a complete spectrum of diamond size and quality designed to be representative of the deposit being assessed. The diamonds are assessed and valued by independent experts that ensure that mineral reserve estimates are reasonable and that a high probability of yielding the planned value can be achieved.

Diamond quantity and value can vary significantly within individual deposits. ALROSA's strength is in the number and variety of deposits mined. The large number of operations and the scale of these mines enables the Company to design and adjust production plans to meet market demand.

ALROSA is a world leader in the exploration and development of diamond-producing operations. The Company has a vast exploration infrastructure and very large prospective land package under licence. The probability of replacing diamond reserves and to maintain a large mineral reserve base is considered by Micon to be high.

For the reasons listed above Micon considers the mineral resources and reserves of ALROSA to represent a relatively low risk.

1.6.2 Operations

ALROSA operates a diverse portfolio of hardrock open pit and underground mines, and conventional placer wash plant and dredging operations. Adverse winter weather can affect production at the open pit mines and Micon has observed a shutdown at the Jubilee pit due to a temperature inversion that caused excessive diesel exhaust fumes to accumulate in the pit. These shutdowns are limited and the mines tend to have excess capacity to make up any shortfalls in ore tonnage. The plants also typically maintain adequate stockpiles at the ROM pad to ensure continuous plant feed.

Underground diamond mining is a challenge, particularly when transitioning from open pit to underground. The pipes tend to taper and become narrow at depth, so lower tonnage per vertical metre. The transition for open pit to underground has been particularly difficult at the Mir mine, which has temporarily suspended production in order to resolve water inflow issues. In contrast the International mine has transitioned well and achieves its production targets. The large Udachny mine is currently transitioning to an underground operation. The Company has drawn upon the excellent experience at the International mine and has created an extensive underground infrastructure to ensure that production targets are met.

The Company operates eight concentrators with a combined production capacity of 31.6 million tonnes per annum. The feed to these hardrock plants is supplemented by concentrates created at more than 19 wash plants (17 at Almazy Anabara and two at Mirny) plus three dredges at Mirny. Micon has inspected all of these plants and has reviewed production and metallurgical data for them. In Micon's opinion, the processing plants operate efficiently, are fit for purpose, and are capable of delivering the planned production targets. Some plants are considered by Micon to be over-built by Western standards. For example, the new Plant No. 16 has two primary crushing lines with one as a standby.

In Micon's experience ALROSA is the premier mining company in the Russian Federation. Generally, there is no shortage of labour as the company provides excellent remuneration and training, and proactive health and safety programmes. Historically, health and safety management in ALROSA has been strongly influenced by the need to comply with statutory requirements, such as the *Unified Safety Rules for Open Pit Mining* (PB 03-498-02) and *Safety Rules for Blasting Operations* (PB 13-407-01). More recently, however, there has been an increasing acceptance within ALROSA that this approach alone is unlikely to achieve the best possible safety outcomes. Consequently, ALROSA has developed a health and safety management system that combines accepted Russian practice and regulatory requirements with the key elements of international practice.

The number and diversity of diamond production units with ALROSA render a high degree of flexibility in meeting production targets. The operations are well managed and production targets are consistently achieved across the Company. For these reasons Micon considers the operations of ALROSA to represent a low risk.

1.6.3 Diamond Market

Bain & Company Russia, LLC (Bain) was commissioned by the Antwerp World Diamond Centre to prepare forecasts of certain macroeconomic factors in relation to the global diamond market. In preparing its economic assessment for the ALROSA assets, Micon has relied upon the forecasts contained within the Bain Report for 2018 (The Global Diamond Industry, 2018).

Bain considered a range of elements that impact on the future demand and selling price of diamonds. Most importantly is the supply of natural rough diamonds and the demand for rough diamonds by downstream cutters and polishers. To assess end-users' demand Bain examined the prospects for economic growth of the largest consumer markets, the U.S., China and India, and the growth of middle-class consumers. A further element considered was the increasing availability of lower-cost synthetic diamonds and the impact these will have on retail prices. To complete its analysis Bain considered the increasing use of digital technologies throughout the diamond mine-to-consumer chain.

Bain analysed the likely depletion of existing diamond mines versus new production derived from planned future operations. In its optimistic scenario Bain forecast that the supply of rough diamonds would be maintained at current levels. The base case scenario envisioned the supply of rough diamonds declining by up to 2% per year eventually creating a shortage of rough diamonds. The gradual decline in rough diamonds combined with the 3% annual growth in GDP in the largest diamond-consuming countries are favourable conditions in support of a modest increase in retail prices.

The preference for natural diamonds over synthetic diamonds is critical to the long-term viability of the production and sale of natural diamonds. Natural diamonds were actively promoted for many years by the De Beers "A Diamond is Forever" slogan. De Beers fomented the idea that a natural stone was an item of beauty and associated natural stones with a sense of integrity and sincerity. Recently the Diamond Producers Association has reinitiated diamond marketing on behalf of the industry with the aim to keep the beauty and allure of natural diamonds in the public conscience.

Synthetic diamonds are created in the laboratory and the cost of synthetic diamonds has reduced drastically over the past decade. De Beers has embraced synthetic diamonds and offers them through its fashion jewellery retailer called Lightbox Jewelery. Lightbox's laboratory grown diamonds are not graded and the company states that to do so may confuse consumers as to the value of synthetic stones compared to the value of rare natural stones. This measure is to reinforce the value of natural diamonds.

Digital technology and particularly blockchain cryptology to follow the path of diamonds from mine to consumer will serve to mitigate some of the negative sentiment related to "conflict diamonds" and falsification of diamond grading certificates that has damaged the reputation of the industry. Demonstrating a clear path from mine to cutter to polisher and retailer will serve to restore and maintain public confidence. In the end the future of the diamond industry depends on the diamond industry's success in maintaining the intangible value of the illustrious diamond in the eye of the consumer.