# **Monument Project Review**

## Introduction

The following review has been prepared from digital files provided by New Nadina Explorations Limited (New Nadina), government assessment report records, a land use public registry, SEDAR documents and from the New Nadina Explorations Limited website. The digital files from New Nadina did not include a comprehensive project summary report or reports with geophysical maps, drill sections or plans, or sampling results for the work carried out to date. Data presented was primarily complied from a series of exploration update memos and spreadsheets.

## Location

The Monument Project property is located in the Lac de Gras area of the Northwest Territories approximately 300 km northeast of Yellowknife, approximately 30 km south of the Ekati diamond mine and 30 km southwest of the Diavik diamond mine.

## **Property Details**

The property consists of three Canada mining leases totalling 7615 acres (Figure 1). The leases were all



Figure 1. New Nadina Monument Project Mining Leases (from AANDC Geoviewer).

issued on May 10th of 2002 and expire on May 10th of 2023. Ownership is registered as 100% New Nadina.

The property is currently subject to a 1% gross overriding royalty payable to each of DHK and 8248567 CANADA LIMITED (acquired from Rio Tinto). Participating interest holders in the Monument Property are Dr. Christopher and Mrs. J. Jennings ("Jennings") 22.11%, Archon Minerals Limited 20.4% and New Nadina as the operator holds 57.49%.

# Land Use Permit

A current land use permit is in place for the Monument Project. It was issued by the Wek'eezhii Land and Water Board under permit number W2011C0004. The permit commenced on September 5, 2012 and expires on September 4, 2017.

The permit allows mineral exploration including use of a camp, diamond drilling including large diameter RC drilling, winter road construction and maintenance, fuel storage and the use of equipment for trenching. The following items are of interest.

- A bond of \$59,000 is required prior to the start of operations. New Nadina has posted this bond.
- The Permittee shall not commence any drilling or move any equipment within five hundred (500) metres of one or more caribou.
- New Nadina signed an exploration agreement with the Yellowknifes Dene First Nation. Prior to entering into an option agreement it would be advisable to review the terms of this agreement.
- The permit is specific to the equipment described in the application.
- New Nadina may have committed to and be obligated to carry out archaeological site assessments of any areas that would have anticipated ground disturbance prior to work.

# **Exploration History**

The current leases were originally part of the larger claim block (DHK claims) staked in February of 1992 by DHK Diamonds Inc. (DHK). Kennecott Canada Exploration Inc. (Kennecott) entered into an option agreement with DHK in September of 1992 to earn an interest in the claims. The original DHK claims consisted of twenty contiguous claims and the option agreement also included seven contiguous claims referred to as the WI block, located a few kilometres to the northeast of the DHK claim block.

Work by Kennecott included:

-Esker and till sampling.

-Kimberlite Indicator Mineral (KIM) sampling of till samples including microprobe analysis.

-A Dighem helicopter electromagnetic /resistivity/magnetic/VLF survey, line spacing of 200 m, flown in 1992

-A MacPhar aeromagnetic and electromagnetic survey, line spacing of 50 m. Location of data and survey location was not confirmed. It may or may not have covered the current leases.

-A HighSense survey was flown over selected areas of the original option at a line separation of 50 m and a sensor height of 17m. Location of data or surveys were not confirmed. It may or may not have covered portions of the current leases.

-Ground geophysical surveys (magnetic, gravity and Zonge transient EM).

-Diamond drilling (31 holes, 2737m)

-Caustic fusion of drill core

-Microprobe analysis of KIM's from drill core

The work resulted in the discovery of three kimberlite pipes (DD17, DD39 and DD42) and one kimberlite dike (DD2002) all of which are located on the current mining leases. DD2002 is considered part of DD42. Available documents indicate work by Kennecott was carried out until at least 1999 and possibly as late as 2003.

### Falcon Survey for DHK, SouthernEra and Archon

A Falcon airborne gravity gradiometer survey was carried out by BHP Diamonds Inc. over the DHK and WI blocks in the fall of 2000. The property ownership is unclear at this time as the report indicated the work was for DHK, SouthernEra Diamonds Inc. and Archon. The survey was flown in a 90 deg north direction with a line spacing of 100m and a nominal altitude of 80 m. Magnetic data was also collected. The data set provided by New Nadina contained the BHP report. No author(s) was indicated on the report cover or within the text. A series of targets were selected and are shown in Figure 2. Five of the selected targets occur on the current leases. Original claim outlines were used in the figure and not the lease survey outlines. DHK-18 is most likely outside the current leases.



