



*Watts, Griffis and McOuat*  
*Since 1962*  
CONSULTING GEOLOGISTS AND ENGINEERS

October 11, 2013

VIA SEDAR

Ontario Securities Commission  
British Columbia Securities Commission  
Alberta Securities Commission

Dear Sirs/Mesdames:

**RE: Adex Mining Inc. – Amended Technical Report**

We are filing with this letter an amended technical report entitled "*Amended Technical Report of the Mount Pleasant Property, Including Mineral Resource Estimates, Southwestern New Brunswick for Adex Mining Inc.*" dated April 13, 2012, and amended October 11, 2013.

The technical report has been amended to address the concerns of the Ontario Securities Commission as set out in its letters of August 8 and September 30, 2013 regarding the disclosure of the Mineral Resources in two separate reports currently filed on SEDAR (one for the North Zone and the other for the Fire Tower Zone) and the disclosure of results of economic studies.

This new report is intended to combine the existing geological information and Mineral Resource estimates as previously disclosed on the two deposits into a single report. All references to previous economic studies have also been removed. The report has not otherwise been amended or updated and does not address any work which may have been done in connection with the Mount Pleasant Mine Property since the original date of the North Zone report (April 2012). As such, there are no new Mineral Resource estimates subsequent to the date of the report, as this additional information has not yet been assembled and analyzed for inclusion in this amended report.

Yours truly,  
**WATTS, GRIFFIS AND McOUAT LIMITED**

Per: Michael Kociumbas, P.Geo.  
Vice-President

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1962 - 2012

**AMENDED TECHNICAL REPORT OF THE  
MOUNT PLEASANT PROPERTY,  
INCLUDING MINERAL RESOURCE ESTIMATES,  
SOUTHWESTERN NEW BRUNSWICK  
FOR  
ADEX MINING INC.**

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Dated April 13, 2012  
Amended October 11, 2013  
Toronto, Canada

## TABLE OF CONTENTS

	Page
<b>1. SUMMARY .....</b>	<b>1</b>
<b>2. INTRODUCTION AND TERMS OF REFERENCE .....</b>	<b>11</b>
2.1 INTRODUCTION .....	11
2.2 TERMS OF REFERENCE .....	12
2.3 SOURCES OF INFORMATION .....	12
2.4 DETAILS OF PERSONAL INSPECTION OF THE PROPERTY .....	14
2.5 UNITS AND CURRENCY .....	14
<b>3. RELIANCE ON OTHER EXPERTS .....</b>	<b>17</b>
<b>4. PROPERTY DESCRIPTION AND LOCATION .....</b>	<b>18</b>
4.1 LOCATION .....	18
4.2 PROPERTY DESCRIPTION .....	21
<b>5. ACCESS, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY .....</b>	<b>23</b>
5.1 ACCESS .....	23
5.2 CLIMATE .....	23
5.3 LOCAL RESOURCES AND INFRASTRUCTURE .....	24
5.4 PHYSIOGRAPHY .....	25
<b>6. HISTORY .....</b>	<b>27</b>
6.1 GENERAL .....	27
6.2 EXPLORATION AND DEVELOPMENT .....	28
6.3 MINING AND MILLING OPERATIONS .....	36
6.4 HISTORICAL DIAMOND DRILLING .....	38
<b>7. GEOLOGICAL SETTING AND MINERALIZATION .....</b>	<b>41</b>
7.1 REGIONAL GEOLOGY .....	41
7.2 LOCAL GEOLOGY .....	42
7.3 MINERALIZATION .....	55
<b>8. DEPOSIT TYPES .....</b>	<b>63</b>
<b>9. EXPLORATION .....</b>	<b>66</b>
9.1 PROCEDURES/PARAMETERS OF SURVEYS AND INVESTIGATION .....	66
9.2 SAMPLING METHODS AND SAMPLE QUALITY .....	67
9.3 RESULTS AND INTERPRETATION OF EXPLORATION .....	68
<b>10. DRILLING .....</b>	<b>69</b>

**TABLE OF CONTENTS**  
(continued)

	Page
<b>11. SAMPLE PREPARATION, ANALYSES AND SECURITY .....</b>	<b>80</b>
11.1 SAMPLE PREPARATION AND ASSAYING .....	80
11.2 QA/QC .....	86
11.3 SECURITY .....	93
<b>12. DATA VERIFICATION .....</b>	<b>94</b>
12.1 SITE VISITS .....	94
12.2 CORE LOGGING AND SAMPLING .....	95
12.3 ADDITIONAL CORE SAMPLING OF 1995 HISTORICAL DRILL CORE .....	98
12.4 COMPOSITE SAMPLES .....	99
12.5 COMPARISON OF ASSAY CERTIFICATES AND ASSAY VALUES .....	100
12.6 COMPARISON OF MEASURED AND CERTIFIED VALUES OF STANDARDS .....	100
12.7 RE-SAMPLING OF TUNGSTEN-MOLYBDENUM ORES .....	103
12.8 RE-ANALYSES OF SULPHIDE CONCENTRATE POND PULPS .....	103
12.9 DUPLICATE ANALYSES OF 2006 PULP SAMPLES .....	104
<b>13. MINERAL PROCESSING AND METALLURGICAL TESTING .....</b>	<b>107</b>
13.1 METALLURGICAL TESTING COMPLETED PRIOR TO 2010 .....	107
13.2 INDIUM-ZINC HYDROMET BENCH SCALE TEST PROGRAM (THIBAUT & ASSOCIATES INC) .....	108
13.3 FLOTATION TEST PROGRAM (SGS CANADA INC., 2010) .....	109
13.4 LOCKED CYCLE FLOTATION TEST PROGRAM (HUNAN NONFERROUS METALS RESEARCH INSTITUTE, 2010) .....	110
13.5 PILOT PLANT FLOTATION TEST PROGRAM (SGS CANADA INC., 2010) .....	113
13.6 INDIUM-ZINC HYDROMET PILOT TEST PROGRAM (THIBAUT & ASSOCIATES INC., 2011) .....	114
13.7 LOCKED CYCLE FLOTATION TEST PROGRAM (SGS CANADA INC., 2011) .....	116
13.8 TIN PYROMETALLURGICAL TEST PROGRAM (XSTRATA PROCESS SUPPORT, 2011) .....	117
13.9 SUMMARY OF FIRE TOWER ZONE METALLURGICAL TESTING - 2010 TO PRESENT .....	118
13.10 SUMMARY OF NORTH ZONE METALLURGICAL TESTING - 2010 TO PRESENT .....	118
<b>14. MINERAL RESOURCE ESTIMATES .....</b>	<b>120</b>
14.1 MINERAL RESOURCE ESTIMATE OF THE FIRE TOWER ZONE BY SRK .....	120
14.2 GENERAL MINERAL RESOURCE ESTIMATION METHODOLOGY .....	121
14.3 DATABASE .....	122
14.4 RESOURCE MODELLING PROCEDURES .....	123
14.5 DATABASE PREPARATION, STATISTICAL ANALYSIS AND COMPOSITING .....	126
14.6 VARIOGRAPHY .....	135
14.7 RESOURCE ESTIMATION .....	137

**TABLE OF CONTENTS**  
(continued)

	<b>Page</b>
14.8 MINERAL RESOURCE CLASSIFICATION AND TABULATION .....	139
14.9 PREVIOUS MINERAL RESOURCE ESTIMATES OF THE NORTH ZONE BY ADEX .....	142
14.10 MINERAL RESOURCE ESTIMATE FOR THE NORTH ZONE .....	144
14.11 DRILLHOLE DATABASE .....	145
14.12 DATA ANALYSIS .....	148
14.13 GRADE CAPPING .....	158
14.14 COMPOSITES .....	158
14.15 HISTORICAL PRODUCTION.....	159
14.16 VARIOGRAPHY .....	159
14.17 ESTIMATION APPROACH .....	163
14.18 CLASSIFICATION.....	164
14.19 GRADE ESTIMATION PARAMETERS .....	165
14.20 BULK DENSITY AND TONNAGE .....	167
14.21 GRADE INTERPOLATION.....	167
14.22 SOFTWARE .....	168
14.23 CHECKS OF MINERAL RESOURCE ESTIMATES .....	168
14.24 SENSITIVITY STUDIES .....	172
14.25 RECONCILIATION .....	172
14.26 OTHER METALS.....	173
14.27 DISCUSSION ON OTHER MATERIAL FACTORS.....	174
<b>15. MINERAL RESERVE ESTIMATES.....</b>	<b>175</b>
<b>16. MINING METHODS .....</b>	<b>175</b>
<b>17. RECOVERY METHODS.....</b>	<b>175</b>
<b>18. PROJECT INFRASTRUCTURE .....</b>	<b>175</b>
<b>19. MARKET STUDIES AND CONTRACTS.....</b>	<b>175</b>
<b>20. ENVIRONMENTAL STUDIES, PERMITTING, AND SOCIAL OR COMMUNITY IMPACT.....</b>	<b>176</b>
20.1 BACKGROUND.....	176
20.2 RELATED ENVIRONMENTAL STUDIES .....	178
20.3 ENVIRONMENTAL IMPACT AND MANAGEMENT .....	184
20.4 PERMITTING.....	186
20.5 SOCIAL COMMUNITY AND FIRST NATION ISSUES .....	191
<b>21. CAPITAL AND OPERATING COSTS .....</b>	<b>192</b>

**TABLE OF CONTENTS**  
(continued)

	Page
<b>22. ECONOMIC ANALYSIS .....</b>	<b>192</b>
<b>23. ADJACENT PROPERTIES .....</b>	<b>192</b>
<b>24. OTHER RELEVANT DATA AND INFORMATION .....</b>	<b>192</b>
<b>25. INTERPRETATION AND CONCLUSIONS .....</b>	<b>193</b>
<b>26. RECOMMENDATIONS.....</b>	<b>197</b>
<b>27. DATE AND SIGNATURE PAGE.....</b>	<b>202</b>
<b>CERTIFICATES .....</b>	<b>203</b>
<b>REFERENCES .....</b>	<b>215</b>
<b>APPENDICES.....</b>	<b>222</b>
<b>APPENDIX 1: ASSAY CERTIFICATES – FIRE TOWER ZONE</b>	
<b>APPENDIX 2: VARIOGRAMS – FIRE TOWER ZONE</b>	
<b>APPENDIX 3: SUMMARY OF 2010 DIAMOND DRILLHOLES</b>	
<b>APPENDIX 4: SUMMARY OF 2011 DIAMOND DRILLHOLES</b>	

**LIST OF TABLES**

1.	Ground-staked mineral claims that constitute the Mount Pleasant Property .....	18
2.	History of work on the Mount Pleasant Property .....	28
3.	Summary of Mount Pleasant diamond drilling programs surface and underground holes.....	39
4.	Significant tin assays from the 2010 trench re-sampling program .....	68
5.	Adex drilling programs prior to 2010 .....	69
6.	Phase 1 diamond drillholes on the Fire Tower Zone .....	70
7.	Summary results of the 2008 diamond drill program .....	71
8.	Comparison of 2008 twin hole assay results .....	71
9.	Phase II drill core assay results for the FTN and FTE sub-zones .....	72
10.	Phase II drill core assay results - Fire Tower Breccia Zone .....	72
11.	Drillhole metadata for the 2010 diamond drilling program.....	75
12.	Drillhole metadata for the 2011 diamond drilling program.....	76
13.	Significant tin-indium intercepts/assays from the 2010 diamond drilling program .....	77
14.	Significant tin-indium intercepts/assays from the 2011 diamond drilling program .....	79

**TABLE OF CONTENTS**  
**(continued)**

		<b>Page</b>
15.	Composite samples from 600 adit rock dump and bulk piles .....	81
16.	Analytical results for composite samples collected by the author (3) and Adex (1), which were analysed at SGS and Actlabs, respectively .....	99
17.	Certified and measured values for standards MP-1a, MP-1b and MP-2 .....	101
18.	Certified and measured values for standards MP-1b and MP-2 .....	103
19.	Comparative analyses of 1995 Piskehegan pulp samples.....	105
20.	WGM analytical results (Mount Pleasant, 2008).....	106
21.	Bulk sulphide concentrate head grades from North Zone 2011 hydromet pilot test program .....	108
22.	Head grades from SGS 2010 North Zone flotation test program .....	109
23.	Bond rod and ball mill grindability work index results from the 2010 North Zone flotation test program.....	109
24.	Overall metallurgical balance results for SGS 2010 North Zone flotation test program.....	110
25.	Head grades from Hunan 2010 North Zone flotation test program.....	111
26.	Grades of final product streams from Hunan 2010 North Zone locked cycle test (tin recovery by flotation).....	112
27.	Recoveries (distributions) to final product streams from Hunan 2010 North Zone locked cycle test (tin recovery by flotation) .....	112
28.	Grades of final product streams from Hunan 2010 North Zone locked cycle test (tin recovery by flotation and gravity separation) .....	112
29.	Recoveries (distributions) to final product streams from Hunan 2010 North Zone locked cycle test.....	113
30.	Head grades from SGS 2010 North Zone pilot test program.....	114
31.	Average grades of final product streams from SGS 2010 North Zone pilot test program.....	114
32.	Average recoveries (distributions) to final product streams from SGS 2010 North Zone pilot test program.....	114
33.	Bulk sulphide concentrate head grades from North Zone 2011 hydromet pilot test program.....	115
34.	Head grades from SGS 2011 North Zone flotation test program .....	116
35.	Grades of final product streams from SGS 2011 North Zone locked cycle test.....	116
36.	Recoveries (distributions) to final product streams from SGS 2011 North Zone locked cycle test.....	117
37.	Low grade tin concentrate grades for Xstrata 2011 pyrometallurgical test program.....	117
38.	Mount Pleasant Mineral Resource estimate, Fire Tower Zone.....	120
39.	Basic statistics of drillhole samples in FTZ.....	126
40.	Basic statistics of 3.0 m composites in the mineralized envelope of the FTZ.....	129
41.	Correlation matrix of 3.0 m composites in the mineralized envelope of the FTZ.....	132
42.	Basic statistics as 3.0 m composites in the mineralized envelope of the FTZ.....	132
43.	Variogram models (FTZ).....	135
44.	Block model grid parameters for FTZ .....	137
45.	Mount Pleasant Mineral Resource statement, Fire Tower Zone (SRK, October 11, 2008) ...	139
46.	As distribution in FT West and North (sub)zones .....	139
47.	FTZ Indicated Mineral Resources grade sensitivities.....	140
48.	FTZ Inferred Mineral Resources grade sensitivities.....	141
49.	The Mineral Resource of the FTZ estimated using ID <sup>2</sup> methods .....	142
50.	Tin-indium "Resources" of the North Zone.....	143

**TABLE OF CONTENTS**  
**(continued)**

		<b>Page</b>
51.	Indicated and Inferred Mineral Resource estimates of the North Zone.....	143
52.	February 2012 Mineral Resources – North Zone, Mount Pleasant Property.....	144
53.	Contained metal, North Zone, Mount Pleasant Property (capped).....	144
54.	North Zone filtered drillhole data – Sn and Zn sample length statistics.....	149
55.	North Zone filtered drillhole data – in sample length statistics.....	149
56.	North Zone summary statistics - Sn, Zn and In assays by domain.....	152
57.	North Zone summary statistics - other elements in the 100 domain.....	157
58.	North Zone summary statistics - other elements in the 200 domain.....	157
59.	North Zone summary statistics - Sn, Zn and In composites by domain.....	159
60.	Block model configuration.....	164
61.	Effect of changing GMV cutoff on Indicated Resources.....	172
62.	Effect of changing GMV cutoff on Inferred Resources.....	172
63.	Other elements of interest.....	174
64.	MMER authorized limits of deleterious substances.....	191
65.	February 2012 Mineral Resources – North Zone, Mount Pleasant Property.....	195
66.	Contained metal, North Zone, Mount Pleasant Property (capped).....	196
67.	Mount Pleasant Mineral Resource statement, Fire Tower Zone (SRK, October 11, 2008) ...	196
68.	Mount Pleasant Property (excluding Fire Tower Zone) proposed work plan and budget.....	198
69.	Mount Pleasant Fire Tower Zone, proposed work plan and budget.....	201

**LIST OF FIGURES**

1.	Simplified geographic map of southwestern New Brunswick showing Property location.....	19
2.	Claim map.....	20
3.	Sketch map showing the distribution of various topographic features on the Property (Claim Block 1505), including the North Zone, Saddle Zone and Fire Tower Zone.....	26
4.	Map showing the location of the Mount Pleasant area with respect to the Maritimes Basin and known tectono-stratigraphic zones and belts in New Brunswick.....	41
5.	Part of the bedrock geological map of New Brunswick (Map NR-1) showing the distribution of rock units in the Mount Pleasant area.....	43
6.	Geological map of the Property showing the distribution of formally named rock units and the approximate location of 7 (black rectangle).....	44
7.	Geological map of Mount Pleasant showing informal rock units and locations of the 2010 and 2011 drillholes.....	48
8.	Photographs of sedimentary breccia (Unit SBx).....	49
9.	Photographs of quartz-feldspar porphyry (Unit QFP).....	49
10.	Photographs of feldspar porphyry (Unit FP).....	50
11.	Photographs of hydrothermal breccia and granite porphyry (Unit Bx).....	51
12.	Photographs of fine-grained granite (Granite I).....	52
13.	Photographs of granite porphyry (Granite II).....	53
14.	Photographs of comb quartz layers.....	54
15.	Schematic SSE - NNW longitudinal section (looking west) of Mount Pleasant.....	56
16.	Photographs of tin-base metal mineralization in the Deep Tin zone.....	57



**TABLE OF CONTENTS**  
**(continued)**

		<b>Page</b>
17.	Photomicrographs (transmitted light) of cassiterite from the Deep Tin zone.....	58
18.	Photomicrographs (transmitted light) of cassiterite from the Endogranitic zone.....	59
19.	Photographs of tin mineralization in the Saddle Zone.....	60
20.	Schematic cross section.....	64
21.	Photographs of drill collars.....	74
22.	Scatter plots showing decreasing R <sup>2</sup> -values for zinc, arsenic, tin and bismuth (in weight percent) of 96 samples from the 2010 drilling program.....	87
23.	Scatter plots showing decreasing R <sup>2</sup> -values for molybdenum, copper, indium, and tungsten (in weight percent except for indium) of 96 samples from the 2010 drilling program.....	87
24.	Scatter plots showing decreasing R <sup>2</sup> -values for tin, zinc, copper and lead (in weight percent) of 11 samples from the 2010 trenching program.....	88
25.	Scatter plots showing decreasing R <sup>2</sup> -values for indium, tungsten, bismuth and molybdenum (in weight percent except for indium) of 11 samples from the 2010 trenching program.....	88
26.	Scatter plots showing decreasing R <sup>2</sup> -values for zinc, indium, copper and tin (in weight percent except for indium) of 15 samples (MPS-series cores) that were re-assayed in 2010.....	89
27.	Scatter plots showing decreasing R <sup>2</sup> -values for tungsten, lead, molybdenum and bismuth (in weight percent) of 15 samples (MPS-series cores) that were re-assayed in 2010.....	90
28.	Scatter plots showing decreasing R <sup>2</sup> -values for copper, indium, tin and lead (in weight percent except for indium) of 122 samples from the 2011 drilling program.....	90
29.	Scatter plots showing decreasing R <sup>2</sup> -values for bismuth, tungsten, zinc and molybdenum (in weight percent) of 122 samples from the 2011 drilling program.....	91
30.	Scatter plots showing decreasing R <sup>2</sup> -values for tin, arsenic, bismuth and zinc (in weight percent) of 37 samples (from LNZ-15) that were re-assayed in 2011.....	92
31.	Scatter plots showing decreasing R <sup>2</sup> -values for copper, molybdenum, tungsten and lead (in weight percent) of 37 samples (from LNZ-15) that were re-assayed in 2011.....	92
32.	Scatter plots showing decreasing R <sup>2</sup> -values for zinc, arsenic, molybdenum and copper (in weight percent) of 32 samples from the 2010 and 2011 drilling programs.....	97
33.	Scatter plots showing decreasing R <sup>2</sup> -values for tin, bismuth, lead and indium (in weight percent except for indium) of 32 samples from the 2010 and 2011 drilling programs.....	97
34.	Fire Tower Zone drillhole location plan showing section locations.....	124
35.	Fire Tower Zone cross section 12,375N illustrating updated polylines.....	127
36.	3-D representation of the drillholes with respect to the FTZ mineralized envelop (FT West in blue and FT North in yellow).....	128
37.	Histogram representing distribution of the assay sampling length.....	129
38.	Cumulative frequency plot of MoS <sub>2</sub> .....	130
39.	Cumulative frequency plot of WO <sub>3</sub> .....	130
40.	Cumulative frequency plot of Bi.....	130
41.	Cumulative frequency plot of As.....	130
42.	Cumulative frequency plot of WO <sub>3</sub> Eq 3.0 m composites in the FT West zone.....	131
43.	Cumulative frequency plot of MoS <sub>2</sub> 3.0 m composites in the FT North Zone.....	131
44.	Cumulative frequency plot of WO <sub>3</sub> .....	131
45.	Cumulative frequency plot of Bi.....	131
46.	Cumulative frequency plot of As.....	131
47.	Cumulative frequency plot of WO <sub>3</sub> Eq 3.0 m composites in FT North Zone.....	131
48.	Histogram of As composites within the As rich zone (>0.5 % As) in FTW.....	133
49.	Histogram of As composites within the low As (<0.5 % As) zone in FTW.....	133

**TABLE OF CONTENTS**  
**(continued)**

		<b>Page</b>
50.	Histogram of As composites within the As rich (>0.5 % As) zone in FTN .....	134
51.	Histogram of As composites within the low As (<0.5 % As) zone in FTN .....	134
52.	Variogram of MoS <sub>2</sub> in the FT West zone .....	135
53.	Omnidirectional variogram of WO <sub>3</sub> in the FT West zone .....	136
54.	Variogram of MoS <sub>2</sub> in the FT North Zone .....	136
55.	Omnidirectional variogram of WO <sub>3</sub> in the FT North Zone .....	137
56.	FTZ Indicated Resource grade-tonnage curve based on OK model .....	141
57.	3D View - traces of surface and underground drillholes .....	146
58.	Histogram of sample lengths for Sn and Zn in the Resource area.....	150
59.	Histogram of sample lengths for In for the Resource Area .....	150
60.	Histogram of uncut Sn assays in 100 domain.....	152
61.	Histogram of uncut Sn assays in 200 domain.....	153
62.	Histogram of uncut Zn assays in 100 domain.....	153
63.	Histogram of uncut Zn assays in 200 domain.....	154
64.	Histogram of uncut In assays in 100 domain.....	154
65.	Histogram of uncut In assays in 200 domain.....	155
66.	Boxplot showing Sn grades by domain .....	155
67.	Boxplot showing Zn grades by domain .....	156
68.	Boxplot showing In grades by domain .....	156
69.	Experimental variograms for Sn in the 100 domain .....	160
70.	Experimental variograms for Zn in the 100 domain.....	160
71.	Experimental variograms for In for the 100 domain .....	161
72.	Experimental variograms for Sn in the 200 domain .....	162
73.	Experimental variograms for Zn in the 200 domain.....	162
74.	Experimental variograms for In for the 200 domain .....	163
75.	Vertical cross-section 15500E, looking west and showing drillholes with 3 m Composites for Sn values and the interpolated indicated block grades for Sn .....	169
76.	Plan view at the 950 m elevation, showing drillholes with 3 m composites for Sn values and the interpolated indicated block grades for Sn.....	169
77.	3D View of the North Zone and 100 domain solid, looking north-west .....	170
78.	Swath plots comparing average Zn, Sn and In grades from the block model's indicated blocks to length-weighted average grades of assays along the columns, rows and levels of the block model.....	171

## 1. SUMMARY

The Mount Pleasant Mine Property ("Mount Pleasant" or "Property") in 1995 was acquired by Adex Mining Inc. ("ADEX"), a Toronto based Canadian junior mineral exploration company. The Property is located in Charlotte County, New Brunswick, and is the site of the past producing Mount Pleasant Tungsten Mine ("MPTM") which produced 990,200 tonnes grading 0.35% WO<sub>3</sub> between 1983 and 1985 from the Fire Tower Zone. Other zones, including the predominantly tin-indium North Zone and tin, tungsten, molybdenite and bismuth-bearing Saddle Zone, occur on the Property but have never been mined. ADEX trades on the TSX Venture Exchange under the symbol "ADE".

Watts, Griffis and McOuat Limited ("WGM") was retained initially by Adex in 2006 to complete a technical report of the Property and prepare an "Inferred Mineral Resource" estimate for the Fire Tower Zone. In 2008, WGM was retained to produce an updated technical report including an updated Mineral Resource estimate for the Fire Tower Zone utilizing the Phase I (2008) diamond drilling results. In 2009, WGM was retained to prepare a technical report including an updated Mineral Resource estimate for the North Zone, and in 2011, WGM was retained to prepare an updated Mineral Resource estimate of the North Zone, utilizing diamond drilling results from 2010 and 2011. This report, which includes a re-presentation of the 2008 Mineral Resources for the Fire Tower Zone and updated Mineral Resources for the North Zone, has been prepared in accordance with the Canadian Securities Administrators' National Instrument 43-101 ("NI 43-101") governing standards of disclosure for mineral projects. WGM's previous Technical Reports on the Property in 2006, 2008 (Amended 2012) and 2009, are available for the reader to review on the SEDAR website at [www.sedar.com](http://www.sedar.com). **Note: These reports are no longer current and should not be relied upon.**

The Property consists of 1,600 ha of mining claims, located 60 km south of Fredericton, the provincial capital city. The claims are held under prospecting license 14338 by ADEX Minerals Corp., a 100% owned subsidiary of ADEX, under claim group number 1505. Since the Technical Report on Mount Pleasant (Dunbar and de L'Etoile 2009) was filed, however, New Brunswick has gone from a ground-staked claim system, based upon Magnetic North, to an on-line map staked claim system based upon True (geodetic) North, effective April 14, 2010. The present annual work requirement for the Property is \$81,600, and the renewal date is February 2<sup>nd</sup>. On Jan 22, 2010, the annual renewal fee was paid forward for three years, until February 2, 2013. ADEX reports a current reserve of \$652,799.88 available for future renewals.

ADEX holds the surface rights for some 405 hectares of the Property. The surface rights for the northern part of the North Zone, southern part of the Fire Tower Zone and eastern side of Mount Pleasant are owned by third parties. ADEX has retained 100% ownership of the buildings and equipment remaining on the Property

However, the Province of New Brunswick holds a \$2.0 million mortgage on the buildings to cover the cost of building removal and rehabilitation. The government also holds a \$0.715 million security bond posted by ADEX for mine reclamation. There may also be a royalty payment, in the amount of \$0.10 per ton of ore mined, payable to Mount Pleasant Mines Limited, although ADEX has no original documentation to confirm or deny the existence of this royalty.

Since 1954, the majority of the exploration work has been focused on development of tungsten-molybdenum deposits of the Fire Tower Zone and indium-bearing, tin-base metal deposits of the North Zone. Work has consisted of extensive surface and underground drilling programs, bulk sampling and metallurgical work. Surface exploration has included soil and bedrock sampling, ground geophysical surveying, geological mapping, stripping and trenching, and diamond drilling. Underground exploration and development has included a 1,187 m long access ramp connecting the Fire Tower Zone with the North Zone as well as the excavation of several adits. Historically, 1,330 surface and underground holes, totalling 158,561 m, have been drilled and approximately 70% of the resulting core is currently stored at the mine site. All historical drillhole information and assay results were compiled into a GEMCOM database between 1995 and 1997.

The Mount Pleasant Tungsten Mine was put into production in September 1983 at a total construction cost of \$150 million. Mining was done by open stoping. The concentrator was designed to process 650,000 tonnes per year from the Fire Tower Zone and produce 2,000-2,500 tonnes per year of 70%  $WO_3$  tungsten concentrate (through tungsten magnetic separation) and 700-1,000 tonnes per year of 85%  $MoS_2$  molybdenum concentrate (through a leaching process yielding 60% recovery). Cost overruns, metallurgical problems and falling tungsten prices led to mine closure in July 1985 after only 22 months of production. The underground workings were allowed to flood and the mine was placed on care and maintenance.

During the production period, the mine produced 990,200 tonnes of tungsten ore, all from the Fire Tower Zone, at an average grade of 0.35%  $WO_3$ . There was no attempt to extract molybdenum or any other metals. A total of 2,000 tonnes of tungsten concentrate, grading 70%  $WO_3$ , was produced. At the time of closure, the mine reported a total recoverable diluted "mineable ore reserve" of 6,863,300 tonnes at an average grade of 0.38%  $WO_3$  and

0.17% MoS<sub>2</sub>. Included in the "reserve" was an inventory of 800,000 tonnes of broken tungsten-molybdenum material, grading approximately 0.39% WO<sub>3</sub> and 0.19% MoS<sub>2</sub>.

In 1996, Kvaerner was contracted to conduct a Feasibility Study to explore the possibility of mining tin and indium from the North Zone and to prepare a "mineral resource" estimate, which included an audit and verification of ADEX's "reserve" estimates of the North Zone. Limited additional surface diamond drilling was carried out to support this study. Kvaerner estimated a total "mineable resource" of 3,718,338 tonnes with a grade of 0.662% Sn, 85.72 ppm In, 0.091% WO<sub>3</sub>, 0.044% MoS<sub>2</sub>, 0.150% Cu, 0.050% Pb, 0.089% Bi and 0.695% Zn for the North Zone using a recovery factor of 85%, a dilution factor of 20% and a cutoff grade of 0.1% Sn. The study concluded that the North Zone deposits were uneconomic due to declining tin prices and high capital costs. This historic "reserves and resource" estimate was prepared prior to the implementation of NI 43-101. WGM has neither audited these estimates nor made any attempt to classify them according to NI 43-101 standards, or the Council of the Canadian Institute of Mining, Metallurgy and Petroleum definitions ("CIM") Standards. A Qualified Person has not done sufficient work to classify this historical information as a current Mineral Reserve and as such this estimate should not be relied upon.

In 2008, SRK under contract to WGM, prepared an NI 43-101 and CIM Standards-compliant Mineral Resource estimate of the Fire Tower West and Fire Tower North sub-zones as follows:

**Summary of 2008 Mineral Resource Estimate of the Fire Tower Zone (SRK)**

Area	Tonnes	%WO <sub>3</sub>	%MoS <sub>2</sub>	%As	%Bi
<b>Indicated</b>					
Fire Tower West	9,148,900	0.32	0.21	0.29	0.04
Fire Tower North	<u>4,340,100</u>	<u>0.35</u>	<u>0.20</u>	<u>1.15</u>	<u>0.09</u>
<b>Total Indicated</b>	<b>13,489,000</b>	<b>0.33</b>	<b>0.21</b>	<b>0.57</b>	<b>0.06</b>
<b>Inferred</b>					
Fire Tower West	831,000	0.26	0.20	0.21	0.04
Fire Tower North	<u>10,700</u>	<u>0.26</u>	<u>0.17</u>	<u>0.26</u>	<u>0.05</u>
<b>Total Inferred</b>	<b>841,700</b>	<b>0.26</b>	<b>0.20</b>	<b>0.21</b>	<b>0.04</b>

\* Mineral Resources are not mineral reserves and do not have demonstrated economic viability.  
 All figures have been rounded to reflect the relative accuracy of the estimates.  
 Reported at a cutoff of 0.3%WO<sub>3</sub> Eq grade. WO<sub>3</sub> Eq (equivalent) = %WO<sub>3</sub> + 1.5 x %MoS<sub>2</sub>.

During 2008, ADEX completed a two-phase, 49 hole definition diamond drilling program totalling 13,300 m to test both the Fire Tower Zone and North Zone mineralization. Thirty-six holes, for a total of 8,859.1 m, were drilled on the North Zone, including three for metallurgical bench and mineralogical testing. ADEX also dispatched a total of 1,065 samples consisting of split cores, fill-in samples, pulps and rejects collected from some

124 historical drillholes for assay verification. All new analytical data were inputted by ADEX into the existing GEMCOM database.

Subsequently, SGS-GeoStat Ltd. ("**SGS-Geostat**") prepared a new NI 43-101 and CIM Standards-compliant Mineral Resource estimate of the North Zone as follows:

<b>North Zone - Mineral Resource Estimate, Mount Pleasant Mine Property</b>										
Sub-Zones	Tonnes	% Sn	g/t In	g/t In (Cap)	% Zn	% As	%WO <sub>3</sub>	%MoS <sub>2</sub>	% Cu	% Bi
<b>Indicated</b>										
Deep Tin	5,006,000	0.39	101.0	95.2	0.86	1.25	0.08	0.06	0.14	0.08
Endogranitic	4,336,000	0.55	21.8	20.3	0.28	0.85	0.12	0.06	0.10	0.09
Upper Deep Tin	838,000	0.22	102.8	94.9	1.36	0.76	0.08	0.06	0.07	0.05
#4 Tin Lode	<u>702,000</u>	<u>0.25</u>	<u>74.1</u>	<u>74.1</u>	<u>1.00</u>	<u>0.19</u>	<u>0.01</u>	<u>0.01</u>	<u>0.09</u>	<u>0.00</u>
<b>Total Indicated</b>	<b>10,882,000</b>	<b>0.43</b>	<b>67.8</b>	<b>64.0</b>	<b>0.67</b>	<b>0.98</b>	<b>0.09</b>	<b>0.06</b>	<b>0.11</b>	<b>0.08</b>
<b>Inferred</b>										
#1-3 Tin Lode	2,345,000	0.18	76.8	73.5	1.08	0.28	0.02	0.03	0.09	0.01
#5 Tin Lode	1,267,000	0.15	115.4	111.3	1.50	0.70	0.07	0.04	0.08	0.03
North Adit	3,076,000	0.27	62.1	62.1	0.83	1.16	0.09	0.06	0.09	0.07
North W-Mo	<u>915,000</u>	<u>0.26</u>	<u>54.3</u>	<u>49.8</u>	<u>0.58</u>	<u>1.14</u>	<u>0.25</u>	<u>0.12</u>	<u>0.12</u>	<u>0.10</u>
<b>Total Inferred</b>	<b>7,603,000</b>	<b>0.22</b>	<b>74.6</b>	<b>72.3</b>	<b>0.99</b>	<b>0.80</b>	<b>0.08</b>	<b>0.05</b>	<b>0.09</b>	<b>0.05</b>

The Mineral Resources above are based on a SNEQ% cut-off of 0.25%. The SNEQ% value is a combination of Sn and In as follows: SNEQ% = Sn% + 41.67 In%.

**Note: The Mineral Resource Estimate of the North Zone by SGS-Geostat is no longer current and should not be relied upon.**

Preliminary mineralogical and liberation studies were completed at SGS Lakefield Research Limited ("**SGS Lakefield**"). Some Hydromet testing work was also completed. ADEX contracted SGS Lakefield Resource Europe Ltd. ("**SGS Lakefield England**") of Cornwall, England, to design a gravity-flotation separation process for processing ore from the Fire Tower Zone and North Zone deposits. A Baseline Environmental Effects Monitoring Program was completed by Jacques Whitford. A Preliminary Assessment of the North Zone was filed on SEDAR in 2010 and is entitled, "*NI 43-101 Technical Report Mount Pleasant North Zone Preliminary Assessment, Mount Pleasant Property, Southwestern New Brunswick, Canada*" (Thibault et al. 2010). **Note: This report is no longer current and should not be relied upon.**

Geologically, the Mount Pleasant deposits are situated on the southwestern margin of the Late Devonian Mount Pleasant Caldera ("MPC") and are associated with a post-caldera, multi-layered granitic complex (Granite I, II, III) that intruded along the margin of the MPC. The deposits are porphyry type and formed from metal-bearing fluids, which evolved from the inward-cooling magma body that produced this granitic complex. Older tungsten-

molybdenum deposits are genetically related to, and in part hosted within Granite I, whereas younger indium-bearing tin-base metal deposits are related to, and in part hosted within Granite II. No significant mineralization has been found within Granite III although this granite has not been fully explored. All deposits occur within 450 m from surface.

The Fire Tower Zone is dominated by tungsten-molybdenum mineralization occurring within three distinct deposits, the Fire Tower North, the Fire Tower West and Fire Tower South. Mineralization occurs as veinlets and is disseminated in the matrix of silicified breccia that constitutes part of the Mount Pleasant Porphyry. Fine-grained wolframite and molybdenite are the principal minerals of economic interest. Intense greisen-type alteration (quartz-topaz-fluorite) is associated with higher grade tungsten-molybdenum zones.

The North Zone consists of eight distinct tin-indium-bearing deposits or sub-zones, including three Tin Lodes, consisting of the Deep Tin Zone, Upper Deep Tin Zone, Endogranitic Zone, North Adit Zone, North W-Mo Zone and the #1-3, #4 and #5 Tin Lodes. Mineralization occurs mostly in chlorite-altered and brecciated host rocks located adjacent to granite and porphyry dykes. Tungsten-molybdenum mineralization is also present in the "X" and "Y" zones, collectively referred to as the North W-Mo Zone, and is partly overprinted by tin-indium deposits of the North Adit Zone. The boundaries of each sub-zone are gradational and they commonly cross-cut geological units and structural boundaries. Consequently, resource boundaries were defined based solely on %Sn and %In values (or %WO<sub>3</sub> and %MoS<sub>2</sub> values in the case of the North W-Mo sub-zone). The largest tin-base metal deposits occur along the contact of Granite I or within Granite II. The Deep Tin Zone is the shallowest underground deposit and is hosted within brecciated Granite I.

The Saddle Zone, located between the Fire Tower Zone and the North Zone, contains an irregular distribution of tin mineralization consisting of cassiterite with small amounts of tungsten, molybdenite and bismuth hosted within Granite II.

Two diamond drilling programs were conducted in 2010 and 2011, focussed on the North Zone. In 2010, 26 holes totalling 3734 m were drilled and sampled; in 2011, 18 holes (1-17, plus 17A) totalling 7007 m were drilled and sampled. The purpose of the 26-hole, 2010 program was to delineate tin, indium, and zinc resources in the North Zone, which were known from historical drilling and from ADEX's 2008 program, and to collect geotechnical data (3 holes) to help site a new portal and decline into the North Zone. Fifteen of the holes were oriented vertically and the others were inclined, varying from -41 to -75 degrees; the holes varied in length from 35 to 250 metres. The purpose of the 18-hole, 2011 program was to further delineate (infill holes) the tin, indium, and zinc resources of the North Zone and to obtain mineralized material for metallurgical testing (three holes). In addition, the open, east

side of the North Zone was drill tested, following up on positive exploration results from the 2010 drill program, and six holes were drilled in the Saddle Zone, located approximately half way between the North and Fire Tower zones, which had not been drilled since 1990. All of the holes were oriented vertically and varied in length from 75 to 570 metres.

Of the 44 holes drilled (counting AM11-17 and AM11-17A as two) during 2010 and 2011, 38 of the cores obtained were sampled for analysis. A total of 2318 mineralized samples were collected for assay, 1121 samples from 23 of the 2010 cores, and 1197 samples from 15 of the 2011 cores. Three metallurgical holes (AM11-10, AM11-11 and AM11-12) were not assayed. In addition, 306 samples from historical holes were submitted to Actlabs for re-analysis. As part of its due diligence procedures, ADEX dispatched 252 pulp samples by bonded courier to SGS Canada Mineral Services Inc. (“SGS”) in Toronto for assay verification of approximately every 10<sup>th</sup> sample that was sent to Actlabs. In addition, 39 pulp samples from hole LNZ-15 were sent to SGS for re-assay. In 2010, several MPS-series cores were quartered and re-assayed at Actlabs for indium only, because Brunswick Tin Mines (BTM) did not assay for this element at the mine laboratory. As part of its quality control procedures, Actlabs included one or more of CANMET standards MP-1a, MP-1b and MP-2 in each batch of samples that ADEX submitted for assay during 2010 and 2011.

In the authors' opinion, the sample preparation, security and analytical procedures used by ADEX conform to generally accepted practice of the Canadian mining industry and are appropriate for the purposes of this report. Mr. Paul Dunbar, QP, made two site visits in 2008 related to the 2008 Fire Tower Zone drilling and Dr. Steven McCutcheon, independent consultant and QP, made four visits to the Property in 2011, which pertain to the 2010 and 2011 drilling programs. Sampling intervals were selected by the QP after reviewing the assay data from both the 2010 and 2011 drilling programs. In total, 32 samples were taken. Comparison of the results from Actlabs and SGS for these 32 samples shows reasonable correlation between the two analytical laboratories for zinc, arsenic, molybdenum and copper. However, R<sup>2</sup>-values for tin, bismuth, lead and indium are 0.90, 0.85, 0.85 and 0.77, respectively. The low R<sup>2</sup>-values most likely reflect the inhomogeneous distribution of the mineralization in the core, i.e. the quarter-sampled material was different from the split-sampled material. This is the most reasonable explanation, given the fact that there is good correlation between Actlabs and SGS for re-assays of samples during the entire 2011 drilling program.

Random checks of individual samples revealed that values in ADEX's GEMCOM database were identical to those in the Assay Certificates. In addition, historical data from C-series, DDH-series, E-series, LNZ-series, MPS-series, and U-series holes in the GEMCOM database of the North Zone were randomly checked to verify which “NS” values for Zn, WO<sub>3</sub> and



MoS<sub>2</sub> should be replaced by numeric zero values. This was done by comparison of assay values in hardcopy assay sheets stored at the mine site with values in an Excel file extracted from the database. Necessary changes were made to the Excel file and then it was returned to ADEX for incorporation into the database.

Since the beginning of 2009 ADEX has conducted a series of metallurgical sampling and testing programs on the North Zone, as follows:

- Bulk sample collection of stockpiled Sn-Zn-In mineralized material from the 600 Adit dump;
- Indium-Zinc Hydromet Bench Scale Test to produce zinc metal and indium sponge from zinc concentrate;
- Flotation Bench Scale Test to develop a process flowsheet to recover tin concentrate, zinc/indium concentrate and bulk sulphide concentrate;
- Locked Cycle Flotation Test to define a process flowsheet for zinc, indium and tin recovery as concentrates;
- Pilot Plant Flotation Test consisting of grinding, desliming, zinc flotation, bulk sulphide flotation, desliming and tin flotation;
- Indium-Zinc Hydromet Pilot Test to develop a process to produce added value zinc metal and indium sponge from zinc/indium flotation concentrate;
- Locked Cycle Flotation Test in follow-up to the flotation test program in order to further optimize the flowsheet, reagent dosages, and recoveries of zinc-indium and tin concentrates; and
- Tin Pyrometallurgical Test to extract tin from a low-grade tin concentrate with elevated arsenic content.

A February 2012 NI 43-101 Mineral Resource estimate has been prepared for the North Zone for the elements Sn, Zn and In. Values for other elements are tabulated in this report as they have potential implications for metallurgical purposes but those elements are not considered as part of the current NI 43-101 resource estimate and they do not contribute to any of the economic parameters used for the estimate. The minimum cutoff grade and block size used for the estimate were applied with the assumption that a resource with potential bulk mineable characteristics has been appropriately estimated using these parameters. Mineral Resource estimates and contained metal are summarised as follows:

**February 2012 Mineral Resources – North Zone, Mount Pleasant Property**

Mineral Resource Class	Tonnage (Millions of tonnes)	Cut Sn Grade (%)	Cut Zn Grade (%)	Cut In Grade (ppm)
Indicated	12.4	0.38	0.86	63.5
Inferred	2.8	0.30	1.13	69.8

- Resources were estimated using composites within a Block Model with block dimensions of 5x5x5 m and using an inverse distance squared grade interpolation method. Top cuts were applied to Sn, Zn and In assays before compositing. A cutoff of US\$75 Gross Metal Value (“GMV”) was applied and a recovery of 100% is assumed;
- Mineral resources which are not mineral reserves do not have demonstrated economic viability. The estimate of mineral resources may be materially affected by environmental, permitting, legal, title, socio-political, marketing, or other relevant issues;
- The quantity and grade of reported inferred mineral resources in this estimation are uncertain in nature and there has been insufficient exploration to define these inferred resources as an indicated or measured mineral resource and it is uncertain if further exploration will result in upgrading them to an indicated or measured mineral resource category; and
- The mineral resources in this press release were estimated using the Canadian Institute of Mining, Metallurgy and Petroleum (CIM), CIM Standards on Mineral Resources and Reserves, Definitions and Guidelines prepared by the CIM Standing Committee on Reserve Definitions and adopted by CIM Council November 27, 2010.

**Contained Metal, North Zone, Mount Pleasant Property (Capped\*)**

Mineral Resource Class	Contained Sn (kg)	Contained Zn (kg)	Contained In (kg)
Indicated	47,000,000	107,000,000	789,000
Inferred	8,600,000	32,000,000	198,000

- Top cuts of 3% Sn and 4% Sn were applied to Sn assays before compositing; top cuts of 5% Zn and 8% Zn were applied to Zn assays before compositing and top cuts of 500 ppm In and 600 ppm In were applied to In assays before compositing. The top cuts applied varied according to the domain. A cutoff of US\$75 GMV was applied and a recovery of 100% is assumed; and
- Figures may not total due to rounding.

The North Zone Mineral Resource estimate is based on surface and underground diamond drilling totalling 640 drillholes with an aggregate length of 85,515 m done from the 1950s to 2011, and from surface to a maximum depth of 580 metres. A bulk density factor of 2.70 t/m<sup>3</sup> is assigned for this estimation. There are a total of 27,527 sample intervals that were assayed for Sn and Zn in the filtered drillhole database used for estimation and 74,684.27 m of the core was sampled for those elements (87.3% of the total drilled length of 85,515.16 m for the holes in the filtered database). The mean sample length for the Sn and Zn samples is 2.71 m, the median sample length is 3.04 m and the mode for sample lengths is 3.05 m. There are substantially fewer samples analysed for In than for Sn and Zn (9,435 samples over 27,813 m in the filtered data, which represents about 33% of the drill core). All elements are composited to 3.0 m run-length composites. Except for a number of very short and a few long assay

intervals the 3.0 m composites are not substantially different in length than the majority of assay intervals.

The block model configuration was completed based upon a block size of 5 metres for which Sn, Zn and In grades were estimated by an inverse distance squared (“ID<sup>2</sup>”) method. A dollar equivalent value, designated as the Gross Metal Value (“GMV”), was calculated for each mineralized block by performing a simple manipulation of the block model grade parameters based on prices as listed below and as determined by the following formula:

$$\text{GMV} = \text{Sn}(\%) \times 183.72 + \text{Zn}(\%) \times 20.00 + \text{In}(\%) \times 6,000.00$$

The GMV values of 183.72 for Sn, 20.00 for Zn and 6,000.00 for In represent the USD value per tonne for those metals assuming the 3 year average of US\$18.37 per kg of Sn, US\$2.00 per kg of Zn and US\$600.00 per kg of In (the imperial equivalents of these are US\$8.33 per pound for Sn and US\$0.91 per pound for Zn). Recoveries are assumed to be 100%.

A conceptual mining plan for the North Zone was described in a previous Technical Report, the Mount Pleasant North Zone Preliminary Assessment (Thibault et al. 2010). **Note: This report is no longer current and should not be relied upon.** Various metallurgical and hydrometallurgical test programs have been completed on samples from the North Zone. However, a definitive flowsheet for processing has not been developed relative to the February, 2012 mineral resource assessment - as defined herein.

The former Mount Pleasant Tungsten Mine site has much of the infrastructure required for mining of the North Zone. The existing site infrastructure includes a tailings pond, administrative and warehouse buildings, A-Frame ore storage building, a concentrator building, a power substation and access roads to the site.

The mine site has been under care and maintenance since 1985. Mine water that overflows from the flooded Fire Tower Zone workings is currently treated by neutralization with lime, followed by storage in a settling pond to precipitate and store metal hydroxide sludge, prior to the treated mine water being discharged into the existing tailings pond. The mine water treatment plant is currently operated under New Brunswick Approval to Operate I-6154. Water quality parameters analyzed in monthly grab samples have typically been in compliance with prescribed limits. The overall tailings deposition and water management plan is not yet finalized and on-going studies are aimed to develop an appropriate tailings management and disposal strategy that is well-suited to the characteristics of the deposit and the existing conditions at the site.

The capital and operating costs for both mining and processing operations have not been updated from the Mount Pleasant North Zone Preliminary Assessment. Also, there has been no additional work performed on the assessment of North Zone product markets or contracts. The economic analysis and the relative impact of the North Zone Mineral Resources (as defined herein) on the project economics have not been determined. **Note: This PEA report is no longer current and should not be relied upon.**

Based upon the work completed for this report and the previous experience at Mount Pleasant, the authors make a series of interpretations, conclusions and recommendations. The proposed work plan and budget for the North Zone and remaining Mount Pleasant Property (excluding the Fire Tower Zone) amounts to \$4,000,000. The cost of the proposed work plan for the Fire Tower Zone has been estimated at \$4.4 million (Dunbar and el-Rassi, 2008, amended 2012).

## 2. INTRODUCTION AND TERMS OF REFERENCE

### 2.1 INTRODUCTION

In 1992, Adex Mining Inc. ("ADEX") was formed as a junior mining company from the amalgamation of Adonis Resources Inc. and Belex Mining Corp. after which it commenced operations and began trading on the Toronto Stock Exchange ("TSX").

ADEX acquired a 100% interest in the Mount Pleasant Mine Property ("Mount Pleasant" or the "Property") from Piskahegan Resources Limited ("**Piskahegan**"), a private company, in 1995. The Property is located at Mount Pleasant, New Brunswick, Canada, and is the site of the past producing Mount Pleasant Tungsten Mine. The mine closed in 1985 due to dropping tungsten prices and metallurgical problems and was placed on care and maintenance.

In 2006, ADEX contracted Watts, Griffis and McOuat Limited ("**WGM**") to conduct a technical review of Mount Pleasant and to prepare a report in compliance with Canadian Securities Administrators' National Instrument 43-101 ("NI 43-101"). This report (Dunbar, de l'Etoile, El-Rassi, and Boyd, 2006) was prepared as part of ADEX's effort to have a Ministerial cease-trade order (dated May 27, 1998) by the Ontario Securities Commission lifted so that the Company could raise funds to further develop the Property. The Company was originally de-listed from the TSX for failure to meet minimum listing requirements. Prior to the cease trade order, the shares traded under the symbol "AMG" on the Toronto Stock Exchange. ADEX obtained the revocation of the cease trade order on March 23, 2008 and then re-listed its common shares on the TSX Venture Exchange in July, 2007. ADEX has also been granted an "Approval to Operate" and the tailings dam has also been repaired. The Company currently trades under the symbol "ADE".

ADEX raised \$3.0 million in flow through funding to further explore and develop the Fire Tower Zone ("FTZ") and the North Zone ("NZ") deposits. ADEX has further advanced mineral resource development at Mount Pleasant with the completion of a Phase 1 diamond drilling program and re-sampling programs on the FTZ for delineating additional mineralization and upgrading the previous resource estimate of the FTN and FTW sub-zones.

