NEW AGE METALS INC.

RIVER VALLEY MINERAL RESOURCE UPDATE

JANUARY 09, 2019

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NEW AGE METALS INC.

PROJECT NO.: 171-12082-00_RPT-01_R6
EFFECTIVE DATE: OCTOBER 31, 2018
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REVISIONS

Revision #	Date	Prepared by	Description of Revision
0	April 27, 2018	Todd McCracken	Draft issued for Client review
1	May 2, 2018	Todd McCracken	Draft issued for Client review
2	May 4, 2018	Todd McCracken	Issued to Client
3	May 4, 2018	Todd McCracken	Issued to Client
4	November 27, 2018	Todd McCracken	Address BCSC comments
5	December 17, 2018	Todd McCracken	Address BCSC comments
6	January 9, 2019	Todd McCracken	Address BCSC comments

SIGNATURES

The report has an effective date of October 31, 2018 and an adjusted date of January 9, 2019.

PREPARED BY

Original signed and stamped by
Todd McCracken, P.Geo.

Todd McCracken, P.Geo.
Manager - Mining

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ABBREVIATIONS

UNITS OF MEASURE

above mean sea level ..... amsl
acre ..... ac
ampere ..... A
annum (year) ..... a
billion ..... B
billion tonnes ..... Bt
billion years ago ..... Ga
British thermal unit ..... BTU
Centimetre ..... cm
cubic centimetre ..... cm^3
cubic feet per minute ..... cfm
cubic feet per second ..... ft^3/s
cubic foot ..... ft^3
cubic inch ..... in
cubic metre ..... m^3
cubic yard ..... yd^3
Coefficients of Variation ..... Cvs
day ..... d
days per week ..... d/wk
days per year (annum) ..... d/a
dead weight tonnes ..... DWT
decibel adjusted ..... Ba
decibel ..... dB
degree ..... °
degrees Celsius ..... °C
diameter ..... ø
dollar (American) ..... US$
dollar (Canadian) ..... CAN$
dry metric ton ..... mt
foot ..... ft
gallon ..... gal
gallons per minute ..... gpm
Gigajoule ..... GJ
Gigapascal ..... GPA
Gigawatt ..... GW
Gram ..... g
grams per litre ..... g/L
grams per tonne ..... g/t
greater than ..... >
hectare (10,000 m^2) ..... ha
hertz ..... Hz
horsepower ..... hp
hour ..... h
hours per day ..... h/d
hours per week ..... h/wk
hours per year ..... h/a
inch ..... in
kilo (thousand) ..... k
kilogram ..... kg
kilograms per cubic metre ..... kg/m^3
kilograms per hour ..... kg/h
kilograms per square metre ..... kg/m^2
kilometre ..... km
kilometre ..... km
kilometres per hour ..... km/h
kilopascal ..... kPa
kiloton ..... kt
kilovolt ..... kV
kilovolt-ampere ..... kVa
kilowatt ..... kW
kilowatt hour ..... kWh
kilowatt hours per tonne ..... kWh/t
kilowatt hours per year ..... kWh/a
less than ..... <
litre L
litres per minute ..... L/m
megabytes per second ..... Mb/s
megapascal ..... Mpa
megavolt-ampere ..... Mva
megawatt ..... MW
metre ..... m
metres above sea level ..... masl
metres Baltic sea level ..... mbsl
metres per minute ..... m/min
metres per second ..... m/s
microns ..... µm
milligram ..... mg
milligrams per litre ..... mg/L
millilitre ..... mL
millimetre ..... mm
million ..... M
million bank cubic metres ..... Mbm^3
million bank cubic metres per annum ..... Mbm^3/a
million tonnes ..... Mt
minute (plane angle) ..... '
minute (time) ..... min
month ..... mo
ounce ..... oz
pascal ..... Pa
centipoise ..... mPa·s
parts per million ..... ppm
parts per billion ..... ppb
percent ..... %
pound(s) ..... lb
pounds per square inch ..... psi
revolutions per minute ..... rpm

second (plane angle) ..... "
second (time) ..... s
short ton (2,000 lb) ..... st
short tons per day ..... st/d
short tons per year ..... st/y
specific gravity ..... SG
square centimetre ..... cm^2
square foot ..... ft^2
square inch ..... in^2
square kilometre ..... km^2
square metre ..... m^2
three-dimensional 3D
tonne (1,000 kg) (metric ton) ..... t
tonnes per day ..... t/d
tonnes per hour ..... t/h
tonnes per year ..... t/a
tonnes seconds per hour metre cubed ..... ts/hm^3
volt V
week ..... wk
weight/weight ..... w/w
wet metric ton ..... wmt

ACRONYMS

Actlabs ..... Activation Laboratories Ltd.
Amplats ..... Anglo American Platinum Limited
ATV ..... All-Terrain Vehicle
EM ..... Electromagnetic
EPMA ..... Electron Probe Micro Analysis
GeoSim ..... GeoSim Consultants
ICP ..... Inductively Coupled Plasma
ICP-AES ..... Inductively Coupled Plasma-Atomic Emission Spectroscopy
IP ..... Induced Polarization
Kaymin ..... Kaymin Resources Ltd.
Inventus ..... Inventus Mining Inc.
LA-ICP-MS ..... Laser Ablation-Inductively Coupled Plasma-Mass Spectrometry)
LiDAR ..... Light Detection and Ranging
LIL ..... Large Ion Lithophile
MLAS ..... Mining Lands Administrative System
Mount Logan ..... Mount Logan Resources Ltd.
MTU ..... Michigan Technological University
NAD ..... North American Datum
NAM ..... New Age Metals Inc.
PEA ..... Preliminary Economic Assessment
PFN ..... Pacific North West Capital Corp.
PGE ..... Platinum Group Elements
Project (the) ..... River Valley Project
Property (the) ..... River Valley Property
QA/QC ..... Quality Assurance / Quality Control
QP ..... Qualified Person
QEMSCAN ..... Quantitative Evaluation of Materials by Scanning Electron Microscope
RVI ..... River Valley Intrusion
SGS ..... SGS Canada Inc.
UTM ..... Universal Transverse Mercator
WSP ..... WSP Canada Inc.

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1 SUMMARY

The River Valley Property (the Property) is a magmatic contact-hosted platinum- palladium-gold (platinum group elements (PGE)) project located in northeastern Ontario, approximately 60 km northeast of Sudbury. Sudbury is one of the largest metallurgical complexes in North America with several operating mines, two sulphide concentrator mills, two nickel-copper – PGE smelters, and a nickel refinery. The Property claim group consists of thirty claim units and two mining leases that cover approximately 6,688 ha, and are centered at approximately 555371 mE and 5172514 mN (North American Datum (NAD) 83-Universal Transverse Mercator (UTM) Zone 17T). The claims are currently 100% owned by New Age Metals Inc. (NAM) formerly known as a Pacific North West Capital (PFN).

The Property has seen extensive exploration, which started in earnest in 1999 with work by NAM. Approximately $40 million has been spent on the Project by NAM and their joint venture partner. To date a total of 710 boreholes have been completed on the Property.

Surface mineralization has been identified for approximately 16 km of strike along a contact zone of the River Valley Intrusion. This includes 4 km of the recently acquired River Valley Extension, where approximately $5 million was expended and a previous 84 drillholes were completed. To date, eight mineralized zones have been diamond drill delineated along the 16 km of strike. The mineralization has been mainly drill tested to less than 300 m vertical in the Dana North / Dana South Zones and to less than 200 m vertical in the other mineralized zones.

An Induced Polarization surveys were completed in the summer of 2017 and the winter of 2018 has identified numerous anomalies, including the recently discovered Pine Zone occurring in the footwall of the Dana North Zone.

WSP Canada Inc. (WSP) has been commissioned to generate a new resource estimate and technical report. This report has been prepared in accordance with National Instrument 43-101 (NI 43-101) and the Form 43-101F1.

1.1 GEOLOGY

The River Valley Project (the Project) is part of the Paleoproterozoic East Bull Lake Intrusive Suite, dated between 2491 and 2475 Ma, and consists of a total of eight distinct bodies of dominantly gabbronorite to gabbroic anorthosite.

The East Bull Lake Suite Intrusions exhibit geochemical characteristics consistent with being derived from fractionated tholeiitic or high-alumina tholeiitic parental magmas. The estimated parental magma compositions for the East Bull Lake Suite Intrusives are thus broadly similar to those postulated for the intrusive suite in the world class Noril'sk-Talnakh nickel-copper-PGE camp in Siberia.

The three largest and most economically interesting bodies of the East Bull Lake Suite Intrusives are the East Bull Lake and Agnew Intrusions (situated within the Sudbury Province), and the River Valley Intrusion (situated in the Grenville Front Tectonic Zone). The River Valley Intrusion, the largest of the East Bull Lake Intrusive Suite by area, covers an area of approximately 200 km^2.

The contact between the River Valley Intrusion and the Archean basement trends southeasterly for a distance of approximately 16 km. On the basis of surface mapping and diamond drilling, the idealized sectional stratigraphy of the mineralized environment comprises five major units, from the layered rocks of the River Valley Intrusion in the west to the igneous basal contact of the intrusion to the east.

The mineralized breccia unit occurring at the contact has been identified along most of this 16 km strike length. The contact is divided into several areas based on structural offsetting, alteration grades, and grade distribution.

1.2 CONCLUSIONS

The Induced Polarization Survey in the footwall environment of the River Valley intrusion lead to the discovery of the Pine Zone. The Pine Zone is a new resource delineated on the Project. The relationship between Dana North and the Pine Zone maybe structurally controlled and / or primary magmatic.

The Project database is up to date and includes the results of the 2017 drilling program. The borehole database has been validated against the original drill logs and assay certificates. As a result, the QP is of the opinion that using all the diamond drilling is appropriate for any resource estimate.

All the procedures implemented by NAM in regard to core logging, sample collection, sample analysis, and quality assurance/quality control (QA/QC) meet industry standards. The data quality supports the resource estimate. The resource estimate update was completed on the Dana North, Dana South, Pine, Banshee, Lismer, Lismer Extension, Varley, Azen, Razor, and River Valley Extension Zones, using the ordinary kriging (OK) methodology on a capped and composited borehole dataset consistent with industry standards. Validation of the results was conducted through the use of visual inspection, swath plots, and global statistical comparison of the model against inverse distance squared (ID^2) and nearest neighbour (NN) models.

The mineral resource is amenable to open pit mining. Table 1.1 summarizes the results of the resource estimation using a 0.4 g/t 0.35 g/t PdEq cutoff for a pit constrained resource and 2.00 g/t PdEq cutoff for potential underground remnants. Table 1.2 summarizes the contained metal within the resource.

Table 1.1 River Valley Resource Summary (using 0.35 g/t and 2.00 g/t PdEq Cutoff)

Class	PdEq Cutoff (g/t)	Tonnes	Pd (g/t)	Pt (g/t)	Rh (g/t)	Au (g/t)	Cu (%)	Ni (%)	Co (%)	PdEq (g/t)
Total Measured	0.35	56,025,400	0.54	0.20	0.013	0.03	0.06	0.02	0.006	0.94
	2.00	71,300	2.33	0.75	0.036	0.09	0.12	0.02	0.002	3.38
	0.35+2.00	56,096,700	0.54	0.20	0.013	0.03	0.06	0.02	0.006	0.94
Total Indicated	0.35	43,153,300	0.49	0.19	0.003	0.03	0.05	0.02	0.006	0.84
	2.00	5,200	2.23	0.60	0.003	0.11	0.03	0.04	0.000	3.20
	0.35+2.00	43,158,500	0.49	0.19	0.003	0.03	0.05	0.02	0.006	0.84
Total Meas +Ind	0.35	99,178,700	0.52	0.20	0.009	0.03	0.06	0.02	0.006	0.90
	2.00	76,500	2.32	0.74	0.034	0.09	0.11	0.02	0.002	3.37
	0.35+2.00	99,255,200	0.52	0.20	0.009	0.03	0.06	0.02	0.006	0.90
Inferred	0.35	52,306,000	0.31	0.15	0.012	0.04	0.04	0.02	0.001	0.63
	2.00	-	-	-	-	-	-	-	-	-
	0.35+2.00	52,306,000	0.31	0.15	0.012	0.04	0.04	0.02	0.001	0.63

Table 1.2 River Valley In Situ Metals (using 0.35 g/t and 2.00 g/t PdEq Cutoff)

Class	PGM + Au (oz)	Pd (oz)	Pt (oz)	Au (oz)	Rh (oz)	PdEq (oz)	Cu (lbs)	Ni (lbs)	Co (lbs)
Total Measured	1,394,136	982,851	361,976	49,309	23,499	1,700,957	74,209,162	24,704,987	7,405,216
Total Indicated	983,071	677,717	263,712	41,641	4,163	1,165,978	47,515,218	19,009,293	5,701,428
Total Meas +Ind	2,377,207	1,660,568	625,689	90,950	27,662	2,866,935	121,724,380	43,714,280	13,106,644
Inferred	840,851	521,328	252,255	67,268	20,180	1,059,473	46,071,125	23,035,562	1,151,778

1.3 RECOMMENDATIONS

It is the QP's opinion that additional exploration expenditures are warranted to improve the viability of the Project and advance the Project towards a Preliminary Economic Assessment (PEA). It is recommended that NAM undertake a two-stage exploration program focused on delineation and expansion drill programs that will concentrate on the open pit potential along strike and down-dip of the known resources.

Each program can be carried out concurrently and independently of each other; neither is contingent on the results of the other.

1.3.1 PHASE 1

The Phase 1 exploration program is planned to expand the resources and to increase the confidence of the resource by improving resource categories. The drill program should test targets adjacent to and down-dip of Dana South, Lismer Extension, Lismer Ridge, Varley, and River Valley Extension zones as well as any new targets discovered during the Phase 1 program. The program should also advance the resources at Banshee from Inferred to Indicated, and better delineate the boundaries of that zone.

The continuation of the metallurgical study completed in Phase 1 is recommended. An optimized flowsheet with metal recoveries would be generated in order to support the PEA.

A geotechnical study involving geotechnical logging and strength testing of drill core is recommended. A rock mechanic engineer would train the field geologist to properly collect the geotechnical data from the drill core before sampling. Selected core samples of the various lithologies and mineralization styles would be sent for strength testing. The results would provide basic inter-ramp slope angles and the bench face angles to Ontario Mining regulation to support the PEA.

A high-resolution topographic survey, such as LiDAR, should be flown over the Property to allow for a topographic base leading into a PEA.

The PEA will evaluate the Project at a high-level engineering and financial study. The mineralization will be interrogated with pit shell designs and mining schedule. The study would incorporate the latest information provided by the exploration programs as well as the metallurgical and geotechnical studies. The infrastructure to support the mining operation including office, dry, warehousing, maintenance shops, water treatment plant, processing plant, and tailing storage facility would be designed. The output of the PEA would be a mine plan, mine schedule, a capital cost estimate, operating cost estimate incorporated into a financial model to provide total cash flow, net present value (NPV), and internal rate of return (IRR).

The estimated cost to complete Phase 1 is estimated to be $980,000. Table 1.3 summarizes the proposed Phase 1 budget.

Table 1.3 Phase 1 Budget

Project	Activity	Rate ($)	Units	Cost ($)
River Valley	Diamond Drilling (NQ)	135	3000 m	405,000
	Consulting	600	200 days	120,000
	Metallurgical Study	150,000	1	150,000
	Geotechnical Study	45,000	1	45,000
	LiDAR Survey	1	1	80,000
	Preliminary Economic Assessment	1	1	180,000
			TOTAL	**$980,000**

***Note**: Drilling cost includes salaries, all field costs, assays and consumables.*

1.3.2 PHASE 2

The Phase 2 exploration program is planned to test the extension and continuity of high-grade domains. The drill program should target potential extensions of high-grade domains along strike and across strike of the deposit including the footwall targets delineated by the IP survey.

An IP survey similar to what was completed with the Pine Zone should be conducted along the entire footwall contact of the River Valley intrusive. The surveys should be broken down to manageable size grids to allow for intrastation and drill targeting.

After logging and sampling for assay, the core should be submitted for mineralogical studies and pre-concentrations test work.

The geological staff will continue to conduct surface exploration and prospecting of untested anomalies and structure, and to review the potential of reef style mineralization outside of known resource.

An environmental baseline study would be initiated. The collection of flora, fauna, water quality, and weather would be done to Ontario Ministry of Environment and Climate Change standards.

The estimated cost to complete the Phase 2 program is approximately $709,050. Table 1.4 summarizes the proposed Phase 2 budget.

Table 1.4 Phase 2 Budget

Project	Activity	Rate ($)	Units	Cost ($)
River Valley	Diamond Drilling (NQ)	135	1830 m	247,050
	Consulting	600	120 days	72,000
	Induced Polarization Survey	120,000	1	120,000
	Metallurgical Study	95,000	1	95,000
	Environmental Baseline	175,000	1	175,000
			TOTAL	**$709,050**

***Note**: Drilling cost includes salaries, all field costs, assays and consumables.*

1.3.3 OTHER RECOMMENDATIONS

The following recommendations are based on observations by the QP during the site visits or during the resource estimation process. These recommendations are suggestions for policy and procedures conducted by NAM to further enhance the potential viability of the Project. The recommendations are in no order of importance.

SPECIFIC GRAVITY MEASUREMENTS

It is recommended that NAM increase the frequency of specific gravity measurements from drill core in order to build up the specific gravity database. The specific gravity database should represent at a minimum 5% of the total assay dataset. In order to build the specific gravity data, measurements should be collected at 20 m intervals.

Due to the low-sulphide content on the Property, a regression formula is unlikely to be successfully generated using assay data. The specific gravity data needs to be linked not only to the analytical results but to the lithology and alteration of the rocks.

RHODIUM COBALT AND SILVER ANALYSIS

It is recommended to continue to analyze a smaller subset of data for rhodium, cobalt, and silver. These minerals are potential pay metals, yet the cost of analysis can be prohibitive to assay every sample for rhodium, cobalt, and silver. It is recommended to assay approximately 5% of the data with a good spatial distribution between the samples.

CHANNEL SAMPLING

When channel samples are being collected on surface, the channels should be cut as one continuous swath across the outcrop. The use of channel samples can be important in resource estimations as it provides data near-surface which is not available from diamond drillholes.

STORAGE OF SAMPLE REJECTS AND PULPS

The current storage of course rejects and pulps is subject to contamination. The 45-gallon barrels are placed in an upright position and the lids are rusting through. The barrels should be laid on the side and stacked appropriately, or the material placed inside larger storage containers such as shipping containers.

GEOTECHNICAL DATA COLLECTION

Logging procedures should be modified to initiate the collection of more detailed geotechnical data prior to geological logging and sampling for the purposes of rock mechanics and slope stability studies. A rock mechanics engineer can provide the basics of the data collection procedures. This data will form the basis to justify slope angles during any open pit optimization studies.

SECURE DATABASE

All the data collected on the Project should be validated and then secured in a single master database system with set policies and procedures as to who has access to the data. A back-up copy of the database should be created weekly and placed in a separate storage location.

Validation of the data completed during this study identified several minor inconsistencies between the database and the logs. Corrections have been made, yet there may be further corrections to be made in the master file.

DEVELOPMENT OF 3D STRUCTURAL GEOLOGICAL MODEL

The QP recommends a structural vectoring model be created to better understand the geometry of the zones. The presence of potential cross faults, folds, and footwall mineralization can have a significant impact on the resource.

2 INTRODUCTION

The Property is a PGE-bearing intrusive system project located approximately 60 km northeast of Sudbury in northeastern Ontario. The claims are currently 100% owned by NAM.

A significant amount of work has been conducted on the Property since the 1960s, with the majority of the work conducted since 1999 by NAM.

To date, NAM has delineated eight mineralized zones on the Property through the completion surface exploration and diamond drillholes.

In August 2017, WSP was commissioned by NAM to complete a resource estimate update and technical report on the Property. The object of the report was to:

- Prepare a technical report on the Project in accordance with NI 43-101 summarizing land tenures, exploration history, and drilling.
- Disclose a current mineral resource on the Property.
- Provide recommendations and budget for additional work on the Property.

The report was prepared in accordance with NI 43-101, Form 43-101F1 and Companion Policy 43-101CP.

All data reviewed for the report was provided by NAM in digital format, with access to paper reports and logs when requested. The work completed by NAM encompasses exploration, primarily diamond drilling. Historical work conducted in the region has been compiled by NAM and was available for review.

The author and qualified person (QP) of this report, Mr. Todd McCracken, P.Geo., is a professional geologist with more than 27 years of experience in exploration and operations, including several years working in magmatic PGE-nickel sulphide deposits. Mr. McCracken visited the Property for one day on July 25, 2011, September 15, 2017, and November 9, 2017. Mr. McCracken was accompanied by Mr. Richard Zemoroz, Project Geologist with NAM.

The QP considers the site visit current, per Section 6.2 of NI 43-101CP, on the basis that the material work completed on the Property since the date of the site visit was partially reviewed during the initial site visit and all practices and procedures documented were adhered to.

2.1 UNITS OF MEASURE

The metric system has been used throughout this report. Tonnes are dry metric of 1,000 kg, or 2,204.6 lb. All currency is in Canadian dollars (CAN$), and referenced as '$', unless otherwise stated.

2.2 EFFECTIVE DATE

The adjusted date of this report is January 9, 2019. The effective date of the mineral resource estimate is October 31, 2018.

3 RELIANCE ON OTHER EXPERTS

The Qualified Person (QP) who prepared this report relied on information provided by experts who are not QPs. The relevant QP believes that it is reasonable to rely on these experts, based on the assumption that the experts have the necessary education, professional designations, and relevant experience on matters relevant to the technical report.

- Todd McCracken, P. Geo., relied upon Trevor Richardson of NAM for matters pertaining to mineral claims and mining leases as disclosed in Section 4 and confirmed on the Ontario Ministry of Northern Development and Mines website (http://www.mndm.gov.on.ca/mines/claimaps_e.asp).

4 PROPERTY DESCRIPTION AND LOCATION

The Property lies within Dana and Pardo Townships and is located about 100 road kilometres (60 km direct) northeast of the City of Greater Sudbury, Ontario (Figures 4.1 and 4.2), and centered at approximately 555371 mE and 5172514 mN (NAD83-UTM Zone 17T). The Property is accessed from Sudbury by traveling east along Highway 17 for 100 km to the town of Warren, at this point turn north onto Highway 539. Travel north along Highway 539 for 22 km to the junction of Highway 805. Travel northwest along Highway 805 from the village of River Valley, a distance of about 19.5 km from the Temagami River. Turn right onto a logging road, for about 800 m, then right at a fork in the road, and continue an additional 200 m. At this point several skidder roads and access trails lead south toward the mineralized zones.

The Property claim group consists of 418 mining claims in 30 claim units that cover approximately 6,688 ha (Table 4.1). The claims are located within Dana, Janes, McWilliams, and Pardo Townships (Figure 4.3). The claim groups are all contiguous and surround two mining leases that total 5,347.489 ha. (Table 4.2).

Some claims appear to be past the expiry date. At the effective date of this report, the Ontario Government had suspended the claim staking system as it transitions to the Mining Lands Administrative System (MLAS) for online staking. During this suspended period, no new claims could be staked and no claims will lapse.

On April 7, 2011 NAM announced that they had closed the purchase of the remaining 50% interest in the unincorporated joint venture covering the Project from Anglo American Platinum Limited (Amplats) through its wholly-owned subsidiary, Kaymin Resources Ltd. (Kaymin). Pursuant to the terms of the agreement with Amplats and Kaymin, as announced in NAM's news release of January 31, 2011, a total of 8,117,161 fully paid and non-assessable common shares of NAM (reflecting a 12% interest in NAM based upon the issued and outstanding common shares of NAM as of November 30, 2010 (67,643,008)) and three-year warrants to purchase up to 3,000,000 common shares of NAM at a price of CAN$0.30 per common share have been issued to Kaymin for its 50% interest in the joint venture. The transaction provided NAM with an undivided 100% interest in the Project.

Land or work permits are not required at this stage of the Project.

Initial contact and meeting has been made with aboriginal groups whose jurisdictions overlie the Property. These groups are the Temagami First Nation, Nipissing First Nation, and the Métis Nation of Ontario. Temagami First Nations has visited the Project several times. Nipissing First Nation has visited the Project in 2017.

Figure 4.1 Provincial Location Map

Figure 4.2 Location Map

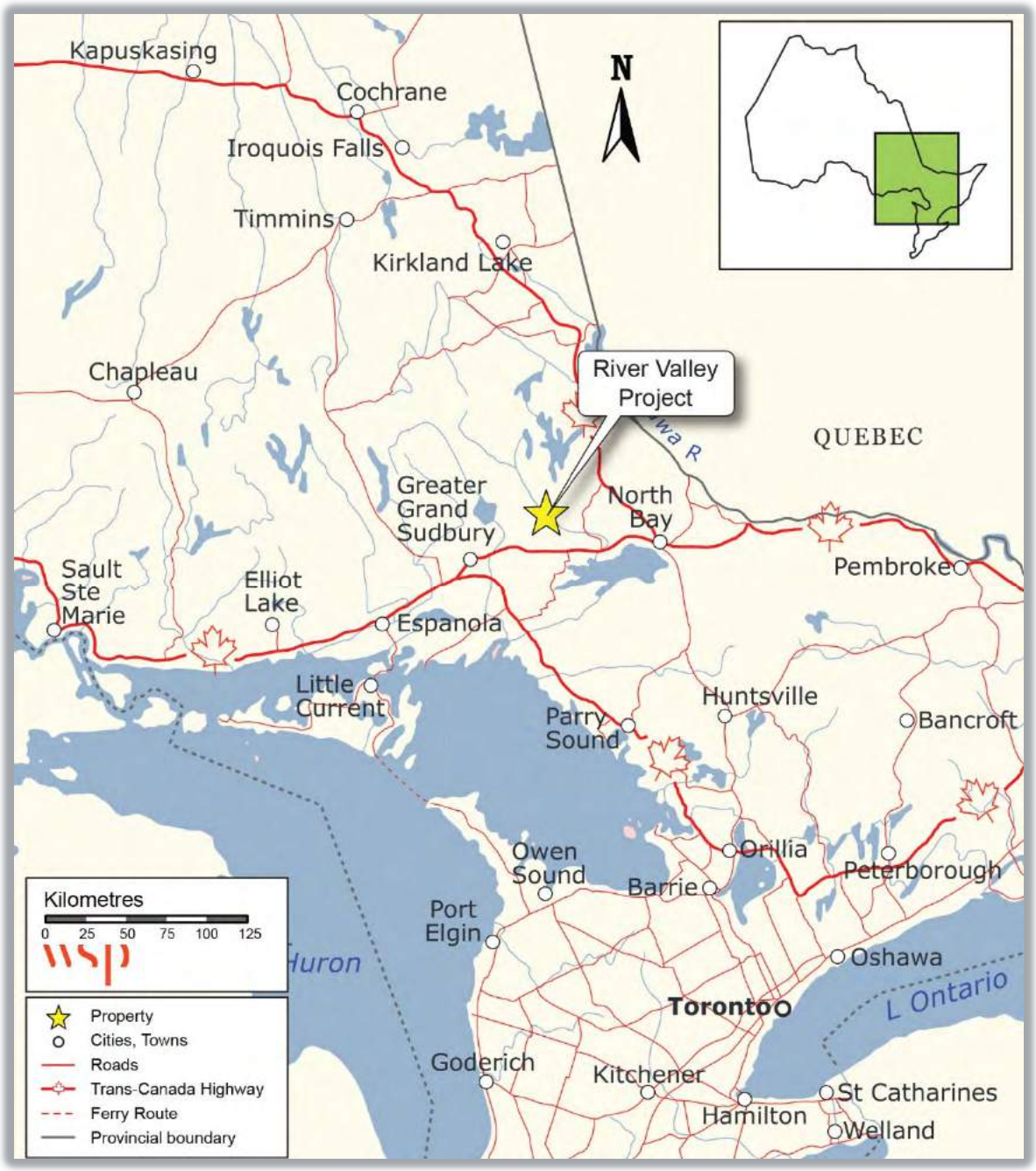


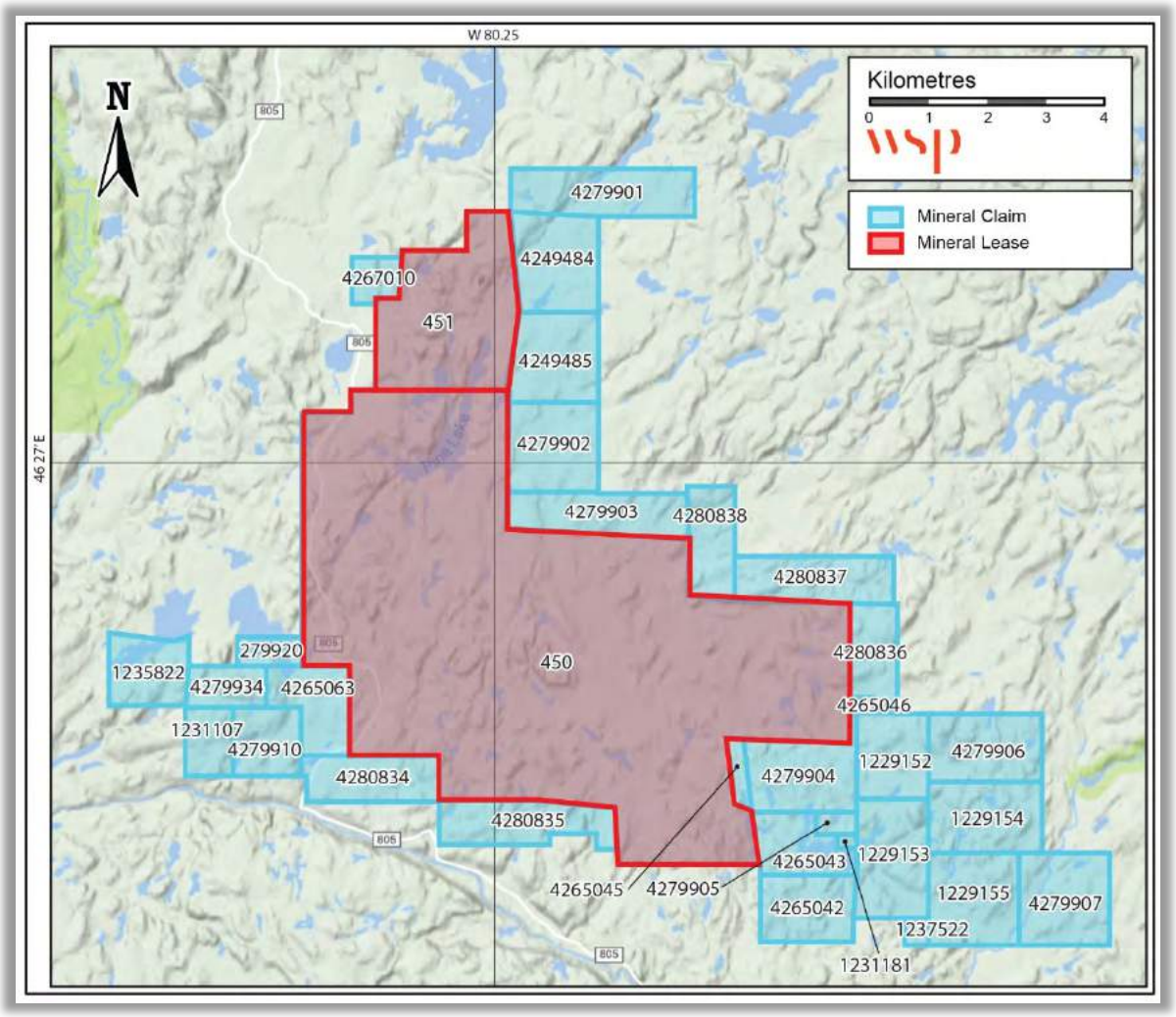
Table 4.1 River Valley Mining Claims

Township / Area	Claim Number	Recording Date	Claim Due Date	Percent Option (%)	Work Required ($)	Total Applied ($)	Total Reserve ($)
DANA	4265042	2016-Aug-05	2018-Aug-05	100	4,800	0	0
DANA	4265043	2016-Aug-05	2018-Aug-05	100	3,600	0	0
DANA	4265045	2016-Aug-05	2018-Aug-05	100	800	0	0
DANA	4265063	2016-Jun-03	2018-Jun-03	100	4,800	0	0
DANA	4279902	2016-Jun-02	2018-Jun-02	100	6,400	0	0
DANA	4279903	2016-Jun-02	2018-Jun-02	100	6,400	0	0
DANA	4280834	2016-Sep-13	2018-Sep-13	100	4,800	0	0
DANA	4280835	2016-Sep-13	2018-Sep-13	100	6,000	0	0
DANA	4280838	2016-Sep-13	2018-Sep-13	100	4,000	0	0
JANES	1231107	1998-Dec-17	2017-Dec-17	70	2,400	40,800	0
JANES	1235822	1998-Dec-10	2017-Dec-10	70	4,800	81,600	0
JANES	4279909	2016-Jun-03	2018-Jun-03	100	4,800	0	0
JANES	4279910	2016-Jun-10	2018-Jun-10	100	3,600	0	0
JANES	4279920	2016-Aug-05	2018-Aug-05	100	1,600	0	0
MCWILLIAMS	1229152	1998-Nov-16	2018-Nov-16	100	4,800	86,400	30,825
MCWILLIAMS	1229153	1998-Nov-16	2018-Nov-16	100	6,000	108,000	106,697
MCWILLIAMS	1229154	1998-Nov-16	2018-Nov-16	100	6,000	108,000	0
MCWILLIAMS	1229155	1998-Nov-16	2018-Nov-16	100	6,400	115,200	1,100
MCWILLIAMS	1231181	1999-May-25	2019-May-25	100	400	7,200	0
MCWILLIAMS	1237522	1999-May-25	2019-May-25	100	400	7,200	0
MCWILLIAMS	4265046	2016-Aug-05	2018-Aug-05	100	400	0	0
MCWILLIAMS	4279904	2016-Jun-02	2018-Jun-02	100	6,400	0	0
MCWILLIAMS	4279905	2016-Jun-02	2018-Jun-02	100	800	0	0
MCWILLIAMS	4279906	2016-Jun-02	2018-Jun-02	100	6,000	0	0
MCWILLIAMS	4279907	2016-Jun-02	2018-Jun-02	100	6,400	0	0
MCWILLIAMS	4280836	2016-Sep-13	2018-Sep-13	100	3,600	0	0
MCWILLIAMS	4280837	2016-Sep-13	2018-Sep-13	100	6,000	0	0
PARDO	4249484	2016-Jun-02	2018-Jun-02	100	6,400	0	0
PARDO	4249485	2016-Jun-02	2018-Jun-02	100	6,000	0	0
PARDO	4279901	2016-Jun-02	2018-Jun-02	100	6,400	0	0

Table 4.2 River Valley Mining Leases

Mining Lease	Size (ha)	Township	Recorded	Current Expiry Date
CLM450	4,777.181	Dana	01-Nov-11	31-Oct-32
CLM451	570.308	Pardo	11-Jan-12	28-Feb-33

Figure 4.3 River Valley Lease and Claim Map



5 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE, AND PHYSIOGRAPHY

5.1 SITE TOPOGRAPHY, ELEVATION, AND VEGETATION

The Property lies at a mean elevation of about 325 masl. Relief is moderate and typical of Precambrian Shield topography. The eastern part around Azen Creek is lower and marshy. Forest cover is mainly poplar with about 25 to 33% white pine regrowth.

Outcrop exposure on the Property is limited to about 20% with the remaining areas covered mostly by a thin (less than 1 m) veneer, yet locally reach 10s of metres of glacial till, gravel, outwash sand, and silt. Most of the area around the Dana Lake Lismer Ridge, Casson, Varley, and Azen Creek areas has been logged within the past 15 years.

5.2 ACCESS

The Property is accessed from Sudbury by travelling east along Highway 17 for 100 km to the town of Warren, at this point turn north onto Highway 539. Travel north along Highway 539 for 22 km to the junction of Highway 805. Travel northwest along Highway 805 from the village of River Valley, a distance of about 19.5 km from the Temagami River. Turn right onto a logging road, for about 800 m, then right at a fork in the road, and continue an additional 200 m. At this point several skidder roads and access trails lead south toward the mineralized zones.

Lismer Zone can be accessed by an all-terrain vehicle (ATV) trail from Highway 805 by turning east at a gravel pit at Kilometre 14 (ATV trail at north edge of pit) and following the trail for about 6 km.

The region is serviced by Highway 17, a part of the Trans-Canada Highway network and the Sudbury Regional Airport which has daily regional flights to Thunder Bay, Toronto, Timmins, and Ottawa.

5.3 CLIMATE

There is no active weather station at the village of River Valley. The climate in the region is typical Canadian Shield summers and winter with temperatures averaging from 19°C in the summer to -13°C in the winter. Precipitation comes in the form of 30 to 64 cm of snow in the winter months, and 77 to 101 mm of rain in the summer (http://www.theweathernetwork.com/statistics/cl6068150).

Drilling and geophysical surveys can be carried out year-round from skidder roads. Surface bedrock exploration can be done for about seven to eight months of the year.

5.4 INFRASTRUCTURE

The City of Greater Sudbury, a major mining and manufacturing city, can provide all of the infrastructure and technical needs for any exploration and development work.

A 230 kV transmission line is located passing through Warren, approximately 22 km from the Project. A 115 kV transmission line passes through the village of Field, located approximately 15 km to the east of the Project.

Water is abundant in region from numerous lakes and rivers to support exploration programs and mining activities.

6 HISTORY

The exploration history of the region dated back to the 1960s, with work on the Property starting in earnest in 1999 (***Zemoroz, 2008***). Table 6.1 summarizes the history of the Property and discloses historical estimates. Historical estimates within the table are considered relevant but not reliable. A QP has not done sufficient work to classify the historical estimate as a current mineral resource. NAM is not treating the historical estimates as current resources and the historical estimates should not be relied upon.

A summary of the historic metallurgical studies is provided in Section 6.1.

Table 6.1 Project History

Year	Company	Activities
1963	Tomrose Mines Ltd.	Prospecting and trenching over Prospectus, furthering prospecting was recommended.
1963	Tomrose Mines Ltd.	Diamond drill program on Tomlinson Property; additional work recommended.
1964	Tomrose Mines Ltd.	Geochemical exploration of overburden areas recommended over Prospectus; several areas across Property were recommended for specific drilling targets.
1965	Falconbridge Ltd.	An electromagnetic (EM) survey was conducted over Tomrose Option; no further work was recommended.
1966	Azen Mines Ltd.	Magnetometer survey over Harper property; further prospecting of anomalous areas was recommended.
1968	Kenco Exploration (Canada) Ltd.	Airborne mag-EM survey over Janes, Davis, Henry, and Dana Townships.
1969	Kenco Exploration (Canada) Ltd.	J.P. Patrie exposed mineralization in trenches and pits.
1996	WMC International	Geological and geochemical exploration along the Project included: reconnaissance traversing, regional airborne geophysical survey, ground truthing of weak EM anomalies, and regional till-sampling program.
1997	Tenajon Resources	Two phases of exploration; the first consisted of mapping/prospecting while the second included stripping, detailed mapping, and channel sampling focused on the Pardo property.
1998	Luhta, Bailey, and Orchard	Prospecting and sampling on 18 contiguous claims in Pardo and Dana Townships.
1999	Aquiline Resources	Reconnaissance exploration fieldwork along the edges of intrusion.
1999	Mustang Minerals	Prospecting and grab samples on Mustang South & North Grid (Dana Township), 78 km line cutting and magnetic surveying by Dan Patrie Exploration Ltd.
1999	Pacific North West Capital (PFN) / Amplats	With joint venture partner Amplats established a Phase 1 surface program which included: establishing detailed and regional exploration grids, regional prospecting and sampling, grid prospecting and sampling, preliminary geological grid mapping, stripping and cleaning of selected outcrops areas, detailed sampling, preliminary mapping, orientation biogeochemical survey, and orientation IP and ground magnetometer geophysical surveys.
2000	Platinum Group Metals Ltd.	Exploration along Brady Janes property included soil and rock samples, prospecting on claims at Henry Township and south-central Janes Township, geological mapping and geochemical sampling program over Henry Block.

(table continues on next page)

Year	Company	Activities
2000	Mustang Minerals	Geological exploration along Mustang North Grid which included mapping, sampling, prospecting, and a ground magnetic survey.
2000	Mustang Minerals	Quantec Geoscience conducted IP/resistivity surveys along South Grid (Crerar Township) and the North Grid (Dana and McWilliams Townships).
2000	PFN/Amplats	Phase 2 program surface consisted of; grid cutting, geophysical surveys, and regional mapping/prospecting and detailed mapping/sampling of new cleared areas over the Dana Lake Area and Lismer Ridge. From February to March, Phase 1 drilling program included a total of 2,000 m of drilling in 13 holes with focus on the mineralization at the Dana Lake Area. From June to July, Phase 2 drill program entailed of total of 2,820.8 m of drilling in 14 holes with focus on the mineralization at the Dana Lake Area. In September, Phase 3 drill program consisted of 1,958.5 m in drilling in 10 drillholes at the Dana Lake Area and 3 holes at Lismer's ridge (13 holes total).
2001	Aquiline Resources	Geological mapping and sampling on Anaconda Project. Ironbank International was commissioned to complete channel sampling across IP targets. JVX conducted IP/resistivity and magnetometer surveys on Dana North property.
2001	Mustang Minerals	Second phase of mapping and sampling was conducted on three separate grids (North, Southeast, and Regional Central). Geophysical survey along Henry Grid, Diagonal Grid. Magnetometer and IP survey carried out on Mustang Mineral's Dana-McWilliams Property conducted by Vision Exploration. Line cutting in Upper Canada Claim Group by Vision. Quantec Geoscience conducted IP surveying on North Extension of the River Valley Property and Upper Canada Claim Property. Seventeen thousand metre diamond drill program designed and completed.
2001	PFN/Amplats	Phase 3 surface program consisted of sample collections from the property with concentrations in the south eastern and western contact areas. From February to July Phase 4 drilling commenced; a total of 16,027 m drilled in 98 holes.
2002	Aquiline Resources	JVX Ltd. refurbished gridlines and conducted IP/Resistivity and Magnetometer surveys on Anaconda Project, five IP anomalies identified.
2002	Mustang Minerals	Vision Exploration conducted a Magnetometer Survey over Southeast Grid. Two target areas were drilled within the North Grid totalling nine holes. LG Property added to Mustang in 2001 and consisted of line cutting, ground magnetometer, IP survey, mapping, sampling, and prospecting.
2002	PFN/Amplats	From period of October to December, Phase IV surface included regional geological mapping and sampling, stripping, detailed mapping and sampling, and line cutting and IP and ground magnetometer geophysical surveys. From period of November to August, Phase V drilling resulted in a total of 83 holes with 22,319 assay samples from Lismer Ridge, Dana South, and Banshee Lake.
2003	Aquiline Resources	Ironbank International was commissioned for design and implementation a drilling program to test geophysical (IP) targets on Aquiline's AQI Project (formerly Anaconda). Fifteen holes were drilled, totalling 2,000 m.
2003	PFN/Amplats	SPECTREM Air flew airborne mag, EM, and radiometric surveys over the River Valley property.
2004	PFN/Amplats	From period May to October, Phase VI surface included extensive geological mapping of the eastern portion of the property with the collection of samples. From period November 2002 to May 2004, Phase VI drill program consisting of a total of 44,131 m of drilling from 208 holes at Dana Lake, Banshee Lake, Lismer Ridge, MacDonalds, Varley, Azen Creek, Razor, Jackson's flat, and Pardo.

(table continues on next page)

Year	Company	Activities
2005	PFN/Amplats	From period December to October, a 35 to 40 t rock bulk sample was taken from four sites (two at Dana South, one at Road Zone, and one Dana North). Samples shipped to Amplats in South Africa for metallurgical testing. D.S. Dorland Ltd. surveyed the perimeter of the 33-claim block joint venture property in Dana and Pardo Townships. A trenching operation was undertaken on the northeast end of Lismer extension. Follow-up geological mapping and sampling was carried out. From period September to March Phase VII drilling consisted of 20,516.4 m of drilling in 103 holes with focus on Lismer Extension, Varley, Varley Extension/Azen, Pardo, Jackson's flat, and Casson. From period October to November, Phase VIII drill program consisted of 3,681.15 m drilled in 20 holes with focus on Spade Lake, Jackson's Flat South, Varley Extension/Azen Drop Zone, and Casson.
2006	PFN/Amplats	Mapping prospecting and sampling follow up from the 2005 program. Cut 50 line km of grid in the Jackson Flats south to perform IP and magnetic survey. Gravity survey in selected traverse. Completed mobile metal ion orientation survey.
2007	PFN/Amplats	Power stripping and channel sampling program was implemented in September and continued into November. Three hundred and seventy-one metres were stripped and 326 samples taken
2008	PFN	Starting in April of 2008, Gord Trimble, an independent consultant, was brought in to conduct a study on Dana North and South. During June and July, in conjunction with the Dana North South Study, cutting channels sample across three stripped zones at the Dana Lake area of the Project. One hundred and twenty-nine samples were taken and all were approximately 0.35 m long. The channel areas were mapped at a scale of 1:100.
2011-2012	PFN	From period April 2011 to January 2012, Phase IX drill program consisted of 12,767 m drilled in 46 holes with focus on Dana North and Dana South. Completed a surface water, sediment and banthic study. Resource estimation completed on the Project.
2015	PFN	Drilled 2 holes in Dana North totalling 474 m.
2016	PFN	In August acquired six mineral claims from Mustang Minerals Corp to extend the PGE mineralized trend by 4 km to the southeast of River Valley (River Valley Extension). In October, staked 8 mining claims adjacent to the River Valley Extension. In November, staked 14 mining claims. Selected grab samples collected from River Valley Extension and Dana South. Five drillholes totalling 1,267 m.
2017	NAM	PFN changes name to New Age Metals. Completes an IP geophysical survey on the Pine Zone and Banshee Zone. Completes 14 holes totalling 3,729 m on Dana North and Pine Zones.

6.1 HISTORICAL METALLURGICAL STUDY

Previous metallurgical studies completed on the Project must be classified as limited and selective. Testing has been done on high-grade samples of limited size and not all the zones were tested.

In the fall of 1999, as part of a senior graduate course at Michigan Technological University (MTU) and sponsored in part by NAM and Amplats, Erik Luhta obtained a mini-bulk rock sample totalling 4,264 lb from the Dana Lake area. Specifically, the sample was collected (blasted) from the North Zone 2 (1,333.3 lb net crushed) and South Zone (2,197.0 lb net crushed) in areas that had relatively high PGM assays, as determined from 1999 detailed surface sampling (***Luhta et al.,1999***).

The specific gravity of the material was found to be 2.9. Pilot plant grinding and flotation tests resulted in recoveries of 81.4% copper, 73.4% gold, 68.5% platinum, 74.1% palladium, 27.5% rhodium, and 29.4% nickel. However, steady state was not achieved during this run due to the exhaustion of material after only a few hours of operation.

The 2006 flotation test work on a sample from the Project, (***Malysiak, 2006***) compared their results with previous test work by Hey and Plint in 2001.

The 2006 tests were completed on a composite sample comprised of four samples in equal portions from Dana South Site A – MET 750, Dana South Site B – MET 751, Dana North Road Zone – MET 752, and Dana North Zone 2 – MET 753, while the 2001 testing was conducted on 13 borehole samples and consisted of the highest-grade intersections from each hole.

The platinum and palladium recoveries were enhanced up to 10% by increasing the grind from 60%-75 µm to 80% -75 µm. Nevertheless, the overall flotation response was still low compared to a typical platinum operation.

7 GEOLOGICAL SETTING AND MINERALIZATION

7.1 REGIONAL GEOLOGY

The Paleoproterozoic East Bull Lake Intrusive Suite, dated between 2491 and 2475 Ma, consists of eight distinct bodies of dominantly gabbronorite to gabbroic anorthosite that occur in both the Southern and Grenville provinces between Elliot Lake and the Temagami River (Figure 7.1) ***(Easton, 1999; James et al., 2002a***).

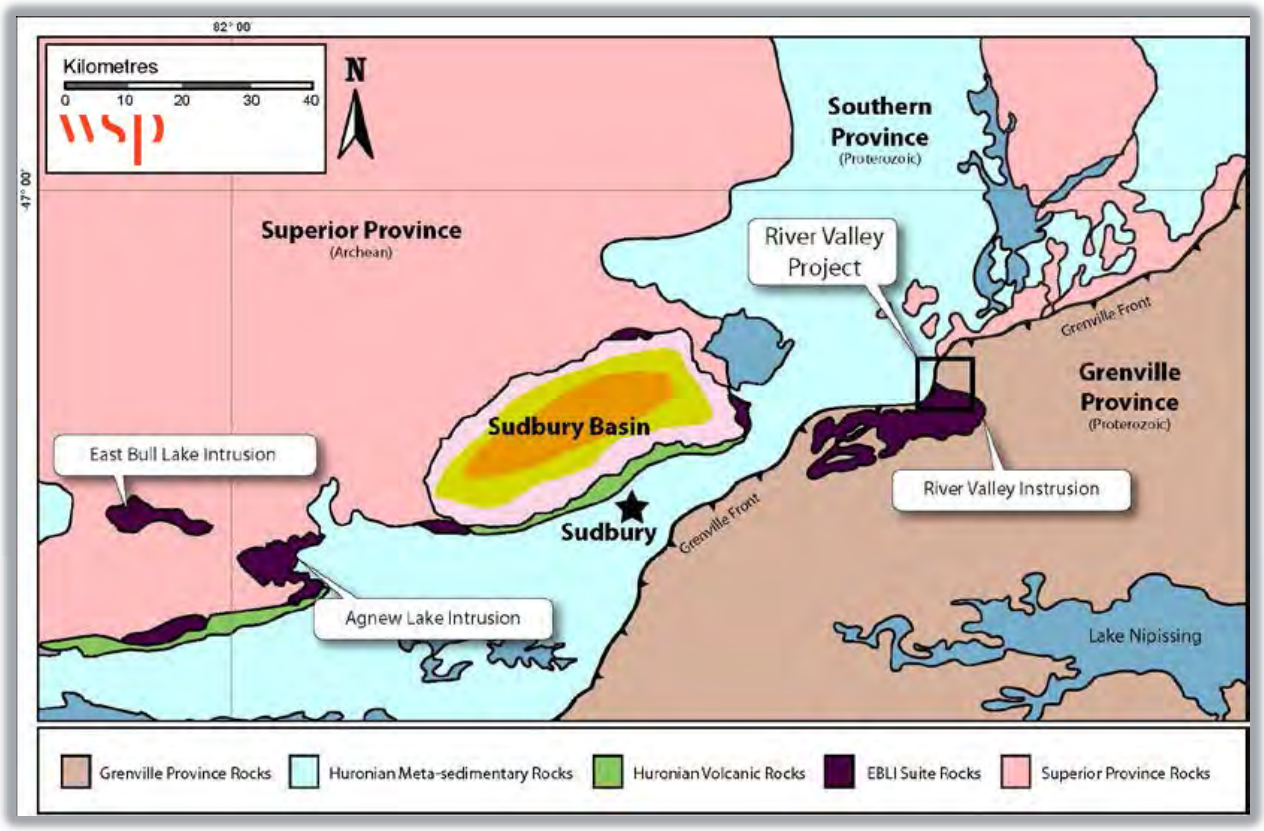
Intrusions of the East Bull Lake Intrusive Suite share a number of common characteristics in addition to lithology, including typically sill-like to lopolithic forms, igneous layering, and anomalous PGE content. The emplacement of the East Bull Lake Intrusive Suite bodies, the subsequent eruption of volcanic rocks belonging to the Huronian Supergroup, and the formation of the depositional basin filled by Huronian Supergroup sediments is attributed by most authors to a Paleoproterozoic intracontinental rifting event, which resulted from a mantle plume that was centered near Sudbury (***Easton, 2003; Easton et al., 2004***). Rift related magmatic activity is also manifested in the gabbroic rocks of the Hearst-Matachewan dyke swarm.