Figure 2. Anomaly Targets Selected by BHP in 2000.

It should be noted the selections were based on an integration of available magnetic data and KIM information; they are not solely gravity anomalies. The UTM coordinates are in NAD 83. Gravity anomalies in lakes should be accepted with caution as the data would not have been processed to take into account water depth.

In May of 2002, New Nadina applied through Kennecott to take certain claims (DHK 16, 17 and 18) abandoned by DHK to lease. Legal surveys were completed in September of 2002 after a property release agreement was received from independent directors of DHK and transfer of the claims to NNE was completed in 2004. Exploration programs were carried out from 2005 to 2009.

Work by New Nadina included:

-Till sampling in 2005

- Kimberlite Indicator Mineral (KIM) processing of till samples. It did not appear there was probe work done on the samples.

-Interpretation of available KIM data for till sampling (includes microprobe data from Kennecott).

-Interpretation of Kennecott probe chemistry of KIM's for DD17, DD39 and DD42.

-Airborne geophysics using a Versatile Time Domain Electromagnetic (VTEM) survey flown by Geotech airborne geophysical surveys.

-ground geophysics including magnetic, gravity and HLEM surveys. Magnetic surveys included complete coverage of the property by utilization of an operator with a magnetometer towed behind a snowmobile as well as more conventional walkmag surveys.

-Diamond drilling (87 holes, 8538 m).

-Caustic fusion of drill core.

-Reverse Circulation (RC) drilling (18 holes, 873 m).

-Caustic fusion of RC samples. Results not located or presented in available literature. Internal New Nadina correspondence noted that the information was not released due to diamond breakage having been observed in the sample(s).

## New Nadina Till Sampling Review

A review of till sampling was completed by Kevin Kivi in 2007 and is presented in Figures 3 and 4. The data shows a strong kimberlite indicator mineral train at 301 degress Azimuth from known kimberlites Sonja, Nic, DD17, RIP, Bling and DD17-11. These kimberlites form the central zone and have also been referred to as the "Blue Pearl" cluster. Mr. Kivi noted a number of historic samples plotted in water, indicating locational errors. He also postulated that the prominent mineral train dispersion pattern was wider than it should be, indicating the possibility that there are undetected kimberlite bodies to the north of the central cluster.



Figure 3. Kimberlite Indicator Mineral (KIM) trains on the Monument Property. Larger circles are higher counts, blue diamonds are zero counts, red dots are proposed samples. Colours code: purple is pyrope, green is chrome diopside, blue is ilmenite and light yellow is olivine. Larger circles represent higher grain counts (from Kivi 2007).



Figure 4. Description after Kivi (2007). Ragged-edged blue pearl KIM dispersal train with several areas of high interest in which a subtle ground magnetic conductor or EM response would be considered a high interest anomaly. Linear counts are represented in pie symbols in Figure 2, whereas a logarithmic count is represented in Figure 1. Teal circles represent 2006 samples, pink circles represent areas of interest.

Given that the orientation of the central kimberlite cluster is oblique to the ice direction over a strike length exceeding 1 kilometre, it is debatable if the dispersion train is wider than expected. The noted jog in the indicator train (indicated by black dashed line in Figure 1.) may be due to irregular sampling density caused by water cover. While there are some areas of interest indicated in Figure 2, there is distinct contrast in intensity of indicator trains in the eastern and northern portions of the property compared to the train in the central to northwestern portion of the property

## New Nadina Kimberlite Chemistry Review

In 2005 Mr. KIvi also reviewed selected mineral grains for the kimberlite pipes DD17, DD39 and DD42. Within the information provided information regarding sample processing procedures or picking results. It is not known if New Nadina had kimberlite core processed for KIM information. The kimberlite indicator mineral chemistry for samples collected by Kennecott and reviewed by Mr. Kevi is located in Appendix 1. The chemistry was interpreted to be similar to other low grade diamondiferous kimberlite bodies in the Slave Geologic Province.