Since 2006, three NI 43-101 Technical Reports, including Mineral Resource estimates, have been completed on the Property. One was on tungsten-molybdenum mineralization of the Fire Tower Zone (Dunbar and El-Rassi 2008, amended September 24, 2012), another was on tin-indium-zinc mineralization of the North Zone (Dunbar and de L'Etoile 2009), and the third was a Preliminary Assessment of the North Zone (Thibault et al. 2010). All three

reports are available on the SEDAR website [[http://www.sedar.com/homepage\\_en.htm](http://www.sedar.com/homepage_en.htm)].

**Note: The three Technical Reports referred to above are no longer current and should not be relied upon.**

## **2.2 TERMS OF REFERENCE**

In July 2008, WGM was retained by ADEX to prepare a NI 43-101 Technical Report in support of an updated Mineral Resource estimate of the Fire Tower Zone. This estimate was an update of a previous estimate completed in 2006 using new drilling information from a 2008 program. In November 2011, WGM was contracted by ADEX to prepare a new NI 43-101 Technical Report in support of an updated Mineral Resource estimate of the North Zone. This estimate was to be based upon ADEX's results from its 2010 and 2011 diamond drilling programs and data that were used for the previous estimate (Dunbar and de L'Etoile, 2009), which are in ADEX's GEMCOM database. ADEX interpreted and modelled the boundaries of the North Zone deposits and updated the GEMCOM database to assist with the Mineral Resource estimate and provided these data to WGM for their utilization.

The purpose of this report is to document the Mineral Resource estimates for the Property, including the 2008 Fire Tower Zone and updated North Zone estimates, which may be used to raise additional funds to further develop and conduct more advanced studies of the Property. The classification of Mineral Resources used in this report conforms to the definitions provided in NI 43-101 and the guidelines adopted by the Council of the Canadian Institute of Mining Metallurgy and Petroleum ("CIM") Standards.

This report is intended to be used by ADEX subject to the terms and conditions of its contract with Watts, Griffis and McOuat Limited. That contract permits ADEX to file this report as a Technical Report with Canadian Securities Regulatory Authorities pursuant to provincial securities legislation. Except for the purposes legislated under provincial securities laws, any other use of this report by any third party is at that party's sole risk.

The preparation of the April, 2012 North Zone report was authorized by Mr. Patrick Merrin, P.Eng., COO for ADEX, on November 21, 2011.

## **2.3 SOURCES OF INFORMATION**

Data used to generate the Mineral Resource estimate of the FTZ originated from a project database created by ADEX in 1997 and later updated by WGM in 2006. The ADEX GEMCOM Project database contained three separate drillhole databases pertaining to three Mount Pleasant zones; namely the FTZ, the Saddle Zone and the North Zone (not to be

confused with the Fire Tower North portion of the FTZ). SRK did not validate the data for the North Zone and Saddle Zone workspaces.

The pre-2008 FTZ drillhole database consisted of 676 collar locations (in mine coordinates), downhole survey data, geological codes, and 24,544 assay intervals with multi-element values (percent of MoS<sub>2</sub>, WO<sub>3</sub>, Sn, Cu, Zn, Pb, Bi, As, Ca, Fe and In (ppm)). The data was provided to SRK in digital form on a CD. The 2008 data which contained additional data for twenty-three diamond drillholes was supplied to SRK as Microsoft Excel spreadsheets via e-mail. In total, the FTZ database was comprised of 699 collar locations and 26,355 assay intervals.

The Mineral Resource estimate for the North Zone is based upon 77 diamond drillholes completed by ADEX and 567 historical holes drilled by previous operators on the Property; several holes were re-assayed by ADEX. The ADEX drilling includes 11/11 AM96-series, 35/48 AM08-series, 23/26 AM10-series, and 8/18 AM11-series holes; over 6200 assays of drill cores from these holes were incorporated into ADEX's GEMCOM database. The historical drilling includes 157/164 C-series, 124/166 DDH-series, 12/12 E-series, 10/16 LNZ-series, 87/227 MPS-series, and 175/185 U-series holes; over 23,000 assays of drill cores from these holes were incorporated into ADEX's GEMCOM database. All data from this drilling were made available to WGM by ADEX, after the integrity of the database was confirmed by independent Qualified Person ("QP") and Geologist, Dr. Steven McCutcheon, P.Geo.

Information about the historical drilling and all of ADEX's work prior to 2009 is described in the Technical Report by Dunbar and de L'Etoile (2009). **Note: This report is no longer current and should not be relied upon.** Information about ADEX's 2010 and 2011 work, described in Sections 7 to 12 of this report, was supplied to WGM by independent QP, Dr. Steven McCutcheon, P.Geo., who was contracted by ADEX for this purpose. He obtained information from site visits, from a review of ADEX's recent technical reports and drilling data, from hardcopy files and correspondence at the mine site, from government reports (including assessment reports), and from discussions and correspondence with ADEX consulting geologists Mr. Gustaaf Kooiman and Dr. Trevor Boyd.

A complete list of the material reviewed is provided under References at the end of this report. Copies of selected reference material are available for review at the WGM office in Toronto.

## **2.4 DETAILS OF PERSONAL INSPECTION OF THE PROPERTY**

WGM personnel visited the Property in 2008, but not in 2010 or 2011. However, independent QP Dr. McCutcheon, P.Geo., made four visits to the Property in 2011. The first was on September 28<sup>th</sup> to 30<sup>th</sup>, at which time an active drill site and several drill collars were visited with G. Kooiman; core logging, splitting and sampling procedures were observed in the core building, and the core and pulp storage areas were inspected. Also, drill cores from three holes were inspected and photographed. The second visit was on October 17<sup>th</sup>, after the drilling program was finished, at which time two additional drill cores were inspected and photographed. The third visit was on November 3<sup>rd</sup> and 4<sup>th</sup>, after most of the assays were in-hand, at which time quarter samples were collected from mineralized intervals in ten drillholes – five from the 2010 program and five from the 2011 program. The fourth visit was on December 2<sup>nd</sup> and 3<sup>rd</sup>, at which time samples were collected from a stockpile of tungsten ore, to be used for metallurgical testing and feasibility studies. During this visit, GPS coordinates were obtained from 10 of 26 drillhole collars in the 2010 program and from 8 of 18 drillhole collars in the 2011 program.

Dr. McCutcheon received the full co-operation and assistance of ADEX personnel during the site visit and the authors are grateful for the assistance provided by ADEX in the preparation of the Mineral Resource estimate and this NI 43-101 Report.

## **2.5 UNITS AND CURRENCY**

Metric units are used throughout this report, and Currency units are Canadian dollars ("C\$"), unless noted otherwise.

### **Abbreviations & Symbols**

<i>Ag</i>	<i>silver</i>
<i>Ar</i>	<i>argon</i>
<i>AR#</i>	<i>assessment report number</i>
<i>As</i>	<i>arsenic</i>
<i>Au</i>	<i>gold</i>
<i>Bi</i>	<i>bismuth</i>
<i>C\$</i>	<i>Canadian dollars</i>
<i>cm</i>	<i>centimeter</i>
<i>Cu</i>	<i>copper</i>
<i>d</i>	<i>day</i>
<i>E</i>	<i>East</i>
<i>EM</i>	<i>electromagnetic (geophysical survey)</i>
<i>ft</i>	<i>feet</i>
<i>ft<sup>2</sup></i>	<i>square feet</i>
<i>FTZ</i>	<i>Fire Tower Zone</i>



<b><i>g</i></b>	<b><i>gram</i></b>
<b><i>GPS</i></b>	<b><i>global positioning system</i></b>
<b><i>g/t</i></b>	<b><i>grams per tonne</i></b>
<b><i>ha</i></b>	<b><i>hectare</i></b>
<b><i>in</i></b>	<b><i>inch</i></b>
<b><i>In</i></b>	<b><i>indium</i></b>
<b><i>ICP</i></b>	<b><i>inductively coupled plasma (analytical technique)</i></b>
<b><i>IP</i></b>	<b><i>induced polarization (geophysical survey)</i></b>
<b><i>IRR</i></b>	<b><i>internal rate of return</i></b>
<b><i>JV</i></b>	<b><i>joint venture</i></b>
<b><i>kb</i></b>	<b><i>kilobar</i></b>
<b><i>kg</i></b>	<b><i>kilogram</i></b>
<b><i>km</i></b>	<b><i>kilometres</i></b>
<b><i>lb</i></b>	<b><i>pound</i></b>
<b><i>m</i></b>	<b><i>meters</i></b>
<b><i>Ma</i></b>	<b><i>million years</i></b>
<b><i>Mag</i></b>	<b><i>magnetic (geophysical survey)</i></b>
<b><i>mm</i></b>	<b><i>millimeter</i></b>
<b><i>Mo</i></b>	<b><i>molybdenum</i></b>
<b><i>MoS<sub>2</sub></i></b>	<b><i>molybdenite</i></b>
<b><i>MPa</i></b>	<b><i>Megapascals</i></b>
<b><i>MS</i></b>	<b><i>mass spectrometry (analytical technique)</i></b>
<b><i>n</i></b>	<b><i>number</i></b>
<b><i>N</i></b>	<b><i>North</i></b>
<b><i>NAD'83</i></b>	<b><i>North American datum 1983</i></b>
<b><i>NI</i></b>	<b><i>National Instrument</i></b>
<b><i>NPV</i></b>	<b><i>net present value</i></b>
<b><i>NZ</i></b>	<b><i>North Zone</i></b>
<b><i>OES</i></b>	<b><i>optical emission spectroscopy (analytical technique)</i></b>
<b><i>opt</i></b>	<b><i>Troy ounces per ton</i></b>
<b><i>oz</i></b>	<b><i>Troy ounce</i></b>
<b><i>Pb</i></b>	<b><i>lead</i></b>
<b><i>P. Geo.</i></b>	<b><i>professional geoscientist</i></b>
<b><i>ppb</i></b>	<b><i>parts per billion</i></b>
<b><i>ppm</i></b>	<b><i>parts per million</i></b>
<b><i>QP</i></b>	<b><i>Qualified Person</i></b>
<b><i>R<sup>2</sup>-value</i></b>	<b><i>square of the sample correlation coefficient</i></b>
<b><i>S</i></b>	<b><i>surface</i></b>
<b><i>SLC</i></b>	<b><i>sub-level caving (mining method)</i></b>
<b><i>Sn</i></b>	<b><i>tin</i></b>
<b><i>SP</i></b>	<b><i>self potential (geophysical survey)</i></b>
<b><i>ton (st)</i></b>	<b><i>short ton (2000 lb)</i></b>
<b><i>tonne (t)</i></b>	<b><i>metric tonne (1000 kg)</i></b>
<b><i>tpd</i></b>	<b><i>tonnes per day</i></b>
<b><i>UG</i></b>	<b><i>underground</i></b>
<b><i>US\$</i></b>	<b><i>United States dollars</i></b>
<b><i>UTM</i></b>	<b><i>Universal Transverse Mercator</i></b>
<b><i>VCR</i></b>	<b><i>vertical crater retreat (mining method)</i></b>
<b><i>W</i></b>	<b><i>tungsten</i></b>
<b><i>WO<sub>3</sub></i></b>	<b><i>tungsten oxide</i></b>
<b><i>yr</i></b>	<b><i>year</i></b>
<b><i>XRF</i></b>	<b><i>X - ray fluorescence (analytical technique)</i></b>
<b><i>Zn</i></b>	<b><i>zinc</i></b>

$^{\circ}C$	<i>degrees Celsius</i>
%	<i>percent by weight (wt) or volume (vol)</i>
$\pm$	<i>plus or minus</i>
$\geq$	<i>greater than or equal to</i>
$\leq$	<i>less than or equal to</i>
$>$	<i>greater than</i>
$<$	<i>less than</i>
$\mu$	<i>micron</i>

### Selected Conversion Factors

<i>1 in = 2.540 cm</i>
<i>1 ha = 107,639 ft<sup>2</sup></i>
<i>1 kg = 2.205 lb</i>
<i>1 m = 3.281 ft</i>
<i>1 tonne = 2205 lb</i>
<i>1 ppm = 1 mg/kg (1 g/t)</i>
<i>1 opt = 34.2857 gpt</i>
<i>% Mo = 0.599 x % MoS<sub>2</sub></i>
<i>% W = 0.793 x % WO<sub>3</sub></i>

### **3. RELIANCE ON OTHER EXPERTS**

WGM prepared this study using the resource materials, reports and documents as noted in the text and "References" at the end of this report. Although the authors have made every effort to accurately convey the content of those reports, they cannot guarantee either the accuracy or the validity of the work described within the reports.

WGM has not independently verified the legal title to the Property, nor has it verified the status of ADEX's Property agreements. We are relying on public documents and information provided by ADEX for the descriptions of title and status of the Property agreements. WGM has also relied upon information about the status of each mineral claim on the Property from "NB e-CLAIMS" [<http://nbeclaims.gnb.ca/nbeclaims/>] and on correspondence with the Mining Recorder's Office of the New Brunswick Department of Natural Resources (NBDNR). WGM has no reason to doubt the title situation is other than what is reported by ADEX.

ADEX has reviewed this Technical Report and confirms that all information disclosed herein, to the best of their knowledge, is accurate.

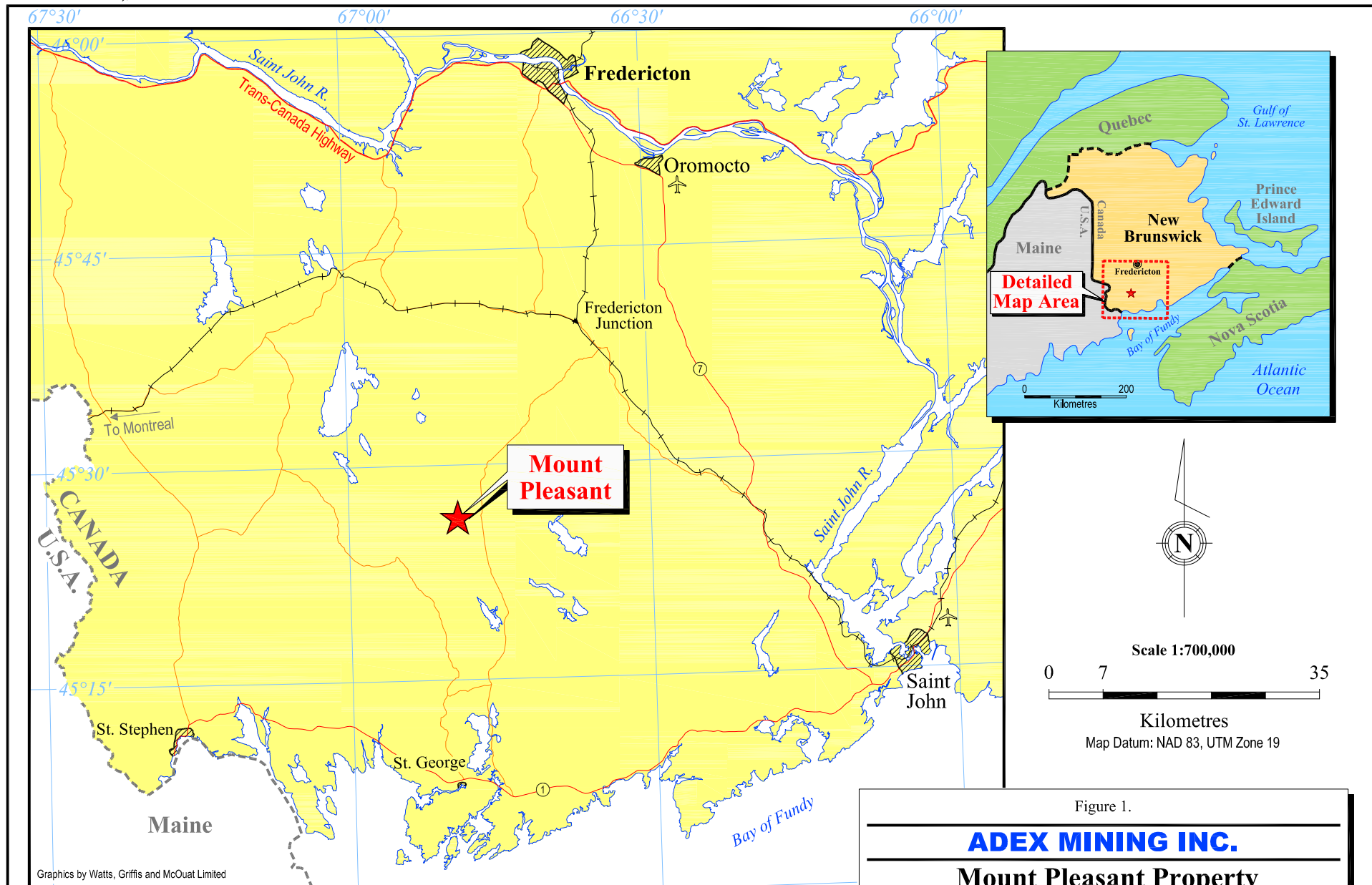
## 4. PROPERTY DESCRIPTION AND LOCATION

### 4.1 LOCATION

The Property is located in Charlotte County, New Brunswick (NTS 21 G/07), approximately 60 km south of Fredericton, 65 km northwest of Saint John and 35 km north of St. George at latitude 45°26'N and longitude 66°49'W (Figure 1). The entire land package consists of 102 contiguous, ground-staked mineral claims covering approximately 1,600 ha in claim group 1505 (Figure 2, Table 1), held under prospecting license 14338 by Adex Minerals Corp., a 100% owned subsidiary of ADEX. Since the last Technical Report on Mount Pleasant (Dunbar and de L'Etoile, 2009) was filed, however, New Brunswick has gone from a ground-staked claim system, based upon Magnetic North, to an on-line map staked claim system based upon True (geodetic) North, effective April 14, 2010. Now, claim group 1505 is considered to be one claim comprising 60 full claim units and parts of 36 others. Each claim unit has fixed coordinates and is identified by a unique number-letter code. Even though the Property has not yet been officially converted to the new system, the new claim units are in effect and can be viewed on NB e-CLAIMS [<http://nbeclaims.gnb.ca/nbeclaims/>].

**TABLE 1.  
GROUND-STAKED MINERAL CLAIMS THAT CONSTITUTE THE  
MOUNT PLEASANT PROPERTY**

Claim Tag Numbers					
<b>Map Index No. 1505</b>					
<b>License Number: 14338 Expire Date: 2/2/2013</b>					
337950	337967	337984	338001	338018	338035
337951	337968	337985	338002	338019	338036
337952	337969	337986	338003	338020	338037
337953	337970	337987	338004	338021	338038
337954	337971	337988	338005	338022	338039
337955	337972	337989	338006	338023	338040
337956	337973	337990	338007	338024	338041
337957	337974	337991	338008	338025	338042
337958	337975	337992	338009	338026	338043
337959	337976	337993	338010	338027	338044
337960	337977	337994	338011	338028	338045
337961	337978	337995	338012	338029	338046
337962	337979	337996	338013	338030	338047
337963	337980	337997	338014	338031	338048
337964	337981	337998	338015	338032	338049
337965	337982	337999	338016	338033	338050
337966	337983	338000	338017	338034	338051



Graphics by Watts, Griffis and McQuat Limited

Figure 1.

**ADEX MINING INC.**  
**Mount Pleasant Property**  
*Southwestern New Brunswick*  
**Location Map**

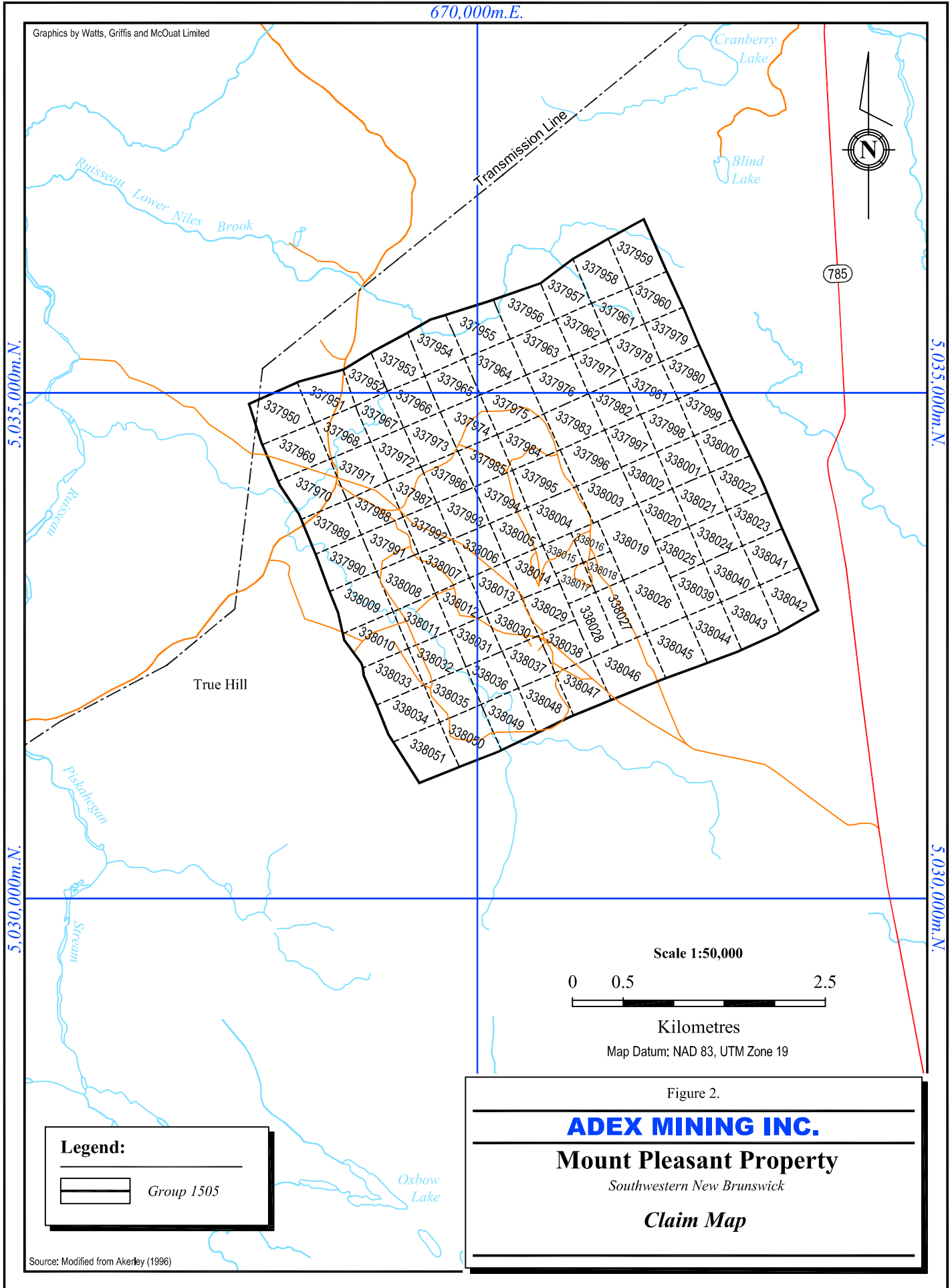


Figure 2.

**ADEX MINING INC.**

**Mount Pleasant Property**

Southwestern New Brunswick

**Claim Map**

New Brunswick is still in the process of changing its remaining ground staked claims to map claims, which will be done by the Mining Recorder once the order to do so is proclaimed by the Provincial Government. Property holders will no longer be required to maintain in physical good order the perimeter of ground-staked claim groups. Furthermore, a property status report will not have to be filed every five years. In January 1989, Hughes Surveys and Consultants legally surveyed the perimeter of claim group 1505.

Annual work requirements must be completed and an annual renewal fee must be paid on claims to keep them in good standing. The present annual work requirement for claim 1505 is \$81,600, and the renewal date is February 2<sup>nd</sup>. On Jan 22, 2010, the annual renewal fee was paid forward for three years for a total of \$9,180. The fees are fully paid until February 2, 2013. ADEX reports a current reserve of \$652,799.88 available for future renewals.

The New Brunswick Mining Act requires that claim holders submit a work report to the Mining Recorder every year exploration work is completed on the property, whether or not the holder has sufficient work credits to renew the claims. The office of the Mining Recorder has requested that ADEX submit and file a work report covering its exploration activity since the filing of its last report.

## **4.2 PROPERTY DESCRIPTION**

### **Surface Rights**

ADEX currently holds the surface rights to approximately 405 hectares, including the area of the former mine buildings. During late 2003 and 2004, surface rights covering approximately 800 hectares were sold to several new owners. In 2008, ADEX provided a 1:10,000 scale surface rights map to WGM, which showed that the surface rights to parts of the deposits are no longer owned by ADEX. For example, the surface rights to the southern half of the Fire Tower Zone, the northern part of the North Zone, and eastern side of Mount Pleasant are owned by third parties, including the Province. The surface rights to the Saddle Zone, the northern half of the Fire Tower Zone and southern part of the North Zone are still held by ADEX. Also, there is a right of way for the Province to the top of Mount Pleasant, and NB Power has a right of way for a power line to its communications tower.

### **Royalty Payments**

A document by D.M. Fraser Services Inc. (1994) indicates that a royalty payment in the amount of \$0.10 per ton of ore mined is payable to Mount Pleasant Mines Limited (“MPM”). This royalty is payable yearly on a non-cumulative basis out of net net profits (the definition of "net net profits" appears to be more or less the equivalent of industry standard "net

profits"), if and when net net profits are made. ADEX has no original documentation to confirm or deny the existence of this royalty.

### **Environmental Permits and Other Factors**

ADEX has 100% ownership of the buildings and equipment remaining on the Property, which changed ownership from Piskahegan in 1996. The Province of New Brunswick still holds a \$2.0 million mortgage on the buildings as security to cover the costs of building removal and contouring (ADEX, 1995). In addition, ADEX has a \$0.715 million security bond posted with the New Brunswick government for mine reclamation. Environmental and permitting issues are discussed more fully in Section 20 of this Technical Report.



## **5. ACCESS, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY**

### **5.1 ACCESS**

Mount Pleasant is located in southwestern New Brunswick (see Figure 1). The mine site is accessible by all-weather roads from either Fredericton, approximately 80 km by road north of Mount Pleasant, or from the small town of St. George, approximately 40 km by road to the south. The Property can be accessed by proceeding 60 km west of Saint John on Route 1 to provincial highway Route 785 (Beaver Harbour turn off). Then travel north approximately 35 km on Route 785, past Irving's Lake Utopia paper mill, to the fork in the chip-sealed road. Bear left at the fork and the mine gatehouse is an additional 4 km after the fork. Route 785 is maintained on a year-round basis by the Province and is the main access route to the Property. It was used for the transportation of concentrates from the former Mount Pleasant Tungsten Mine to the port of Saint John and the eastern United States seaboard. The New Brunswick/Maine border is located approximately 80 km to the southwest by road.

### **5.2 CLIMATE**

The majority of information regarding climate reported herein has been gathered from the Environment Canada website [[http://climate.weatheroffice.gc.ca/Welcome\\_e.html](http://climate.weatheroffice.gc.ca/Welcome_e.html)]. The climate in southwestern New Brunswick is characterized by warm summers, from June through September, generally cool and wet spring and fall seasons, and moderately cold winters from December through March. The proximity of southern New Brunswick to the Bay of Fundy provides a moderating effect on minimum winter temperatures relative to those experienced in northern New Brunswick. Environment Canada historical climate records for nearby Fredericton from 1971 to 2000 indicate average daily minimum temperatures in January and February of  $-15.5^{\circ}\text{C}$  and  $-14.1^{\circ}\text{C}$ , respectively. The extreme minimum temperatures for the same periods are reported as  $-35.6^{\circ}\text{C}$  and  $-37.2^{\circ}\text{C}$  whereas the average maximum temperatures are  $-4.0^{\circ}\text{C}$  and  $-2.3^{\circ}\text{C}$ , respectively. In the summer, the maximum temperatures are  $25.6^{\circ}\text{C}$  average and  $36.7^{\circ}\text{C}$  extreme for July while for August the maximum temperatures are  $24.7^{\circ}\text{C}$  average and  $37.2^{\circ}\text{C}$  extreme. The average minimum temperature in July is  $13.0^{\circ}\text{C}$  and in August it is  $12.1^{\circ}\text{C}$ . The yearly average total precipitation is 1,143.3 mm including 276.5 cm of snowfall and 885.5 mm of rain.

The months of May to October are the best time to conduct field programs, such as geological mapping, soil geochemical surveys, and trenching. However, ground geophysical surveys and drilling programs can be conducted year round. Winter drilling can be advantageous for ease

of crossing active streams or watersheds as many of these water bodies are frozen solid during the winter season. The New Brunswick climate allows for year-round mining and milling activities.

### **5.3 LOCAL RESOURCES AND INFRASTRUCTURE**

Saint John, the largest city in New Brunswick with a population of around 70,000 (2011 Census), is the second largest port in Atlantic Canada. This major seaport is ice-free all year and is located approximately 80 km by road from the Property. Today, this industrial city is dominated by pulp and paper, oil refining and light manufacturing. When the Mount Pleasant Tungsten Mine operated from 1983 to 1985, tungsten ore concentrate was regularly shipped via Route 785 to Saint John for shipments to Europe. Concentrates could also be transported via Route 1 west to potential U.S. customers.

The City of Fredericton with a population of around 56,000 (2011 Census) is located about an hour drive north of Mount Pleasant. This city is the provincial capital and home to the University of New Brunswick. St. George, with a population of around 1,500 (2011 Census), is about a half hour drive to the south and 70 km west of Saint John. As there is no accommodation at Mount Pleasant, mine personnel would most likely live in St. George. Labour could be recruited locally from Saint John, St. George, St. Stephen and Fredericton as well as from Bathurst, a mining community in northeastern New Brunswick.

There are commercial airports located at Fredericton (Oromocto) and Saint John. The closest railway line runs from Saint John through Fredericton Junction northeast of Mount Pleasant to the city of Montreal, Quebec.

There is a considerable amount of existing infrastructure on the Property. The principal buildings are the Administration Building, Warehouse, "A" Frame", Ore Storage Shed, Concentrator, Maintenance Shop, Core Storage and Cold Storage buildings. On the first floor, the administration building accommodates the mine and geological offices, change rooms and lamp room. On the second floor, offices were reserved for management and for the human resources and accounting departments. Telephone and internet services are in place in the maintenance / office building.

Water for processing was previously supplied from a pump house located on nearby Piskahegan River to a storage reservoir on the hillside above the mill (Billiton, 1985). However, the pump house is no longer in service.

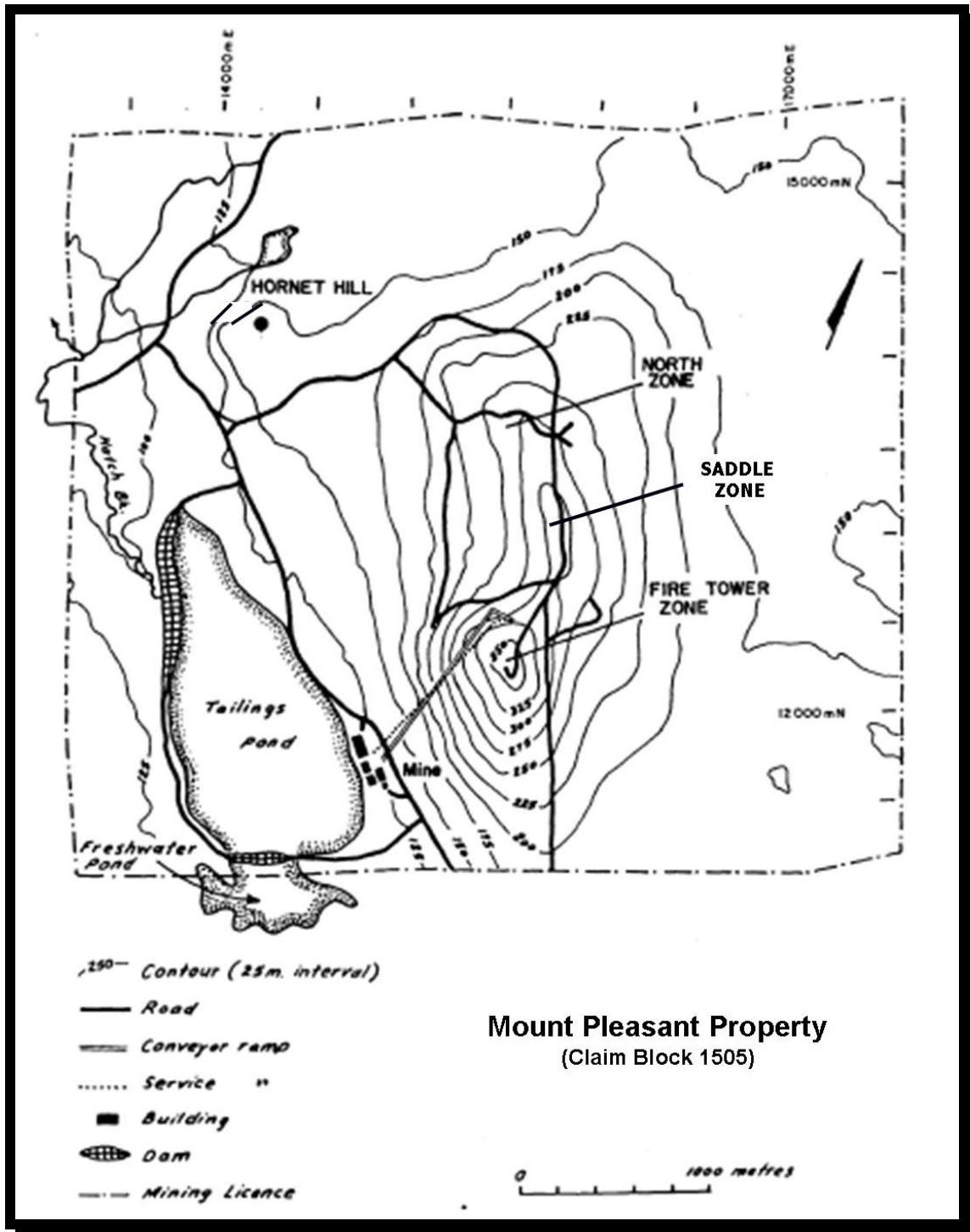
An existing tailings pond (Figure 3) is permitted with an “Approval to Operate” license from the New Brunswick Department of Environment. A drilled well at the mine site provides water for domestic consumption.

Electric power is supplied to the Property by the New Brunswick transmission grid connected to the electric utility, NB Power. The supply is delivered at 138 kV and is transformed to 4,160 V and 600 V to feed equipment. However, ADEX sold most of the milling equipment in the late 1990s and early 2000s to raise money for Property and title maintenance.

#### **5.4                    PHYSIOGRAPHY**

Southern New Brunswick is characterized by low-lying hills and gently rolling topography with hills sloping down to tidal marshes at the edge of the Bay of Fundy (McLeod, 1990). Mount Pleasant, at approximately 370 m above sea level, is some 230 m above the Hatch Brook valley floor and is one of the highest points in southern New Brunswick. The rolling topography is a manifestation of the Pleistocene glaciation that affected the Mount Pleasant area. The dominant ice-transport direction was from the northwest; consequently, hills and stream valleys tend to have a northwest-southeast orientation. Outcrops are sparse but till thickness is not great, occurring mostly as an intermittent veneer rather than a thick blanket, especially at higher elevations. Mount Pleasant is drained by Hatch Brook to the west, Lower Niles Brook to the north, and McDougall Inlet to the east.

Very little of the land in the area is suitable for agriculture so most of it is tree covered, with softwoods in the lowlands and hardwoods on the hills. However, forestry operations in the region have been converting many of the hills into softwood plantations. Mount Pleasant itself was harvested in the 1990s so little marketable timber remains on the Property; however, it has been allowed to regenerate naturally rather than converting it to a softwood plantation.



(modified after Kooiman, 1985)

Figure 3. Sketch map showing the distribution of various topographic features on the Property (Claim Block 1505), including the North Zone, Saddle Zone and Fire Tower Zone

## 6. HISTORY

### 6.1 GENERAL

A review paper (Kooiman 2004) summarizing all historical work previously conducted on the Property has been provided by Mr. G. Kooiman, consulting geologist to ADEX. The description below has largely been extracted from this paper with permission of the author. Additional information has been provided from other reports and documents provided by ADEX to complete this review. The authors believe the historical descriptions presented are generally accurate, but have not independently verified the data.

Mount Pleasant has a long history of exploration and development. The focus of exploration over the years has shifted from tin-base metals ("Tin Lodes") from 1954-1969, to porphyry tungsten-molybdenum-bismuth deposits (1969-1985), to porphyry tin deposits (1985-1991) and back to tin-base metals (1991-2004), and now includes indium, which is an important component of the mineralization.

WGM has prepared four technical reports on the Property, including an initial NI 43-101 compliant Inferred Mineral Resource estimate of the Fire Tower Zone (Dunbar et al., 2006) followed by an upgrading of this estimate to Inferred and Indicated classifications (Dunbar et al., 2008, amended 2012). Then NI 43-101 compliant Inferred and Indicated Mineral Resource estimates of the North Zone were prepared (Dunbar and de L'Etoile 2009), followed by a Preliminary Economic Assessment ("PEA") of the North Zone (Thibault et al., 2010).

**Note: These reports are no longer current and should not be relied upon**

All of the historical work completed on the Property has been summarized in Table 2.

**TABLE 2.**  
**HISTORY OF WORK ON THE MOUNT PLEASANT PROPERTY**

Year	Operator	Work Performed
1954	Geochemical Associates	Stream and soil sample surveys
1955	Selco Exploration Ltd.	Diamond drilling, ground EM & radiation surveys
1956-1960	Kennco Explorations (Canada) Ltd.	IP surveying, diamond drilling – Fire Tower Zone
1960-1965	Mount Pleasant Mines Limited	Stripping & trenching, mapping, soil/bedrock sampling, IP, seismic, SP, magnetic, gravity surveys, surface/UG drilling, met. testing, UG development and bulk sampling, feasibility/"reserve" study on North Zone
1967-1968	Sullivan Mining Group	North Zone: diamond drilling, development (750 & 900 adits), geophysical & geochemical surveys
1969 -1974	Brunswick Tin Mines	Diamond drilling, development (400/900/750 adits), bulk sample(s) & met work, I.P/EM surveying, re-mapping
1977 – 1979	Mount Pleasant Tungsten Mine (Billiton – BTM Joint Venture)	Dewatering, 10,000 tonne bulk sample, Feasibility Study by Strathcona Mineral Services
1980 – 1984	Mount Pleasant Tungsten Mine	Mine/mill construction, production (1983) at 650,000 tpy, UG drilling , reduced output (325,000 tpy) in 1984
1985	Mount Pleasant Tungsten Mine	Mine Closure
1985	Billiton Exploration Canada Limited	Surface diamond drilling (North Zone) for tin resources, visits by tin experts
1985 - 1988	Lac Minerals & Billiton Joint Venture (Lac as operator)	North Zone drilling, 1,187 m access ramp (Fire Tower Zone to North Zone Endogranite Zone), surface and UG drilling, , water pumps stopped, 280 tonne bulk sample (Endogranitic & Crest) to Lakefield (metallurgical work), North Zone Access Decline sampling program
1988 -1989	"Lac-Billiton Tin Project"	Ore handling alternatives report, Redpath Mining Consultants Tin exploration, IP survey, surface diamond drilling northeast of the North Zone, Saddle Zone
1989 -1990	Novagold Resources Inc.	Diamond drilling - Saddle Zone
1990	Novagold Resources Inc.	Cominco: 30 tonne metallurgical testwork at Lakefield, CANMET – focus on tin recoveries, feasibility study by WGM
1991-1992	Novagold Resources Inc.	600 samples analyzed for indium, Property returned to Lac WGM due diligence, samples shipped to Lakefield Research and Cominco, promotional video by NBDNR, concentrate shipped to SIDECH bismuth smelter (Belgium)
1993	Lac Minerals	Purchased mine/mill complex and mineral rights from Lac/Billiton, clear cut forest, 2000 samples analyzed for indium (core, pulps)
1993-1995	Piskehegan Resources Limited	Diamond drilling, 100 kg sample to Research & Productivity Council to start bacterial inoculum for bioleach test work, 30 tonne sample for bioleach heap test from 600 and 900 adits. ADEX acquired Piskehegan Resources in 1995.

## **6.2 EXPLORATION AND DEVELOPMENT**

### **Tin Based Metal Deposit (1954-1969)**

The Mount Pleasant area was first staked in 1954 by Geochemical Associates in follow up to one of the very first stream sediment surveys in North America for base metals, which indicated the possible presence of copper and lead mineralization located on the east side of Hatch Brook Valley and on the west flank of Mount Pleasant (Parrish and Tully 1976). This

coincided with the discovery of large base metal deposits in the Bathurst Camp located in northeastern New Brunswick. The claims were subsequently optioned to Selco Exploration Limited ("**Selco**"); this company conducted geological studies, ran a vertical loop electromagnetic ("EM") survey, and a reconnaissance radiation survey. A massive boulder of löllingite (FeAs<sub>2</sub>) was found near the Fire Tower on Mount Pleasant.

Selco drilled four packsack drillholes to test a geochemical anomaly and preliminary "Geiger Counter" radiometric surveys were completed in the vicinity of the Fire Tower. However, none of the drillholes intersected any significant metallic mineralization and it was concluded that the mineralized zones themselves showed only background radioactivity. As a result, the claims were returned to Geochemical Associates in July of 1955. In 1956, Kennco Exploration (Canada) Limited ("**Kennco**"), the Canadian subsidiary of Kennecott Copper, optioned this claim group and drilled ten holes but results were again disappointing and the option was dropped. The Geological Survey of Canada ("**GSC**") ran an aeromagnetic survey of the area in May of 1956 (GSC 1957; Parrish and Tully 1976), which revealed that Mount Pleasant is located on the side of a large aeromagnetic high. Furthermore, it determined that magnetic surveys would be of little help in outlining mineralized zones on the property. Geochemical Associates allowed the claims to lapse in 1958.

Renewed interest came with the discovery of in-situ gossanous outcrop material higher up on Mount Pleasant. Samples of this material contained base metals and anomalous amounts of tin. In 1959, Mount Pleasant Mines Limited ("**MPM**") was formed and it re-staked the property. Subsequently, Kennco optioned the property again and re-assayed all the old geochemical samples for tin, molybdenum, copper and lead (Parrish and Tully 1976). Additional claims were staked followed by the first ground induced polarization ("IP") survey to be conducted on the property. The IP Survey identified two broad north-south trending anomalies, one that coincided with the current Fire Tower Zone and the other with the current Saddle Zone. Both geophysical anomalies correlated fairly well with previously identified anomalous soil values. IP surveying was followed by the drilling of 24 shallow holes in 1960. Drilling intersected tungsten, molybdenum and tin mineralization but its distribution was erratic and it could not be followed. Meanwhile, Kennco's exploration interest shifted to Western Canada, so the option was dropped.

From 1960 to 1965, MPM completed surface stripping (120 m<sup>2</sup>) and trenching, soil and bedrock sampling, ground geophysics (IP, seismic, self potential ("SP"), magnetic and gravity surveys), surface diamond drilling (Fire Tower Zone), metallurgical testing of drill cores, detailed geological investigations, extensive underground development and underground sampling and drilling programs (Parrish and Tully, 1976). The geological investigations culminated with a Master's thesis on the geology of Mount Pleasant at the University of New

Brunswick (Ruitenbergh 1963), IP surveying was conducted by McPhar Geophysics Ltd. over all three of the currently known zones (Fire Tower area, Saddle Zone and North Zone) as well as reconnaissance surveys in the area west of Hornet Hill. A total of eighteen IP anomalies were identified. Follow-up diamond drilling indicated that the IP anomalies could not be directly related to the main molybdenum, tungsten, bismuth zones but were most likely related to disseminated mineralization in the cap rock. Ground magnetic surveys over the North Zone and Fire Tower Zone areas did not locate any significant magnetic anomalies. On the North Zone, results indicated that silicified zones showed up as weaker magnetic background readings and that chloritized zones stood up above background.

The exploration work by MPM outlined widespread but erratic tin-base metal mineralization in the northern part of the current Property (the North Zone) and diamond drilling in the southern part (Fire Tower Zone) encountered many mineralised intersections with varying amounts of tin, tungsten and molybdenum. MPM drove a 1,465 m adit (the 600 Adit), where some of the underground drilling took place, and from 1963-64 outlined a number of tin-bearing lodes (the Open Pit Zone). At that time, it was difficult to establish a geological model for the tin-base metal mineralization at Mount Pleasant as similar deposits were not known in New Brunswick or anywhere else in Canada.

From 1961 to 1962, several SP and resistivity measurements, both on surface and in diamond drillholes, were completed in the North Zone and Saddle Zone areas (Parrish and Tully 1976). Several weak anomalies were located within the Saddle area but data collected from the North Zone were inconclusive, possibly due to wide spread sphalerite mineralization. In May 1963, a 100-ton bulk sample was collected from the North Zone for testing. A feasibility, development and "reserve" study, based mostly on the North Zone results, was completed in 1964. A gravity survey was conducted over the 600 Adit in August of 1965 to try to prove the vertical continuity of the #1 and #3 Tin Lodes. The results were inconclusive indicating that tin-base metal lodes might be reflected by low gravity values. Some exploration work was completed on the #7 Tin Lode as well. However, work abruptly stopped when MPM ran into financial problems.

The area lay dormant until mid-1967 when the Sullivan Mining Group ("**Sullivan**") began exploration for tin and copper in the Fire Tower Zone. Sullivan followed up on some excellent diamond drill intersections by driving two exploration adits. The 750 Adit (1,330 m long) and the 900 Adit (194 m long) were driven 2.4 by 2.4 m into the Fire Tower North Zone. Only small replacement-style mineralized bodies were found. Additional geophysical and geochemical work was carried out in 1968 (Parrish and Tully, 1976).



### **Porphyry-Molybdenum-Bismuth Deposits (1969-1985)**

Sullico Mines Limited, which became part of Sullivan in 1969, optioned the Mount Pleasant claim group in 1967. In 1968, exploration activities focused on the Fire Tower Zone area with the intersecting of tungsten, molybdenum and bismuth mineralization by drillhole MPS 39.

In 1969, Brunswick Tin Mines ("**BTM**") was formed as a joint venture between Sullivan (78%) and MPM (22%). That same year, surface diamond drilling discovered large porphyry-type tungsten-molybdenum-bismuth zones in the Fire Tower Zone. By 1971, a "resource" had been outlined for the Fire Tower Zone with additional "resources" outlined in the North Zone and Deep Tin Zone (subzone) in 1972. All exploration attention was now focused on the large porphyry deposits.

IP surveying was completed on adjoining claim groups in Hatch Brook, Upper Niles Brook, Beach Hill, Little Mount Pleasant, McDougall Lake and the East Group area in 1970 (Parrish and Tully 1976). Weak anomalies attributed to contact pyritic and graphitic mineralization were located in the Upper Niles Brook and Hatch Brook areas. The strongest anomaly was identified on the East Group where drilling intersected significant tin mineralization. Drill testing of a second IP anomaly at Little Mount Pleasant intersected some zinc mineralization.

In 1971, an x-ray fluorescent spectrometer ("XRF") was set up in St. Stephen by BTM and all core and other materials were assayed using this equipment. The surface of Mount Pleasant was re-mapped and a second IP survey completed. Exploration shifted to the Deep Tin Zone (subzone) in 1972 and the near-surface, #4 Tin Lode. An 815-ton bulk sample was collected from the 750 Adit (North Zone). During 1972, a preliminary ground EM survey with an EM-16 unit was conducted over the Saddle Zone area and Hornet Hill.

BTM drove the 400 Adit (400 ft above sea level) into the higher grade part of the Fire Tower West Zone in 1973 to obtain a bulk sample. This adit became the "+400 level" because BTM subsequently added 10,000 feet to all levels such that the 400 Adit was given a mine elevation of 10,400 feet. Levels below sea level had elevations less than 10,000 feet. This was done to avoid having negative mine levels. When the metric system was adopted in later years, 1,000 m was added to sea level; at that time the 10,400 level became the 1120 level. Exploration drifts were also established on the "+100 level" (later 1030 level) and extensive underground diamond drilling was undertaken. Surface diamond drilling was also completed as well as 1,500 m of underground development.

In 1974, MPM dropped its ownership in BTM to 11% due to its inability to provide its share of exploration funding. BTM completed metallurgical studies and in 1976 completed a

feasibility study for a tungsten mine at Mount Pleasant based on the "reserves" in the Fire Tower Zone and then started to actively search for another partner to help develop the Property.

In November, 1977, Billiton Exploration Canada Limited (“**Billiton**”) formed a 50/50 joint venture ("JV") with BTM (Sullivan 89%, MPM 11%) establishing the Mount Pleasant Tungsten Mine. The JV gave Billiton the right to undertake a full Feasibility Study and earn a 50% interest in the Property by putting it into production (Billiton, 1985). Arrangements were made to dewater the 400 decline, the 1030 Level workings, and to mine a 10,000-tonne bulk sample in the core of the Fire Tower West body. The sample was shipped to Sullivan’s Nigadoo River Mine, near Bathurst, where a continuous mill test was carried out to evaluate the recovery of wolframite and molybdenite by flotation (Billiton, 1985). Strathcona Mineral Services Limited was contracted to compile the Feasibility Study, which was completed in 1979. With the outlook for tungsten prices being favourable, a decision to proceed to production was made at a design capacity of 650,000 tonnes mined/milled per year.

Mine/mill construction commenced in April 1980 with a total construction cost of \$150 million (Billiton, 1985). Underground operations started in December 1982, with the start up of the primary crusher, and sales of tungsten (wolframite) concentrate began in December 1983. A total of 14,478 m of underground drilling was completed to delineate the tungsten-molybdenum zones between 1981 and 1985. In 1984, mine production was reduced to 325,000 tonnes per year.

The mine experienced numerous setbacks, including cost over-runs, metallurgical difficulties and falling tungsten prices, which meant poor profitability and eventually led to the mine being permanently closed in July 1985. During the mining operation from 1983 to 1985, a total of 990,200 tonnes of tungsten ore was milled.

After the mine closed, Sullivan dropped its interest in Mount Pleasant and MPM exchanged its shares in the Mount Pleasant Tungsten Mine for a royalty based on \$0.10 per short ton of ore mined.

### **Porphyry Deposits (1985-1991)**

Mount Pleasant Tungsten Mine geologists re-logged most of the surface and underground diamond drill cores drilled by BTM in the summer of 1981. As a result, they found that a significant amount of tin mineralization in the North Zone occurred in a fine-grained granite underlying and intruding more intensely altered older rocks. As most of the budget went to further outlining and sampling of the tungsten-molybdenum zones, it was not until the spring of 1984 that Billiton made funds available for a tin exploration program in the North Zone. A

total of 4,767 m of diamond drilling was carried out in 1985. All twelve holes (E-series) in this program intersected significant tin mineralization in the contact Crest, adjacent contact Flank and within the Endogranitic Zone (subzone), the latter hosted by younger fine-grained granite.