The East Bull Lake Suite Intrusions exhibit geochemical characteristics (high aluminum, relatively low magnesium and Large Ion Lithophile (LIL)-enriched trace element profiles) consistent with being derived from fractionated tholeiitic or high- alumina tholeiitic parental magmas (***Peck et al., 1993; Peck et al., 1995; Vogel et al., 1998***). The estimated parental magma compositions for the East Bull Lake Intrusive Suite are thus broadly similar to those postulated for the intrusive suite in the world class Noril'sk-Talnakh nickel-copper-PGE camp in Siberia (***Findlay, 2001***).

The three largest and most economically interesting bodies of the East Bull Lake Intrusive Suite are the East Bull Lake and Agnew Intrusions (situated within the Sudbury Province) and the River Valley Intrusion (situated in the Grenville Front Tectonic Zone). Smaller bodies include the intrusions in Drury, Falconbridge, May, Street, and Wisner Townships ***(Easton et al., 2004***).

The most completely preserved of the three largest bodies is the Agnew Lake Intrusion with approximately 2 km of stratigraphy being preserved, while the East Bull Lake and River Valley Intrusions have roughly only 1 km. The significant volume of melanocratic norites and troctolites recognized in the River Valley Intrusion are not present in the intrusions west of the Grenville Front, and may indicate that the former represents a deeper part of the stratigraphy (***Easton et al., 2004***).

Figure 7.1 Regional Geology



An economically important feature commonly shared by the Agnew Lake, East Bull Lake, and River Valley Intrusions is the occurrence of a copper-nickel-PGE-bearing breccia unit situated at the base of the intrusions, where the footwall contact is preserved. The breccia units are characterized by inclusions of footwall and cognate mafic to ultramafic xenoliths and autoliths set within a gabbronorite to olivine-bearing gabbronorite matrix. Near the contact, marginal footwall breccias and zones of extensive footwall dykes may also be present. Blebby to disseminated chalcopyrite and pyrrhotite, typically in modal amounts from 0.5 to 2%, occur in the matrix of the marginal and brecciated rocks, and occasionally within the breccia's more mafic fragments. This sulphide mineralization commonly contains between 1 g/t and 5 g/t combined platinum-palladium-gold, and remains the focus of current mineral exploration (***James et al., 2002a; 2002b***).

7.2 PROPERTY GEOLOGY

The River Valley Intrusion, the largest of the East Bull Lake Intrusive Suite by area, covers an area of approximately 200 km^2 and underlies parts of Crerar, Dana, Henry, Janes, and McWilliams Townships.

On the ground held by NAM, the contact between the River Valley Intrusion and the Archean basement trends south-easterly for a distance of approximately 16 km, from the northwest corner of Dana Township through to the south-central Dana-McWilliams townships boundary. The mineralized breccia unit occurring at the contact has been identified along most of this 16 km strike length. The contact is divided into several areas. Starting in the northwest and proceeding to the southeastern extent of the Property, these areas are: Dana North, Dana South, Banshee, Lismer Extension, Lismer Ridge, Varley, Azen, Jackson's Flats, and Razor. Drill data suggests that the dip between the contact of the mineralized breccia and the Archean footwall gneiss ranges from about 65 to 75° west, toward the intrusion. The dip is however highly variable along strike, ranging from 65 to 85° west to 65 to 85° east. East of the Dana South area, drill data suggests that the Archean-River Valley Intrusion contact generally dips into the intrusion at 60 to 70°.

Along the Grenville Front, in northwest Dana Township, the River Valley Intrusion is in thrust contact with quartzite of the Mississagi Formation (***Davidson, 1986***). In west central and southwest Dana Township, the River Valley Intrusion forms a contact with mafic and felsic metavolcanic rocks of the lower Huronian Supergroup (***Easton and Hrominchuk, 1999***).

The River Valley Intrusion in Dana Township, north of the Sturgeon River Fault, shows an increase in metamorphic grade southeast away from the Grenville Front and into the main Grenville terrane. River Valley Intrusion rocks west of Dana Lake have a mid- to upper-greenschist facies imprint. In the Lismer Ridge Zone metamorphic grade is lower amphibolite facies. East of Lismer, from the Varley to Razor areas, metamorphic grade is mid- to upper-amphibolite.

North of the Sturgeon River Fault in Dana Township, numerous northeast-trending discreet shears/faults transect the River Valley Intrusion and are interpreted to be synchronous with development of the Grenville Front Thrust and Grenville Thrust Boundary Fault.

Two north-trending faults cut the River Valley Intrusion (RVI) north of the Sturgeon River fault in Dana Township. These north-south faults (the Drop Zone West and Drop Zone East faults) occur approximately 500 m apart and bound a segment of the RVI intrusion that has an apparent displacement of 1.3 km to the south. It is possible that the West and East Drop Zone faults are part of the Upper Wanapitei River fault system, which has a protracted history dating back to at least 2170 Ma (***Buchan and Ernst, 1994 in Easton, 2003***).

A zone of northwest-trending faults (Turtle Creek, Martin Creek, and Cre-Mac Faults) transects the Property held by NAM, and parallels the Sturgeon River Fault. The Sturgeon River Fault is an important structural feature within the River Valley Intrusion, juxtaposing highly deformed and recrystallized River Valley Intrusion rocks of the Grenville Province in Crerar Township against River Valley Intrusion rocks of the Southern-Grenville Province Boundary Zone in Dana Township (***Easton, 2003***). River Valley Intrusion rocks north of the Sturgeon River Fault generally are much less deformed and often exhibit preserved or partly preserved primary mineralogy. A northwest-trending syncline may form a major structure within the area currently owned by NAM. The syncline (referred to as the Turtle Creek syncline) trends northwest across the eastern portion of the Property. East of the Drop Zone East Fault, the synclinal axis of the fold trends sub-parallel to the River Valley Intrusion- Archean contact (Figure 7.2).

On the basis of surface mapping and diamond drilling, the idealized sectional stratigraphy of the mineralized environment comprises five major units, from the layered rocks of the River Valley Intrusion in the west to the igneous basal contact of the intrusion to the east (Figure 7.3).

- **Layered Sequence**: units of massive pyroxenite to anorthosite, forming the bulk of the River Valley Intrusion; layering is poorly developed but where present is subvertical.

- **Inclusion-bearing Zone**: 1.65 to 98.50 m wide; scattered, elevated PGM values; mainly leucogabbro-gabbro fragments (less than 20% volume) with either fine-grained mafic matrix or medium-grained felsic matrix; fragments are generally larger (decimetre to metre scale) than those in the Breccia Zone.
- **Breccia Zone**: 11.50 to 193.05 m wide; elevated PGM values (Main Zone); mainly gabbro-melagabbro fragments (greater than 20% volume) with fine- to medium grained mafic matrix; fragments are generally small (centimetre to decimetre scale).
- **Boundary Zone**: 0 to 40 m wide; also referred to as footwall breccia; where present, consists of country rock (Archean paragneiss/migmatite) mixed with River Valley Intrusive rocks.
- **Country Rock**: Footwall or hanging wall Archean paragneiss-migmatite- gabbro and possibly Huronian sedimentary rocks.

Figure 7.2 Property Geology

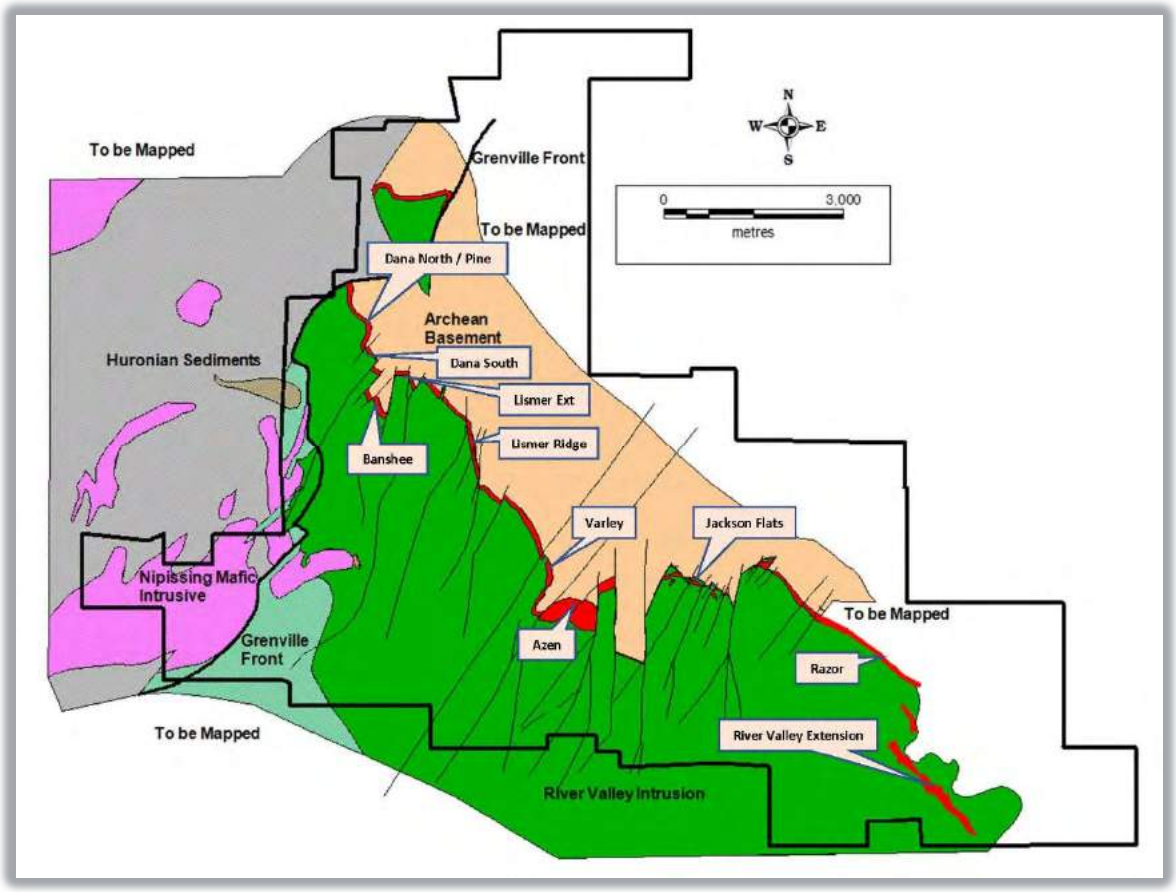
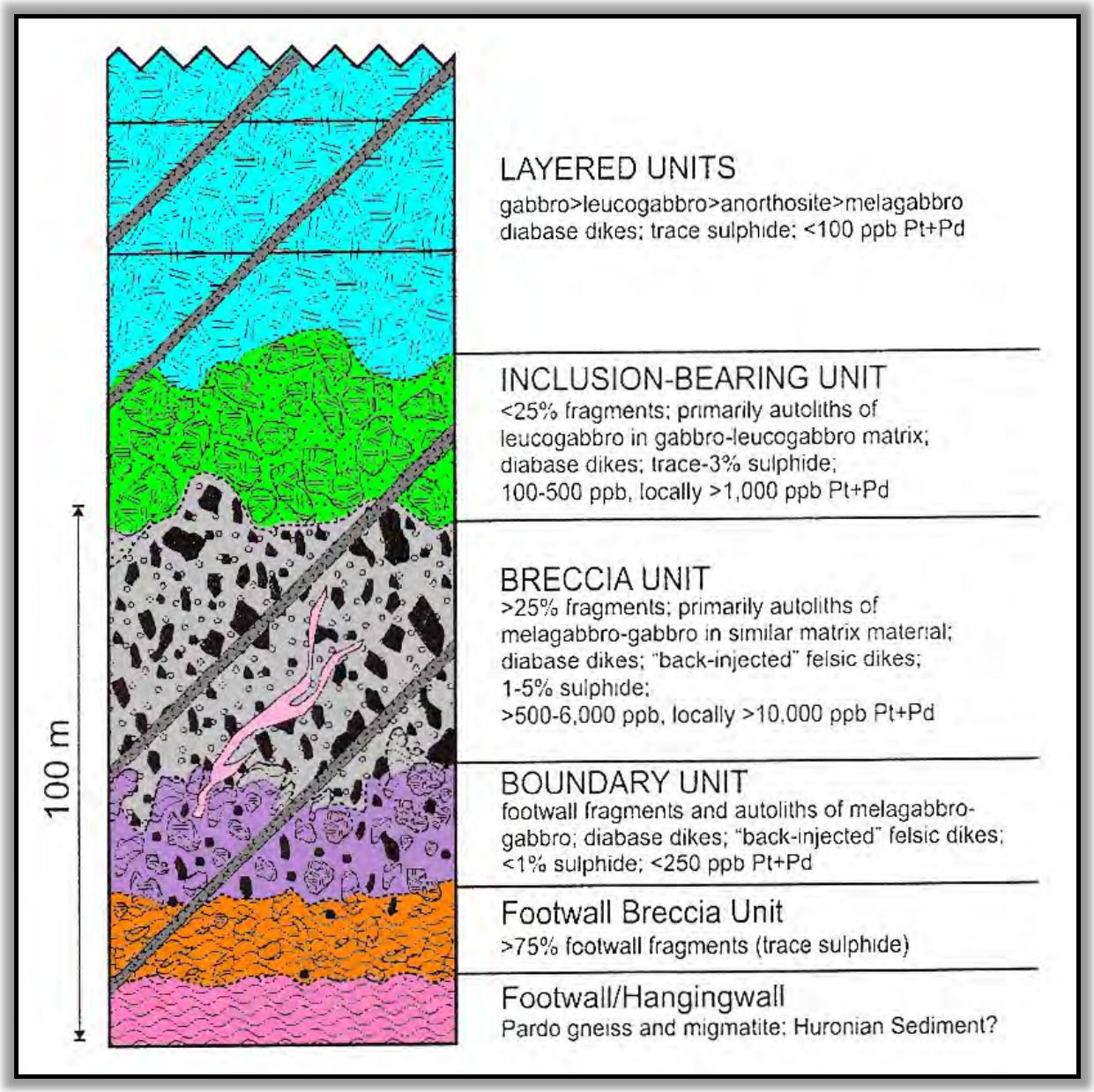


Figure 7.3 Stratigraphic Section



7.3 MINERALIZATION

An economically important feature commonly shared by the Agnew Lake, East Bull Lake, and River Valley Intrusions is the occurrence of a copper-nickel-PGE bearing breccia unit situated at the base of the intrusions, where the footwall contact is preserved. The breccia units are characterized by inclusions of footwall and cognate mafic to ultramafic xenoliths and autoliths set within a gabbronorite to olivine-bearing gabbronorite matrix. Near the contact, marginal footwall breccias and zones of extensive footwall dykes may also be present. Blebby to disseminated chalcopyrite and pyrrhotite, typically in modal amounts from 0.5 to 2%, occur in the matrix of the marginal and brecciated rocks and occasionally within the breccia's more mafic fragments. This sulphide mineralization commonly contains between 1 g/t and 5 g/t combined platinum-palladium-gold. On the basis of work completed to date, several important observations and conclusions can be made regarding the geological environment of the contact-type PGM-copper-nickel sulphide mineralization on the Property.

- The Breccia Zone (approximately 10 to 195 m intersections), which includes the main mineralized breccia or Main Zone, has relatively consistent, elevated PGM values. The Main Zone occurs within about 20 m of the intrusive contact with Archean paragneiss and migmatite.
- The Inclusion-Bearing Zone (approximately 1.0 to 100 m intersections) is variably mineralized and has scattered, elevated PGM values.
- Sulphide contents generally range from 1 to 5% total sulphide but can be as high as 10% when occurring as localized clusters of disseminated and bleb sulphide. There is a moderate correlation between PGM-bearing sulphide mineralization and patches of blue-grey quartz (referred to as cauliflower) and/or elevated biotite concentrations.
- The majority of sulphide mineralization occurs as magmatic sulphide grains that are primarily disseminated and bleb textured, with subordinate net-textures. Principal sulphide minerals are chalcopyrite, pyrrhotite, and pentlandite with subordinate pyrite, cubanite and bornite.
- Although the mineralized sections at the Dana Lake Area and Lismer Ridge are broadly similar, there are several notable differences. Mafic rocks at Lismer Ridge commonly develop a moderate foliation and tend to have a higher proportion of chlorite and biotite. There is also a higher proportion of visible chalcopyrite relative to pentlandite + pyrrhotite at Lismer Ridge and chalcopyrite is more commonly recrystallized along foliations. At Lismer Ridge, blue quartz is not as prolific within the mineralized sections. These differences are likely the result of a slightly higher metamorphic grade at Lismer Ridge (mid- to upper-amphibolite facies), relative to the Dana Lake Area (greenschist facies).

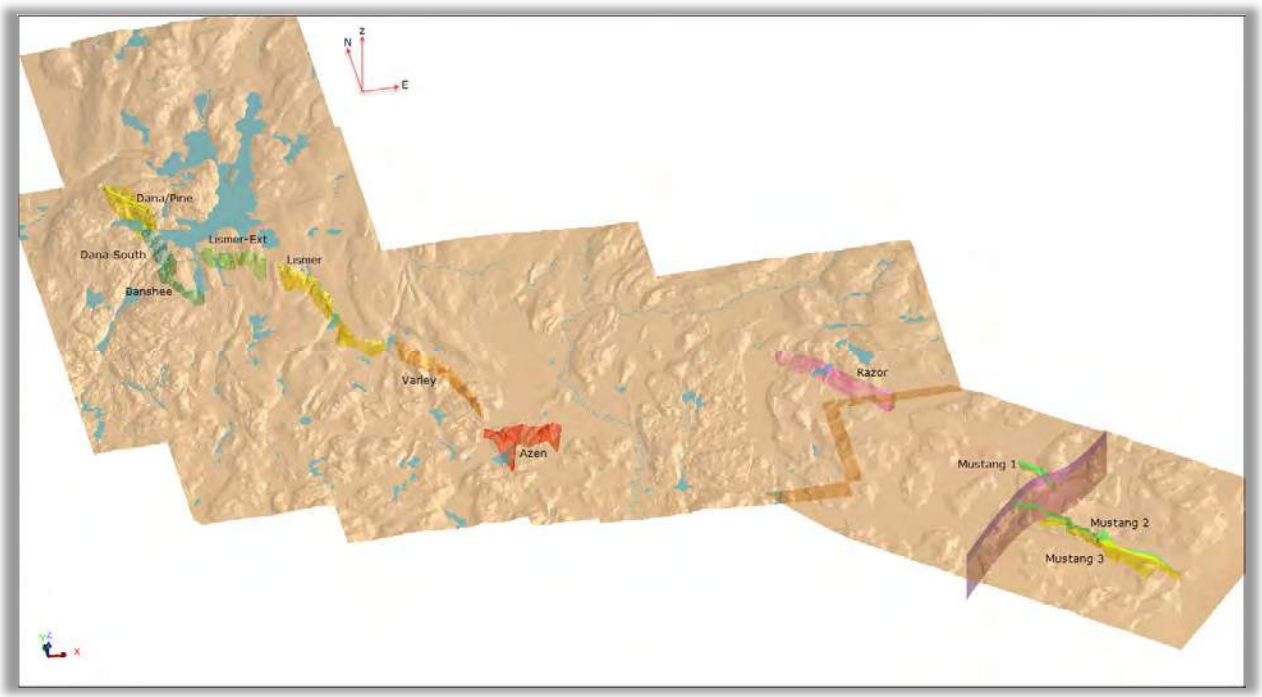
Table 7.1 lists the typical minerals with economic potential that have been observed at the Project by x-ray diffraction and scanning electron microscope studies of hand samples.

Table 7.1 River Valley Minerals

Minerals	Formula
Chalcopyrite	$CuFeS_2$
Pyrrhotite	$Fe_{(1-x)}S$
Pentlandite	$(Fe, Ni)_9S_8$
Pyrite	FeS_2
Cubanite	$CuFe_2S_3$
Bornite	Cu_5FeS_4
Sperrylite	$PtAs_2$
Mackinawite	$(Fe, Ni)_9S_8$
Cubanite	$CuFe_2S_3$
Arsenopyrite	FeAsS

The zones of mineralized breccia starting in the northwest and proceeding to the southeastern extent of the contact on the Property are: Dana North, Dana South, Banshee, Lismer's Extension, Lismer's Ridge, Varley, Azen, Razor, and River Valley Extension (Figure 7.4).

Figure 7.4 River Valley Mineral Zones (Oblique view – not to scale)

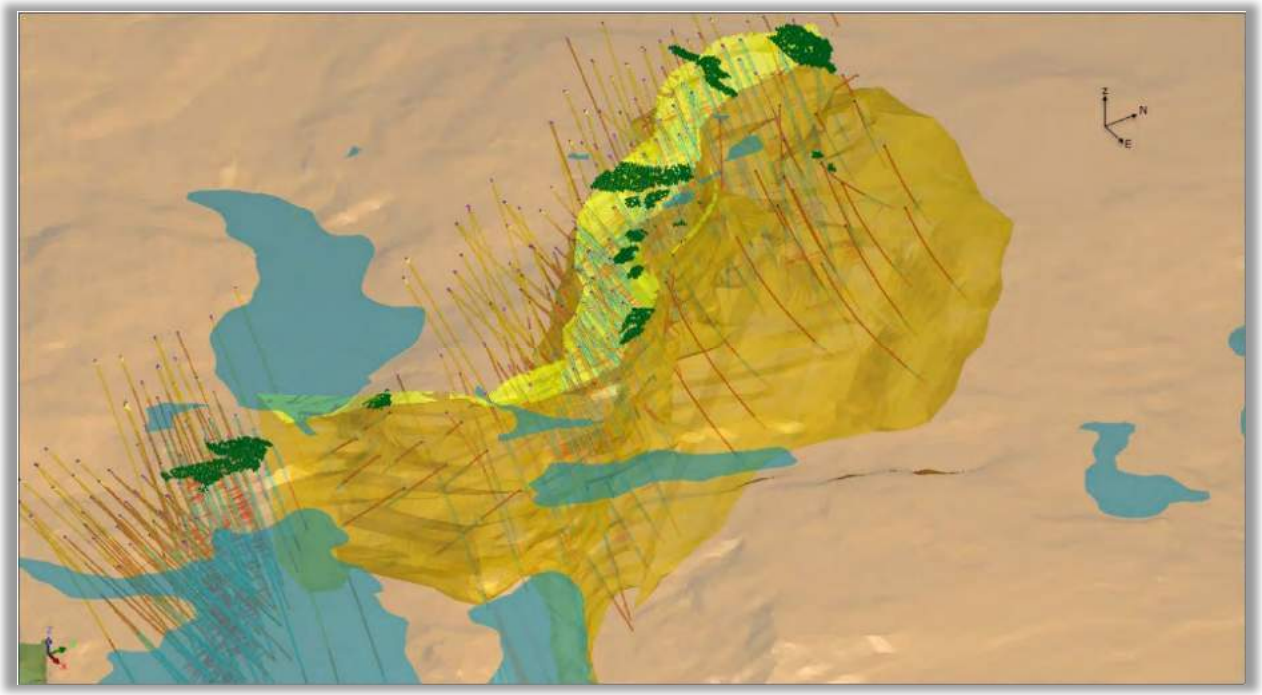


7.3.1 DANA NORTH / PINE

Dana North, the most northwestern zone, has a strike length of approximately 1,000 m. The zone dips steeply to the west-southwest at 80 to 85°. The rocks have undergone lower- to middle-greenschist facies metamorphism. This area exhibits little structural disturbance. The zone averages 50 m in width but varies greatly from hole to hole (Figure 7.5).

The Pine Zone is a mineralized splay off of Dana North. It is unknown at this time if the Pine Zone is structurally emplaced or primary magmatic placement. The strike is roughly perpendicular to Dana North and dips to the southeast at approximately 40° to 45°. The average thickness of the Zone is 45 m, yet thins to 15 m the east.

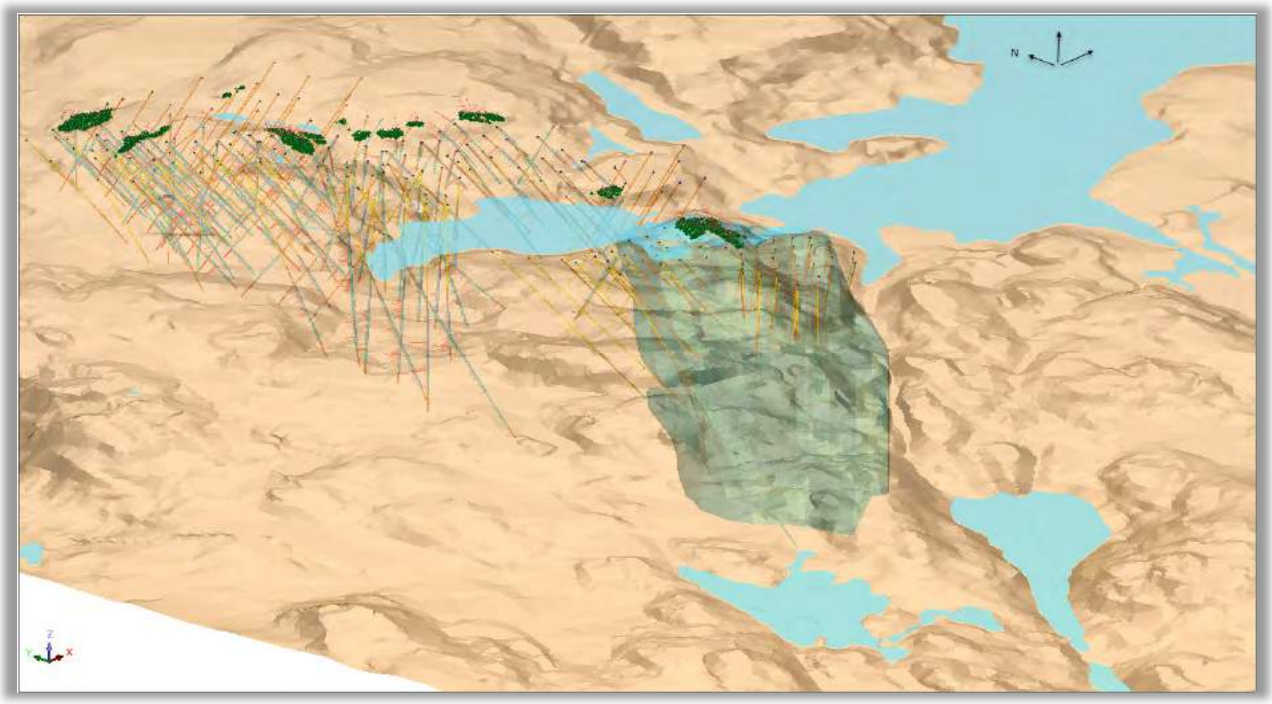
Figure 7.5 Oblique Long Section Dana North/Pine



7.3.2 DANA SOUTH

Proceeding southeast, Dana South is approximately 500 m in length, dips at 80 to 85° to the west-southwest, and varies greatly in width between holes and sections. The rocks here have undergone mid- to upper-greenschist metamorphism and the southern extent of this zone exhibits structural disturbance due to the proximity of the Dana Lake Shear Zone (Figure 7.6).

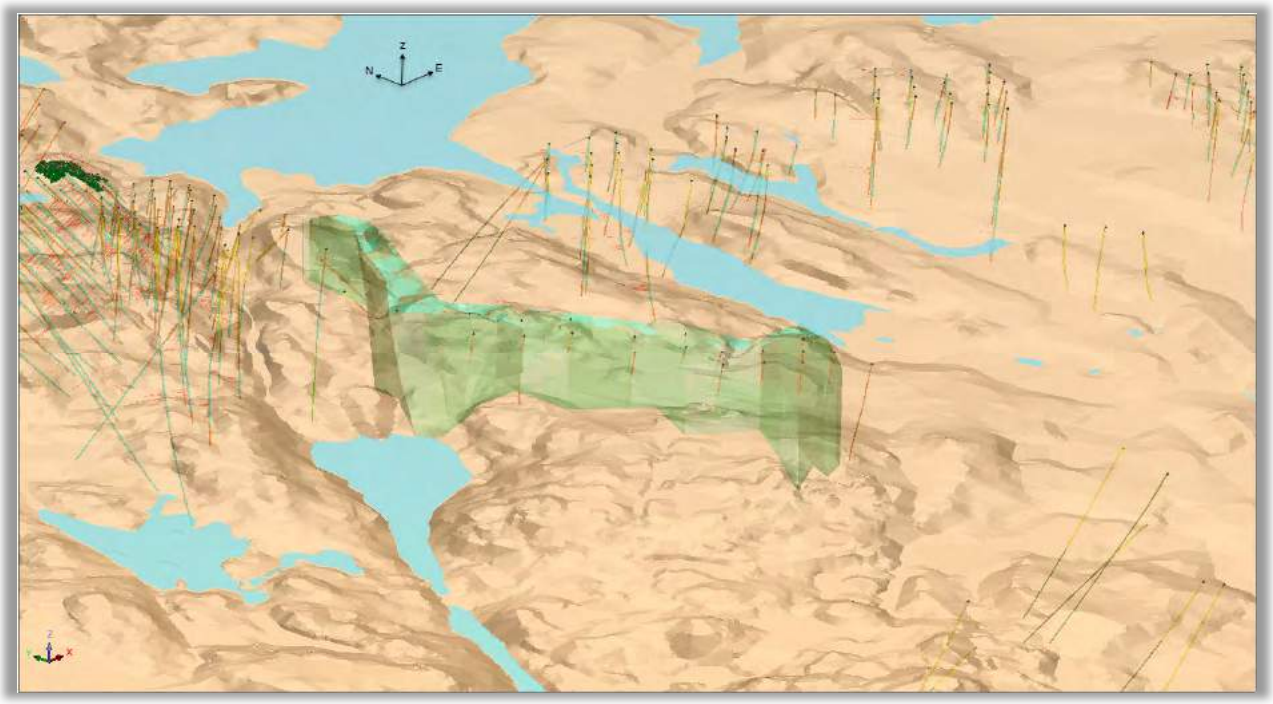
Figure 7.6 Oblique Long Section Dana South



7.3.3 BANSHEE

The next zone further to the southeast is Banshee Lake which is a fault-offset band of marginal series rocks. This block of breccia has been displaced approximately 350 m to the southwest. The metamorphic grade of the rock here is lower amphibolite facies. The strike length of this zone is approximately 500 m and dips to the southwest at 60 to 70°. The rocks here show relatively more structural fabric in the way of fracture, shears, and foliation than at Dana (Figure 7.7).

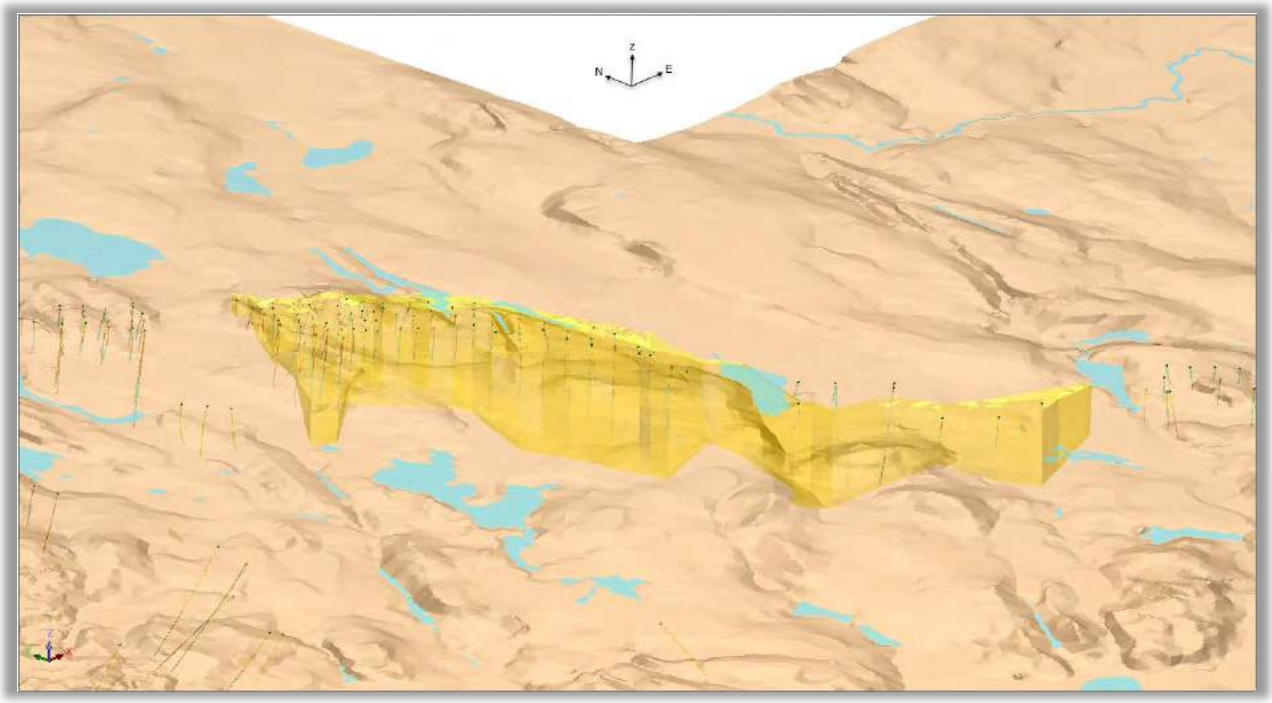
Figure 7.7 Oblique Long Section Banshee



7.3.4 LISMER RIDGE AND LISMER EXTENSION

The next two zones, which can be described together due to the proximity and identical geology, are Lismer Extension and Lismer Ridge. These zones have a combined strike length of approximately 2,400 m dip east-southeast at about 60 to 70°. These zones have a lower- to mid-amphibolite grade metamorphic over print and exhibit a more penetrate structural fabric in the way of foliation throughout than the last zones. The rocks are more highly chloritized and carry more biotite relative to the other zones. The sulphides are composed of a higher percentage of chalcopyrite and are recrystallized along foliation planes (Figure 7.8).

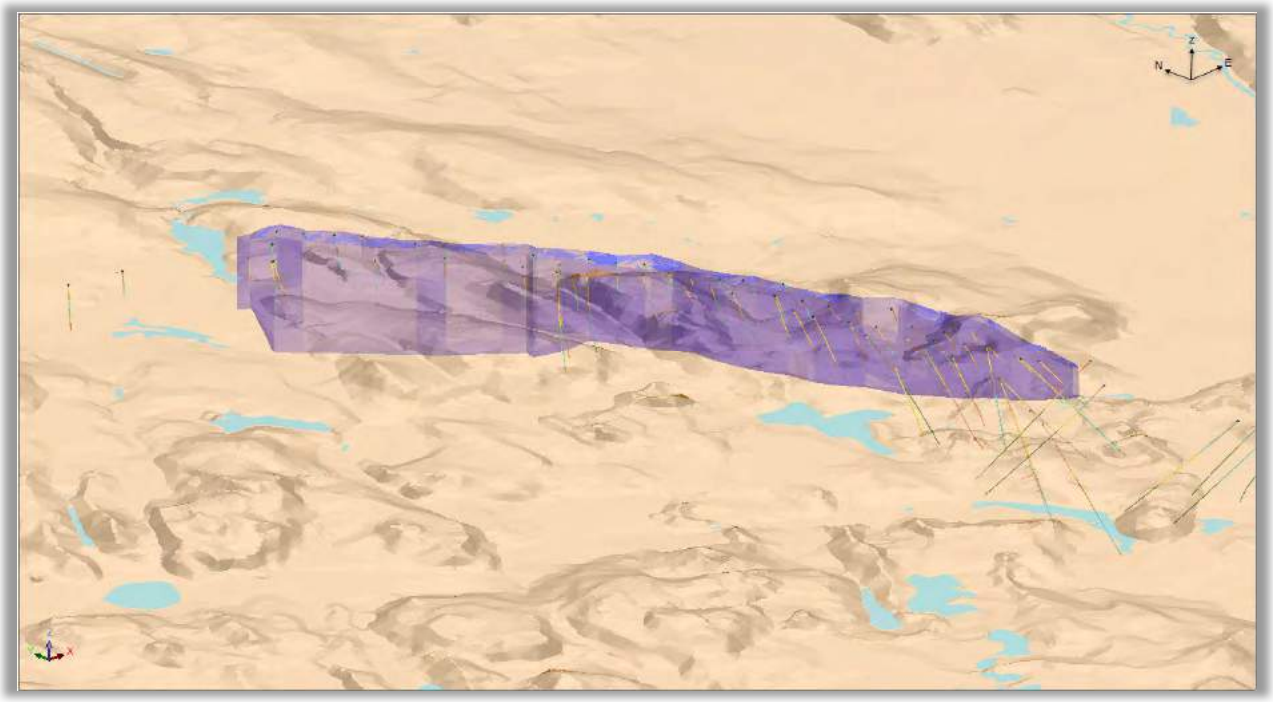
Figure 7.8 Oblique Long Section Lismer Ridge and Lismer Extension



7.3.5 VARLEY

The next zone is Varley, which has strike length of approximately 2,500 m and dips to the west at approximately 60 to 70°. The rocks here have undergone lower- to mid-amphibolite grade metamorphism but display little structural deformation (Figure 7.9).

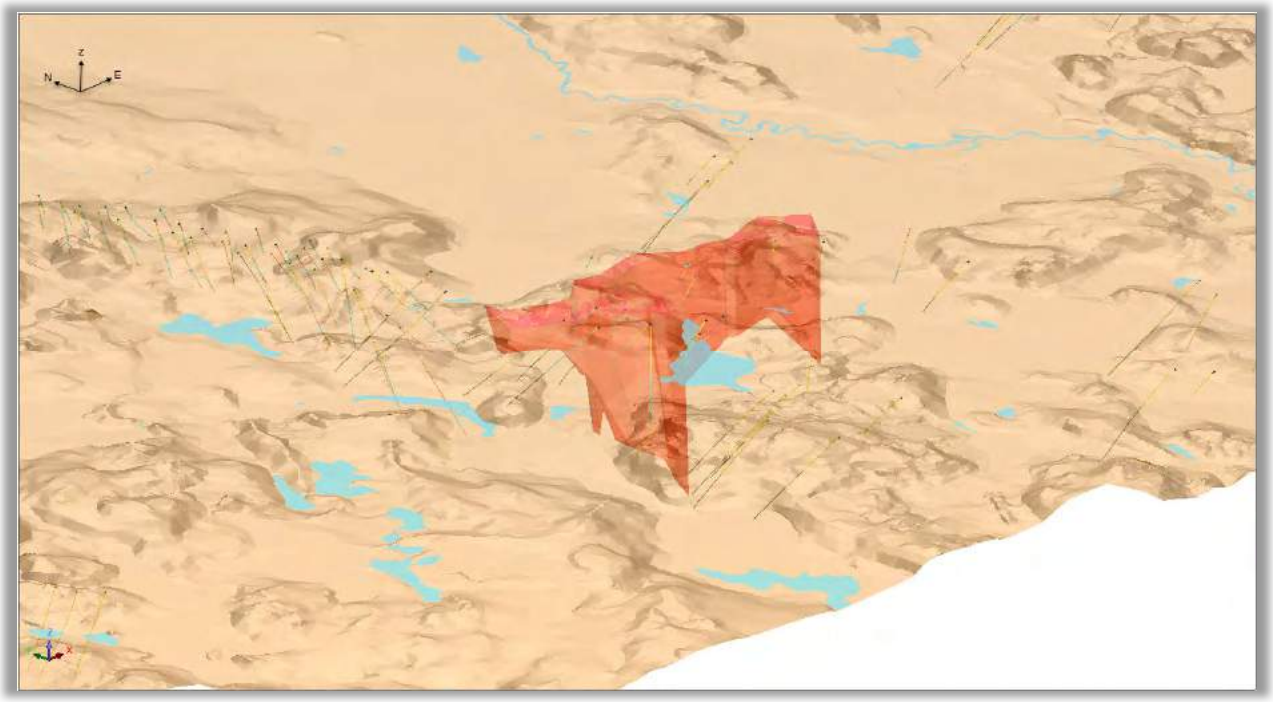
Figure 7.9 Oblique Long Section Varley



7.3.6 AZEN

At this juncture the contact swings to the east from the previous northwest-southeast orientation and is where the Azen Zone is encountered. This zone has a strike length of approximately 1,300 m and dips 30 to 50° south. The rocks have a mid- amphibolite facies over print (Figure 7.10).

Figure 7.10 Oblique Long Section Azen



7.3.7 RAZOR

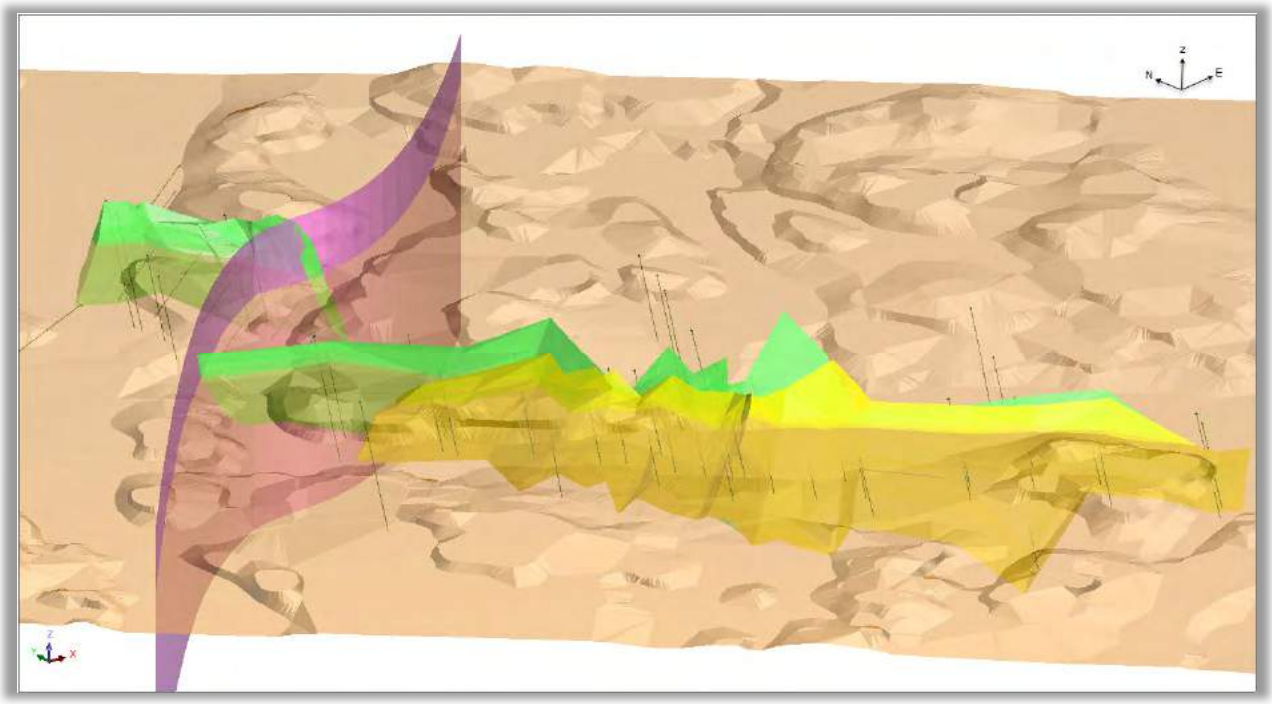
Razor has a strike length of approximately 1,400 m. This zone dips progressively steeper to the east from about 80° to the south to steeply north at the far eastern end. The rocks have undergone upper amphibolite grade metamorphism (Figure 7.11).

Figure 7.11 Oblique Long Section Razor

7.3.8 RIVER VALLEY EXTENSION

The River Valley Extension has a strike length of approximately 2,400 m. The zone consists of two parallel mineralized horizons that are truncated to the north by a strike-slip fault. To the north of the fault, a single mineralized horizon exists. This zone dips steeply at about 80° to the southwest or northeast depending on the location (Figure 7.12).

Figure 7.12 Oblique Long Section River Valley Extension



8 DEPOSIT TYPE

Two styles of mineralization have been observed at the Project: contact nickel-PGE mineralization (US Geological Survey #5b) and reef PGE mineralization (US Geological Survey #2b) (http://pubs.usgs.gov/bul/b1693/html/bullfrms.htm).

The presence of several highly-anomalous assays from rocks lying within higher portions of the River Valley Intrusion's stratigraphy suggests that there are opportunities for PGE mineralization such as reef- or stratabound-type targets, or narrow, high-grade breccia zones.

8.1 CONTACT-STYLE PGM MINERALIZATION

Contact-style PGM mineralization develops as the result of sulphur-saturation brought on by the interaction of the fertile parental magma with the surrounding country rock lithologies. The contamination of the initial fertile parental magma by the addition of either silicon dioxide and/or sulphur can directly result in sulphur- saturation and the separation of a PGE-rich immiscible sulphide. The addition of silicon dioxide and/or sulphur is typically achieved by the assimilation of either local country rock lithologies and/or the assimilation of breccia fragments previously developed along the contact margin. Analogies for this model include Lac des Iles (northwestern Ontario), the Platreef (South Africa), and Portimo Complex (Finland).

Contact-style PGM mineralization is the most common form of PGM mineralization within the East Bull Lake Intrusive Suite. Mineralized zones are commonly restricted to within 200 to 300 m of the true footwall contact, and mineralized zones are commonly 20 to 100 m wide. Mineralization occurs typically as fine- to medium- grained disseminated to blebby chalocopyrite+pryrrhotite+pentlandite within a heterolithic gabbro to melagabbro breccia.

8.2 REEF-STYLE PGM MINERALIZATION

Reef-style PGM mineralization is a strata-bound or strata-form style of mineralization that typically occurs higher up in the stratigraphy of the intrusion at the contact between two separate and distinct lithological units. Sulphur-saturation and therefore sulphide segregation can be the result of the interaction between distinctly different types of magma, with sulphur-saturation occurring at their interface. Geochemical evolution of the overlying magma can also cause sulphur-saturation and the separation of immiscible sulphides can accumulate between the two units.

Due to the stratigraphic control and narrow target widths (1 to 10 m) of reef-style PGM mineralization, exploration programs must be focused entirely on the productive horizon. In order to identify the proper horizon, geochemical traverses are essential with the goal being to look for systematic changes in PGE and/or nickel- copper tenors across lithological boundaries. Once the specific horizon is identified, then grid sampling and ground-based geophysics should be used over the target area.

9 EXPLORATION

9.1 EXPLORATION PRIOR TO 2006

NAM has conducted exploration on the Property since 1999. A summary of the activities conducted by NAM and/or their joint venture partners is summarized in Table 9.1. The information summarized in the table has not been reviewed by the QP and had been sourced from various internal company reports and press releases available from NAM's website.

Table 9.1 Exploration Work Prior to 2006

Year	Company	Activities
1999	PFN/Amplats	With joint venture partner Amplats established a Phase 1 surface program which included: establishing detailed and regional exploration grids, regional prospecting and sampling, grid prospecting and sampling, preliminary geological grid mapping, stripping and cleaning of selected outcrops areas, detailed sampling, preliminary mapping, orientation biogeochemical survey, and orientation IP and ground magnetometer geophysical surveys.
2000	PFN/Amplats	Phase 2 program surface consisted of; grid cutting, geophysical surveys, and regional mapping/prospecting and detailed mapping/sampling of new cleared areas over the Dana Lake Area and Lismer Ridge.
2001	PFN/Amplats	Phase 3 surface program consisted of sample collections from the property with concentrations in the south eastern and western contact areas.
2002	PFN/Amplats	From period of October to December, Phase IV surface included; regional geological mapping and sampling, stripping, detailed mapping and sampling, and line cutting and IP and ground magnetometer geophysical surveys.
2003	PFN/Amplats	SPECTREM Air flew airborne mag, EM, and radiometric surveys over the River Valley property.
2004	PFN/Amplats	From period May to October, Phase VI surface included extensive geological mapping of the eastern portion of the property with the collection of samples.
2005	PFN/Amplats	From period December to October, a 35-40 t rock bulk sample was taken from four sites (two at Dana south, one at Road Zone, and one Dana North). Samples shipped to Amplats in South Africa for metallurgical testing. D.S. Dorland Ltd. surveyed the perimeter of the 33-claim block joint venture property in Dana and Pardo Townships. A trenching operation was undertaken on the northeast end of Lismer extension. Follow-up geological mapping and sampling was carried out.

9.2 2006 SURFACE PROGRAM

The surface program carried out from May to November 2006 was designed to follow up on the 2004 and 2005 surface programs. Mapping and prospecting was also carried out in areas where previous work was lacking.

The objectives of the surface program were as follows:

- Map and sample areas that contain concentrations of anomalous samples as identified in the 2005 surface program (Figure 9.1, and Tables 9.2 and 9.3).
- Decipher the contact relations between the River Valley Intrusion and the adjacent Huronian sediments on the western edge of the Property and the River Valley Intrusion outlier in the Pardo area.

- Prospect and map the magnetic anomalies in the River Valley Intrusion/Huronian contact area of the Property.
- Cut a grid of 50-line kilometres in the Jackson's Flats south area and perform IP and magnetic surveys.
- Prospect and trace the Olivine gabbronorite units exposed along the road in Jackson's Flats south where anomalous samples were yielded during the 2005 surface program.
- Perform gravity survey profiles along selected traverses across the regional stratigraphy to see if this method would be a viable exploration tool and/or reveals useful information about the nature of the River Valley Intrusion.
- Conduct mobile metal ion geochemical orientation surveys over areas of known mineralization to determine whether this method would be responsive in the River Valley Intrusion PGM environment. If good results were obtained, then surveys would be conducted over prospective areas lacking outcrop.

This program consisted of 2,432 grab samples and 341 channel samples being taken.