### New Nadina Versatile Time Domain Electromagnetic (VTEM) Survey

New Nadina commissioned a Versatile Time Domain Electromagnetic (VTEM) survey flown by Geotech airborne geophysical surveys. No report for the survey was located in the data provided. From company memos it is assumed the survey was flown sometime in the spring of 2008. Survey specifications and details were not located. A Geotech report for the survey was reported not to have outlined any new targets (Kevi, 2009) and it was recommended the data be reviewed by a geophysicist specializing in interpretation of VTEM data.

## New Nadina Snowmobile Magnetometer Survey (DogMag)

Total field magnetic surveying was carried out by towing an operator in a wooden sled by snowmobile. This was referred to as a DogMag survey in the supplied documents. Surveying began in 2006 and by 2007 the property was covered. A survey review report was prepared (Sumara, 2007) and was within the data set provided (file MonDog080107Rpt2006&2007.pdf). Line spacing was 25 m. Sumara (2007) used the data to select 157 anomalies as potential kimberlite targets. A plot of total magnetic field data is illustrated in Figure 5 and Figure 6 shows anomaly locations only. Indicated UTM coordinates are Nad83.

In 2008 DogMag surveys were carried out over selected areas using a tighter line spacing of 15m and a CDGPS receiver for location control. Locations of these surveys were not detailed in the information provided.



Figure 5. Total Field Magnetics from Sled towed magnetometer survey (Sumara, 2007).



Figure 6. Targets from Sled towed magnetometer survey (Sumara, 2007).

A quick review of Figure 5 shows the data to be very noisy and streaky. This may be due to the operator and sled not being magnetically clean, being too close to the snowmobile resulting in the sensor being affected by the snowmobiles electromagnetic field and by sensor shake caused by the sled being pulled over rough ground. Most likely it is the result of a combination of these sources of possible data error.

It should be noted that the most current target data list located was tilted *target list2\_ascendingorder\_2009\_JR.xls.* The date modified is April 28<sup>th</sup> of 2009. The list appears to only contain a portion of the 157 anomalies selected by Ms. Sumara. The original nomenclature used was M-1-07 to M-157-07. In the 2009 spread sheet it appears the prefix M and the suffix 07 were dropped and in some cases the coordinates changed by a few metres. In the 2009 file there are multiple sample series nomenclatures and there is no indication of when or by who the selections were made with the exception of the CJ series which are Whiz Bang targets selected by Chris Jennings. It is not known why a number of the 2007 picks were dropped from the 2009 list. Perhaps a decision was made to remove some based on the data quality.

## **New Nadina Conventional Ground Grids**

In 2005 a ground magnetic survey and a HLEM survey were reported to have been completed over the known DD-17 and DD-39 pipes and surrounding area. A plot for HLEM survey over the DD17 pipe was located and is shown in Figure 7.



Figure 7. Max-Min 2 HLEM electromagnetic surveys completed by the Monument JV in 2005. Colour gridded data is conductivity; in-phase (solid line) and quadrature (dashed line) profiles are shown along surveyed lines (Kevi 2008).

In 2009 it was decided to forgo additional DogMag surveys and Aurora Geosciences Ltd. (Aurora) was contracted to carry out detailed ground surveys using walkmags. A total of 51 man days were required for 771 km of survey for an average of 15.1 km per man day. For comparative purposes Figure 8 shows walkmag data over the central and southern kimberlite zones. The grid survey locations for work carried out by Aurora are shown in Figure 9.



Figure 8. Walkmag over Central and Southern Kimberlite Zones.



Figure 9. 2009 Gound Magnetic "Walkmag" Grid Locations

New Nadina also carried out some gravity surveys in 2006 over selected areas but the data did not result in any new kimberlite detection.

## **New Nadina Drilling Programs**

New Nadina carried out drilling programs every year from 2005 to 2009. A total of 92 diamond drill holes were completed for a total meterage of 8,538. A total of 18 RC holes were drilled for a total meterage of 873. The RC holes were drilled in 2009. A total of 8 new kimberlites (Trio, Sonja, NIC, RIP, Bling, Sparky, Gemini and Genie) were discovered by New Nadina and samples were sent for caustic fusion at SRC Geoanalytical Laboratories. The documents provided for review make mention of later sampling being carried out for DMS processing but no records of this being carried out were located.