Site visits by several leading experts on tin geology confirmed the significance of the discovery. Dr. R.G. Taylor and Dr. P.J. Pollard of the Tin-Tungsten Research Unit of James Cook University of North Queensland, Townsville, Australia, concluded their visit report by saying that "it should be realized that to establish 2-3 million tonnes of good grade "reserves" (0.8-1.0% Sn) is an extremely difficult task and this potential seems obtainable at Mount Pleasant," (Taylor and Pollard 1985). Dr. K.F.G. Hosking of Camborne, Cornwall, U.K, also inspected the key drill cores and sections from the North Zone and was similarly impressed by the drilling results stating that "the zone was a very promising tin prospect".

After the closure of the tungsten mine, Billiton started to actively search for a joint venture partner to further explore the tin deposits of the North Zone. Of the eight major mining companies that presented bids, Lac Minerals Limited ("**LAC**") became the preferred partner. Approximately \$6.5 million was spent between 1985 and 1988 to drive a 1,187 m long access drift from the Fire Tower Zone to the North Zone, conduct underground drilling to delineate the zone(s) of tin mineralization and to produce a feasibility study.

The "Lac-Billiton Tin Project" started in October 1985, with LAC as the operator, notwithstanding the collapse of the International Tin Council cartel, which saw tin prices drop from US\$17.50/kg to US\$5.50/kg. The project involved completing 2,101 m of development, which included a 3.5 m by 5.0 m, 1,187 m long access ramp that started from the 1020 level of the service ramp of the Fire Tower Zone and extended to the North Zone. The North Zone Access Decline and lateral exploration development were channel sampled in 1986 by collecting 256 face, wall and muck samples. None of these samples was a continuous channel sample but most of them consisted of 20 – 25 fist-sized pieces.

The joint venture completed 25,377 m of surface (LNZ series holes) and underground diamond drilling. Two bulk samples totalling 2,582 tonnes were excavated from the Contact Crest and Endogranitic Zone (subzone) and processed in the bulk-sample tower on surface. Some 280 tonnes were shipped to Lakefield Research ("**Lakefield**") for metallurgical test work. The remaining material was stored in the "A-frame" building on site where it remains today.

In 1987, Redpath Mining Consultants Limited (“**Redpath**”) of North Bay, Ontario, prepared a three-volume report (Redpath, 1987) on ore handling alternatives for tin ore from the North Zone. Pilot plant testing was completed on bulk samples collected from the Endogranitic Zone (subzone) and the Contact Crest deposit.

However, by the end of 1987, the tin price was still hovering in the US\$5.50-\$6.50/kg range, well below the US\$11.00/kg required for a positive production decision. As a result, LAC put the tin project on hold and the underground workings were allowed to flood. The plant and equipment were placed on a care and maintenance program. Some equipment was reallocated to other operating properties or sold.

During 1988, LAC continued its exploration for other tin deposits on the Property with a modest budget of \$250,000 plus government funding (MISP programs). An IP survey was carried out over the northeast quadrant of the Property, covering an area of 4.0 km<sup>2</sup>. A six-hole surface drilling program started in June 1988, and was completed in October of that same year. LAC terminated its exploration activities by the end of 1988.

In October, 1989, NovaGold Resources Inc. (“**NovaGold**”) optioned the Property from LAC/Billiton. NovaGold completed a three-hole diamond drilling program (NMR series holes) in the Saddle Zone and conducted metallurgical work on the tin mineralization based on a new flowsheet to investigate the North Zone as a potential polymetallic mineral deposit. NovaGold completed initial metallurgical studies on the removal and processing of the sulphide mineralization to recover tin, indium, zinc and copper (ADEX, 1995).

NovaGold also commissioned a study by Cominco Engineering Services Limited (“**Cominco**”), which developed a flow-sheet to produce a 50% tin concentrate at an 80% recovery rate. As part of this study, a total of 30 tonnes of samples for metallurgical test work were shipped to Lakefield, Cominco of Vancouver, British Columbia, and the Federal Government’s CANMET research facility in Ottawa. In 1990, NovaGold initiated a tin feasibility study by WGM with involvement of Davy Canada Inc. as well as a mineralogical study of 40 core samples. In 1992, NovaGold allowed their option to lapse due to financial constraints.

### **Tin-Indium Base Metal Deposits**

Due to low tin prices and a bleak outlook for significant price recovery, exploration efforts focused on other metals associated with tin. NovaGold became interested in the presence of indium in 1991, after visits by indium/bismuth experts of the Geological Survey of Japan and the U.S. Bureau of Mines, who provided very useful insights into the geology, metallurgy and production figures of indium-bearing deposits, as well as the indium industry as a whole. A

sampling program was initiated in November 1991, and was eventually completed with assistance of the New Brunswick Department of Natural Resources ("NBDNR"). Approximately 500 samples were analyzed for indium. The Geological Survey of Canada ("GSC") also participated in the 1991/1992 program by analyzing over 100 samples of mineralized and un-mineralized rocks from the Fire Tower West Zone (subzone). Prior to the 1991/1992 program, less than 50 indium assays were available. In addition, only a few hundred semi-quantitative assays were carried out during the 1970s.

In the spring of 1992, the Property reverted back to LAC due to NovaGold's failure to secure financing or find a senior partner to advance the project. Ongoing interest in indium and bismuth by the Japanese and Europeans prompted NBDNR to take a proactive role in promoting the Property, assisting in technical matters and facilitating meetings with potential investors.

In early 1993, Drew and McKeown began negotiations for the Property. Due diligence work was carried out by WGM and samples were shipped to Lakefield and Cominco. NBDNR produced a promotional video on Mount Pleasant. A bismuth-bearing concentrate was shipped to SIDECH. During a trade mission to Germany and Belgium in April 1993, led by then Premier McKenna, a meeting was held with the principals of SIDECH in Brussels.

In December 1993, Piskahegan with Drew and McKeown as principals, purchased the mine/mill complex and the mineral rights to Mount Pleasant from Billiton and LAC. Piskahegan continued to develop the metallurgical processes for the treatment of tin-sulphides from the North Zone and Deep Tin Zone (subzone) and prepared a new pre-feasibility study. A deal was struck with a local contractor to clear-cut most of the forest that covered Mount Pleasant in order for the company to meet its financial obligations.

Piskahegan quickly recognized the importance of indium as a co-product in any future mining operation and over 2,000 samples of previously drilled core were analyzed for indium. The investigation confirmed the widespread occurrence of indium, in particular in the tin-zinc-copper-rich deposits.

A five-hole diamond drilling program funded by ADEX was completed in 1995 to test indium, zinc and copper mineralization within the Fire Tower Zone. Drilling intersected a new small zone called the Scotia Zone (subzone) and determined that the Fire Tower Zone contained tin-bearing mineralization with good indium, zinc and copper values.

In 1994, D.M. Fraser Services Ltd. prepared a report (Fraser 1995) for Piskahegan reviewing the feasibility of producing tin, indium, base metals and rare-earth metals utilizing all work conducted on the Property since 1987.

Finally, in January 1995, a 100 kg sample was shipped to Research and Productivity Council ("RPC") of Fredericton, New Brunswick to start bacterial inoculums for bioleach test work (Akerly, 1996).

### **6.3 MINING AND MILLING OPERATIONS**

#### **Fire Tower Zone**

The Mount Pleasant Tungsten Mine was put into production in 1983 at a total construction cost of \$150 million. Mining started in the Fire Tower West orebody after two declines were completed between 1981 and 1982 (Billiton, 1985). These declines provided access to the orebody at the north end of the Fire Tower West and Fire Tower South zones (subzones). The Service Ramp runs from the surface to the 955 level (the 1,000 m mine level equals sea level) averaging a 15% slope and was used for transportation of mine personnel, materials and waste haulage. The Conveyor Ramp is 940 m long, 625 m at an 18% slope and 315 m at a 25% slope, and runs from the underground crusher on the 935 level to the surface portal.

According to mining records (Billiton, 1985), the underground mining started in December 1982. The primary mining method employed at Mount Pleasant was transverse, long-hole, open stoping with primary and secondary extraction. The ore extraction was done without backfill. Some of the stopes were large and in excess of several hundreds of thousands of tonnes. The mine levels were laid out at 30 and 45 m intervals. However, during the initial stages of production it was determined that shrinkage mining was essential to provide additional stope support due to the failure of one or more pillars. Additionally, vertical slicing was replaced by horizontal slicing using vertical crater retreat techniques.

The mine was designed to produce 650,000 tonnes of tungsten-molybdenum ore per year with a manpower level of 77 underground employees. During the 1983-85 production period, the underground productivity averaged 50 tonnes per-man-shift. In 1984, the total manpower on site was 235 employees. Prior to the operation shut down, the manpower level dropped to 155 employees and production was reduced to 325,000 tonnes per year.

Selling and shipment of the tungsten concentrate began in December 1983. The tungsten concentrate was sold exclusively to Billiton Metals and Ores International BV, the Netherlands (Billiton, 1985). Long-term supply contracts were in place with European and

U.S. customers. The concentrate was delivered in 250 kg drums or one-tonne bags. Lots of 18-22 tonnes were transported in containers by truck/ship to Europe or by truck to the U.S.

However, the mine was plagued by setbacks. During construction of the mine, the tungsten price dropped to US\$12.50/kg and dropped even further in subsequent years. Severe capital cost overruns, from an original \$89 million to over \$150 million, in addition to metallurgical difficulties made for a bleak outlook for the mine. By 1984, the price of tungsten had dropped further to US\$8.40/kg.

In July 1985, the mine was closed permanently due to poor metal prices and the resulting poor profitability and metallurgical problems after less than 2 years of production. A total of 990,200 tonnes of "tungsten ore" was milled from 1983 to 1985. Tungsten was the only metal recovered in the plant. No attempts were made to run the molybdenum recovery circuits. The ore bins contain an unknown amount of uncrushed ore and there are twenty-five 205 litre drums containing historic bulk-sample material from the Fire Tower Zone securely stored in the warehouse.

The main mine is currently flooded to the portal level of the access ramps. Kvaerner (1997) estimated that de-watering will take 24 weeks.

### **North Zone**

The North Zone was never mined by any of the previous operators. The previously proposed mining methods are summarized below. As with all mineral deposits, mining methods are dictated by the deposit geology, size, shape and orientation.

Billiton proposed access to the North Zone via the over 900 metre-long drift from the Fire Tower West, which connects to a 1,200 m decline that starts from surface, a distance of about 600 m north of the mill (Billiton, 1985). They proposed that the Deep Tin Zone (subzone) could be mined using the same methods used at the Fire Tower Zone. The Contact Crest mineralization would require a modified slice and bench or sub-level retreat method. The more steeply dipping Contact Flank mineralization might be amenable to blast-hole stoping or blast-hole shrinkage, if the mineralization had a regular shape, or cut-and-fill, if it did not. The Endogranitic mineralization could be mined by a room and pillar layout using top-slice and bench methods or blast-hole retreat with remote mucking.

Piskahegan proposed using sub-level caving ("SLC") as its main mining method for the Endogranitic Zone (subzone) and contact deposits (ADEX 1995). Some blast-hole stoping would be employed on the Endogranitic Zone (subzone) but blast hole could be the main mining method for the Deep Tin Zone (subzone) because the mineralization was interpreted to

be one mass. SLC was proposed because it was considered a low cost mining method. However, this technique has a high dilution factor (21%), especially in vein-type mineralization. Blast-hole stoping was considered a low-cost mining method and in the Deep Tin Zone (subzone) less dilution (15%) was expected because the mineralization was in one mass. Vertical-crater-retreat mining was also proposed where applicable.

Kvaerner (1997) recommended a mixture of SLC and long-hole stoping, with mining of ore from the North Zone and Deep Tin Zone (subzone) at a rate of 2,500 t/d. SLC would be used for 90% of the deposits and long hole for the remainder.

#### **6.4 HISTORICAL DIAMOND DRILLING**

Since 1955, at least a dozen drilling campaigns have been completed to explore and develop deposits at Mount Pleasant. Over the last 50 years, 1,318 drillholes totalling 155,444 m have been drilled, including 450 surface holes and 868 underground holes, totalling 93,657 m and 61,787 m, respectively (Table 3). These drill programs have led to discovery of the Fire Tower Zone tungsten-molybdenum deposits and the North Zone tin-indium deposits, as well as to preliminary exploration of tin mineralization at Hornet Hill. Prior to this report, the last diamond drill program completed by ADEX was in 2008.

Each of the drill programs is described below. The collar locations for the surface drillholes have been tied into a surveyed mine grid and are plotted in Figure 7 (Section 7 of this report). All sample intervals reported represent lengths measured down core and do not necessarily represent the true thickness of the mineralized zones as many of them appear to be irregularly shaped, both vertically and horizontally.

Most holes were inclined holes up to 1973 when vertical drilling became more common place. The size of the drill core prior to the Sullivan Mining Group's takeover was AX (Parrish and Tully 1976). From 1969 to 1972 Sullivan and BTM continued to use A core and AQ core. As of June 1972, BTM started to use BQ core as they found that BQ holes did not deviate as much as AQ holes. Underground drilling conducted in the 600, 750 and 900 adits was completed with air-powered BBU drills, producing A, E or XRT size core (Parrish and Tully 1976). In 1975, two Longyear EHS 38, electric drills were used in the 400 decline that produced BQ core.



**TABLE 3.  
SUMMARY OF MOUNT PLEASANT DIAMOND DRILLING PROGRAMS  
SURFACE AND UNDERGROUND HOLES**

Year	Company	Drilling Type	Hole Series	Hole Numbers	Total Holes	Metres Drilled	Source
1954	Selco Exp.	S	DDH	1 to 4 (incl.)	4	305	AR# 470129
1956	Kennco Exp.	S	DDH	5 to 10 (incl.)	6	222	AR# 470104
1960	Kennco Exp.	S	DDH	11 to 27 (incl.)	17	2,655	AR# 470106
				41 to 47 (incl.)	7	736	AR# 470106
1961-62	Mount Pleasant Mines	S	DDH	28 to 40 (incl.)	13	1,291	AR# 470111
				48 to 103 (incl.)	56	5,655	AR# 470113
1963-65	Mount Pleasant Mines	S	DDH	104 to 166, except 129, 130, 162, 163	61	5,819	Mine files
				500 to 517, 523, 524	20	2,295	Mine files
	Mount Pleasant Mines	UG	U (D series of MPM)	1 to 195, except 17 holes not drilled, & 10 added (18A, 19A, 30A, 43A, 50A, 94S, 194A)	185	7,743	Mine files
1967-1977	Brunswick Tin Mines	S	MPS	1 to 235, except 86, 133, 134, 208, 210, 211 & 213	228	58,624	Mine files
		UG	A	1 to 173 (incl.)	173	14,757	AR# 470099
		UG	D7	1 to 123 (incl.)	123	4,773	Mine files
		UG	D9	1 to 35 (incl.)	35	959	Mine files
1981-85	Mount Pleasant Tungsten	UG	B	1 to 203, except holes 185 to 199 were never drilled	188	15,431	Mine files
1985	Billiton Exp.	S	E	1 to 16, excluding 10, 13, 14, & 15 (plus E-16/D1)	12	4,903	Mine files
1986	Billiton - Lac Minerals	UG	C	1 to 164 (incl.)	164	18,124	Mine files
1987-88	Billiton - Lac Minerals	S	LNZ	1 to 18 (incl.)	18	6,679	Mine files
1989	NovaGold Res.	S	NMR	89-1, 90-1, & 90-2	3	1,702	Mine files
1995	Piskehegan Res.	S	PRL	95-1 to 95-5	5	2,771	AR# 474687
<b>Totals:</b>					<b>1,318</b>	<b>155,444</b>	

Abbreviations as follow: S = surface, UG = underground, and AR# = assessment report number

Since 1985, all surface holes have been drilled vertically, starting with NQ-size core and switching to BQ approximately half to two-thirds of the distance down hole (Gowdy, 1995). All underground holes were BQ-size and they were rarely surveyed. During the Lac-Billiton Tin Project, down-hole surveys were carried out occasionally, using a Pajari instrument, mainly to check the deviation of deeper holes. All surface holes were drilled vertically and drillholes seldom deviated more than 3° over their entire length. Most underground holes were relatively short and Pajari tests were carried out sporadically.

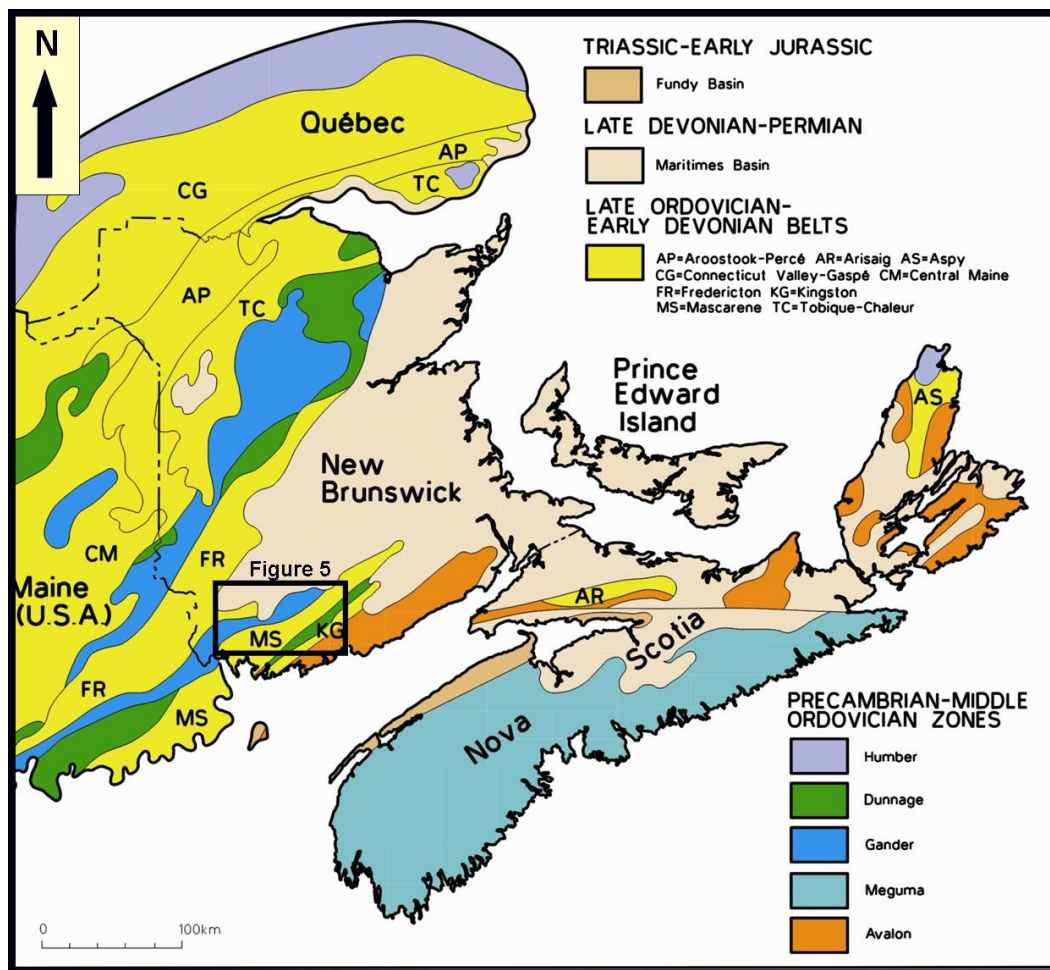
Ten historical holes from surface were intersected by underground workings. Surface and underground drill cores are reported 99% sampled and assayed (Kvaerner 1997). Average sample length was 3.0 m. Much of the core splitting was done with a Longyear core splitter. Drill reports seldom reveal the name of the company that did the drilling.

Further information regarding the historical diamond drill programs at Mount Pleasant is contained in WGM Technical Reports (Dunbar et al., 2006, 2009).

## 7. GEOLOGICAL SETTING AND MINERALIZATION

### 7.1 REGIONAL GEOLOGY

The Mount Pleasant area, located in southern New Brunswick, lies within the Appalachian Orogen of eastern Canada; more specifically, near the western end of the Maritimes Basin, which contains rocks ranging in age from Late Devonian to Permian (Figure 4). This basin oversteps the five well-known tectono-stratigraphic zones (terranes) of the Appalachian Orogen (Williams 1979, 1995), and post-dates continental collision that occurred during the Early to Middle Devonian Acadian Orogeny (McCutcheon and Robinson 1987).



(modified from inset map on the Bedrock Geology of New Brunswick, NBDNR 2008).

Figure 4. Map showing the location of the Mount Pleasant area (black rectangle) with respect to the Maritimes Basin and known tectono-stratigraphic zones and belts in New Brunswick

It is predominantly filled by gently dipping sedimentary rocks that were deposited in alluvial, fluvial, lacustrine and marine environments but it also contains minor subaerial volcanic rocks, especially near the base of this successor basin. Volcanic rocks in the Mount Pleasant area are assigned to the Late Devonian Piskahegan Group, which represents the remnants of a large epicontinental caldera complex (McCutcheon et al, 1997); the southwestern margin of this caldera complex is where the Mount Pleasant deposit is situated.

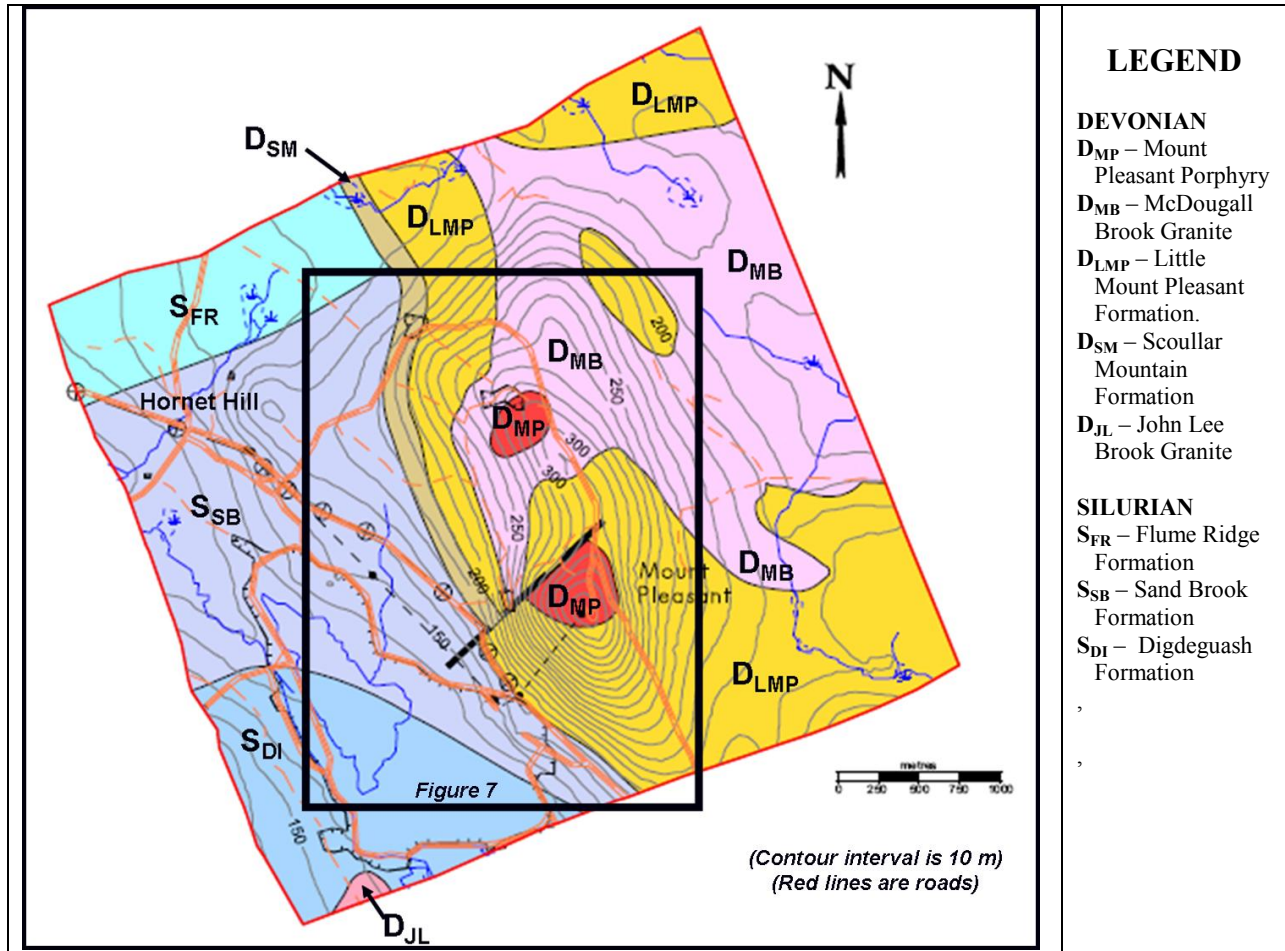
## **7.2 LOCAL GEOLOGY**

The Piskahegan Group was originally introduced by van de Poll (1967) and subsequently revised by McCutcheon (1990). For detailed descriptions of the formations comprising this group, the reader is referred to the “New Brunswick Bedrock Lexicon” under “Databases” on the New Brunswick Department of Energy and Mines (NBDEM) website: [<http://www.gnb.ca/0078/minerals/index-e.aspx>]. The distribution of all formations comprising this group is shown on the “Bedrock Geology Map of Southwestern New Brunswick” (Smith 2005), which can be down-loaded as a free PDF file (NR-5) under “Selected Publications” on the NBDEM website.

Part of the “Bedrock Geology Map of New Brunswick” (NBDEM, 2008) shows the distribution of the Late Devonian Piskahegan Group and adjacent rock units in the vicinity of Mount Pleasant. The Piskahegan Group (Unit **LD<sub>PI</sub>**) includes felsic (pale yellow), mafic (green) and sedimentary (orange) rocks that mainly occupy a triangular area measuring approximately 13 by 17 km and underlie a curvilinear belt that extends to the east of it (Figure 5). Most of the rocks of the triangular area, and all of those to the east, belong to the intracaldera and exocaldera sequences, respectively, of McCutcheon et al., (1997). A late-caldera fill sequence oversteps and extends to the west of the triangular area in the north and includes late-stage intrusions, including the Mount Pleasant Porphyry (Unit **LD<sub>MP</sub>**) but not the McDougall Brook Granite (Unit **LD<sub>MB</sub>**), which is part of the intracaldera sequence. The age of the Piskahegan Group is constrained by fossils (McGregor and McCutcheon 1988) and by radiometric ages (Tucker et al., 1998; Anderson 1992). Notably, the group is roughly coeval with the Late Devonian Mount Douglas Granite (Unit **LD<sub>MD</sub>**), part of the Saint George Batholith (see Bedrock Lexicon) to the southeast, and with other small Late Devonian intrusions (units **LD<sub>BH</sub>**, **LD<sub>K</sub>**, **LD<sub>PR</sub>**, **LD<sub>SR</sub>**, and **LD<sub>TH</sub>**) to the southwest of Mount Pleasant. All these rocks post-date the Early to Middle Devonian Acadian Orogeny and therefore, lack penetrative deformation fabrics.



Piskahegan Group, and three named Devonian intrusions. Each of these is briefly described below based upon information extracted from the Bedrock Lexicon and elsewhere. However, much of this formal nomenclature did not exist prior to the 1990s; instead, an informal “mine terminology” was applied to rock units on the Property by previous operators, which is subsequently described and correlated with the formal terminology.



(modified after McLeod et al., 1998 and Smith 2005).

Figure 6. Geological map of the Property showing the distribution of formally named rock units and the approximate location of Figure 7 (black rectangle).

### Kingsclear Group

The western part of the Property is underlain by the Digdeguash, Sand Brook and Flume Ridge formations. The Sand Brook Formation has the greatest areal extent and is in direct contact with rocks of the Piskahegan Group at the mine site. The Digdeguash Formation underlies a small area in the southwest part of the Property and the Flume Ridge Formation underlies an area in the northwest.

The Early Silurian Digdeguash Formation (Unit **S<sub>DI</sub>**) consists of medium to dark grey, medium- to coarse-grained, lithic to feldspathic wacke; light grey quartz wacke and polymictic, granule conglomerate; and dark grey to black shale. Wacke beds are medium-to thick-bedded and commonly graded. This unit is gradationally overlain by the Sand Brook Formation and is intruded by the Late Silurian Jake Lee Mountain Granite in the southwest corner of the Property.

The Silurian Sand Brook Formation (Unit **S<sub>SB</sub>**) comprises light green to greyish green, thin- to medium-bedded, fine-grained, feldspathic wacke interstratified with maroon and green, laminated, mudstone. The green beds contain an abundance of epidote and actinolite. In contrast, the conformably overlying Flume Ridge Formation contains light grey, carbonate-rich beds. The Sand Brook Formation is unconformably overlain by (and/or in fault contact with) the Scoullar Mountain Formation or Little Mount Pleasant Formation, both of which belong to the Late Devonian Piskahegan Group.

The Late Silurian Flume Ridge Formation (Unit **S<sub>FR</sub>**) consists of greyish green, calcareous sandstone, siltstone, and shale. The sandstone contains large detrital muscovite flakes and abundant iron carbonate. The shale commonly occurs as thin partings in the sandstone rather than as discrete beds. This formation is unconformably overlain by the Scoullar Mountain Formation near the northern boundary of the Property.

### **Piskahegan Group**

Much of the eastern part of the Property is underlain by rocks of the Scoullar Mountain and Little Mount Pleasant Formations. The Little Mount Pleasant Formation has the greater areal extent of the two; the Scoullar Mountain Formation is confined to a narrow, northerly trending band that extends from the west side of Mount Pleasant to the northern boundary of the Property (see Figure 6).

The Late Devonian Scoullar Mountain Formation (Unit **D<sub>SM</sub>**) is characterized by greenish grey, cobble to boulder, sedimentary breccia with minor sandstone, pebbly sandstone and conglomerate, but it also contains local interbeds of quartz-feldspar crystal tuff. To the east of the Property, at Scoullar Mountain, porphyritic to amygdaloidal andesite flows constitute the top of this formation. The sedimentary breccia is dominated by clasts of metasedimentary rocks, suggesting that the lower contact of this formation is an erosional unconformity, but it also contains felsic tuff clasts that are typical of the Rothea Formation (exocaldera facies), eruption of which produced the original caldera. This breccia is interpreted to have formed from talus shed from the ring-fracture fault scarp of that caldera (McCutcheon et al., 1997).

The Late Devonian Little Mount Pleasant Formation (Unit **D<sub>LMP</sub>**) is characterized by greyish red, quartz-feldspar crystal tuff containing red clasts of pseudomorphed pumice, where unaltered, but this formation also contains minor flow-banded rhyolite at the base, which does not occur on the Property. Where altered, the rocks are greenish grey and with increasing alteration, feldspar and pseudomorphed pumice clasts become hard to recognize, which is the case on most of the property. This formation disconformably overlies the Scoullar Mountain Formation and is intruded by feldspar porphyry, a subvolcanic (locally extrusive?) phase of the McDougall Brook Granite.

### **Intrusive Rocks**

The John Lee Brook Granite underlies the extreme southwestern corner of the Property, whereas the McDougall Brook Granite underlies most of the northeastern part. Two small plugs of Mount Pleasant Porphyry, one on the North Zone and the other on the Fire Tower Zone, crop out at Mount Pleasant and a possible third one subcrops at Hornet Hill (see Figure 6).

The Early Devonian John Lee Brook Granite (Unit **D<sub>JL</sub>**) consists of grey, medium-grained, equigranular, two-mica monzogranite. The presence of primary muscovite, and locally garnet, distinguishes this intrusion from others in the Saint George Plutonic Suite. This granite intrudes both the Digdeguash and Sand Brook formations. An  $^{40}\text{Ar}$ - $^{39}\text{Ar}$  cooling age of  $384 \pm 7$  Ma on muscovite suggests that the granite is Early Devonian (McLeod, 1990).

The Late Devonian McDougall Brook Granite (Unit **D<sub>MB</sub>**) consists predominantly of porphyritic microgranite (monzogranite) with a border phase of feldspar porphyry and minor equigranular to porphyritic, fine-grained, quartz monzonite. This granite is the youngest unit within the intracaldera sequence of the Mount Pleasant caldera complex. All three phases occur on the Property, but the feldspar porphyry is the only phase that crops out on Mount Pleasant. It intrudes rocks of the Scoullar Mountain and Little Mount Pleasant formations, but it is intruded by the Mount Pleasant Porphyry.

The Late Devonian Mount Pleasant Porphyry (Unit **D<sub>MP</sub>**) comprises greyish olive to greenish black, sparsely quartz-feldspar phyric porphyry and associated chloritic and silicic breccias. The porphyry occurs as multi-stage, flow-banded dykes and small plugs that grade downward into granite. The breccias are both matrix-supported and clast-supported, but original rock types are commonly unrecognizable due to extensive magmatic-hydrothermal alteration. The breccias and associated intrusive rocks form roughly vertical, pipe-like complexes interpreted to be centres of subvolcanic intrusive and related hydrothermal activity (McCutcheon et al.,



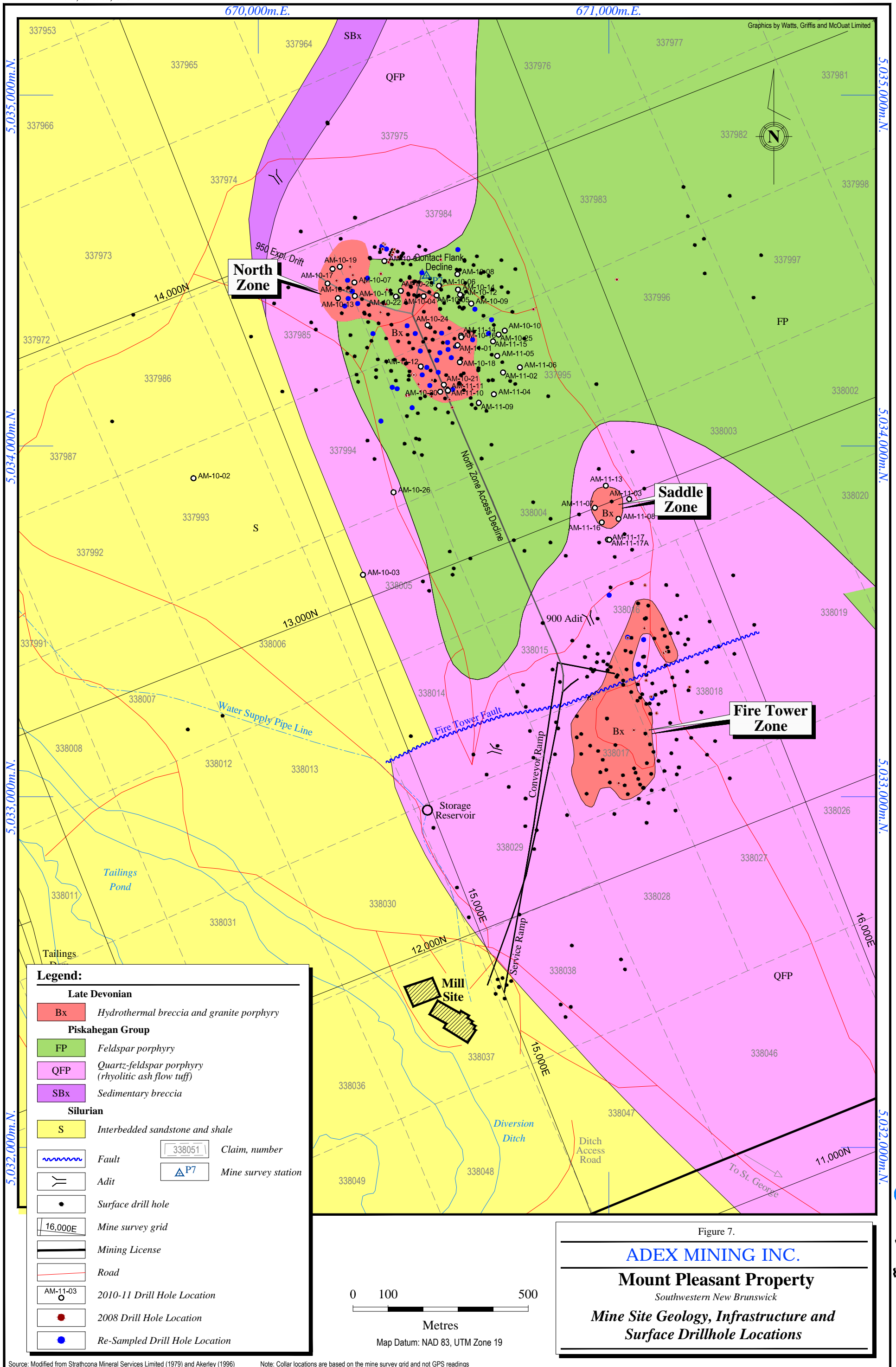
2001). Drilling and underground workings have revealed that there are several phases of granite at depth, which represent successive cooling stages of one magma body. These granite phases, which are described in the next section, are considered to be genetically related to the tungsten-molybdenum and tin orebodies (Kooiman et al., 1986; Sinclair et al., 1988; McCutcheon, 1990).

The geology of the North, Saddle and Fire Tower Zones, plus drillhole locations are shown in Figure 7.

### **Mine Terminology**

Riddell (1962) published the first rudimentary map of the Mount Pleasant deposit but Ruitenbergh (1967) published a better one at a reasonable scale, which was based upon his unpublished MSc thesis (Ruitenbergh 1963). This map was reproduced as NBDNR Map Plate 69-12 (Ruitenbergh 1969), in which the following units are delineated: “brecciated metasediments intruded by quartz-feldspar porphyry”, “intensely altered quartz-feldspar porphyry”, “intensely altered latite porphyry”, and “banded quartz-feldspar porphyry”. These four informal units are now referred to as: sedimentary breccia (Unit **SBx**), quartz-feldspar porphyry (Unit **QFP**), feldspar porphyry (Unit **FP**), and hydrothermal breccia and granite porphyry (Unit **Bx**), respectively. This informal mine terminology is used in Figure 7 and throughout the remainder of this report. However, keep in mind that the formal names for these units are: Scoullar Mountain Formation, Little Mount Pleasant Formation, McDougall Brook Granite and Mount Pleasant Porphyry, respectively.

Sedimentary breccia (Unit **SBx**) crops out intermittently in a narrow belt that extends from the northern boundary of the Property in a southerly direction, along the western flank of Mount Pleasant towards the Fire Tower Zone, where it separates Silurian sedimentary rocks from Unit QFP. This sedimentary breccia also occurs in the subsurface beneath both the North and Saddle zones, where it has been intersected in numerous drillholes. It overlies and is also intruded by QFP and FP in the North Zone; however, it appears to overlie FP in the Saddle Zone, either indicating that some FP is extrusive or that FP occurs as a sill in sedimentary breccia. Where unaltered, this clast-supported breccia predominantly consists of variably sized, angular fragments of Silurian sedimentary rocks (Figure 8a). However, this is not obvious where the breccia is intensely altered (Figure 8b).



**Legend:**

- |   |  |
|---|--|
| <b>Late Devonian</b>  |  |
| <span style="background-color: #f08080; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Bx  | Hydrothermal breccia and granite porphyry          |
| <b>Piskahegan Group</b>   |  |
| <span style="background-color: #90ee90; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> FP  | Feldspar porphyry                                  |
| <span style="background-color: #ffb6c1; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> QFP | Quartz-feldspar porphyry (rhyolitic ash flow tuff) |
| <span style="background-color: #e6e6fa; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> SBx | Sedimentary breccia                                |
| <b>Silurian</b>   |  |
| <span style="background-color: #ffff00; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> S   | Interbedded sandstone and shale                    |
|   | Fault  |
|   | Adit   |
|   | Surface drill hole                                 |
|   | Mine survey grid                                   |
|   | Mining License                                     |
|   | Road   |
|   | 2010-11 Drill Hole Location                        |
|   | 2008 Drill Hole Location                           |
|   | Re-Sampled Drill Hole Location                     |
|   | Claim, number                                      |
|   | Mine survey station                                |

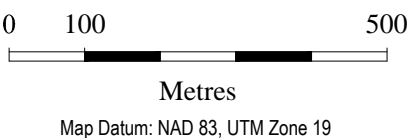


Figure 7.  
**ADEX MINING INC.**  
**Mount Pleasant Property**  
 Southwestern New Brunswick  
**Mine Site Geology, Infrastructure and Surface Drillhole Locations**

Source: Modified from Strathcona Mineral Services Limited (1979) and Akerley (1996) Note: Collar locations are based on the mine survey grid and not GPS readings

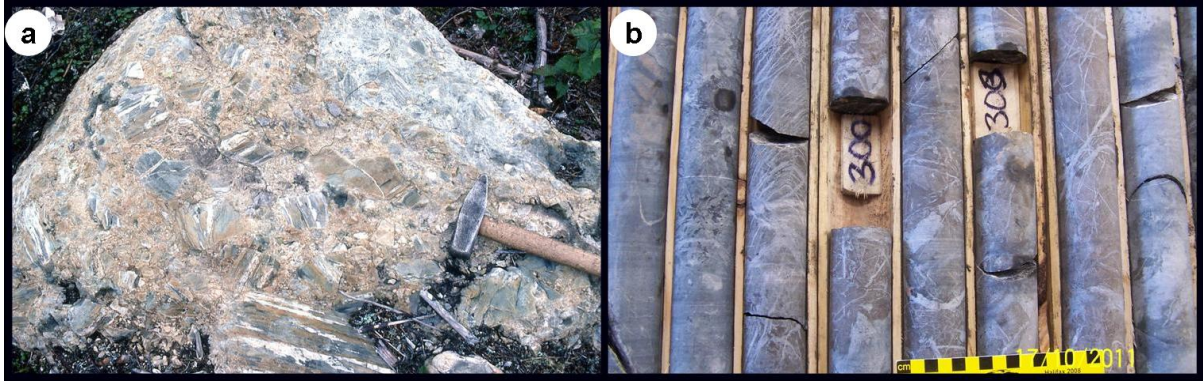


Figure 8. Photographs of sedimentary breccia (Unit **SBx**):

- a) Field photograph showing variably sized, angular and veined clasts of Silurian sedimentary rocks; note the brownish hue to many of the clasts (hammer head is 13 cm).
- b) Highly altered sedimentary breccia (note the brownish hue) in drill core from hole AM11-14 (divisions on scale are cm).

Quartz-feldspar porphyry (Unit **QFP**) underlies a large part of the Property, extending from the northern boundary, along the western side of Mount Pleasant past the North Zone, to the Fire Tower Zone and then to the southeast beyond the Property boundary. It also underlies the northeast corner of the Property. Where unaltered, the QFP is a pinkish to reddish grey, crystal tuff containing 30 – 40% crystals, with approximately twice as much pink feldspar as clear quartz, which range in size from 0.5 – 3.0 mm (Figure 9a). For the most part, the QFP is an extrusive (volcanic) unit that overlies sedimentary breccia but locally it reportedly intrudes this breccia (Ruitenbergh 1963). Where altered, QFP is various shades of green and grey, with the feldspar largely replaced by alteration minerals, although crystal forms are commonly preserved, and quartz crystals are unaffected (Figure 9b).

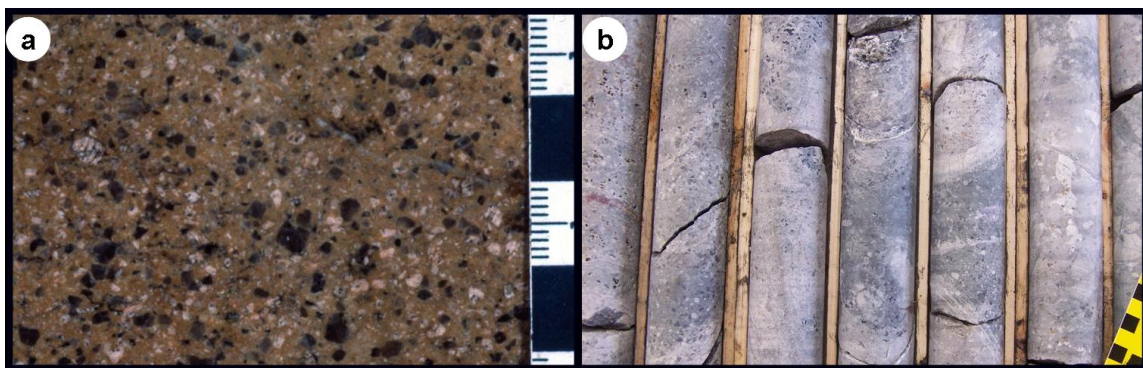


Figure 9. Photographs of quartz-feldspar porphyry (Unit **QFP**):

- a) Cut slab of unaltered QFP showing variably sized, dark grey quartz and pink feldspar (small divisions on scale are millimetres).
- b) Highly altered QFP in drill core from the upper part of hole AM11-12; dark grey quartz crystals and white feldspar pseudomorphs are visible in places; brecciated QFP is visible to the right (divisions on scale are centimetres).

Feldspar porphyry (Unit **FP**) underlies much of the northeastern part of the Property; it crops out intermittently in the North Zone but does not occur at surface in the Fire Tower Zone. Where unaltered, it is greyish red to reddish brown and contains 20 – 35% feldspar phenocrysts (1 – 12 mm) in a very fine grained (microcrystalline) groundmass (Figure 10a). This unit represents the fine-grained border or sub-volcanic part of the McDougall Brook Granite, which is the terminal phase of igneous activity that produced the Mount Pleasant Caldera, or its extrusive equivalent, the Bailey Rock Rhyolite (McCutcheon et al., 1997). The FP intrudes both quartz-feldspar porphyry and sedimentary breccia. Where altered, FP is various shades of green and grey, with the feldspar largely replaced by alteration minerals, although crystal forms are commonly preserved (Figure 10b).

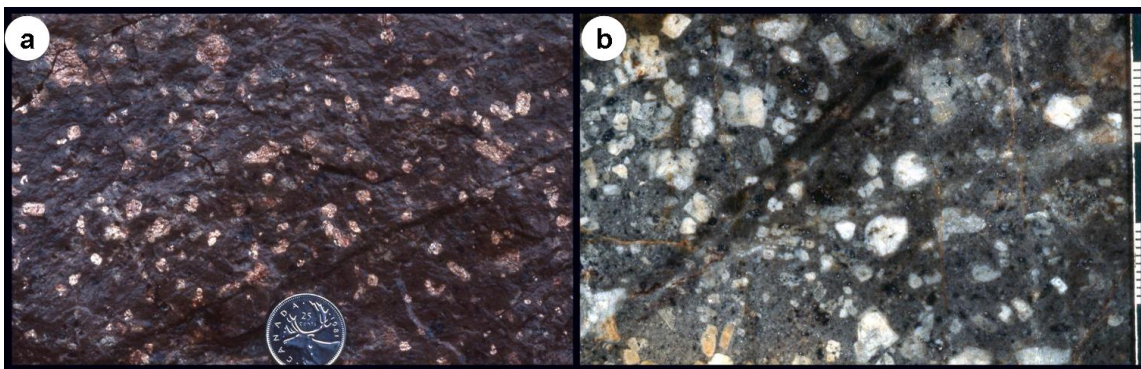


Figure 10. Photographs of feldspar porphyry (Unit **FP**):

- a) Cut slab of unaltered FP showing variably sized feldspar phenocrysts in very fine grained groundmass (coin is 2.4 cm in diameter).
- b) Cut slab of altered FP in which the feldspar phenocrysts are largely replaced by clay minerals and quartz (small divisions on scale are millimetres).

Hydrothermal breccia and granite porphyry (Unit **Bx**) have the least areal extent, compared to the other rock units at Mount Pleasant, and they are confined to two small sub-circular (tadpole-shaped) areas, one at the North Zone and the other at the Fire Tower Zone. Several stages of magmatic-hydrothermal brecciation and more than one phase of intrusive activity are apparent, which are associated with a post-caldera granite body at depth. It was inward cooling of the original granitic magma that produced the magmatic-hydrothermal fluids, which caused brecciation of the country rocks and carried the metals that formed the tungsten-molybdenum and tin-indium deposits (McCutcheon 1990).

Two broad types of hydrothermal breccia were recognized in the Fire Tower Zone by Kooiman et al., (1986) – an older and more voluminous silicic phase and a younger cross-cutting chloritic phase. The older phase consists of angular to sub-rounded, light grey to white, greisenized fragments in a silicified matrix, whereas the younger phase contains

greisenized fragments in a chloritic matrix. The latter type is generally associated with flow-banded, “granite-porphyry” dykes (Figure 11). In thin section, these dykes bear little resemblance to granite because they are extremely fine grained (cryptocrystalline), reflecting fluidized emplacement, and are more appropriately called tuffisite dykes (Lentz 2011). The same types of breccia also occur in the North Zone.

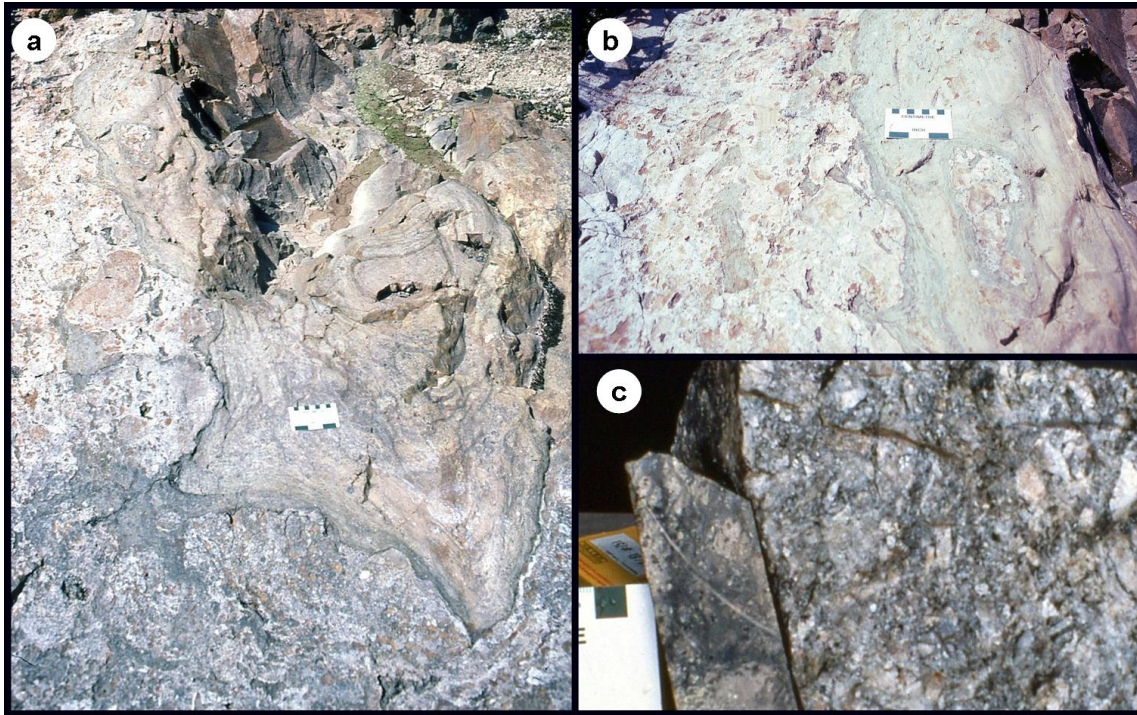


Figure 11. Photographs of hydrothermal breccia and granite porphyry (Unit **Bx**):

- a) Outcrop of flow-banded, “granite porphyry” dyke cutting hydrothermal breccia at the Fire Tower Zone (small divisions on scale are centimetres).
- b) Close up of the margin of this flow-banded dike and chloritic breccia to the left of the scale (small divisions on scale are centimetres).
- c) Cut slab of silicic breccia showing greisenized fragments (light grey) in a silicified matrix.