Figure 9.1 2006 Surface Exploration

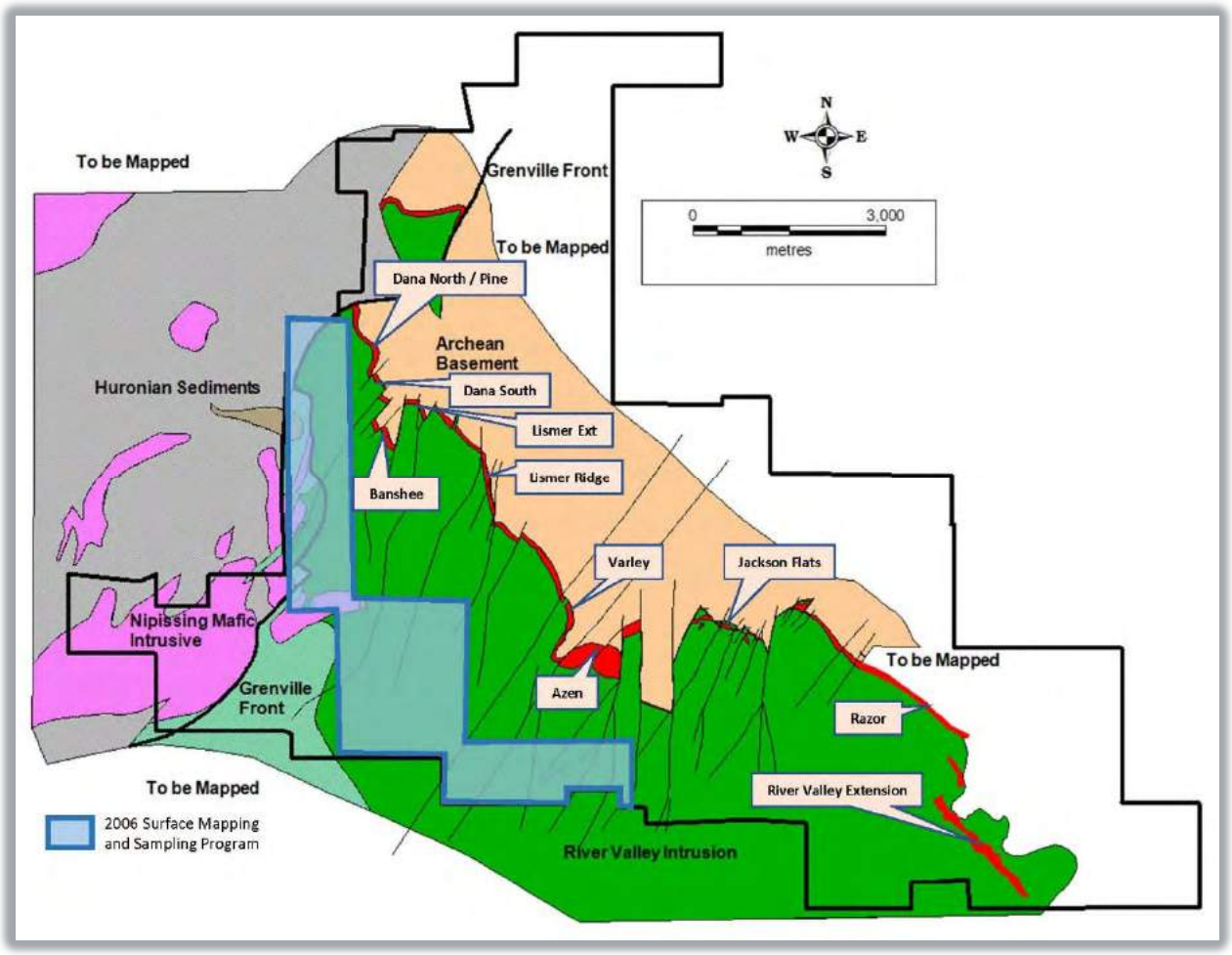


Table 9.2 2006 Surface Grab Sampling Program

Sample No.	Au (ppb)	Pt (ppb)	Pd (ppb)	Pt+Pd+Au (ppb)	Pd:Pt	Ni (ppm)	Cu (ppm)
ND308-06	65	220	261	546	1.18636	204	61
RZ159	5	300	261	566	0.87	20	85
RZ190	211	200	196	607	0.98	2,030.00	331
ND092-06	10	330	286	626	0.86667	52.9	23
ND182-06	76	160	406	642	2.5375	197	94
ND257-06	9	440	237	686	0.53864	141	12
ND188-06	66	290	336	692	1.15862	664	50
PW1286	64	240	391	695	1.62917	1,410.00	620
SB100-06	57	230	413	700	1.79565	1,370.00	143
ND184-06	10	400	360	770	0.9	213	23
ND298-06	57	470	314	841	0.66809	26	301
SB139-06	89	610	162	861	0.26557	341	341
ND237-06	341	260	287	888	1.10385	3,050.00	704
PW558	17	660	226	903	0.34242	102	18
ND075-06	320	320	269	909	0.84063	2,570.00	651
ND323-06	18	320	670	1,008	2.09375	334	20
RZ186	409	380	382	1,171	1.00526	3,700.00	209
ND224-06	417	380	405	1,202	1.06579	3,430.00	872
RZ188	425	460	442	1,327	0.96087	4,080.00	1,280
PW1318	192	1,110	623	1,925	0.56126	1,680.00	68
RZ160	16	910	1,020	1,946	1.12088	18	55
ND076-06	850	550	553	1,953	1.00546	5,560.00	1,650
PW415	8	1,920	787	2,715	0.4099	127	22
ND183-06	142	1,790	1,390	3,322	0.77654	291	51
ND175-06	90	2,160	2,990	5,240	1.38426	459	60

Table 9.3 Highlights of the Channel Sampling Program

Sample No.	Au (ppb)	Pt (ppb)	Pd (ppb)	Pt+Pd+Au (ppb)	Pd:Pt	Ni (ppm)	Cu (ppm)
DR068	53	810	769	1,632	0.949	71	774
DR283	21	580	859	1,460	1.481	31	287
DR047	26	750	533	1,309	0.711	33	204
DR152	40	690	559	1,289	0.81	18	228
DR260	52	670	566	1,288	0.845	39	187
DR230	26	900	335	1,261	0.372	20	200
DR282	29	680	548	1,257	0.806	47	253
DR048	46	580	542	1,168	0.934	36	123
DR074	102	450	474	1,026	1.053	73	695
DR186	43	550	364	957	0.662	17	156
DR258	40	430	307	777	0.714	45	431
DR042	101	380	280	761	0.737	53	723
DR304	46	430	260	736	0.605	31	183
DR075	33	440	252	725	0.573	30	254
DR121	10	320	370	700	1.156	37	161
DR078	42	330	305	677	0.924	25	439
DR169	35	330	280	645	0.848	29	190
DR079	43	330	265	638	0.803	35	543
DR267	19	370	234	623	0.632	44	199
DR044	53	320	241	614	0.753	47	428
DR266	15	290	309	614	1.066	50	167
DR229	11	380	207	598	0.545	21	77.5
DR291	24	270	293	587	1.085	36	270
DR072	15	220	334	569	1.518	33	346

During the 2006 mapping and prospecting campaign, several areas where identified in the interior of the River Valley Intrusion that returned anomalous assays for platinum+palladium+gold. These may be sites of possible reef style PGM mineralization and warrant further work and possibly a drilling program. The 2006 IP survey identified a number of chargeability anomalies, which were ground trued with inconclusive results.

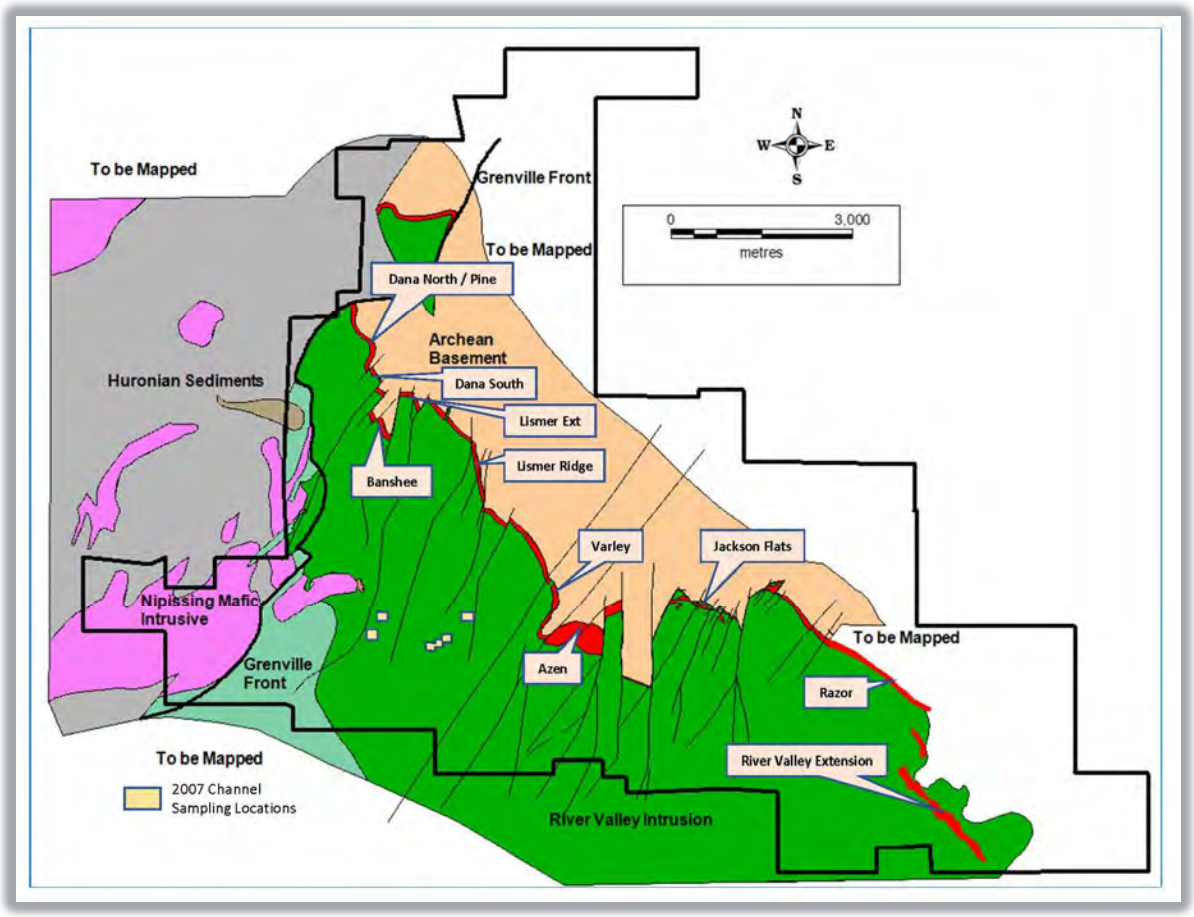
9.3 2007 SURFACE PROGRAM

A power stripping and channel-sampling program was implemented in September and continued into November. The objective of this program was to sample more completely in and around prospective PGM zones and to determine whether there was any continuity and/or control of the PGE mineralization. Three hundred and seventy-one metres were stripped and 326 samples taken (Table 9.4 and Figure 9.2).

Table 9.4 Highlights from 2007 Channel Samples

Sample No.	Lithology	Au (ppb)	Pt (ppb)	Pd (ppb)	Pt+Pd+Au (ppb)	Ni (ppm)	Cu (ppm)
Dragon Zone							
DR350	Melagabbro	97	1,277	749	2,123	55	312
DR351	Melagabbro	46	329	364	739	178	282
DR352	Melagabbro	44	182	308	534	96	275
DR353	Melagabbro	96	509	512	1,117	89	468
DR368	Leucogabbro	170	854	752	1,776	116	1,654
DR370	Leucogabbro	76	333	360	765	80	1230
DR378	Foliated Mafic	34	292	267	593	48	420
DR379	Foliated Mafic	64	744	590	1,398	30	409
DR409	Leucogabbro	287	1,190	1,136	2,613	127	1,191
DR411	Leucogabbro	40	441	433	914	50	298
DR412	Melagabbro	97	911	835	1,843	70	613
DR413	Melagabbro	43	618	531	1,192	52	359
DR414	Melagabbro	48	488	404	940	167	710
DR417	Gabbro	31	414	267	712	38	136
DR420	Melagabbro	37	378	378	793	31	124
DR480	Anorthosite	81	301	342	724	44	323
DR482	Gabbro	20	475	294	789	35	73
DR493	Mafic Gab	5	948	108	1,061	49	157
East Casson Area							
DR512	Anorthosite	29	293	196	518	30	112
DR594	Melagabbro	17	355	133	505	21	65
Road Zone							
DR601	Nipissing Gabbro	430	313	378	1,121	939	3,378
DR602	Nipissing Gabbro	247	212	248	707	686	2,059
DR603	Nipissing Gabbro	281	274	264	819	831	2,290
DR604	Nipissing Gabbro	264	251	237	752	779	2,329

Figure 9.2 2007 Channel Sample Location



9.4 2008 SURFACE PROGRAM

Starting in April of 2008, Gord Trimble, an independent consultant, was brought in to conduct a study on Dana North and South. The main focus of the Dana North South Study (***Trimble, 2008***) was the evaluation of the geological setting, the mineralization distribution, and a re-interpretation of the mineralized envelopes.

During June and July, in conjunction with the Dana North and Dana South Study, thirteen days were spent cutting channels samples across three stripped zones at the Dana Lake area of the Project. The reason for this was that this area was completed on a 2.5 m x 2.5 m sample spacing with short channel cuts taken.

One hundred and twenty-nine samples were taken and all were approximately 0.35 m long. The old grab channel cuts in the vicinity of the new continuous channel were relabelled with metal tags. The new cuts were labelled by nailing a metal tag in an extra saw cut at the beginning of each sample. Sample descriptions were entered into a Microsoft Excel™ spreadsheet. The channel areas were mapped at a scale of 1:100 and extra care was taken to locate each old sample relative to each new sample for comparison purposes. The samples were delivered to SGS Canada Inc. (SGS) laboratories in Garson, Ontario on July 23, 2008 with a request for a 300 g pulp to be returned. Table 9.5 summarizes the significant results from the sampling program, and Figure 9.3 provides the location of the sampling on the Property.

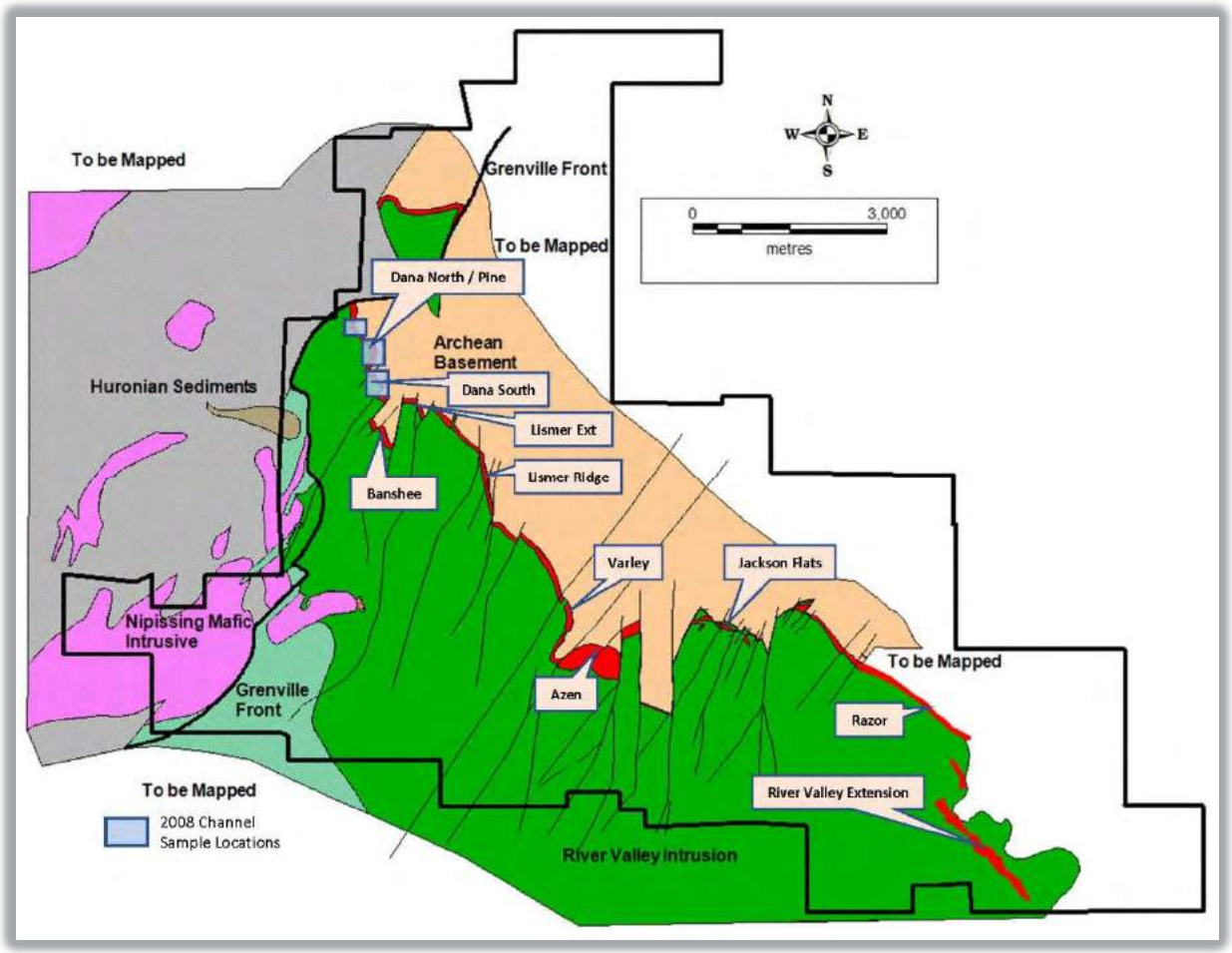
Table 9.5 2008 Channel Sampling Dana Lake

Area	2008 Samples	Au (ppb)	Pt (ppb)	Pd (ppb)	Pt+Pd+Au (ppb)
Dana Lake Road Zone	08RZ001	121	470	1,540	2,131
	08RZ002	102	600	1,860	2,562
	08RZ003	116	790	2,340	3,246
	08RZ004	151	730	2,470	3,351
	08RZ005	146	470	1,400	2,016
	08RZ009	127	610	1,990	2,727
	08RZ013	146	790	2,720	3,656
	08RZ014	130	820	2,320	3,270
	08RZ015	130	780	2,170	3,080
	08RZ016	156	660	2,070	2,886
	08RZ018	139	820	2,910	3,869
	08RZ019	257	1,270	4,080	5,607
	08RZ020	200	720	2,520	3,440
	08RZ021	244	1,440	5,030	6,714
	08RZ022	171	750	2,380	3,301
Dana Lake South Zone	08SZ008	108	420	1,380	1,908
	08SZ010	154	1,020	3,460	4,634
	08SZ013	136	960	3,040	4,136
	08SZ015	166	780	3,270	4,216
	08SZ016	139	900	2,860	3,899
	08SZ017	141	830	2,820	3,791
	08SZ018	181	1,060	3,370	4,611
	08SZ019	95	880	2,330	3,305
	08SZ020	86	870	2,590	3,546
	08SZ021	400	2,230	6,880	9,510
	08SZ030	81	540	1,720	2,341
	08SZ031	101	860	2,970	3,931
Dana Lake Road Zone	08RZ039	68	480	1,520	2,068
	08RZ040	123	940	2,870	3,933
	08RZ041	117	740	2,440	3,297
Dana Lake South Zone	08SZ048	138	780	2,420	3,338
	08SZ049	173	1,540	4,370	6,083
	08SZ050	135	740	2,580	3,455
	08SZ051	186	1,150	3,830	5,166
	08SZ054	89	690	2,210	2,989
	08SZ055	109	510	1,870	2,489
	08SZ058	134	960	2,680	3,774

(table continues on next page)

Area	2008 Samples	Au (ppb)	Pt (ppb)	Pd (ppb)	Pt+Pd+Au (ppb)
Dana Lake Central Zone	08CZ003	107	720	2,140	2,967
	08CZ004	430	2,550	6,390	9,370
	08CZ005	132	520	1,340	1,992
	08CZ009	151	990	2,670	3,811
	08CZ012	120	480	1,720	2,320
	08CZ014	79	630	2,160	2,869
	08CZ015	190	990	2,900	4,080
	08CZ022	45	720	1,660	2,425

Figure 9.3 2008 Channel Sample of Grid South, Grid Road, and Central Zone



9.5 2016 SURFACE PROGRAM

The program, consisting of geological mapping and mineral prospecting, confirmed the presence of high-grade platinum metal mineralization on the River Valley Extension and expanded the overall footprint of mineralization at the Dana South Zone.

Three of four targeted areas on the River Valley Extension were mapped and sampled by PFN geologists. A grab sample from Target Area 1 returned assay values of 12.60 g/t Pd + Pt from a rusty sulphide zone that extends across the width of the outcrop exposure. Three surface grab samples from Target Area 4 returned Pd + Pt assay values of greater than 1 g/t, with a maximum of 2.44 g/t Pd+ Pt, 0.2% Cu, and 0.05% Ni from mineralized outcrops of melagabbronorite with pegmatitic clinopyroxenite fragments and quartz veins. A grab sample from Target Area 2 returned a Pd + Pt assay value of 1.11 g/t. Target Area 3 was not sampled due to limited access.

Three grab samples from the footwall to Dana South Zone returned assays of greater than 2 g/t Pd + Pt and 0.15% Cu. These three samples were taken from outcrops of River Valley Intrusion along the shores of Dana Lake, approximately 50 m from the east boundary of the Dana South Zone. The area between the outcrop and stripped area is covered, but the indications of high-grade mineralization where sampled suggest that the Dana South Zone could potentially be expanded eastward, or that another mineralized zone may be present.

Table 9.6 summarizes the results of the grab samples.

Table 9.6 2016 Grab Sample Summary

Sample Number	Zone	Easting	Northing	Pd g/t	Pt g/t	Pd+Pt g/t	Au g/t	Cu%	Ni%
20429	RV Ext.	565467	5164103	0.516	0.554	1.070	0.120	0.073	0.060
20426	RV Ext.	565441	5164148	1.540	0.901	2.441	0.020	0.183	0.051
25264	RV Ext.	564562	5165932	0.771	0.334	1.105	0.123	0.201	0.130
RZ2016-33	RV Ext.	565449	5164142	0.612	0.553	1.165	0.019	0.019	0.003
RZ2016-38	RV Ext.	564922	5164616	9.524	3.071	12.595	0.070	0.034	0.025
RZ2016-40	RV Ext.	564922	5164607	0.678	1.294	1.972	0.054	0.149	0.027
TR2-2016	Dana South	555465	5172050	3.536	1.215	4.751	0.158	0.248	0.064
Tr1-2016	Dana South	555482	5172043	0.716	0.264	0.980	0.052	0.082	0.010
LH-2016	Dana South	555588	5172015	3.222	1.138	4.360	0.126	0.150	0.015
RZ2016-30	Dana South	555582	5172030	2.716	0.738	3.454	0.164	0.297	0.026
RZ2016-31	Dana South	555582	5172026	1.854	0.499	2.353	0.123	0.282	0.022

9.6 2017 INDUCED POLARIZATION SURVEY

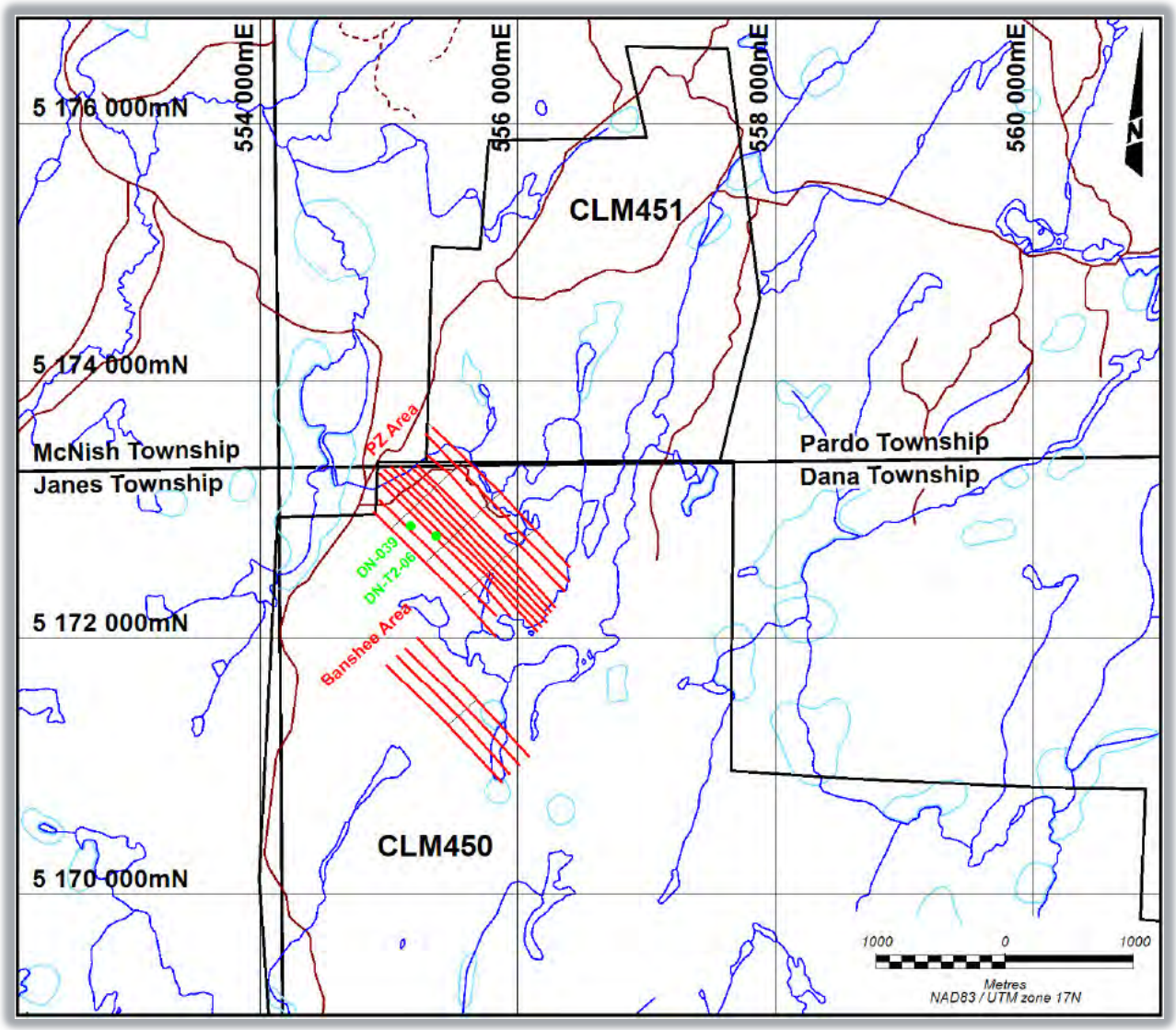
Abitibi Geophysics, based out of Thunder Bay, Ontario, were contracted by NAM, to conduct downhole induced polarization survey (IP) on two holes (DN-039 and DN-T2-06) and a total of 23.55 lineal km of IP survey on two separate grids (PZ and Banshee) on the Project (Figure 9.4).

The data on the two survey grids were acquired over sixteen days June 4, 2017 to June 15, 2017 (***Cole, 2017***). The field data were acquired by one field crew consisting of five members, deploying the IRIS Instruments TIPIX and the IRIS Elrec-PRO 10 channel receiver. A team in the Abitibi Geophysics office in Thunder Bay completed the QC review and interpreted the results. The downhole survey data was acquired on June 18, 2017 with a field crew of two.

Following an interpretation of the pseudosections and the downhole survey, a total of 40 chargeable sources was interpreted. The chargeable sources are trending primarily NE/SW, which would be a similar trend displayed at the Pine Zone. Sixteen of the sources are near surface on the PZ grid and six are near surface on the Banshee grid. All near surface sources could be ground truthed with prospecting and stripping.

The eighteen sources were deeper and would require drilling to evaluate, thirteen from the PZ grid and five from the Banshee grid. Most of the targets are in the 150 to 200 m vertical depth with a few targets being 400 m vertical in depth.

Figure 9.4 2017 IP Survey Grid

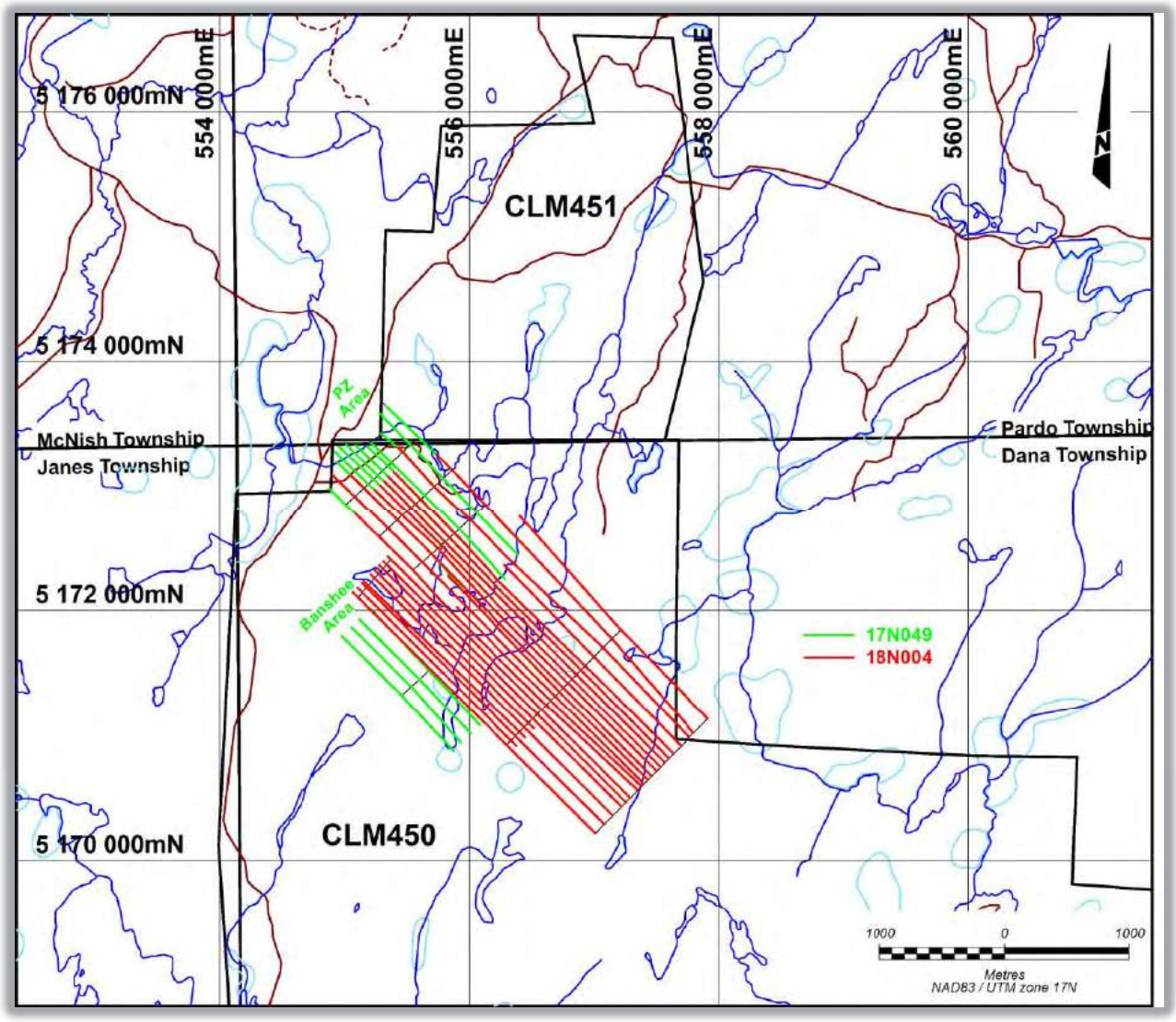


9.7 2018 INDUCED POLARIZATION SURVEY

Abitibi Geophysics, based out of Thunder Bay, Ontario, were contracted by NAM, to conduct a total of 63.79 lineal km of induced polarization survey (IP) on the Project (Figure 9.5).

The data were acquired over twenty-four days from January 20, 2018 to February 13, 2018 (***Cole, 2018***). The field data were acquired by one field crew consisting of five members, deploying the IRIS Instruments TIPIX and the IRIS Elrec-PRO 10 channel receiver. A team in the Abitibi Geophysics office in Thunder Bay completed the QC review and interpreted the results.

Figure 9.5 2018 IP Survey Grid



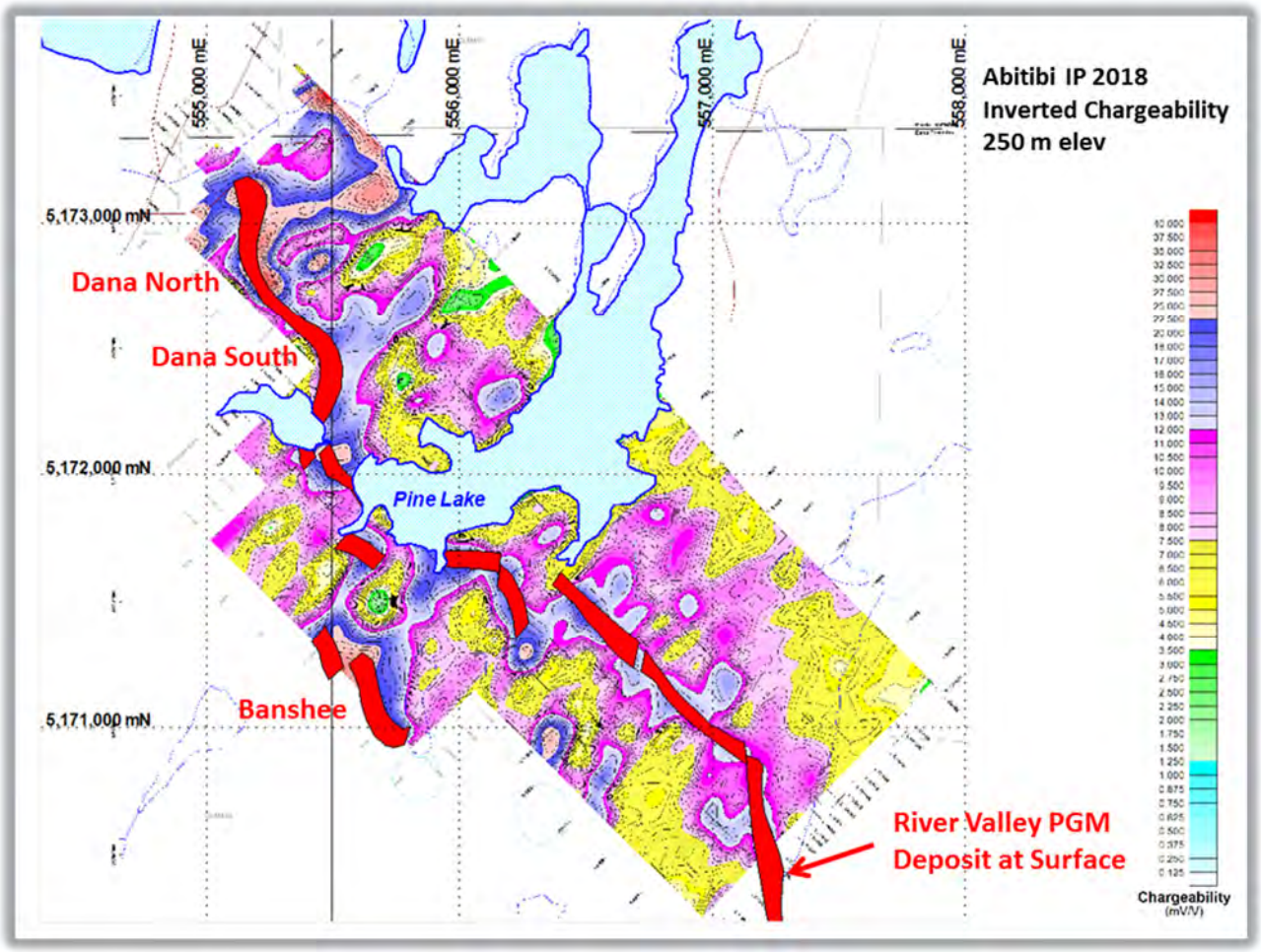
Source: Cole, 2018

Following a detailed interpretation of the pseudosections and with the help of the recovered VOXI vertical sections, a total of 46 chargeable sources were interpreted. The chargeable sources are trending primarily NE/SW, which would be a similar trend displayed at the Pine Zone. Fifteen of the sources were near surface and could be ground truthed with prospecting and stripping.

The 27 sources were deeper and would require drilling to evaluate. Most of the targets are in the 200 to 300 m vertical depth with a few targets being 400 m vertical in depth.

Figure 9.6 is an interpretation of the chargeability at around the 250 m elevation, which is approximately 75 m below surface. The areas in the footwall with chargeability above 12000 mV/V are of interest.

Figure 9.6 2018 Chargeability Results



10 DRILLING

10.1 DIAMOND DRILLING PRIOR TO 2012

NAM has conducted diamond drilling on the Property since 2000. A summary of these activities up to the end of 2012 conducted by NAM and/or their joint venture partners is presented in Table 10.1.

Table 10.1 Diamond Drill Summary Prior to 2006

Year	Company	Activities
2000	PFN/Amplats	From February to March, Phase 1 drilling program included a total of 2,000 m of drilling in 13 holes with focus on the mineralization at the Dana Lake Area. Drilling by NDS Drilling, NQ core size.
		From June to July, Phase 2 drill program entailed of total of 2,820.8 m of drilling in 14 holes with focus on the mineralization at the Dana Lake Area. Drilling by NDS Drilling, NQ core size.
		In September, Phase 3 drill program consisted of 1,958.5 m in drilling in 10 drillholes at the Dana Lake Area and 3 holes at Lismer's ridge (13 holes total). Drilling by NDS Drilling, NQ core size.
2001	PFN/Amplats	From February to July Phase 4 drilling commenced; a total of 16,027 m drilled in 98 holes. Drilling by NDS Drilling, NQ core size.
2002	PFN/Amplats	From period of November to August, Phase V drilling resulted in a total of 83 holes with 22,319 assay samples from Lismer Ridge, Dana South, and Banshee Lake. Drilling by Bradley Brothers, NQ core size.
2004	PFN/Amplats	From period November 2002 to May 2004, Phase VI drill program consisting of a total of 44,131 m of drilling from 208 holes at Dana Lake, Banshee Lake, Lismer Ridge, MacDonalds, Varley, Azen Creek, Razor, Jackson's Flat, and Pardo. Drilling by Bradley Brothers, NQ core size.
2005	PFN/Amplats	From period September to March Phase VII drilling consisted of 20,516.4 m of drilling in 103 holes with focus on Lismer Extension, Varley, Varley Extension/Azen, Pardo, Jackson's Flat, and Casson. Drilling by Bradley Brothers, NQ core size.
2005	PFN/Amplats	From period October to November, Phase VIII drill program consisted of 3,681.15 m drilled in 20 holes with focus on Spade Lake, Jackson's Flat South, Varley Extension/Azen Drop Zone, and Casson. Drilling by Bradley Brothers, NQ core size.
2011-2012	PFN	From period April 2011 to January 2012, Phase IX drill program consisted of 12,767 m drilled in 46 holes with focus on Dana North and Dana South. Drilling by Foraco Drilling, NQ core size,

The information summarized in Table 10.1, totaling 689 drillholes (154,972 m), was ~~reviewed and~~ disclosed by the QP in the 2012 technical report (***McCracken, 2012***). The information was sourced from various internal company reports and press releases are available from NAM's website.

Ten percent of this ~~The~~ data from these diamond drill programs was validated against the original drill logs and assay certificates and were deemed to be suitable for the use in the resource estimate.

10.2 DIAMOND DRILLING

The 2015 drilling program carried out on the Property commenced on January 28, 2015 and was completed on February 2, 2015. Jacob and Samuel Drilling Ltd., based out of Sudbury, Ontario, was contracted to carry out the diamond drill program using a hydraulic VD 5000 diamond drill rig. A total of two holes were drilled totalling 474 m of NQ sized core. Dip tests were taken approximately every 50 m with a REFLEX tool.

The 2016 drilling program was carried out on the Property in the fall of 2016. Jacob and Samuel Drilling Ltd., based out of Sudbury, Ontario, was contracted to carry out the diamond drill program using a hydraulic VD 5000 diamond drill rig. A total of five holes were drilled totalling 1,267 m of NQ sized core. Dip tests were taken approximately every 50 m with a REFLEX tool.

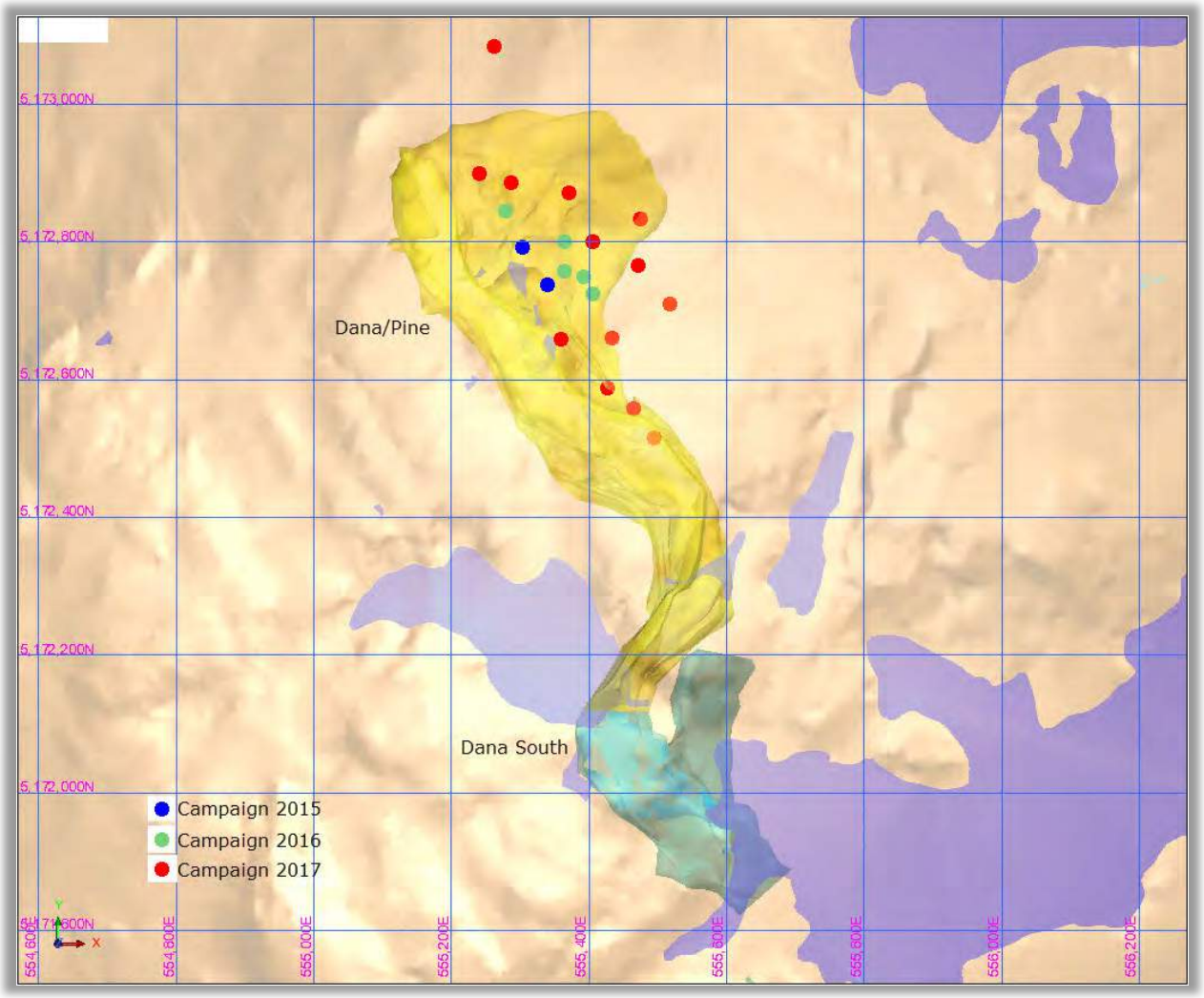
The 2017 drilling program carried out on the Property commenced in June 2017 and was completed in September 2017. Jacob and Samuel Drilling Ltd., based out of Sudbury, Ontario, was contracted to carry out the diamond drill program using a hydraulic VD 5000 diamond drill rig. A total of 14 holes were drilled totalling 3,728 m of NQ sized core. Dip tests were taken approximately every 50 m with a REFLEX tool.

Table 10.2 summarizes the collars for the drillholes completed between 2015 and 2017. Figure 10.1 displays the location of the drillholes completed between 2015 and 2017.

Table 10.2 2015 to 2017 Drilling Collar

Borehole ID	Zone	UTM East	UTM North	Elevation	Azimuth	Dip	Length (m)
DN-15-001	Dana North	555339	5172738	323	325	-60	258
DN-15-002	Dana North	555304	5172792	321	325	-60	216
DN-16-T2-03	Pine	555278	5172845	319	325	-60	171
DN-16-T2-06	Pine	555364	5172800	326	325	-60	249
DN-16-T2-10	Pine	555393	5172750	327	325	-60	281
DN-16-T2-11	Pine	555406	5172724	325	325	-60	298
DN-16-T2-13	Pine	555364	5172757	324	325	-60	268
PZ-17-01	Pine	555475	5172833	325	325	-60	229
PZ-17-02	Pine	555471	5172765	325	325	-60	278.04
PZ-17-03	Pine	555370	5172871	325	325	-60	182
PZ-17-04	Pine	555262	5173084	325	325	-50	325
PZ-17-05	Pine	555405	5172800	325	325	-60	251
PZ-17-06	Pine	555364	5172800	325	325	-50	212
PZ-17-07	Pine	555286	5172886	325	325	-60	149.59
PZ-17-08	Pine	555240	5172899	325	325	-60	124.2
T3-17-01	Dana North	555360	5172659	325	325	-60	282
T3-17-02	Dana North	555427	5172588	325	325	-60	344
T3-17-03	Dana North	555433	5172660	325	325	-60	303.37
T3-17-04	Dana North	555494	5172516	325	325	-60	381
T3-17-05	Dana North	555517	5172709	325	325	-60	312
T3-17-06	Dana North	555465	5172558	325	325	-60	356

Figure 10.1 2015 – 2017 Drill Collar Locations



10.3 DRILL RESULTS

Drilling continued to establish continuity between previously-identified mineralized intercepts on the deposit. At shallow to moderate depths, drilling encountered moderate- to high-grade PGM mineralization in most of the holes drilled. Low-grade PGM mineralization ranging 0.5 to 1.5 g/t was encountered over wide intersections in many of the holes ranging 8 to 25 m in length. In some holes, multiple wide low-grade zones were cored (Table 10.3). Figures 10.2 to 10.5 are examples of some to the diamond drill results completed during the 2011 drill program.