The known kimberlites on the Monument Project leases are shown in Figure 10.



Figure 10. Kimberlite Locations Monument Project (New Nadina website)

New Nadina has divided the kimberlites on the property into four main reference zones or strings that include the northern, central, southern and eastern zones. New Nadina (MD&A April 21, 2010) summarized the zones as follows:

**Northern Zone:** The Trio and DD42 string are in the north on the south shore of Lac de Gras. The DD42a is the most westerly and most recent under water target tested of the DD42 string of geophysical targets. A further winter program is necessary to test the remaining targets and acquire kimberlite for diamond content and analyses.

**Central Zone:** The largest kimberlite within the string is DD17 and is just over a hectare in size. It is located in the middle of the central zone in close proximity to two pipes to the west and three to the east. There are component similarities of the kimberlites in this string with diamond recovery ranging between 434 to 594 stone per tonne. The central zone is the most tested to date and consists of Sonja, Nic, DD17, RIP, Bling and DD17-11.

**South Zone:** The south zone contains kimberlites DD39, Sparky and Gemini. Within this zone remain at least two untested targets. The core samples from these pipes have produced samples of 473, 458 and 422 per tonne.

**East Zone:** There is also a cluster of small targets in the zone near the east boundary where the Genie kimberlite is located.

Table 1 contains a list of the kimberlites along with caustic fusion sample results and estimated pipe sizes.

Sieve Size (mm) +	Trio (0.02 ha)	DD-42a (0.15 ha)	DD-42 (0.15 ha?)	DD42 East Dike (size unknown)	Sonja (0.03 ha)	NIC (0.03)	DD-17 (1.1 ha)	RIP (0.41 ha)	Bling Dike (Size Unknown)	DD17-11 (0.08 ha)	Sparky (0.11 ha)	DD-39 (0.16 ha)	Gemini (0.05 ha)	Genie (0.01 ha)
+4.750	0	0	0	0	) <mark>  (</mark>	0	0	) 0	0	0	C	) 0	0	0
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+1.700	0	0	0	0	C	0		) 0	0	1	. 1	. 0	O	0
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+0.600	11	3	0	0	1	. 4	9	3	0	1	8	1	7	0
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+0.300	60	13	1	0	14	10	27	7 18	9	8	31	. 10	15	0
+0.212	77	31	4	1	. 27	16	28	3 24	13	25	31	. 15	22	1
+0.150	144	57	7	0	35	27	53	32	22	33	51	. 24	33	3
+0.106	237	78	8	0	52	. 34	82	2 57	41	. 40	67	36	61	. 9
Total Stones	557	192	20	1	. 135	165	964	413	94	182	207	91	147	13
Weight (kg)	1015.19	296.00	62.10	3.95	278.15	167.95	2137.63	981.10	159.00	280.30	411.93	192.29	348.42	144.28
Stones/Tonne	549	648	322	253	485	982	451	421	594	649	503	473	422	90
Note -Info provi - the Geni -the hole repre lows -Data	rmation for ided (Monu- table tiltle e. Data cor table in the 09-05 drille esent the da (DD42a to4 a is only for	r Trio in New ument Proje d <i>Monume</i> npiled in the MD&A had ed in the sp ata as listed 12d). DD42a samples co	w Nadina Apr ect All - diamo nt property M is file is from I results for D ring of 2009 i d in the "all sa i is the larges bllected by N	ril 21 1020 Mi onds&sample <i>licrodiamono</i> the spreads D42a. It is no s not in the c amples sprea st and posible ew Nadina ar	D&A reporte s 1993 to 20 drecovery fr heet (Monu ot clear from latabase but adsheet." It is y all targets of these san	ed 1022 kg 09.xls om core sai ment Proje n the all sar twas used s also not cl have been noles were	and 565 to mples to du ct All - diar nples spre for the rep ear if DD4: sometime processed	atal stones. ate in the a nonds&san ad sheet ho corted MD8 2a = DD42 s s generaliz by SBC Geo	This informa bove MD&A ( oples 1993 to ow these nun &A numbers f shown on loc ed as DD42. panalytical La	tion could did not incl 2009.xls). nbers were for DD42a ation maps boratories	not be repea ude results f arrived at bu also listed ab s, but docum	ted from the or Sparky, D ut it looks lik ove. Two se ents refer to	e spread sheet D39, Gemini al e possible data parate columa 4 closely spac	nd a for ns æd mag

dated Feb 8, 2009, indicates that Kennecott results for DD39 were never sieved. Pehaps this is true for all the Kennecott data.