Other informal rock units have been recognized in the subsurface at Mount Pleasant. In the Fire Tower Zone, Kooiman et al., (1986) recognized fine-grained granite, granite porphyry, and porphyritic granite, from oldest to youngest. In the North Zone, Sinclair et al., (1988) recognized Granite I, Granite II and Granite III, from oldest to youngest, which they correlated with the three phases in the Fire Tower Zone, respectively.

Granite I or fine-grained granite is the oldest intrusive phase in the North Zone and it also occurs under the Fire Tower Zone in association with low-grade tungsten-molybdenum mineralization (Sinclair et al 2006). This granite represents the outer, quickly cooled carapace

of the original granitic magma and it is extensively altered and brecciated because it was affected by hydrothermal fluids that evolved during cooling of the other intrusive phases. Fluids derived from the magma during this early stage of cooling were responsible for the initial development of the breccia pipes, specifically the silicic breccia, at the Fire Tower and North Zones and for the tungsten-molybdenum mineralization. This granite is various shades of grey, green or white because of alteration, and is distinguished from other phases by its grain size, specifically the absence of feldspar phenocrysts (Figure 12).

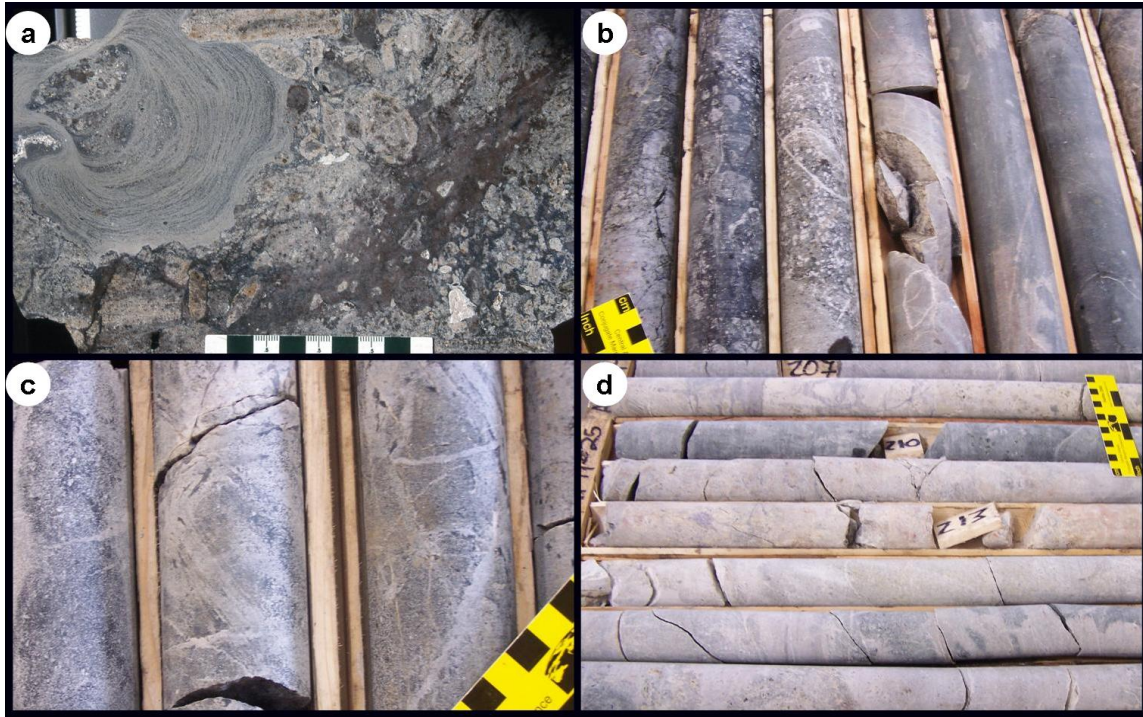


Figure 12. Photographs of fine-grained granite (Granite I):

- a) Cut slab of brecciated fine-grained granite cut by a flow-banded tuffisite dyke comprising rock flour and rounded pebbles (small divisions on scale are millimetres).
- b) Drill core (dry) from hole AM11-12 showing fine-grained granite (right) in contact with brecciated country rocks (left); note the large clast of feldspar porphyry in the third row from the left (divisions on scale are centimetres).
- c) Close up of drill core (dry) from hole AM11-10 showing ghost texture in fine-grained granite (divisions on scale are centimetres).
- d) Drill core (dry) from hole AM11-14 showing variably coloured fine-grained granite (small divisions on scale are centimetres).

Granite II or granite porphyry is similar mineralogically to Granite I but it is characterized by feldspar phenocrysts and chloritic alteration. This granite occurs in the North Zone, Saddle Zone and Fire Tower Zone. Tin mineralization is generally associated with Granite II. Two separate phases of Granite II have been identified: Granite IIA is fine to medium grained, porphyritic granite, whereas Granite IIB is equigranular, fine grained granite that either

underlies or crosscuts Granite IIA, the predominant phase. Granite IIA also occurs as dykes and plugs in the upper parts of the breccia pipes at both the Fire Tower and North Zones, which locally have surface expression (Figure 13). Granite IIB occupies protrusions or cupolas that intrude the lower part of the pipe. The contact between Granite IIA and Granite IIB is defined by comb quartz layers. Indium-bearing tin-base metal zones in the North Zone are primarily within the Granite IIA, commonly in close proximity to Granite IIB; however, the endogranitic tin is entirely in Granite IIB.

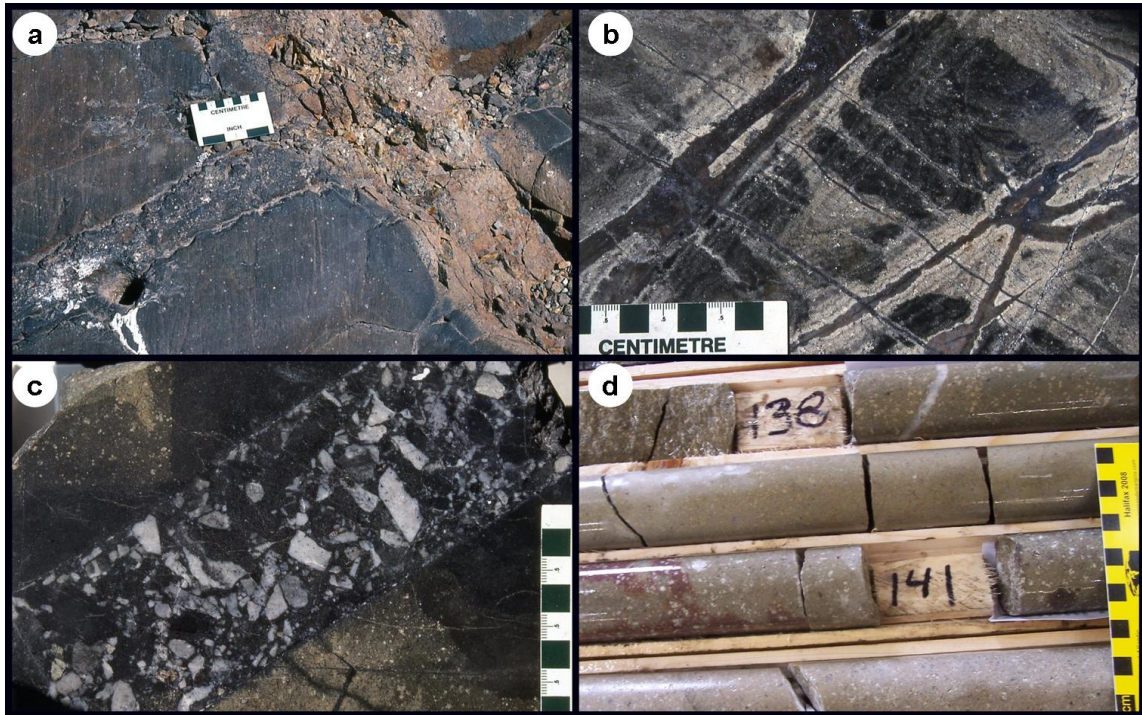


Figure 13. Photographs of granite porphyry (Granite II):

- a) Outcrop at the Fire Tower Zone of dark greenish grey granite porphyry that is cut by a breccia (pebble) dyke (beneath scale) and by pinkish grey alteration (small divisions on scale are centimetres).
- b) Cut slab of granite porphyry with stockwork veins and yellowish grey alteration (small divisions on scale are millimetres).
- c) Cut slab of granite porphyry crosscut by a breccia (pebble) dyke; note the feldspar phenocrysts (white specks) in the granite (small divisions on scale are millimetres).
- d) Drill core (dry) from hole AM11-14 showing yellowish grey granite porphyry; feldspar phenocryst (white specks) are visible (small divisions on scale are centimetres).

Comb quartz is a layer or band of quartz crystals that are all oriented roughly perpendicular to a plane, such as the wall of a vein, dike or the roof of a magma chamber. Comb quartz layers near the roof of a magma chamber are referred to as unidirectional solidification textures ("USTs") and are associated with fluid-saturated and/or undercooled magmas (Sinclair, 1994). USTs, sometimes referred to as "brainrock", are a distinctive feature restricted mainly to

Granite IIB near the Granite IIA contact (see Figure 13), and have proved invaluable in deciphering the local mine geology (Gowdy, 1995; Billiton, 1985). In the Saddle Zone, Granite II forms a cupola, with Granite IIA above Granite IIB below (Figure 14); comb quartz layers typically occur near the upper contacts of both of these granites.

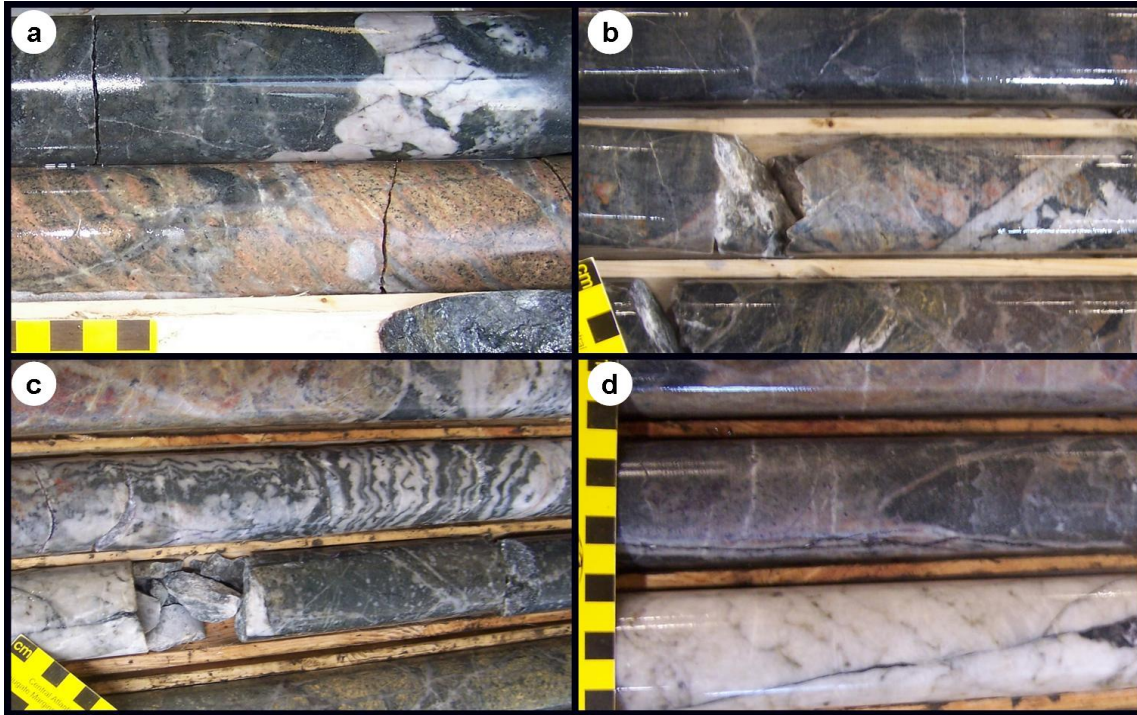


Figure 14. Photographs of comb quartz layers:

- a) Drill core (wet) from hole AM11-08 showing a comb quartz layer (white) that is parallel to the wall of a Granite IIB dike (divisions on scale are centimetres).
- b) Drill core (wet) from hole AM11-10 showing comb quartz layer in a vein (divisions on scale are centimetres).
- c) Drill core (wet) from hole AM11-13 showing parallel comb quartz layers or “brainrock” (divisions on scale are centimetres).
- d) Drill core (wet) from hole AM11-13 showing growth zones (thin wavy lines) in quartz (divisions on scale are centimetres).

Granite III or porphyritic granite is relatively fresh and generally coarser (medium) grained than Granites I and II. It extends to the south and appears to be continuous with porphyritic granite that underlies the Fire Tower Zone. It underlies Granite II and the contact between these two intrusive units is marked by chill zones, aplitic layers or, in some cases, by zones of USTs, either comb-quartz layers or dendritic unidirectional feldspar crystal layers, another type of UST. To date, no significant "mineral resource" has been identified within this unit but it has not yet been fully explored (Akerley, 1996; Piskahegan, 1995; ADEX, 1995).



## **7.3 MINERALIZATION**

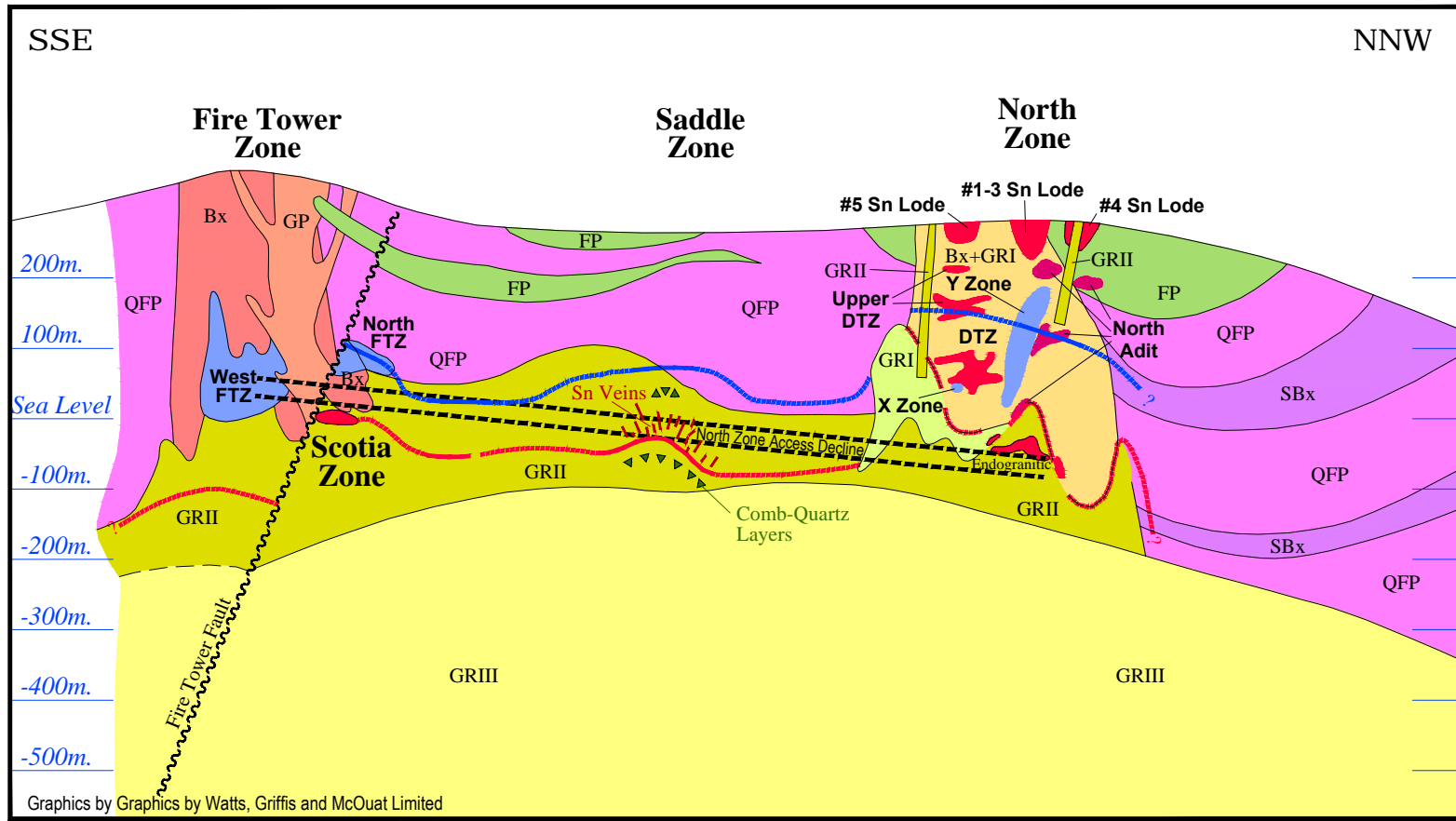
### **Mineralized Zones**

There are three main mineralized zones at Mount Pleasant, namely: the Fire Tower Zone, Saddle Zone and North Zone, from south to north. At depth, the Fire Tower and North Zones have been subdivided as shown in a schematic longitudinal section (Figure 15). The mineralization in each zone is related to a topographic high (cupola or cusp) in the roof (upper contact) of an underlying body of granite that evolved magmatic-hydrothermal fluids as it cooled. The cupolas beneath the Fire Tower and North Zones (not the Saddle Zone) were close enough to surface that fluid pressures exceeded the confining pressure of the rocks (lithostatic load), allowing hydrothermal breccias to form, mainly in the country rocks but also in the early-cooled carapace of the granite. Each of these mineralized zones was described in a previously filed NI 43-101 report (Dunbar and de l'Etoile 2009). The reader is referred to the SEDAR website [[http://www.sedar.com/issuers/issuers\\_en.htm](http://www.sedar.com/issuers/issuers_en.htm)] for a copy of this report, which contains detailed descriptions of these zones.

The Fire Tower Zone and North Zone deposits are located approximately 1.0 km apart and are mostly less than 400 m vertically from surface. The Fire Tower Zone contains predominantly large (low grade) tungsten-molybdenum deposits and was previously mined underground for tungsten. Some small indium-bearing tin-base metal zones are also present. The North Zone contains the most important indium-bearing, tin-base metal "resources" outlined to date along with some poorly defined low-grade tungsten-molybdenum bodies (ADEx 1995). The Saddle Zone, located approximately halfway between the Fire Tower Zone and the North Zone, contains tin and some base metals and newly discovered tungsten-molybdenum mineralization. Although this report primarily focuses on the North and Saddle Zones, specifically on work done on tin mineralization in 2010 and 2011, it does include information from the earlier NI 43-101 technical report on the updated Mineral Resource estimate for the Fire Tower Zone (Dunbar and El-Rassi, 2008, amended 2012). A brief description of these zones follow.

### **North Zone**

The tin and porphyry tungsten-molybdenum deposits of the North Zone represent two different periods of mineralization even though they overlap spatially. Tin mineralization in the North Zone is younger and crosscuts the older tungsten-molybdenum zones. Six tin deposits have been delineated, some near surface and others at depth. Historically, each one of these deposits has been called a zone but they are actually subzones of the North Zone and should be renamed accordingly. However, to maintain consistency with previous descriptions



Graphics by Graphics by Watts, Griffis and McQuat Limited

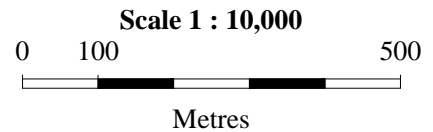


Figure 15.

**ADEX MINING INC.**

**Mount Pleasant Property**  
 Southwestern New Brunswick

**Schematic Longitudinal Section**  
 February, 2012

**Legend:**

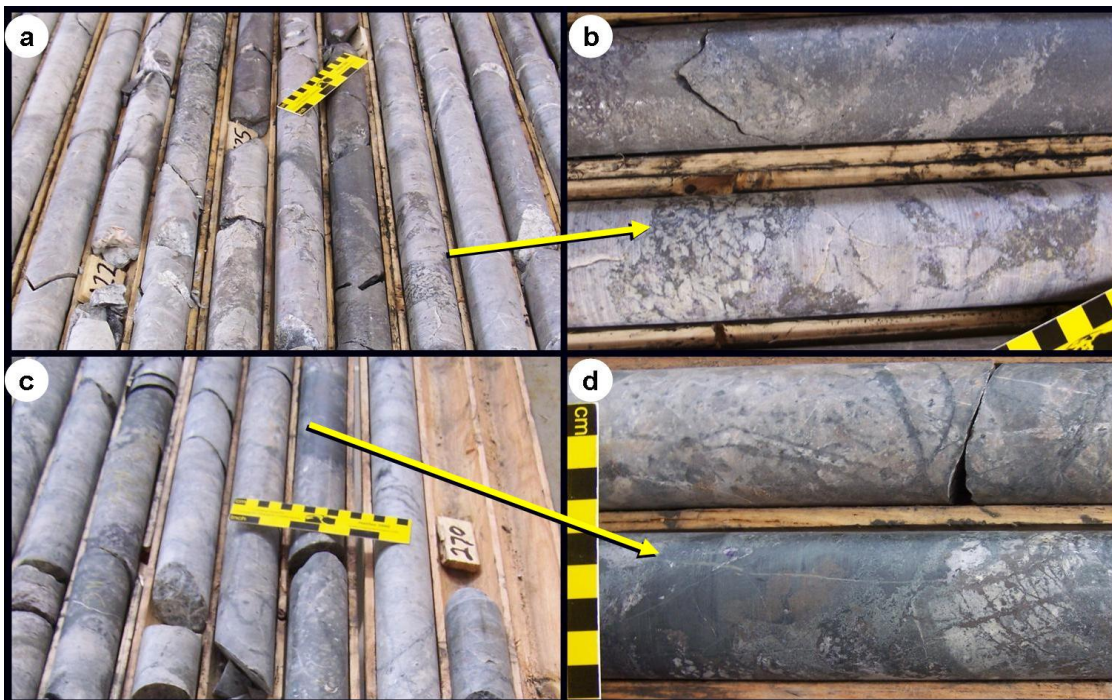
Late Devonian		Late Devonian		Mineralization	
GRIII	Granite III	FP	Feldspar Porphyry		Tin (Indium, Zinc, Copper)
GRII	Granite II	QFP	Quartz-Feldspar Porphyry		Tungsten (Molybdenum, Bismuth)
GRI	Granite I	SBx	Sedimentary Breccia		
Bx	Breccia	Bx+GRI	Breccia+Granite I		
GP	Granite Porphyry		Fault		

Source: ADEX Mining Corp. (1995)

lower case spelling of “zone” is used to show their secondary importance to the main North Zone. These are named as follows:

- Deep Tin Subzone (zone);
- Upper Deep Tin Subzone (zone);
- Endogranitic Subzone (zone);
- North Adit Subzone (zone);
- North W-Mo Subzone (zone); and
- #1 to #6 Tin Lodes.

The Upper Deep Tin zone is the shallowest of all the tin-bearing deposits in the North Zone with the exception of the Tin Lodes. Contact bodies associated with the Endogranitic and North Adit zones are deposits that flank the granitoid cupola and its protuberances and also its crest (Sinclair 1994). The Endogranitic, Deep Tin and North Adit zones and the Sn lodes near surface are generally steeply dipping, whereas the Upper Deep Tin zone is more or less sub-horizontal. Indium-bearing tin-base metal zones in the North Zone appear to be principally associated with sphalerite and are more concentrated in the Deep Tin zone (Figure 16).



**Figure 16. Photographs of tin-base metal mineralization in the Deep Tin zone:**

- a) Drill core (dry) from hole AM11-12 showing the distribution of sulphides (dark grey) as massive pods and fracture fillings in altered fine-grained granite (divisions on scale are centimetres).
- b) Close-up of massive and fracture filling sulphides (mostly sphalerite) in previous photo (divisions on scale are centimetres).
- c) Drill core (dry) from hole AM11-12 showing tin-bearing chloritic interval in altered granite (divisions on scale are centimetres).
- d) Close-up of chloritic zone from previous photo showing cassiterite (brown) in chlorite and in fracture fillings (divisions on scale are centimetres).

The principal metallic minerals in these deposits are cassiterite, arsenopyrite, löllingite, sphalerite and chalcopyrite with lesser amounts of stannite, pyrite, marcasite, galena, wolframite, molybdenite, tennantite, chalcocite, bornite, native bismuth, bismuthinite and wittichenite. The main non-metallic minerals are fluorite and chlorite (Kooiman, 2004).

Fander (1990) did a petrographic study of 35 tin-bearing samples from the North Zone and found that tin mostly occurs as cassiterite (oxide) with tin-sulphide phases present in a few of the samples. He noted that “...much of the cassiterite is exceedingly fine-grained when considered as individual crystals, and the masses of dehydrated Sn hydroxides are often composed of grains too small to resolve with an optical microscope...” However, he reported that there are two populations of cassiterite: large single crystals and crystal aggregates that are amenable to a coarser grind and gravity separation, and small individual crystals that could be recovered by finer grinding and flotation (Figures 17 and 18). Because of this, he advised that “...upgrading/processing needs to be handled with care, based upon an understanding of the mineralogy” and cautioned that “...there could be a temptation to overgrind, leading to needless problems, expense, and loss of cassiterite.”

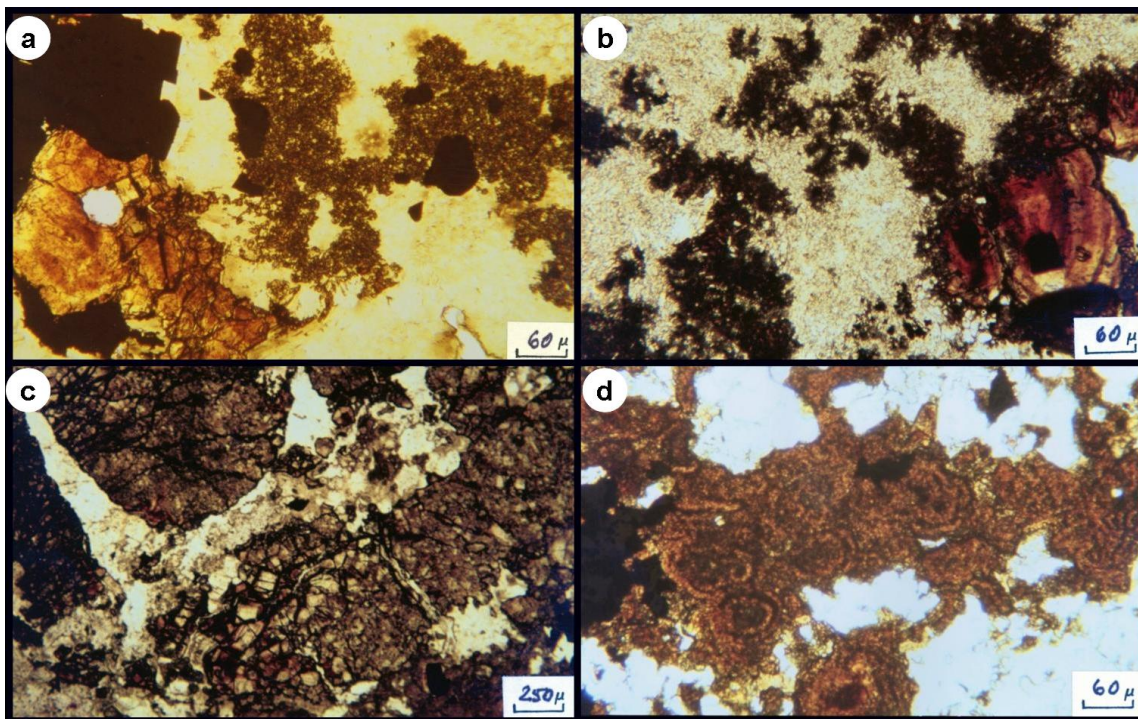


Figure 17. Photomicrographs (transmitted light) of cassiterite from the Deep Tin zone:

- Large cassiterite crystal (reddish orange) and aggregates of ultrafine cassiterite (brown) associated with arsenopyrite (black) and chlorite (pale green); bar scale is 60 microns (from Fig.2 of Fander 1990).
- Aggregates of ultrafine cassiterite (dark brown) intergrown with topaz (light grey), enveloping a large zoned crystal of cassiterite (pale red); bar scale is 60 microns (from Fig.3 of Fander 1990).
- Coarse-grained, micro-fractured cassiterite (brown); bar scale is 250 microns (from Fig.4 of Fander 1990).
- Cryptocrystalline cassiterite (reddish orange) with well-defined colloform texture; bar scale is 60 microns (from Fig.5 of Fander 1990).

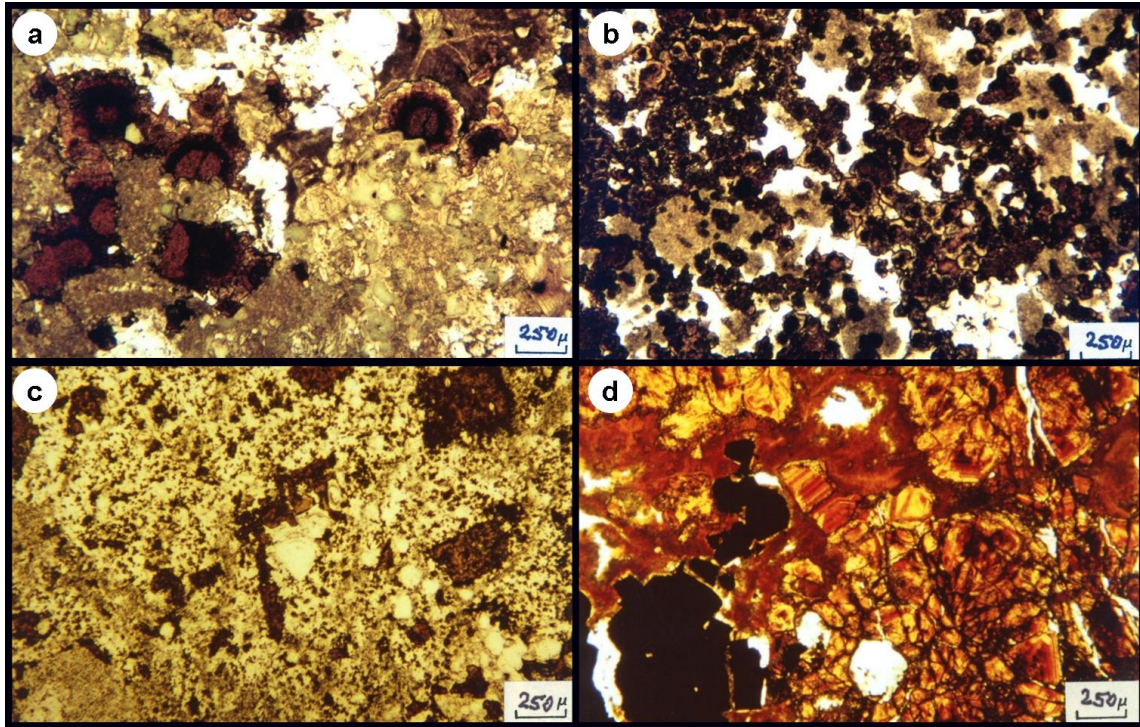


Figure 18. Photomicrographs (transmitted light) of cassiterite from the Endogranitic zone:

- a) Radiating cassiterite needles (light brown) on zoned cassiterite cores (dark brown to reddish brown); bar scale is 250 microns (from Fig.22 of Fander 1990).
- b) Granular cassiterite with very dark brown cryptocrystalline (?) cores and light brown clear rims; bar scale is 250 microns (from Fig.26 of Fander 1990).
- c) Ultrafine cassiterite (brown specks), in places replacing feldspar (brown patches); bar scale is 250 microns (from Fig.28 of Fander 1990).
- d) Coarse-grained, zoned cassiterite (reddish orange) cut by microfractures and fracture fillings; bar scale is 250 microns (from Fig.31 of Fander 1990).

Four tungsten-molybdenum deposits have been identified in the North Zone, which are labelled “W” (eastern), “X” (southern), “Y” (western), and “Z” (upper). They form a ring-like pattern with a low grade to barren central core (Parrish and Tully 1976). The W and X deposits are actually one body, the only difference between them being that the X deposit, in part, overlaps the Deep Tin zone, and more rarely, the Upper Deep Tin zone. The Y deposit is the largest, and the Z deposit is the smallest but it has the highest tungsten and lowest bismuth grades of the four deposits. These deposits are similar to, but smaller in size than, those of the Fire Tower Zone and are of lower grade (Kooiman et al 2005; Kvaerner 1997). The tin content of these deposits reflects the superposition of the younger tin-base metal mineralization on the tungsten-molybdenum deposits. Indium content is low (typically  $\leq 1$  ppm) in tungsten-molybdenum deposits that are not overprinted by the tin-base metal mineralization.

## Saddle Zone

Tin-base metal mineralization was discovered in the Saddle Zone during a 1988 surface drilling program that was initiated by Lac Minerals because tin mineralization was encountered underground, during development work between the Fire Tower Zone and the North Zone (Sinclair 1994). A 40-metre section in hole LNZ-15, within Granite IIA, graded 0.33% Sn. Subsequently, NovaGold Resources intersected a 16-metre section, also within granite, of 1.31% Sn in drillhole NMR-89-1; this hole also intersected W-Mo-Bi mineralization within quartz-feldspar porphyry adjacent to this granite (Sinclair, 2011). Holes drilled during the 2011 campaign show that tin mineralization has greater extent than previously known (Figure 19) and that tungsten-molybdenum mineralization is also present.

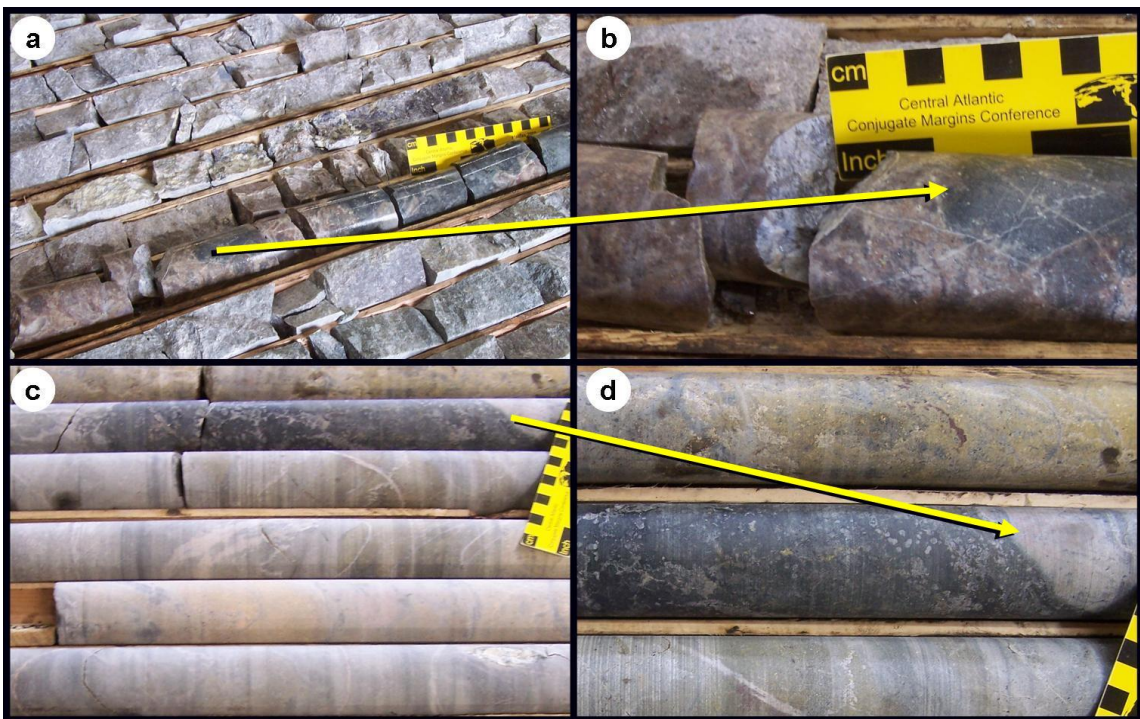


Figure 19. Photographs of tin mineralization in the Saddle Zone:

- Drill core (mostly dry) from hole AM11-07 showing the upper part of a 33 m interval that assayed 0.34% Sn (divisions on scale are centimetres).
- Close-up of silicified, cassiterite-bearing (brownish grey) granite in previous photo (divisions on scale are centimetres).
- Drill core (dry) from hole AM11-13 showing part of the 21 m interval that assayed 0.36% Sn (divisions on scale are centimetres).
- Close-up of garnet-bearing chloritic interval (dark green) from previous photo; pinkish grey spots are garnets (divisions on scale are centimetres).

Sinclair (2011) prepared a brief description of the Saddle Zone, parts of which are quoted and/or paraphrased as follows: “The Saddle Zone intrusion is part of a ridge of Granite II that extends north from the Fire Tower North Zone and lies east of a hill (or ridge) of Granite III.

The intrusion is roughly oval in plan, about 300 m long by 200 m wide near its base. It is steep-sided in sections and is highest in the southwest part of the intrusion in the vicinity of drillhole AM11-16, where narrow dykes form the upper part of the intrusion.” Tungsten-molybdenum mineralization occurs above the east shoulder of Granite IIA and extends to the south above the ridge of Granite IIA. This zone is on the order of 50 to 100 m wide, 25 to 100 m high and extends at least 150 m down the southern side of Saddle Zone intrusion and along the crest of the ridge of Granite IIA. In places, the zone extends into Granite IIA, but mainly it occurs above the contact. Further drilling is required to fully delineate the resources of the Saddle Zone and to determine if mineralization is continuous with that in the Fire Tower Zone to the south.

### **Fire Tower Zone**

The Fire Tower Zone is a tungsten-molybdenum deposit that contains three distinct zones: Fire Tower North, Fire Tower West and Fire Tower South. The tungsten-molybdenum deposits in the Fire Tower Zone mainly occur in the lower part of the breccia pipe and the upper part of the underlying fine-grained granite, and to a lesser extent in associated volcanic rocks (Kooiman et al, 2005). These low-grade porphyry-type deposits are characterized by extensive stockworks of mineralized fractures and quartz veinlets. Higher grade zones occurring in areas of intense fracturing measure 200 to 300 m across and as much as 100 m in vertical extent. The high-grade zones are surrounded by lower-grade zones that are characterized by more widely spaced fractures that extend for hundreds of metres into the surrounding rocks.

Mineralization occurs as veinlets and disseminated grains in breccias mainly located within the Mount Pleasant porphyry. The principal "economic-type" minerals are fine-grained wolframite and molybdenite, along with minor amounts of native bismuth and bismuthinite. The gangue minerals consist of cassiterite, arsenopyrite, löllingite, quartz, topaz and fluorite. Multi-stage mineralization is indicated by crosscutting relationships between mineralized fractures and veinlets. Sparse molybdenum-bearing fractures in fine-grained granite appear to represent the final stage of mineralization associated with crystallization of this granite. Finally, the tungsten-molybdenum deposits appear to predate crosscutting dykes of unmineralized granite porphyry that truncate mineralized stockwork zones.

Some small indium-bearing tin-base metal zones are also present. The characteristics of the indium-bearing tin-base metal deposits hosted within the Fire Tower Zone have been best described by Kooiman et al. (2005). These deposits occur as irregular veins and mineralized breccias that are irregularly distributed throughout the Fire Tower Zone and are associated with altered and mineralized granite porphyry dykes. Throughout the Fire Tower Zone, the

tin-base metal deposits either crosscut or truncate tungsten-molybdenum stockworks. In general, veins range from 1 to 2 cm in width and up to several metres in strike length. In places, larger veins up to 10 m in width and 100 m long can occur. Veins pinch and swell along strike and contain abundant chlorite and fluorite and disseminated massive sulphides. The Fire Tower Zone contains one tin lode, called the No. 7 tin lode.

Mineralized breccias are irregular bodies and occur as small vertical circular pipes up to 10 m wide and 100 m in vertical extent. These breccias can contain fine-grained sulphides and cassiterite as well as chlorite and fluorite.

The indium-bearing tin-base metal veins and breccias contain the principal oxide minerals cassiterite and wolframite. Sulphide mineralization consists mainly of sphalerite, chalcopyrite, galena and arsenopyrite and minor amounts of pyrite, löllingite, molybdenite, tennantite, native bismuth and bismuthinite.

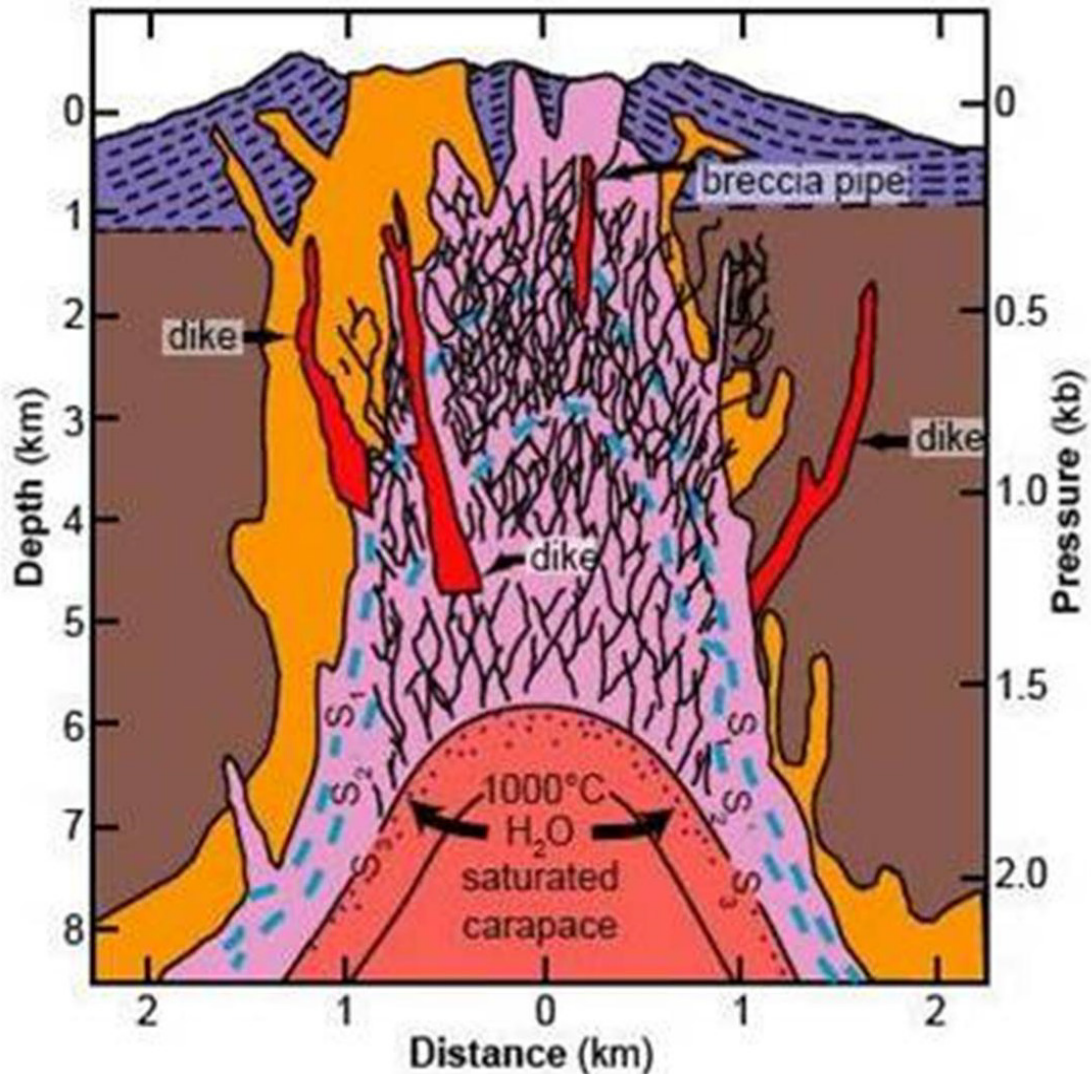
The reader is referred to the NI 43-101 technical report by Dunbar and El-Rassi (2008, amended 2012) for additional details on the Fire Tower Zone.



## 8. DEPOSIT TYPES

As noted in a previously filed 43-101 report by Dunbar and de l'Etoile (2009), the North Zone deposits at Mount Pleasant have many characteristics in common with porphyry tin deposits. However, at the time of discovery in the late 1950s, it was difficult to establish a geological model for the tin-base metal mineralization at Mount Pleasant because similar deposits were not known in New Brunswick or elsewhere in Canada. Comparisons were made with hypothermal-type deposits of Cornwall, England, or xenothermal-type deposits of Bolivia (Riddell, 1962; Hosking 1963). Hosking (1985) concluded that the North Zone tin deposits were broadly similar in geological setting to Bolivian porphyry deposits, excluding the very rich Tin Lodes. He noted that exogranitic and endogranitic tin deposits, which are associated with the apices of granitoid cusps (cupolas), are common and well-documented in many parts of the world, including eastern Germany, Czechoslovakia, eastern Australia and eastern Mongolia. Parts of the North Zone have also been compared to granite-related greisen deposits, such as Cinovec, Krupka and Krasno in Czechoslovakia (Billiton Canada Ltd. 1985b). On the “Metallogenic Map of New Brunswick” (2002), Mount Pleasant is classified as a “greisen and stockwork vein” deposit type, which equates to the porphyry tin deposit type (model 20a of Cox and Singer 1986; model 19.7 of Kirkham and Sinclair 1996). At Mount Pleasant, porphyry tin mineralization is younger than, and partly overlaps, earlier porphyry tungsten mineralization (model 16 of Cox and Singer 1986; model 19.6 of Kirkham and Sinclair 1996).

The regional and deposit scale characteristics of various types of porphyry deposits, including porphyry tin, have been described by Seedorff et al., (2005) and Sinclair (2007). A generalized magmatic-hydrothermal model illustrating how porphyry deposits form, originally described by Burnham (1967), is shown in Figure 20. In this model, a small body of magma of intermediate-composition is cooling from the margin (contact with its host rocks) inward and evolving large volumes of magmatic, metal-bearing fluids that episodically become over-pressured and break the surrounding rocks, releasing metals and fingers of magma (dykes) into the resulting fractures and breccias. The episodic nature of this cooling process ultimately concentrates enough metals to form a mineral deposit, the nature of which largely depends upon the composition and tectonic setting of the intrusion. For porphyry tin deposits, relatively small granitic intrusions in post-orogenic, extensional settings are a prerequisite, especially in areas underlain by thick continental crust.



(after Burnham, 1979)

Figure 20. Schematic cross section showing an inward-cooling intrusion (shades of orange, pink and red) intruding country rocks (brown) and early-erupted volcanic rocks (purple). Compared to Mount Pleasant, the orange colour is fine-grained granite (Granite I), representing the quenched margin of the intrusion (magma chamber); note that this phase did not reach anywhere near surface in the North Zone. The pink colour is granite porphyry (Granite II), representing the inward-cooling part of the magma chamber (successive stages of cooling are shown by blue lines labeled S1, S2 and S3), which evolved magmatic-hydrothermal fluids that episodically over-pressured and fractured (heavy black lines) the early cooled parts (carapace) of the intrusion and its host rocks. When over-pressuring occurred, fingers of magma escaped, forming dykes (American spelling on diagram) that cut the carapace and metals were expelled from the top of the magma chamber into the fractured rocks. The red colour is Granite III, representing the final (post-convective) stage of cooling of the intrusion (granite); note that the temperature of the Mount Pleasant magma would have been approximately 700°C, not 1000°C as illustrated.

A detailed description of the porphyry tin, deposit type can be found in the BC Mineral Deposit Profiles, under “Listing by Deposit Group”, as Porphyry Profile L06 [<http://www.em.gov.bc.ca/Mining/Geoscience/MineralDepositProfiles/ListbyDepositGroup/Pages/LPorphyry.aspx>]. Tin mineralization, predominantly fine-grained cassiterite, occurs in stockworks of cross-cutting fractures and quartz veinlets, or is disseminated in the matrix of hydrothermal breccias. Veins, vein sets, and replacement zones may also be present. The deposits vary in shape from inverted cone, to roughly cylindrical, to highly irregular. They are typically large, generally hundreds of metres across and range from tens to hundreds of metres in vertical extent.

## 9. EXPLORATION

The reader is directed to the 2006 WGM technical report for details regarding all of the exploration work conducted on the Mount Pleasant Property from 1994 to 2006 (Watts, Griffis and McOuat, 2006).

Exploration work carried out by the Company between 2006 and 2008 primarily consisted of a two-phase 13,300 m exploration and definition drilling program to expand the then existing Mineral Resource estimate of the FTZ tungsten-molybdenum deposit and to provide drillhole data for a Mineral Resource estimate for the NZ tin-indium deposit. Also during this time, the surface exposure of the FTZ was trenched and chip-sampled.

This section pertains to most recent exploration work carried out, including the re-sampling of historical trenches, which was conducted in the fall of 2010. No geophysical surveys have been conducted on the Property since the last NI 43-101 Report (Dunbar and de L'Etoile 2009) was filed. The results of exploration drilling done on the Property since then are summarized in Section 10. The following description was prepared by G. Kooiman and the authors believe it is accurate but have not independently verified the information.