Table 10.3 2015 - 2017 Significant Diamond Drill Results

Drillhole	Meterage (m)	Interval (m)	Pd g/t	Pt g/t	Au g/t	3E g/t	Cu %	Ni %
DN-16-T2-06	169 to 187	18	1.90	0.67	0.11	2.68	0.18	0.04
DN-16-T2-10	202 to 222	20	1.44	0.48	0.07	1.99	0.14	0.03
DN-16-T2-11	217 to 234	17	1.37	0.47	0.07	1.91	0.15	0.04
DN-16-T2-13	181 to 184	3	1.56	0.60	0.09	2.25	0.16	0.03
PZ-17-06	170 to 192	22	1.08	0.37	0.06	1.51	0.10	0.02
PZ-17-07	77 to 84	7	0.77	0.25	0.04	1.06	0.06	0.02
PZ-17-08	56 to 70	14	1.30	0.48	0.08	2.01	0.15	0.03
T3-17-01	193 to 202	9	1.11	0.37	0.08	1.56	0.14	0.32
T3-17-02	288 to 299	8	1.00	0.33	0.07	1.41	0.17	0.39
T3-17-03	262 to 279	17	0.81	0.26	0.05	1.12	0.11	0.03
T3-17-04	4 to 32	28	1.77	0.57	0.11	2.45	0.11	0.02
T3-17-04	37 to 41	4	2.35	0.83	0.13	3.30	0.19	0.04
T3-17-04	348 to 355	7	1.15	0.39	0.09	1.64	0.11	0.02
T3-17-06	331 to 334	3	0.21	0.11	0.02	0.34	0.02	0.02

Figure 10.2 17-20 Cross-Section

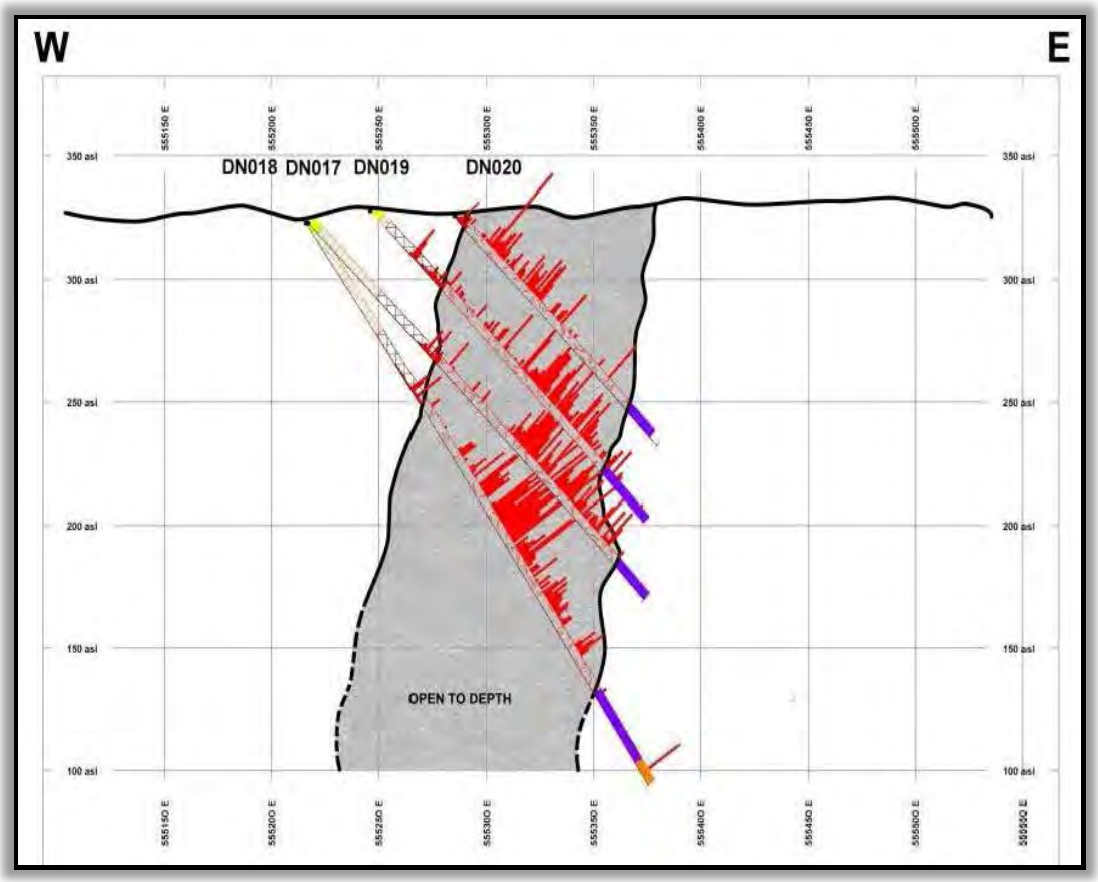


Figure 10.3 26-29 Cross-Section - F

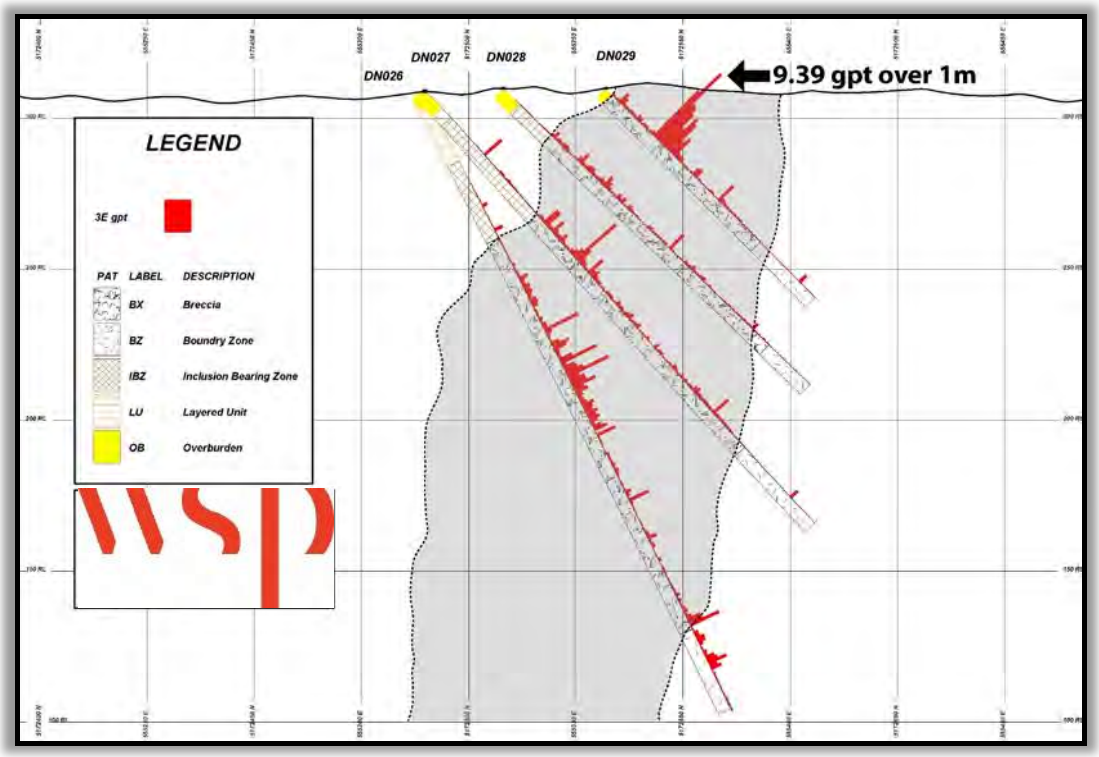


Figure 10.4 DS1 and 2 Cross-Sections

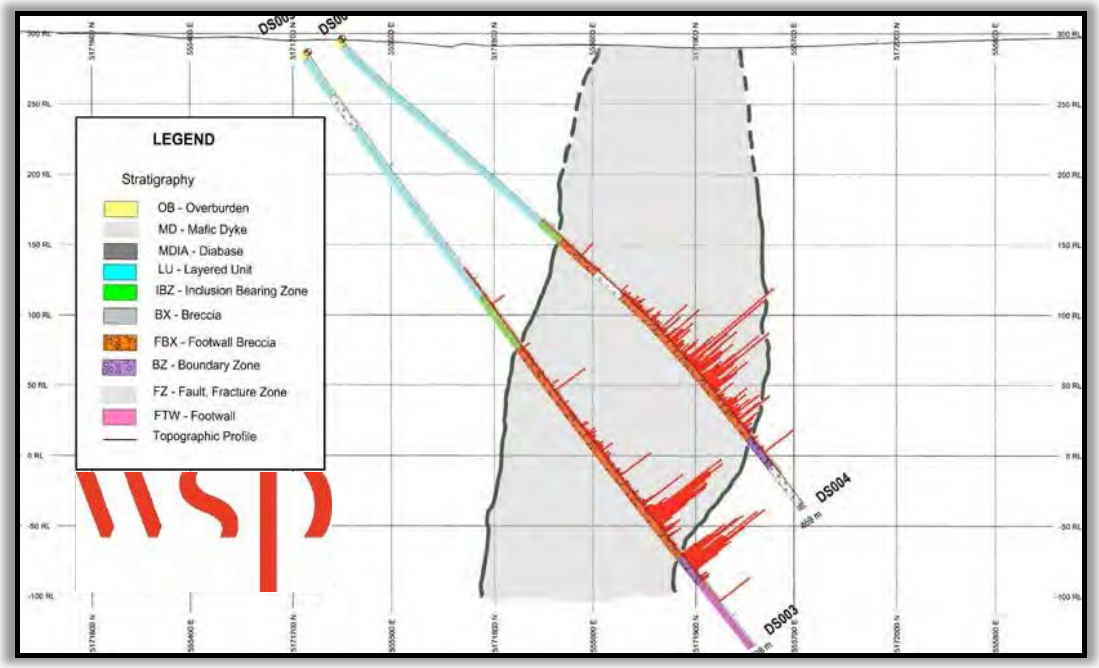
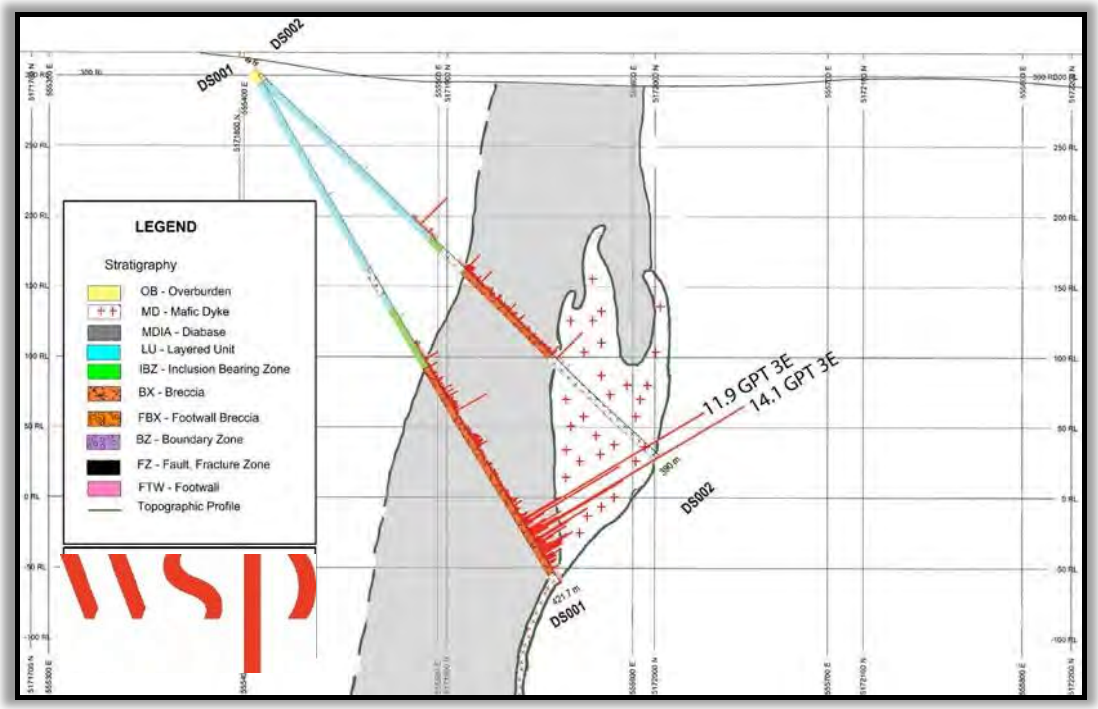


Figure 10.5 DS3 and 4 Cross-Sections



11 SAMPLE PREPARATION, ANALYSES, AND SECURITY

11.1 CORE LOGGING AND SAMPLING PROCEDURES

Core logging and sampling were completed on a property rented in the village of River Valley by NAM. The sampling procedure was as follows:

- Diamond drill core was delivered to the core logging facility on a daily basis.
- The sections of core to be sampled were delimited with a grease pencil.
- The core was photographed and racked for sampling.
- The core was split using a diamond saw by a technician. Half the core was sent out for assay, the other half kept for reference.
- Sampling was done by a technician. Each sample was placed in a plastic bag with appropriately numbered tag corresponding to a sampling interval also placed in the bag. That same number was also printed on the outside of the bag as a cross-check. The samples were then put in rice bags and shipped to SGS sample preparation facilities in Sudbury, Ontario.
- One standard and one blank were inserted into the sample stream every 40 samples.
- As an additional QA/QC procedure, a second split was prepared from the pulp by the primary laboratory, at a 20-sample interval.
- The remaining half of the core was stored in a tagged core box indicating hole and box numbers as well as downhole meterage. The entire core from this phase of drilling was stored temporarily at the River Valley rental property.
- The core was then transported and laid down in NAM's core storage yard in River Valley (Figure 11.1).

Figure 11.1 Core Storage Facility

11.2 SAMPLE PREPARATION

When sufficient samples have been accumulated, all samples, including standards and blanks, are put into rice bags and shipped to the SGS sample preparation facilities in Sudbury, Ontario. SGS has geochemical accreditation that conforms to the requirements of CAN-P-1559 and CAN-P-4E (International Organization for Standardization (ISO) 17025:2005).

The following is a brief description of the sample preparations carried out on the samples submitted (prep code CRU25 and PUL45).

- Samples were sorted and dried.
- Once dried, less than 3.0 kg of the sample was crushed to a 90% passing at 2 mm.
- The sample was split to get a 250 g sample for pulverizing.
- Two-hundred and fifty grams of the crushed sample was then pulverized with chromium steel to allow 85% passing of 75 µm.

11.3 SAMPLES ANALYSES

All samples were assayed for platinum, palladium, gold, copper and nickel, and a 33-element inductively coupled plasma (ICP) suite. Concentrations of platinum, palladium, and gold were determined using standard lead fire assay (FAI313), followed by dissolution with aqua-regia, and measurement with an ICP finish. Lower and upper limits of each element are listed below within a 30 g sample (***SGS, 2012***):

- Gold 1 ppb – 10,000 ppb;
- Platinum 10 ppb – 10,000 ppb;
- Palladium 1 ppb – 10,000 ppb.

Remaining elements were determined using ICP methods using a two-acid digest (a combination consisting of nitric acid and hydrochloric acid). Once the material was digested, the solution was analyzed by inductively coupled plasma-atomic emission spectroscopy (ICP-AES). Two-acid digestion methods were the weakest of the digestions and silicate material was not affected, resulting in partial results for most elements (***SGS 2012***).

The ICP14B method used was an aqua-regia digest and is recommended for all samples which contain no organic material and are low in sulphide content. The combination is based on a 3:1 ratio of hydrochloric acid to nitric acid (***SGS, 2012***).

Concentrations of copper-nickel were determined by ICP methods with detection limit of 0.5 ppm for copper and 1 ppm for nickel; the upper limit for both copper and nickel is 1%.

At no time was a NAM employee or designate of NAM involved in the preparation or analysis of the samples.

11.4 QA / QC PROGRAM

NAM QA/QC program in 2000 for the Phase 1 drill program consisted of the course reject and pulp duplicates submitted to three analytical laboratories (*Jobin-Bevans, 2000*). A total of 572 pulps and 168 course rejects were analyzed. The laboratories used were XRAL Laboratories in Rouyn-Noranda, Quebec, Accurassay Laboratories in Thunder Bay, Ontario, and Bondar Clegg in Val-d'Or, Quebec which is now known as ALS Minerals. The results from the Pt-Pd-Au pulp and reject assays were within acceptable levels of reproducibility (±25%).

NAM QA/QC program in 2000 for the Phase 2 drill program consisted of the pulp duplicates submitted to Accurassay Laboratories in Thunder Bay (*Jobin-Bevans, 2000*). A total of 296 pulps were analyzed. The results from the Pt-Pd-Au pulp assays were within acceptable levels with an R^2 of 0.91. There was one gold duplicate and four platinum assays that were significantly higher than the original assays.

NAM QA/QC program in 2000 for the Phase 3 drill program consisted of the pulp duplicates submitted to Accurassay Laboratories in Thunder Bay (*Jobin-Bevans, 2000*). A total of 94 pulps were analyzed. The results from the Pt-Pd-Au pulp assays were within acceptable levels of reproducibility (±25%) with only four samples exceeding threshold.

NAM QA/QC program in 2001 for the Phase 4 drill program consisted of the pulp duplicates submitted to Bondar Clegg in Val-d'Or, Quebec which is now known as ALS Minerals (*Lyon and Jobin-Bevin, 2001*). A total of 805 pulps were analyzed. The results from the Pt-Pd-Au pulp assays were within acceptable levels of reproducibility (±25%) with less than 25% of the samples set exceeding the threshold.

NAM continues to maintain a QA/QC program that has been in place since 2002. The QP has reviewed the results of the QA/QC program conducted from 2002 to 2012 (***McCracken, 2012***). The QA/QC program remains unchanged and is summarized below.

- Bulk material from the Property was collected for the purpose of creating internal standards that could be submitted in the sample stream as a quality control measure. Three standards were created:
  - a low-grade (approximately 500 ppb platinum-palladium-gold);
  - a mid-grade (approximately 900 ppb platinum-palladium-gold;
  - a high-grade (approximately 2,000 ppb platinum-palladium-gold) sample.
- In addition to the pulp blank, a coarse blank was submitted for every 20 samples to test sample preparation and for contamination.
- One standard and one blank were inserted every 40 samples into the sample stream. These standards were manufactured from River Valley material using carefully chosen sections of NAM's drill core. The standards were prepared for use prior to drilling. Five samples of each standard were sent to five separate accredited laboratories for a round-robin analysis. The mean value for each standard was determined to be the mean value between the five laboratories.
- The geologist would mark on the core where and what type of reference material was to be inserted. The insertion of the material into the sample steam was completed by a technician.
- As an additional QA/QC procedure, a second split was prepared from the pulp by the primary laboratory at a 20-sample interval. This split was sent to a second lab (Activation Laboratories Ltd. (Actlabs)) where a check assay was done.

The 2002 Phase 5 program included 1,134 duplicates and 96 standards inserted into the sample stream. The results from the Pt-Pd-Au pulp duplicates assays were within acceptable levels with an R^2 of 0.90 and 0.98 depending on the element. The results of the standards were all within ± 2 Standard Deviations (*Jobin-Bevin and Lyon, 2002*).

The 2004 Phase 6 program included 13 duplicates and 63 standards inserted into the sample stream. The results from the Pt-Pd-Au pulp duplicates assays indicated there was an issue duplicating the results at low grades. Gold had four samples that exceeded the 25% threshold, yet three of the samples have grades less than 50 ppm (Figure 11.2). Only two platinum duplicates exceeded the 25% threshold (Figure 11.3), yet all thirteen duplicates of palladium exceeded the 25% threshold (Figure 11.4). NAM addressed the issue with SGS (correspondence with SGS, February 2003) and all the samples were re-run using new equipment. The results of the standards were all within ±2 Standard Deviations and have acceptable accuracy.

Figure 11.2 Phase 6 Gold Duplicate

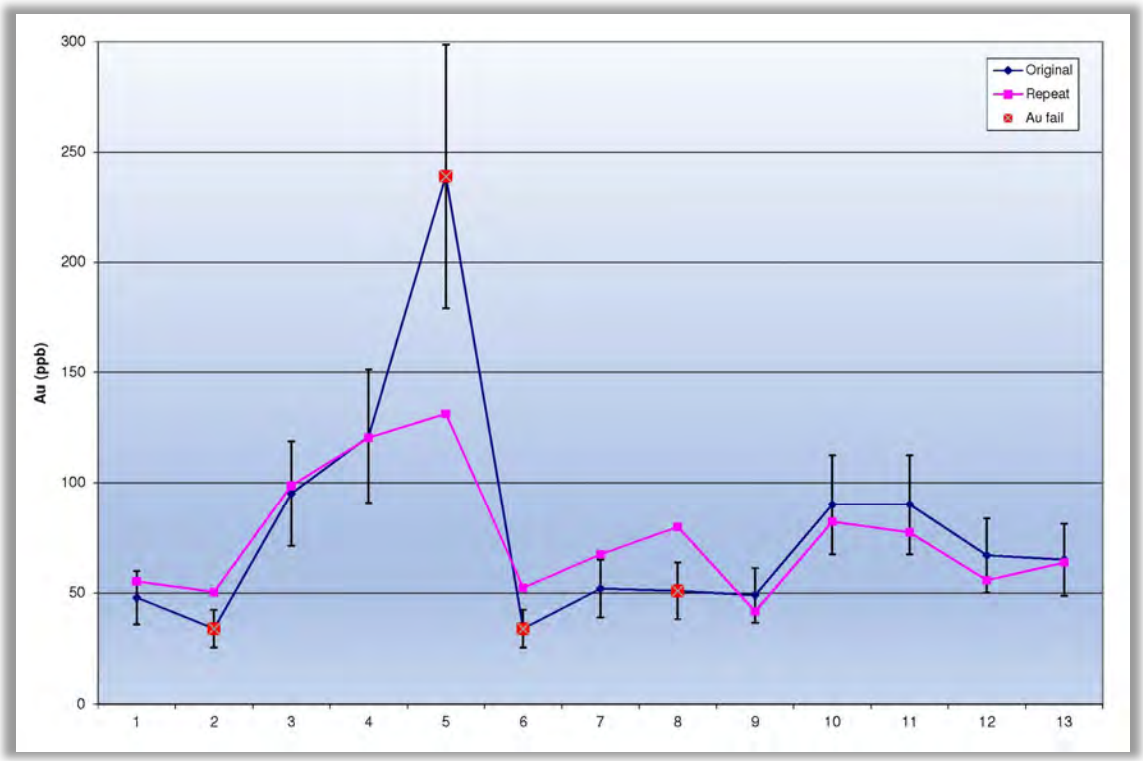


Figure 11.3 Phase 6 Platinum Duplicate

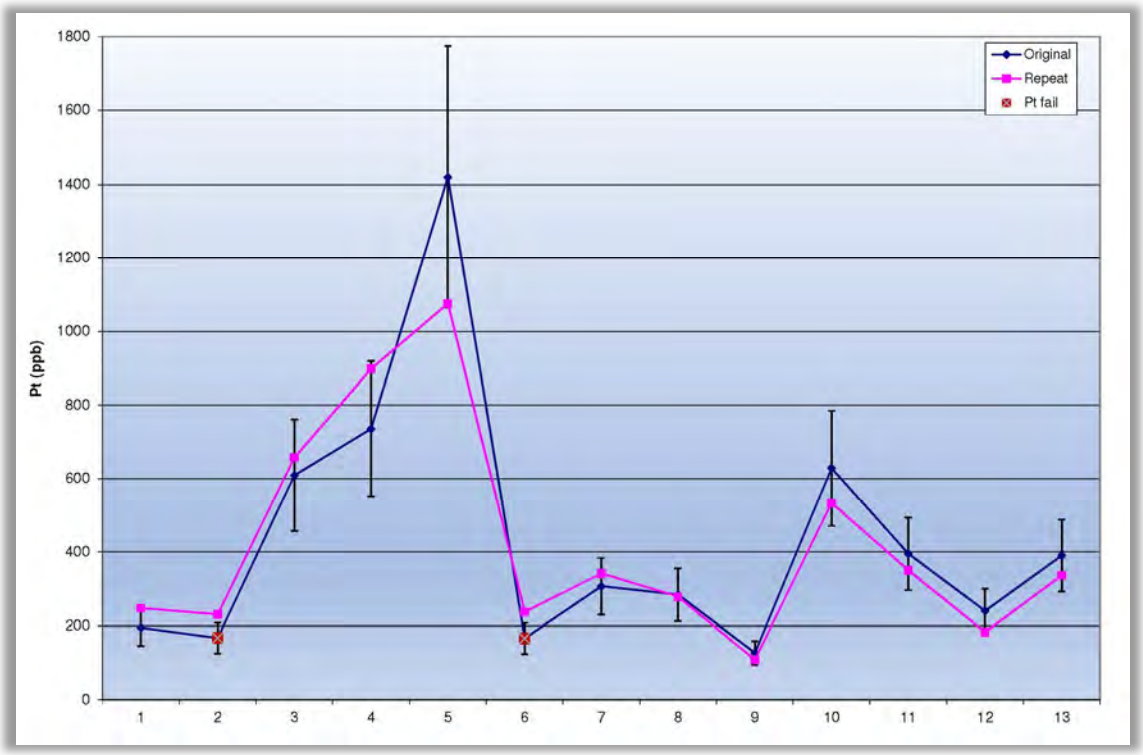
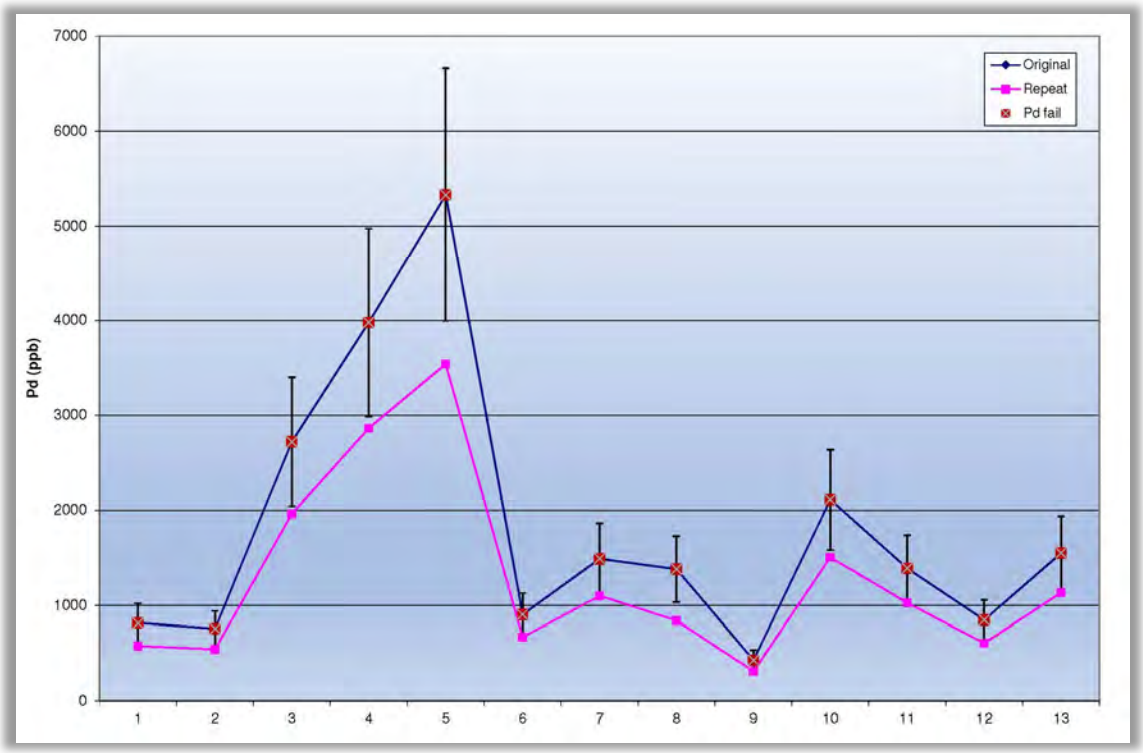


Figure 11.4 Phase 6 Palladium Duplicate



The 2005 Phase 7 program includes 595 check assays, 289 core duplicates, 589 pulp duplicates, and 309 standards (*Kelso, 2005*). The results from the Pt-Pd-Au core and pulp duplicates assays indicated that there continued to be an issue duplicating the results at low grades. The results of the standards were primarily within ±2 Standard Deviations and have acceptable accuracy.

The 2005 Phase 8 program includes 156 check assays, 89 core duplicates, 170 pulp duplicates and 265 standards. The results from the Pt-Pd-Au core and pulp duplicates assays indicated that there continued to be an issue duplicating the results at low grades. The results of the standards were primarily within ±2 Standard Deviations with only seven samples failing and being re-assayed.

The results from the 2011 Phase 9 program are disclosed in a previous technical report (*McCracken, 2012*). Table 11.1 summarizes the results.

Table 11.1 2011 QA/QC Results

Standard	Sample Count	Out of Control Results
RV-1 Pd	71	5
RV-1 Pt	71	5
Rv-1 Au	71	6
RV-2 Pd	74	6
RV-2 Pt	74	4
Rv-2 Au	74	5
RV-3 Pd	70	1
RV-3 Pt	70	4
Rv-3 Au	70	2
Pd Blank	214	47
Pt Blank	214	1
Au Blank	214	8

For the 2015 to 2018 drill programs, a summary of the QA/QC results is provided in Table 11.2. In general, the Standards all performed within acceptable limits. The results for RV2-Au are bias low, yet still within the specification of the material. The results for the RV3-Au should be reviewed as in the latter half of the program, the results are skewed. The QP does not consider the results for RV3-Au to be an issue as the values are generally less than 20 ppb. The palladium blanks display a significant variance during the 2015 program. The issues were addressed with the laboratory and there was a marked improvement in the results.

Table 11.2 2015-2018 QA/QC Results

Standard	Sample Count	Accuracy (%)	Precision (%)	Out of Control Results
RV-1 Pd	24	-0.98	2.47	0
RV-1 Pt	24	-0.31	6.59	0
Rv-1 Au	24	-2.49	6.61	0
RV-2 Pd	21	-0.87	4.19	0
RV-2 Pt	21	1.43	8.4	1
Rv-2 Au	21	-12.04	6.65	1
RV-3 Pd	22	3.56	4.91	1
RV-3 Pt	22	-3.87	8.25	1
Rv-3 Au	22	6.41	5.68	4
Pd Blank	68	N/A	N/A	5
Pt Blank	68	N/A	N/A	0
Au Blank	68	N/A	N/A	0
Pd Check	142	N/A	N/A	4
Pt Check	142	N/A	N/A	2
Au Check	142	N/A	N/A	4

Figures 11.5 to 11.18 are the charts for the 2015-2018 QA QC program.

Figure 11.5 RV1-Palladium Standard

Figure 11.6 RV1-Platinum Standard

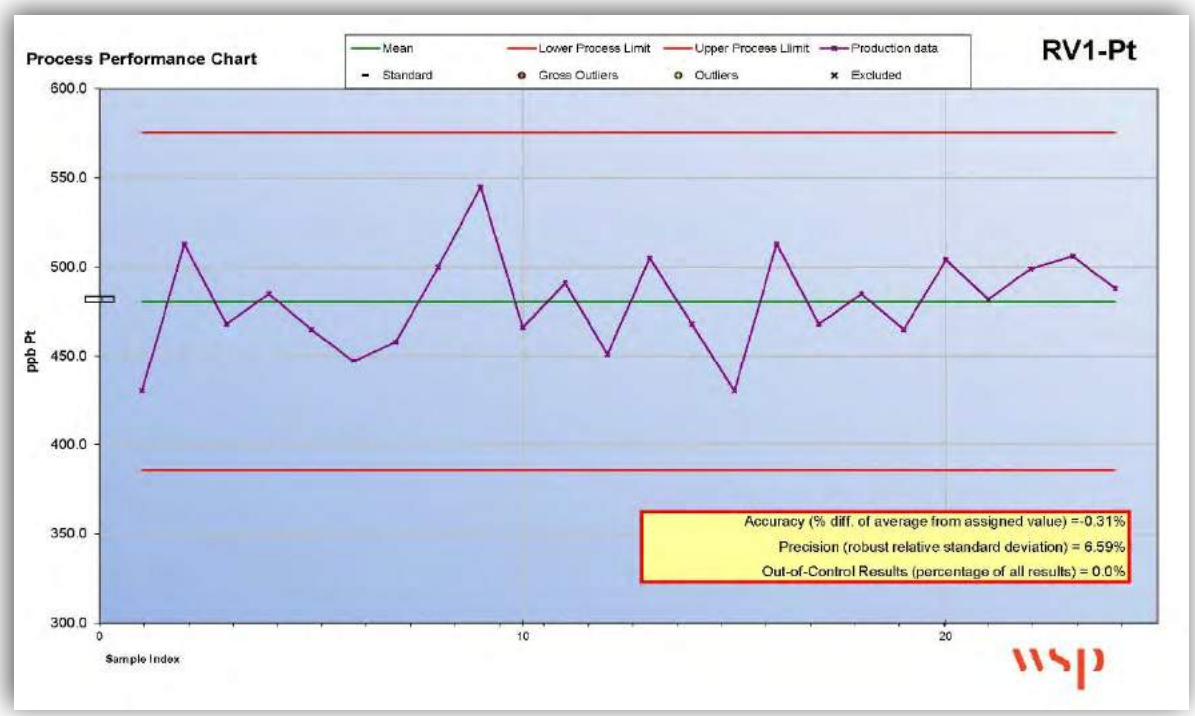


Figure 11.7 RV1-Gold Standard

Figure 11.8 RV2-Palladium Standard

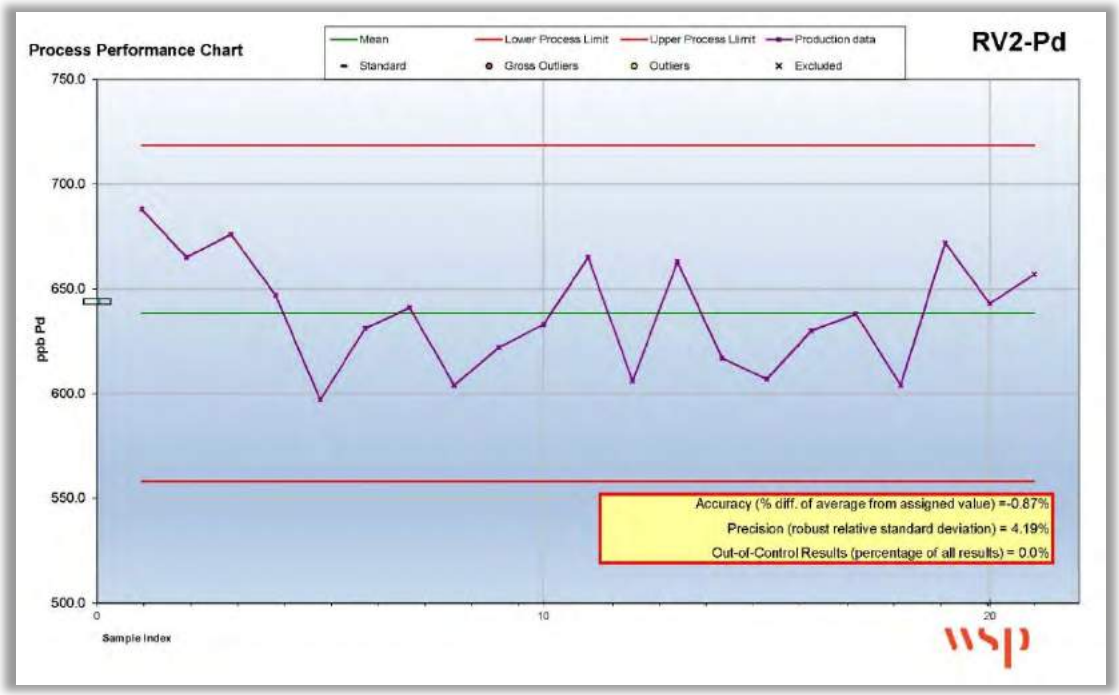


Figure 11.9 RV2-Platinum Standard

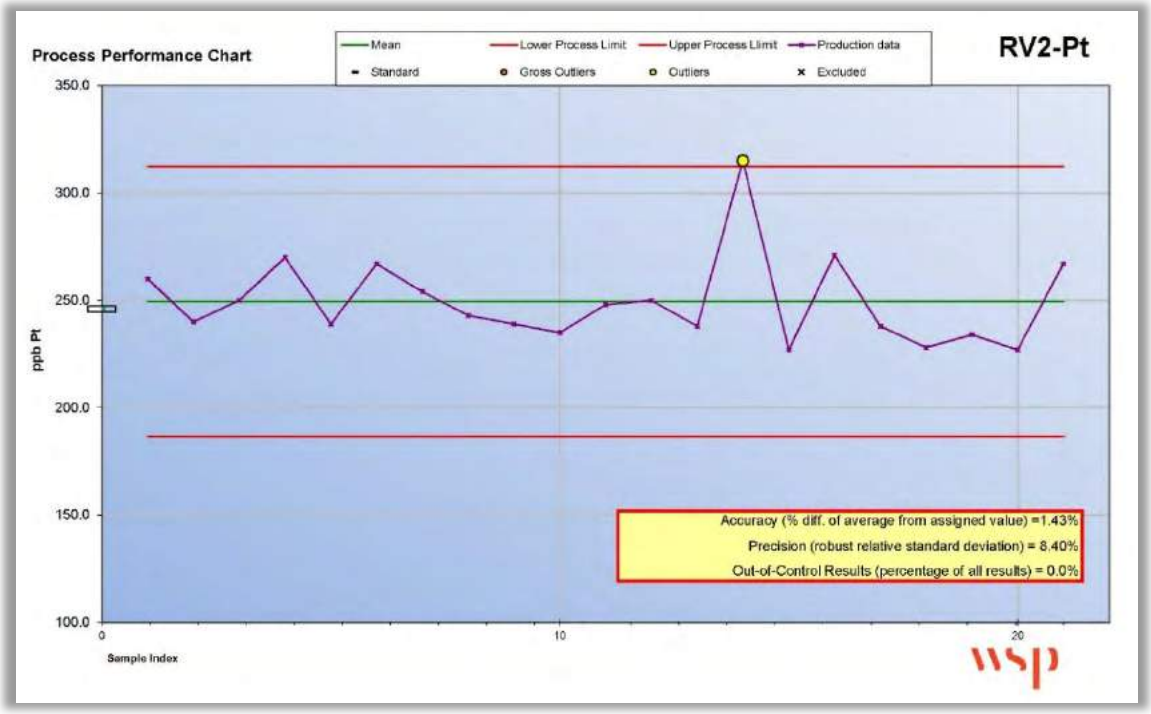


Figure 11.10 RV2-Gold Standard

Figure 11.11 RV3-Palladium Standard

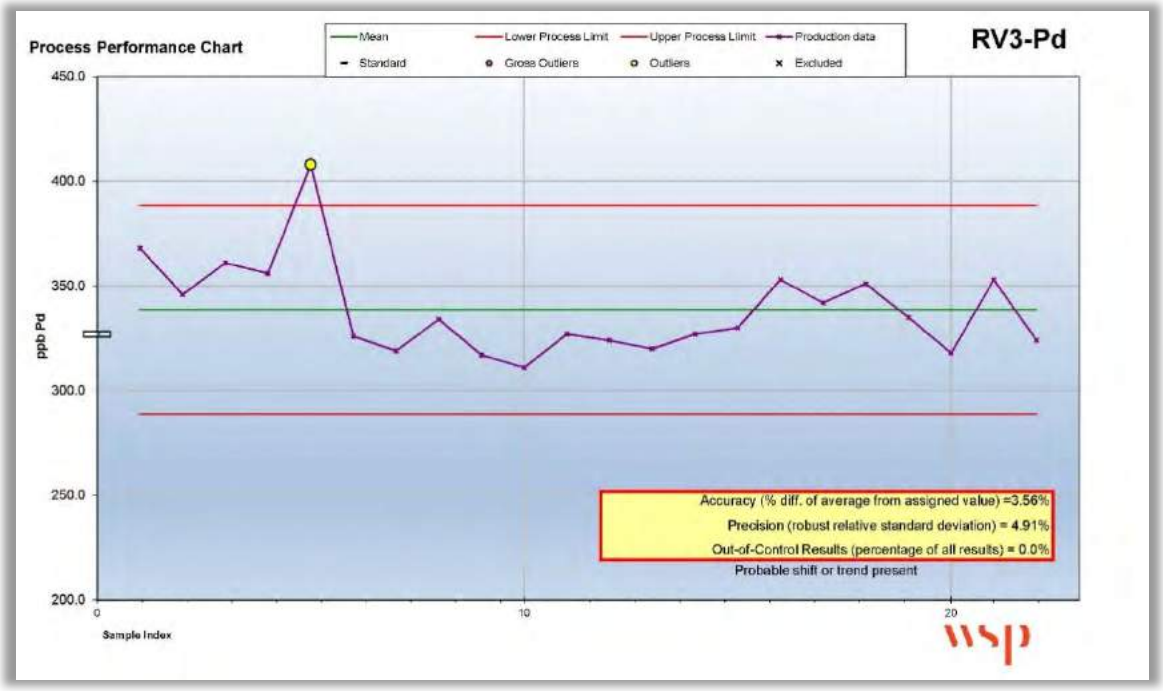


Figure 11.12 RV3-Platinum Standard

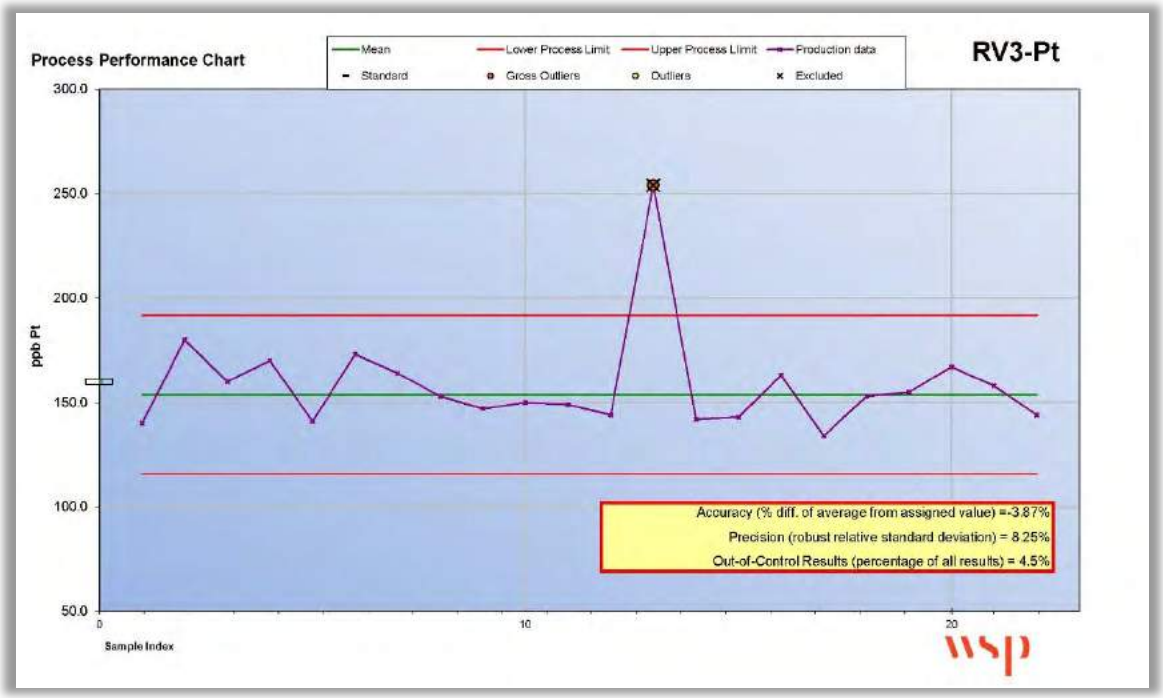


Figure 11.13 RV3-Gold Standard

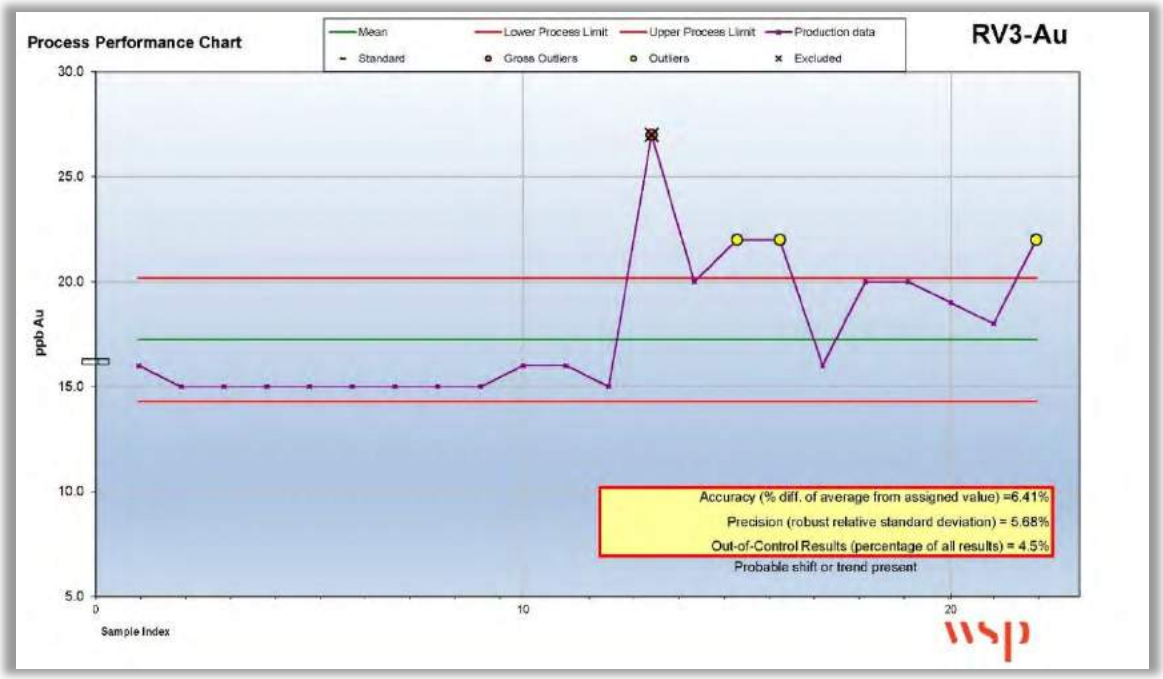


Figure 11.14 Palladium Blank

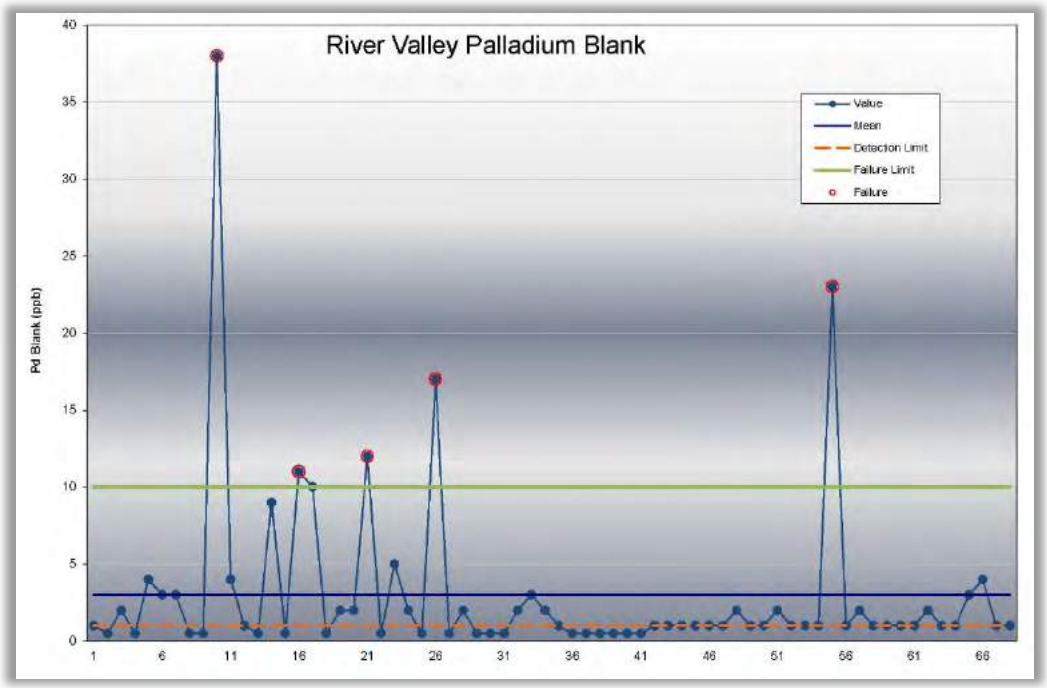


Figure 11.15 Platinum Blank

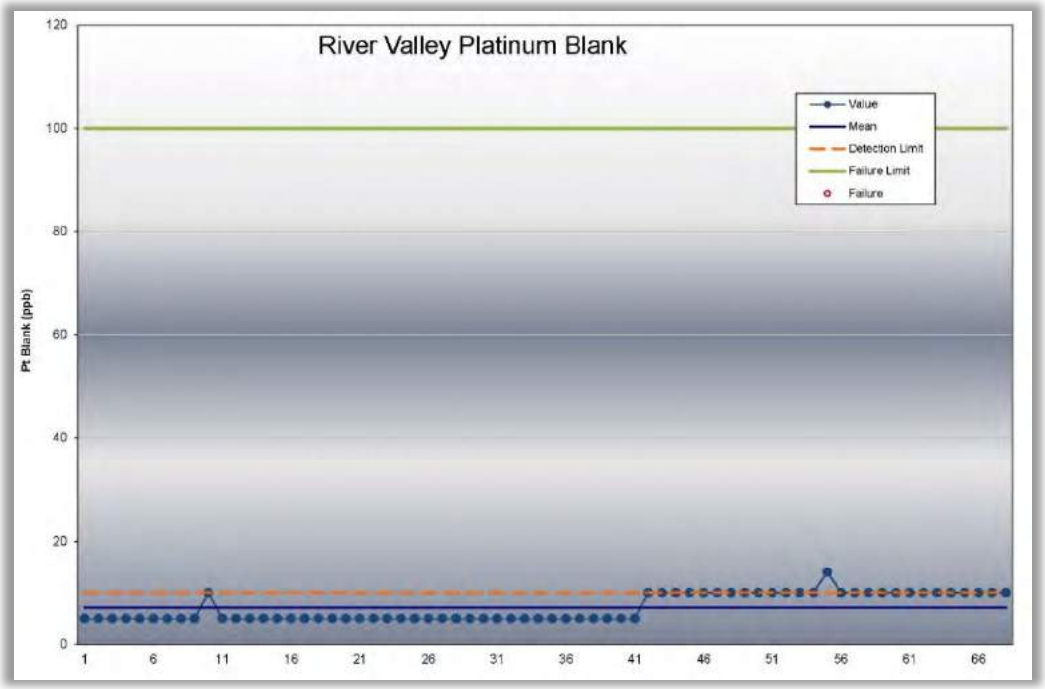


Figure 11.16 Gold Blank

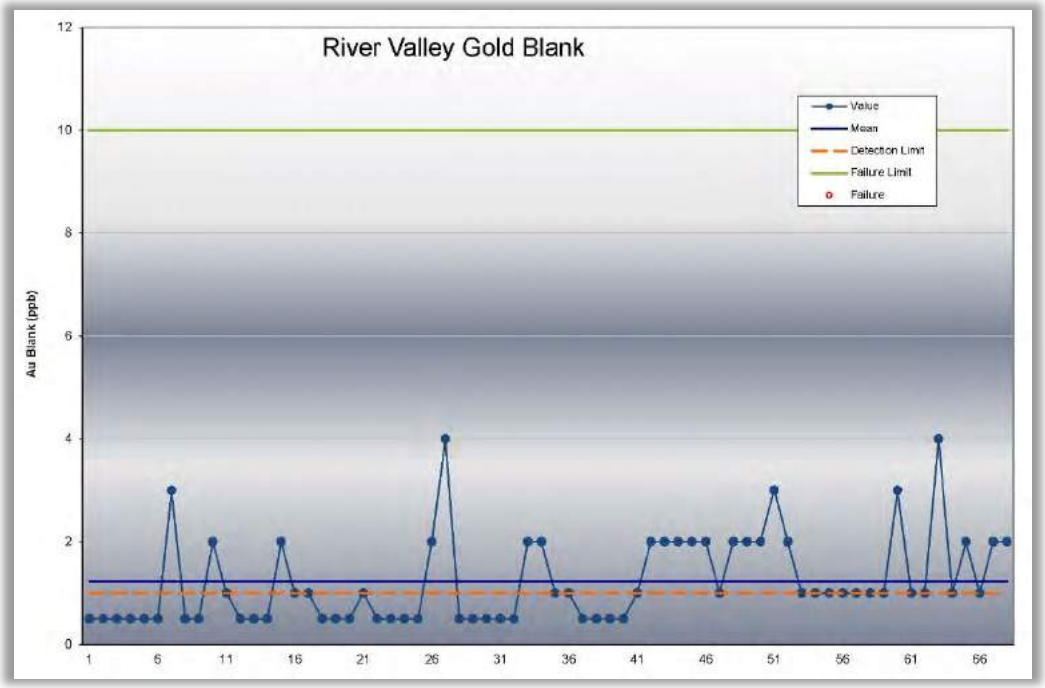


Figure 11.17 Palladium Check

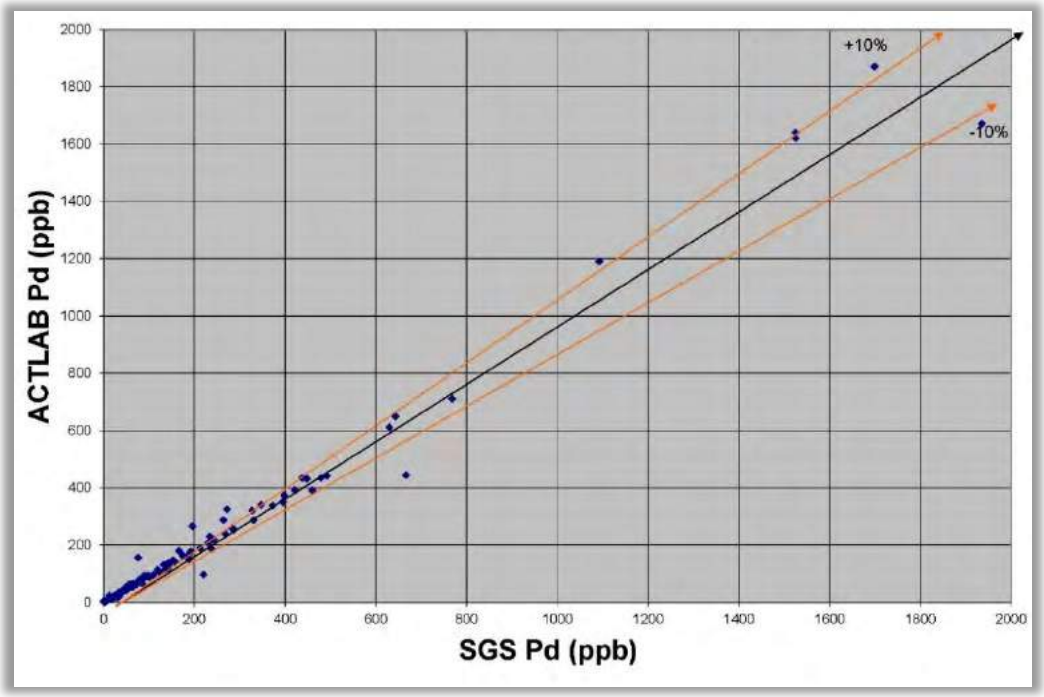
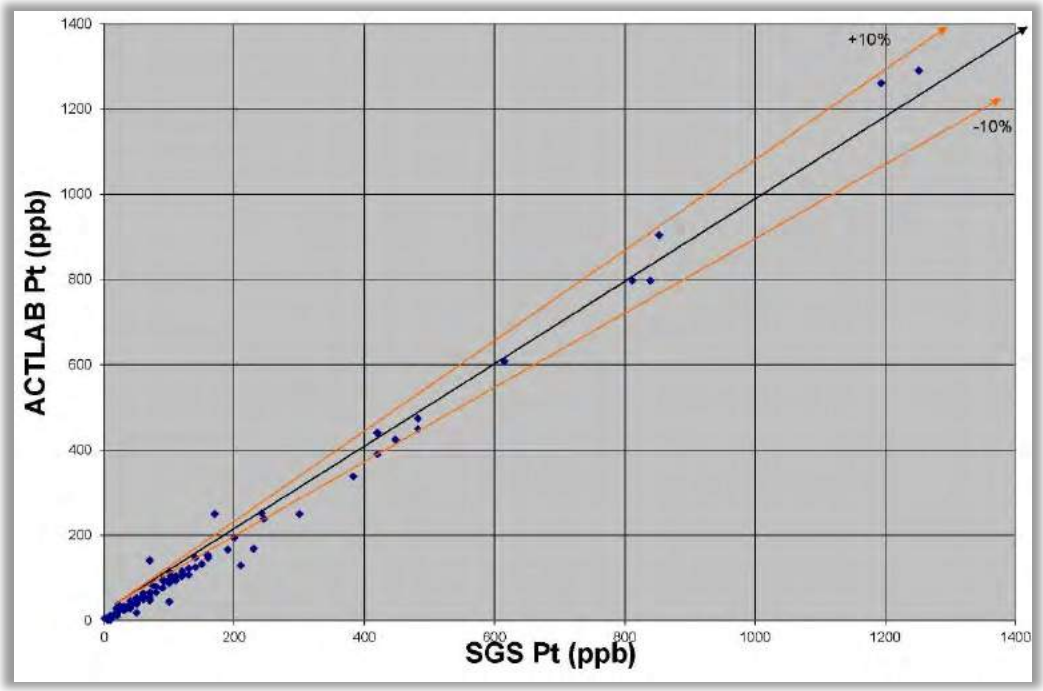


Figure 11.18 Platinum Check



11.5 QP'S OPINION

It is the QP's opinion that the sample preparation, analytical procedures, and QA/QC program meet industry standards and support the resource estimation.