Gordon Clarke, January 14, 2014

Table 1. Monument Project Kimberlite Information

### **Summary and Recommendations**

Work to date on the Monument property has been successful in locating 12 diamondiferous kimberlities/kimberlite bodies. They are however very small, with the exception of DD-17 with a documented area of 1.1 ha which is comparable to the economic Diavik A154S pipe. There remains the possibility of the discovery of new kimberlite bodies, but the possibility of larger ones have being missed given the amount of exploration on the property to date is low. The data provided for review did not contain a comprehensive compilation of work to date including reviewable maps or detailed interpretation of caustic fusion results. This is required to check for the possibility of remaining larger targets and to better evaluate the grade potential of known bodies, in particular for DD-17. Therefore it is recommended:

-Caustic fusion data should be plotted and compared to the latest diamond grade curve information and interpreted by someone with experience in grade estimations. If possible all original data sets/assay sheets from SRC should be located.

-The available data set should be searched for available shape files and data sets from which a set of compilation maps could be prepared showing drill hole traces, geophysics and the most current set of anomalies selected as potential untested targets.

-The wording regarding royalty is a bit ambiguous; it should be confirmed if it is 1% each to DHK and 8248567 CANADA LIMITED for a total of 2%.

-The terms and conditions of an Exploration Agreement between New Nadina and the Yellowknifes Dene First Nation should be reviewed.

Gordon Clarke P. Geol.

January 15, 2014

### References

Kivi, K, 2005. Memorandum. Monument Kimbetrlite Indicator Mineral Chemistry Review.

Kivi, K, 2007. Memorandum. 2006 till Sampling Results and Interpretation.

Kivi, K, 2009. Memorandum. Monument Summer 2008 Drill Summary.

New Nadina Explorations Ltd. Company Website. http://www.nadina.com/

Sumara, M, 2007. Review of 2006 and 2007 Ground Magnetometer Survey Data Over The Monument Property. Internal report for New Nadina Explorations Limited.

# Appendix 1

Review of Kimberlite Indicator Mineral chemistry

(Kevin Kivi, inter office memo dated May 5<sup>th</sup> 2005)

### **Monument Kimberlite Indicator Mineral Chemistry Review**

Kennecott's mineral chemistry was compiled and reviewed with current geochemical plots, using current interpretation of Slave Craton indicator mineral geochemistry.

### **DD17: Kimberlite Indicator Mineralogy and Chemistry**

One composite sample (34710022) was collected from drill core from hole 93DD17-01. I recall the procedure was to collect a 10 cm piece of split core every 1.5 meters along the kimberlite intersection to get average mineral chemistry for the pipe. There was no effort made to get an indication of upside potential. DD17 is a wood-bearing kimberlite, which is similar to project pipes of Diavik and Ekati. I recall the kimberlite was KIM-rich, which suggests significant mantle sampling, and chrome diopside were abundant and fairly large. Larger CPX may represent sampling of the asthenosphere.

### **Pyrope Garnets DD17:**



A total of 157 pyrope garnet analyses are represented on the modified Gurney and Sobolev plots. A strong lhertzolite trend is the dominant feature in this plot with G10 (hartzburgitic) garnets occurring at 5-6 wt% Cr2O3 and about 10 wt% Cr2O3. The low-chrome G10s are likely from an upper layer of low pressure hartzburgite which is in the graphite stability field. Three high-chrome G10s are significant, and likely represent diamond-bearing hartzburgite. Eclogitic

garnets are represented by four analyses with about 9 wt% CaO. These are likely high temperature diamond-bearing eclogite.