### **9.1 PROCEDURES/PARAMETERS OF SURVEYS AND INVESTIGATION**

#### **Historical View**

In the early 1960s, several trenching/stripping programs were carried out on the North Zone, in the vicinity of what are now called the #1 and the #3 lodes, to help delineate structures and mineralized zones. Between the beginning of September 1961 and the end of October 1962, Mount Pleasant Mines Limited (“MPM”) stripped a large area measuring approximately 260 m by 137 m. Trenches were cut in the rock at 20 foot (6.1 m) intervals between mine-grid sections 50900 E and 51300 E (later converted to metric sections 15514 E and 15636 E, respectively). Some 3.66 km of trenching was completed, which involved clearing vegetation and overburden by tractor, drilling and blasting, and rock breaking. A few trenches were excavated to a depth of 1.2 to 1.8 m, a width of 1.8 m and a length of 30 m. A surface assay plan, dated August 1963, showing the original trenching results of MPM was compiled by Behre Dolbear & Company Inc. of New York (Banfield 1963); this company cleaned approximately 1.1 km of old trenches during the summer of 1965 and check-sampled MPM’s results by panel sampling areas measuring 1.5 m long by 0.9 m wide. This work formed the basis for selecting trenches to be re-sampled during the fall of 2010.

### **Trenching Program in 2010**

Four historical trenches, originally dug by MPM, were selected for re-sampling in 2010. The four trenches, labelled T1 to T4, are located on mine grid sections 15618 E, 15600 E, 15569 E, and 15551 E, respectively, MPM grid lines 51240 E, 51180 E, 51080 E, and 51000 E. Approximately 106 m of old trenches were cleaned by excavator and rock breaker, as well as manually, before re-sampling. Chip samples were collected in the deepest, least oxidized parts of the trenches. Approximately 5 to 8 kg of rock was collected per sample; each sample represents one linear metre along the trench, except for one sample in Trench T3 (#185192), which covers two metres of trench. The rocks were mostly chloritized, silicified and, in places, brecciated feldspar porphyry (FP), with minor granite porphyry (GP) occurring as irregular dykes. A grab sample (# 185198) from a small breccia pipe adjacent to Trench T3 was also collected.

Trench T1 was 21 m long and sampled from south to north. The first sample from 0–1 m (# 186046) was at mine grid coordinates 15618 E, 13702 N and elevation 1,265 m. The last sample from 20 – 21 m (# 186026) was at mine grid coordinates 15618 E, 13723 N and elevation 1,262 m.

Trench T2 was 25 m long and also sampled from south to north. The first sample from 0-1 m (# 186025) was at mine grid coordinates 15600 E, 13700 N and elevation 1272 m, which is 25 m north of the collar of historical hole E-3. The last sample from 24 – 25 m (# 186001) was at mine grid coordinates 15600 E, 13725 N and elevation 1,268 m.

Trench T3 was 31 m long and sampled from north to south. The first sample from 0-1 m (# 186047) was at mine grid coordinates 15569 E, 13726 N and elevation 1,268 m. The last sample from 30 – 31 m (# 185197) was at mine grid coordinates 15569 E, 13695 N and elevation 1,265 m.

Trench T4 was 30 m long and sampled from north to south. The first sample from 0-1 m (# 186651) was at mine grid coordinates 15551 E, 13721 N and elevation 1,266 m. The last sample from 29 – 30 m (# 186680) was at mine grid coordinates 15551 E, 13691 N and elevation 1,266 m.

## **9.2 SAMPLING METHODS AND SAMPLE QUALITY**

The quality of the 2010 samples could not possibly be as good as the original 1960s samples because the rocks were freshly exposed at that time. Approximately 50 years of weathering undoubtedly caused oxidation of some minerals. However, care was taken to get the freshest

material possible for each composite chip sample and the samples were collected by experienced people, G. Kooiman and W. Maston, using hammers and a rented rock breaker. At least twenty small samples, ranging from large chips to small hand specimen, were taken in each metre of trench and placed in plastic sample bags. An assay tag was inserted into each bag, the tag number was written on the bag with indelible marker, and the bag was sealed using a plastic zip lock. Several bagged samples were placed in fiberglass shipping bags, secured with zip locks and taken to the mine site for safe keeping until all four trenches were sampled. Subsequently, they were delivered directly to the sample preparation facility of Activation Laboratories Ltd. (Actlabs) in Fredericton, with instructions to process them as described in Section 11 of this report. No blank, duplicate or standard samples were inserted into the sample stream by ADEX geologists.

### **9.3 RESULTS AND INTERPRETATION OF EXPLORATION**

A tabulated list of significant assays from re-sampling of trenches in 2010 is shown in Table 4.

**TABLE 4.**  
**SIGNIFICANT TIN ASSAYS FROM THE 2010 TRENCH RE-SAMPLING PROGRAM**

Trench	From (m)	To (m)	L (m)	% Sn	ppm In	% Zn	% Cu	% Bi	% WO <sub>3</sub>	% MoS <sub>2</sub>	% As
T1	17	21	4	0.26	100	0.36	0.08	0.03	0.02	0.01	0.92
(including)	19	21	2	0.34	162	0.63	0.12	0.05	0.02	0.02	1.39
T2	6	9	3	0.40	23	0.74	0.03	0.01	0.04	00.01	00.45
(including)	6	8	2	0.50	31	0.99	0.04	0.02	0.03	0.02	0.59
T3	0	15	15	0.47	31	0.79	0.06	0.02	0.04	0.01	0.75
(including)	8	14	6	0.84	39	1.22	0.08	0.01	0.05	0.01	1.11
T4	10	29	19	0.20	21	0.45	0.04	0.02	0.08	0.03	0.69
(including)	12	15	3	0.45	43	1.48	0.11	0.03	0.05	0.07	1.90

The results of the 2010 sampling are comparable to the 1960s assays for the equivalent sample intervals. In short, the results show that fifty years of weathering has not affected the compositional integrity of the mineralization that much.

## 10. DRILLING

Historical drilling on the Mount Pleasant Property is described in Section 6 of this Report. Three previously filed NI 43-101 reports, one by Dunbar et al., (2006), the second by Dunbar and El-Rassi (2008, amended 2012) and the third by Dunbar and de l’Etoile (2009), provide details of ADEX’s 1996 and 2008 drilling programs on the Property, which are summarized in Table 5 below. The reader is referred to these reports on the SEDAR website [[http://www.sedar.com/issuers/issuers\\_en.htm](http://www.sedar.com/issuers/issuers_en.htm)] for more information. This section describes diamond drilling programs that were conducted in 2008, 2010 and 2011.

**TABLE 5.  
ADEX DRILLING PROGRAMS PRIOR TO 2010**

<b>Year</b>	<b>Hole Series</b>	<b>Hole Numbers</b>	<b>Total Holes</b>	<b>Metres Drilled</b>	<b>Source</b>
1996	AM	96-1 to 96-11	11	3,231	AR# 474828
2008	AM	08-1 to 08-49	49	13,300	AR# 476667

### **2008 Drilling Program**

Since 2008, ADEX completed 47 drillholes in total for its Phases 1 and 2 programs for a total of 13,300 m, testing both the tin-indium-zinc-copper and tungsten-molybdenum-bismuth zones throughout the Property. These drill programs, operated under the supervision of ADEX geological staff, were carried out in order to verify the extent of known mineralization, to delineate the possible extensions of zones and to expand on the existing Mineral Resource estimates at the FTZ and NZ. Drilling was also completed to recover fresh drill core material for metallurgical bench and mineralogical testing.

#### *Phase I*

ADEX completed a 6,030 m Phase 1 diamond drilling program on the Property from March 1 to June 1, 2008 covering both the FTZ and NZ. Drillholes AM-08-08, 09 and 11 to 16 tested the FTZ; drillholes AM-08-01 to 07 and 10 tested the North Zone. ADEX designed the FTZ drilling program following the 2006 recommendations presented by WGM (Watts, Griffis and McOuat, 2006).

The Phase 1 resource definition drill program of the FTZ was completed:

1. to upgrade the classification of the 2006 resource estimation of the FTE and FTN;
2. to delineate additional tonnage in parts of the deposit not previously drill tested; and,

3. to determine if there was justification to upgrade the resource categorization of the FTZ from an "inferred" to the "indicated" category.
4. to recover fresh drill core for metallurgical and mineralogical testing.

A total of nine holes were drilled totalling 3,312 m (Table 6). Two of these twined 1995 drillholes PRL 95-2 and PRL 95-4. The remaining holes were drilled to delineate further mineralization within the deposit. The drill contract was awarded to Lantech Drilling Services Inc. of Dieppe, New Brunswick. Core size was "NQ". Down hole surveys were completed using a Reflex single shoot instrument every 100 m. Upon the completion of each hole, the casing was left in for all holes, the holes were capped and numbered and the collar location recorded using a global positioning instrument ("GPS").

**TABLE 6.**  
**PHASE 1 DIAMOND DRILLHOLES ON THE FIRE TOWER ZONE**

Hole No.	NAD 83		Elevation (m)	Sub-Zone	Length (m)	Azimuth	Dip	Comments
	Northing	Easting						
AM-08-08	5033287.780	671118.454	1,322	Fire Tower East	449	Vertical		Twin PRL 95-4
AM-08-09	5033455.876	671051.274	1,313	Fire Tower North	560	Vertical		Twin PRL 95-2
AM-08-11	5033481.000	671100.000	1,309	Fire Tower North	381	Vertical		Delineation hole
AM-08-12	5033042.000	671026.000	1,342	Fire Tower West	421	Vertical		Delineation hole
AM-08-13	5033411.000	671156.000	1,306	Fire Tower North	30	090	83°	Abandoned hole
AM-08-13A	5033411.000	671156.000	1,306	Fire Tower North	219	090	83°	Delineation hole
AM-08-14	5033195.000	671069.000	1,347	Fire Tower South	401	Vertical		Delineation hole
AM-08-15	5033316.000	671229.000	1,296	Fire Tower East	401	270	72°	Delineation hole
AM-08-16	5033330.000	671106.000	1,319	Fire Tower East	450	Vertical		Delineation hole
<b>TOTAL</b>					<b>3,312</b>			

ADEX logged the core, Rock Quality Designation ("RQD") and core recovery data were collected and the core was photographed and split. Drill geologists used a binocular microscope to assist in identifying the individual mineral phases within the drill core as mineralization is commonly very fine grained and not visible to the naked eye.

A total of 619 spit core samples were collected from the FTZ drillholes, each measuring 3.0 m in length. All analytical results were added to the company's GEMCOM digital database.

The significant drill results are summarized in Table 7. A comparison of the 2008 twin drillholes with the 1995 drillholes is summarized in Table 8 demonstrating a moderately good comparison of analytical results with the twin holes.



**TABLE 7.**  
**SUMMARY RESULTS OF THE 2008 DIAMOND DRILL PROGRAM**

Hole No.	Purpose of Drillhole	Drilling Results
AM-08-08	Twin of PRL-95-04 (FTE) that intersected 0.30 Wt% Wo <sub>3</sub> , 0.20 Wt% MoS <sub>2</sub> , 0.06 Wt% Bi and 0.19 Wt% as over a core length of 83.2 m (279.6 to 362.8 m) in granite 1 and 2.	Results compared well between the two holes confirming presence of w-mo mineralization (see Table 3). PRL-95-04 lower in as.
AM-08-09	Twin of PRL-95-02 (FTN) that intersected 0.22 Wt% Wo <sub>3</sub> , 0.14 Wt% MoS <sub>2</sub> , 0.09 Wt% Bi, 1.60 Wt% as over a core length of 84 m (167.0 to 248.0 m).	Results compared reasonably well although hole AM-08-09 was higher in W, Mo, Bi and as (see Table 3).
AM-08-11	Collared 50 m northwest of AM-08-09 to further delineate the extent of the FTN zone.	Intersected good W-Mo-As mineralization in the fire tower breccias and granite 2 rocks (see Table 2).
AM-08-12	Drilled to test the southern part of the FTW zone – further delineation of known W-Mo mineralization.	Intersected good W-Mo grades (see Table 2).
AM-08-13	Drilled to test the eastern extension of the FTN zone.	Abandoned (lost bit in fractured rock)
AM-08-13A	Re-drilled hole AM-08-13	Intersected good W-Mo grades (see Table 2), hole ended due to bad ground conditions.
AM-08-14	Drilled to test the FTS zone in proposed Stope 3S	Good W-Mo grades intersected (see Table 2)
AM-08-15	Drilled to test the lateral extent of the FTE zone intersected by AM-08-08.	Good W-Mo and Sn mineralization intersected as two separate sub-zones (see Table 2).
AM-08-16	Drilled between holes AM-08-08 and AM-08-09 to delineate the northern extent of the FTE zone near the Fire Tower fault.	Numerous narrow sections of low-grade W-Mo and Sn mineralization intersected (see Table 2).

**TABLE 8.**  
**COMPARISON OF 2008 TWIN HOLE ASSAY RESULTS**

Hole No.	From (m)	To (m)	Length (m)	Tin (wt.% Sn)	Indium (g/t In)	Zinc (wt.% Zn)	Copper (wt.% Cu)	Bismuth (wt.% Bi)	Tungsten (wt.% WO <sub>3</sub> )	Molybdenum (wt.% MoS <sub>2</sub> )	Arsenic (wt.% As)	
<b>AM-08-08</b>	278.0	353.0	75.0	NSA	NSA	NSA	NSA	0.06	0.27	0.22	0.30	
	389.0	395.0	6.0	0.26	31	0.71	0.31	NSA	NSA	NSA	0.70	
	279.6	362.8	83.2	NSA	NSA	NSA	NSA	0.06	0.30	0.20	0.19	
	384.1	393.3	9.2	0.54	8	0.14	NSA	NSA	NSA	NSA	0.10	
<b>AM-08-09</b>	167.0	248.0	81.0	NSA	NSA	NSA	NSA	0.15	0.28	0.15	2.89	
	Including	218.0	248.0	30.0	0.07	64	0.92	0.08	0.24	0.43	0.23	4.82
		341.0	374.0	33.0	0.46	135	3.73	0.28	0.27	0.28	0.17	0.36
	Twin of PRL-95-02	160.0	244.0	84.0	NSA	NSA	NSA	NSA	0.09	0.22	0.14	1.60
Including	218.0	244.0	26.0	NSA	56	0.83	NSA	0.10	0.22	0.17	1.89	
	341.0	374.0	33.0	0.12	43	2.18	1.4	0.21	0.55	0.15	1.19	

Drillhole AM-08-09 weaves in and out of the FTN with core intersects looking like they intersected fingers of mineralization rather than one complete zone. Hole AM-08-11 was drilled straight down the middle of the FTN. The best mineralization in terms of molybdenum was intersected from 270 to 291 m. The silicified breccias contained a lot of arsenopyrite, which is typical of the FTN mineralization. Hole AM-08-13 was abandoned due to a lost drill bit in fractured ground. The core was logged but did not contain any visible mineralization so no core samples were taken from this hole. Drillhole AM-08-13A stopped

near the top of the FTZ due to drill problems just as it started to intersect core containing interesting mineralization. Hole AM-08-15 was drilled to test mineralization previously intersected by hole PRL 95-4 and AM-08-08. This hole intersected part of the mineralized body at depth and essentially closed off the FTZ to the east but extended the deposit in that direction. The zone remains open to the south of the drill holes. Mineralization is shouldered by a quartz feldspar porphyry unit. Tungsten-molybdenum is commonly associated with fine grained bismuthite with arsenopyrite.

### *Phase II*

A Phase II drill program, consisting of four holes totalling 1,126 m, was completed on the FTZ. Vertical holes AM-08-21 and AM-08-24 were drilled to depths of 435 and 531 m, respectively. According to ADEX, hole AM-08-24, drilled 100 m north-northeast of AM-08-11, has extended the FTN a farther 40 m in that direction. Hole AM-08-21 was drilled 50 m south of AM-08-08 to test the FTE Sub-Zone. Preliminary assay results are summarized in Table 9.

**TABLE 9.**  
**PHASE II DRILL CORE ASSAY RESULTS FOR THE FTN AND FTE SUB-ZONES**

Hole No.	From (m)	To (m)	Bi (wt %)	WO <sub>3</sub> (Wt %)	MoS <sub>2</sub> (wt %)	As (wt %)
AM-08-21	324.0	366.0	0.03	0.15	0.18	0.52
AM-08-24	423.0	441.0	0.12	0.29	0.15	0.48

*Source: Preliminary results, T. Boyd, (2008)*

The remaining two holes were drilled to test a known surface exposure of tin-zinc-copper mineralization within an area called the "Fire Tower Breccia" which is located in the FTZ. Hole AM-08-42 was drilled east at an inclination of 60° to a depth of 100 m. The second hole AM-08-43, also drilled toward the east, had an inclination of 45° and a final depth of 60m. Assay results are presented in Table 10. No estimation of true width can be provided at this stage for any of the Phase II drillholes.

**TABLE 10.**  
**PHASE II DRILL CORE ASSAY RESULTS - FIRE TOWER BRECCIA ZONE**

Hole No.	From (m)	To (m)	Sn (wt %)	In (g/t)	Zn (wt %)	Cu (wt %)	As (wt %)
AM-08-42	14.0	68.0	0.13	55	1.57	0.2	0.73
AM-08-43	11.0	41.0	0.16	54	1.62	0.22	0.4

*Source: Adex Mining Inc. (2008e)*

### **Drillhole Surveying**

In May, the drill collar locations for holes AM-08-08 and AM-08-09 were surveyed by Murphy Surveys (1990) Ltd. ("**MSL**"), located in Old Ridge, New Brunswick. Surveying was done using a real time Trimbel G8 (base and rover) receiver with a Trimble TSC2 data collector/controller. All points were acquired within an accuracy of  $\pm 0.1$  m or less. Coordinates are reported in NAD83. At the time of the survey, all of the Phase 1 drilling of the North Zone was completed but only the first two holes, hole AM-08-08 and AM-08-09, in the Fire Tower Zone had been drilled.

ADEX submitted the MSL collar data for holes AM-08-08 and AM-08-09 and June WGM GPS collar survey coordinates, using a GARMIN 12, for the remaining holes to SRK for importing into the GEMCOM database for the resource calculation. It should be noted that the accuracy of the WGM survey data reported ranged from 4.0 to 5.0 m. Comparisons of the WGM hole coordinates for holes 8 and 9 against the MSL data differed by 1.0 to 2.0 m.

In October, MSL returned to Mount Pleasant and completed surveying the rest of the Phase I and II drill collar locations.

### **2010 and 2011 Drilling Programs**

Contracts for both drilling programs were awarded to Lantech Drilling Services Inc. ("**LanTech**") of Dieppe, New Brunswick. Core size was "NQ". Down hole surveys were completed using a Reflex single shoot instrument every 100 m. Upon completion of each hole, the casing was left in and the hole was capped and numbered (Figure 21). The drilling was conducted under the supervision of ADEX geological staff.

Approximately 10,741 m were drilled in the two programs. In 2010, 26 holes totalling 3,734 m were drilled and sampled; in 2011, 18 holes (1 to 17, plus 17A) totalling 7,007 m were drilled and sampled. The relationship between sample/intersection lengths and true thickness is not known for these holes. All reported intervals are intersection widths, not true widths. Drillhole locations are shown on the geology map (see Figure 7 in Section 7 in this Report), and the drillhole metadata are provided in Tables 11 and 12.

ADEX geological personnel logged the core at its drill-core storage facility on the mine site. Core from the 2010 program was logged by T. Boyd, G. Kooiman, and W. Maston, whereas core from the 2011 program was logged by G. Kooiman, D.V. Venugopal and Wei Zhang. Rock Quality Designation ("**RQD**") and core recovery data were also collected; the core was partially photographed, and intervals (mostly 3 m long) were marked and tagged by the geologist to be split by technical personnel. A binocular microscope was used to assist in

identifying the individual mineral phases within the drill core because the mineralization is very fine grained and commonly not visible to the naked eye.

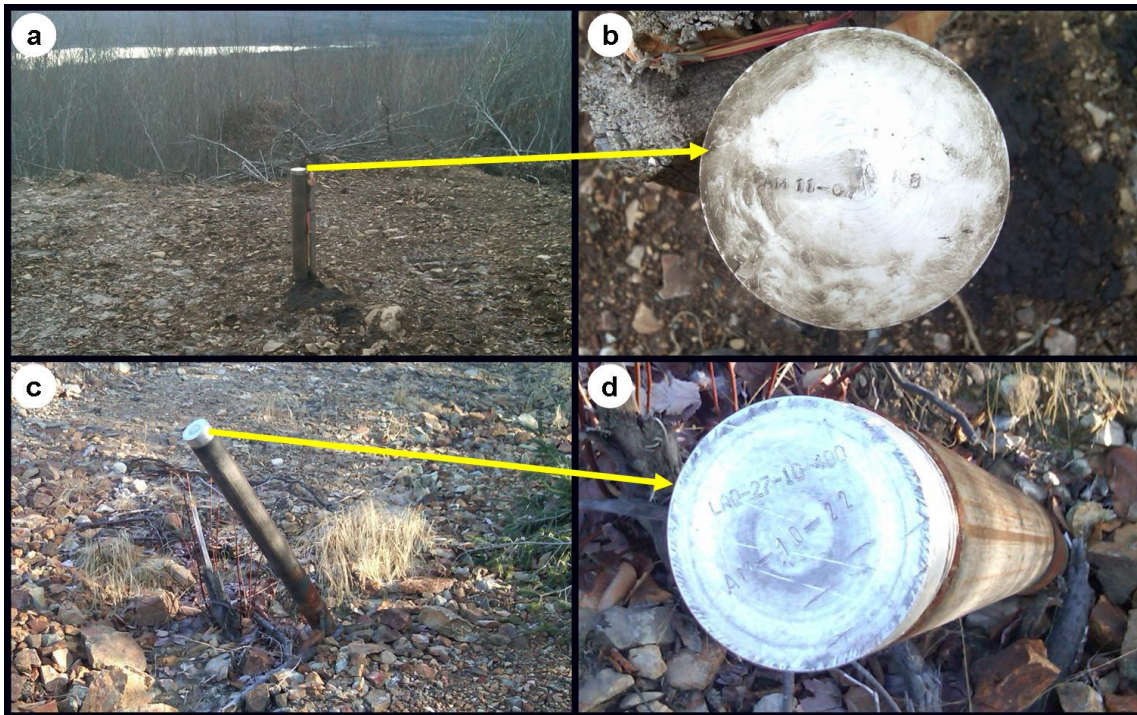


Figure 21. Photographs of drill collars:

- a) Casing of vertical hole AM11-07 in the Saddle Zone (looking west).
- b) Close-up of the casing-cap showing the hole number stamped into it.
- c) Casing of inclined hole AM10-22 in the North Zone (looking southeast).
- d) Close-up of the casing-cap showing the hole number stamped into it.

After the drilling was completed, the drill collar locations for both the 2010 and 2011 holes were surveyed by Murphy Surveys (1990) Ltd. ("MSL"), located in Old Ridge, New Brunswick. Surveying was done using a real time Trimbel G8 (base and rover) receiver with a Trimble TSC2 data collector/controller. All points were acquired within an accuracy of  $\pm 0.1$  m or less, and reported to three decimal places in Canadian Standard Reference System (NB Stereographic, NAD'83) coordinates as well as Mine Grid coordinates. The NB Stereographic coordinates are rounded to zero decimals and their equivalent UTM, NAD'83 coordinates are also shown.

The author used a hand-held GPS (Garmin model 60CSx) to check the locations of 18 of the 43 holes (10 from 2010 and 8 from 2011) against coordinates obtained by MSL, and found that the UTM coordinates differed by only 1.0 to 2.0 m.

**TABLE 11.**  
**DRILLHOLE METADATA FOR THE 2010 DIAMOND DRILLING PROGRAM**  
**(Coordinates are in Metres and Azimuths are in Magnetic Degrees)**

Hole	NB Stereographic		UTM Coordinates - NAD'83			Mine Coordinates			Azimuth	Dip	L (m)	Claim Unit
	Easting	Northing	Easting	Northing	Zone	Easting	Northing	Elev.				
AM10-01	2474839	7382625	670360	5034526	19T	15449	13876	1245	n/a	-90	231	2619027L
AM10-02	<i>(Hole was not surveyed; estimated mine coordinates)</i>					14715	13500	1165	n/a	-90	35	2619037H
AM10-03	2474749	7381733	670299	5033632	19T	15063	13066	1191	n/a	-90	70	2619027D
AM10-04	2474947	7382522	670472	5034426	19T	15516	13741	1262	180	-45	91	2619027L
AM10-05	2474984	7382523	670509	5034428	19T	15551	13730	1267	180	-60	52	2619027L
AM10-06	2474992	7382550	670516	5034456	19T	15568	13753	1267	180	-41	72	2619027L
AM10-07	2474751	7382567	670275	5034465	19T	15347	13851	1239	n/a	-90	207	2619027L
AM10-08	2475046	7382582	670569	5034489	19T	15629	13765	1269	180	-50	108	2619027L
AM10-09	2475083	7382496	670608	5034405	19T	15635	13672	1276	180	-67	141	2619027K
AM10-10	2475175	7382416	670703	5034328	19T	15695	13565	1284	260	-60	160	2619027K
AM10-11	2474751	7382529	670276	5034427	19T	15334	13814	1238	n/a	-90	210	2619027L
AM10-12	2475052	7382523	670576	5034430	19T	15615	13707	1272	n/a	-90	90	2619027L
AM10-13	2474703	7382524	670228	5034420	19T	15287	13826	1235	n/a	-90	210	2619027L
AM10-14	2475046	7382538	670570	5034445	19T	15614	13723	1272	180	-75	89	2619027L
AM10-15	2474675	7382567	670198	5034462	19T	15275	13876	1232	n/a	-90	200	2619027L
AM10-16	2475051	7382402	670580	5034309	19T	15573	13593	1260	n/a	-90	118	2619027F
AM10-17	2474690	7382608	670212	5034504	19T	15303	13909	1235	n/a	-90	230	2619027L
AM10-18	2475045	7382331	670575	5034238	19T	15543	13529	1255	n/a	-90	250	2619027E
AM10-19	2474711	7382613	670233	5034510	19T	15325	13907	1236	n/a	-90	200	2619027L
AM10-20	2474986	7382248	670520	5034154	19T	15460	13471	1245	n/a	-90	200	2619027E
AM10-21	2474997	7382268	670530	5034174	19T	15477	13486	1246	n/a	-90	225	2619027E
AM10-22	2474868	7382523	670393	5034425	19T	15442	13770	1251	180	-60	65	2619027L
AM10-23	2474883	7382539	670407	5034441	19T	15461	13779	1265	180	-55	90	2619027L
AM10-24	2474956	7382439	670483	5034344	19T	15496	13661	1259	n/a	-45	70	2619027L
AM10-25	2475157	7382407	670685	5034318	19T	15675	13561	1281	260	-45	120	2619027F
AM10-26	2474837	7381962	670379	5033863	19T	15231	13253	1210	n/a	-90	200	2619027E

**TABLE 12.**  
**DRILLHOLE METADATA FOR THE 2011 DIAMOND DRILLING PROGRAM**  
**(The coordinates and hole lengths (L) are in metres)**

Hole	NB Sterographic		UTM Coordinates - NAD'83			Mine Coordinates			Azimuth	Dip	L (m)	Claim Unit
	Easting	Northing	Easting	Northing	Zone	Easting	Northing	Elev.				
AM11-01	2475040	7382379	670569	5034286	19T	15555	13576	1281	n/a	-90	249	2619027E
AM11-02	2475167	7382298	670699	5034209	19T	15647	13456	1298	n/a	-90	426	2619027F
AM11-03	2475515	7381925	671059	5033847	19T	15849	12988	1317	n/a	-90	570	2619027C
AM11-04	2475139	7382236	670673	5034146	19T	15600	13408	1286	n/a	-90	402	2619027F
AM11-05	2475152	7382345	670682	5034256	19T	15649	13506	1295	n/a	-90	404	2619027F
AM11-06	2475215	7382311	670747	5034224	19T	15697	13452	1305	n/a	-90	426	2619027F
AM11-07	2475418	7381904	670961	5033823	19T	15749	13001	1310	n/a	-90	514	2619027C
AM11-08	2475483	7381870	671027	5033791	19T	15800	12947	1318	n/a	-90	500	2619027C
AM11-09	2475095	7382214	670630	5034123	19T	15551	13401	1274	n/a	-90	414	2619027F
AM11-10	2475009	7382250	670542	5034156	19T	15482	13465	1263	n/a	-90	377	2619027E
AM11-11	2475008	7382251	670542	5034157	19T	15482	13466	1263	n/a	-90	75	2619027E
AM11-12	2474933	7382322	670464	5034225	19T	15435	13558	1262	n/a	-90	270	2619027E
AM11-13	2475449	7381965	670991	5033886	19T	15801	13048	1317	n/a	-90	491	2619027F
AM11-14	2475050	7382407	670579	5034314	19T	15574	13598	1284	n/a	-90	405	2619027E
AM11-15	2475142	7382387	670671	5034297	19T	15653	13549	1296	n/a	-90	444	2619027F
AM11-16	2475435	7381861	670980	5033781	19T	15752	12955	1310	n/a	-90	501	2619027C
AM11-17	2475451	7381812	670998	5033732	19T	15750	12903	1308	n/a	-90	84	2619027C
AM11-17A	2475456	7381811	671002	5033732	19T	15754	12901	1309	n/a	-90	455	2619027C

The purpose of the 26 hole, 2010 program was to delineate tin, indium, and zinc resources in the North Zone, which were known from historical drilling and from ADEX's 2008 program, and to collect geotechnical data (3 holes) to help site a new portal and decline into the North Zone. Fifteen of the holes were oriented vertically and the others were inclined, varying from -41 to -75 degrees; the holes varied in length from 35 to 250 metres. A summary of what each 2010 hole intersected can be found in Appendix 1 and a tabulated list of significant intersections is presented in Table 13.

**TABLE 13.  
SIGNIFICANT TIN-INDIUM INTERCEPTS/ASSAYS FROM THE  
2010 DIAMOND DRILLING PROGRAM**

Hole	From (m)	To (m)	L (m)	% Sn	ppm In	% Zn	% Cu	% Bi	% WO <sub>3</sub>	% MoS <sub>2</sub>	% As
<b>AM-10-01</b>	132	177	45.0	0.11	58	1.00	0.04	0.08	0.03	0.04	1.29
AM-10-01	186	192	6.0	0.20	92	1.30	0.04	0.08	0.22	0.03	1.53
AM-10-01	222	231	9.0	0.27	103	0.79	0.21	0.04	0.08	0.06	1.51
<b>AM-10-04</b>	40	67	27.0	0.44	63	1.61	0.08	0.01	0.05	0.03	0.80
<i>(including)</i>	52	58	6.0	0.44	128	3.03	0.07	0.02	0.05	0.02	1.12
AM-10-04	73	79	6.0	0.13	128	2.56	0.12	0.03	0.05	0.05	0.64
<b>AM-10-05</b>	13	49	36.0	0.21	35	1.81	0.04	0.02	0.04	0.02	0.76
<b>AM-10-06</b>	51	54	3.0	0.15	159	0.47	0.46	0.04	0.05	0.03	1.33
<b>AM-10-07</b>	117	123	6.0	0.97	11	0.02	0.01	0.05	0.14	0.05	1.91
AM-10-07	129	147	18.0	0.02	3	0.05	0.00	0.10	0.32	0.15	1.27
AM-10-07	189	207	18.0	0.03	24	0.16	0.02	0.05	0.31	0.19	1.26
<b>AM-10-08</b>	9	12	3.0	0.12	215	3.46	0.10	0.00	0.01	0.00	0.17
AM-10-08	96	102	6.0	0.24	118	0.89	0.12	0.02	0.01	0.02	0.29
<b>AM-10-10</b>	110	114	4.0	4.67	984	14.50	0.56	0.83	0.37	0.03	5.28
<b>AM-10-11</b>	45	51	6.0	0.12	87	1.18	0.04	0.03	0.02	0.04	0.15
AM-10-11	138	159	21.0	0.35	4	0.04	0.02	0.07	0.04	0.02	0.81
<b>AM-10-12</b>	4	10	6.0	0.39	73	1.15	0.35	0.04	0.01	0.03	2.33
AM-10-12	67	90	23.0	0.52	62	0.35	0.21	0.04	0.04	0.03	1.20
<b>AM-10-13</b>	135	162	27.0	0.79	50	0.19	0.23	0.09	0.02	0.03	1.38
<i>(including)</i>	141	144	3.0	2.42	230	0.84	1.24	0.39	0.06	0.06	4.80
<b>AM-10-14</b>	75	88.5	13.5	0.76	95	0.07	0.19	0.03	0.02	0.01	1.15
<b>AM-10-15</b>	69	78	9.0	0.27	32	0.19	0.03	0.02	0.01	0.02	0.29
AM-10-15	108	114	6.0	0.30	133	1.00	0.07	0.03	0.02	0.02	0.18
<b>AM-10-16</b>	112	118	6.0	0.44	753	6.50	0.40	0.07	0.04	0.06	1.85
<b>AM-10-17</b>	192	195	3.0	0.94	63	0.68	0.04	0.07	0.01	0.01	7.06
<b>AM-10-18</b>	91	100	9.0	0.20	86	1.67	0.17	0.05	0.05	0.03	0.98
AM-10-18	202	208	6.0	1.74	520	7.01	0.21	0.03	0.06	0.04	0.36
AM-10-18	244	250	6.0	0.03	6	0.05	0.01	0.17	0.31	0.08	0.57
<b>AM-10-19</b>	57	63	6.0	0.26	308	3.58	0.29	0.02	0.02	0.02	0.73
<b>AM-10-20</b>	15	21	6.0	0.19	42	1.93	0.08	0.04	0.02	0.06	1.52
AM-10-20	42	84	42.0	0.06	140	1.47	0.05	0.05	0.06	0.07	0.24
<i>(including)</i>	42	45	3.0	0.06	330	5.92	0.13	0.06	0.06	0.09	0.59
<i>(including)</i>	63	69	6.0	0.05	412	3.43	0.13	0.04	0.05	0.06	0.36
<i>(including)</i>	81	84	3.0	0.40	658	4.40	0.24	0.05	0.02	0.04	0.73
AM-10-20	111	117	6.0	0.49	212	9.42	0.46	0.02	0.05	0.04	0.90
AM-10-20	183	189	6.0	0.26	1856	10.52	0.91	0.08	0.20	0.14	2.08
<b>AM-10-21</b>	69	129	60.0	0.13	131	2.94	0.09	0.06	0.04	0.05	3.11
AM-10-21	204	210	6.0	0.49	49	0.22	0.30	0.05	0.09	0.12	1.93
<i>(including)</i>	204	207	3.0	0.92	67	0.23	0.10	0.05	0.06	0.14	1.17
<b>AM-10-22</b>	60	65	5.0	0.17	235	2.12	0.31	0.01	0.04	0.01	0.64
<b>AM-10-23</b>	50	68	18.0	0.16	280	1.65	0.12	0.03	0.03	0.01	0.79
<b>AM-10-24</b>	60	69	9.0	0.22	103	2.92	0.06	0.02	0.05	0.03	2.97
<b>AM-10-25</b>	66	69	3.0	0.16	146	7.65	0.13	0.00	0.00	0.00	0.12

Hole AM10-10 was drilled at  $-60^\circ$  towards  $260^\circ$  magnetic to try to duplicate historical hole MPS-112, which was drilled at  $-45^\circ$  towards  $260^\circ$  magnetic. This historical hole intersected nearly 58 m of 0.07% Sn and 2.81% Zn; however, AM10-10 cut 6 m of 4.67% Sn, 14.5% Zn and 984 g/t In.

The purpose of the 18 hole, 2011 program was to further delineate (infill holes) the tin, indium, and zinc resources of the North Zone and to obtain mineralized material for metallurgical testing (3 holes). In addition, the open, east side of the North Zone was drill tested, following up on positive exploration results from the 2010 drill program, and six holes were drilled in the Saddle Zone, located approximately half way between the North and Fire Tower zones, which had not been drilled since 1990. All of the holes were oriented vertically and varied in length from 75 to 570 metres. A summary of what each 2011 hole intersected can be found in Appendix 2 and a tabulated list of significant intersections is presented in Table 14.

To the author's knowledge, there are no drilling, sampling or recovery factors that could materially affect the accuracy and reliability of the analytical results.



**TABLE 14.**  
**SIGNIFICANT TIN-INDIUM INTERCEPTS/ASSAYS FROM THE**  
**2011 DIAMOND DRILLING PROGRAM**

Hole	From (m)	To (m)	L (m)	% Sn	ppm In	% Zn	% Cu	% Bi	% WO3	% MoS2	% As
<b>AM11-01</b>	105	117	12.0	0.29	66	1.26	0.12	0.04	0.19	0.06	0.76
AM11-01	162	237	75.0	0.24	107	0.59	0.22	0.07	0.05	0.07	1.13
<b>AM11-02</b>	171	177	6.0	0.33	73	1.34	0.05	0.02	0.01	0.00	0.09
AM11-02	351	357	6.0	1.73	38	0.10	0.24	0.03	0.05	0.02	0.02
AM11-02	390	399.2	9.2	0.36	34	0.44	0.02	0.02	0.05	0.01	0.42
<b>AM11-03</b>	159	165	6.0	0.31	171	1.82	0.05	0.05	0.03	0.02	1.10
AM11-03	222	225	3.0	0.36	354	19.20	0.89	0.05	0.02	0.03	0.17
AM11-03	294	306	12.0	0.13	191	3.65	0.11	0.03	0.03	0.03	0.79
AM11-03	345	357	12.0	0.68	31	0.27	0.12	0.02	0.01	0.00	0.44
<b>AM11-04</b>	114	132	18.0	0.32	9	0.16	0.10	0.03	0.01	0.02	3.93
AM11-04	270	273	3.0	2.01	31	0.54	0.03	0.02	0.04	0.05	0.16
AM11-04	318	330	12.0	0.25	42	0.27	0.54	0.11	0.11	0.07	0.64
AM11-04	342	372	30.0	0.01	10	0.06	0.01	0.21	0.47	0.28	0.66
<b>AM11-05</b>	53	62	9.0	0.43	174	4.22	0.49	0.02	0.00	0.00	0.51
<i>(including)</i>	<i>53</i>	<i>56</i>	<i>3.0</i>	<i>1.17</i>	<i>505</i>	<i>10.40</i>	<i>1.41</i>	<i>0.03</i>	<i>0.01</i>	<i>0.01</i>	<i>1.00</i>
AM11-05	335	338	3.0	0.13	185	4.37	0.04	0.02	0.01	0.07	0.39
<b>AM11-07</b>	290	323	33.0	0.34	6	0.01	0.03	0.11	0.02	0.04	1.35
<i>(including)</i>	<i>290</i>	<i>308</i>	<i>18.0</i>	<i>0.47</i>	<i>5</i>	<i>0.01</i>	<i>0.04</i>	<i>0.10</i>	<i>0.01</i>	<i>0.02</i>	<i>1.18</i>
AM11-07	371	383	12.0	0.80	35	0.45	0.09	0.02	0.05	0.03	0.32
<b>AM11-08</b>	233	260	27.0	0.02	30	0.30	0.02	0.19	0.08	0.07	1.25
AM11-08	272	275	3.0	0.44	132	3.27	0.07	0.09	0.01	0.09	0.30
AM11-08	293	296	3.0	0.01	4	0.12	0.18	0.02	0.64	0.00	0.03
AM11-08	353	362	9.0	0.36	231	1.09	0.10	0.04	0.01	0.01	0.15
<b>AM11-09</b>	171	204	33.0	0.01	19	0.47	0.09	0.05	0.03	0.21	0.08
AM11-09	357	360	3.0	0.02	1	0.03	0.00	0.15	0.25	0.22	0.29
AM11-09	378	381	3.0	0.86	0	0.01	0.34	0.02	0.03	0.02	0.00
<b>AM11-13</b>	125	128	3.0	0.34	251	1.36	0.36	0.08	0.10	0.05	0.99
AM11-13	296	317	21.0	0.30	24	0.25	0.07	0.02	0.01	0.04	0.18
<b>AM11-14</b>	33	45	12.0	0.29	222	1.06	0.09	0.03	0.01	0.01	0.41
AM11-14	186	192	6.0	0.35	876	3.96	0.21	0.02	0.04	0.01	0.47
<i>(including)</i>	<i>189</i>	<i>192</i>	<i>3.0</i>	<i>0.59</i>	<i>1480</i>	<i>6.32</i>	<i>0.35</i>	<i>0.02</i>	<i>0.07</i>	<i>0.01</i>	<i>0.92</i>
AM11-14	234	309	75.0	0.27	22	0.28	0.09	0.21	0.19	0.33	0.83
<i>(including)</i>	<i>234</i>	<i>246</i>	<i>12.0</i>	<i>0.58</i>	<i>35</i>	<i>0.18</i>	<i>0.10</i>	<i>0.47</i>	<i>0.27</i>	<i>0.23</i>	<i>1.28</i>
<i>(including)</i>	<i>267</i>	<i>279</i>	<i>12.0</i>	<i>0.91</i>	<i>68</i>	<i>0.78</i>	<i>0.28</i>	<i>0.14</i>	<i>0.07</i>	<i>0.21</i>	<i>1.67</i>
<i>(including)</i>	<i>279</i>	<i>309</i>	<i>30.0</i>	<i>0.04</i>	<i>5</i>	<i>0.11</i>	<i>0.06</i>	<i>0.12</i>	<i>0.26</i>	<i>0.45</i>	<i>0.38</i>
AM11-14	348	354	6.0	0.03	1	0.05	0.00	0.11	0.34	0.04	3.15
AM11-14	381	387	6.0	0.15	1	0.04	0.00	0.08	0.30	0.02	0.10
<b>AM11-15</b>	24	27	3.0	0.50	335	4.92	0.48	0.05	0.00	0.00	0.55
AM11-15	255	261	6.0	0.30	5	1.12	0.04	0.04	0.16	0.07	0.11
AM11-15	363	369	6.0	0.88	0	0.04	0.01	0.07	0.07	0.03	0.07
AM11-15	387	393	6.0	0.33	10	0.10	0.02	0.01	0.06	0.03	0.15
AM11-15	411	414	3.0	0.06	1	0.19	0.00	0.07	0.35	0.12	0.10
<b>AM11-16</b>	12	15	3.0	0.25	51	2.76	0.34	0.00	0.00	0.00	0.19
AM11-16	42	45	3	0.17	155	2.12	0.23	0.02	0.01	0.00	0.15
AM11-16	246	261	15.0	0.24	110	1.05	0.39	0.14	0.01	0.11	0.50
<i>(including)</i>	<i>246</i>	<i>249</i>	<i>3.0</i>	<i>0.95</i>	<i>378</i>	<i>1.84</i>	<i>1.84</i>	<i>0.22</i>	<i>0.01</i>	<i>0.14</i>	<i>0.33</i>
AM11-16	288	291	3.0	0.25	147	1.06	0.11	0.01	0.01	0.00	0.33
AM11-16	321	330	9.0	0.10	11	0.16	0.02	0.09	0.00	0.05	0.21
AM11-16	339	342	3.0	0.88	5	0.08	0.01	0.09	0.03	0.03	0.02
<b>AM11-17</b>	39	45	6.0	0.20	78	1.91	0.27	0.02	0.01	0.00	0.22
<b>AM11-17A</b>	110	113	3.0	0.18	230	4.59	0.16	0.02	0.10	0.04	0.71
AM11-17A	206	209	3.0	0.60	42	1.80	0.04	0.03	0.03	0.03	0.53
AM11-17A	227	230	3.0	0.38	179	6.51	0.08	0.02	0.04	0.04	0.48
AM11-17A	308	365	57.0	0.04	3	0.13	0.02	0.17	0.29	0.20	2.97

## 11. SAMPLE PREPARATION, ANALYSES AND SECURITY

### 11.1 SAMPLE PREPARATION AND ASSAYING

The following section applies to sampling of a historical rock dump in 2009, to sampling of trenches in 2008 and 2010; to sampling of drill cores in 2008, 2010 and 2011, and to re-analysis of sample pulps from a few historical holes, which was done in 2008, 2010 and 2011. Information regarding sample preparation, analyses and security was obtained through discussions with G. Kooiman and information provided from reports provided by ADEX and directly by the analytical laboratories. The authors believe this information is accurate but have not independently verified the information.

Composite samples were collected for assay during 2009 from a rock dump in front of, and adjacent to, the 600 Adit portal (UTM coordinates: 670040 East, 5034803 North), situated on the northwest side of the North Zone. The material was collected under the supervision of Trevor Boyd, P.Geol., ADEX's qualified person at that time. During the 1960s, approximately 1000 tonnes of mineralized material had been selectively extracted from the #1-3 Tin Lode sub-zone via the 600 Adit and piled outside but never processed.

In June 2009, a series of small pits were dug throughout the rock dump and 10, approximately 10 kg samples were taken in order to assess their metal content for metallurgical testing. The samples were sent to Activation Laboratories ("Actlabs") in Ancaster, Ontario for analysis using the same methods as described in the technical report of Dunbar and de L'Etoile (2009).

The results of the initial sampling were encouraging, so in July and August, 161.5 tonnes were taken from this rock dump using a mechanical back hoe, in addition to hand sorting. The material was placed in five piles near the 600 Level Adit portal and then shipped separately to the crushing facilities of Fundy Contractors Limited at Bethel, near St. George, where each pile was crushed to pass a -12.5 mm screen. The crushed material was returned to the Mount Pleasant mine site and stored on separate prepared pads. The fine fraction (-5 mm) of the largest pile (pile #5) was placed upon a separate pad. One sample was taken from each pile except for the coarse fraction of pile #5, where two samples were taken. In total, seven approximately 10 kg composite samples were taken and sent to Actlabs for analysis. Details regarding both stages of sampling are shown in Table 15. The analytical results showed that the weight-adjusted average grade of the five piles is 0.03% MoS<sub>2</sub>, 0.06% WO<sub>3</sub>, 0.63% Sn, 0.55% Cu, 0.13% Pb, 1.39% Zn, 0.04% Bi, 1.07% As and 228 ppm In. The six sample piles were then combined into a single bulk sample pile and stored in the mill building, to be used as feed for future metallurgical bench and pilot testing.

**TABLE 15.  
COMPOSITE SAMPLES FROM 600 ADIT ROCK DUMP AND BULK PILES**

Sample #	Description	UTM Coordinates NAD'83		
		Easting	Northing	Zone
185401	Dump 1A; unsorted with coarse & fines	669984	5034835	19
185402	Dump 1B; picked mineralized blocks	669984	5034835	19
185403	Development 1A; unsorted with coarse & fines	669970	5034859	19
185404	Development 1B; picked mineralized blocks	669970	5034859	19
185405	Development 2A; unsorted with coarse & fines	669944	5034893	19
185406	Development 2B; picked mineralized blocks	669944	5034893	19
185407	Dump 3A; unsorted with coarse & fines	670008	5034843	19
185408	Dump 3B; picked mineralized blocks	670008	5034843	19
185409	Dump 4A; unsorted with coarse & fines	670019	5034877	19
185410	Dump 4B; picked mineralized blocks	670019	5034877	19
185691	Cu-rich pile #5 (-5 mm fraction)		12.5 tonne pile	
185692	Cu-rich pile #5 (sample A)		41.5 tonne pile	
185693	Cu-rich pile #5 (sample B)		41.5 tonne pile	
185694	Hand-sorted Cu-Zn pile #3		29 tonne pile	
185695	Zn-rich mineralized pile #4		31.5 tonne pile	
185696	Mineralized development pile #2		18 tonne pile	
185697	Low-grade development pile #1		29 tonne pile	

All four trenches that were excavated in 2010 (see Section 9 in this report), were chip sampled for analysis, with each sample being one metre in length except for one two metre sample. A total of 106 samples were collected for assay, 21 from Trench 1, 25 from Trench 2, 30 from Trench 3, and 30 from Trench 4. Notable assay results from this trenching are summarized in Table 4 in the Exploration section. One grab sample from a breccia pipe adjacent to Trench 3 was also assayed.

Of the 44 holes drilled (counting AM11-17 and AM11-17A as two) during 2010 and 2011, 38 of the cores obtained were sampled for analysis. A total of 2319 mineralized samples were collected for assay, 1121 samples from 23 of the 2010 cores, and 1198 samples from 15 of the 2011 cores. Notable assay results from this drilling are summarized in the Drilling section. Three geotechnical holes (AM10-02, AM10-03 and AM10-26) and three metallurgical holes (AM11-10, AM11-11 and AM11-12) were not assayed.

A total of approximately 400 kg of rejects from the 2008 drill program were shipped to SGS Mineral Services Canada (“SGS”) in Toronto during 2010 for metallurgical testing. Rejects from holes AM 08-03, AM 08-04, AM 08-06, AM 08-07, AM 08-30, AM 08-31, AM 08-35, AM 08-37 and AM 08-40A were utilized. Thirty five kilograms of drill core from holes AM 08-03, AM 08-04, AM 08-30, AM 08-31, AM 08-35 and AM 08-40A were obtained for rod grindability work and shipped to SGS during 2010. During 2011, 45 kg of drill core rejects from the 2010 drill program obtained from holes AM-10-16, AM-10-18, AM-10-20 and AM-10-21 were shipped to SGS.

In 2008, ADEX collected 300 split core samples from 1995 Piskahegan Resources Limited drillholes PRL-94-1, PRL-95-3, PRL-95-4 and PRL-95-5. The drill core, not previously sampled, was split in half following the same method for the 2008 drill core samples.

The 2006 original split core samples for drillholes PRL95-02, B104, B114 and B169 were assayed by IC90M for In, As, Bi, Cu, Mo, Pb, Sn and W using sodium fusion and ICP-MS finish. Zinc was determined using the ICM90A method. The 2008 ore grade analyses at SGS used sodium peroxide fusion with ICPOES finish for As, Bi, Cu, Mo, Pb, Sn, W and Zn. In was determined by method ICM90A. Pulps submitted to Activation laboratories were analyzed for In and Bi by sodium fusion, ICP/MS finish, for As, Cu, Pb and Zn by sodium fusion, ICP finish, and for Mo, Sn and W by XRF fusion.

In general, all mineralized and altered cores were sampled; only un-mineralized or weakly altered cores were left un-split. Core intervals were marked off and tagged, mostly in 3 m sample lengths, by the geologist who logged the core. The maximum sample interval was 4.5 m and the shortest interval was 0.5 m. These intervals were split by technical personnel, under the supervision of the geologist, using a hydraulic splitter. The entire split was placed in a plastic bag with the sample tag; the tag number was written on the bag with indelible marker, and the bag was sealed using a plastic zip lock. The remaining half of the core was put back in the box with the duplicate sample tag for future reference. Individual bagged samples were placed in fiberglass shipping bags, secured with zip locks and delivered directly to Activation Laboratories Ltd. (Actlabs) sample preparation facility in Fredericton. No blank, duplicate or standard samples were inserted into the sample stream by ADEX geologists.