12 DATA VERIFICATION

The QP carried out an extensive validation of the data set in 2011. The validation of the data files in 2011 was completed on 60 of the 596 drillholes in the total database, or 10% of the dataset. The validation was carried out on the diamond drillhole data files against the original drillhole logs and assay certificates.

Data verification was completed on collar coordinates, end-of-hole depth, downhole survey measurements, from and to intervals, assay sample intervals, and analytical results. No errors were identified in the collar, survey, or lithology files.

The assay file contained several drillhole entries where the assays for copper were in the nickel field, and the assays for zinc were in the copper field. This represents less than 0.1% errors within the entire assay dataset. Corrections were made to the dataset. All assays entered as zeros were converted to half the detection limit and were not considered to be errors in the data.

The QP carried out an additional validation of the diamond drillhole data files against the original drillhole logs and assay certificates for the holes completed between 2015 and 2017.

Data verification was completed on collar coordinates, end-of-hole depth, downhole survey measurements, from and to intervals, assay sample intervals, and analytical results. No errors were identified in the collar, survey, assay, or lithology files.

The drillhole data was imported into the Surpac™ program, which has a routine that checks for duplicate intervals, overlapping intervals, and intervals beyond the end-of-hole.

The QP has verified the location of drillhole casings in the field using a Garmin GPSMap 60Csx. The locations inspected included Dana North / Pine, Dana South and River Valley Extension. All collars inspected were within 5 m of the XY coordinates stated on the drill logs.

The QP has visually inspected the drill core from several of the zones against the drill logs.

12.1 QP'S OPINION

It is the QP's opinion that the data is of sufficient quality to support the resource estimation.

13 MINERAL PROCESSING AND METALLURGICAL TESTING

13.1 2012 MINERALOGICAL ANALYSIS

NAM completed a mineralogical analysis in October 2012 (***Gu, 2012)***. The analysis was completed by SGS of Lakefield and is independent of NAM.

A mineralogical analysis was completed on two composites created from existing drill core from Dana North and Dana South. The analysis focused on modal analysis, nickel element deportment, grain size distribution, mineral association and liberation and electron microprobe analysis.

The mineral distribution of the Dana North composite is comprised of ~54 wt% of amphibole/pyroxene, 25 wt% of plagioclase, 12 wt% of chlorite, 5% of quartz, 2% of micas and 1% of potassium-feldspar. The chalcopyrite content is 0.48 wt%, and the nickel-sulphides content is 0.03 wt%. The pyrite and pyrrhotite account for 0.13 wt% and 0.28 wt% respectively.

The mineral distribution of the Dana South composite is comprised of ~ 54 wt% of amphibole/pyroxene, 22 wt% of plagioclase,13 wt% of chlorite, 5% of quartz, 3% of micas and 1% potassium-feldspar. The chalcopyrite content is 0.37 wt%, and the nickel-sulphides content is 0.04 wt%. The pyrite and pyrrhotite account for 0.14 wt% and 0.16 wt% respectively.

There is no talc reported in either of the composites, however, chlorite and micas are observed at ~5% and ~1% respectively in each composite.

The grain size distribution of chalcopyrite, pyrite, and the nickel sulphides was between 15 µm and 30 µm for both composites. This indicates that finer primary grind and regrind are likely necessary in order to improve the liberation of the pay minerals.

A bulk concentrate grades of 16% Cu, 2% Ni, 189 g/t PGM was generated from the composites and metal recoveries is estimated to be 84% Cu, 22% Ni, 69% PGM. The recoveries for rhodium, cobalt and silver were not calculated, yet indication are the metals are likely to be recoverable.

13.2 2018 MINERALOGICAL ANALYSIS

NAM completed a Phase 1 Mineralogical analysis in February 2018 (***Kormos, 2018***). The analysis was completed by XPS of Sudbury and is independent of NAM.

A mineralogical analysis was completed on four composites from existing samples and include typical-grade Pine Zone, high-grade Pine Zone, typical-grade Dana North Zone, and high-grade Dana North Zone. The analysis focused on both Platinum Group Metals (PGM) and base metals mineralogy. QEMSCAN (Quantitative Evaluation of Materials by Scanning Electron Microscope), EPMA (Electron Probe Micro Analysis) and LA-ICP-MS (Laser Ablation-Inductively Coupled Plasma-Mass Spectrometry) were utilized to characterize the samples.

The objective of the analysis was to:

- Provide chemical analysis for the four composite samples.
- Provide the modal mineralogy of the composite samples.
- Provide the in situ grain sizes of the major mineral excluding the PGM minerals.

- Determine the association of the minerals of interest.
- Determine the compositional data including nickel in silicates and PGMs in sulphides.
- Identify and size the PGMs in concentrate.
- Conduct a PGM deportment.

Table 13.1 summarizes the chemical analysis and calculated QEMSCAN. The PGM values are from the chemical analysis and are not reconciled.

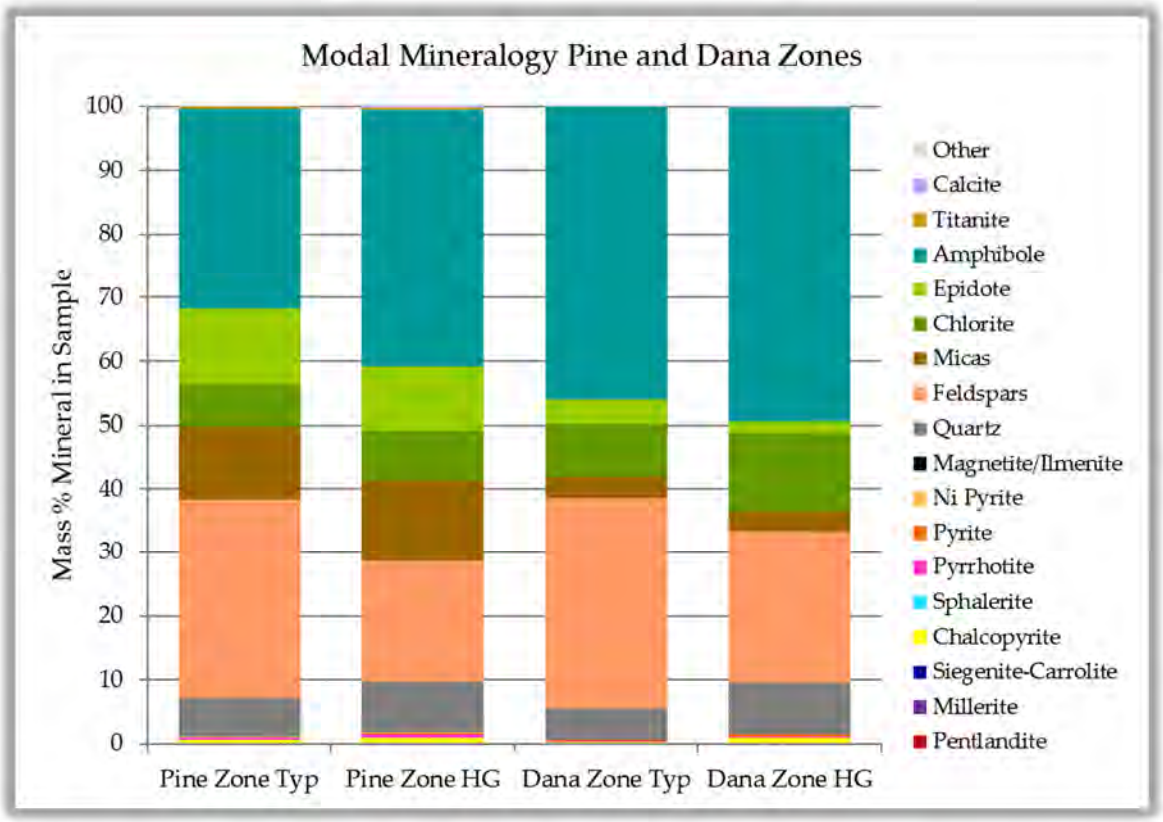
A full mineral suite produced by QEMSCAN is provided on Figure 13.1. The QEMSCAN results suggest:

- Nickel sulphides consist of primarily pentlandite, with trace amounts of millerite and siegenite-carrolite. The pentlandite contains relatively high levels of Co.
- Cu sulphides occur almost exclusively as chalcopyrite.
- Fe sulphides consist of both pyrrhotite and pyrite. There are two generations of pyrite: one appears fresh, the other highly altered. The altered variety may be marcasite, although grades are not high enough to confirm using x-ray diffraction. High Ni levels were measured in the altered pyrite. The levels of altered Ni rich pyrite in the typical Dana Zone sample is much lower than in the other samples.
- A comparison of sulphide ratios in the different samples shows that chalcopyrite to Fe sulphides is relatively consistent in all samples. Pyrrhotite to pentlandite ratios, a metallurgical indicator in Sudbury ores, is slightly higher in Pine Zone samples compared to Dana Zone samples. The ratio of pyrite to Ni pyrite (altered pyrite), is relatively consistent in the two Pine Zone samples and the Dana high-grade sample. The ratio is much higher in the typical-grade Dana sample, indicating less altered pyrite compared to the other three samples.
- The Pine Zone contains more epidote in both the typical- and high-grade samples than either of the samples from the Dana Zone. Epidote altered Sudbury breccia is a common host of copper ores in Sudbury.
- The Pine Zone contains more biotite than either of the samples from the Dana Zone.
- The two high-grade samples contain slightly higher levels of quartz than the two typical-grade samples. Quartz in the typical-grade samples have a somewhat stronger association to feldspar.
- It is unclear if the higher-grade and less feldspar association contributes to the blue colour that has been reported by the geologists on site.

Table 13.1 Comparison of Chemical Analysis vs. QEMSCAN

		Pine Zone Typ	Pine Zone HG	Dana Zone Typ	Dana Zone HG
Assay (element %)	Cu (%)	0.19	0.26	0.09	0.24
	(Chemical)	*0.20*	*0.28*	*0.11*	*0.27*
	Fe (%)	6.78	8.26	6.66	7.72
	(Chemical)	*7.59*	*8.38*	*6.61*	*8.68*
	Mg (%)	4.46	5.56	5.37	6.16
	(Chemical)	*4.19*	*5.02*	*5.19*	*6.03*
	Ni (%)	0.04	0.06	0.04	0.06
	(Chemical)	*0.04*	*0.06*	*0.03*	*0.06*
	S (%)	0.36	0.61	0.20	0.48
	(Chemical)	*0.49*	*0.68*	*0.31*	*0.55*
	Si (%)	23.97	23.58	24.69	24.38
	(Chemical)	*22.57*	*22.87*	*24.27*	*22.93*
	Au (ppm) (Chemical)	*0.11*	*0.43*	*0.08*	*0.19*
	Pd (ppm) (Chemical)	*1.50*	*2.99*	*0.77*	*3.27*
	Pt (ppm) (Chemical)	*0.57*	*0.84*	*0.27*	*1.08*

Figure 13.1 QEMSCAN Modal Mineralogy



In situ grain sizes are produced from measurements where the textures are preserved before the samples are milled. It should be noted that the average grain size reported here will be lower than the size required to liberate.

Results in all four composites indicate that the average size of chalcopyrite ranges from 9 µm in both the high-grade Pine and Dana Zones up to 12 µm in the typical Pine Zone. The average grain size of pentlandite ranges from just 5 µm in the high-grade Dana Zone to 7 µm in the two Pine Zone composites. Pyrrhotite, the coarsest sulphide, has an average grain size up to 18 µm in the typical Dana Zone sample.

The following is a summary of the findings from the XPS report (***Kormos, 2018***):

- Nickel sulphide are dominated by pentlandite with trace levels of millerite and siegenite, representing between 38% and 49% of the total nickel.
- Pentlandite contains high levels of cobalt with an average of 2.2% Co.
- Two generations of pyrite have been identified: a fresh pyrite with a blocky and sometimes euhedral habit, and an altered pyrite with an unusual elongated fabric. The altered pyrite contains high nickel grades, up to 6.8%. The combined population of altered pyrite in the four composites has an average nickel grade of 2.9%.
- A comparison of sulphide ratios in the different samples shows that chalcopyrite to iron sulphides is relatively consistent in all samples.
- A comparison of modal mineralogy indicates that the Pine Zone contains more epidote and more biotite as compared to the Dana Zone samples.
- The high-grade PGM samples contain slightly more quartz than the typical-grade samples.
- Bright phase searches showed the PGMs are dominated by kotulskite (Pd(Te,Bi)), isomertieite ($Pd_{11}Sb_2As_2$), guanglinite (Pd_3As), and sperrylite ($PtAs_2$).
- The main PGM minerals are Kotulskite Pd(Bi,Te), Isomertieite $Pd_{11}Sb_2As_2$, and Sperrylite $PtAs_2$. Kotulskite is more common in the Pine Zone than in the Dana Zone while Isomertieite was identified in higher quantities in the Dana Zone. Based on a grind target of 75 µm, PGMs are well liberated: 75% in the Dana Zone and 51% in the Pine Zone with grain sizes ranging from 2 µm up to a maximum of 50µm. Grain sizes of PGMs locked in silicate gangue range in size from 1 µm to 15 µm.

14 MINERAL RESOURCE ESTIMATES

The effective date of the mineral resource estimate is October 31, 2018.

14.1 DATABASE

NAM maintains all borehole data in a Microsoft Excel™. Header, survey, assays, and lithology tables are saved in individual files. The Microsoft Excel™ files were provided to WSP by NAM on November 28, 2017.

The database contains 710 boreholes with 106,554 assays records in the database, and 2,642 surface channel samplings. Table 14.1 summarizes the borehole database.

Table 14.1 Borehole Database

	Number of Drillholes	Length (m)
Project total	3,351	161,233
Channel samples	2641	792
Drillholes total	710	160,441
Drillholes evaluated	609	135,772
Dana North	142	29,961
Pine Zone	21	5,470
Dana South	85	23,960
Lismer	104	21,064
Lismer-Ext	55	11,758
Varley	58	10,200
Razor	24	4,629
Banshee	22	3,983
Azen	14	3,732
River Valley Extension	84	21,014

The non-assayed intervals within the database were assigned as blank. The QP believes that non-assayed material should not be assigned a zero value, as this does not reflect the true value of the material. Sample intervals with values below detection limit (<) in the database were assigned half the detection limit.

The resource estimation was conducted using Surpac™ (version 6.8.1).

14.2 SPECIFIC GRAVITY MEASUREMENTS

There is limited specific gravity data available on the Project with only 432 samples which represents 0.4% of the total sample database. All the samples are from only three of the zones: Dana North, Dana South, and Lismer Ridge. Table 14.2 summarizes the statistics of the specific gravity measurements taken to date.

Table 14.2 Specific Gravity Summary

Zone	No. of Samples	Average	Minimum	Maximum
All	432	2.94	2.61	3.26
Dana North	90	2.86	2.66	3.04
Dana South	6	2.88	2.82	2.95
Lismer Ridge	336	2.95	2.61	3.26

The QP reviewed the potential to generate a regression formula for specific gravity based on several other elements. Upon review, it was determined that currently a regression formula based on grades cannot be generated due to low correlation factors.

The QP used a specific gravity of 2.94 for the resource estimate, which is the length-weighted average of 432 specific gravity samples.

The QP recommends that NAM continue to collect specific gravity measurements from the various rock types and grade distributions in order to build up the dataset. At a minimum, 5% of the dataset should have specific gravity measurements before an acceptable regression formula can be built.

14.3 PALLADIUM EQUIVALENT FORMULA

The PdEq calculation is based on the assumptions in Table 14.3. Metal prices are based on an approximate 24-month trailing average at October 31, 2018. Concentrate recovery, smelter payables and refining charges are based on the comparable projects.

Table 14.3 Assumptions for PdEq Calculation

Element	Metal Price $US/lb or oz	Concentrate Recovery (%)	Smelter Payable (%)	Refining Chg. $US/lb or oz
Ni	5.25	75	75	0.50
Cu	2.75	70	75	0.08
Au	1,275	85	80	10
Pt	950	85	80	10
Pd	950	85	90	10
Rh	1,500	85	80	10
Co	30	50	70	3

Using these assumptions, the PdEq in g/t is calculated as:

PdEq g/t = (Ni % x 2.55) + (Cu % x 1.34) + (Au g/t x 1.20) + (Pt g/t x 0.89) + (Rh g/t x 1.41) + (Co % x 9.01) + Pd g/t

- Factor1 = 0.0321508 (converts ounces to grams);
- Factor2 = 22.04622 (converts pounds to grade percent);
- Factor3 = 0.002205 (converts pounds to parts per million).

14.4 GEOLOGICAL INTERPRETATION

Three-dimensional wireframe models of mineralization were developed in Surpac™ by the QP with approval of all shapes by NAM. The basic wireframe designs were based on design criteria that included a minimum downhole width of 2.0 m and a minimum grade of 0.3 g/t PdEq.

Sectional interpretations were created in Surpac™ software. The section interpretations were then used to create plan view interpretations at 10 m intervals. Those plan view interpretations were linked together with control strings and triangulated to build a three-dimensional solid. Pine Zone was modeled together with Dana North area, because of their proximity and tridimensional shape, which allowed to create a single orebody. Also, a set of contact analysis graphs were created for Pd, Pt, Au, Ni, Cu, and Co. Those graphs indicate both Dana North and Pine are the same domain (Figures 14.1 to 14.6). The solids were validated in Surpac™ and no errors were found.

The zones of mineralization interpreted for each area were generally contiguous; however, due to the nature of the mineralization there are portions of the wireframe that have grades less than 0.3 g/t PdEq yet are still within the mineralizing trend.

Table 14.4 summarizes the basic parameters of the various mineral wireframes used in this resource estimate.

Figure 14.1 Contact Analysis - Gold

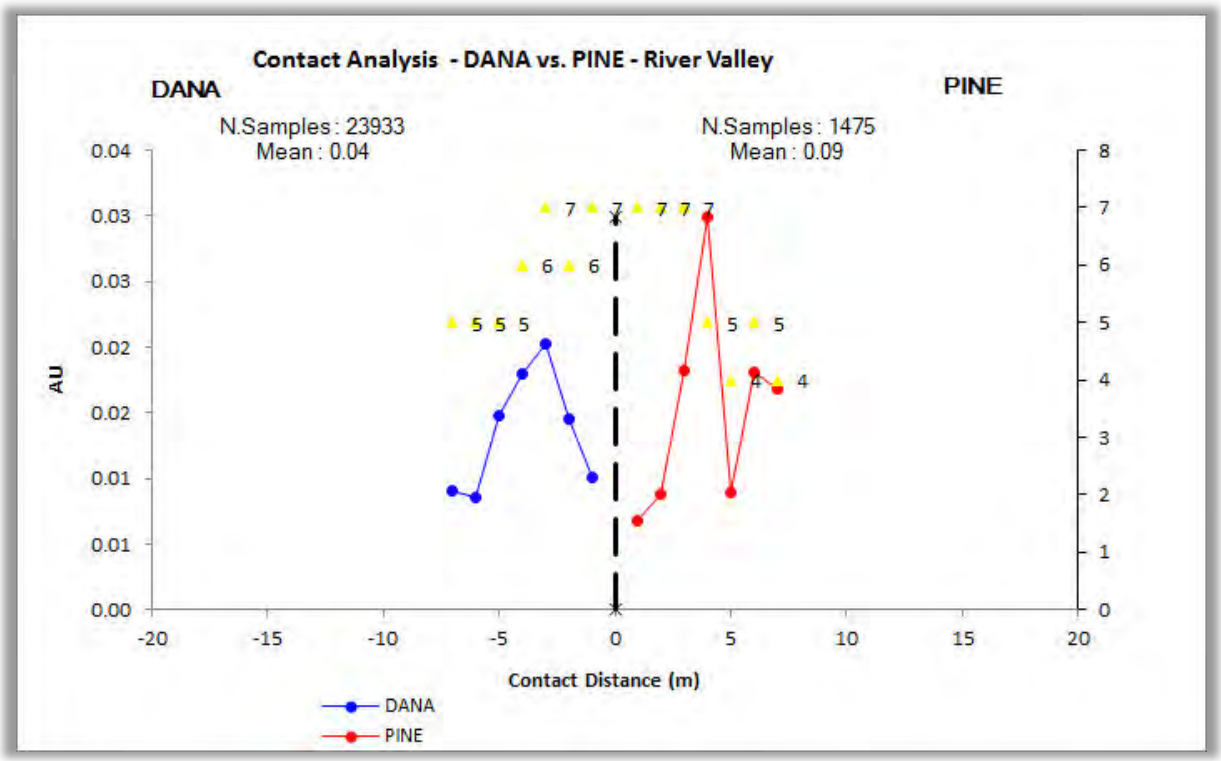


Figure 14.2 Contact Analysis – Platinum

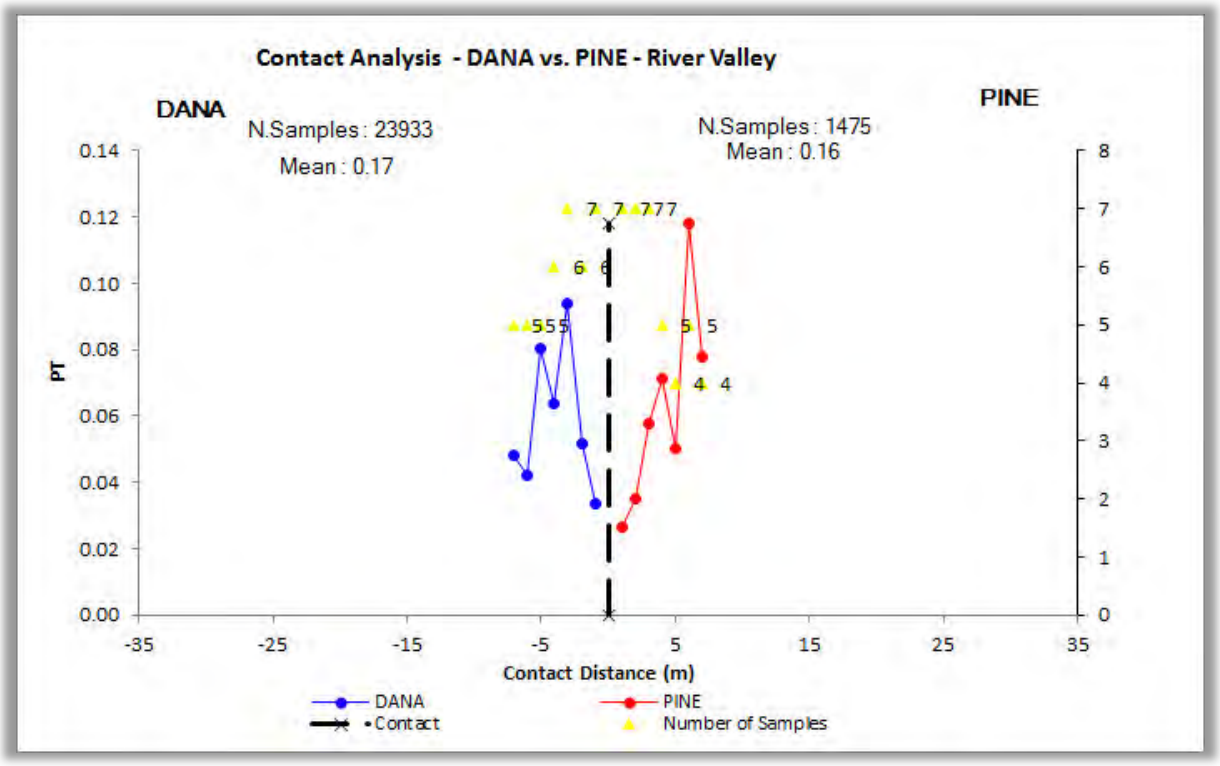


Figure 14.3 Contact Analysis – Palladium

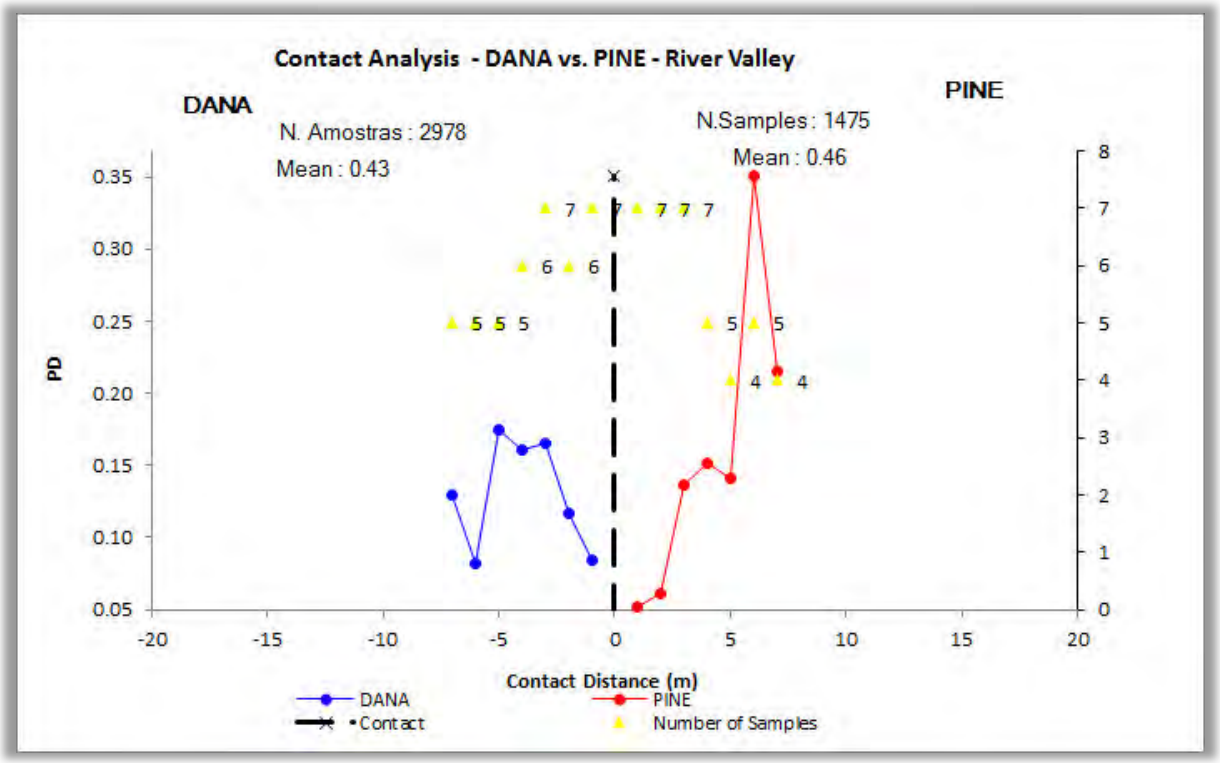


Figure 14.4 Contact Analysis – Nickel

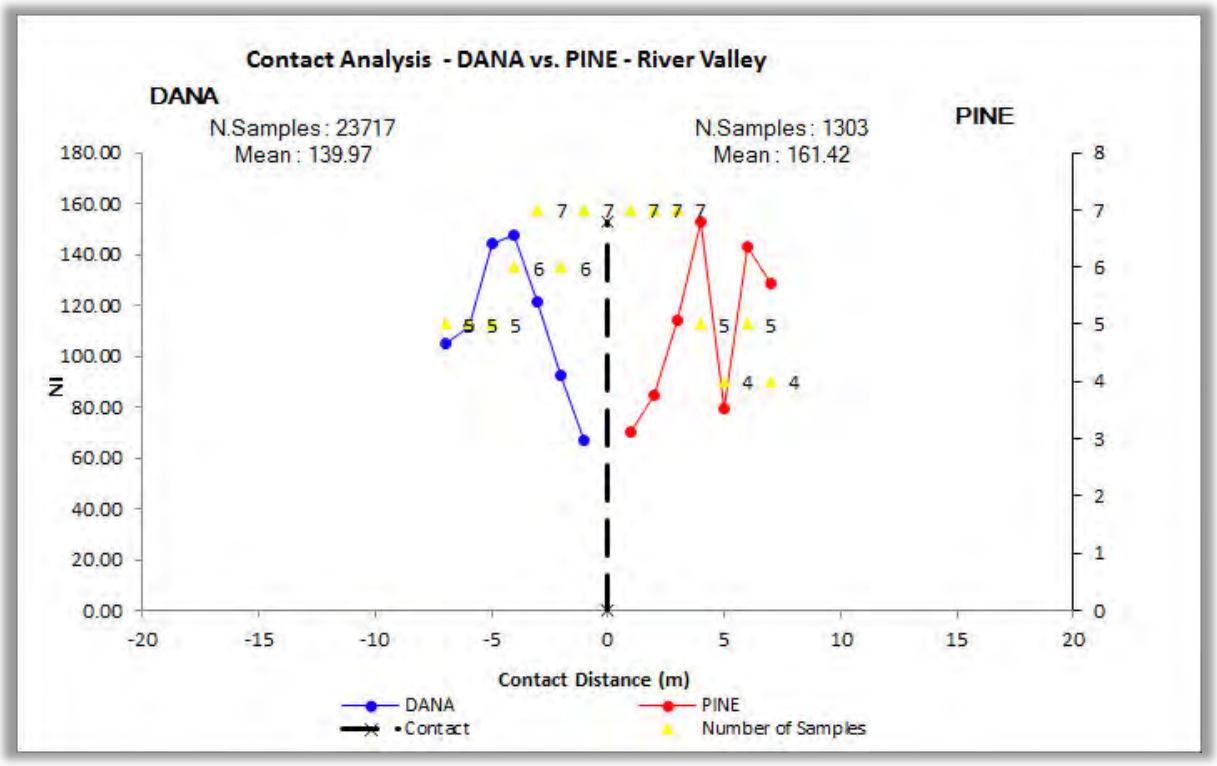


Figure 14.5 Contact Analysis – Copper

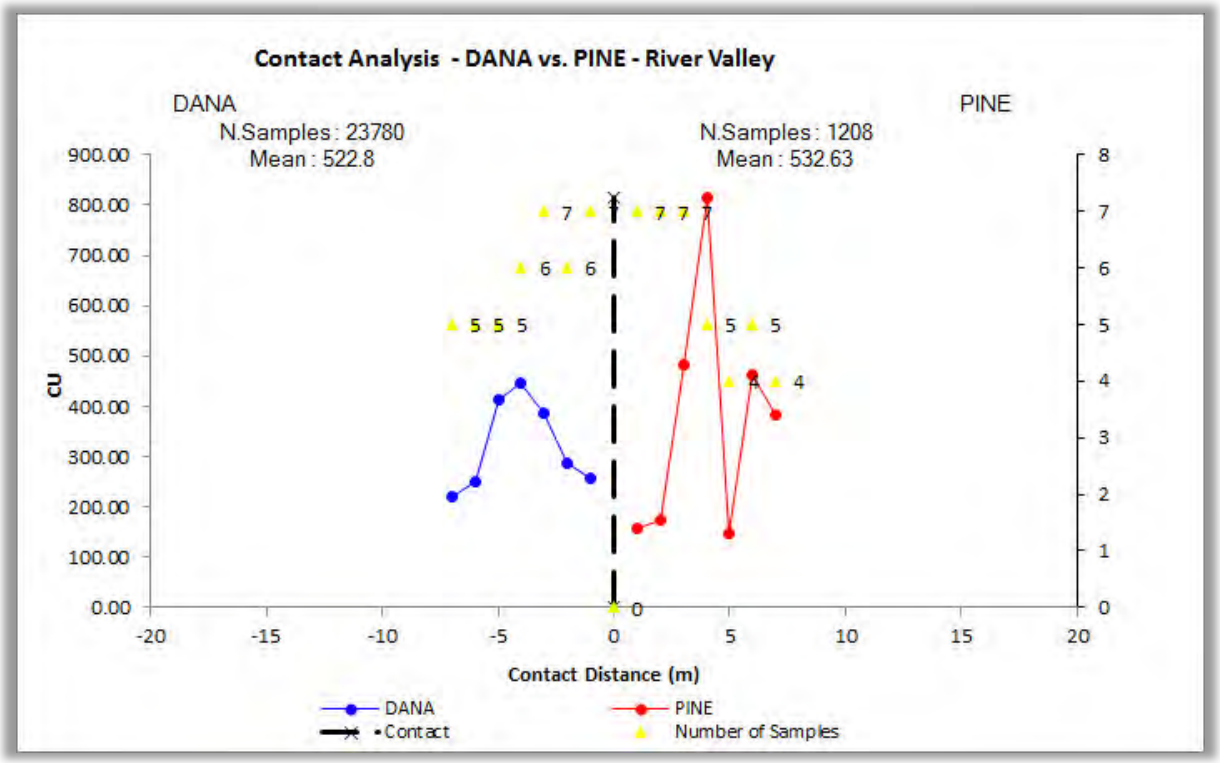


Figure 14.6 Contact Analysis - Cobalt

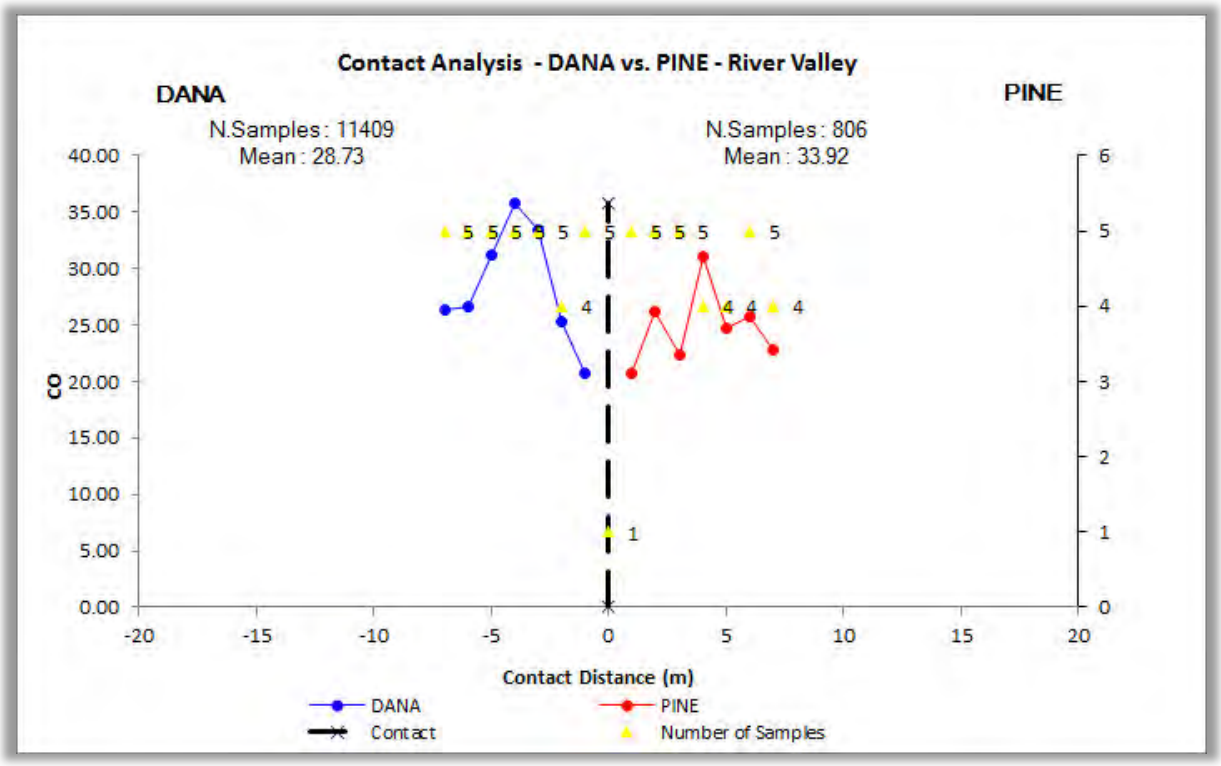


Table 14.4 Wireframe Summary

Zone	Domain	Minimum X	Maximum X	Minimum Y	Maximum Y	Minimum Z	Maximum Z	Surface Area (m^2)	Volume (m^3)
100-150	Dana - Pine Zone	555,105	555,611	5,172,116	5,172,993	-120	350	1067408	22203225
200	Dana South	555,380	555,695	5,171,822	5,172,209	-160	306	441213	10410281
300	Lismer	556,764	557,701	5,169,533	5,171,227	-17	322	1333680	23908113
400	Lismer_Ext	555,927	556,669	5,171,273	5,151,684	-33	315	491745	7563933
500	Varley	557,790	558,526	5,168,052	5,169,547	81	310	736398	11900868
600	Razor	562,009	563,200	5,167,370	5,168,461	20	286	937427	24427631
700	Banshee	555,407	555,882	5,170,899	5,171,733	59	320	517682	7096293
800	Azen	558,434	559,342	5,167,475	5,167,847	-135	282	798475	13959818
910	River Valley Extension	564,281	564,696	5,165,488	5,166,038	56	410	511829	6183081
920	River Valley Extension	564,263	565,712	5,163,662	5,165,186	-154	458	2081177	17620334
930	River Valley Extension	564,281	564,696	5,165,488	5,166,038	56	410	511829	6183081

14.5 EXPLORATION DATA ANALYSIS

14.5.1 ASSAYS

The portion of the deposit included in the mineral resource was sampled by 22,162 PdEq assays, being 21,569 in Dana North, and 594 in Pine. The assay intervals within each zone were captured using a Surpac™ macro into individual borehole files. These borehole files were reviewed to ensure all the proper assay intervals were captured in the interpretation of plan view intervals. Table 14.5 summarizes the basic statistics for the assays at River Valley as a whole and for each of the ten zones individually.

Table 14.5 Borehole Statistics

Zone	Domain	Field	No of Records	Minimum	Maximum	Mean	Standard Deviation
100	Dana	Length	21,569	0.04	4	0.779	0.345
		Augt	21,569	0	1.552	0.031	0.051
		Ptgt	21,569	0	5.28	0.166	0.279
		Pdgt	21,569	0.001	16.55	0.416	0.846
		CuPer	21,511	0.00003	1.020	0.052	0.067
		NiPer	0	0.00005	0.156	0.013	0.012
		Fe-perc	11,600	0.005	24.5	7.969	82.554
		Co-ppm	11,600	0.5	294	28.865	15.994
		S-perc	5,559	0.005	3.21	0.2	0.209
		Rh-ppb	5,307	0.25	410	18.981	28.212
		Ag-ppm	11,600	0.1	20	0.735	0.869
100	Dana - Channel Samples	Length	2,569	0	2.67	0.045	0.078
		Augt					
		Ptgt	2,569	0.01	5520	603.489	780.729
		Pdgt	2,569	5	1560	205.605	174.84
		CuPer					
		NiPer					
		Fe-perc	2,569	0.01	384	13.331	32.809
		Co-ppm					
		S-perc	2,569	0.3	0.3	0.3	0
		Rh-ppb					
		Ag-ppm					
150	Pine Zone * *only drillholes drilled after 2013 in Pine Zone area	Length	594	1	1	1	0
		Augt	594	0.001	0.352	0.02	0.038
		Ptgt	594	0.005	1.913	0.11	0.226
		Pdgt	594	0.001	5.82	0.291	0.688
		CuPer	594	0.00013	0.533	0.037	0.063
		NiPer	594	0.00001	0.108	0.015	0.012
		Fe-perc	386	0.33	8.57	4.448	1.496
		Co-ppm	386	0.25	93	35.15	14.367
		S-perc	386	0.01	2.55	0.263	0.303
		Rh-ppb					
		Ag-ppm	386	1	3	1.01	0.144

(table continues on next page)

Zone	Domain	Field	No of Records	Minimum	Maximum	Mean	Standard Deviation
200	Dana South	Length	14,908	0.05	24.85	0.774	0.522
		Augt	14,908	0.00025	1.396	0.032	0.055
		Ptgt	14,908	0.00003	6.73	0.177	0.34
		Pdgt	14,908	0.00003	18.03	0.483	1.127
		CuPer	14,908	0.00003	1.0001	0.037	0.067
		NiPer	14,908	0.00003	0.164	0.009	0.012
		Fe-perc	14,908	0.005	10.8	2.471	1.101
		Co-ppm	14,908	0.5	433	27.621	17.193
		S-perc	14,908	0.005	1.58	0.143	0.189
		Rh-ppb	14,908	0.5	280	15	27.557
		Ag-ppm	14,908	0.1	10	0.604	0.56
300	Lismer	Length	14,321	0.05	5.5	0.633	0.266
		Augt	14,321	0.00025	2.43	0.025	0.041
		Ptgt	14,321	0.00003	5.63	0.14	0.234
		Pdgt	14,321	0.00003	14.99	0.32	0.636
		CuPer	14,321	0.00003	0.979	0.035	0.058
		NiPer	14,321	0.00003	0.567	0.011	0.017
		Fe-perc	14,321	0.01	6.84	1.72	0.904
		Co-ppm	14,321	0.5	222	23.703	17.694
		S-perc					
		Rh-ppb	14,321	0	160	15.024	24.704
		Ag-ppm	14,321	0	4.2	0.44	0.471
400	Lismer Ext	Length	4,617	0.02	10	0.774	0.34
		Augt	4,617	0.00025	0.636	0.029	0.044
		Ptgt	4,617	0.00003	22.08	0.178	0.4
		Pdgt	4,617	0.00003	51	0.412	1.022
		CuPer	4,617	0.00003	1	0.046	0.063
		NiPer	4,617	0.00003	0.115	0.011	0.014
		Fe-perc	4,617	0.26	6.69	1.545	0.835
		Co-ppm	4,617	0.5	202	20.714	14.065
		S-perc	4,617	0.005	0.97	0.196	0.189
		Rh-ppb					
		Ag-ppm					
500	Varley	Length	3,122	0.1	15	0.99	
		Augt	3,122	0.00025	0.626	0.026	
		Ptgt	3,122	0.005	5.383	0.148	
		Pdgt	3,122	0.00003	14.16	0.376	
		CuPer	3,122	0.00069	0.531	0.044	
		NiPer	3,122	0.0005	0.138	0.013	
		Fe-perc	3,122	0.44	8.48	2.106	
		Co-ppm	3,122	0.5	117	19.198	
		S-perc	3,122	0.005	1.2	0.148	
		Rh-ppb					
		Ag-ppm	3,122	0.1	8.4	0.293	

(table continues on next page)

Zone	Domain	Field	No of Records	Minimum	Maximum	Mean	Standard Deviation
600	Razor	Length	2,332	0.1	4	0.99	0.12
		Augt	2,332	0.00025	0.956	0.016	0.034
		Ptgt	2,332	0.005	3.06	0.086	0.132
		Pdgt	2,332	0.00003	3.47	0.191	0.3
		CuPer	2,332	0.00008	0.448	0.029	0.039
		NiPer	2,332	0.0007	0.243	0.02	0.024
		Fe-perc	2,332	0.28	7.28	1.097	0.655
		Co-ppm	2,332	2	118	14.669	13.262
		S-perc	2,332	0.01	2.86	0.152	0.256
		Rh-ppb					
		Ag-ppm	2,332	0.1	9.1	0.315	0.421
700	Banshee	Length	1,676	0.05	1.5	0.775	0.257
		Augt	1,676	0.00025	0.439	0.024	0.035
		Ptgt	1,676	0.00003	12.772	0.134	0.306
		Pdgt	1,676	0.00003	18.92	0.22	0.529
		CuPer	1,676	0.00003	0.452	0.036	0.06
		NiPer	1,676	0.00003	0.093	0.007	0.01
		Fe-perc					
		Co-ppm					
		S-perc					
		Rh-ppb					
		Ag-ppm					
800	Azen	Length	1,123	0.1	1.5	0.978	0.119
		Augt	1,123	0.00025	0.635	0.018	0.029
		Ptgt	1,123	0.005	1.31	0.089	0.111
		Pdgt	1,123	0.00003	3.456	0.259	0.345
		CuPer	1,123	0.00049	0.443	0.049	0.053
		NiPer	1,123	0.0003	0.173	0.024	0.021
		Fe-perc	1,123	0.69	5.56	2.016	0.857
		Co-ppm	1,123	5	425	33.424	48.566
		S-perc	1,123	0.03	1.24	0.223	0.222
		Rh-ppb					
		Ag-ppm	1,123	0.1	50.1	1.934	8.04
910	River Valley Ext Orebody 1	Length	768	0.5	1.5	1.121	0.22
		Augt	768	0.001	0.969	0.033	0.058
		Ptgt	768	0.005	3.326	0.147	0.182
		Pdgt	768	0	4.79	0.263	0.325
		CuPer	767	0.001	0.546	0.053	0.052
		NiPer	767	0.002	0.217	0.027	0.023
		Fe-perc					
		Co-ppm					
		S-perc					
		Rh-ppb					
		Ag-ppm					

(table continues on next page)

Zone	Domain	Field	No of Records	Minimum	Maximum	Mean	Standard Deviation
920	River Valley Ext Orebody 2	Length	772	0.2	1.5	1.055	0.247
		Augt	772	0.001	0.54	0.038	0.049
		Ptgt	772	0.005	4.24	0.168	0.242
		Pdgt	772	0	4.878	0.192	0.322
		CuPer	767	0.001	0.273	0.049	0.050
		NiPer	767	0.001	0.106	0.018	0.016
		Fe-perc					
		Co-ppm					
		S-perc					
		Rh-ppb					
		Ag-ppm					
930	River Valley Ext Orebody 3	Length	485	0.25	1.5	1.26	0.276
		Augt	485	0.001	0.592	0.032	0.047
		Ptgt	485	0.005	3.654	0.174	0.264
		Pdgt	485	0.001	3.15	0.311	0.4
		CuPer	485	0.0007	0.261	0.043	0.046
		NiPer	485	0.0011	0.457	0.032	0.037
		Fe-perc					
		Co-ppm					
		S-perc					
		Rh-ppb					
		Ag-ppm					

The correlation coefficients for the elements were reviewed prior to any capping and compositing to determine if any correlation existed between the elements to allow similar variogram and estimation parameters to be used. Table 14.6 summarizes the correlation between the elements.

Table 14.6 Correlation Coefficients

	pd_gt	pt_gt	au_gt	ni_ppm	cu_ppm	fe_pct	co_ppm	s_pct	rh_ppb	ag_ppm
length										
pd_gt	1									
pt_gt	0.87	1								
au_gt	0.81	0.8	1							
ni_ppm	0.67	0.63	0.62	1						
cu_ppm	0.75	0.72	0.79	0.78	1					
fe_pct	0.1	0.11	-0.04	-0.06	-0.04	1				
co_ppm	0.37	0.35	0.36	0.83	0.5	0.11	1			
s_pct	0.17	0.13	0.47	0.74	0.61	0.08	0.73	1		
rh_ppb	-0.23	-0.18	0.82	0.64	0.74	-0.08	0.38	0.36	1	
ag_ppm	0.13	0.12	0.12	0.11	0.16	0.61	0.21	0.14	0.12	1

14.5.2 GRADE CAPPING

Raw assay data for each element was examined individually to assess the amount of metal that is at risk from high-grade assays. The Surpac™ Decile function along with reviewing the log probability plots was used in determining if grade capping was required (Figures 14.7 to 14.11).

It was determined that capping was not required on any element in the dataset. The potential of smearing high-grade samples will be controlled by the kriging process.