### Chromite DD17:

Four chromite grains plot in the diamond inclusion field (right domain) and 12 analyses plot in the domain to the left, which is chromite-diamond intergrowths. The strong representation of high interest

chromite grains (>70% of those analysed) suggests that DD17 chromites are sourced from diamondbearing peridotite.

## Ilmenite DD17:



Ilmenite analysed from DD17 show a vertical alignment of analyses which are high in both Cr2O3 and MgO. No Fe-rich compositions are represented. These compositions are favorable for diamond preservation.



Orthopyroxene analyses align between 40-45 mW/m2 geotherm. Most analyses plot to the right of the graphite/diamond line. This suggests a significant proportion of the peridotite sampled by kimberlite DD17 is from pressures where carbon would exist in the form of diamond. The small scatter within the graphite field may correspond with low-pressure G-10 pyrope garnets (<6 wt% Cr2O3).

**Clinopyroxene DD17:** 



Chrome diopside analyses, when processed using the Nimis and Taylor's single grain geobarometer shows all CPX analyses plot to the right of the graphite/diamond line. The cluster also plots between 40-45 mW/m2 as the OPX grains do in the previous section. Below 56 Kba a population with a cooler geotherm is present.



Chrome diopside analyses plotted using Ramsay's classification shows the dominant source is lhertzolite. Based on the dominant CPX population within the diamond stability field, it is likely that kimberlite DD17 sampled diamond-bearing lhertzolite.

## **DD39: Kimberlite Indicator Mineralogy and Chemistry**

One composite sample (34710050) was collected from drill core from hole 93DD39-01. DD39 was a very small and irregular body, as I recall that was very difficult to drill – hence the large number of drill holes in the area without kimberlite intersections.

#### Pyrope Garnets DD39



DD39 pyrope garnet shows some similarity to DD17, but it lacks high-chrome G9 garnets (> 8 wt% Cr2O3) and high temperature eclogitic garnets – one low temperature eclogitic garnet is present. DD39 also has a significant cluster that crowd the Wehrlite-Ihertzolite boundary (in the Sobolev plot). Curiously, two analyses of high-temperature hartzburgite G-10s appear, which suggest that some diamond-bearing rock has been sampled by the kimberlite. I recall the kimberlite was also indicator poor – which suggests less lithospheric sampling.

# **Chromite DD39**



DD39 has a strong representation of high-interest chrome spinel compositions, with at least 7 grains plotting in the diamond inclusion field, and about 18 grains plotting in the diamond intergrowth field to the left. I been a big fan of chromite as a diamond indicator in the central Slave – many kimberlites with only trace diamonds have outstanding chromite chemistry.



### **Ilmenite DD39**

Ilmenite analysed from DD39 show a vertical alignment of analyses which are high in both Cr2O3 and MgO, which is similar to DD17. No Fe-rich compositions are represented. These compositions are favorable for diamond preservation. The paucity of analyses suggest the standard sample was KIM poor.

## **Orthopyroxene DD39**



Orthopyroxene analyses align between 40-45 mW/m2 geotherm with most analyses plotting to the right of the graphite/diamond line. Unfortunately CPX was not present in the database, and I cannot recall if this is a query error, or if CPX was absent (I would guess the first scenario). If DD39 is re-sampled, then CPX should be analysed to see how its geotherm compares to OPX.

### **DD42: Kimberlite Indicator Mineralogy and Chemistry**

Two composite samples (34710027 and 34710030) were collected from drill core from hole 93DD42-01 and 93DD42-03 respectively. I cannot recall the nature of kimberlite DD42, except that I thought DD17 was the most promising of the three on the Monument property.

## Pyrope Garnets DD42:



DD42 pyrope garnet shows some similarity to DD17, but the kimberlite lacks high-chrome G9 garnets (> 8 wt% Cr2O3) and has an abundance of low-pressure G-10s, which suggest that it is sampling too high in the stratigraphy. High temperature eclogite is absent. Two G10 analyses just cross Grutter's diamond line.





DD42 has a strong representation of high-interest chrome spinel compositions, with 3 grains plotting in the diamond inclusion field, and about 17 analyses plotting in the diamond intergrowth field. I recall that this was the first kimberlite that I saw 50 micron chromite crystals clustered to one another like grapes. I do not know the significance of this texture. Only pyrope and chrome spinel is represented in Kennecott's database.