The majority of the analytical work between 2006 – 2008 was completed by SGS Mineral Services ("SGS") located in Don Mills, Ontario (Boyd, 2008, 2006). This laboratory is an ISO/IEC 17025 accredited laboratory. Samples, including those from the 2008 drill program, were analyzed for W, Mo, Sn, Bi, As, Zn, Cu, Pb, and ICP-MS finish for In. The following methods were used to analyze samples at SGS:

- A sample, weighing less than 3.0 kg, was first dried, crushed to 75% passing 2 mm, split to 250 g and then pulverized to 85% passing 75 micron (method code PRP89);
- Ore grade analysis by sodium peroxide fusion, ICPOES finish for Cu, Pb, Zn, As, Sn, Bi, Mo and W (method code ICP90Q);

- Indium by sodium peroxide fusion ICP-MS finish using method code IC90M (detection limit 0.2 ppm to 0.1wt %). Over-limit Indium analyses were completed using method code ICP90Q after sodium fusion ore grade analyses; and,
- In and Zn by sodium peroxide fusion/ICP-AES and ICP-MS finish (method code ICM90A).

The 2008 pulp duplicates plus the additional core and pulp samples were sent to Activation Laboratories ("**Actlabs**"), located in Ancaster, Ontario, for analysis as follows:

- The sample was dried, crushed (90% to pass 2 mm), split to 250 gm and pulverized to 95% passing 75 micron at their sample preparation facility in Fredericton, New Brunswick;
- Peroxide fusion and ICP analysis for Cu, Pb, Mo and As (method code 8). Detection limits 0.01 wt % for As, Pb and Zn, 0.008 for MoS<sub>2</sub>, and 0.005 for Cu;
- Peroxide fusion ICP/MS analysis for Bi and In (method code 8). Detection limits 2 ppm for Bi and 0.2 ppm for Indium; and
- Fusion XRF for Sn and W (method code 8). Detection limits 0.002 wt % for Sn and 0.003 wt% for WO<sub>3</sub>.

Actlabs is ISO/IEC 17025 and CAN-P-1579 (Mineral Analysis) accredited by the Standards Council of Canada (SCC).

The 2006 original split core samples for drillholes PRL95-02, B104, B114 and B169 were assayed by IC90M for In, As, Bi, Cu, Mo, Pb, Sn and W using sodium fusion and ICP-MS finish. Zinc was determined using the ICM90A method. The 2008 ore grade analyses at SGS used sodium peroxide fusion with ICPOES finish for As, Bi, Cu, Mo, Pb, Sn, W and Zn. In was determined by method ICM90A. Pulps submitted to Activation laboratories were analyzed for In and Bi by sodium fusion, ICP/MS finish, for As, Cu, Pb and Zn by sodium fusion, ICP finish, and for Mo, Sn and W by XRF fusion.

ADEX grab samples FC-1 to FC-5 collected for the barrels of crushed W-Mo ore material and the 19 pulps collected from the sulphide concentrate pond were analyzed by SGS using the following analytical methods:

- Code FAI303, 30 g sample of pulverized material was fire assayed for Au with an ICP finish; and,

- Code ICM90A (described above) for 54 elements including Cu, Zn, Ag, As, Bi, In, Mo, Sn and W.

The high-definition mineralogy assessment completed at SGS Lakefield was completed using QEMSCAN technology and X-ray diffraction analyses. Electron Microprobe analysis was completed on the indium carrying minerals.

The drill core from the 2010 and 2011 drilling programs is stored in racks, either in the core logging building or on the mine site, which has a security fence around it and a security person on duty 24 hours a day, 7 days per week. All drill core from previous drilling programs is stored within the confines of this fenced compound. All coarse rejects and pulps are also stored, either in the core building or in locked, metal shipping containers within the fenced compound.

Upon receipt at Actlabs' facility in Fredericton, New Brunswick, each sample was:

- logged into the company's tracking system and dried;
- crushed (90% to minus 10 mesh or 2 mm) in entirety; and
- mechanically split (riffle) to obtain a representative 250 g sample.

Each 250 g sample was pulverized (95% to minus 200 mesh or 0.075 mm) using a mild steel mill, and the resulting powders were then shipped by bonded courier to the company's laboratory in Ancaster, Ontario for analysis.

All of the 2010 powdered samples were analysed as follows:

- sodium peroxide fusion of 0.2 g of powdered sample, acid dissolution of the fused sample, followed by ICP/OES analysis (Code 8 – Peroxide Fusion ICP) for As, Cu, Mo (reported as MoS<sub>2</sub>), Pb, and Zn;
- sodium peroxide fusion of 0.2 g of powdered sample, acid dissolution of the fused sample, followed by ICP/MS analysis (Code 8 – Peroxide Fusion ICPMS) for Bi and In; and
- lithium metaborate/tetraborate fusion of 0.5g of powdered sample, with the resulting glass disc analysed for Sn and W (reported as WO<sub>3</sub>) using a Panalytical Axios Advanced wavelength dispersive XRF (Code 8 – Fusion XRF).

The detection limits in weight percent, except for In, were as follows: As = 0.01, Bi = 0.002, Cu = 0.005, In = 0.2 ppm, MoS<sub>2</sub> = 0.008, Pb = 0.01, Sn = 0.002, and WO<sub>3</sub> = 0.003. Actlabs inserted blanks, duplicates and certified standards, including at least one of three Mount

Pleasant standards (MP-1a, MP-1b and MP-2), into each batch of samples as part of its quality control program.

Most of the 2011 powdered samples (except those from holes AM11-02 and AM11-04, which were done the same way as the 2010 sample) were analysed as follows:

- sodium peroxide fusion of 0.2 g of powdered sample, acid dissolution of the fused sample, followed by ICP/OES analysis (Code 8 – Peroxide Fusion ICP) for As, Cu, Mo (reported as MoS<sub>2</sub>), Pb, and Zn; and
- sodium peroxide fusion of 0.2 g of powdered sample, acid dissolution of the fused sample, followed by ICP/MS analysis (Code 8 – Peroxide Fusion ICPMS) for Bi, In, Sn, and W (reported as WO<sub>3</sub>).

The detection limits are the same as those given above.

In addition, 306 samples from historical holes were submitted to Actlabs for re-analysis by the methods described above. This included 117 samples from two AM96 series cores, 168 samples from five MPS series cores (assayed for In only), and 21 samples from one LNZ series core. The AM96 series samples were mostly newly split core that had not previously been assayed; the MPS series samples were all quartered core because pulps no longer exist; and the LNZ series samples were mostly pulps with a few samples of previously un-split core.

As part of its due diligence procedures, ADEX dispatched 252 pulp samples by bonded courier to SGS Canada Mineral Services Inc. (“SGS”) in Toronto for assay verification of approximately every 10<sup>th</sup> sample that was sent to Actlabs. In addition, 39 pulp samples from hole LNZ-15 were sent to SGS for re-assay. Each of these samples was analyzed as follows:

- dried, weighed and crushed to 75% passing 2 mm, split to 250 g and pulverized to 85% passing 75 microns (0.075 mm) as required;
- sodium peroxide fusion of 0.2 g of powdered sample, acid dissolution of the fused sample, followed by ICP-OES analysis (Code ICP90Q) for As, Bi, Cu, Mo, Pb, Sn, W, and Zn;
- sodium peroxide fusion of 0.1 g of powdered sample, acid dissolution of the fused sample, followed by ICP-MS analysis (Code IC90 m) for In.

The detection limit in weight percent for all elements by ICP90Q was 0.01%; the reporting range for indium by IC90 m was 0.2 ppm – 0.1%. SGS inserted duplicates into the sample stream as a quality control measure. Furthermore, ADEX inserted certified standards, MP-1b and MP-2 (either one or both), into every other batch of samples sent to SGS.

Both Actlabs (Ancaster) and SGS Mineral Services (Toronto) are ISO/IEC 17025 and CAN-P-1579 accredited. ISO 17025 is the main standard used by testing and calibration laboratories; it has many commonalities with the ISO 9000 (9001, 9002) standard, but emphasizes both management and technical requirements. Management requirements are primarily related to the operation and effectiveness of the quality management system within the laboratory. Technical requirements address the competence of staff, methodology, test/calibration equipment and test methods. Full validation of test methods and proof of proficiency set this standard apart from ISO 9001 or 9002. CAN-P-1579 details the Standard Council of Canada's (SCC) requirements for the accreditation of mineral analysis testing laboratories. It is specific to laboratories that perform mineral analysis for exploration, mining and mineral processing projects; it elaborates upon and adds requirements to those in the ISO 17025 standard. Both Actlabs and SGS have an arms-length relationship with ADEX; no employee, officer, director or associate of ADEX has any affiliation with these companies, other than as a customer.

## **11.2            QA/QC**

For the 2010 drilling program, pulps from 96 of the 1121 samples that were sent to Actlabs were also submitted to SGS for analysis by ADEX. The assay results for arsenic, bismuth, tin, and zinc show good correlation between the two analytical laboratories, with  $R^2$ -values  $\geq 0.95$  (Figure 22). However, molybdenum, copper, indium, and tungsten show decreasing  $R^2$ -values of 0.92, 0.89, 0.70, and 0.61, respectively (Figure 23). Lead (not shown) has the lowest R-value (0.01) of any element, largely because two samples (427849 and 427850) from hole AM10-14 have radically different results by the two labs (1.61% and 1.71% from Actlabs, versus below detection limit from SGS for both samples). The same two samples also have very different copper values (0.14% and 0.34% from SGS versus below detection limit from Actlabs), accounting for the low R-value of copper. Four samples (428178, 428320, 428330 and 428340) from three holes (AM10-24, AM10-22 and AM10-18, respectively) account for the low R-value of indium. The SGS values in parts per million (ppm) for these four samples are 82, 136, 113, and 227, respectively, versus 447, 2, 8, and 85 from Actlabs. The original assay certificates confirm the numbers are correct so the reason for this discrepancy is unknown.

For the 2010 trenching program, pulps from 11 of the 107 samples that were sent to Actlabs were also submitted to SGS for analysis. The assay results for arsenic (not shown), copper, indium, lead, tin, tungsten and zinc show good correlation between the two analytical laboratories, with  $R^2$ -values  $\geq 0.92$ ; however, bismuth and molybdenum have  $R^2$ -values of 0.77 and 0.34, respectively (Figures 24 and 25). The low  $R^2$ -values for the latter two elements reflect the fact that many values for both are at or near their detection limits.



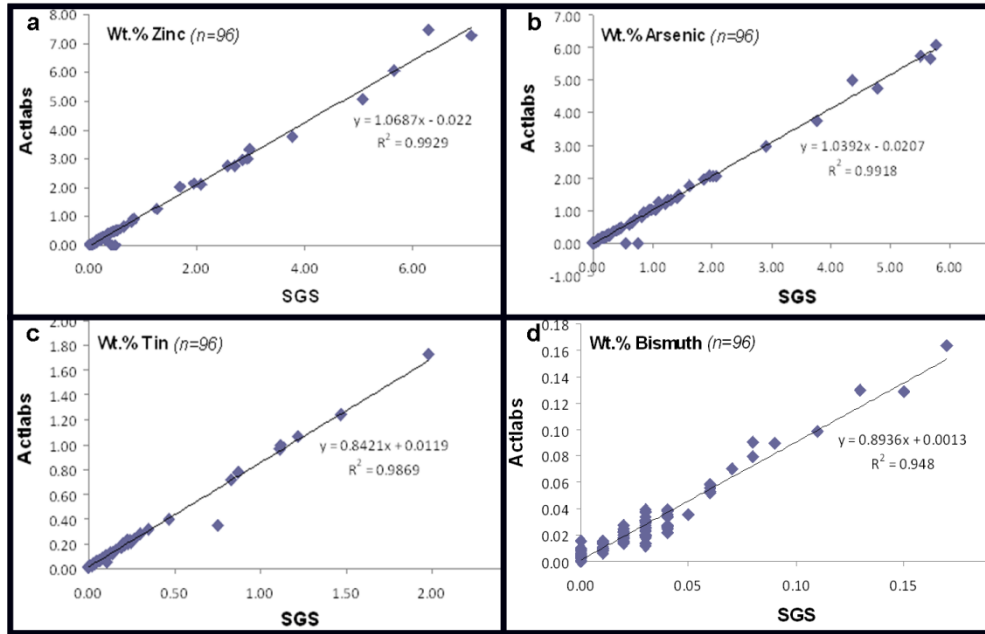


Figure 22. Scatter plots showing decreasing  $R^2$ -values for zinc, arsenic, tin and bismuth (in weight percent) of 96 samples from the 2010 drilling program. Samples were sent to both Actlabs and SGS for analysis: a) Zn versus Zn; b) As versus As; c) Sn versus Sn; d) Bi versus Bi.

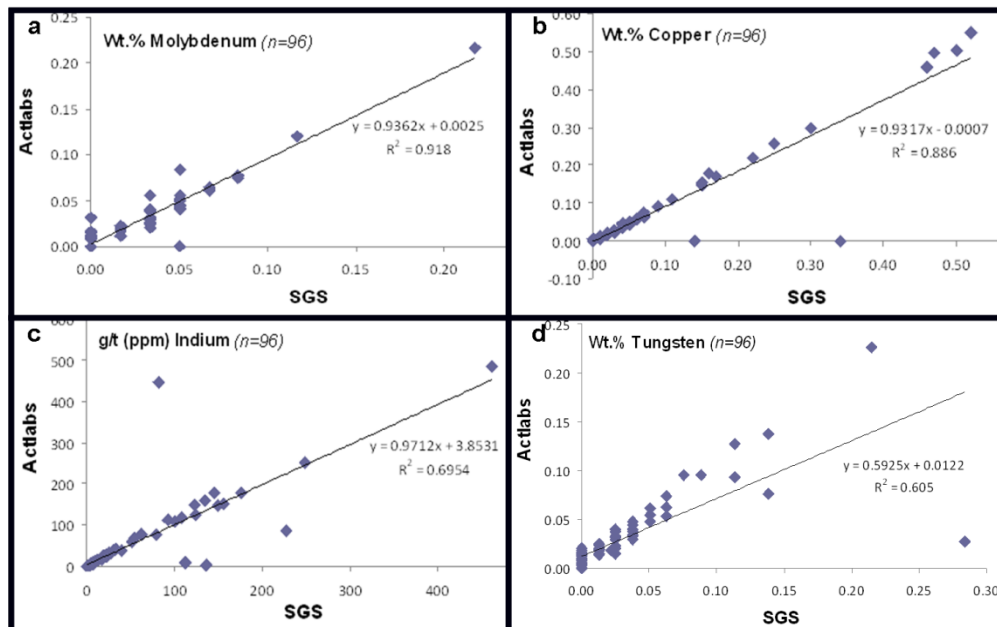


Figure 23. Scatter plots showing decreasing  $R^2$ -values for molybdenum, copper, indium, and tungsten (in weight percent except for indium) of 96 samples from the 2010 drilling program. Samples were sent to both Actlabs and SGS for analysis: a)  $MoS_2$  versus  $MoS_2$ ; b) Cu versus Cu; c) In versus In; d)  $WO_3$  versus  $WO_3$ .

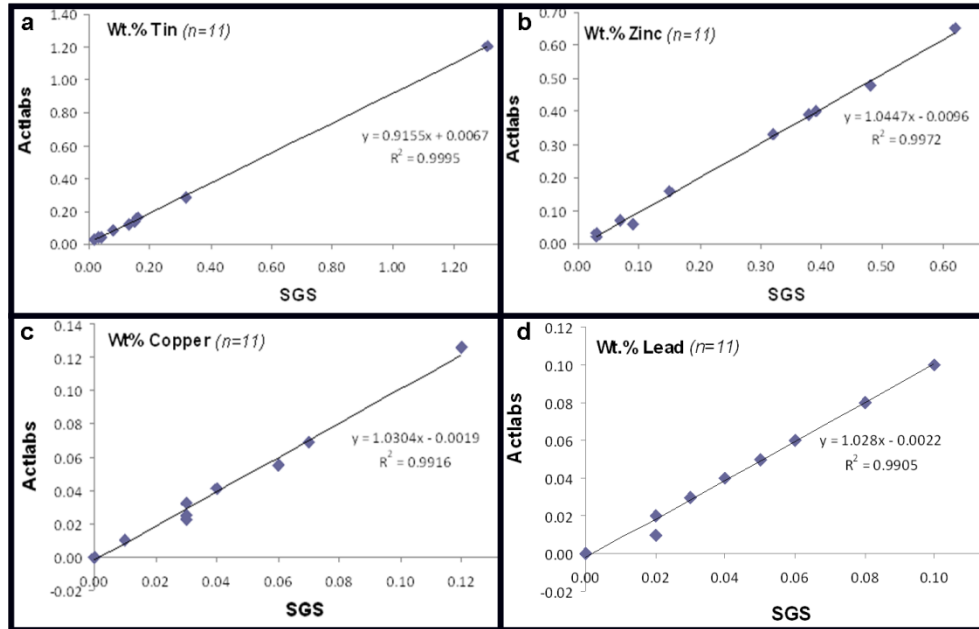


Figure 24. Scatter plots showing decreasing  $R^2$ -values for tin, zinc, copper and lead (in weight percent) of 11 samples from the 2010 trenching program. Samples were sent to both Actlabs and SGS for analysis: a) Sn versus Sn; b) Zn versus Zn; c) Cu versus Cu; d) Pb versus Pb.

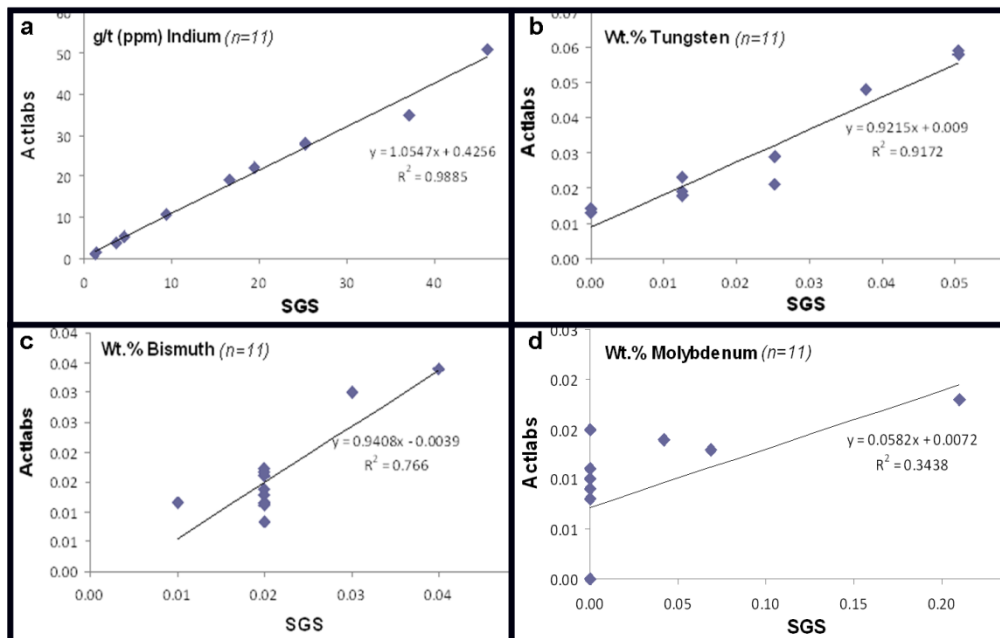


Figure 25. Scatter plots showing decreasing  $R^2$ -values for indium, tungsten, bismuth and molybdenum (in weight percent except for indium) of 11 samples from the 2010 trenching program. Samples were sent to both Actlabs and SGS for analysis: a) In versus In; b)  $WO_3$  versus  $WO_3$ ; c) Bi versus Bi; d)  $MoS_2$  versus  $MoS_2$ .

In 2010, several MPS-series cores were quartered and re-assayed at Actlabs for indium only, because Brunswick Tin Mines (BTM) did not assay for this element at the mine laboratory. Pulps from 15 of the 168 samples that were sent to Actlabs were also submitted to SGS for the complete suite of elements normally assayed. For the scatter plots, all assay values (except for indium) are from the BTM laboratory. The assay results for arsenic (not shown), copper, indium, tin, and zinc show good correlation between the two analytical laboratories, with  $R^2$ -values  $\geq 0.99$  (Figure 26). However, tungsten, lead, molybdenum, and bismuth exhibit decreasing  $R^2$ -values of 0.87, 0.84, 0.74, and 0.71, respectively (Figure 27). The low  $R^2$ -values reflect the fact that many of these samples have values less than or equal to twice their detection limits.

For the 2011 drilling program, pulps from 122 of the 1198 samples that were sent to Actlabs were also submitted to SGS for analysis. The assay results for all elements show good correlation between the two analytical laboratories, with  $R^2$ -values  $\geq 0.98$  (Figures 28 and 29). The highest R-value is for copper and the lowest R-value is for molybdenum.

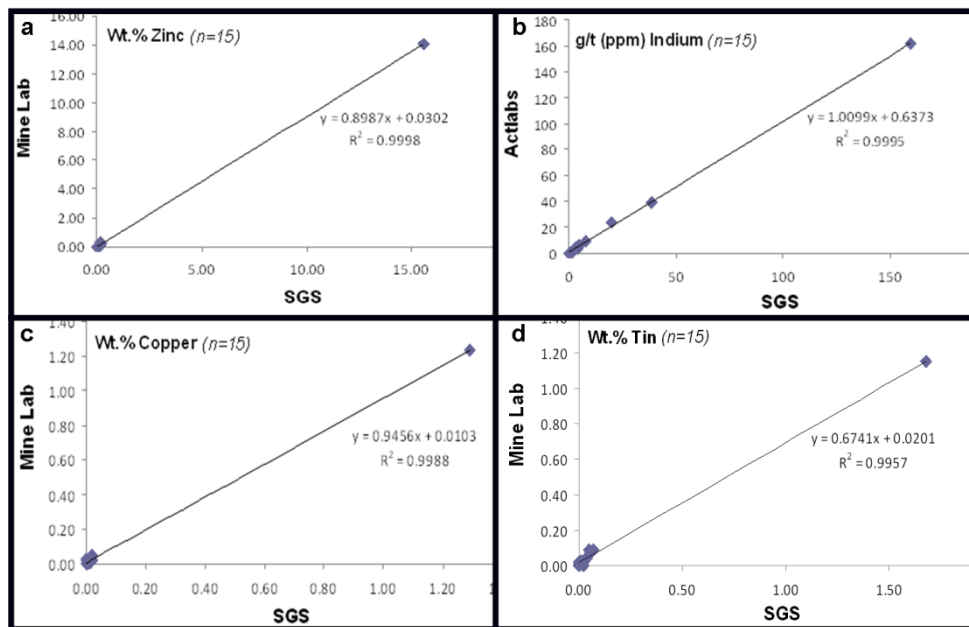


Figure 26. Scatter plots showing decreasing  $R^2$ -values for zinc, indium, copper and tin (in weight percent except for indium) of 15 samples (MPS-series cores) that were re-assayed in 2010. Samples were sent to both Actlabs (for indium only; other elements are historic data from mine laboratory) and SGS for analysis: a) Zn versus Zn; b) In versus In; c) Cu versus Cu; d) Sn versus Sn.

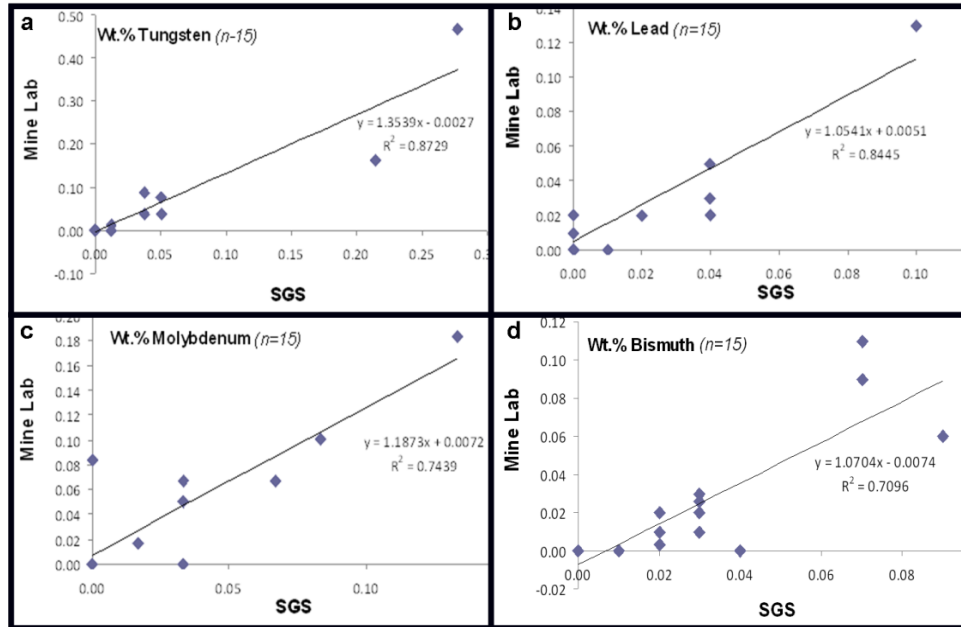


Figure 27. Scatter plots showing decreasing  $R^2$ -values for tungsten, lead, molybdenum and bismuth (in weight percent) of 15 samples (MPS-series cores) that were re-assayed in 2010. Samples were sent to both Actlabs (for indium only; other elements are historic data from mine laboratory) and SGS for analysis: a)  $WO_3$  versus  $WO_3$ ; b) Pb versus Pb; c)  $MoS_2$  versus  $MoS_2$ ; d) Bi versus Bi.

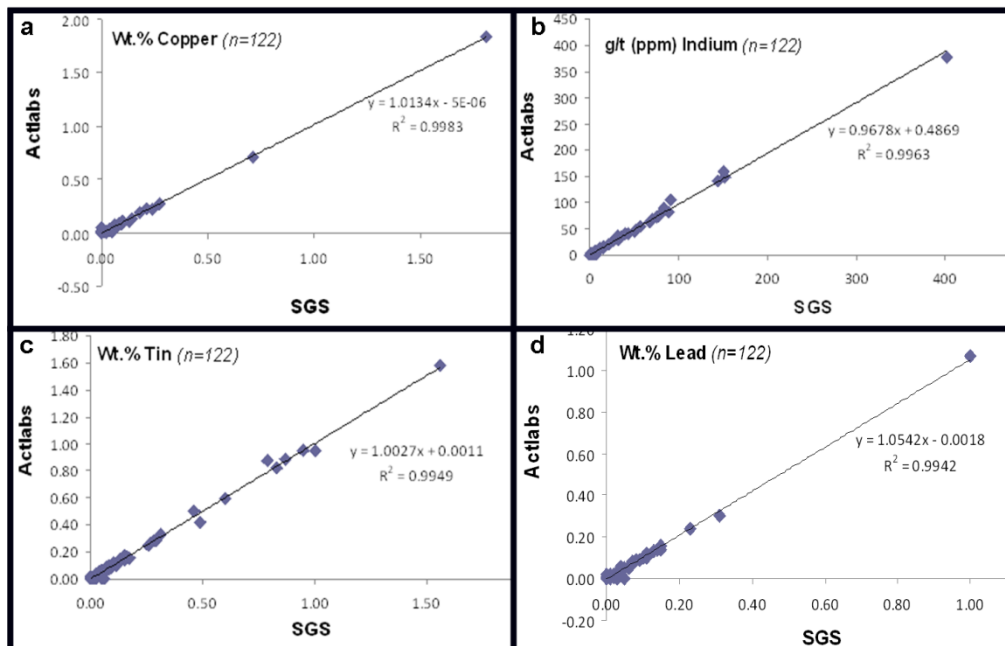


Figure 28. Scatter plots showing decreasing  $R^2$ -values for copper, indium, tin and lead (in weight percent except for indium) of 122 samples from the 2011 drilling program. Samples were sent to both Actlabs and SGS for analysis: a) Cu versus Cu; b) In versus In; c) Sn versus Sn; d) Pb versus Pb.

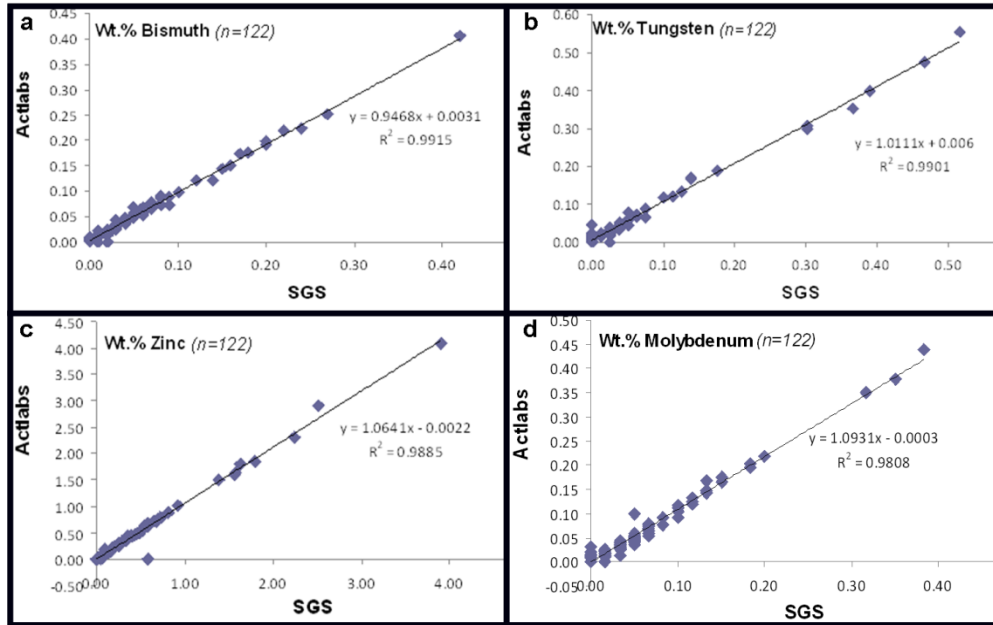


Figure 29. Scatter plots showing decreasing  $R^2$ -values for bismuth, tungsten, zinc and molybdenum (in weight percent) of 122 samples from the 2011 drilling program. Samples were sent to both Actlabs and SGS for analysis: a) Bi versus Bi; b)  $WO_3$  versus  $WO_3$ ; c) Zn versus Zn; d)  $MoS_2$  versus  $MoS_2$ .

In 2011, parts of two LNZ-series cores were assayed, one at Actlabs and the other at SGS. The interval of interest in core LNZ-15 was originally assayed at the mine laboratory by Lac Minerals, so pulps were available for re-assay, and results from the two laboratories could be compared. For hole LNZ-17, however, only three samples were previously assayed from the interval of interest, so there are few data to compare. Comparison of LM's results with those of SGS, for LNZ-15 shows good correlation for arsenic, bismuth, tin and zinc with  $R^2$ -values  $\geq 0.95$  (Figure 30). Copper and molybdenum both have  $R^2$ -values  $\geq 0.91$  but the R-value for tungsten is only 0.48 and there is no value for lead because all of the SGS data are below detection limit (0.01%) for lead (Figure 31).

In the authors' opinion, the sample preparation, security and analytical procedures used by ADEX conform to generally accepted practice of the Canadian mining industry and are adequate for the purposes of this report.

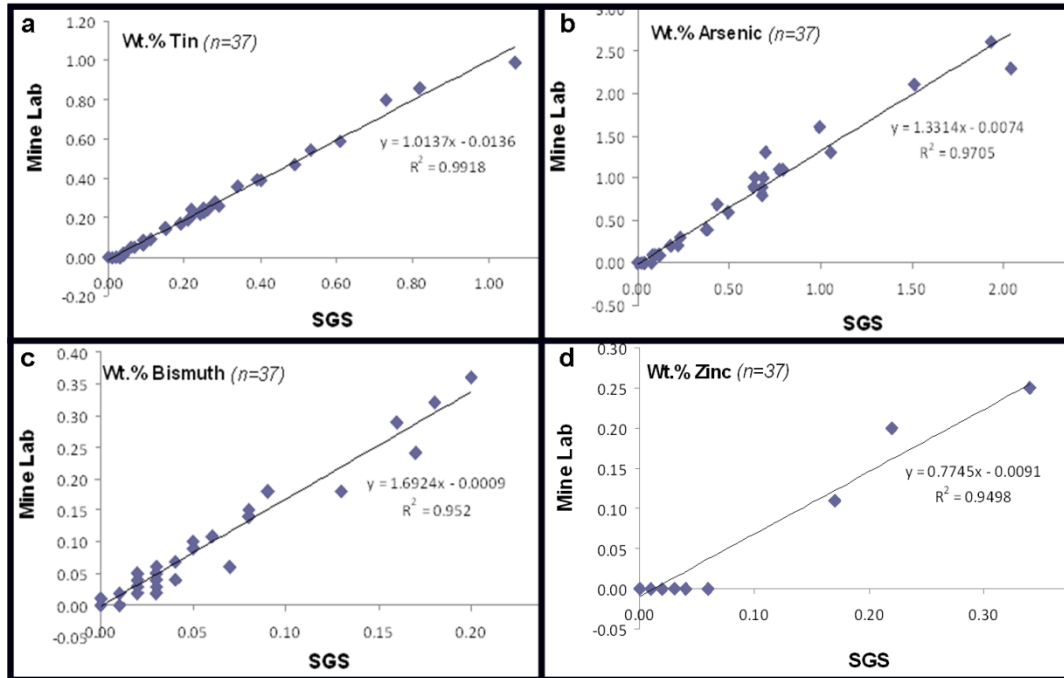


Figure 30. Scatter plots showing decreasing  $R^2$ -values for tin, arsenic, bismuth and zinc (in weight percent) of 37 samples (from LNZ-15) that were re-assayed in 2011. Samples were sent to SGS for analysis (historic data are from mine laboratory): a) Sn versus Sn; b) As versus As; c) Bi versus Bi; d) Zn versus Zn.

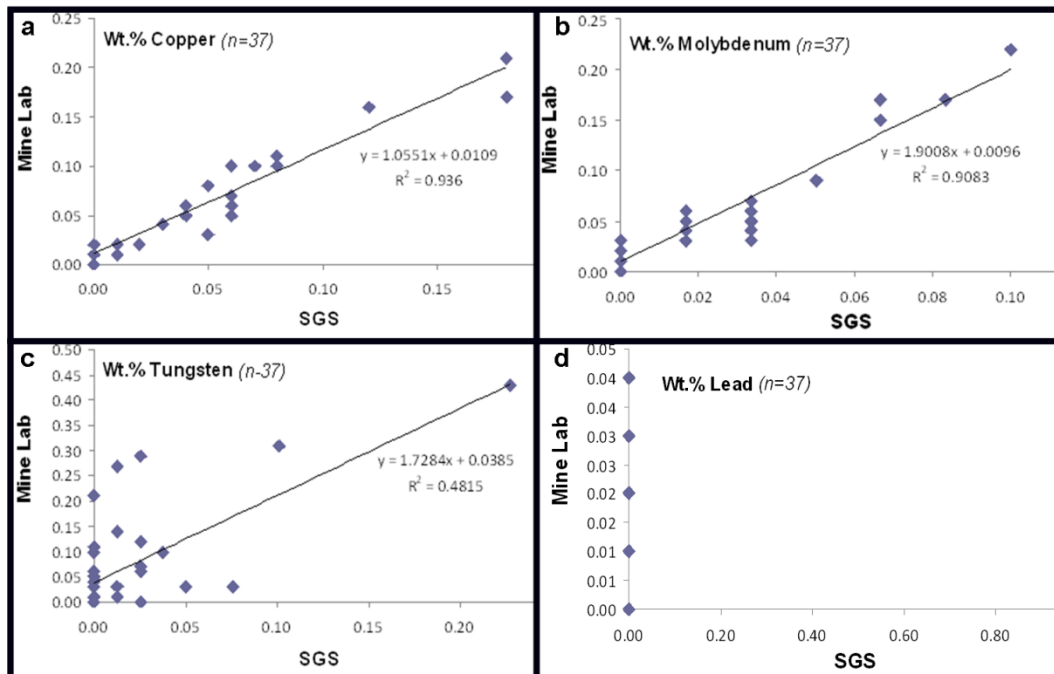


Figure 31. Scatter plots showing decreasing  $R^2$ -values for copper, molybdenum, tungsten and lead (in weight percent) of 37 samples (from LNZ-15) that were re-assayed in 2011. Samples were sent to SGS for analysis (historic data are from mine laboratory): a) Cu versus Cu; b)  $\text{MoS}_2$  versus  $\text{MoS}_2$ ; c)  $\text{WO}_3$  versus  $\text{WO}_3$ ; d) Pb versus Pb.

### **11.3 SECURITY**

Effort was made to secure the chain of custody of all samples that were sent for analysis. This included careful labelling of sample bags, sealing them with zip locks immediately after their collection, and delivery of the samples directly to Actlabs by ADEX personnel, or to SGS Mineral Services by bonded courier. All pulps and coarse rejects from SGS were returned to the mine site by bonded courier. Pulps and rejects from Actlabs were released in work-order sequence to ADEX personnel at the sample preparation facility in Fredericton, once a final assay report for that work order was completed. All returned pulps and coarse rejects were stored in metal shipping containers by work order within the security-fenced compound that surrounds the mine site. The compound is monitored by a security guard on duty 24 hours a day, 7 days per week.

## 12. DATA VERIFICATION

Drill core and surface rock samples collected by ADEX and previous owners of the project were submitted by these companies to various accredited laboratories. The independent QP viewed recent drill core and collected verification samples. These samples were collected and assayed independently of ADEX to validate the results. Although the authors have reviewed a selection of assay results and Certificates generated by the labs and believe they are generally accurate, the authors are relying on the labs as experts in the field of analytical procedure.

Data verification by the independent QP included the following components of ADEX's 2008, 2010 and 2011 work:

- site visits to verify drilling;
- core logging and independent sampling of drill cores;
- collection of composite samples;
- comparison of values in assay certificates with those in the GEMCOM database; and
- comparison of measured and certified values for analytical standards that are specific to Mount Pleasant.

Each of these components is more fully described below. In addition, historical data from C-series, DDH-series, E-series, LNZ-series, MPS-series, and U-series holes in the GEMCOM database of the North Zone were randomly checked against hardcopy assay files at the mine site in early January, 2012.

### **12.1 SITE VISITS**

In 2008, WGM conducted two visits to the Mount Pleasant Property. The first visit was completed from May 2<sup>nd</sup> to May 6, 2008 when only hole AM-08-08 had just finished being drilled. A second visit was conducted from June 23 to 26, 2008 upon the completion of the Phase 1 drill program. During each visit, all of the new exploration work was reviewed, the 2008 drill core was examined and each of the drill sites was visited. A GPS (Garmin 12XL) was used to record the locations of the drill collar casings (NAD83, Zone 19T). Digital photographs were taken to document the field visit and sampling activities. A total of 13 samples of the drill core were taken to determine their precious and base metal concentrations and confirm the presence of mineralization.



WGM submitted the 13 quarter split drill core samples and one standard to SGS in Don Mills. The following analytical methods were used to assay the samples:

- Preparation code PRP89 as described above;
- Ore grade analysis using method ICP90Q for Cu, Pb, Zn, As, Sn, Bi, Mo and W as described above;
- A 50 g pulp fire assayed for gold, ICP-AES finish (method FAI505);
- IC90M for In as described above with over-limit In analyses by ICP90Q; and,
- A 50 g pulp assayed for Ag (method AAA50).

One standard sample MP-2 was submitted with this batch of samples as part of WGM's QA/QC procedures and is the same standard inserted by ADEX in sample shipments to the various laboratories. This tungsten-molybdenum ore reference material has been certified by CANMET Mining and Mineral Sciences Laboratories, located in Ottawa, Ontario as part of the Canadian Certified Reference Materials Project ("CCRMP"). The certified values were not reported to ensure its continued use in future ADEX diamond drilling programs.

The QP (Dr. Steven McCutcheon, P.Geo.) made four visits to the Property in 2011, which pertain to the 2010 and 2011 drilling programs. The first was on September 28<sup>th</sup> to 30<sup>th</sup>, at which time an active drill site and several drill collars were visited with G. Kooiman; core logging, splitting and sampling procedures were observed in the core building; and the core and pulp storage areas were inspected. Also, drill cores from three holes were inspected and photographed. The second visit was on October 17<sup>th</sup>, after the drilling program was finished, at which time two additional drill cores were inspected and photographed. The third visit was on November 3<sup>rd</sup> and 4<sup>th</sup>, after most of the assays were in-hand, at which time quarter samples were collected from mineralized intervals in ten drill cores – five from the 2010 program and five from the 2011 program. The fourth visit was on December 2<sup>nd</sup> and 3<sup>rd</sup>, at which time samples were collected from a stockpile of tungsten ore as a bulk sample for metallurgical testing. During this visit, GPS coordinates were obtained from 10 of 26 drill collars in the 2010 program and from 8 of 18 drill collars in the 2011 program.

## **12.2 CORE LOGGING AND SAMPLING**

Drill cores from holes AM11-07, AM11-10, AM11-12, AM11-13 and AM11-14 were logged by the QP to obtain a “feel” for the nature and distribution of the mineralization with respect to its host rocks and associated alteration. Holes AM11-07 and AM11-13 are from the Saddle Zone; the other three are from the North Zone. Photographs of various features in these cores were taken for documentation purposes but no samples were taken during the logging process.

Sampling intervals were selected by the QP after reviewing the assay data from both the 2010 and 2011 drilling programs. Only intersections with significant assays over two or more standard sample intervals were selected for sampling as the true widths of these intercepts may exceed the minimum mining width requirement of 3 m. Two contiguous samples were taken in the 6 m interval; each sample comprised 3 m of quartered core that matched the original split-core interval that was sent to Actlabs for assay. Cores AM10-05 (4 samples), AM10-10 (2 samples), AM10-13 (4 samples), AM10-18 (2 samples), and AM10-21 (4 samples) were sampled from the 2010 drilling program. Cores AM11-02 (2 samples), AM11-04 (2 samples), AM11-07 (4 samples), AM11-14 (4 samples), and AM11-15 (4 samples) were sampled from the 2011 drilling program. In total, 32 samples were taken. The author supervised the quartering of the core; personally inserted the sample tags in their plastic bags and secured them with zip locks; packed the samples in plastic shipping pails and secured the lids; and delivered the pails directly to the bonded courier for shipping to SGS for analysis with instructions to use the same analytical procedures used by ADEX (described in Section 11) and to send a copy of the results directly to the author. Standards were not submitted with this batch of samples because they were included in the original sample stream at Actlabs and ADEX's check samples at SGS provide a basis for comparison.

Comparison of the results from Actlabs and SGS for these 32 samples shows reasonable correlation between the two analytical laboratories for zinc, arsenic, molybdenum and copper, with  $R^2$ -values  $\geq 0.92$  (Figure 32). However,  $R^2$ -values for tin, bismuth, lead and indium are 0.90, 0.85, 0.85 and 0.77, respectively (Figure 33). Tungsten (not shown) has the lowest  $R$ -value at 0.04. The low  $R^2$ -values most likely reflect the inhomogeneous distribution of the mineralization in the core, i.e., the quarter-sampled material was different from the split-sampled material.

This is the most reasonable explanation, given the fact that there is good correlation between Actlabs and SGS for re-assays of samples during the entire 2011 drilling program (see Figures 28 and 29, previously).

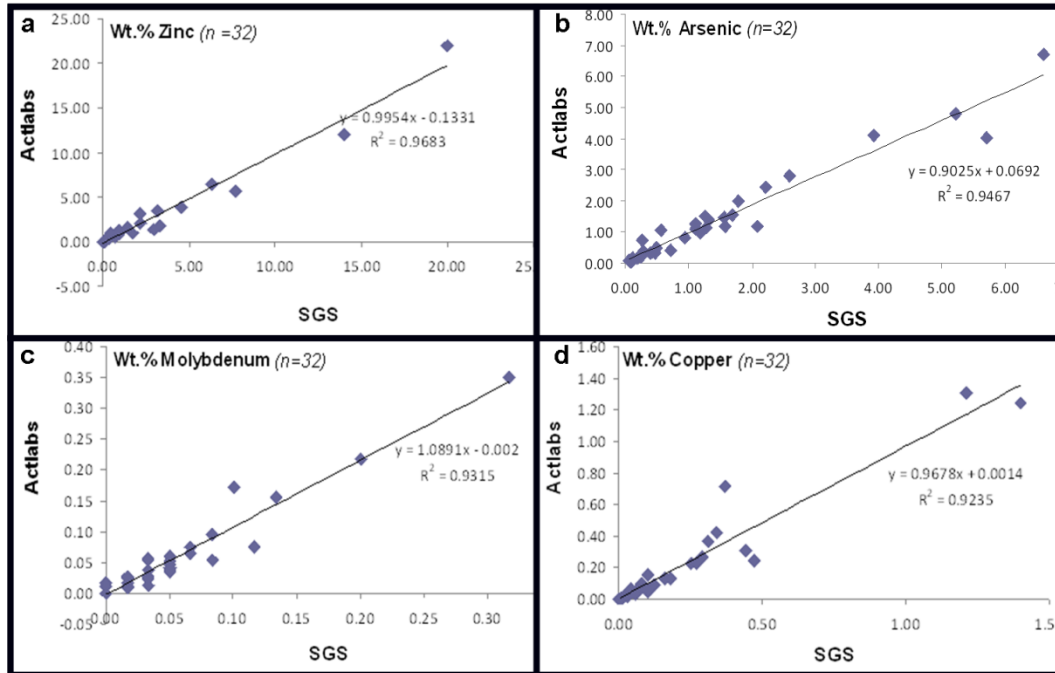


Figure 32. Scatter plots showing decreasing  $R^2$ -values for zinc, arsenic, molybdenum and copper (in weight percent) of 32 samples from the 2010 and 2011 drilling programs. Samples were sent to both Actlabs and SGS for analysis: a) Zn versus Zn; b) As versus As; c)  $MoS_2$  versus  $MoS_2$ ; d) Cu versus Cu.

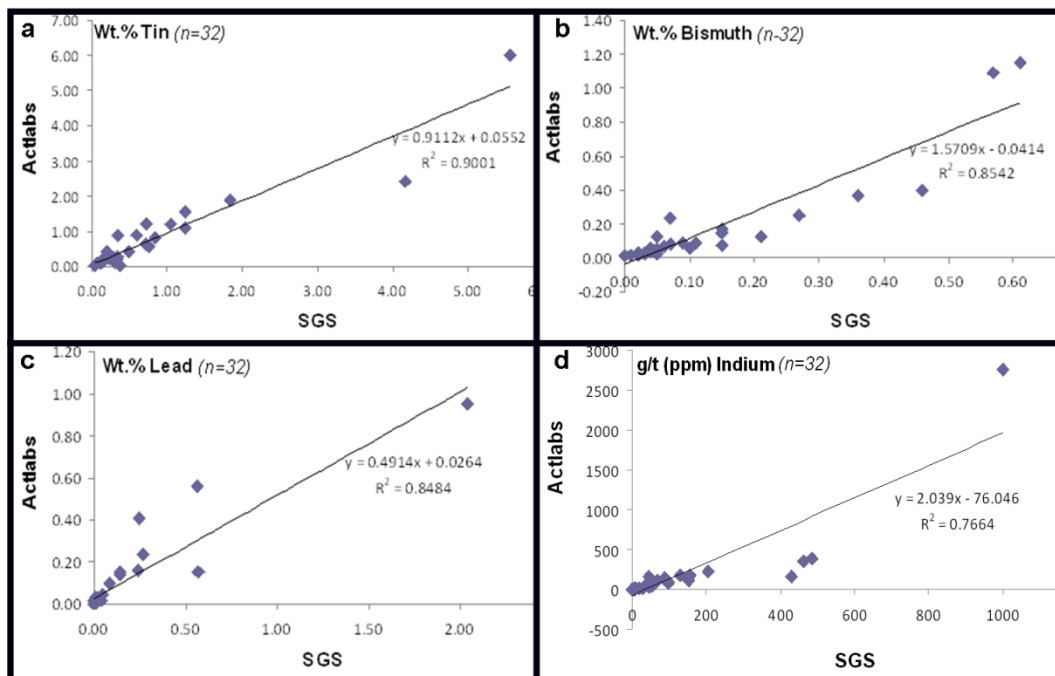


Figure 33. Scatter plots showing decreasing  $R^2$ -values for tin, bismuth, lead and indium (in weight percent except for indium) of 32 samples from the 2010 and 2011 drilling programs. Samples were sent to both Actlabs and SGS for analysis: a) Sn versus Sn; b) Bi versus Bi; c) Pb versus Pb; d) In versus In.

### **12.3 ADDITIONAL CORE SAMPLING OF 1995 HISTORICAL DRILL CORE**

ADEX conducted a review of all historical drillholes completed to date on the FTZ to identify holes containing un-split drill core that resided either in geologically favourable areas within 200 m from surface and/or core sections with visible tungsten or molybdenum, zinc or tin mineralization not previously sampled.

This review identified four 1995 Piskahegan Resources Limited drillholes, designated as PRL-94-1, PRL-95-3, PRL-95-4 and PRL-95-5, which contained mineralized core that was not previously sampled. All four holes were part of Scotia or Fire Tower East ("FTE") subzones of the FTZ. A total of 300 samples were collected as follows:

- PRL 95-1: 171710 – 171793 (84 samples);
- PRL 95-3: 171794 – 171800, 171151 – 171186 (43 samples);
- PRL 95-4: 171101 – 171150, 171651 – 171709 (109 samples); and,
- PRL 95-5: 171187 – 171200, 173251 – 173300 (64 samples).

Each sample measured ten-feet (3.1 m) in length which was consistent with Piskahegan's historical sampling procedure. ADEX entered all of the assay results into the GEMCOM database.

Two new zones of mineralization were identified in drillholes PRL95-04 and PRL95-05. Hole PRL-95-04, which originally intersected deeper zinc-copper-tin-indium mineralization at a depths of 384.1 to 396.3 m, returned a new zone of tungsten-molybdenum mineralization at a shallower vertical depth, between 279.6 to 362.8 m. This section of core returned 0.30% WO<sub>3</sub>, 0.20% MoS<sub>2</sub> and 0.06% Bi over a core length of 83.2 m. A new shallow zone, containing low grade zinc-copper-tin-indium, was identified in hole PRL95-05 from 109.8 to 131.1 m, which returned 2.63% Zn, 0.15 % Cu, 0.10% Sn and 45 ppm In over a core length of 21.3 m. None of the samples collected in this interval contained any significant values of tungsten or molybdenum. However, it should be noted that three zones containing a mixture of these metals as well as varying concentrations of zinc, copper, tin and indium were previously defined between vertical depths of 152.4 to 334.5 m. ADEX recalculated the new significant intersection grades using both the new assay data and historically reported assays (Boyd, 2008).

According to Boyd (2008), none of the sampling in holes PRL 95-01 or PRL 95-03 returned any significant assay values. Additional sampling of unsplit core at depths of less than 200 m was undertaken in holes PRL95-02 and PRL95-03 in follow-up to the results in PRL95-05.