Figure 14.7 Log Probability Plot - Gold

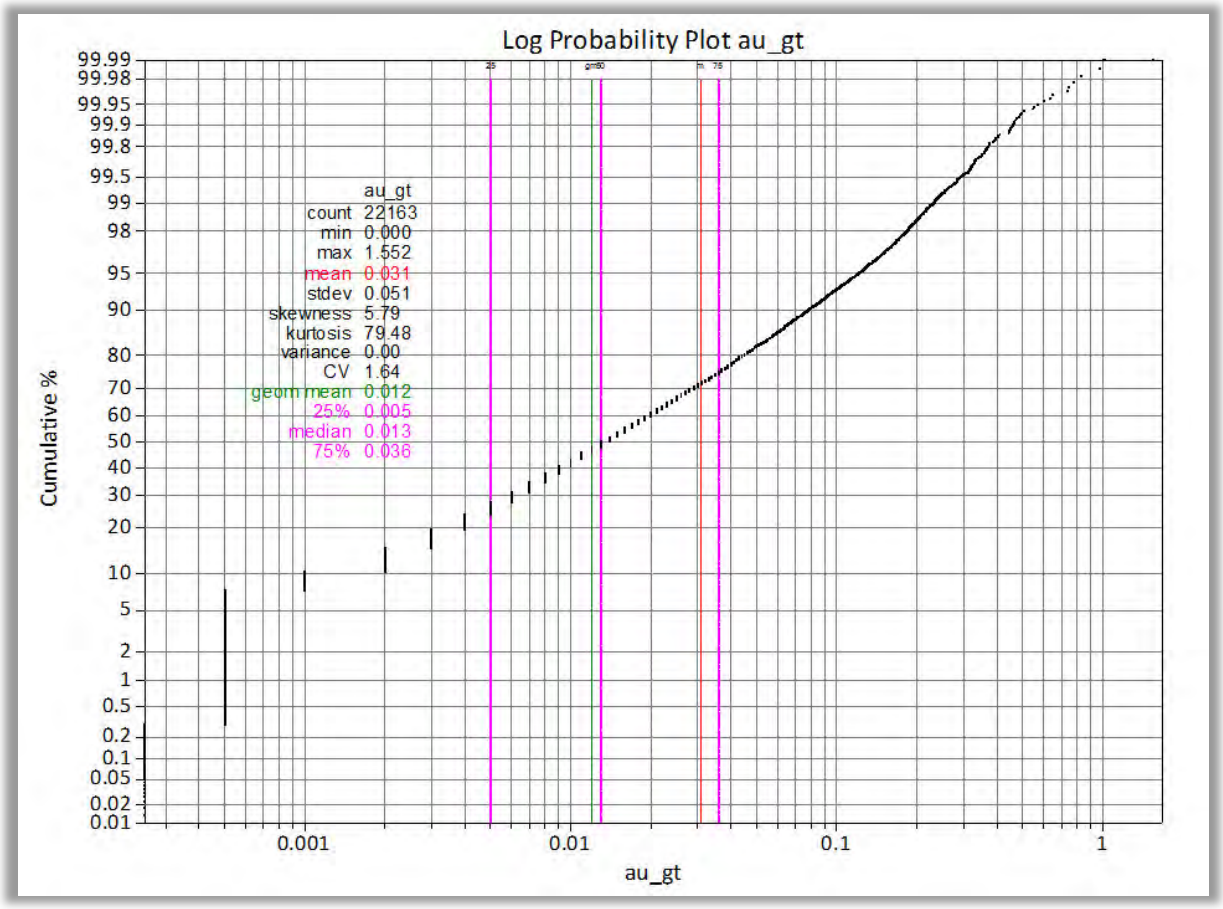


Figure 14.8 Log Probability Plot - Platinum

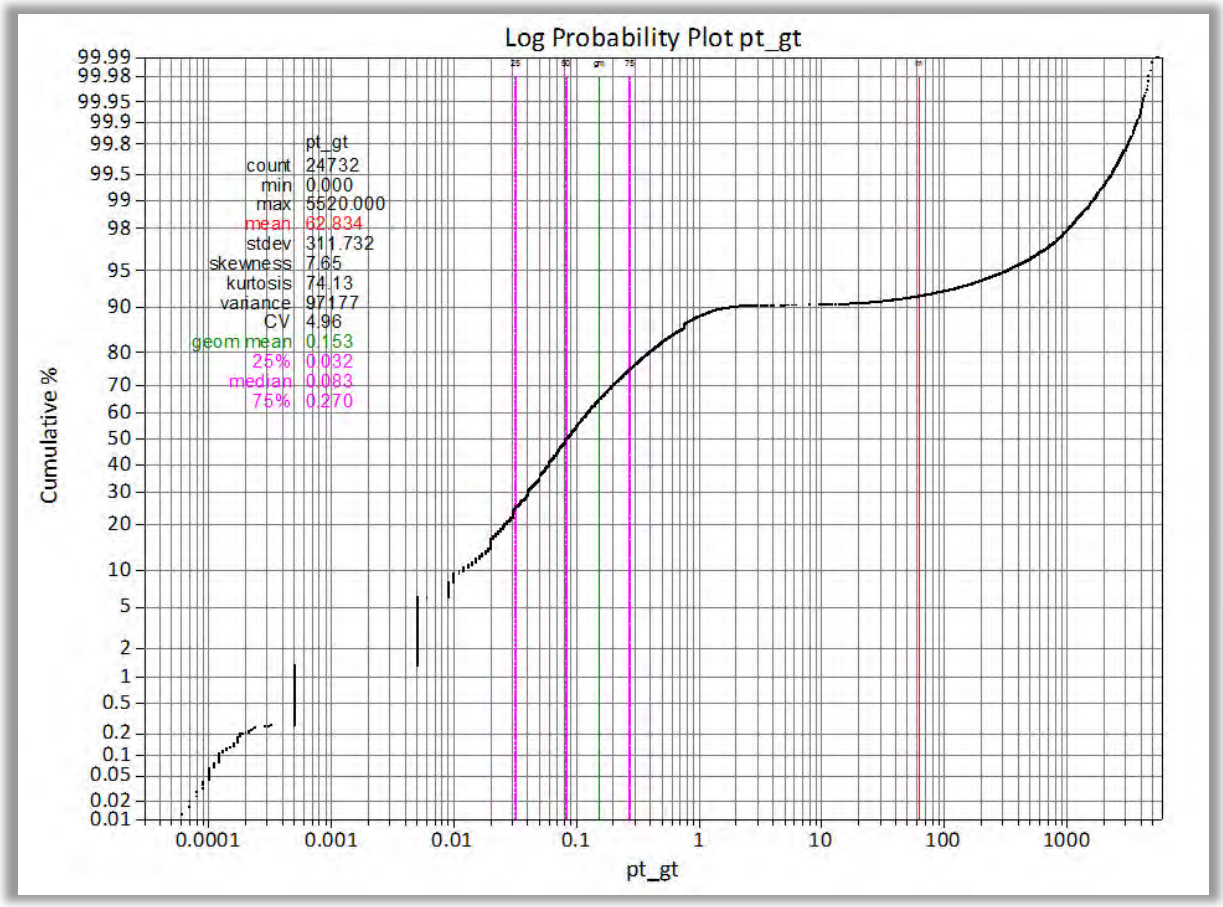


Figure 14.9 Log Probability Plot - Palladium

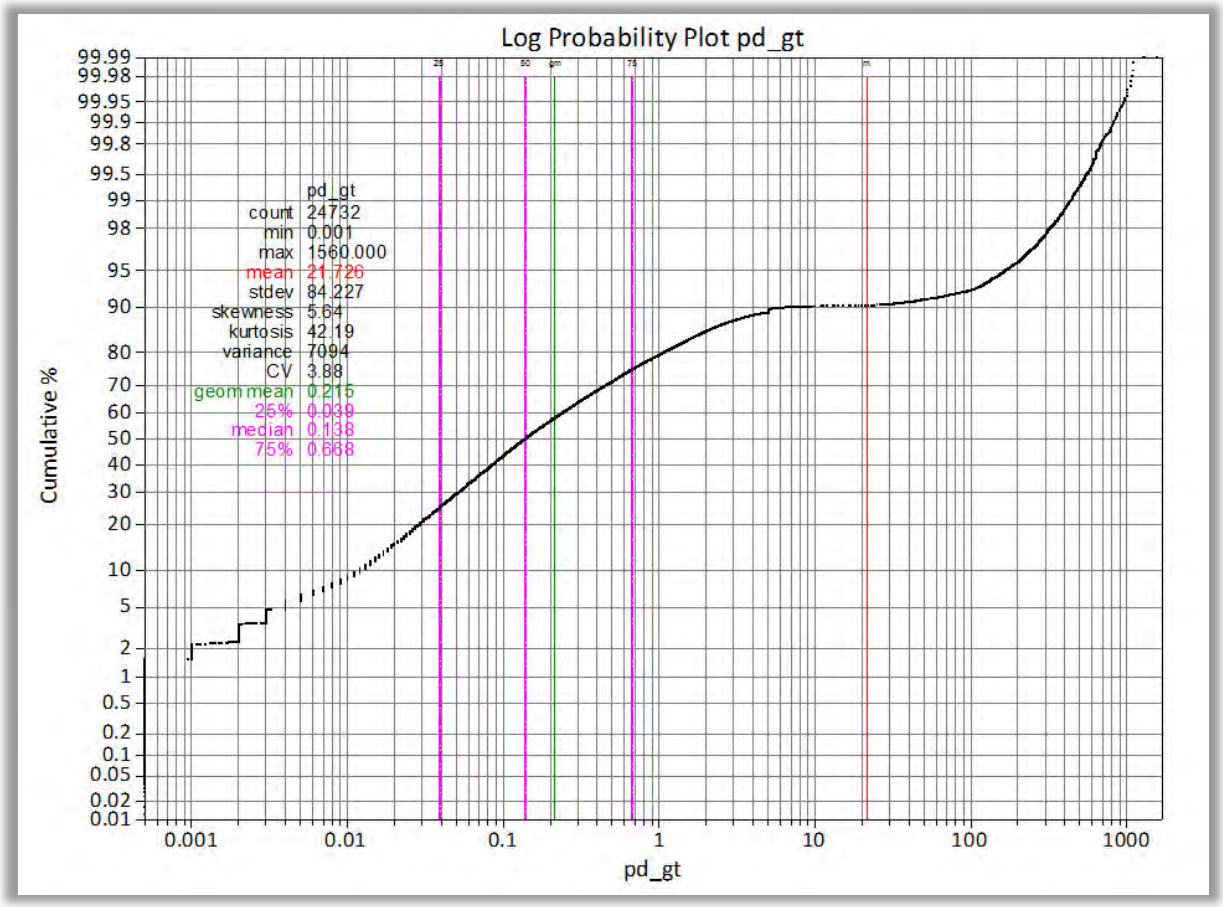


Figure 14.10 Log Probability Plot – Nickel

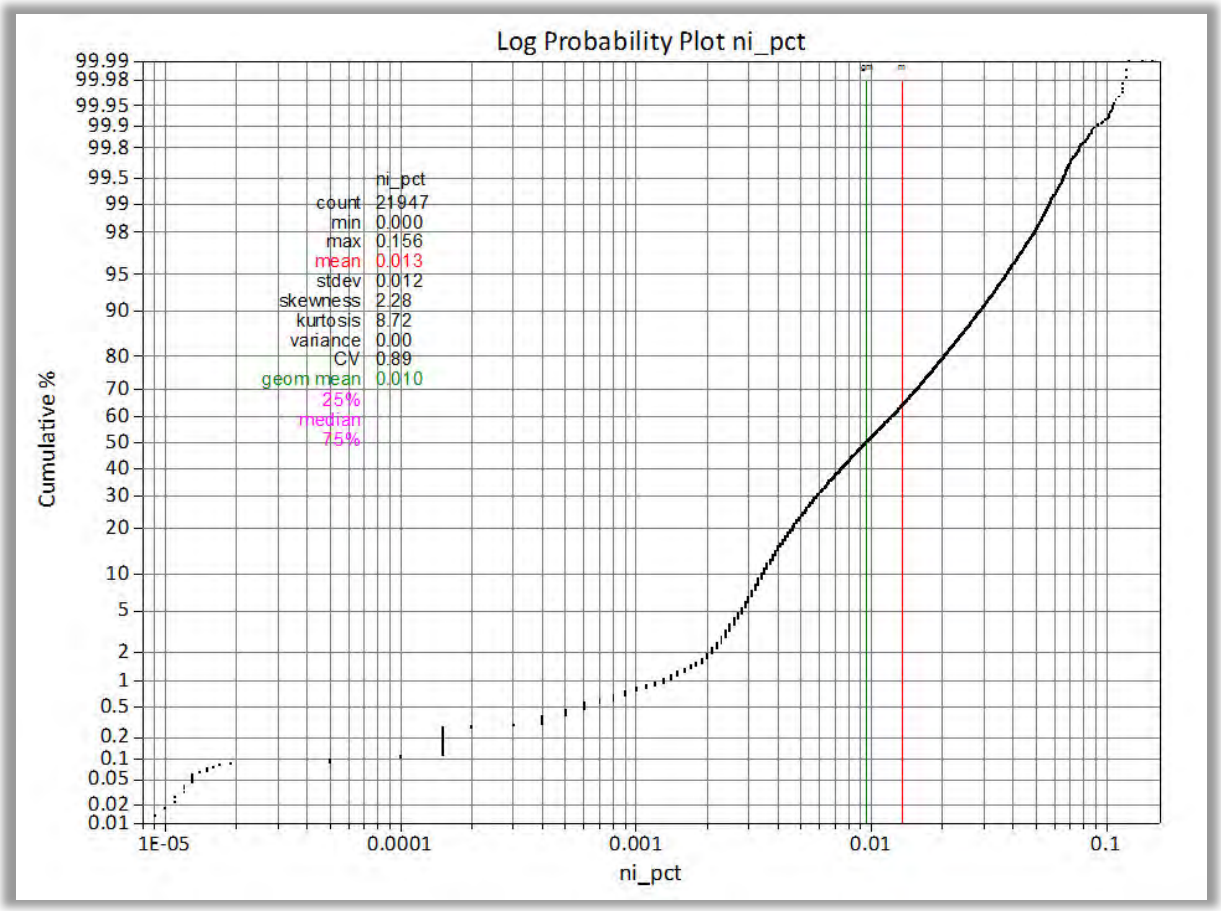
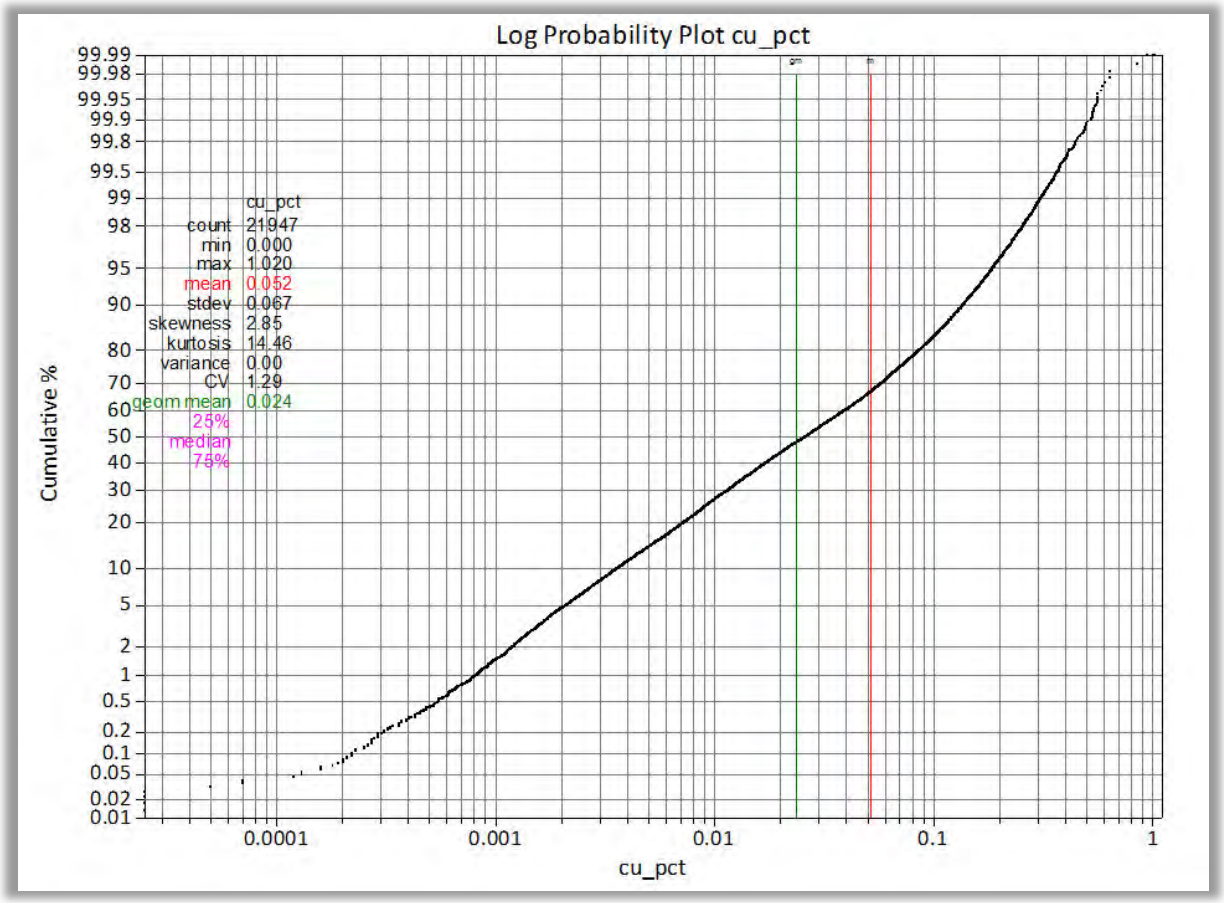


Figure 14.11 Log Probability Plot – Copper



14.5.3 COMPOSITING

Compositing of all the assay data was completed on various interval lengths from 1 to 5 m honouring the interpretation of the geological solids (Figures 14.12 to 14.16).

Figure 14.12 River Valley 1 m Composite Histogram

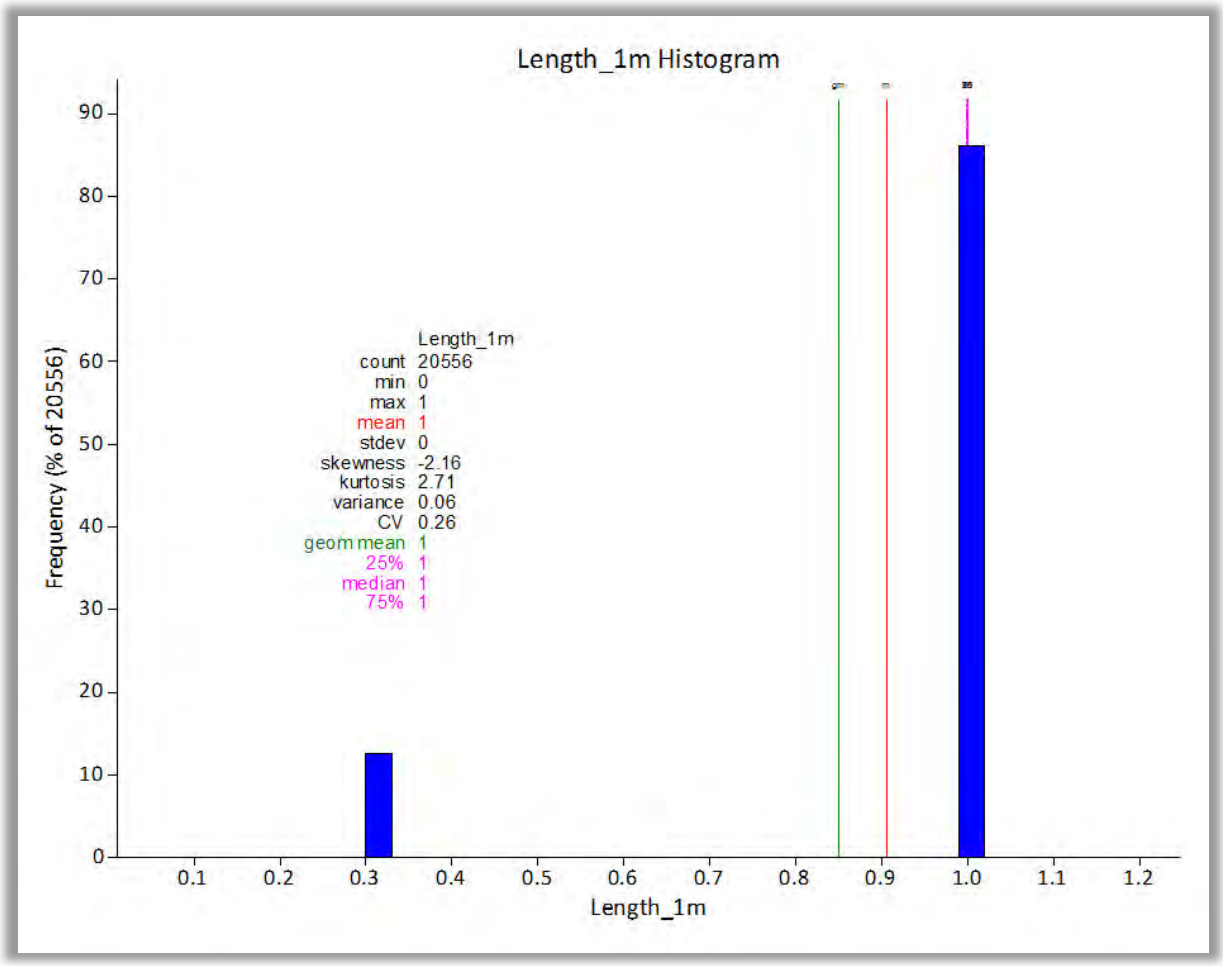


Figure 14.13 River Valley 2 m Composite Histogram

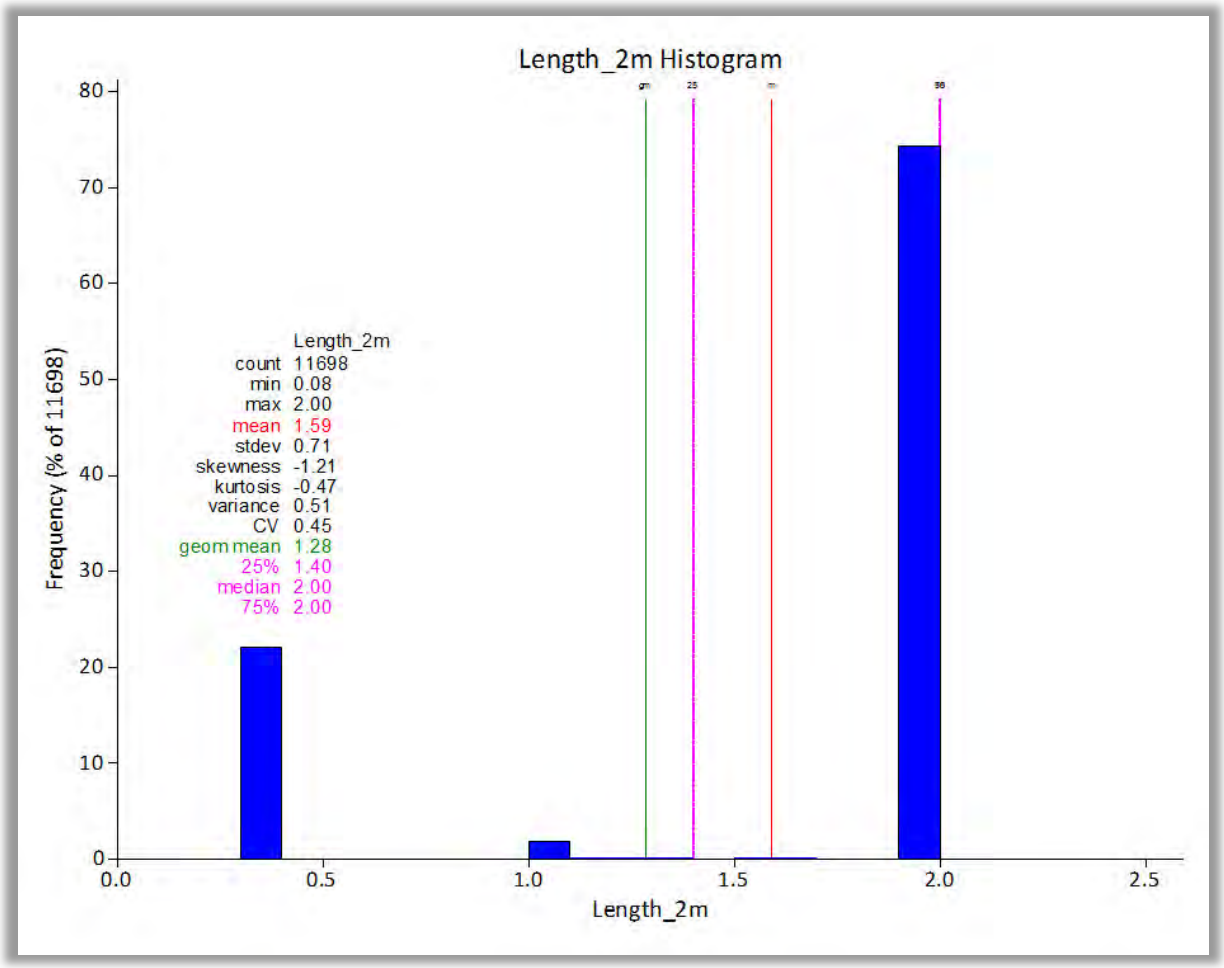


Figure 14.14 River Valley 3 m Composite Histogram

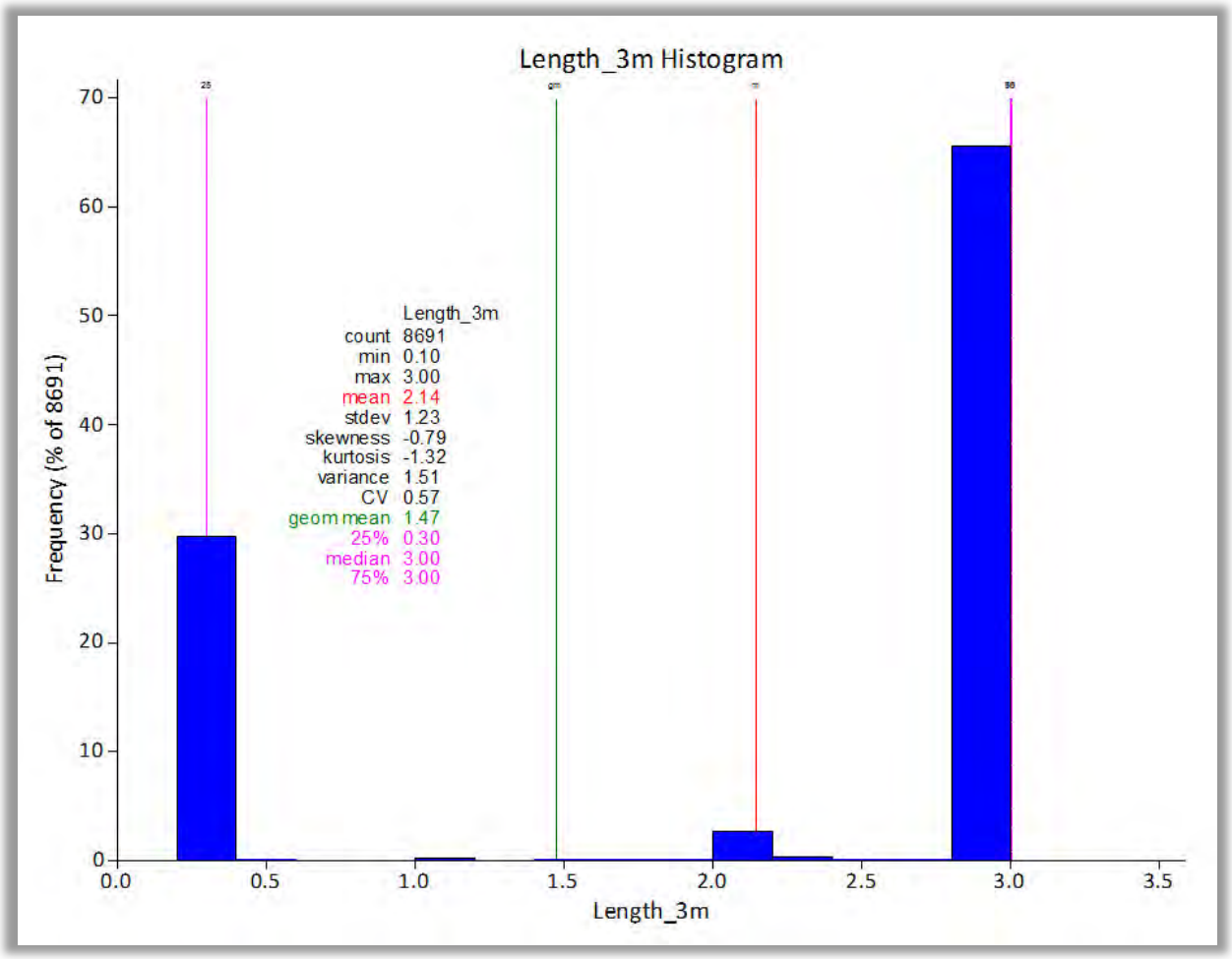


Figure 14.15 River Valley 4 m Composite Histogram

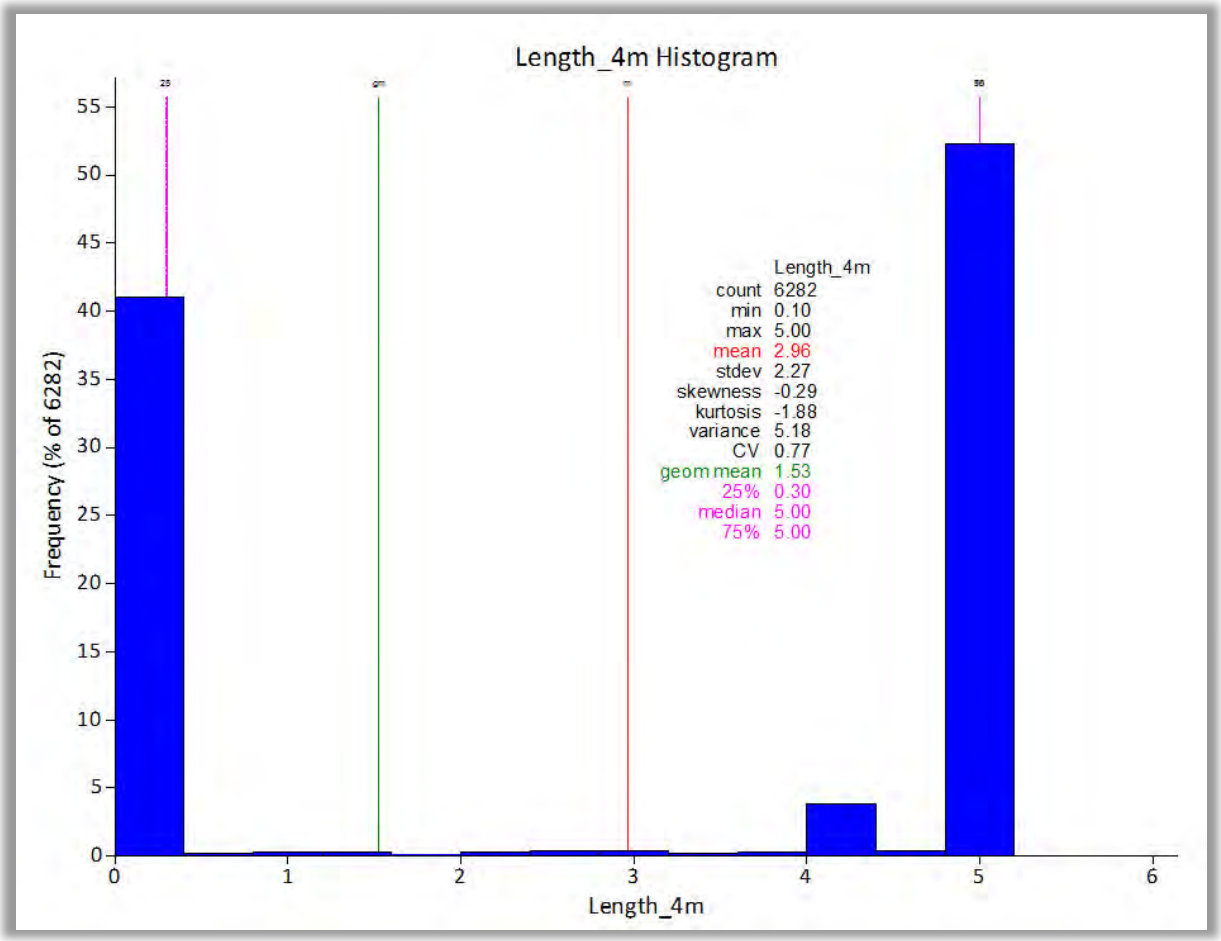
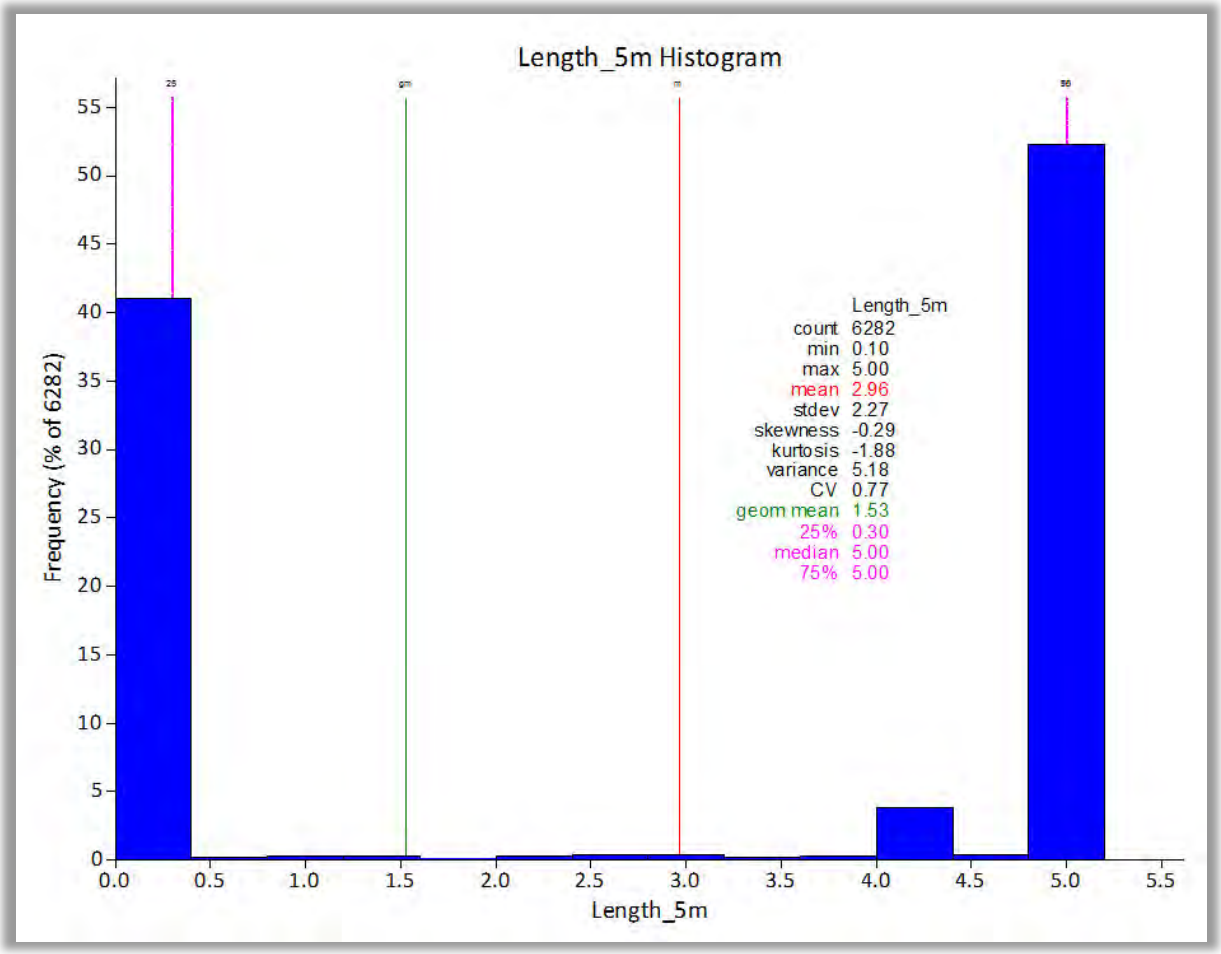


Figure 14.16 River Valley 5 m Composite Histogram



The 2 m composite was selected as it corresponds to approximately one-half the cell widths to be used in the modelling process and displays the most consistent statistics. The backstitching process was used in the compositing routine to ensure all captured sample material was included. The backstitching routine adjusts the composite lengths for each individual borehole in order to compensate for the last sample interval. The minimum composite length in all runs was set at 0.35 m to allow the small channel samples on surface to remain as individual composites. Table 14.7 summarizes the statistics for the boreholes after compositing.

Table 14.7 River Valley Drillhole Composite Statistics

Zone	Domain	Field	No of Records	Minimum	Maximum	Mean	Standard Deviation
100	Dana	Augt	11,012	0.001	2.670	0.033	0.052
		Ptgt	11,012	0.001	3.904	0.168	0.260
		Pdgt	11,012	0.001	12.380	0.435	0.823
		CuPer	10,998	0.000001	0.563	0.051	0.061
		NiPer	10,954	0.0004	0.156	0.015	0.013
		Fe-perc	5,583	0.340	9.295	2.713	1.110
		Co-ppm	5,583	1.250	160.500	27.956	13.102
		S-perc	2,774	0.005	1.590	0.203	0.186
		Rh-ppb	5,394	0.010	384.000	16.095	28.809
		Ag-ppm	5,583	0.100	2.110	0.676	0.384
150	Pine ** ** With composited files from Dana that are inside Pine Zone. Those were considered as part of Pine	Augt	676	0.0005	0.297	0.028	0.043
		Ptgt	676	0.0005	1.946	0.162	0.265
		Pdgt	676	0.0005	5.869	0.460	0.832
		CuPer	590	0.00047	0.433	0.052	0.067
		NiPer	590	0.00001	0.091	0.017	0.012
		Fe-perc	416	0.59440	7.811	3.618	1.230
		Co-ppm	416	2.06000	140.100	34.078	14.688
		S-perc	416	0.0100	1.806	0.222	0.213
		Rh-ppb					
		Ag-ppm	416	1.00000	2.650	1.015	0.118
200		Augt	6,396	0.000	0.862	0.034	0.049
		Ptgt	6,396	0.000	5.475	0.181	0.303
		Pdgt	6,396	0.000	14.630	0.504	1.020
		CuPer	6,396	0.000	0.824	0.041	0.064
		NiPer	6,396	0.000	0.156	0.010	0.013
		Fe-perc	3,296	0.535	7.689	2.473	0.976
		Co-ppm	3,296	3.392	169.489	27.617	14.190
		S-perc					
		Rh-ppb	1,200	0.000	343.000	18.356	36.749
		Ag-ppm	3,296	0.100	4.098	0.605	0.463
300		Augt	4,562	0.000	0.384	0.025	0.031
		Ptgt	4,562	0.000	5.401	0.141	0.195
		Pdgt	4,562	0.000	14.935	0.321	0.536
		CuPer	4,562	0.000	0.547	0.035	0.049
		NiPer	4,562	0.000	0.329	0.011	0.014
		Fe-perc	1,490	0.275	6.142	1.721	0.776
		Co-ppm	1,490	2.000	98.283	23.720	13.893
		S-perc					
		Rh-ppb	187	0.000	160.000	16.544	22.876
		Ag-ppm	1,490	0.100	2.449	0.440	0.359

(table continues on next page)

Zone	Domain	Field	No of Records	Minimum	Maximum	Mean	Standard Deviation
400		Augt	1,802	0.000	0.346	0.029	0.036
		Ptgt	1,802	0.000	6.723	0.177	0.281
		Pdgt	1,802	0.001	15.983	0.411	0.753
		CuPer	1,802	0.000	0.372	0.046	0.055
		NiPer	1,802	0.000	0.106	0.011	0.013
		Fe-perc	328	0.385	4.856	1.545	0.677
		Co-ppm	328	3.000	70.000	20.751	10.765
		S-perc					
		Rh-ppb	57	0.000	333.392	31.242	59.673
		Ag-ppm	328	0.100	2.000	0.436	0.306
500		Augt	1,573	0.000	0.429	0.026	0.039
		Ptgt	1,573	0.005	2.439	0.147	0.233
		Pdgt	1,573	0.000	7.195	0.376	0.638
		CuPer	1,573	0.002	0.363	0.044	0.041
		NiPer	1,573	0.001	0.094	0.013	0.009
		Fe-perc	590	0.529	6.350	2.116	0.745
		Co-ppm	590	3.500	86.000	19.226	8.374
		S-perc					
		Rh-ppb					
		Ag-ppm	590	0.100	3.800	0.292	0.345
600		Augt	1,173	0.000	0.480	0.016	0.025
		Ptgt	1,173	0.005	1.679	0.086	0.107
		Pdgt	1,173	0.000	2.025	0.191	0.252
		CuPer	1,173	0.000	0.230	0.029	0.033
		NiPer	1,173	0.001	0.130	0.020	0.020
		Fe-perc	663	0.329	5.305	1.109	0.565
		Co-ppm	663	2.000	86.468	14.898	11.426
		S-perc					
		Rh-ppb					
		Ag-ppm	663	0.100	4.625	0.318	0.338
700		Augt	662	0.000	0.236	0.024	0.029
		Ptgt	662	0.000	4.115	0.133	0.204
		Pdgt	662	0.000	6.750	0.219	0.356
		CuPer	662	0.000	0.291	0.036	0.054
		NiPer	662	0.000	0.053	0.007	0.009
		Fe-perc					
		Co-ppm					
		S-perc					
		Rh-ppb					
		Ag-ppm					

(table continues on next page)

Zone	Domain	Field	No of Records	Minimum	Maximum	Mean	Standard Deviation
800		Augt	561	0.000	0.269	0.018	0.021
		Ptgt	561	0.005	0.604	0.089	0.090
		Pdgt	561	0.000	2.273	0.259	0.286
		CuPer	561	0.001	0.348	0.049	0.046
		NiPer	561	0.000	0.120	0.024	0.018
		Fe-perc	150	0.712	4.179	2.017	0.736
		Co-ppm	150	5.435	306.009	33.411	45.575
		S-perc					
		Rh-ppb					
		Ag-ppm	150	0.100	50.100	1.928	5.951
910		Augt	439	0.001	0.490	0.033	0.043
		Ptgt	439	0.005	1.766	0.149	0.136
		Pdgt	439	0.001	2.495	0.274	0.248
		CuPer	439	0.001	0.309	0.054	0.046
		NiPer	439	0.002	0.124	0.027	0.020
		Fe-perc					
		Co-ppm					
		S-perc					
		Rh-ppb					
		Ag-ppm					
920		Augt	419	0.001	0.380	0.041	0.043
		Ptgt	419	0.005	2.140	0.172	0.181
		Pdgt	419	0.001	2.613	0.195	0.249
		CuPer	419	0.001	0.221	0.050	0.043
		NiPer	419	0.001	0.087	0.018	0.013
		Fe-perc					
		Co-ppm					
		S-perc					
		Rh-ppb					
		Ag-ppm					
930		Augt	306	0.001	0.363	0.031	0.035
		Ptgt	306	0.005	1.435	0.164	0.176
		Pdgt	306	0.001	2.004	0.309	0.341
		CuPer	306	0.001	0.232	0.042	0.041
		NiPer	306	0.002	0.457	0.032	0.038
		Fe-perc					
		Co-ppm					
		S-perc					
		Rh-ppb					
		Ag-ppm					

14.6 SPATIAL ANALYSIS

Variography, using Surpac™ software, was completed for all elements globally for all zones. Downhole variograms were used to determine nugget effect and then correlograms were modelled to determine spatial continuity in the zones.

Table 14.8 summarizes results of the variography, for each of the elements in Dana North and Pine Zones created using Surpac.

The remaining zones are unchanged from the 2012 technical report, which used Datamine to create the variograms. Table 14.9 summarizes the Datamine parameters.

Table 14.8 Surpac Variogram Parameters

Zone	Domain	Field	Nugget	Sill 1st S	Sill 2nd S	Sill 3rd S	Range 1st S	Range 2nd S	Range 3rd S
Dana Pine Zone	100 150	Augt	0.658	0.198	0.145		6.779	50.118	
		Ptgt	0.250	0.310	0.440		8.550	61.180	
		Pdgt	0.229	0.314	0.458		9.391	62.106	
		CuPer	0.295	0.625	0.081		13.118	50.061	
		NiPer	0.295	0.625	0.081		13.118	50.061	
		Fe-perc	0.181	0.108	0.449	0.261	16.836	32.101	70.304
		Co-ppm	0.265	0.383	0.258	0.094	13.074	33.295	63.468
		S-perc	0.181	0.108	0.449	0.261	16.836	32.101	70.304
		Rh-ppb	0.229	0.314	0.458		9.391	62.106	
		Ag-ppm	0.181	0.108	0.449	0.261	16.836	32.101	70.304
River Valley Extension	910 920 930	Augt	Inverse of distance						
		Ptgt							
		Pdgt							
		CuPer							
		NiPer							
		Fe-perc							
		Co-ppm							
		S-perc							
		Rh-ppb							
		Ag-ppm							

Table 14.9 Datamine Variogram Parameters

Zone	Domain	Field	Nugget	Sill 1st. S	Sill 2nd. S	Sill 3rd. S	Range 1st. S	Range 2nd. S	Range 3rd. S
Dana South **Lismer** **Lismer Ext** **Varley** **Razor** **Banshee** **Azen**	200 300 400 500 600 700 800	Augt	0.00115	0.00069	0.002		7	90	
		Ptgt	0.045	0.021	0.045		20	60	
		Pdgt	0.350	0.370	0.455		23	70	
		CuPer	0.001	0.001	0.003		10	80	
		NiPer	0.00005	0.00006	0.0001		27	100	
		Fe-perc	50.000	317.666	674.588		3	20	
		Co-ppm	150.000	82.839	90.547		14	60	
		S-perc	0.016	0.008	0.019		10	20	
		Rh-ppb	325.000	77.993	642.480		13	30	
		Ag-ppm	0.420	0.284			10		

14.7 RESOURCE BLOCK MODEL

Individual block models were established in Surpac™ for each of the eight zones using one parent model as the origin. The model was not rotated. Drillhole spacing is variable with the majority of the surface drilling spaced at 25 m sections and 25 to 75 m on sections. A block size of 2.5 m x 5 m x 2.5 m was selected in order to accommodate the nature of the mineralization and be amenable for the open pit potential. The final block model is an integration between Dana North/Pine with Dana South, Banshee, Lismer, Lismer-Ext, Varley, Azen and Razor, which were created in Datamine™ Studio (v. 3.19.3638.0).

Table 14.10 summarizes details of the parent block model.

Table 14.10 Parent Model Parameters

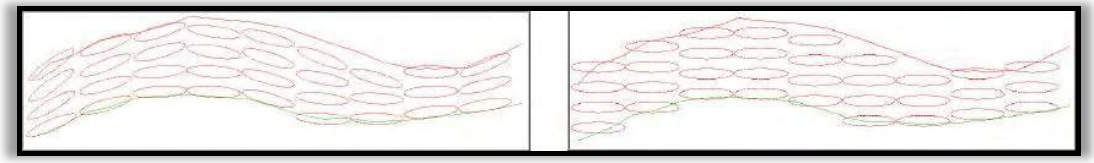
Parameter	Value
Minimum X Coordinate	555120
Minimum Y Coordinate	5163470
Minimum Z Coordinate	-160
Maximum X Coordinate	566000
Maximum Y Coordinate	5172940
Maximum Z Coordinate	335
Block Size (m)	2.5 x 5 x 2.5
Rotation	0
Sub-block	none
Total No. Blocks	1,632,052,224

14.7.1 DYNAMIC ANISOTROPY

Due to the curved nature of the wireframes and the distribution of the mineralization within the zones, a single search ellipse would not be practical and would result in the smearing of grades in a direction that does not represent the true nature of the mineralization.

Dynamic anisotropy is an option in Surpac™ that allows the anisotropy rotation angles that define search volumes and variogram models to be defined individually for each cell in the model, thus allowing the search volume to be precisely oriented to follow the trend of the mineralization. Figure 14.17 is an example of how the orientation of the search ellipse will vary across the mineralized zone using dynamic anisotropy search compared an anisotropic search.

Figure 14.17 Dynamic Anisotropy Example



14.7.2 ESTIMATION CRITERIA

The interpolations of the zones were completed using the estimation methods NN, ID^2, and OK. The estimations were designed for three passes. In each pass, a minimum and maximum number of samples were required as well as a maximum number of samples from a borehole in order to satisfy the estimation criteria. Tables 14.11 to 14.13 summarize the interpolation criteria for the zones.

Table 14.11 Estimation Criteria

Zones	Estimation Pass No.	Search Ellipse Factor	Minimum No. of Composites	Maximum No. of Composites	Maximum No. of Composites per BH
Dana	1	0.5	6	15	5
	2	1	5	15	4
	3	1.5	4	15	3
	4	2	3	15	2
Pine Zone	1	0.5	6	15	5
	2	1	5	15	4
	3	1.5	4	15	3
	4	2	3	15	2
River Valley Extension 1	1	0.5	6	15	5
	2	1	5	15	4
	3	1.5	4	15	3
	4	2	3	15	3
River Valley Extension 2	1	0.5	6	15	5
	2	1	5	15	4
	3	1.5	4	15	3
	4	2	3	15	3
River Valley Extension 3	1	0.5	6	15	5
	2	1	5	15	4
	3	1.5	4	15	3
	4	2	3	15	3

Table 14.12 Surpac™ Search Criteria

Zone		Elements	Bearing	Plunge	Dip	Major axis	Semi-major axis	Minor axis	Anisotropy Ratio	
									Major / Semi-major	Major / Minor
Dana Pine River Valley Extension	100 150 910 920 930	Augt	243.68	-74.21	19.98	32.10	14.29	8.83	2.25	3.64
		Ptgt	259.27	-72.04	34.97	61.18	20.28	26.53	3.02	2.31
		Pdgt	259.27	-72.04	34.97	62.11	26.91	20.61	2.31	3.01
		CuPer	243.68	-74.21	19.98	50.06	25.59	18.58	1.96	2.70
		NiPer	243.68	-74.21	19.98	50.06	25.60	18.57	1.96	2.70
		Fe-perc	243.68	-74.21	19.98	32.10	14.29	8.83	2.25	3.64
		Co-ppm	301.53	-69.41	75.03	33.30	13.71	9.51	2.43	3.50
		S-perc	243.68	-74.21	19.98	32.10	14.29	8.83	2.25	3.64
		Rh-ppb	259.27	-72.04	34.97	62.11	26.91	20.61	2.31	3.01
		Ag-ppm	243.68	-74.21	19.98	32.10	14.29	8.83	2.25	3.64

Table 14.13 Datamine Search Ellipse Criteria

		Nugget			First Structure			Second Structure		
		Z Rotation	Y Rotation	X Rotation	Along Strike (Y)	Down Dip (Z)	Across Strike (X)	Along Strike (Y)	Down Dip (Z)	Across Strike (X)
200	Augt	30	-60	90	7	21	11	90	100	70
300	Ptgt	30	-60	90	20	20	5	60	50	40
400	Pdgt	30	-60	90	23	22	17	70	110	60
500	CuPer	210	-30	90	14	8	20	60	70	60
600	NiPer	30	-60	90	27	12	5	100	110	57
700	Fe-perc	0	0	0	3	3	3	20	20	20
800	Co-ppm	-60	0	120	14	8	20	60	70	60
	S-perc	210	-30	90	10	7	72	20	40	31
	Rh-ppb	210	-30	90	13	13	5	30	45	20
	Ag-ppm	0	0	0	10	10	10	0	0	0

14.8 RESOURCE CLASSIFICATION

Several factors are considered in the definition of a resource classification:

- NI 43-101 requirements;
- Canadian Institute of Mining, Metallurgy and Petroleum (CIM) guidelines;
- The authors' experience with magmatic PGE-nickel deposits;
- Spatial continuity based on variography of the assays within the drillholes;
- Drillholes spacing and estimation runs required to estimate the grades in a block.

No new drilling has taken place in Dana South, Lismer, Lismer-Ext, Varley, Razor, Banshee, and Azen. The materials included in the mineral resource are based on the 2012 resource block model that remains valid.

Dana North and Pine follow the rule for their classification.

- Variographic runnings:
  - 1st running: 50% of the size of the search ellipsoid for each interpolated element;
  - 2nd running: 100% of the size of the search ellipsoid for each interpolated element;
  - 3rd running: 150% of the size of the search ellipsoid for each interpolated element;
  - 4th running: 200% of the size of the search ellipsoid for each interpolated element.
- Measured Resource (Code 1):
  - blocks with Palladium Equivalent grade (Pd_Eq) > 0;
  - minimum of 6 samples used for interpolation;
  - only blocks in the 1st and 2nd runnings.
- Indicated Resource (Code 2):
  - blocks with Pd_Eq > 0;
  - blocks not previously classified as "Code 1";
  - all blocks included in the 3rd running;
  - all remaining blocks from 1st and 2nd running not classified as "Code 1";
  - blocks not included in the 4th running.
- Inferred Resource (Code 3):
  - blocks not previously classified as "Code 1" or "Code 2";
  - all remaining blocks with Pd_Eq > 0.