## **12.4 COMPOSITE SAMPLES**

In addition, three composite samples were collected from a stockpile of tungsten-bearing ore that came from the Fire Tower Zone for metallurgical work. This stockpile came from the Secondary Crusher feed in the mill and dated back to the last stages of mine operation in 1985. The “mine/mill daily tonnage and grade” report for the month of May 1985 showed that 24,755 tonnes of ore were processed at an average grade of 0.34% WO<sub>3</sub>. ADEX had previously collected one composite sample from this stockpile and sent it to Actlabs for analysis.

Each composite sample, including the ADEX sample, comprised fist-sized pieces of freshly broken rock that were randomly selected from the stockpile of material. The individual pieces were washed with water and placed in a plastic bucket; each bucket weighed approximately 25 kg. The author collected one sample from the Secondary Crusher floor, and two others from the A-frame building where the bulk sample was being accumulated prior to shipping. One of the latter samples was taken from the amassed bulk sample and the other was from the northeast corner of the shed where another ore pile was located. At the time, there was a possibility that this ore pile might have to be included in the bulk sample if enough material could not be had from the Secondary Crusher feed.

Samples collected by the QP were sent to SGS for assay; each bucket was packed, sealed and personally delivered to a bonded courier for shipping. The instructions to SGS were to crush the entire sample, homogenize it and split to 250 g, after which processing was to follow the same procedures as described in Section 11. The analytical results were to be sent directly to the author.

The analytical results are shown in Table 16 along with data from the ADEX sample. The overall WO<sub>3</sub> grade from the Secondary Crusher feed, approximately 0.26% at SGS and 0.28% at Actlabs, is somewhat lower than the average mill feed (0.34%) from May 1985. However, on individual days during that month, values ranged from 0.16 – 0.57% WO<sub>3</sub>.

**TABLE 16.  
ANALYTICAL RESULTS FOR COMPOSITE SAMPLES COLLECTED BY THE AUTHOR (3) AND  
ADEX (1), WHICH WERE ANALYSED AT SGS AND ACTLABS, RESPECTIVELY**

Description	% As	% Cu	%MoS <sub>2</sub>	% Pb	% Zn	ppm In	% Bi	% Sn	%WO <sub>3</sub>
A-Frame NE corner	0.04	<0.01	0.32	<0.01	0.03	1	0.06	<0.01	0.21
A-Frame (2nd Crusher)	0.87	<0.01	0.25	0.01	0.03	1	0.05	<0.01	0.24
2nd Crusher floor	0.29	0.43	0.18	0.05	0.26	47	0.06	0.06	0.28
Stockpile (ADEX)	0.50	0.04	0.25	0.05	0.15	8	0.09	0.02	0.28

## **12.5 COMPARISON OF ASSAY CERTIFICATES AND ASSAY VALUES**

Independent verification of results from the 2010-11 core-sampling was achieved by comparing results reported by ADEX with copies of original, signed Assay Certificates (in PDF format) that were obtained directly from Actlabs and SGS. Random checks of individual samples revealed that values in ADEX's GEMCOM database were identical to those in the Assay Certificates.

In addition, historical data from C-series, DDH-series, E-series, LNZ-series, MPS-series, and U-series holes in the GEMCOM database of the North Zone were randomly checked to verify which "NS" values for Zn, WO<sub>3</sub> and MoS<sub>2</sub> should be replaced by numeric zero values. This was done by comparison of assay values in hardcopy assay sheets stored at the mine site with values in an Excel file extracted from the database. Necessary changes were made to the Excel file and then it was returned to ADEX for incorporation into the database.

## **12.6 COMPARISON OF MEASURED AND CERTIFIED VALUES OF STANDARDS**

Canadian Certified Reference Materials (standards) have been prepared by CANMET from tin-bearing and tungsten-bearing material obtained from Mount Pleasant. Standard MP-1 was a certified reference material for zinc-tin-copper-lead ore, which was first issued in 1978. It became exhausted and a new standard, named MP-1a, was prepared in 1983 to replace the original one. Standard MP-2, a certified reference material for tungsten-molybdenum ore, was prepared at the same time. Revised values for these two standards were reported in 1996. Standard MP-1a was replaced by standard MP-1b in 2008. The reference values used for MP-1a and MP-2 in Table 17 are from 1996, and those for MP-1b are from 2008.

As part of its quality control procedures, Actlabs included one or more of standards MP-1a, MP-1b and MP-2 in each batch of samples that ADEX submitted for assay during 2010 and 2011. Perusal of Table 12 reveals the following:

- The average measured values in 2010, of all elements except As, are within the certified error ranges ( $\pm$  numbers) for standard MP-1b. However, the measured ranges (High and Low values) for As, Cu, Mo, Pb and Zn have some values that are outside the certified error ranges (<Cert. Range; >Cert. Range). The median value (Median) for As is at the upper limit of the certified range;

**TABLE 17.  
CERTIFIED AND MEASURED VALUES FOR STANDARDS MP-1A, MP-1B AND MP-2  
USED BY ACTLABS DURING 2010 AND 2011**

Standard	As%	Cu%	Mo%	Pb%	Zn%	In ppm	Bi%	Sn%	W%
MP-1b (certified values):	2.30	3.07	0.0285	2.09	16.67	565 ±10	0.095	1.61	0.11
	±0.04	±0.04	±0.001	±0.03	±0.14		±002	±0.05	
Average MP-1b (2010):	2.35	3.10	0.03	2.08	16.65	574	0.09	1.60	0.11
Median:	2.34	3.08	0.03	2.08	16.70	570	0.09	1.60	0.11
High:	2.49	3.26	0.03	2.15	17.50	611	0.10	1.61	0.11
Low:	2.28	2.98	0.02	2.00	15.70	554	0.09	1.59	0.11
<Certified Range:	0	4	14	4	6	2	14	0	0
>Certified Range:	11	7	0	5	4	7	4	0	0
Number (n):	(n=23)	(n=23)	(n=23)	(n=23)	(n=23)	(n=24)	(n=23)	(n=8)	(n=8)
MP-2 (certified values):			0.28				0.245	0.043	0.65
			±0.01				±0.007	±0.002	±0.02
Average MP-2 (2010):			0.30				0.24	0.04	0.65
Median:			0.28				0.23	0.04	0.65
High:			0.53				0.25	0.04	0.65
Low:			0.27				0.23	0.04	0.65
<Certified Range:			0				7	6	0
>Certified Range:			1				0	0	0
Number (n):			(n=12)				(n=11)	(n=23)	(n=23)
MP-1a (certified values):	0.84	1.44	0.029	4.33	19.02	330 ±8	0.032	1.28	
	±0.01	±0.01	±0.001	±0.02	±0.10		±0.001	±0.02	
Average MP-1a (2011):		1.40	0.03	3.95	17.99	316		1.20	0.04
Median:		1.40	0.03	3.93	18.10	314		1.19	0.04
High:		1.55	0.03	4.32	18.80	348		1.28	0.05
Low:		1.32	0.02	3.57	16.40	290		1.11	0.04
<Certified Range:		10	12	11	12	10		16	
>Certified Range:		1	0	0	0	2		0	
Number (n):		(n=12)	(n=12)	(n=12)	(n=12)	(n=17)		(n=17)	(n=15)
MP-1b (certified values):	2.30	3.07	0.03	2.09	16.67	565	0.10	1.61	0.11
Average MP-1b (2011):	2.36	3.11	0.03	2.11	16.35	569	0.10	1.61	0.11
Median:	2.31	3.06	0.03	2.06	16.10	551	0.10	1.61	0.11
High:	3.44	3.52	0.04	3.05	17.30	588	0.10	1.77	0.12
Low:	2.14	2.88	0.02	1.03	14.80	486	0.09	1.48	0.10
<Certified Range:	5	23	33	23	58	19	6	7	0
>Certified Range:	11	20	5	4	3	6	11	4	0
Number (n):	(n=62)	(n=62)	(n=62)	(n=62)	(n=62)	(n=30)	(n=30)	(n=28)	(n=28)
MP-2 (certified values):			0.28				0.25	0.04	0.65
Average MP-2 (2011):			0.14				0.24	0.04	0.63
Median:			0.14				0.24	0.04	0.63
High:			0.15				0.25	0.05	0.67
Low:			0.14				0.23	0.04	0.59
<Certified Range:			6				3	4	11
>Certified Range:			0				0	1	2
Number (n):			(n=6)				(n=17)	(n=20)	(n=20)

- The average measured values in 2010, of all elements except Mo, are within the certified error ranges for standard MP-2. Furthermore, the measured ranges for Bi, Sn and W are either within or are very close to their certified error ranges. Only one value for Mo is higher than its certified range;
- The average measured values in 2011, of all elements except Mo are lower than the certified error ranges for standard MP-1a;
- The average measured values in 2011, of all elements except As, Cu and Zn, are within the certified error ranges for standard MP-1b. However, the measured ranges for all elements have values that are outside their certified error ranges. Notably, 58 of 62 Zn values and 33 of 62 Mo values are below their certified lower limits (<Cert. Range); and
- The average measured values in 2011, of all elements except Mo, are within the certified error ranges for standard MP-2. Furthermore, the measured ranges for Bi and Sn are either within or are very close to their certified error ranges. Notably, 11 of 20 W values and all 6 Mo values are below their certified lower limit; in fact, the median value for Mo is approximately half of its certified average value.

To sum up, the measured values of Mount Pleasant standards indicate that Actlabs' analytical data for the 2010 and 2011 drilling programs are quite good for most elements, with the following caveats. Arsenic (As) values are likely a bit too high and molybdenum (Mo) values, especially in molybdenum-rich samples, and zinc (Zn) values are probably too low. However, it is the QP's opinion that the analytical data from past and current drilling programs are adequate for the purposes of this report since tin and indium are the main metals of interest in the North Zone.

In addition, ADEX submitted blind samples of standards MP-1b and/or MP-2 into some of its batches of Actlabs' pulp samples that were sent to SGS for re-analysis in 2011. For comparison, the SGS measured values on these standards are shown in Table 18. For the three analyses of standard MP-1b, the average measured values for all elements, except zinc (Zn), are within their certified ranges. Notably, all three Zn values are less than the certified lower limit of standard MP-1b. For both analyses of standard MP-2, the measured values of all elements are within their certified ranges.



**TABLE 18.  
CERTIFIED AND MEASURED VALUES FOR STANDARDS MP-1B AND MP-2  
ANALYSED AT SGS IN 2011**

Standard	% As	% Cu	% Mo	% Pb	% Zn	ppm In	% Bi	% Sn	% W
<i>MP-1b (certified)</i>	2.30	3.069	0.0285	2.091	16.67	565	0.0954	1.61	0.110
	±0.04	±0.042	±0.001	±0.029	±0.14	±10	±0.0023	±0.045	
2011 Average:	2.31	3.03	0.030	2.09	15.40	561	0.100	1.607	0.103
Measured:	2.30	3.00	0.030	2.03	15.60	578	0.100	1.550	0.100
Measured:	2.28	3.03	0.030	2.08	15.50	565	0.100	1.660	0.100
Measured:	2.36	3.07	0.030	2.15	15.10	541	0.100	1.610	0.110
<i>MP-2 (certified)</i>			0.281				0.245	0.043	0.65
			±0.010				±0.007	±0.002	±0.02
2011 Average:	0.20	0.09	0.275	0.05	0.36	5	0.245	0.045	0.635
Measured:	0.20	0.08	0.280	0.04	0.33	4	0.250	0.040	0.640
Measured:	0.20	0.10	0.270	0.05	0.39	5	0.240	0.050	0.630

## **12.7 RE-SAMPLING OF TUNGSTEN-MOLYBDENUM ORES**

In 2006, ADEX collected five grab samples, numbered FC-1 to FC-5, from sealed barrels of crushed W-Mo mineralized ore placed in long-term storage at the mine site (see reference to barrels, Watts, Griffis and McOuat, 2006, page 62). Historical records indicate that these barrels were believed to contain material that originated from the FTZ that was mined by Billiton just before production halted in 1984 (Boyd, 2006). The same analytical procedures were used as recommended by WGM (Watts, Griffis and McOuat, 2006). Boyd (2006) concluded that the analytical results were consistent with historical WO<sub>3</sub> and MoS<sub>2</sub> grades reported from the FTZ.

## **12.8 RE-ANALYSES OF SULPHIDE CONCENTRATE POND PULPS**

During the Billiton Mount Pleasant mining operations, a flotation circuit recovered sulphides in the ore prior to further processing of the tungsten ore (Boyd, 2006). This sulphide concentrate was disposed of in a pond located behind the warehouse (Watts, Griffis and McOuat, 2006). In 1995, ADEX analyzed nineteen samples of the concentrate for mostly zinc and molybdenum to assess their economic potential.

In 2006, the preserved pulps were reanalyzed using the analytical methods recommended in the NI 43-101 report. According to Boyd (2006), the results were "largely consistent with the 1995 analytical results but consistently lower than the original estimated grade determined by Billiton during disposal by Billiton".

## **12.9                    DUPLICATE ANALYSES OF 2006 PULP SAMPLES**

As part of ADEX's due diligence program, 46 pulp samples previously analyzed by ADEX in 2006 by SGS were dispatched to SGS and Activation Laboratories for re-analyses using assay methods for comparison against original geochemical methods. Fourteen samples originated from drillhole PRL 95-02, drilled by Piskehegan Resources in 1995. The remaining samples were from the 1981 to 1985 Mount Pleasant Tungsten Mine drill program, holes B104 (9 samples), B114 (21 samples) and B169 (2 samples).

The initial split core samples were analyzed for In, As, Bi, Cu, Mo, Cu, Pb, Sn, and W using method IC90M and ICM90A for Zn only (see Section 13.0, Sample Preparation, Analyses and Security). In 2008, the pulp samples were re-submitted to SGS for the same elements by methods ICP90Q and ICM90A (In only). The pulps were then dispatched to Actlabs for check assaying using analytical method Code 8 (XRF, ICP and ICP/MS finish).

ADEX's comparative examination of the different analytical methods between the two laboratories resulted in the following conclusions (Boyd, 2008):

1. Concentrations of indium, copper, lead and arsenic compared well between the two laboratories and differing analytical methods.
2. Molybdenum, tungsten and bismuth, on average, differed by less than 5% between the two laboratories with SGS usually reporting the higher grades.
3. Activation results were lower in zinc in comparison to SGS by nearly 10%.
4. No trends were evident for tin.
5. The MP2 standard reference material returned values similar to accepted values at SGS, but measured values at Actlabs were generally lower than accepted values.

In 2008, ADEX collected 20 additional pulp duplicate samples from the Piskehegan drill core. Samples were taken from the following holes:

- PRL-95-1, 9 samples;
- PRL-95-3, 1 sample; and,
- PRL-95-4, 10 samples.

ADEX dispatched 32 pulps and 16 rejects, originally assayed by SGS, to Actlabs for recheck analyses (approximately 8.0% of the original 619 split core samples taken). Overall, the SGS results compared well with those obtained by Actlabs (Table 19). There was some variability with the rejects which is to be expected due to sample heterogeneity.

**TABLE 19.**  
**COMPARATIVE ANALYSES OF 1995 PISKEHEGAN PULP SAMPLES**

Hole No.	Sample No.	From (m)	To (m)	Interval (feet)	SGS Mineral Services				Activation Laboratories			
					As %	Bi %	MoS <sub>2</sub> %	WO <sub>3</sub> %	As %	Bi ppm	MoS <sub>2</sub> %	WO <sub>3</sub> %
<b>PRL-95-4</b>	171110	300	310	10	0.37	0.02	0.05	0.05	0.37	210	0.042	0.048
	171120	400	410	10	0.39	0.04	0.10	0.15	0.40	456	0.106	0.160
	171130	500	510	10	0.03	<0.01	BTL	BTL	0.03	33	< 0.008	0.004
	171140	600	610	10	1.48	0.05	BTL	BTL	1.54	527	< 0.008	0.004
	171150	700	710	10	1.22	0.07	0.05	0.10	1.25	686	0.058	0.098
	171660	810	820	10	0.06	0.02	0.12	0.06	0.06	166	0.107	0.067
	171670	910	917	7	0.08	0.02	0.08	0.09	0.08	231	0.083	0.086
	171680	1,220	1,230	10	0.02	0.02	0.13	0.14	0.02	233	0.146	0.141
	171690	1,370	1,380	10	0.02	0.05	BTL	0.01	0.02	496	0.013	0.013
	171700	1,480	1,490	10	0.22	<0.01	BTL	BTL	0.23	97	< 0.008	< 0.003
<b>PRL-95-1</b>	171710	630	640	10	0.02	0.01	0.03	BTL	0.01	153	0.033	0.014
	171720	730	740	10	0.02	0.01	0.05	BTL	0.03	168	0.047	0.006
	171730	830	840	10	0.23	0.02	0.15	0.04	0.23	231	0.147	0.045
	171740	927	936	9	0.09	0.02	0.13	0.03	0.08	202	0.131	0.024
	171750	1,030	1,040	10	0.03	<0.01	BTL	0.03	0.03	24	0.012	0.028
	171760	1,130	1,140	10	0.31	0.04	0.12	0.01	0.32	382	0.106	0.008
	171770	1,230	1,240	10	0.02	0.08	0.07	0.08	0.02	667	0.07	0.069
	171780	1,370	1,380	10	0.09	0.03	0.03	0.11	0.09	233	0.032	0.116
	171790	1,590	1,600	10	0.03	<0.01	0.02	0.01	0.03	73	0.02	0.018
<b>PRL-95-3</b>	171800	900	910	10	0.10	0.08	0.05	BTL	0.11	829	0.041	< 0.003

In 2008, WGM collected a total of 13 samples of drill core during the site visits to determine their precious and base metal concentrations and confirm the presence of mineralization. Each WGM sample was a ¼ split of an original sample interval collected by ADEX. Overall, the assay results compare reasonably well with the original assays obtained over the same intervals by ADEX (Table 20), with the following exceptions for WGM samples:

- sample MP14 was 35% lower in MoS<sub>2</sub>;
- sample MP15 had over three times as much WO<sub>3</sub>;
- sample 2286 had less than half as much Sn;
- sample 2282 returned lower concentrations of MoS<sub>2</sub> and
- sample 2289 returned significantly higher values of Sn, WO<sub>3</sub>, Zn, In, As and Bi.

No significant gold assays were obtained from any of the samples.

**TABLE 20.**  
**WGM ANALYTICAL RESULTS (MOUNT PLEASANT, 2008)**

Hole No.	Interval (m)	Zone	Sampler	Sample Number	As %	Bi %	Cu %	MoS <sub>2</sub> %	Pb %	Sn %	WO <sub>3</sub> %	Zn %	In ppm
AM-08-08	113-116	FTE	<b>WGM</b>	<b>MP014</b>	<b>2.152</b>	<b>0.134</b>	<b>0.018</b>	<b>0.129</b>	<b>0.015</b>	<b>0.023</b>	<b>0.211</b>	<b>0.172</b>	<b>&lt;40</b>
			ADEX	12926	2.200	0.130	0.020	0.200	0.020	0.020	0.189	0.150	3.10
	305-308	FTE	<b>WGM</b>	<b>MP015</b>	<b>0.254</b>	<b>0.052</b>	<b>0.015</b>	<b>0.268</b>	<b>0.010</b>	<b>0.009</b>	<b>0.483</b>	<b>0.033</b>	<b>&lt;70</b>
			ADEX	12990	0.220	0.040	0.001	0.284	0.010	0.001	0.151	0.040	0.50
AM-08-09	239-242	FTN	<b>WGM</b>	<b>2286</b>	<b>6.810</b>	<b>0.200</b>	<b>0.180</b>	<b>0.301</b>	<b>&lt;0.01</b>	<b>0.170</b>	<b>0.580</b>	<b>0.490</b>	<b>109.00</b>
			ADEX	16397	7.230	0.280	0.280	0.334	0.001	0.310	0.656	0.310	115.00
AM-08-11	267-270	FTN	<b>WGM</b>	<b>2283</b>	<b>2.150</b>	<b>0.110</b>	<b>&lt;0.01</b>	<b>0.050</b>	<b>&lt;0.01</b>	<b>0.010</b>	<b>0.240</b>	<b>0.190</b>	<b>8.90</b>
			ADEX	16551	3.350	0.150	0.001	0.050	0.001	0.020	0.265	0.230	12.30
	285-288	FTN	<b>WGM</b>	<b>2284</b>	<b>0.990</b>	<b>0.130</b>	<b>&lt;0.01</b>	<b>0.267</b>	<b>&lt;0.01</b>	<b>0.020</b>	<b>0.353</b>	<b>0.020</b>	<b>1.50</b>
			ADEX	16557	0.970	0.200	0.001	0.301	0.001	0.020	0.353	0.010	0.90
AM-08-12	316-319	FTW	<b>WGM</b>	<b>2281</b>	<b>0.240</b>	<b>0.050</b>	<b>&lt;0.01</b>	<b>0.033</b>	<b>0.050</b>	<b>0.010</b>	<b>0.177</b>	<b>0.410</b>	<b>0.40</b>
			ADEX	18233	0.360	0.070	0.001	0.050	0.060	0.010	0.202	0.390	0.50
	331-334	FTW	<b>WGM</b>	<b>2282</b>	<b>0.530</b>	<b>0.060</b>	<b>&lt;0.01</b>	<b>0.184</b>	<b>&lt;0.01</b>	<b>&lt;0.01</b>	<b>0.555</b>	<b>&lt;0.01</b>	<b>&lt;0.2</b>
			ADEX	18238	0.810	0.080	0.001	0.334	0.001	0.001	1.059	0.001	0.01
AM-08-13A	204-207	FTN	<b>WGM</b>	<b>2285</b>	<b>0.660</b>	<b>0.050</b>	<b>&lt;0.01</b>	<b>0.184</b>	<b>&lt;0.01</b>	<b>&lt;0.01</b>	<b>0.416</b>	<b>0.150</b>	<b>5.40</b>
			ADEX	16614	0.600	0.040	0.001	0.167	0.001	0.010	0.567	0.170	6.20
AM-08-14	323-326	FTS	<b>WGM</b>	<b>2289B</b>	<b>0.980</b>	<b>0.040</b>	<b>&lt;0.01</b>	<b>0.084</b>	<b>&lt;0.01</b>	<b>&lt;0.01</b>	<b>0.429</b>	<b>0.030</b>	<b>0.80</b>
			ADEX	18269	0.940	0.040	0.001	0.084	0.001	0.010	0.340	0.020	0.50
	353-356	FTS	<b>WGM</b>	<b>2290</b>	<b>0.070</b>	<b>0.100</b>	<b>&lt;0.01</b>	<b>0.267</b>	<b>&lt;0.01</b>	<b>&lt;0.01</b>	<b>0.517</b>	<b>0.020</b>	<b>1.10</b>
			ADEX	18279	0.110	0.120	0.001	0.267	0.001	0.010	0.479	0.030	0.90
AM-08-15	299-302	FTE	<b>WGM</b>	<b>2288</b>	<b>0.290</b>	<b>&lt;0.01</b>	<b>&lt;0.01</b>	<b>0.117</b>	<b>&lt;0.01</b>	<b>&lt;0.01</b>	<b>0.227</b>	<b>0.020</b>	<b>0.60</b>
			ADEX	186401	0.290	0.020	0.001	0.117	0.001	0.001	0.214	0.020	0.40
	332-335	FTE	<b>WGM</b>	<b>2289</b>	<b>0.020</b>	<b>0.020</b>	<b>&lt;0.01</b>	<b>0.200</b>	<b>&lt;0.01</b>	<b>&lt;0.01</b>	<b>0.038</b>	<b>0.020</b>	<b>0.20</b>
			ADEX	186411	0.020	0.010	0.001	0.217	0.001	0.001	0.076	0.010	0.01
AM-08-16	171-174	FTE	<b>WGM</b>	<b>2293</b>	<b>3.150</b>	<b>0.240</b>	<b>0.210</b>	<b>0.017</b>	<b>0.050</b>	<b>5.610</b>	<b>0.618</b>	<b>0.030</b>	<b>10.90</b>
			ADEX	186436	1.530	0.090	0.030	0.084	0.001	0.020	0.290	0.370	3.00

## 13. MINERAL PROCESSING AND METALLURGICAL TESTING

### **13.1 METALLURGICAL TESTING COMPLETED PRIOR TO 2010**

The reader is referred to the Watts, Griffis and McOuat technical reports entitled, "*A Technical Review of the Mount Pleasant Property, Including a Mineral Resource Estimate of the North Zone, Southwestern New Brunswick for Adex Mining Inc.*" (Dunbar and de L'Etoile, 2009) for a description of the 2006 to 2009 test work that has been completed on the Property. The reader is further referred to the Watts, Griffis and McOuat technical report entitled "*A Technical Review of the Mount Pleasant Property, Including a Mineral Resource Estimate for the Fire Tower Zone, Southwestern New Brunswick for Adex Mining Inc.*" (Dunbar et al. 2006) for a description of historical mineral processing and metallurgical testing completed on the Property prior to 2006.

The test work completed prior to 2010 most relevant to the Fire Tower and North Zones involves mineralogical characterization and bench scale testing to develop a gravity-based flowsheet for recovery of tin concentrate.

ADEX awarded a contract to SGS Lakefield in May, 2008 to characterize the elemental and mineralogical make-up of seven 10 – 30 kg samples, two from the Fire Tower Zone and five from the North Zone. The contract included the following parameters:

- The quantification of mineral types;
- Liberation characteristics of minerals (metals) of value;
- Association of minerals (metals) of value with gangue materials and impurities;
- Mineralogical-limiting grade-recovery relation of minerals (metals) of value; and
- Mineral release of metals of value (liberation as a function of grain size).

This work was conducted under the direction of Thibault & Associates Inc.; the results of this work were provided to ADEX (SGS 2008) and they are summarized in the previous Technical Report on the North Zone (Dunbar and de L'Etoile, 2009). Information from this work, such as detailed grain size and liberation analysis of recoverable minerals, was provided to SGS Mineral Services UK Ltd. for further development of grinding, gravity separation and flotation test programs.

SGS Mineral Services UK Ltd. was contracted by ADEX in 2008 to develop a gravity-based separation method for processing tungsten-molybdenum and tin-indium mineralization from the Fire Tower and North Zones, respectively. This work was conducted under the supervision of Thibault & Associates Inc. ADEX sent separate 250 kg samples of fine

crushed ore (tungsten-molybdenum) and bulk sample material (tin-indium), which had been stored under cover on the mine site, to the SGS laboratory in England in March of 2008, to get gravity test work done. The results from the North Zone sample were provided in three reports (MacDonald and Hallewell, 2008c, 2008d, 2008e).

The mineralogy and gravity test programs in 2008 showed that the North Zone tin mineralization was very fine and not readily amenable to a gravity-based recovery process. Subsequent testing focussed on a flotation-based tin recovery process.

### **13.2 INDIUM-ZINC HYDROMET BENCH SCALE TEST PROGRAM** **(THIBAUT & ASSOCIATES INC)**

*Reference:* Thibault & Associates Inc., Indium-Zinc Hydromet Flowsheet Development Bench Scale Unit Operations Characterization, Project 6526-04, March 24, 2010 Rev. 01, Final Report for Adex Mining Inc.

Thibault & Associates Inc. identified a conceptual process to produce zinc metal and indium sponge from North Zone zinc concentrate. A bench scale test program was then initiated to confirm the technical viability of the flowsheet and to define operating conditions for each unit operation. The feed material was a sample of bulk sulphide concentrate generated in 1995 from the North Zone (600 Adit) with head grades as shown in Table 21.

**TABLE 21.**  
**BULK SULPHIDE CONCENTRATE HEAD GRADES FROM North Zone**  
**2011 HYDROMET PILOT TEST PROGRAM**

Element	Zinc (wt%)	Tin (wt%)	Arsenic (wt%)	Iron (wt%)	Lead (wt%)	Copper (wt%)	Indium (g/tonne)
Assay Value	24.8	0.34	5.3	12.7	0.98	3.2	1995

The preliminary bench scale test program i) demonstrated the technical viability of the ferric chloride leach process for extraction of indium and zinc from a bulk sulfide concentrate, ii) defined effective methods for removal of impurities from the circuit, and iii) defined a conceptual solvent extraction flowsheet capable of producing separate indium chloride, zinc chloride and ferrous chloride streams as required for production of indium sponge, zinc metal and for regeneration of the ferric chloride leach solution. The preliminary bench scale test program culminated in production of a small amount of indium sponge product assaying 87.5% indium, 11.6% zinc and containing only trace amounts of impurity metals.

### **13.3 FLOTATION TEST PROGRAM (SGS CANADA INC., 2010)**

*Reference:* SGS Canada Inc., An Investigation into a Metallurgical Testwork Program on Ore Samples from the North Zone of the Mount Pleasant Deposit, Project 12347-001, December, 2010 Final Report for Adex Mining Inc.

The purpose of this test program was to develop a process flowsheet to recover tin concentrate, zinc/indium concentrate and bulk sulphide concentrate from the North Zone at Mount Pleasant. Two metallurgical samples were provided for testing. Sample A was fresh drill core from the 2008 North Zone drill program while Sample B was collected from surface stockpiles of material mined from the North Zone 600 Adit in the 1960s. Head grades for the two samples are shown in Table 22.

**TABLE 22.  
HEAD GRADES FROM SGS 2010 North Zone FLOTATION TEST PROGRAM**

Element	Zinc (wt%)	Tin (wt%)	Arsenic (wt%)	Iron (wt%)	Sulphur (wt%)	Copper (wt%)	Indium (g/tonne)
Sample A (Drill Core)	2.03	0.86	2.1	4.83	1.88	0.19	280
Sample B (Surface Stockpile)	1.46	0.65	1.2	5.04	1.82	0.55	260

Testing occurred from January to May 2010. Table 23 summarizes the ore grindability test results. Batch open-circuit flotation tests were undertaken to evaluate alternative flotation collectors, test conditions and flowsheet configurations. After the initial screening tests, a sequential flowsheet consisting of grinding, zinc flotation, bulk sulphide flotation, desliming, and tin flotation was tested in open circuit for both samples and in locked cycle configuration for Sample B. The metallurgical balance results for open circuit and locked cycle testing are shown in Table 24.

**TABLE 23.  
BOND ROD AND BALL MILL GRINDABILITY WORK INDEX RESULTS  
FROM THE 2010 North Zone FLOTATION TEST PROGRAM**

Element	Bond Rod Mill Work Index – RWI (kWh/tonne)	Bond Ball Mill Work Index – BWI (kWh/tonne)
Sample A (Drill Core)	15.6	13.5
Sample B (Surface Stockpile)	16.2	14.4

The metallurgical response of Sample B was not as good as Sample A and it was suspected this could be due to weathering/oxidation in the surface stockpile. Tin grades achieved using Samples A and B were low, and zinc grades were limited by the significant amount of copper reporting to the zinc concentrate. Further testing was recommended to improve the flowsheet performance.

**TABLE 24.**  
**OVERALL METALLURGICAL BALANCE RESULTS FOR SGS 2010 North Zone**  
**FLOTATION TEST PROGRAM**

Product	Assay		Distribution	
	Tin (wt%)	Zinc (wt%)	Tin (wt%)	Zinc (wt%)
<b>Sample A Open Circuit Flotation Test</b>				
Zinc/Copper Concentrate	0.93	46.7	4.3	90.1
Bulk Sulphide Concentrate	0.88	0.41	0.5	0.1
Slimes to Tailings	0.44	0.08	1.0	0.1
Tin Concentrate	7.80	0.08	63.5	0.3
Tin Tailings	0.05	0.03	3.8	0.8
<b>Sample B Open Circuit Flotation Test</b>				
Zinc/Copper Concentrate	1.19	27.5	6.6	71.0
Bulk Sulphide Concentrate	2.28	3.51	2.6	1.8
Slimes to Tailings	0.24	0.13	0.8	0.2
Tin Concentrate	13.2	0.18	67.8	0.4
Tin Tailings	0.02	0.03	1.9	1.4
<b>Sample B Locked Cycle Flotation Test</b>				
Zinc/Copper Concentrate	1.14	27.3	7.1	75.3
Bulk Sulphide Concentrate	1.17	8.39	5.4	17.2
Slimes to Tailings	0.35	0.25	10.2	3.2
Tin Concentrate	19.2	0.50	62.8	0.7
Tin Tailings	0.05	0.03	5.1	1.6

#### **13.4 LOCKED CYCLE FLOTATION TEST PROGRAM** **(HUNAN NONFERROUS METALS RESEARCH INSTITUTE, 2010)**

*Reference:* Hunan Nonferrous Metals Research Institute, Study on the Beneficiation Technology Development of Indium-Tin Polymetallic ore in Canada, December 30, 2010 Final Report for Rongfeng Canada Investment Co. Ltd.

The intent of this program was to define a process flowsheet for zinc, indium and tin recovery as concentrates from the North Zone. The test program included the following:

- Investigation of North Zone mineralogy;
- Preliminary batch flotation, centrifugal separation and conventional gravity separation to assess flowsheet alternatives;
- Definition of optimum flotation conditions based on open circuit batch flotation tests;
- Propose a process flowsheet based on batch tests;
- Conduct locked cycle test for the recommended flowsheet and operating conditions; and
- Product settling tests.



The test work was conducted between April and December, 2010 on a North Zone metallurgical sample with head grades is shown in Table 25.

**TABLE 25.**  
**HEAD GRADES FROM HUNAN 2010 North Zone FLOTATION TEST PROGRAM**

Element	Zinc (wt%)	Tin (wt%)	Arsenic (wt%)	Iron (wt%)	Sulphur (wt%)	Copper (wt%)	Indium (g/tonne)
Assay Value	1.55	0.86	1.08	4.99	2.44	0.56	270

The mineralogical investigation found that tin deported as follows:

- 73% as cassiterite;
- 14% as hydrocassiterite; and
- 14% as stannite.

It was noted that tin as stannite would normally report to a sulphide concentrate rather than the tin concentrate. Hydrocassiterite was observed to be very fine.

Indium deportment was reported as follows:

- 40% in stannite;
- 25% in sphalerite;
- 20% in mixed copper-indium-sulphide minerals; and
- 15% as indium hydroxide.

Zinc mineralogy in the sample was found to be:

- 86.8% as sphalerite and other sulphides;
- 9.4% as calamine and other oxides; and
- 3.8% as franklinite.

Flotation test work initially considered a sequential flotation for recovery of copper concentrate, zinc concentrate and bulk sulphide concentrate, but it was found that selectivity for copper, zinc, and indium to the appropriate products was difficult to achieve. Based on open circuit flotation tests and gravity separation tests, a process flowsheet was defined as follows: Grinding, bulk sulphide flotation, zinc/copper/indium flotation from bulk sulphide, centrifugal pre-concentration and desliming of bulk sulphide flotation tailings, and finally tin flotation from the centrifugal concentrate. As an option to the final tin flotation step, the test program also considered a combination of gravity separation and flotation to recover the final tin concentrate.

The process flowsheet for tin recovery, which relied solely on flotation, was tested in locked cycle resulting in the following overall metallurgical balance (Tables 26 and 27).

**TABLE 26.**  
**GRADES OF FINAL PRODUCT STREAMS FROM HUNAN 2010 North Zone LOCKED CYCLE TEST (TIN RECOVERY BY FLOTATION)**

Product	Zinc (wt%)	Tin (wt%)	Arsenic (wt%)	Copper (wt%)	Indium (g/tonne)
Zinc/Copper Concentrate	33.09	2.19	1.35	12.41	4112
Arsenic Concentrate	1.18	1.17	25.91	0.51	281
Centrifugal Separation Tailings	0.12	0.12	0.23	0.04	77
Tin Flotation Concentrate	0.66	33.12	0.79	0.14	701
Tin Flotation Tailings	0.10	0.07	0.16	0.03	26
Calculated Head Grade	1.56	0.84	1.13	0.58	249

**TABLE 27.**  
**RECOVERIES (DISTRIBUTIONS) TO FINAL PRODUCT STREAMS FROM HUNAN 2010 North Zone LOCKED CYCLE TEST (TIN RECOVERY BY FLOTATION)**

Product	Zinc (wt%)	Tin (wt%)	Arsenic (wt%)	Copper (wt%)	Indium (g/tonne)
Zinc/Copper Concentrate	90.16	11.10	5.09	90.95	70.09
Arsenic Concentrate	2.54	4.69	77.30	2.96	3.79
Centrifugal Separation Tailings	4.32	8.04	11.46	3.87	17.35
Tin Flotation Concentrate	0.79	73.31	1.30	0.45	5.22
Tin Flotation Tailings	<u>2.19</u>	<u>2.86</u>	<u>4.85</u>	<u>1.77</u>	<u>3.55</u>
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

The process flowsheet for tin recovery by a combination of flotation and conventional gravity separation was also tested in locked cycle resulting in the following overall metallurgical balance (Tables 28 and 29).

**TABLE 28.**  
**GRADES OF FINAL PRODUCT STREAMS FROM HUNAN 2010 North Zone LOCKED CYCLE TEST (TIN RECOVERY BY FLOTATION AND GRAVITY SEPARATION)**

Product	Zinc (wt%)	Tin (wt%)	Arsenic (wt%)	Copper (wt%)	Indium (g/tonne)
Zinc/Copper Concentrate	33.09	2.19	1.35	12.41	4112
Arsenic Concentrate	1.18	1.17	25.91	0.51	281
Centrifugal Separation Tailings	0.12	0.12	0.23	0.04	77
Tin Gravity Concentrate	0.63	55.63	0.88	0.18	717
Tin Flotation Concentrate	0.26	11.31	0.61	0.11	235
Combined Tin Concentrate	0.43	32.22	0.74	0.14	462
Tin Flotation/Gravity Tailings	0.10	0.05	0.16	0.03	26
Calculated Head Grade	1.56	0.85	1.13	0.58	246

**TABLE 29.**  
**RECOVERIES (DISTRIBUTIONS) TO FINAL PRODUCT STREAMS FROM HUNAN 2010**  
**North Zone LOCKED CYCLE TEST**  
**(TIN RECOVERY BY FLOTATION AND GRAVITY SEPARATION)**

Product	Zinc (wt%)	Tin (wt%)	Arsenic (wt%)	Copper (wt%)	Indium (wt%)
Zinc/Copper Concentrate	90.39	11.03	5.09	90.93	71.23
Arsenic Concentrate	2.55	4.66	77.33	2.96	3.85
Centrifugal Separation Tailings	4.34	8.00	11.49	3.88	17.66
Tin Gravity Concentrate	0.37	60.49	0.72	0.28	2.68
Tin Flotation Concentrate	0.17	13.77	0.56	0.19	0.98
Combined Tin Concentrate	0.54	74.26	1.28	0.47	3.66
Tin Flotation/Gravity Tailings	<u>2.18</u>	<u>2.05</u>	<u>4.81</u>	<u>1.76</u>	<u>3.60</u>
<b>Total</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>

Both flowsheet options produced similar results. The zinc and tin concentrate grades were relatively low, and similar to that achieved in the 2010 pilot test program at SGS Canada Inc., but recoveries were higher compared to the 2010 SGS Canada Inc. pilot test program. Reportedly, the zinc concentrate grade was limited by the amount of stannite (containing copper and tin) in the sample which reports to the zinc concentrate. The major limitation to tin recovery was reported to be a consequence of the stannite content in the sample. The tin as stannite reports to the sulphide concentrates and cannot be recovered into the tin concentrate. Indium losses were observed to be associated with the indium hydroxide content which is not recovered in the sulphide flotation process.

### **13.5 PILOT PLANT FLOTATION TEST PROGRAM (SGS CANADA INC., 2010)**

*Reference:* SGS Canada Inc., A Pilot Plant Investigation into the Recovery of Zinc and Tin from the North Zone of the Mount Pleasant Deposit, Project 12347-002, January 31, 2011 Final Report for Adex Mining Inc.

The flowsheet for this test program was based on the 2010 bench scale test program by SGS Canada Inc., consisting of grinding, desliming, zinc flotation, bulk sulphide flotation, desliming, and finally tin flotation. The purpose of the test program was to assess the performance of the flowsheet at a pilot plant scale and optimize the metallurgical response. The 100 tonne sample delivered to SGS Canada Inc. for the test program was taken from material originally extracted from underground development in the North Zone 600 adit in the 1960s that was stockpiled outside on the surface since that time. The sample can be expected to be more weathered/oxidized than freshly mined material.

In the pilot test, a total of 60 tonnes was processed at a feed rate of about 500 kg/hr. Head grades for the test program were similar to the sample used in the 2010 Hunan test program with assays as shown in Table 30.

**TABLE 30.  
HEAD GRADES FROM SGS 2010 North Zone PILOT TEST PROGRAM**

Element	Zinc (wt%)	Tin (wt%)	Arsenic (wt%)	Iron (wt%)	Sulphur (wt%)	Copper (wt%)	Indium (g/tonne)
Assay Value	1.51	0.66	0.98	5.07	2.14	0.50	220

The pilot test included several different runs with varying operating conditions and configurations. The average metallurgical balance results of the best conditions are shown in Tables 31 and 32.

**TABLE 31.  
AVERAGE GRADES OF FINAL PRODUCT STREAMS FROM SGS 2010 North Zone PILOT TEST PROGRAM**

Product	Zinc (wt%)	Tin (wt%)	Copper (wt%)	Indium (g/tonne)
Zinc/Copper Concentrate	28.0	-	9.4	3233
Tin Concentrate	-	31.4	-	-

**TABLE 32.  
AVERAGE RECOVERIES (DISTRIBUTIONS) TO FINAL PRODUCT STREAMS FROM  
SGS 2010 North Zone PILOT TEST PROGRAM**

Product	Zinc (wt%)	Tin (wt%)	Copper (wt%)
Zinc/Copper Concentrate	75.0	-	68.4
Tin Concentrate	-	44.1	-

The tin losses under this test program were considered excessive with an average of 20.3% lost in desliming, 11.9% lost in the zinc and bulk sulphide flotation circuits, and 23.5% lost in the tin flotation circuit, resulting in only 44.1% tin recovery to final concentrate. Zinc recoveries were also low and further testing was recommended to improve the zinc and tin recoveries and grades.

### **13.6 INDIDIUM-ZINC HYDROMET PILOT TEST PROGRAM (THIBAUT & ASSOCIATES INC., 2011)**

*Reference:* Thibault & Associates Inc., Mount Pleasant – North Zone Development, Indium-Zinc Hydromet Mini-pilot Test Program, Project 6528-01, June 24, 2011 Rev. 01, Final Report for Adex Mining Inc.

A test program was undertaken between May 2010 and June 2011 to develop a process to produce added value zinc metal and indium sponge from Mount Pleasant North Zone zinc/indium flotation concentrate. Since Mount Pleasant would be a low tonnage operation (relative to large zinc smelters), the process was based on chloride hydrometallurgy as an alternative to the conventional large scale smelter plant with roasting and sulphuric acid co-production for electrolytic zinc production.

The hydrometallurgical process included the following unit operations:

- Ferric Chloride Leach: leaching of metal sulphides to produce metal chlorides in solution;
- Copper and Arsenic Cementation: removal of copper and arsenic from solution;
- Primary Solvent Extraction: separation of iron (for recycle) from indium and zinc;
- Chlorination: conversion of recycled iron(II) to iron(III) for leaching;
- Sulphide Precipitation: precipitation of tin and other trace impurity metals as sulphides;
- Secondary Solvent Extraction: separation of indium and zinc;
- Tertiary Solvent Extraction: purification / concentration of indium and recycle of acid;
- Indium Cementation: production of indium sponge; and
- Zinc Electrowinning: production of zinc metal and recovery of chlorine for recycle.

The test program consisted of initial bench scale testing to refine pilot plant operating parameters followed by semi-continuous operation of the pilot plant. The concentrate feed for the test program was a bulk sulphide concentrate produced in 1995 at the Technical University of Nova Scotia by ADEX and Research and Productivity Council personnel using a feed sample from the North Zone 600 adit surface stockpile. As a bulk sulphide concentrate, it was lower grade with higher impurity content than the more selective zinc concentrates produced in the 2010-2011 test programs by SGS Canada Inc. Therefore, the concentrate feed represents a worst-case scenario with head grades as shown in Table 33.

**TABLE 33.  
BULK SULPHIDE CONCENTRATE HEAD GRADES FROM North Zone 2011 HYDROMET  
PILOT TEST PROGRAM**

Element	Zinc (wt%)	Tin (wt%)	Arsenic (wt%)	Iron (wt%)	Lead (wt%)	Copper (wt%)	Indium (g/tonne)
Assay Value	23.9	0.36	4.5	12.7	1.51	3.2	1926

The pilot test program produced indium sponge with grades from 90.2% to 96.9% In, and zinc metal grading 99.8% to 99.9% Zn was produced. A metallurgical balance simulation was used to assess the overall mass balance and recoveries from the pilot plant test program. The overall recoveries were calculated to be 87.2% (79.4% to 95.0%) for indium and 89.1% (81.8% to 96.4%) for zinc.

**13.7 LOCKED CYCLE FLOTATION TEST PROGRAM**  
**(SGS CANADA INC., 2011)**

*Reference:* SGS Canada Inc., An Investigation into Optimisation and Locked Cycle Testing on Samples from the Mount Pleasant – North Zone Deposit, Project 12347-003, October 20, 2011 Final Report for Adex Mining Inc.

This test program was a follow-up from the 2010 North Zone flotation test program at SGS Canada Inc. in order to further optimize the flowsheet, reagent dosages, and recoveries. The process flowsheet tested was based on grinding, flotation to recover zinc and copper sulphides, bulk sulphide flotation, conventional desliming with cyclones, and finally tin flotation to recover a tin concentrate. The process did not involve any gravity separation. The testing used a single sample weighing 215 kg consisting of core samples of a number of different North Zone drillholes from the 2008 drill program with the following head grades (Table 34).

**TABLE 34.**  
**HEAD GRADES FROM SGS 2011 North Zone FLOTATION TEST PROGRAM**

Element	Zinc (wt%)	Tin (wt%)	Arsenic (wt%)	Iron (wt%)	Sulphur (wt%)	Copper (wt%)	Indium (g/tonne)
Assay Value	3.30	1.14	2.37	5.24	3.27	0.21	410

Testing occurred from January to May 2011. Initial testing was based on batch flotation tests to define operating conditions for the locked cycle test. The initial testing was not able to produce acceptable copper and zinc concentrates by sequential flotation and therefore a combined copper/zinc concentrate was produced. High intensity conditioning prior to tin flotation at longer residence times improved tin rougher flotation selectivity. A synthetic depressant was defined to help reject arsenic in the tin flotation circuit. Locked cycle testing of the flowsheet resulted in the following overall metallurgical balance (Tables 35 and 36).

**TABLE 35.**  
**GRADES OF FINAL PRODUCT STREAMS FROM SGS 2011 North Zone LOCKED CYCLE TEST**

Product	Zinc (wt%)	Tin (wt%)	Arsenic (wt%)	Iron (wt%)	Sulphur (wt%)	Copper (wt%)	Indium (g/tonne)
Zinc/Copper Concentrate	48.2	0.82	1.33	10.1	32.0	3.37	5310
Bulk Sulphide Concentrate	0.81	1.20	7.03	15.5	5.21	0.23	116
Zinc Cleaner Scav. Tailings	0.95	1.16	22.5	20.3	11.1	0.19	161
Slimes to Tailings	0.31	0.41	0.71	7.67	-	-	-
Tin Concentrate	0.12	40.6	1.13	5.69	-	-	-
Tin Tailings	0.034	0.30	0.39	3.03	-	-	-
Calculated Head Grade	3.34	1.18	2.40	5.48	3.17	0.26	384

**TABLE 36.**  
**RECOVERIES (DISTRIBUTIONS) TO FINAL PRODUCT STREAMS FROM SGS 2011**  
**North Zone LOCKED CYCLE TEST**

Product	Zinc (wt%)	Tin (wt%)	Arsenic (wt%)	Iron (wt%)	Sulphur (wt%)	Copper (wt%)	Indium (wt%)
Zinc/Copper Concentrate	95.6	4.6	3.7	12.2	67.0	87.6	91.7
Bulk Sulphide Concentrate	0.7	2.8	8.0	7.7	4.5	2.5	0.8
Zinc Cleaner Scav. Tailings	2.2	7.5	71.5	28.3	26.7	5.6	3.2
Slimes to Tailings	0.0	3.1	0.5	7.3	-	0.1	-
Tin Concentrate	0.1	62.2	1.0	1.8	-	-	-
Tin Tailings	<u>1.5</u>	<u>19.8</u>	<u>15.3</u>	<u>42.6</u>	=	=	=
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>

### **13.8 TIN PYROMETALLURGICAL TEST PROGRAM** **(XSTRATA PROCESS SUPPORT, 2011)**

*Reference:* Xstrata Process Support, Testing of Pyrometallurgical Options for Extraction of Tin from Tin Concentrate, October 20, 2011 Final Report for Adex Mining Inc.

The purpose of this test program was to conduct an initial assessment of options to extract tin from a low-grade tin concentrate with elevated arsenic content from the North Zone. ADEX sent two samples of concentrate to Xstrata as shown in Table 37.

**TABLE 37.**  
**LOW GRADE TIN CONCENTRATE GRADES FOR XSTRATA 2011**  
**PYROMETALLURGICAL TEST PROGRAM**

Sample	Tin (wt%)	Arsenic (wt%)	Iron (wt%)
Low Grade	13.9%	1.7%	9.44
Higher Grade	35.6%	4.1%	9.34

The program included thermo-chemical modelling to theoretically define pyrometallurgical conditions that could be used in subsequent volatilization, roasting and smelting testwork. The low grade sample would require upgrading to separate most of the iron from the tin prior to smelting, while the higher grade sample (still considered low grade) would require arsenic removal as well as tin-iron separation prior to smelting. It was theoretically determined that the concentrate could be enriched to reduce iron content by volatilizing with pyrite under reducing conditions at 850°C to 900°C.

A series of batch roasts were completed on the higher grade sample and arsenic removal of 80 to 85% was achieved, producing an upgraded concentrate assaying 34.0% tin, 0.31% arsenic and 10.0% iron. Further testing would be required to assess smelting the upgraded concentrate to produce tin metal.

### **13.9 SUMMARY OF FIRE TOWER ZONE METALLURGICAL TESTING - 2010 TO PRESENT**

Metallurgical testing was also completed for the Fire Tower Zone at Mount Pleasant which does not apply to the North Zone and was not reviewed for this report. Testing for the Fire Tower Zone is presented in the following reports:

- 1) Hunan Research Institute of Non-ferrous Metals, Research Report on Laboratory Flow Test for Development of Comprehensive Recovery Dressing Technology of Tungsten Molybdenum Zinc Bismuth Polymetallic Ore, July 24, 2010 Final Report for Rongfeng Canada Investment Co.
- 2) SGS Minerals Services, An Investigation into Hydrometallurgical Treatment of Molybdenum Concentrates from Mount Pleasant, Project 12432-001, September 3, 2010 Final Report for Adex Mining Inc.