Due to the nature of the data, the River Valley Extension is considered an Inferred resource.

No environmental, permitting, legal, title, taxation, socio-economic, marketing, or other relevant issues are known to the QP that may affect the estimate of mineral resources. Mineral reserves can only be estimated on the basis of an economic evaluation that is used in a preliminary feasibility study or a feasibility study of a mineral project; thus, no reserves have been estimated. As per NI 43-101, mineral resources, which are not mineral reserves, do not have to demonstrate economic viability.

14.9 MINERAL RESOURCE TABULATION

The resource reported as of October 31, 2018 has been tabulated in terms of a PdEq cutoff grade. Resources are stated as all blocks above the cutoff grade.

In order to evaluate the potentially economic open pit mineralization at River Valley, a pit optimization was undertaken. Measured, Indicated and Inferred Mineral Resources are reported within this conceptual constraining pit shell. The parameters in Table 14.14 were used to justify the cutoff grades 0.35g/t PdEq for the potential open pit and 2.00g/t PdEq for the potential underground that determines the potentially economic portions of the mineralization.

Table 14.15 is a breakdown of the resource by resource classification for the potential open pit resource and potential underground resource. Table 14.16 is the contained metals by resource classification. Table 14.17 is a breakdown of the resource by zone and resource classification for the potential open pit resource. Table 14.18 is a breakdown of the resource by zone and resource classification for the potential underground resource.

Table 14.14 Potential Mining Parameters

	PdEq Price US$/oz	Exchange Rate %	PdEq Recovery %	Smelter Payable %	Mining Cost $/t mined	Process Cost $/t processed	G&A Cost $/t processed	Pit Slope Angle degree	PdEq Cutoff g/t
Open Pit	950	77	85	90	2.00	10.20	1.25	50	0.35
Underground	950	77	85	90	40.00	18.00	2.75	N/A	2.00

Table 14.15 River Valley Mineral Resource Summary (using 0.35 g/t PdEq and 2.00 g/t PdEq Cutoff)

Class	PdEq Cutoff (g/t)	Tonnes	Pd (g/t)	Pt (g/t)	Rh (g/t)	Au (g/t)	Cu (%)	Ni (%)	Co (%)	PdEq (g/t)
Total Measured	0.35	56,025,400	0.54	0.20	0.013	0.03	0.06	0.02	0.006	0.94
	2.00	71,300	2.33	0.75	0.036	0.09	0.12	0.02	0.002	3.38
	0.35+2.00	56,096,700	0.54	0.20	0.013	0.03	0.06	0.02	0.006	0.94
Total Indicated	0.35	43,153,300	0.49	0.19	0.003	0.03	0.05	0.02	0.006	0.84
	2.00	5,200	2.23	0.60	0.003	0.11	0.03	0.04	0.000	3.20
	0.35+2.00	43,158,500	0.49	0.19	0.003	0.03	0.05	0.02	0.006	0.84
Total Meas +Ind	0.35	99,178,700	0.52	0.20	0.009	0.03	0.06	0.02	0.006	0.90
	2.00	76,500	2.32	0.74	0.034	0.09	0.11	0.02	0.002	3.37
	0.35+2.00	99,255,200	0.52	0.20	0.009	0.03	0.06	0.02	0.006	0.90
Inferred	0.35	52,306,000	0.31	0.15	0.012	0.04	0.04	0.02	0.001	0.63
	2.00	-	-	-	-	-	-	-	-	-
	0.35+2.00	52,306,000	0.31	0.15	0.012	0.04	0.04	0.02	0.001	0.63

Table 14.16 River Valley In Situ Metals (using 0.35 g/t PdEq and 2.00 g/t PdEq Cutoff)

Class	PGM + Au (oz)	Pd (oz)	Pt (oz)	Au (oz)	Rh (oz)	PdEq (oz)	Cu (lbs)	Ni (lbs)	Co (lbs)
Total Measured	1,394,136	982,851	361,976	49,309	23,499	1,700,957	74,209,162	24,704,987	7,405,216
Total Indicated	983,071	677,717	263,712	41,641	4,163	1,165,978	47,515,218	19,009,293	5,701,428
Total Meas +Ind	2,377,207	1,660,568	625,689	90,950	27,662	2,866,935	121,724,380	43,714,280	13,106,644
Inferred	840,851	521,328	252,255	67,268	20,180	1,059,473	46,071,125	23,035,562	1,151,778

Table 14.17 River Valley Pit Constrained Detailed Resource Summary (using 0.35 g/t PdEq Cutoff)

Zone	Tonnes	Pd (g/t)	Pt (g/t)	Au (g/t)	Cu (%)	Ni (%)	Co (%)	Rh (g/t)	PdEq (g/t)
Measured Resources									
Dana N/Pine	26,745,200	0.57	0.22	0.04	0.07	0.02	0.002	0.020	1.00
Dana S	10,083,500	0.76	0.25	0.04	0.07	0.02	0.003	0.014	1.22
Lismer	19,196,700	0.39	0.16	0.02	0.04	0.03	0.013	0.003	0.70
Lismer Ext									
Varley									
Razor									
Banshee									
Azen									
River Valley Ext									
TOTAL	**56,025,400**	**0.54**	**0.20**	**0.03**	**0.06**	**0.02**	**0.006**	**0.013**	**0.94**
Indicated Resources									
Dana N/Pine	1,137,400	0.48	0.23	0.02	0.06	0.02	0.001	0.011	0.86
Dana S	540,200	0.43	0.17	0.03	0.05	0.01	0.011	0.009	0.73
Lismer	10,190,800	0.46	0.18	0.04	0.05	0.02	0.003	0.008	0.82
Lismer Ext	14,645,600	0.52	0.21	0.01	0.06	0.03	0.014	0.002	0.89
Varley	16,639,300	0.49	0.19	0.03	0.05	0.01	0.002	0.000	0.81
Razor									
Banshee									
Azen									
River Valley Ext									
TOTAL	**43,153,300**	**0.49**	**0.19**	**0.03**	**0.05**	**0.02**	**0.006**	**0.003**	**0.84**
Measured & Indicated Resources									
Dana N/Pine	27,882,600	0.57	0.22	0.04	0.07	0.02	0.002	0.020	1.00
Dana S	10,623,700	0.74	0.25	0.04	0.07	0.02	0.003	0.013	1.20
Lismer	29,387,500	0.41	0.17	0.02	0.05	0.02	0.010	0.004	0.74
Lismer Ext	14,645,600	0.52	0.21	0.01	0.06	0.03	0.014	0.002	0.89
Varley	16,639,300	0.49	0.19	0.03	0.05	0.01	0.002	0.000	0.81
Razor									
Banshee									
Azen									
River Valley Ext									
TOTAL	**99,178,700**	**0.52**	**0.20**	**0.03**	**0.06**	**0.02**	**0.006**	**0.008**	**0.90**
Inferred Resources									
Dana N/Pine	139,000	0.40	0.20	0.00	0.03	0.01	0.000	0.003	0.66
Dana S	1,000	0.36	0.06	0.00	0.03	0.01	0.000	0.006	0.50
Lismer	103,000	0.32	0.09	0.02	0.05	0.02	0.003	0.000	0.57
Lismer Ext									
Varley									
Razor	10,957,000	0.36	0.15	0.03	0.05	0.03	0.001		0.70
Banshee	3,359,000	0.29	0.17	0.03	0.04	0.01	0.000		0.55
Azen	17,566,000	0.30	0.10	0.02	0.05	0.03	0.003		0.59
River Valley Ext	20,181,000	0.31	0.18	0.06	0.03	0.00	0.000	0.031	0.65
TOTAL	**52,306,000**	**0.31**	**0.15**	**0.04**	**0.04**	**0.02**	**0.001**	**0.012**	**0.63**

Table 14.18 River Valley Underground Detailed Resource Summary (using 2.00 g/t PdEq Cutoff

Zone	Tonnes	Pd (g/t)	Pt (g/t)	Au (g/t)	Cu (%)	Ni (%)	Co (%)	Rh (g/t)	PdEq (g/t)
Measured Resources									
Dana N/Pine	13,200	2.14	0.67	0.09	0.19	0.04	0.001	0.021	3.23
Dana S	58,100	2.37	0.77	0.09	0.10	0.02	0.002	0.040	3.41
Lismer									
Lismer Ext									
Varley									
Razor									
Banshee									
Azen									
River Valley Ext									
TOTAL	**71,300**	**2.33**	**0.75**	**0.09**	**0.12**	**0.02**	**0.002**	**0.036**	**3.38**
Indicated Resources									
Dana N/Pine	400	2.56	0.53		0.21	0.04		0.029	3.46
Dana S	400	2.60	0.84	0.02	0.02	0.01	0.002	0.019	3.44
Lismer									
Lismer Ext	4,400	2.17	0.58	0.13	0.02	0.04			3.15
Varley									
Razor									
Banshee									
Azen									
River Valley Ext									
TOTAL	**5,200**	**2.23**	**0.60**	**0.11**	**0.03**	**0.04**	**0.000**	**0.004**	**3.20**
Measured & Indicated Resources									
Dana N/Pine	13,600	2.15	0.67	0.09	0.19	0.04	0.001	0.021	3.24
Dana S	58,500	2.37	0.77	0.09	0.10	0.02	0.002	0.040	3.41
Lismer									
Lismer Ext	4,400	2.17	0.58	0.13	0.02	0.04	0.000	0.000	3.15
Varley									
Razor									
Banshee									
Azen									
River Valley Ext									
TOTAL	**76,500**	**2.32**	**0.74**	**0.09**	**0.11**	**0.02**	**0.002**	**0.034**	**3.36**

Figure 14.18 is an inclined plan view of the pit shells generated at River Valley. The approximate strike length of each of the pits is provided to demonstrate the size of the potential resource. The blocks displayed inside the pits are greater than 0.35 g/t PdEq.

Figure 14.19 is a pseudo long section displaying the pit shells and the underground resource blocks above 2.0 g/t PdEq. All the potential underground resources are in close proximity to the bottom of the open pits and can easily be accessed from a portal located near the pit bottoms.

Figure 14.18 River Valley Pit Shells (inclined view – not to scale)

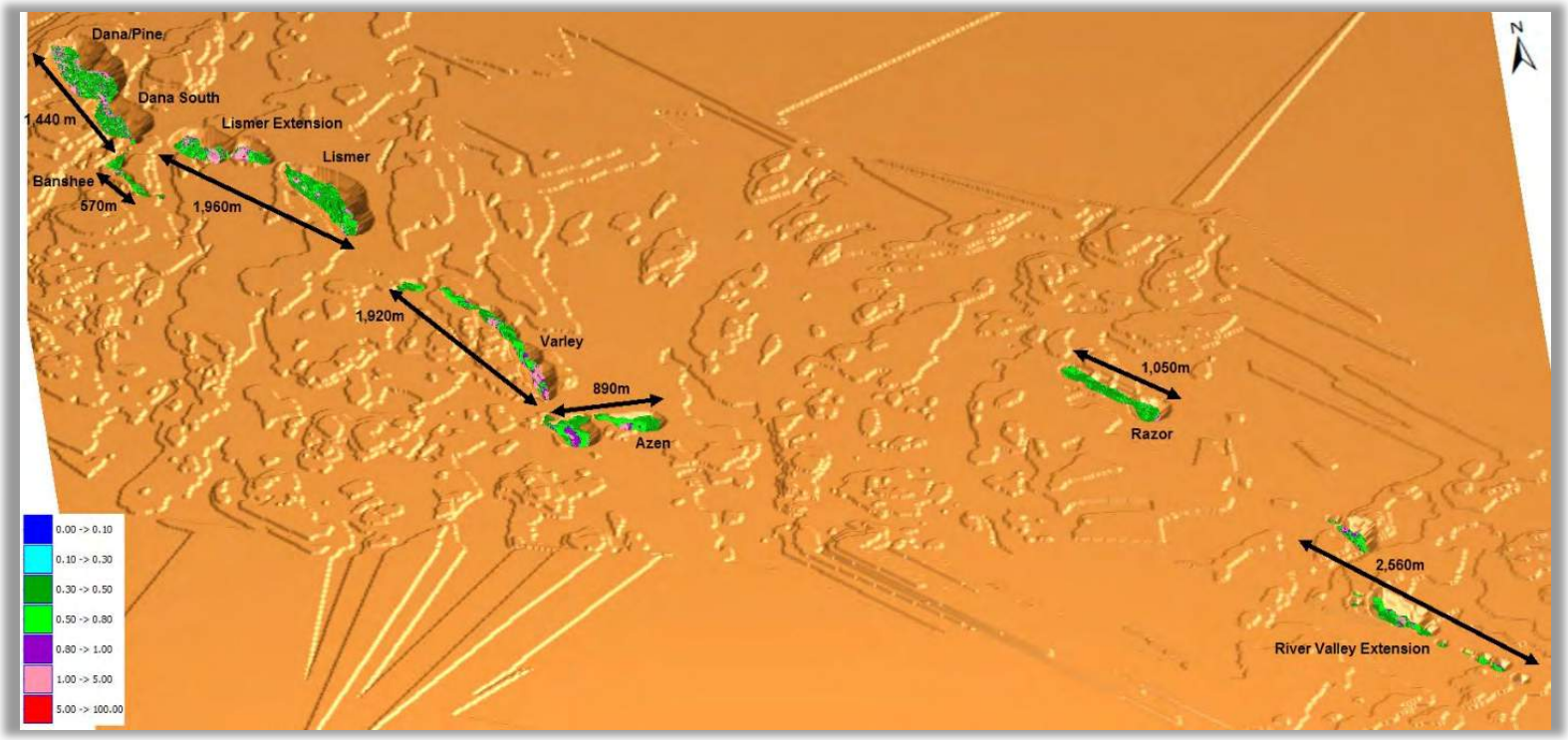
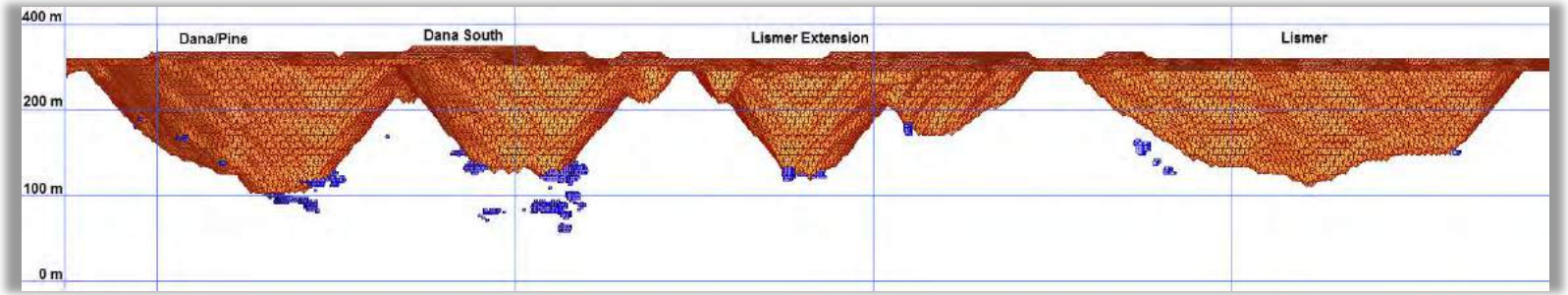


Figure 14.19 River Valley Underground Resources (looking northeast)



14.10 VALIDATION

The River Valley model was validated by three methods:

- Visual comparison of colour-coded block model grades with composite grades on section and plan.
- Comparison of the global mean block grades for OK, ID^2, NN, and composites.
- Swath plots of the various zones in both plan and section views.

14.10.1 VISUAL VALIDATION

The visual comparisons of the block model grades with composite grades for each of the zones show a reasonable correlation between the values. No significant discrepancies were apparent from the sections reviewed, yet grade smoothing is apparent in some locations due to the distance between drill samples being broader in some regions.

Figures 14.20 to 14.30 display the comparison between the block model and the composited drillholes.

Figure 14.20 Dana North – Pine Model vs. Diamond Drillhole Comparison – Section 250

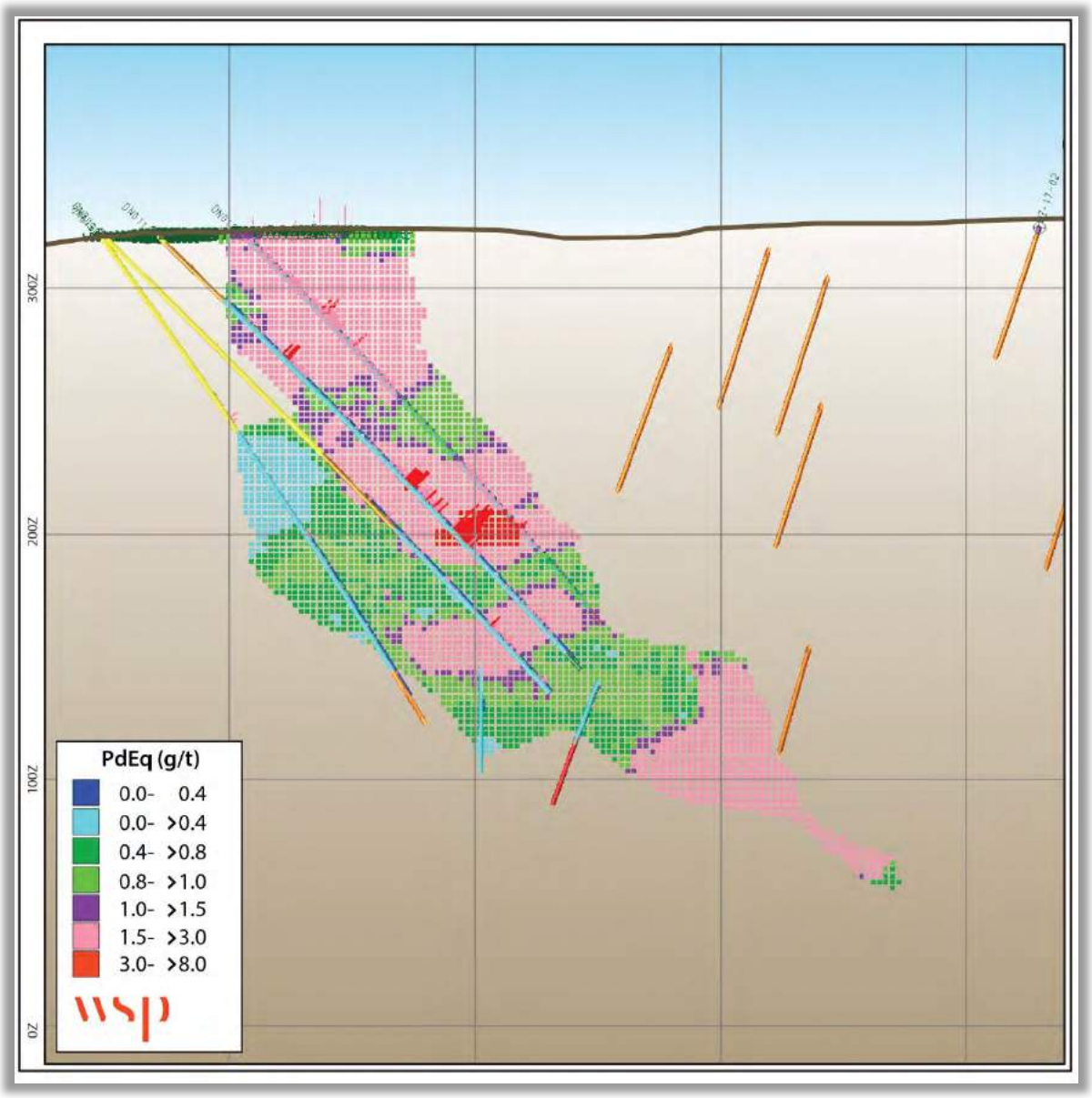


Figure 14.21 Dana North – Pine Model vs. Diamond Drillhole Comparison – Section 270

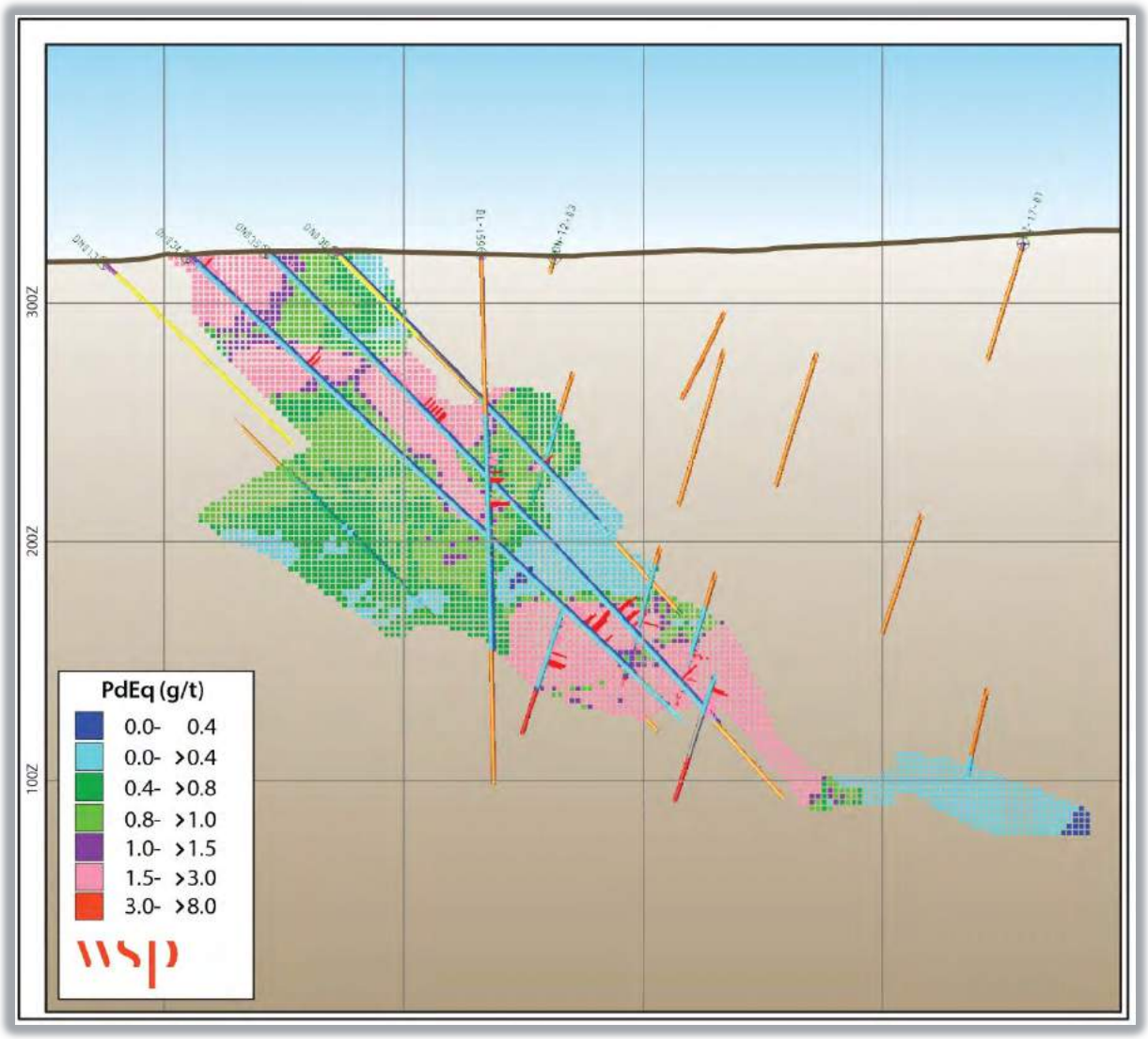


Figure 14.22 Dana North – Pine Model vs. Diamond Drillhole Comparison – Section 290

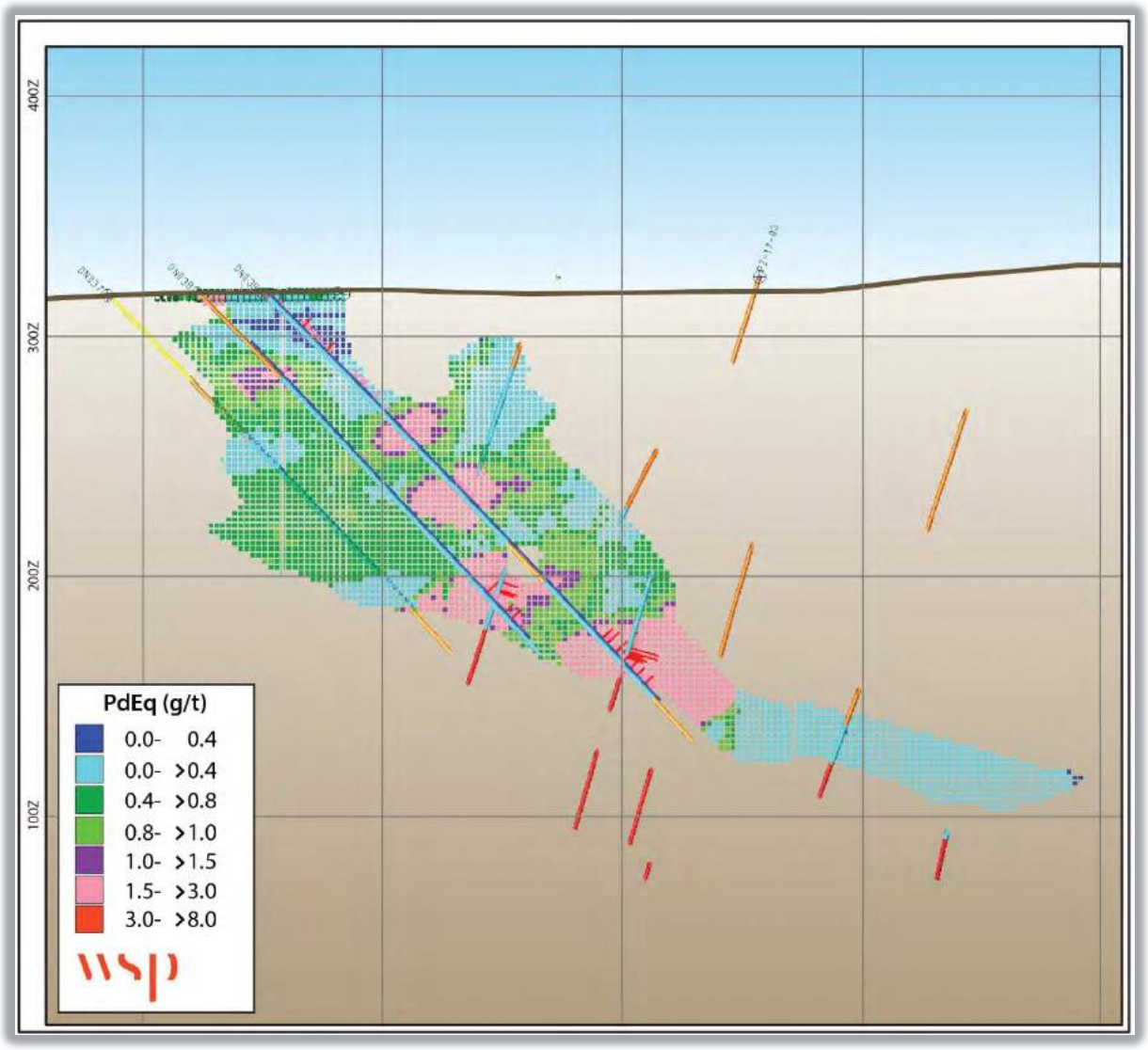


Figure 14.23 Dana South Model vs. Diamond Drillhole Comparison

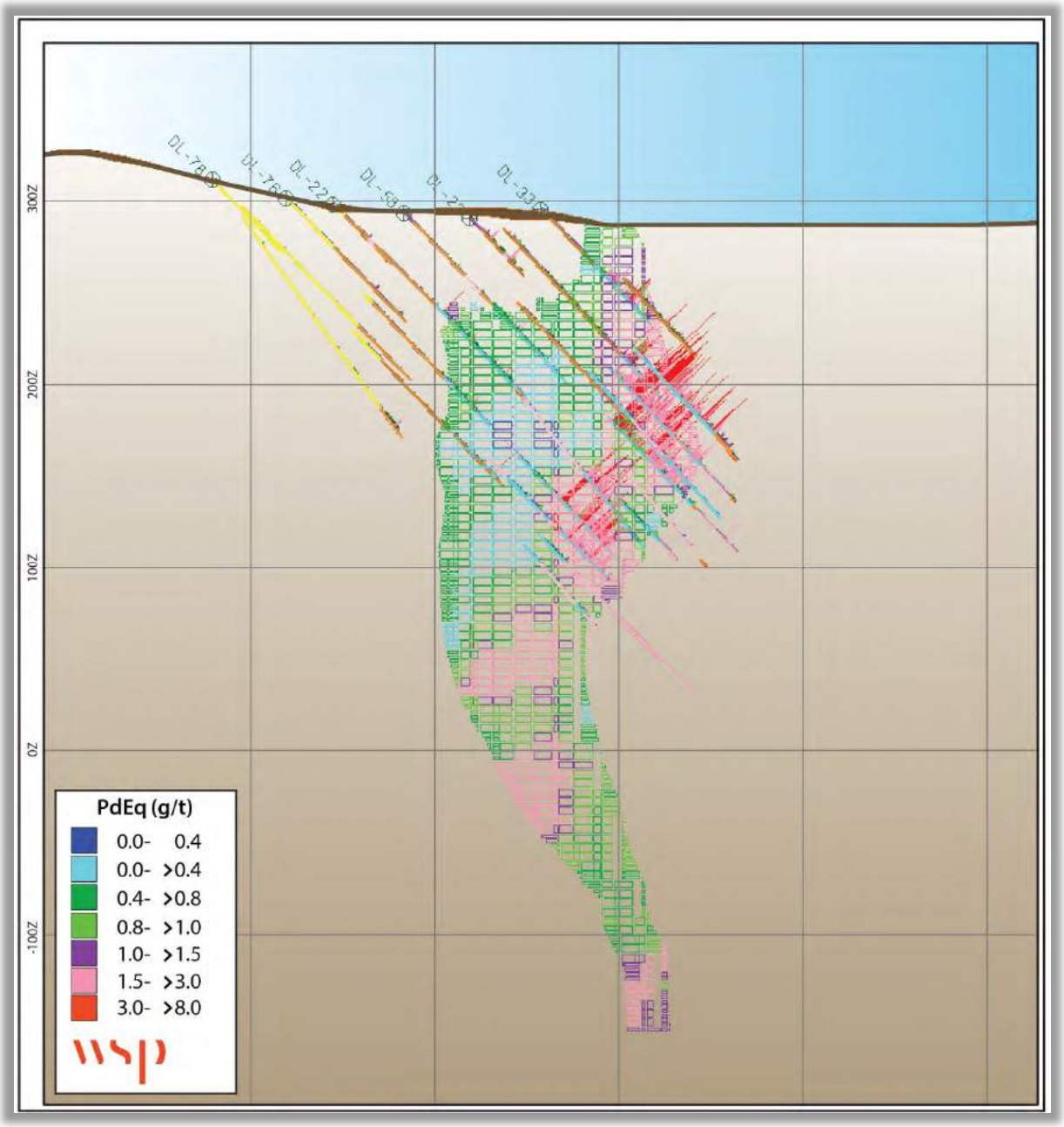


Figure 14.24 Banshee Model vs. Diamond Drillhole Comparison

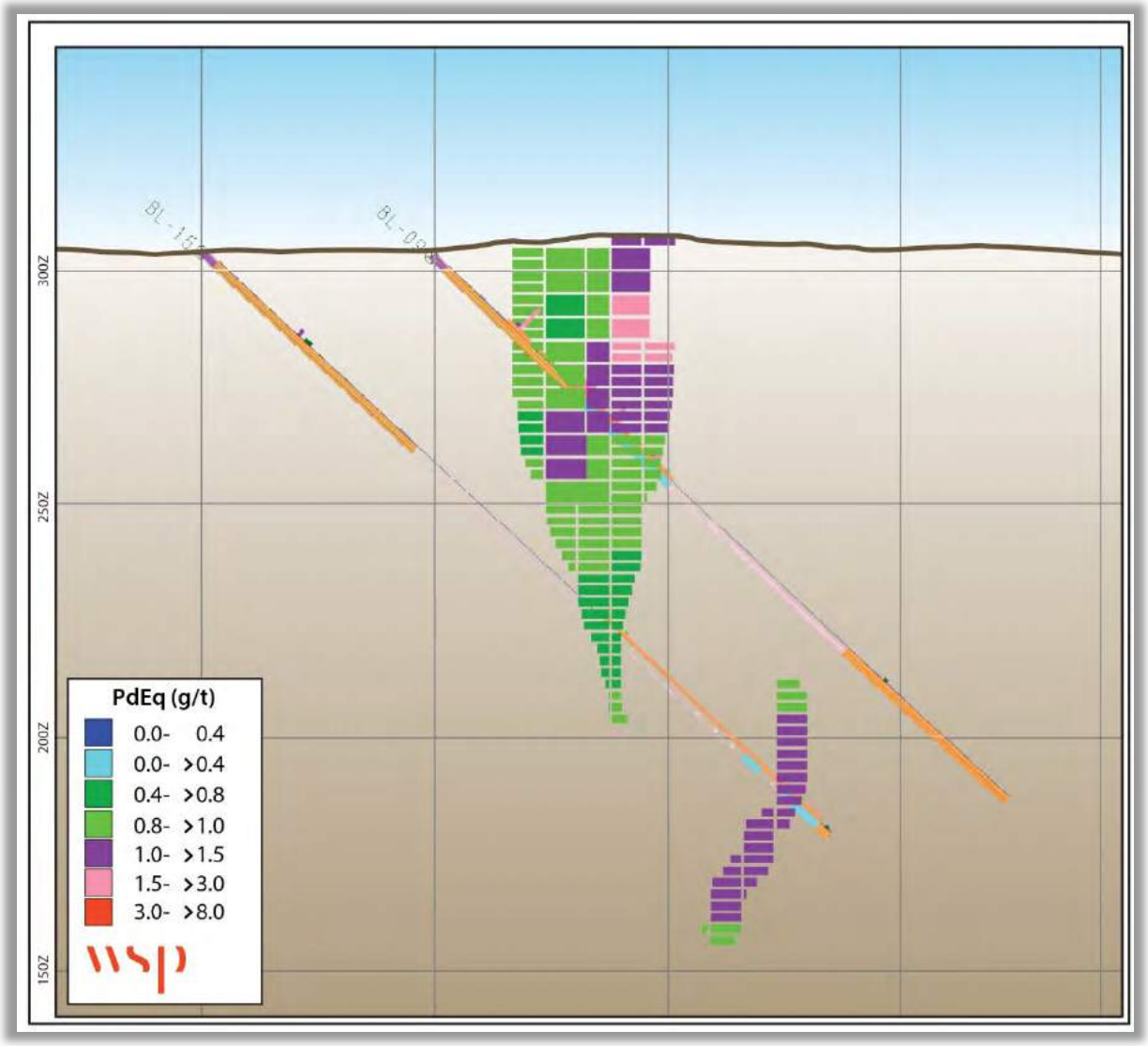


Figure 14.25 Lismer Model vs. Diamond Drillhole Comparison

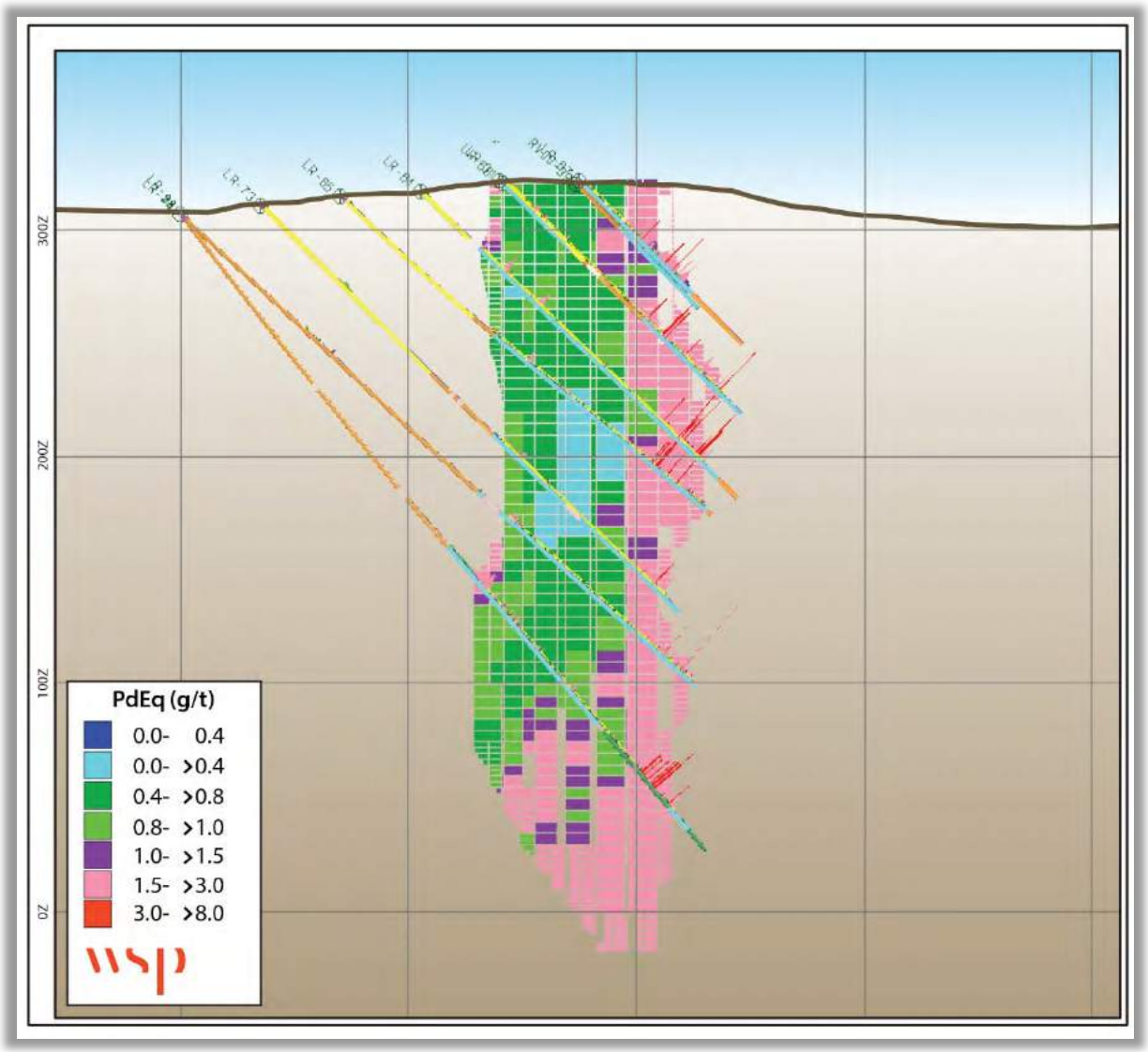


Figure 14.26 Lismer Extension Model vs. Diamond Drillhole Comparison

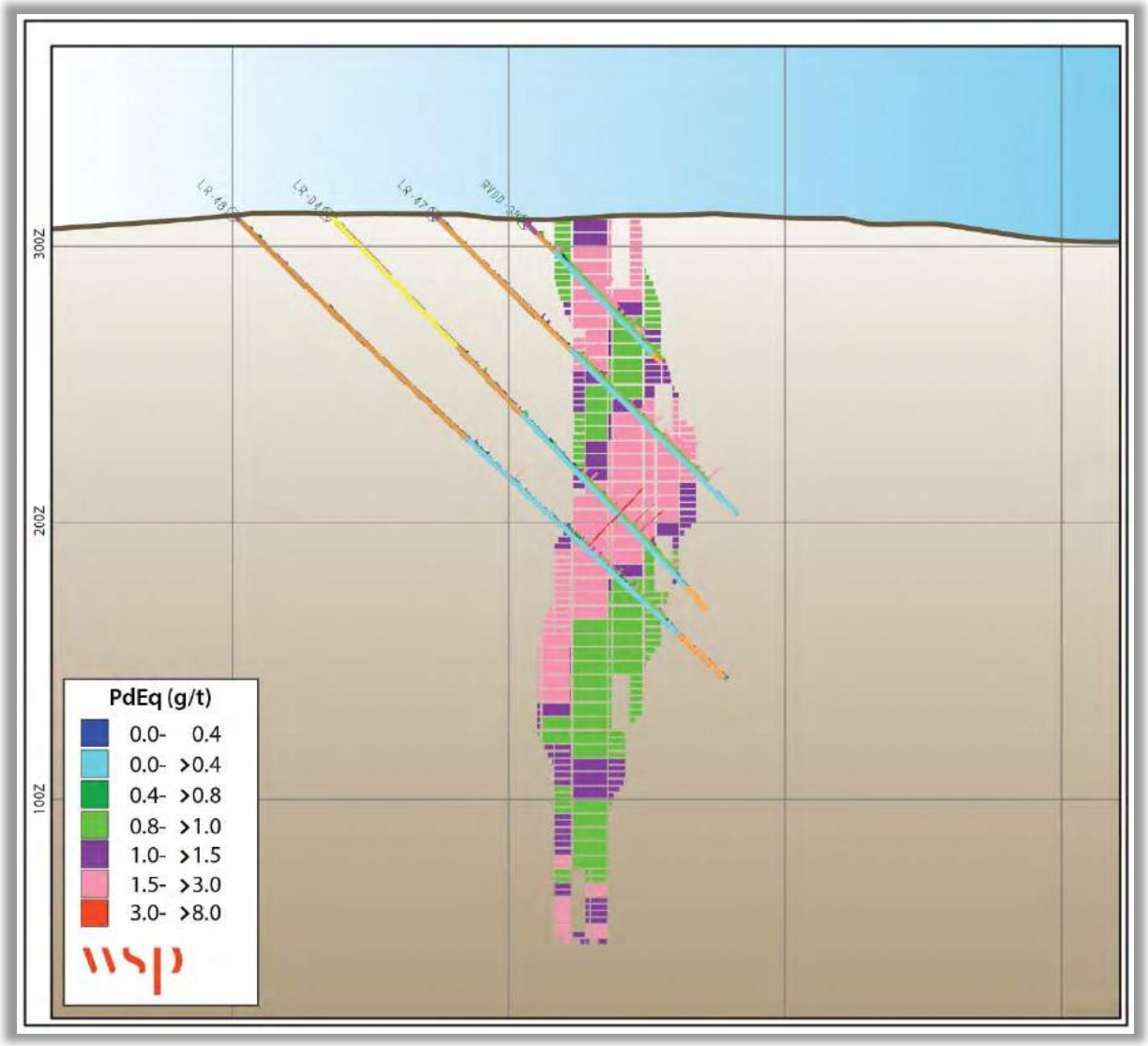


Figure 14.27 Varley Model vs. Diamond Drillhole Comparison

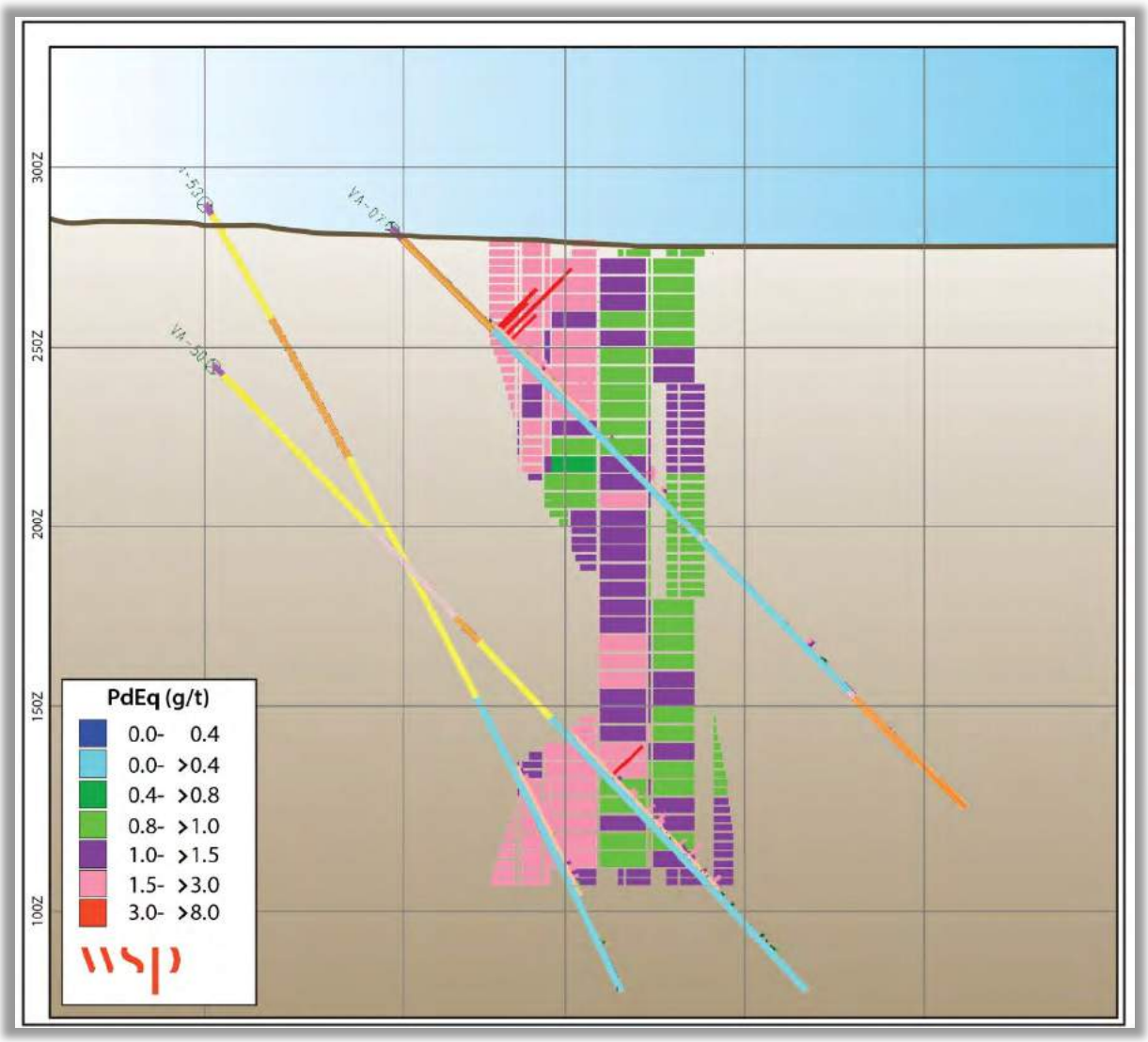


Figure 14.28 Azen Model vs. Diamond Drillhole Comparison

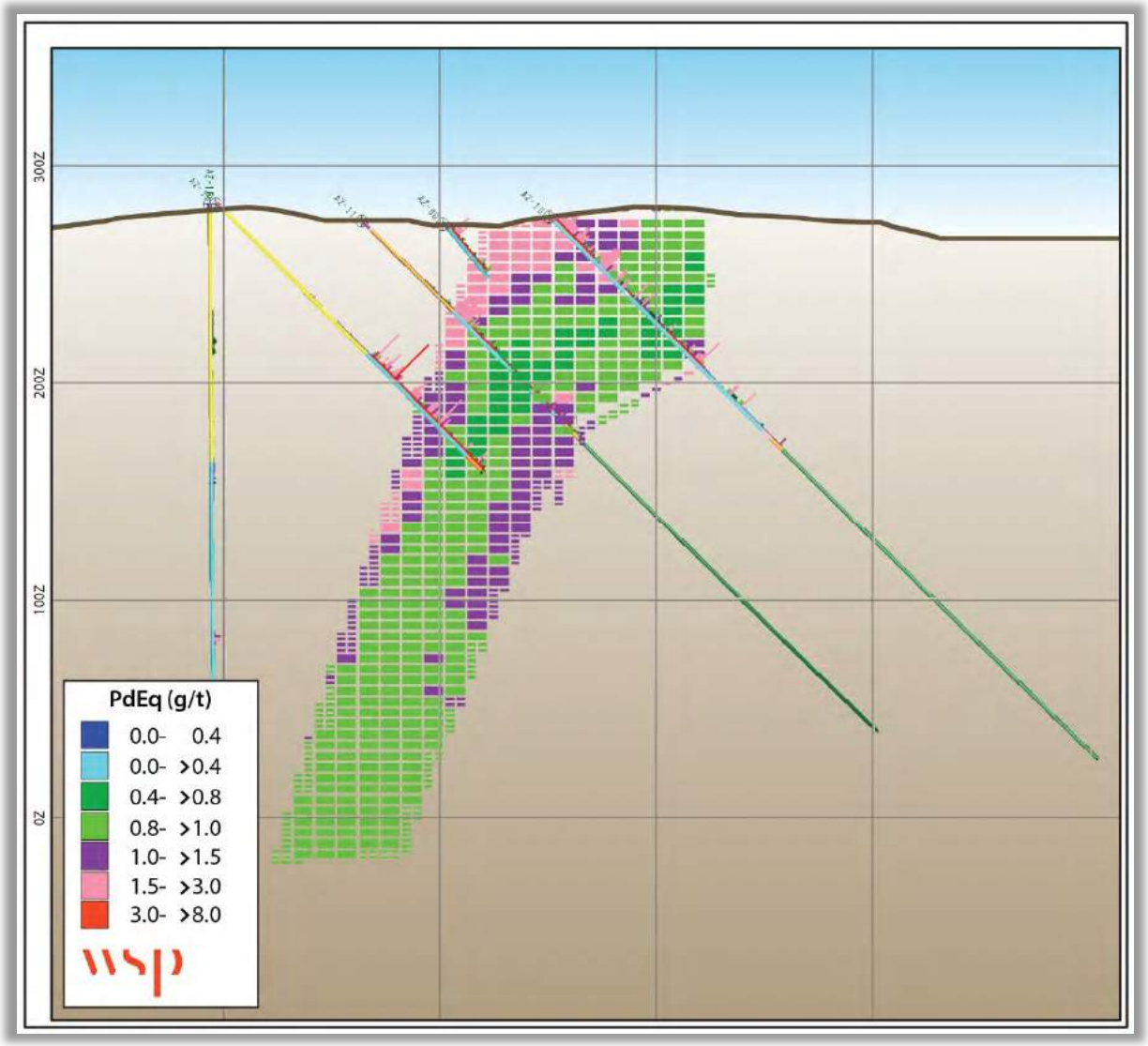


Figure 14.29 Razor Model vs. Diamond Drillhole Comparison

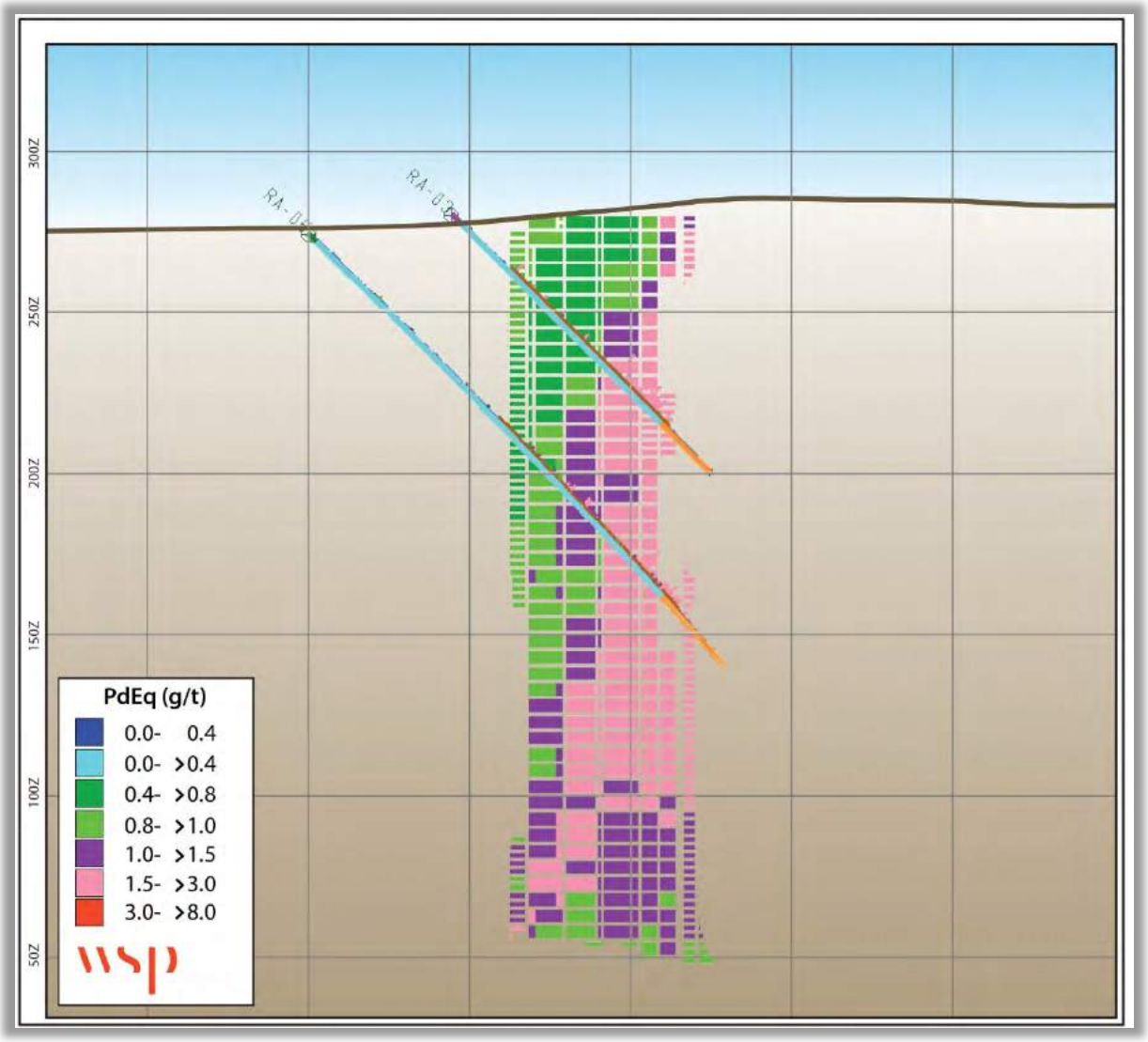
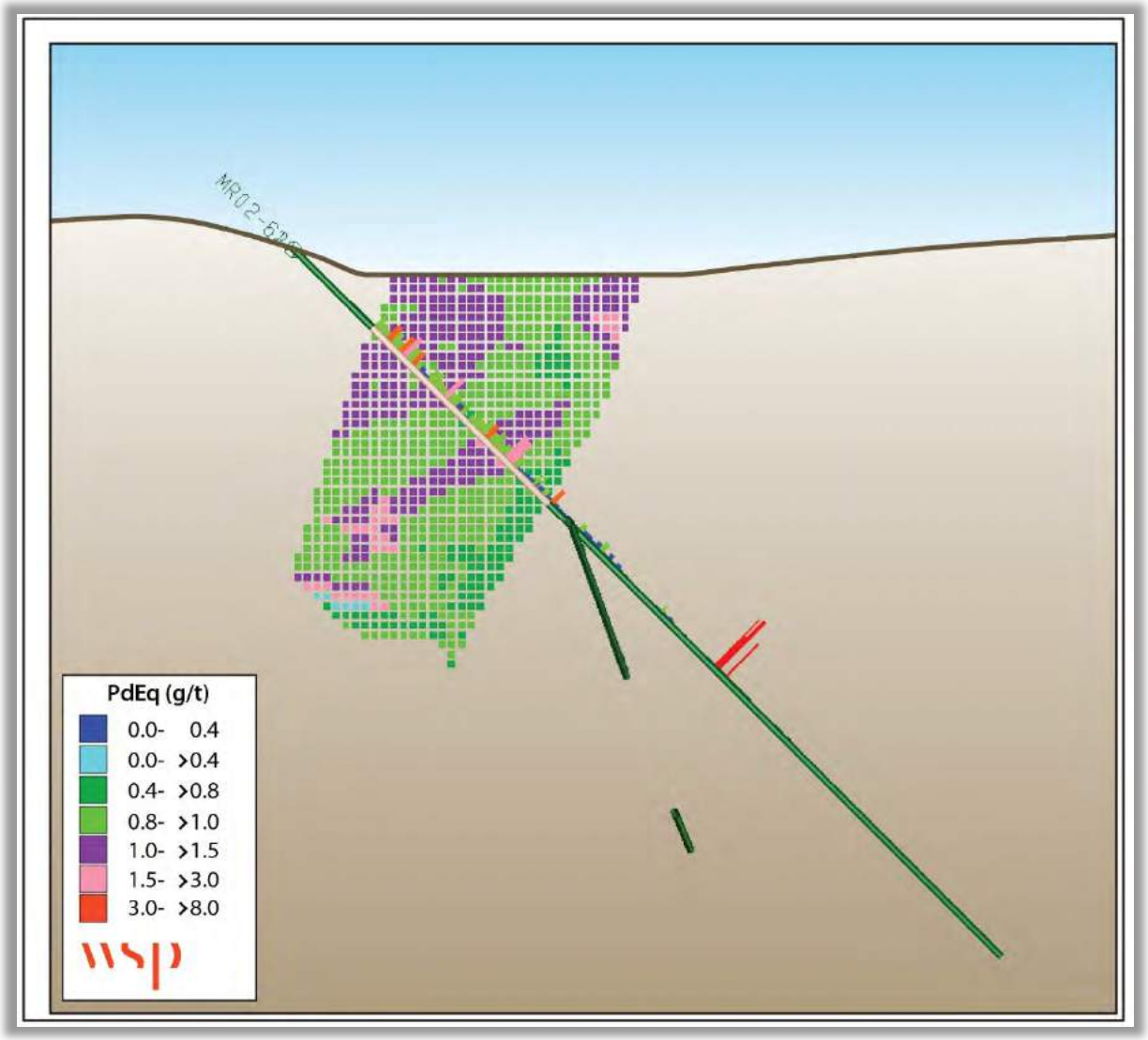


Figure 14.30 River Valley Extension Model vs. Diamond Drillhole Comparison – North Limb



14.10.2 OVERALL COMPARISON

The overall block model statistics for the OK model were compared to the overall ID^2 and NN model values as well as to the composite capped drillhole data. Table 14.19 shows this comparison of the global estimates for the three estimation method calculations. In general, there is agreement between the OK, ID^2, and NN models. Larger discrepancies are reflected as a result of lower drill density in some portions of the model. There is a degree of smoothing apparent when compared to the diamond drill statistics. Comparisons were made using all blocks at a 0 g/t cutoff.

Table 14.19 Comparison of Estimation Method Calculations

Zone			DDH cap/composite	NN Grade	ID^2 Grade	OK Grade
Dana	100	Augt	0.033	0.025	0.025	0.025
		Ptgt	0.168	0.143	0.148	0.148
		Pdgt	0.435	0.348	0.359	0.361
		CuPer	0.051	0.044	0.045	0.046
		NiPer	0.015	0.013	0.013	0.013
		Fe-perc	2.713	5.627	5.776	5.726
		Co-ppm	27.956	18.739	18.330	18.322
		S-perc	0.203	0.104	0.101	0.102
		Ag-ppm	0.676	0.481	0.309	0.305
Pine Zone	150	Augt	0.028	0.020	0.020	0.020
		Ptgt	0.162	0.127	0.128	0.114
		Pdgt	0.460	0.328	0.330	0.314
		CuPer	0.052	0.042	0.041	0.039
		NiPer	0.017	0.014	0.014	0.014
		Fe-perc	3.618	4.358	4.400	4.311
		Co-ppm	34.078	27.173	27.324	27.216
		S-perc	0.222	0.162	0.165	0.159
		Ag-ppm	1.015	0.238	0.216	0.828
Dana South	200	Augt	0.034	0.029	0.030	0.029
		Ptgt	0.181	0.160	0.165	0.163
		Pdgt	0.504	0.425	0.436	0.427
		CuPer	0.041	0.036	0.037	0.036
		NiPer	0.010	0.009	0.009	0.009
		Fe-perc	2.473			2.315
		Co-ppm	27.617	26.514	26.782	26.870
		S-perc				0.085
		Ag-ppm	0.605			0.542
Lismer	300	Augt	0.025	0.021	0.023	0.022
		Ptgt	0.141	0.122	0.125	0.125
		Pdgt	0.321	0.289	0.296	0.296
		CuPer	0.035	0.037	0.040	0.040
		NiPer	0.011	0.013	0.014	0.014
		Fe-perc	1.721			1.014
		Co-ppm	23.720	21.521	21.518	21.760
		S-perc				0.000
		Ag-ppm	0.440			0.137

(table continues on next page)

Zone			DDH cap/composite	NN Grade	ID^2 Grade	OK Grade
Lismer Ext	400	Augt	0.029	0.028	0.029	0.029
		Ptgt	0.177	0.184	0.178	0.180
		Pdgt	0.411	0.423	0.415	0.422
		CuPer	0.046	0.046	0.049	0.049
		NiPer	0.011	0.012	0.012	0.012
		Fe-perc	1.545			0.817
		Co-ppm	20.751	19.293	17.244	17.623
		S-perc				0.026
		Ag-ppm	0.436			0.103
Varley	500	Augt	0.026	0.023	0.023	0.022
		Ptgt	0.147	0.130	0.128	0.129
		Pdgt	0.376	0.327	0.315	0.321
		CuPer	0.044	0.043	0.042	0.042
		NiPer	0.013	0.012	0.012	0.012
		Fe-perc	2.116			1.614
		Co-ppm	19.226	20.918	18.542	18.700
		S-perc				0.110
		Ag-ppm	0.292			0.113
Razor	600	Augt	0.016	0.019	0.018	0.018
		Ptgt	0.086	0.086	0.086	0.086
		Pdgt	0.191	0.199	0.199	0.197
		CuPer	0.029	0.033	0.031	0.031
		NiPer	0.020	0.021	0.020	0.021
		Fe-perc	1.109			0.601
		Co-ppm	14.898	14.233	13.665	13.636
		S-perc				0.085
		Ag-ppm	0.318			0.069
Banshee	700	Augt	0.024	0.021	0.020	0.020
		Ptgt	0.133	0.131	0.110	0.113
		Pdgt	0.219	0.223	0.183	0.195
		CuPer	0.036	0.035	0.032	0.032
		NiPer	0.007	0.007	0.006	0.007
		Fe-perc				
		Co-ppm				
		S-perc				
		Ag-ppm				

(table continues on next page)

Zone			DDH cap/composite	NN Grade	ID^2 Grade	OK Grade
Azen	800	Augt	0.018	0.017	0.017	0.017
		Ptgt	0.089	0.086	0.081	0.083
		Pdgt	0.259	0.260	0.242	0.250
		CuPer	0.049	0.052	0.048	0.049
		NiPer	0.024	0.025	0.024	0.024
		Fe-perc	2.017			0.500
		Co-ppm	33.411	22.564	32.252	32.646
		S-perc				0.049
		Ag-ppm	1.928			0.132
River Valley Extension	910	Augt	0.033		0.020	
		Ptgt	0.149		0.132	
		Pdgt	0.274		0.277	
		CuPer	0.054		0.049	
		NiPer	0.027		0.025	
		Fe-perc				
		Co-ppm				
		S-perc				
		Ag-ppm				
River Valley Extension	920	Augt	0.041		0.022	
		Ptgt	0.172		0.151	
		Pdgt	0.195		0.183	
		CuPer	0.050		0.044	
		NiPer	0.018		0.015	
		Fe-perc				
		Co-ppm				
		S-perc				
		Ag-ppm				
River Valley Extension	930	Augt	0.031		0.021	
		Ptgt	0.164		0.153	
		Pdgt	0.309		0.307	
		CuPer	0.042		0.039	
		NiPer	0.032		0.030	
		Fe-perc				
		Co-ppm				
		S-perc				
		Ag-ppm				

14.10.3 SWATH PLOTS

Swath plots of eastings, northings, and elevations were generated for each mineralized zone respectively. These plots are comparing the OK estimates with the NN and ID^2 estimates and the associated boreholes.

For each element, there is correlation between the three estimation methods. There is grade smoothing of the block models compared to the borehole data, which is a common effect of the modeling process. Figures 14.31 to 14.36 are an example of the swath plots created to validate the block model results.

Figure 14.31 Dana North Palladium Easting Swath Plot

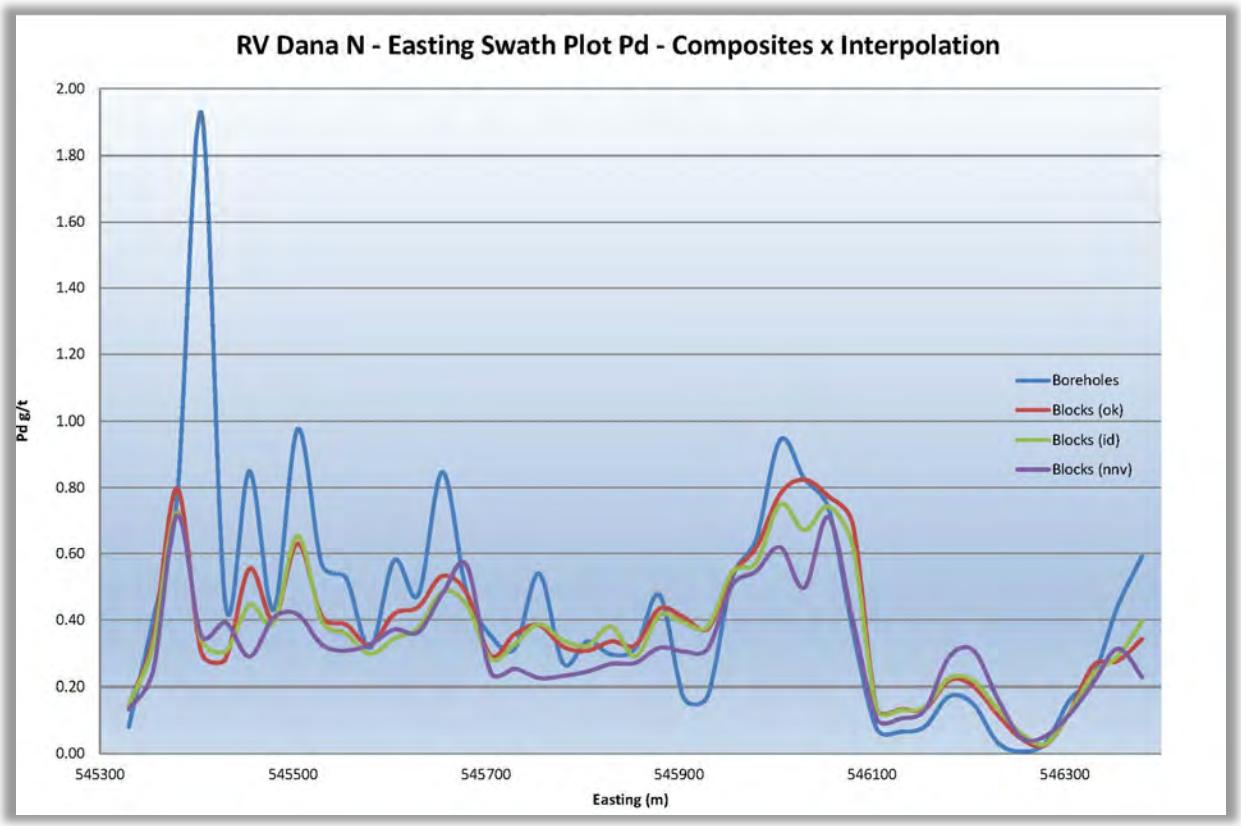


Figure 14.32 Dana North Palladium Northing Swath Plot

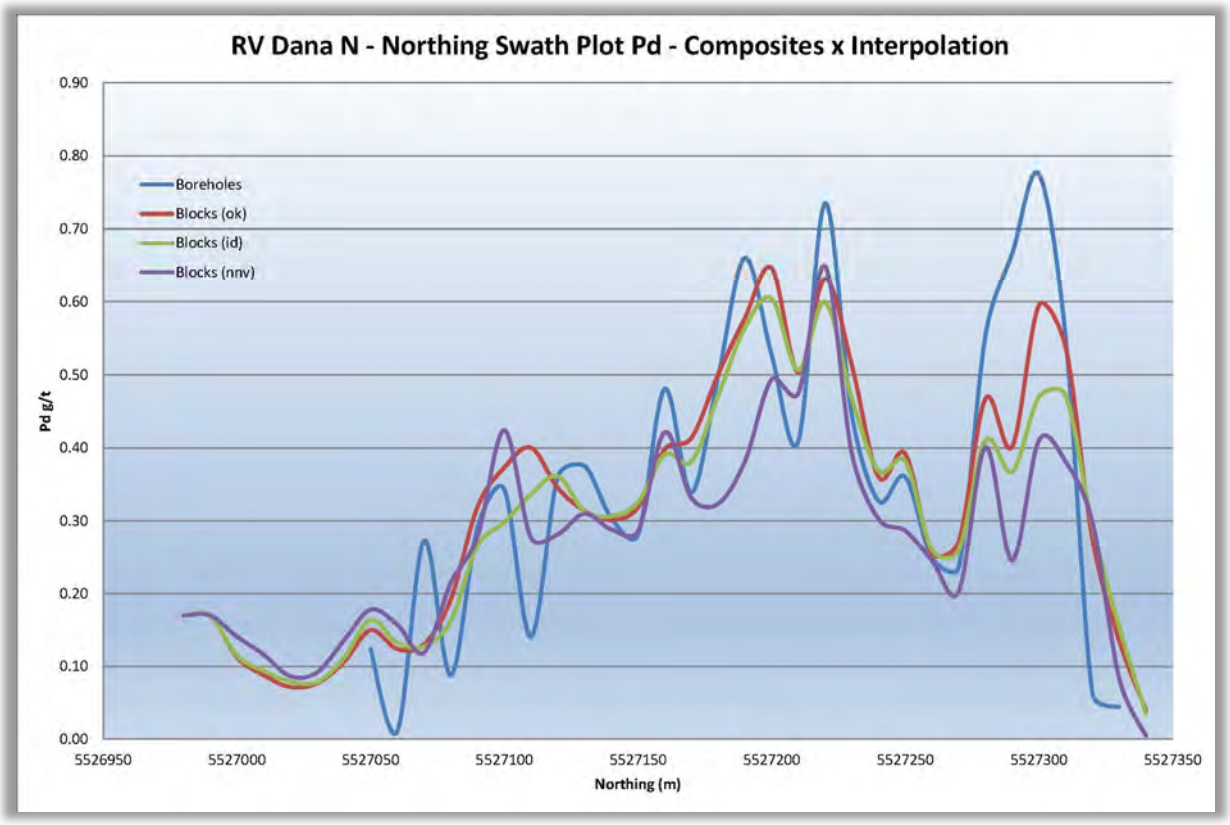


Figure 14.33 Dana North Palladium Elevation Swath Plot

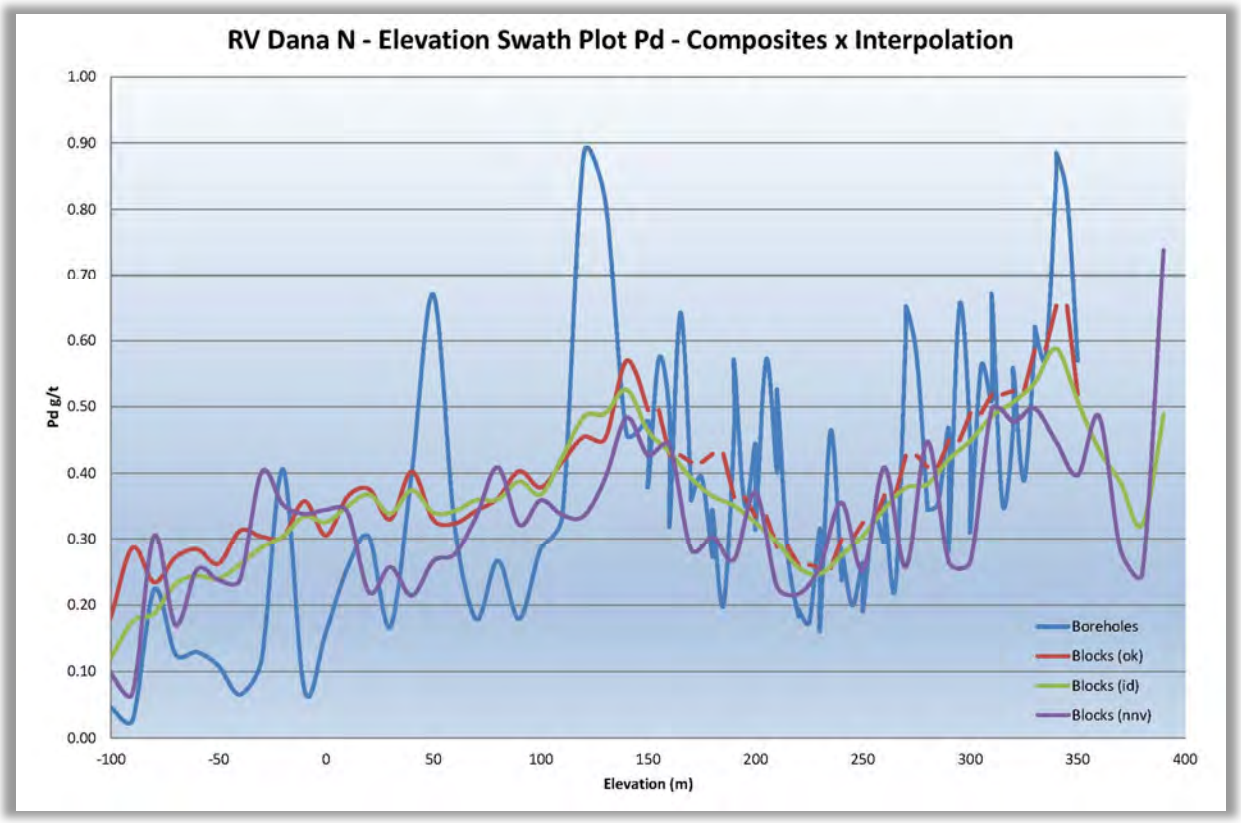


Figure 14.34 Dana North Platinum Easting Swath Plot

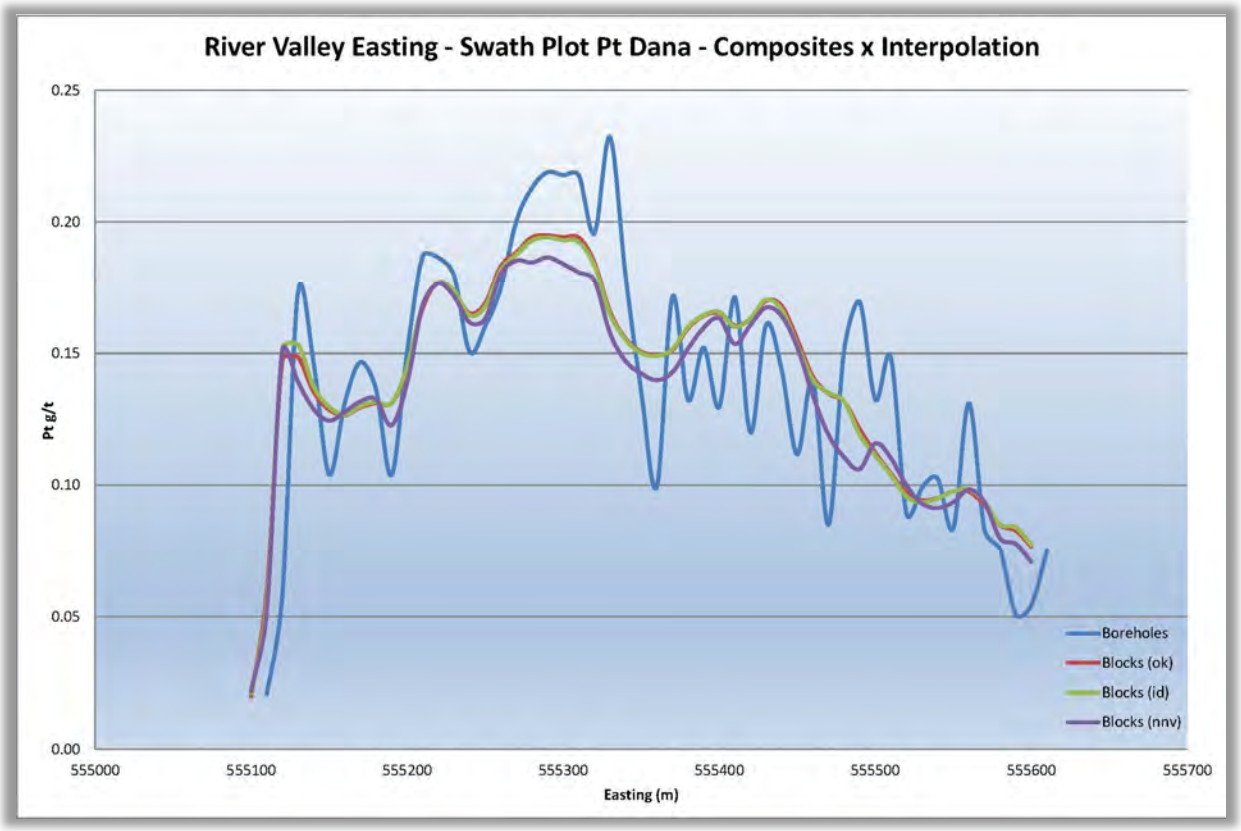


Figure 14.35 Dana North Platinum Northing Swath Plot

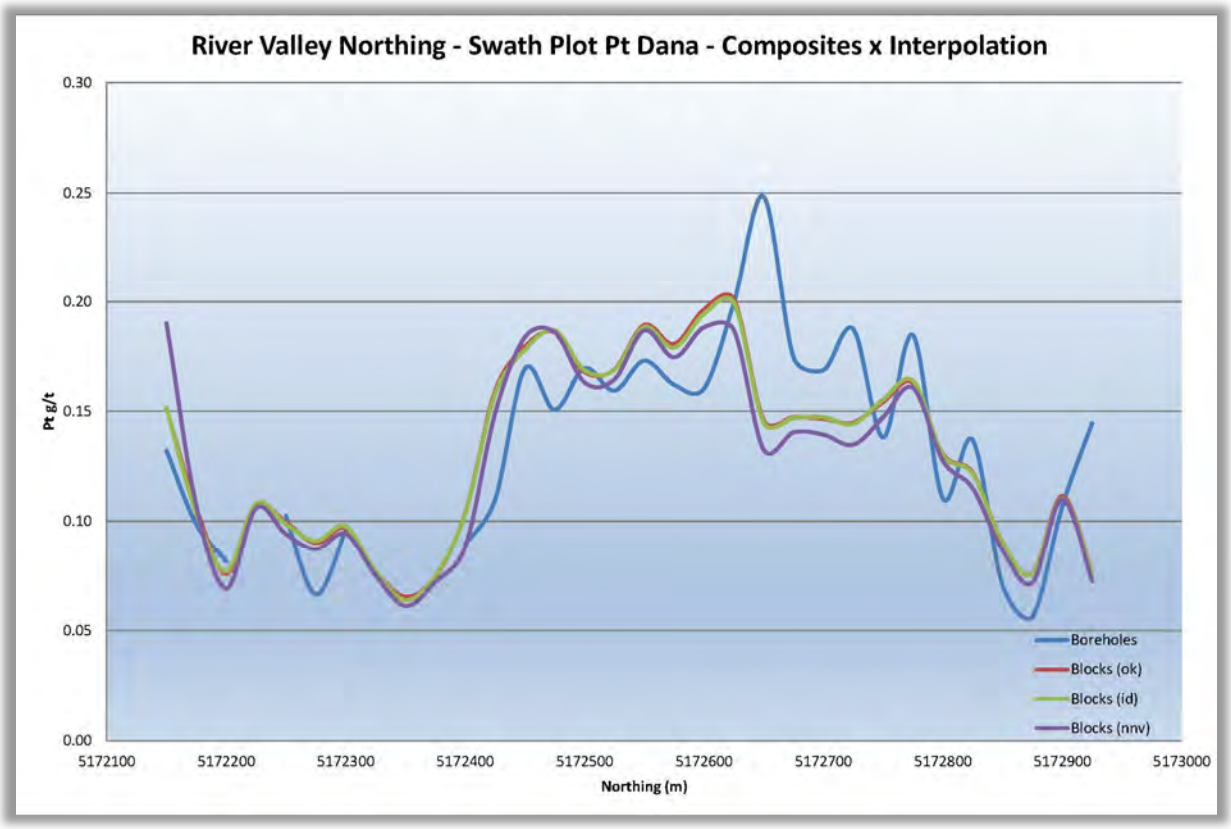
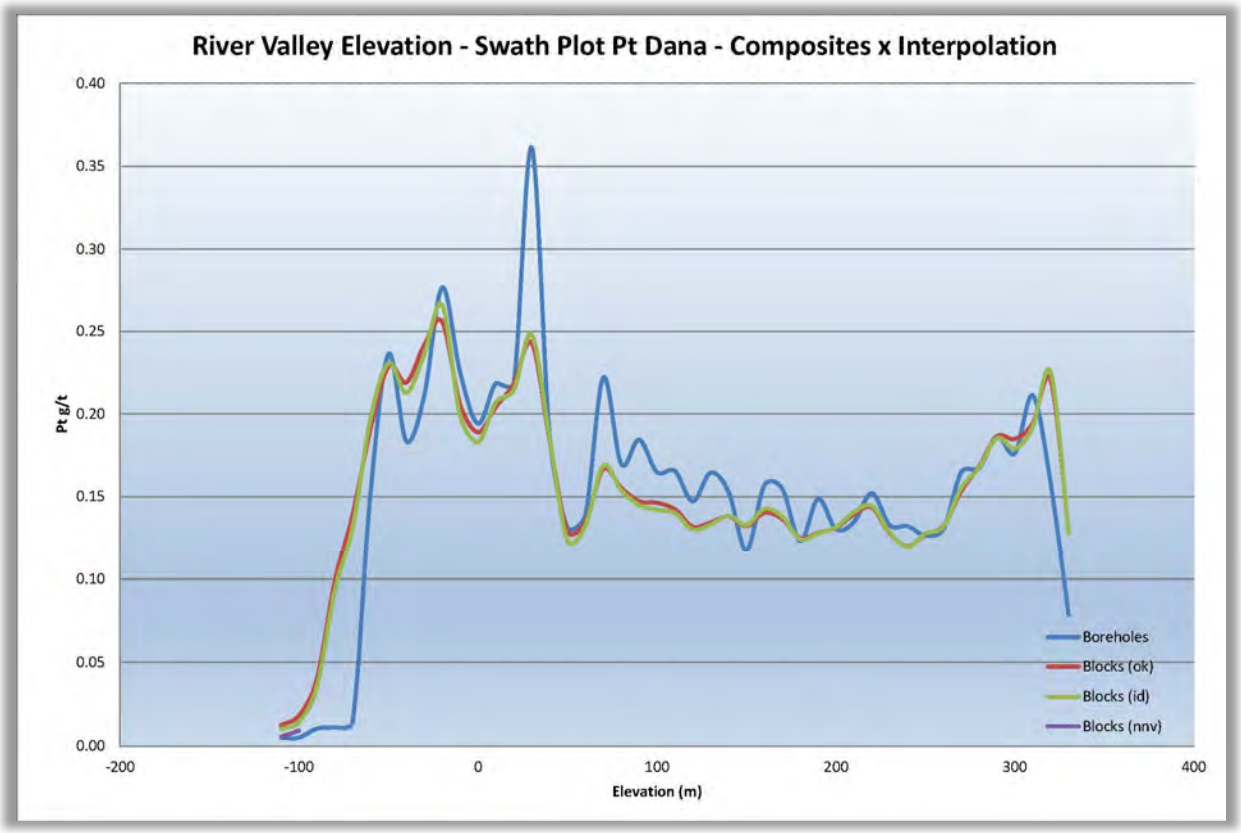


Figure 14.36 Dana North Platinum Elevation Swath Plot



14.10.4 PREVIOUS ESTIMATES

PFN and their joint venture partner have completed four resource estimates prior to 2012. Table 14.20 summarizes the previous results. The QP has not reviewed the models yet consider the models to be material. The information summarized in the table has been sourced from various internal company reports and press releases available from NAM's website.

Table 14.20 Summary of Previous Estimates

Year	Company	Activities	Results
2001	PFN/ Amplats	An Independent Mineral Resource Study was carried out by Derry Mitchener Booth and Wahl (DMBW) as of September 26, 2001 which incorporated Phase I to IV of drilling which amounted to 22,791.74 m in 138 holes. Report estimated an in situ resource at Dana Lake and Lismer Ridge (*Booth and Wahl, 2001*).	13 Mt (measured + indicated + inferred) at 0.35 g/t Pt, 1.04 g/t Pd, & 0.07 g/t Au using a 0.7 g/t Pt + Pd cutoff grade. This was non-compliant.
2002	PFN/ Amplats	DMBW completed a Revised Mineral Resource Estimate, as of September 13, 2002 to incorporate Phase V drill program for the Dana Lake and Lismer's Ridge deposit. A total of 42,627 m in 221 holes had been conducted in 5 phases of drill programs (*Booth and Wahl, 2002*).	18.1 Mt (measured + indicated) at 0.344 g/t Pt, 1.016 g/t Pd, & 0.063 g/t Au using a 0.7 g/t Pt+Pd cutoff grade. An additional 5.8 Mt added as inferred at 0.290 g/t Pt, 0.819 g/t Pd, & 0.050 g/t Au using a 0.7 g/t Pt+Pd cutoff grade.
2004	PFN/ Amplats	DMBW completed a Revised Mineral Resource Estimate, as of April 30, 2004 to incorporate Phase VI drill program for the Dana Lake, Lismer's Ridge, and Varley deposits. A total of 83,838 m in 416 holes had been conducted in 6 phases of drill programs (*Booth and Wahl, 2004*).	25.4 Mt (measured + indicated) at 0.335 g/t Pt, 0.979 g/t Pd, & 0.061 g/t Au using a 0.7 g/t Pt+Pd cutoff grade. An additional 3.6 Mt added as inferred at 0.278 g/t Pt, 0.760 g/t Pd, & 0.049 g/t Au using a 0.7 g/t Pt+Pd cutoff grade.
2006	PFN/ Amplats	DMBW completed a Revised Mineral Resource Estimate, as of March 27, 2006 to incorporate Phase VI and VII drill program for the North Lismer and Varley Zones. A total of 83,838 m in 416 holes had been conducted in previous estimate in 2004, an additional 31 holes from Lismer's Ridge Zone and 70 core holes at Varley were utilized for the purpose of the Revised Mineral Resource Estimate (*Booth and Wahl, 2006*).	19.3 Mt (measured + indicated) at 0.395 g/t Pt, 1.181 g/t Pd, & 0.070 g/t Au using a 1.0 g/t Pt+Pd cutoff grade. An additional 881,000 t added as inferred at 0.465 g/t Pt, 1.356 g/t Pd, & 0.073 g/t Au using a 1.0 g/t Pt+Pd cutoff grade.
2012	PFN	Tetra Tech completed a revised Mineral Resource Estimate, as of June13, 2012 to incorporate Phase VIII drilling program. A total of 135 holes were included in the estimate (*McCracken, 2012*).	91.3 Mt (measured + indicated) at 0.22 g/t Pt, 0.58 g/t Pd, & 0.040 g/t Au using a 0.8 g/t PdEq cutoff grade. An additional 35.9 Mt added as inferred at 0.14 g/t Pt, 0.36 g/t Pd, & 0.03 g/t Au using a 0.8 g/t PdEq cutoff grade.

14.10.5 COMPARISON OF CURRENT ESTIMATE WITH 2012 ESTIMATE

PFN commissioned Tetra Tech to complete a revised resource estimate on the River Valley Property in 2012. A copy of "Technical Report and Resource Estimate on the River Valley PGM Project, Northern Ontario" prepared by Tetra Tech is available on SEDAR by searching Pacific North West Capital Corporation technical reports (***McCracken, 2012***).

Table 14.21 compares the basic parameters of the 2012 estimate with the current 2018 NI 43-101 resource. Table 14.22 illustrates the differences in the prior resource estimate with the current 2018 estimate.

The fundamental difference between the 2012 Tetra Tech resource and the 2018 WSP resource is that the 2018 WSP resource adds the Pine and River Valley Extension zones to the resources totals. The new geological model also included rhodium in the PdEq formula, which was not incorporated in the Tetra Tech model. A change of the metal pricing effected the results of the PdEq values within the WSP model even though the individual grades would not have changed.

Table 14.21 2012 vs. 2018 Model Comparison

	2012 Tetra Tech Model	2018 WSP Model
Number of Drillholes	462 evaluated.	609 evaluated.
Grade Capping	Parrish Analysis No grade capping on any elements.	Parrish Analysis and log Probability plots No grade capping on any elements.
Composite Length	2.0 m average for all zones back stitching allows for "tail" material to be spread evenly over the entire hole composite.	2.0 m average for all zones back stitching allows for "tail" material to be spread evenly over the entire hole composite.
Cutoff Grade	0.8 g/t PdEq.	0.35 g/t PdEq and 2.00 g/t PdEq.
Number of Mineral Zones	8	10
Density	2.94 (length weighted mean of 432 samples).	2.94 (length weighted mean of 432 samples).
Block Size	10 x 10 x 5 (500 m^3) - single subcell.	2.5 x 5 x 2.5 (31.25 m^3) - no subcell.
Estimation Method	OK with ID^2 and NN validation.	OK with ID^2 and NN validation.

Table 14.22 Differences between 2012 and 2018 Estimates

	Tonnes	Pd (g/t)	Pt (g/t)	Rh (g/t)	Au (g/t)	Cu (%)	Ni (%)	Co (%)	PdEq (g/t)
2012 Tetra Tech Model									
Measured Resource @ 0.8 g/t PdEq cutoff	25,584,850	0.63	0.23		0.04	0.06	0.02	0.003	
Indicated Resource @ 0.8 g/t PdEq cutoff	65,754,700	0.56	0.21		0.04	0.06	0.02	0.002	
Inferred Resources @ 0.8 g/t PdEq cutoff	35,911,000	0.36	0.14		0.03	0.06	0.03	0.002	
2018 WSP Model									
Measured Resource @ 0.35 g/t + 2.00 g/t PdEq cutoff	56,096,700	0.54	0.36	0.102	0.03	0.05	0.04	0.008	0.51
Indicated Resource @ 0.35 g/t + 2.00 g/t PdEq cutoff	43,158,400	0.49	0.20	0.011	0.03	0.05	0.02	0.002	0.82
Inferred Resources @ 0.35 g/t + 2.00 g/t PdEq cutoff	52,202,000	0.31	0.15	0.000	0.03	0.05	0.03	0.001	0.63

15 ADJACENT PROPERTIES

Inventus Mining Inc. (Inventus) entered into a share purchase agreement with the shareholders of Mount Logan Resources Ltd. (Mount Logan) which included the purchase of all outstanding shares of Mount Logan. Mount Logan owned a 100% interest in 23 unpatented mining claims northeast of Sudbury and holds an option to acquire up to a 70% interest in a further 16 claims which are contiguous to the 23 claims in the same area known as the Pardo property.

Aggressive drilling programs have been completed from 2009 to 2017 on the Pardo property. Inventus extracted a 1,000-tonne surface bulk sample in 2017 and processed the material at the McEwen Mining's Black Fox Mill near Timmins.

16 OTHER RELEVANT DATA AND INFORMATION

There is no other relevant data or information on the Project.

17 INTERPRETATION AND CONCLUSIONS

Based on the review of the available information and observations made during the site visit, the QP concludes the following, in no particular order of perceived importance:

- The Property is currently held 100% by NAM.
- The Property is analogous to contact-style PGM mineralization developed as the result of sulphur-saturation brought on by the interaction of the fertile parental magma with the surrounding country rock lithologies. This style of mineralization is present in other mineral resources in the region.
- The Property is associated with various phases of mafic to ultramafic intrusives with variable alteration, minor sulphide content.
- The breccia boundary with the Archean footwall is the primary target zone for PGE mineralization.
- NAM has a strong understanding of the regional and local geology to support the interpretation of the mineralized zones on the Property.
- Mineralization is currently defined in nine zones of various thicknesses over a strike length of approximately 16 km.
- IP surveys on the footwall contact of the River Valley intrusive have identified a new style of mineralization (Pine Zone), which opens up a new area for exploration on the Project.
- New targets have been discovered on the Property with characteristics of reef-style mineralization that warrants further investigation.
- Drilling and sampling procedures, sample preparation, and assay protocols are generally conducted in agreement with best practices.
- Verification of the drillhole collars, surveys, assays, core, and drillhole logs indicates the NAM data is reliable.
- Based on the QA/QC program, the data is sufficiently reliable to support the resource estimate generated for the ten zones on the Property.
- The mineral model has been constructed in conformance to industry standard practices.
- The geological understanding is sufficient to support the resource estimation.
- At a PdEq cutoff grade of 0.35 g/t, the combined Measured and Indicated Resource constrained within a pit shell is 99.2 Mt with an average grade of 0.52 g/t palladium, 0.29 g/t platinum, 0.06 g/t rhodium, 0.03 g/t gold, 0.05% copper, 0.03% nickel, and 0.006% cobalt. The Inferred Resource totals 52.2 Mt with an average grade of 0.31 g/t palladium, 0.15 g/t platinum, 0.0 g/t rhodium, 0.03 g/t gold, 0.05% copper, 0.03% nickel, and 0.001% cobalt.
- At a PdEq cutoff grade of 2.00 g/t, the combined Measured and Indicated Resource constrained within potential underground remnants is 76 Kt with an average grade of 2.32 g/t palladium, 0.74 g/t platinum, 0.03 g/t rhodium, 0.09 g/t gold, 0.12% copper, 0.02% nickel, and 0.002% cobalt. There is no Inferred Resource.
- The Property contains resources that are comparable to other advanced PGM projects in the Province.
- The specific gravity value used to determine that tonnage was derived from limited samples, which may reflect a lack of precision with respect to the resource tonnages.
- The resource zones at the Property remain open in the down-dip directions.

18 RECOMMENDATIONS

It is the QP's opinion that additional exploration expenditures are warranted to improve the viability of the Project and advance the Project towards a PEA. It is recommended that NAM undertake a two-stage exploration program focused on delineation and expansion drill programs that will concentrate on the open pit potential along strike and down-dip of the known resources.

Each program can be carried out concurrently and independently of each other; neither is contingent on the results of the other.

18.1 PHASE 1

The Phase 1 exploration program is planned to expand the resources and to increase the confidence of the resource by improving resource categories. The drill program should test targets adjacent to and down-dip of Dana South, Lismer Extension, Lismer Ridge, Varley, and River Valley Extension zones as well as any new targets discovered during the Phase 1 program. The program should also advance the resources at Banshee from Inferred to Indicated, and better delineate the boundaries of that zone.

The continuation of the metallurgical study completed in Phase 1 is recommended. An optimized flowsheet with metal recoveries would be generated in order to support the preliminary economic assessment (PEA).

A geotechnical study involving geotechnical logging and strength testing of drill core is recommended. A rock mechanic engineer would train the field geologist to properly collect the geotechnical data from the drill core before sampling. Selected core samples of the various lithologies and mineralization styles would be sent for strength testing. The results would provide basic inter-ramp slope angles and the bench face angles to Ontario Mining regulation to support the PEA.

A high-resolution topographic survey, such as LiDAR, should be flown over the Property to allow for a topographic base leading into a PEA.

The PEA will evaluate the Project at a high-level engineering and financial study. The mineralization will be interrogated with pit shell designs and mining schedule. The study would incorporate the latest information provided by the exploration programs as well as the metallurgical and geotechnical studies. The infrastructure to support the mining operation including office, dry, warehousing, maintenance shops, water treatment plant, processing plant, and tailing storage facility would be designed. The output of the PEA would be a mine plan, mine schedule, a capital cost estimate, operating cost estimate incorporated into a financial model to provide total cash flow, net present value (NPV), and internal rate of return (IRR).

The estimated cost to complete Phase 1 is estimated to be $980,000. Table 18.1 summarizes the proposed Phase 1 budget.

Table 18.1 Phase 1 Budget

Project	Activity	Rate ($)	Units	Cost ($)
River Valley	Diamond Drilling (NQ)	135	3000 m	405,000
	Consulting	600	200 days	120,000
	Metallurgical Study	150,000	1	150,000
	Geotechnical Study	45,000	1	45,000
	LiDAR Survey	1	1	80,000
	Preliminary Economic Assessment	1	1	180,000
			TOTAL	**$980,000**

***Note**: Drilling cost includes salaries, all field costs, assays and consumables.*

18.2 PHASE 2

The Phase 2 exploration program is planned to test the extension and continuity of high-grade domains. The drill program should target potential extensions of high-grade domains along strike and across strike of the deposit including the footwall targets delineated by the IP survey.

An IP survey in the footwall target areas should be completed, similar to what was complete with the Pine Zone. After logging and sampling for assay, the core should be submitted for mineralogical studies and pre-concentrations test work.

The geological staff will continue to conduct surface exploration and prospecting of untested anomalies and structure and review the potential of reef style mineralization outside of known resource.

An environmental baseline study would be initiated. The collection of flora, fauna, water quality, and weather would be done to Ontario Ministry of Environment and Climate Change standards.

The estimated cost to complete Phase 2 program is approximately $709,050. Table 18.2 summarizes the proposed Phase 2 budget.

Table 18.2 Phase 2 Budget

Project	Activity	Rate ($)	Units	Cost ($)
River Valley	Diamond Drilling (NQ)	135	1830 m	247,050
	Consulting	600	120 days	72,000
	Induced Polarization Survey	120,000	1	120,000
	Metallurgical Study	95,000	1	95,000
	Environmental Baseline	175,000	1	175,000
			TOTAL	**$709,050**

***Note**: Drilling cost includes salaries, all field costs, assays and consumables.*

18.3 OTHER RECOMMENDATIONS

The following recommendations are based on observations by the QP during the site visit or during the resource estimation process. These recommendations are suggestions for policy and procedures conducted by NAM to further enhance the potential viability of the Project. The recommendations are in no order of importance.

18.3.1 SPECIFIC GRAVITY MEASUREMENTS

It is recommended that NAM increase the frequency of specific gravity measurements from drill core in order to build up the specific gravity database. The specific gravity database should represent at a minimum 5% of the total assay dataset. In order to build the specific gravity data, measurements should be collected at 20 m intervals.

Due to the low-sulphide content on the Property, a regression formula is unlikely to be successfully generated using assay data. The specific gravity data needs to be linked not only to the analytical results but to the lithology and alteration of the rocks.

RHODIUM, COBALT, AND SILVER ANALYSIS

It is recommended to continue to analyze a smaller subset of data for rhodium, cobalt, and silver. These minerals are potential pay metals, yet the cost of analysis can be prohibitive to assay every sample for rhodium, cobalt, and silver. It is recommended to assay approximately 5% of the data with a good spatial distribution between the samples.

18.3.2 CHANNEL SAMPLING

When channel samples are being collected on surface, the channels should be cut as one continuous swath across the outcrop. The use of channel samples can be important in resource estimations as it provides data near-surface which is not available from diamond drillholes.

18.3.3 STORAGE OF SAMPLE REJECTS AND PULPS

The current storage of course rejects and pulps is subject to contamination. The 45-gallon barrels are placed in an upright position and the lids are rusting through. The barrels should be laid on the side and stacked appropriately, or the material placed inside larger storage containers such as shipping containers.

18.3.4 GEOTECHNICAL DATA COLLECTION

Logging procedures should be modified to initiate the collection of more detailed geotechnical data prior to geological logging and sampling for the purposes of rock mechanics and slope stability studies. A rock mechanics engineer can provide the basics of the data collection procedures. This data will form the basis to justify slope angles during any open pit optimization studies.

18.3.5 SECURE DATABASE

All the data collected on the Project should be validated and then secured in a single master database system with set policies and procedures as to who has access to the data. A back-up copy of the database should be created weekly and placed in a separate storage location.

Validation of the data completed during this study identified several minor inconsistencies between the database and the logs. Corrections have been made, yet there may be further corrections to be made in the master file.

18.3.6 DEVELOPMENT OF 3D STRUCTURAL GEOLOGICAL MODEL

The QP recommends a structural vectoring model be created to better understand the geometry of the zones. The presence of potential cross-faults, folds, and footwall mineralization can have a significant impact on the resource.

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20 CERTIFICATE OF QUALIFIED PERSON

Todd McCracken, P.Geo.

I, Todd McCracken, P.Geo., of Sudbury, Ontario do hereby certify:

- I am a Manager of Mining with WSP Canada Inc. with a business address at 93 Cedar Street, Suite 300, Sudbury, Ontario P3E 1A7.
- This certificate applies to the technical report entitled ***River Valley Mineral Resource Update*** (the "Technical Report") with an Effective Date of October 31, 2018.
- I am a graduate of the University of Waterloo, B.Sc. (Honours) Applied Earth Sciences, 1992. I am a member in good standing of Association of Professional Geoscientists on Ontario (APGO) License #0631. My relevant experience includes more than 27 years of experience in exploration and operations, including several years working in magmatic PGE-nickel sulphide deposits. I am a "Qualified Person" for the purposes of National Instrument 43-101 (the "Instrument").
- My most recent personal inspection of the Property was one day on July 25, 2011, September 15, 2017, and November 9, 2017, inclusive.
- I am responsible for Sections 1 to 18 of the Technical Report.
- I am independent of New Age Metals as defined by Section 1.5 of the Instrument.
- I have prior involvement with the Property that is the subject of the Technical Report having been a QP on a technical report in dated June 2012.
- I have read the Instrument and the sections of the Technical Report that I am responsible for have been prepared in compliance with the Instrument.
- As of the date of this certificate, to the best of my knowledge, information, and belief, the sections of the Technical Report that I am responsible for contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Signed and dated this 9th day of January 2019 at Sudbury, Ontario.

Original signed and stamped by
Todd McCracken, P.Geo.

Todd McCracken, P.Geo.
Manager - Mining
WSP Canada Inc.

APPENDIX