### **13.10 SUMMARY OF NORTH ZONE METALLURGICAL TESTING, 2010 TO PRESENT**

The testing by SGS Canada Inc. and Hunan Nonferrous Metals Research Institute has defined preliminary flowsheet options for the recovery of tin concentrate and zinc/copper/indium concentrate from the North Zone. The recovery of tin was highest with the Hunan approach, but the tin concentrate grade was low as a result of the testing of both Hunan and SGS Canada Inc. An initial study was undertaken to assess upgrading of the tin concentrate. Further test work is required to ensure tin concentrate can be produced in compliance with smelter schedules.

The recovery of sulphide concentrate (zinc, copper, and indium) was challenging in the test programs that used the metallurgical sample from an existing surface stockpile stored outdoors since the 1960s. This difficulty was observed with the 2010 SGS Locked Cycle test (Sample B), 2010 Hunan Locked Cycle test, and 2010 SGS Pilot test. The metallurgical response for sulphide concentrate recovery was much improved when testing samples from fresh drill core in the 2010 SGS Locked Cycle test (Sample A) and 2011 SGS Locked Cycle test.

It is recommended that additional metallurgical testing be conducted on fresh metallurgical samples obtained from the North Zone to confirm the process flowsheet, improve tin concentrate grades, and define final recoveries to tin and zinc/copper/indium concentrates. Continuous testing at the pilot scale should be conducted to identify a definitive process flowsheet.



Based on bench scale and mini-pilot testing, a preliminary process flowsheet has been defined to produce the finished products of zinc metal and indium sponge from the North Zone low-grade zinc/copper/indium concentrate. It is recommended that further testing be conducted at a larger pilot scale to advance this unique hydrometallurgical process to a definitive process flowsheet.

## 14. MINERAL RESOURCE ESTIMATES

### 14.1 MINERAL RESOURCE ESTIMATE OF THE FIRE TOWER ZONE BY SRK

In September 2008, ADEX engaged WGM to prepare an updated resource estimate for the FTZ in the Mt. Pleasant Project, New Brunswick. This work was, in turn, sub-contracted to SRK by WGM to be included in this report. The data and parameters used by SRK to estimate the Mineral Resource are summarized below.

SRK has prepared Mineral Resource estimates for the Mt Pleasant Fire Tower West Zone and Fire Tower North Zone, collectively known as the FTZ. A summary of the Mineral Resource estimates is tabulated in Table 38.

**TABLE 38.**  
**MOUNT PLEASANT MINERAL RESOURCE ESTIMATE, FIRE TOWER ZONE**  
**(SRK, October 11, 2008)**

Area	Tonnes	%WO <sub>3</sub>	%MoS <sub>2</sub>	%As	%Bi
<b>Indicated</b>					
Fire Tower West	9,148,900	0.32	0.21	0.29	0.04
Fire Tower North	<u>4,340,100</u>	<u>0.35</u>	<u>0.20</u>	<u>1.15</u>	<u>0.09</u>
<b>Total Indicated</b>	<b>13,489,000</b>	<b>0.33</b>	<b>0.21</b>	<b>0.57</b>	<b>0.06</b>
<b>Inferred</b>					
Fire Tower West	831,000	0.26	0.20	0.21	0.04
Fire Tower North	<u>10,700</u>	<u>0.26</u>	<u>0.17</u>	<u>0.26</u>	<u>0.05</u>
<b>Total Inferred</b>	<b>841,700</b>	<b>0.26</b>	<b>0.20</b>	<b>0.21</b>	<b>0.04</b>

\* Mineral Resources are not mineral reserves and do not have demonstrated economic viability. All figures have been rounded to reflect the relative accuracy of the estimates.

Reported at a cutoff of 0.3% WO<sub>3</sub> Eq grade. WO<sub>3</sub> Eq (equivalent) = %WO<sub>3</sub> + 1.5 x %MoS<sub>2</sub>.

The Mineral Resources are reported in accordance with Canadian Securities Administrators' National Instrument 43-101 and have been estimated in conformity with generally accepted CIM "Estimation of Mineral Resource and Mineral Reserves Best Practices" guidelines. For the purposes of this report, the relevant definitions of the CIM guidelines are as follows:

A **Mineral Resource** is a concentration or occurrence of diamonds, natural solid inorganic material, or natural solid fossilized organic material including base and precious metals, coal, and industrial minerals in or on the Earth's crust in such form and quantity and of such a grade or quality that it has reasonable prospects for economic extraction. The location, quantity, grade, geological characteristics and continuity of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge.

An **‘Inferred Mineral Resource’** is that part of a Mineral Resource for which quantity and grade or quality can be estimated on the basis of geological evidence and limited sampling and reasonably assumed, but not verified, geological and grade continuity. The estimate is based on limited information and sampling gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drillholes.

An **‘Indicated Mineral Resource’** is that part of a Mineral Resource for which quantity, grade or quality, densities, shape and physical characteristics, can be estimated with a level of confidence sufficient to allow the appropriate application of technical and economic parameters, to support mine planning and evaluation of the economic viability of the deposit. The estimate is based on detailed and reliable exploration and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drillholes that are spaced closely enough for geological and grade continuity to be reasonably assumed.

A **‘Measured Mineral Resource’** is that part of a Mineral Resource for which quantity, grade or quality, densities, shape, and physical characteristics are so well established that they can be estimated with confidence sufficient to allow the appropriate application of technical and economic parameters, to support production planning and evaluation of the economic viability of the deposit. The estimate is based on detailed and reliable exploration, sampling and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drillholes that are spaced closely enough to confirm both geological and grade continuity.

## **14.2 GENERAL MINERAL RESOURCE ESTIMATION METHODOLOGY**

SRK applied the following methodology for the Mineral Resource estimate of the FTZ:

- Database compilation and verification;
- Resource Modelling:
  - Updating of 3-D wireframe models within major lithological units, using the suite of geochemical assays available for each drillhole sample interval;
  - Data processing (compositing and capping) and statistical analyses;
  - Variography;
  - Grade interpolation and block modelling applying Ordinary Kriging ("OK") grade estimation techniques and carrying out comparative estimations using Inverse Distance Squared ("ID<sup>2</sup>");
  - Resource classification, tabulation and reporting; and
  - Resource validation applying ID<sup>2</sup> methodology.

## 14.3 DATABASE

### 14.3.1 GENERAL

Data used to generate the Mineral Resource estimates originated from Gemcom Software International Inc. ("**GEMCOM** or **GEMS**") project files. The original GEMCOM project was created by ADEX in 1997 and later updated by WGM in 2006. The ADEX GEMS Project contained three separate drillhole databases pertaining to three Mt Pleasant zones, namely the FTZ, the Saddle Zone and the North Zone (not to be confused with the Fire Tower North portion of the FTZ). SRK has not validated the data for the North Zone and Saddle Zone workspaces as they were not part of this study.

The pre-2008 FTZ drillhole database consisted of 676 collar locations (in mine coordinates), downhole survey data, geological codes, and 24,544 assay intervals with multi-element values (percent of MoS<sub>2</sub>, WO<sub>3</sub>, Sn, Cu, Zn, Pb, Bi, As, Ca, Fe and In (ppm)). The data were provided to SRK in digital form on a CD. The 2008 data, which contained additional data for twenty-three diamond drillholes, were supplied to SRK as Microsoft Excel spreadsheets via e-mail. In total, the database comprises 699 collar locations and 26,355 assay intervals.

The GEMCOM project received by SRK also contained a set of geological wireframes and 3-D solids representing underground development and mined-out stopes.

### 14.3.2 DATA VALIDATION

Upon receipt of the data, SRK performed the following validation steps:

- Checking for location and elevation discrepancies by comparing collar coordinates with the drillholes collars already in the GEMCOM project;
- Checking the assay values provided in the excel files against the original assay certificates;
- Checking minimum and maximum values for each quality value field and confirming/modifying those outside of expected ranges;
- Checking for inconsistency in lithological unit terminology and/or gaps in the lithological code; and,
- Checking for gaps, overlaps and out of sequence intervals for both assays and lithology tables.

The GEMCOM assay table contained a few errors, i.e., "composite length greater than hole length", "out of sequence interval" or "negative value interval", which were corrected by SRK using drill logs provided by ADEX. On completion of the validation procedure, SRK

considered the database suitable for resource estimation with no further obvious errors that could affect the Mineral Resource estimate.

### 14.3.3 DATABASE MANAGEMENT

The drillhole data were stored in a GEMCOM multi-tabled workspace specifically designed to manage collar and interval data. Other data, like surface contours or cross sectional geological interpretations were stored in multi-tabled polyline workspaces. The project database also stored section and level plan definitions, 3-D surfaces and solids, and the block models, such that all data pertaining to the project are stored within the same project database.

## 14.4 RESOURCE MODELLING PROCEDURES

### 14.4.1 GENERAL

SRK applied the following procedures for resource modelling:

- Geological interpretation and digitizing of updated lithological outlines;
- 3-D surface (TIN) and solid/wireframe creation;
- Database manipulation and compositing;
- Statistical analysis and variography;
- Block grade estimation; and
- Classification and reporting of Mineral Resources.

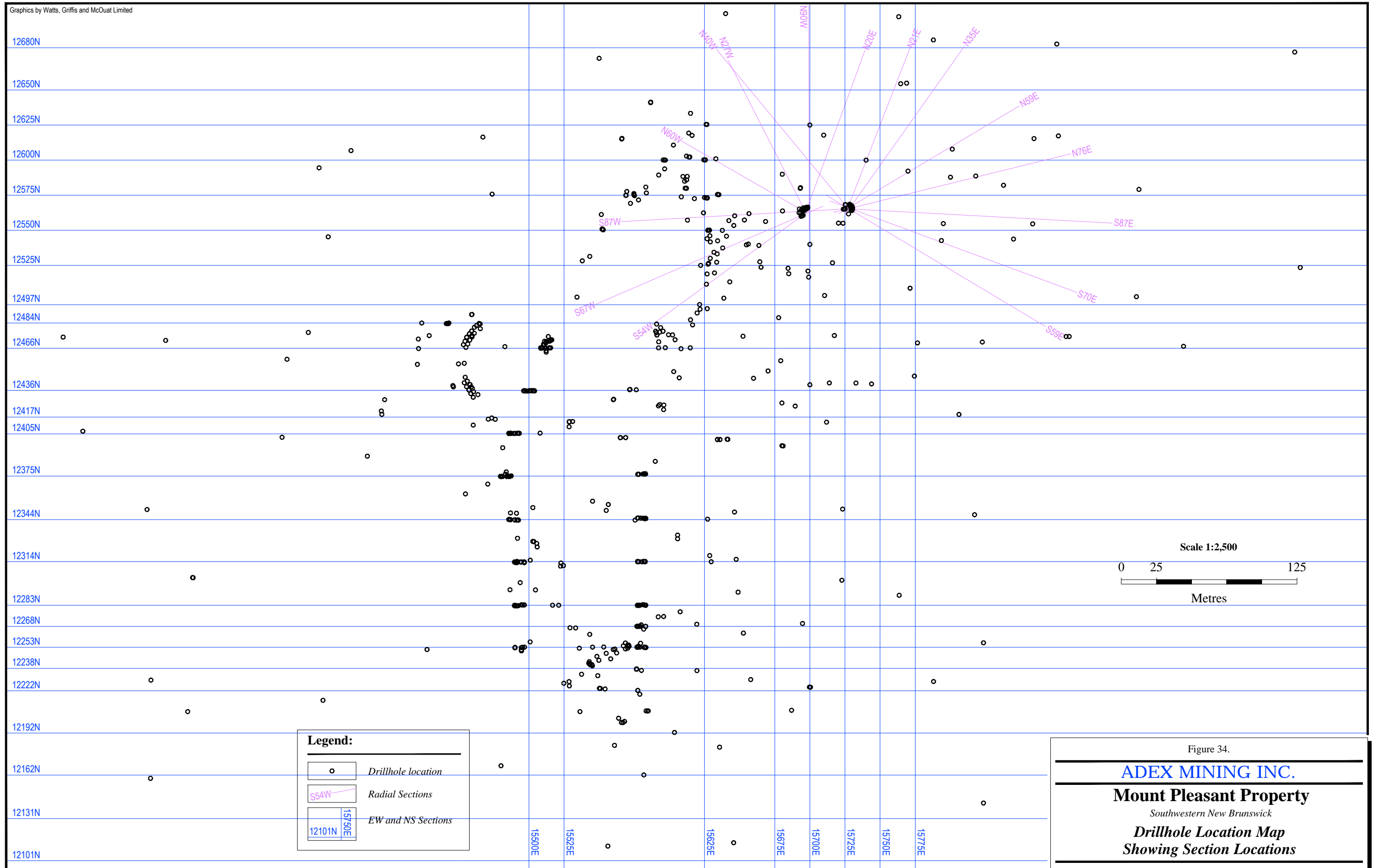
### 14.4.2 GEOLOGICAL INTERPRETATION AND DIGITIZING

#### **Vertical Sections**

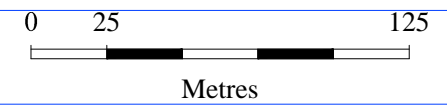
Vertical sections for the Fire Tower West and North Zones were generated by ADEX to coincide with the historical sections. They were oriented east-west ("E-W"), and had a spacing that varied from ten metres to thirty-one metres. The north-south (long) sections had a standard twenty-five metre separation. In the Fire Tower North Zone ADEX also created radial sections to best fit the orientation of underground holes.

In total, twenty-five north-looking vertical (cross) sections, eighteen west-looking vertical (long) sections and fifteen radial sections were supplied to SRK in the Fire Tower West and Fire Tower North Zones. Figure 34 shows the drillhole plan (collars only) and the section locations used for subsequent geological modelling.

Graphics by Watts, Griffis and McOuat Limited



Scale 1:2,500



**Legend:**




-  Drillhole location
-  Radial Sections
-  EW and NS Sections

Figure 34.

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**ADEX MINING INC.**

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**Mount Pleasant Property**  
*Southwestern New Brunswick*

**Drillhole Location Map**  
**Showing Section Locations**

### **Geological Interpretation of the FTZ**

The boundaries of the mineralized body were re-interpreted manually by Mr. Trevor Boyd from ADEX (Boyd, 2008) on twelve drill sections orientated E-W defined solely on %WO<sub>3</sub> and %MoS<sub>2</sub> values. Three main W-Mo mineralized units are recognized by ADEX in the project area: viz. Fire Tower Breccia ("FT-BX"), Granite I ("GR1") and Quartz Feldspar Porphyry ("QFP"). SRK found that mineralization commonly cross-cuts geological units and structural boundaries. SRK also defined mineralization based solely on %WO<sub>3</sub> and %MoS<sub>2</sub> values. These were plotted on cross sections. Mineralization boundaries were drawn halfway between drillholes, and if no holes existed, the boundaries were extended to a maximum of twenty metres away from the nearest hole. In general, extensions of the boundaries were made consistent with the trends defined by joining known cutoff boundaries. A minimum width of three metres was used for defining the zones.

### **Cutoff Grade**

Mineralized zones were defined based on a cutoff grade of 0.3% WO<sub>3</sub> equivalent ("Eq"), with  $WO_3 \text{ Eq} = \%WO_3 + 1.5 \times \%MoS_2$ . The WO<sub>3</sub> Eq cutoff was chosen as a result of the close geological and spatial relationship between the two elements. The equivalency formula is based on a US\$30/tonne tungsten price or US\$100/MTU (US\$10.0/kg WO<sub>3</sub>), upon a mine life of ten plus years and on the previous ten year price relationship between W and Mo. The assumed metal price/Eq grade cutoff is slightly conservative considering that the early 2008 prices were approximately US\$20/kg WO<sub>3</sub> and US\$30/lb for MoO<sub>3</sub>.

### **Digitizing Geological Interpretations and Solid 3-D Wireframe Creation**

The new manually drawn cross sectional interpretations of the mineralization were digitized into a GEMCOM polyline workspace. SRK has used previously defined rock types assigned to the polylines (based on 0.3 % WO<sub>3</sub> Eq) each representing separate zones (Figure 35):

1. WO<sub>3</sub> Eq in the FT West Area (Block Model Code - 104).
2. WO<sub>3</sub> Eq in the FT North Area (Block Model Code - 105).

In total, five sections in the Fire Tower West Zone and seven sections in the Fire Tower North Zone have digitized sectional polylines. The geological polylines digitized on the vertical sections were joined using special polylines (tie lines) in order to produce separate 3-D solids/wireframes for each zone, so individual volumes and tonnages could be reported. In total, two geological wireframes were created; WO<sub>3</sub> Eq in the Fire Tower West and North areas.

## **14.5 DATABASE PREPARATION, STATISTICAL ANALYSIS AND COMPOSITING**

### **14.5.1 BACK-CODING OF ROCK CODE FIELD**

The 3-D solids that represented the interpreted mineralized zones were used to back-code a rock code field into the drillhole workspace. Each interval in the assay table was assigned (back-coded) a new rock code value based on the rock type solid that the interval midpoint fell within. The two geological WO<sub>3</sub> Eq geological solids, for Fire Tower West and Fire Tower North, were back-coded and considered for the Mineral Resource estimate.

Although the database contains assays for multiple elements (MoS<sub>2</sub>, WO<sub>3</sub>, Sn, Cu, Zn, Pb, Bi, As, Ca, Fe and In), only MoS<sub>2</sub>, WO<sub>3</sub>, Bi and As have been investigated.

Table 39 presents basic statistics of the original drillhole data, regardless of position in the mineralized envelope. Figure 36 shows the 3-D drillhole distribution in the FTZ.

**TABLE 39.  
BASIC STATISTICS OF DRILLHOLE SAMPLES IN FTZ**

	Minimum	Maximum	Average	Standard Deviation	C.O.V.
Sample length	0.05 m	7.62 m	2.88 m	0.76	0.26
MoS <sub>2</sub>	0.0%	4.85%	0.07%	0.11	1.23
WO <sub>3</sub>	0.0%	5.10%	0.11%	0.22	2.04
Bi	0.0%	3.38%	0.05%	0.08	1.63
As	0.0%	20.60%	0.45%	0.97	2.19
WO <sub>3</sub> Eq	0.0%	10.82%	0.24%	0.34	1.39

### **14.5.2 PREPARATION OF ASSAY COMPOSITES**

In order to carry out the variography and Mineral Resource block modelling, a set of equal length composites was generated from the raw drillhole intervals. Since the majority of the samples were taken at three metre intervals as indicated in Figure 37, SRK chose to composite the data at 3.0 m as well. Table 40 summarizes the statistics of the composited data inside the mineralized envelope for the West and North Zones.



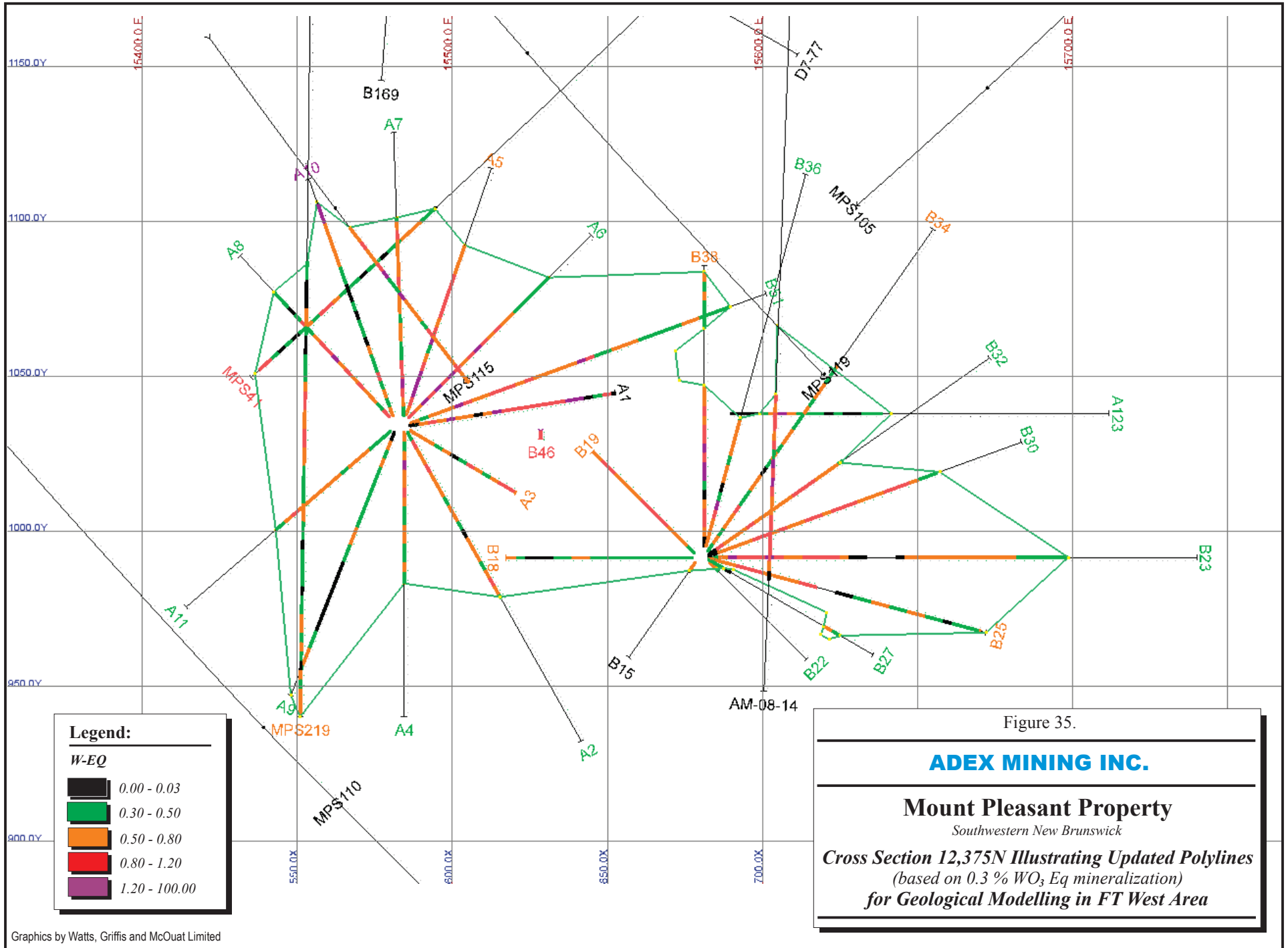


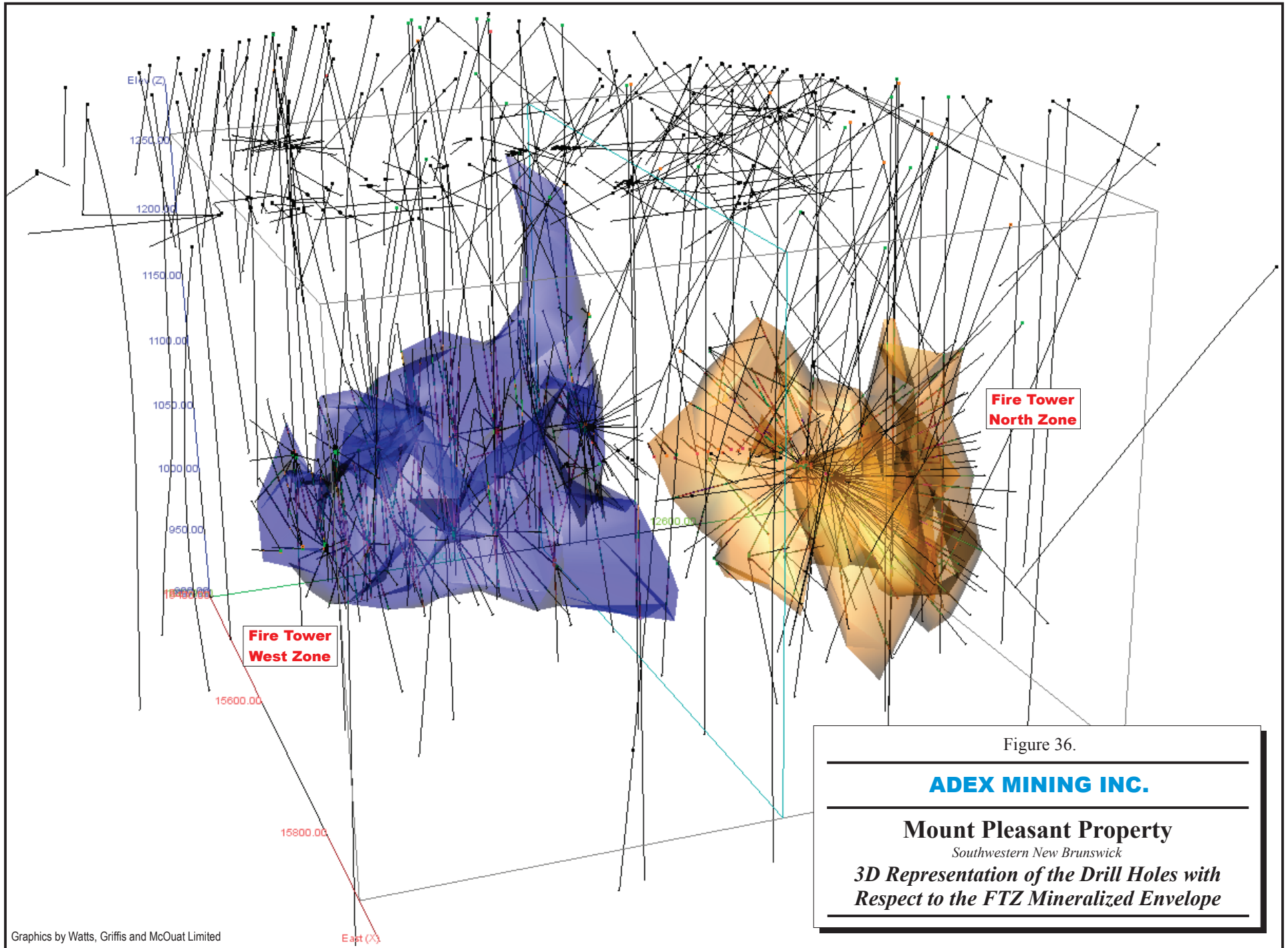
Figure 35.

**ADEX MINING INC.**

**Mount Pleasant Property**

*Southwestern New Brunswick*

**Cross Section 12,375N Illustrating Updated Polylines**  
*(based on 0.3 % WO<sub>3</sub> Eq mineralization)*  
**for Geological Modelling in FT West Area**



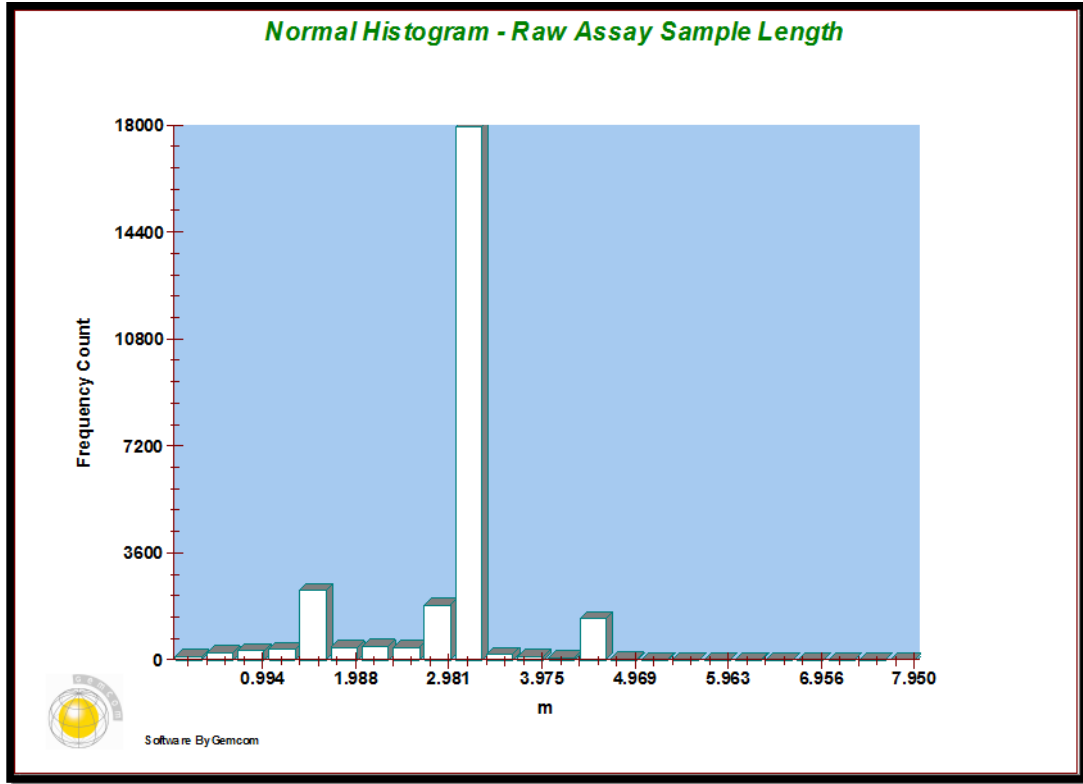


Figure 37. Histogram representing distribution of the assay sampling length

**TABLE 40.**  
**BASIC STATISTICS OF 3.0 m COMPOSITES IN THE MINERALIZED ENVELOPE OF THE FTZ**

Sector	Element	Number	Min (%)	Max (%)	Mean (%)	SD (%)	C.O.V.
<b>West</b>	MoS <sub>2</sub>	4,089	0.00	1.35	0.21	0.12	0.59
	WO <sub>3</sub>		0.00	2.96	0.32	0.28	0.87
	Bi		0.00	3.24	0.04	0.09	2.01
	As		0.00	9.41	0.36	0.68	1.86
	WO <sub>3</sub> _Eq		0.00	3.89	0.63	0.37	0.58
<b>North</b>	MoS <sub>2</sub>	1,746	0.00	1.16	0.20	0.13	0.66
	WO <sub>3</sub>		0.00	3.33	0.33	0.33	1.00
	Bi		0.00	0.77	0.09	0.10	1.11
	As		0.00	18.95	1.25	1.52	1.21
	WO <sub>3</sub> _Eq		0.01	4.14	0.63	0.43	0.69
<b>FT Both Zones</b>	MoS <sub>2</sub>	5,835	0.00	1.35	0.20	0.12	0.61
	WO <sub>3</sub>		0.00	3.33	0.32	0.30	0.91
	Bi		0.00	3.24	0.06	0.09	1.63
	As		0.00	18.95	0.63	1.09	1.73
	WO <sub>3</sub> _Eq		0.00	4.14	0.63	0.39	0.62

14.5.3 OUTLIER TREATMENT

The statistical distributions of MoS<sub>2</sub>, WO<sub>3</sub>, Bi and As show lognormal distributions (Figures 38 to 47) and both zones also exhibit similar behaviour. Considering the nature of the elements and their statistical distributions, SRK is of the opinion that it is not necessary to cap high-grade values for MoS<sub>2</sub> or WO<sub>3</sub>.

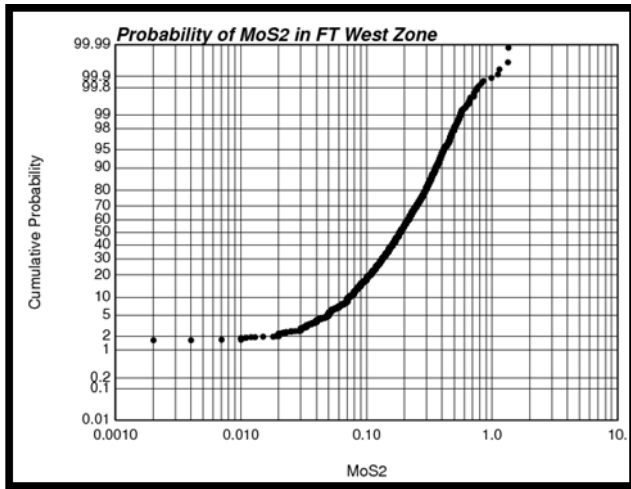


Figure 38. Cumulative frequency plot of MoS<sub>2</sub> 3.0 M composites in the FT West zone

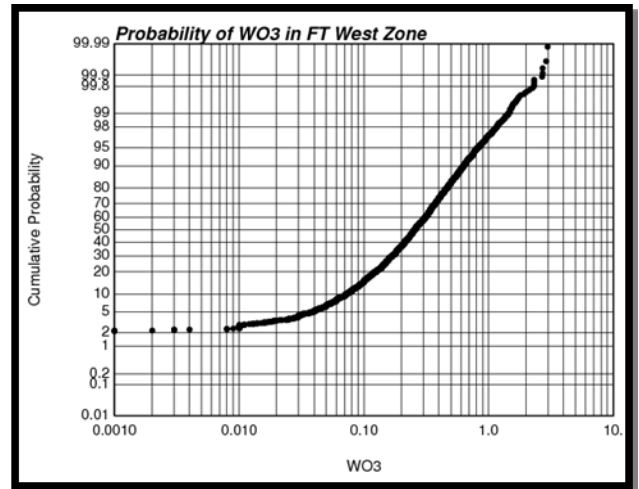


Figure 39. Cumulative frequency plot of WO<sub>3</sub> 3.0 M composites in the FT West zone

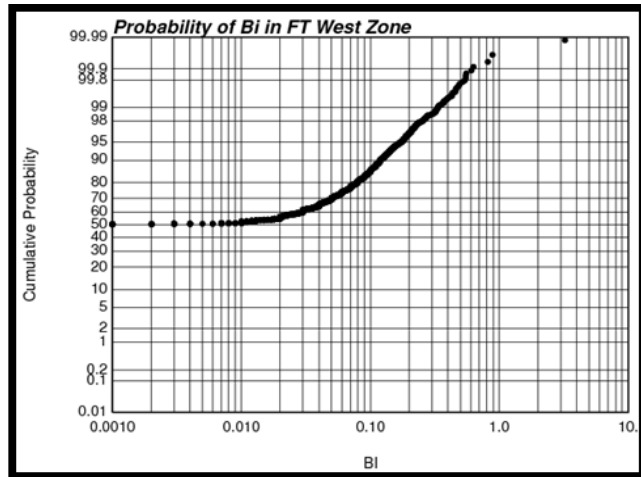


Figure 40. Cumulative frequency plot of Bi 3.0 m composites in the FT West zone

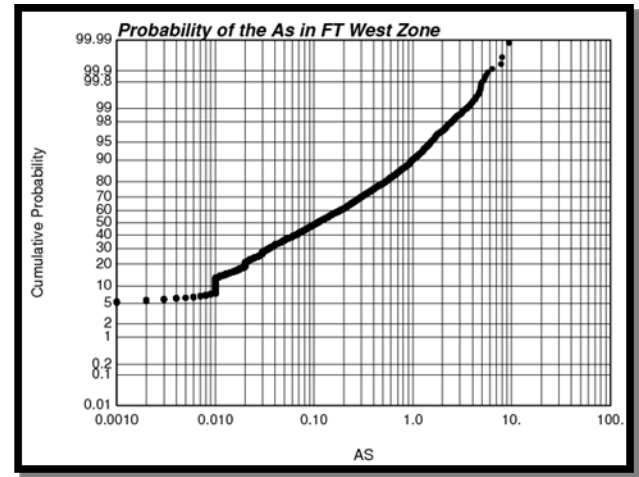


Figure 41. Cumulative frequency plot of As 3.0 m composites in the FT West zone

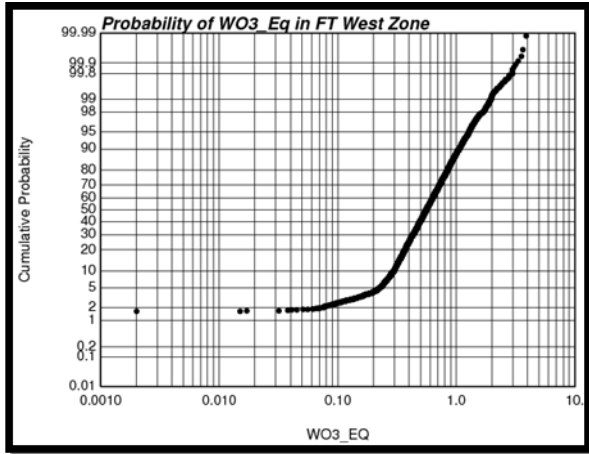


Figure 42. Cumulative frequency plot of  $WO_3$  Eq 3.0 m composites in the FT West zone

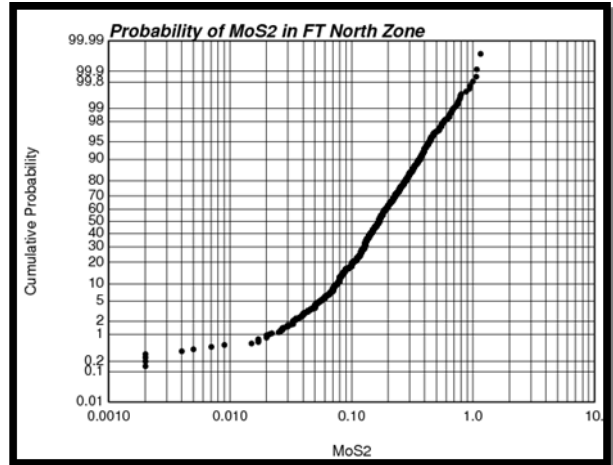


Figure 43. Cumulative frequency plot of  $MoS_2$  3.0 m composites in the FT North Zone

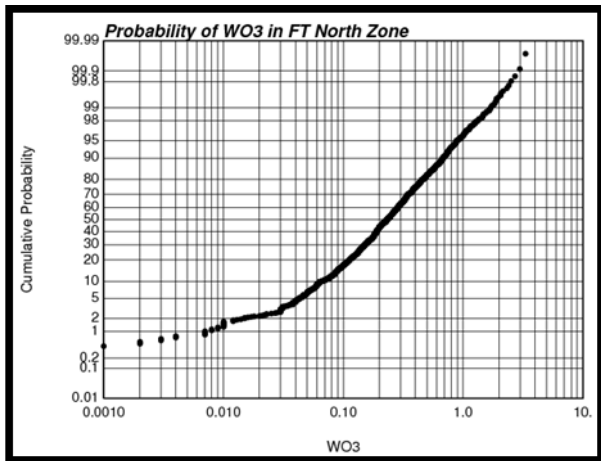


Figure 44. Cumulative frequency plot of  $WO_3$  3.0 M composites in the FT North Zone

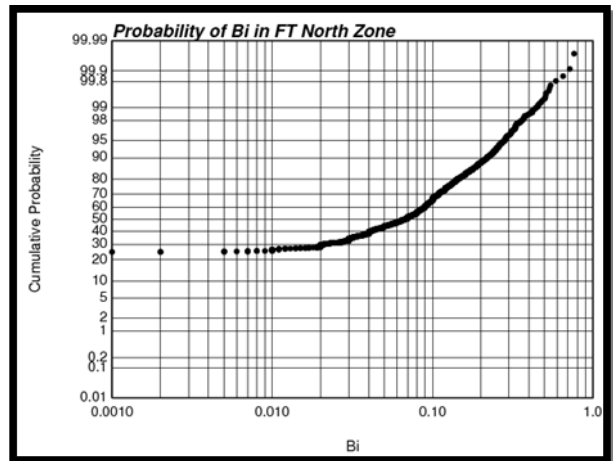


Figure 45. Cumulative frequency plot of Bi 3.0 M composites in the FT North Zone

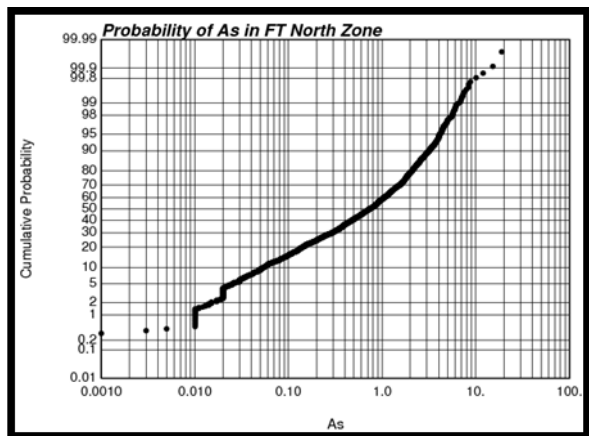


Figure 46. Cumulative frequency plot of As 3.0 m composites in the FT North Zone

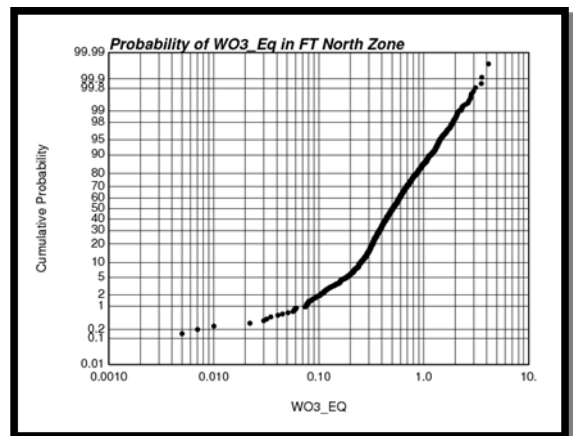


Figure 47. Cumulative frequency plot of  $WO_3$  Eq 3.0 m composites in FT North Zone

14.5.4 STATISTICAL ANALYSES

SRK considered the relation between the various elements that could further facilitate geostatistical study of the FTZ mineralization style. Table 41 summarizes correlation coefficients for the 3.0 m composites of various elements. The best correlation exists between Zn and Sn, Pb and In. Most of the elements, however, show very low relation to each other; therefore, SRK could not calculate covariance.

**TABLE 41.  
CORRELATION MATRIX OF 3.0 m COMPOSITES IN THE MINERALIZED ENVELOPE  
OF THE FTZ**

Element	MoS <sub>2</sub>	Bi	As	Zn	WO <sub>3</sub>	Sn	Pb	In
MoS <sub>2</sub>	1.00	0.15	-0.13	0.00	0.21	-0.01	-0.02	0.00
BI	0.15	1.00	0.26	0.16	0.29	0.18	0.21	0.01
AS	-0.13	0.26	1.00	0.08	0.30	0.11	0.06	0.01
ZN	0.00	0.16	0.08	1.00	0.03	0.44	0.51	0.44
WO <sub>3</sub>	0.21	0.29	0.30	0.03	1.00	0.09	0.00	-0.01
SN	-0.01	0.18	0.11	0.44	0.09	1.00	0.33	0.05
PB	-0.02	0.21	0.06	0.51	0.00	0.33	1.00	0.01
IN	0.00	0.01	0.01	0.44	-0.01	0.05	0.01	1.00

Probability plots in the Figures 48 and 51 show that As have a bimodal distribution in both zones. In order to properly calculate arsenic variograms the 3.0 m As composites were divided into the As rich and low As zones in FT West and North using previously defined As zones (ADEX generated 3-D wireframes). Figures 52 to 55 show histograms of As composites in the four zones. The basic statistics of the As composites are presented in Table 42.

**TABLE 42.  
BASIC STATISTICS AS 3.0 m COMPOSITES IN THE MINERALIZED ENVELOPE  
OF THE FTZ**

Area	Number	Minimum	Maximum	Average	Standard Deviation	C.O.V.
<b>FT West:</b>	>0.5 % As	864	0.00	9.57	0.99	0.98
	<0.5 % As	3,125	0.00	5.95	0.19	0.39
<b>FT North:</b>	>0.5 % As	1,313	0.00	19.22	1.39	1.61
	<0.5 % As	634	0.00	8.94	0.66	1.00

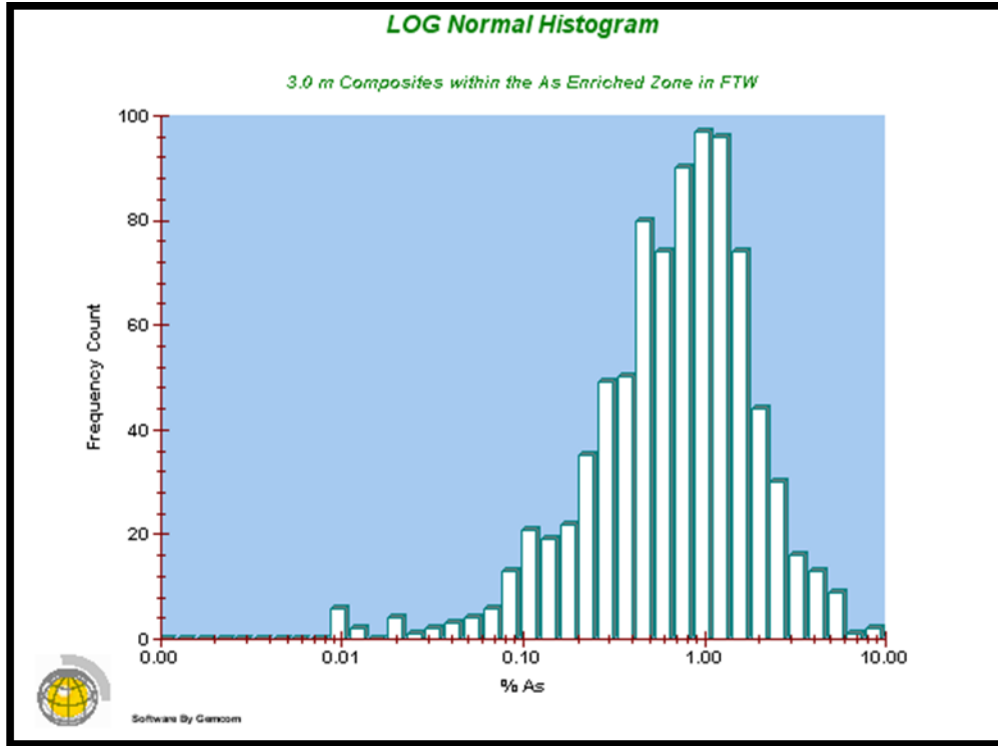


Figure 48. Histogram of As composites within the As rich zone (>0.5 % As) in FTW

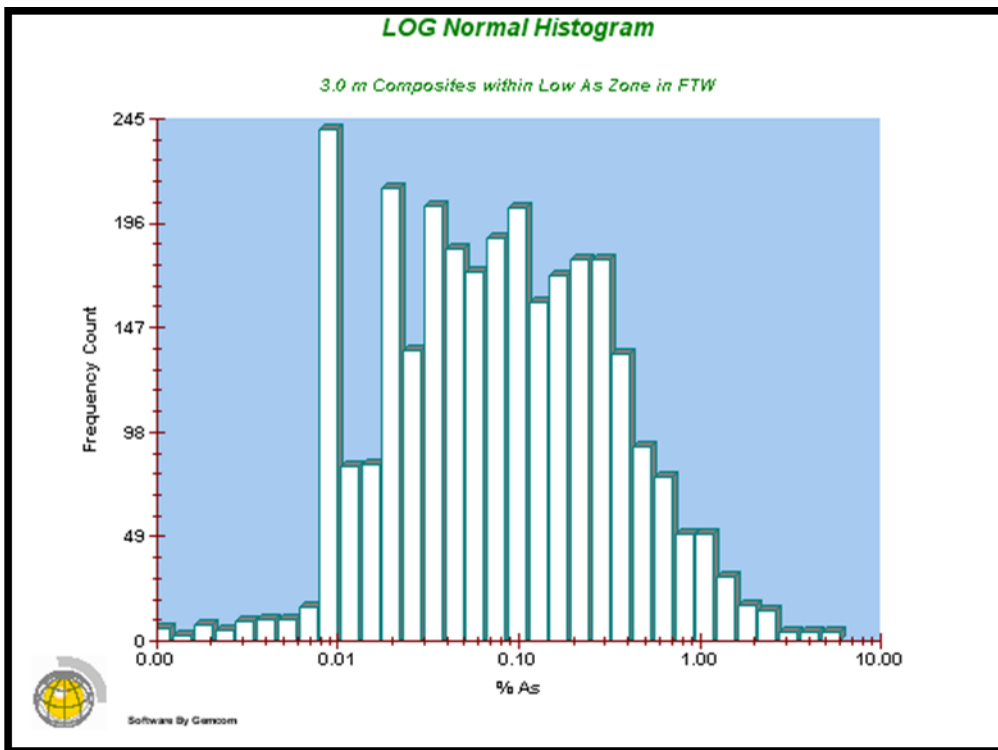


Figure 49. Histogram of As composites within the low As (<0.5 % As) zone in FTW

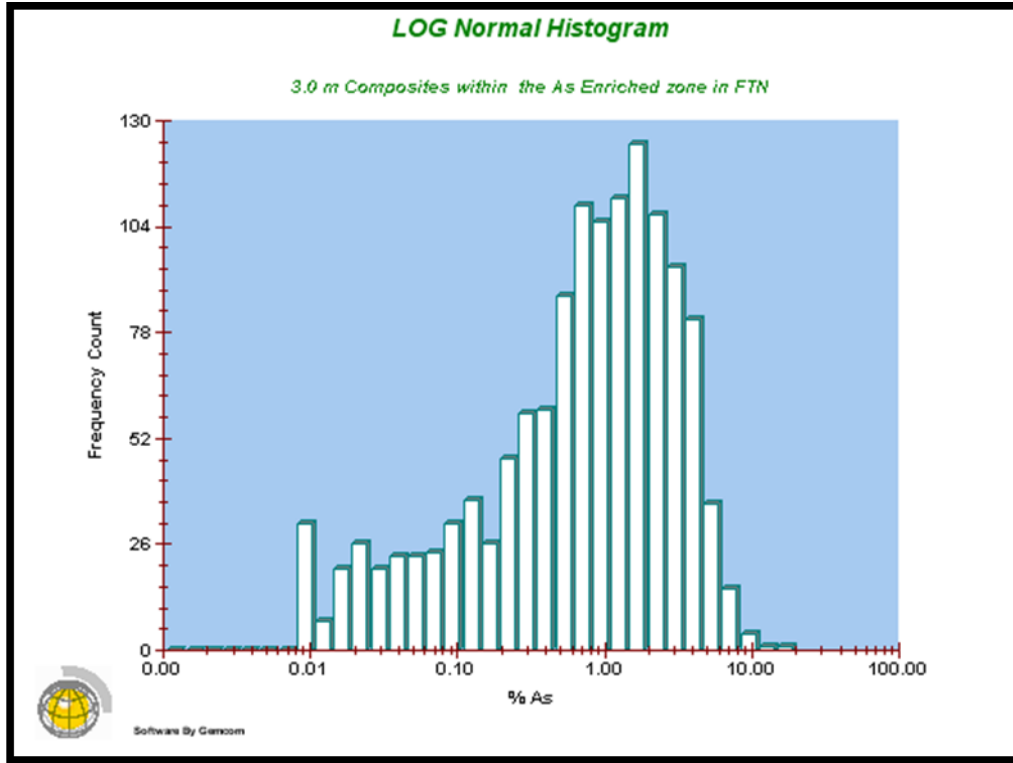


Figure 50. Histogram of As composites within the As rich (>0.5 % As) zone in FTN

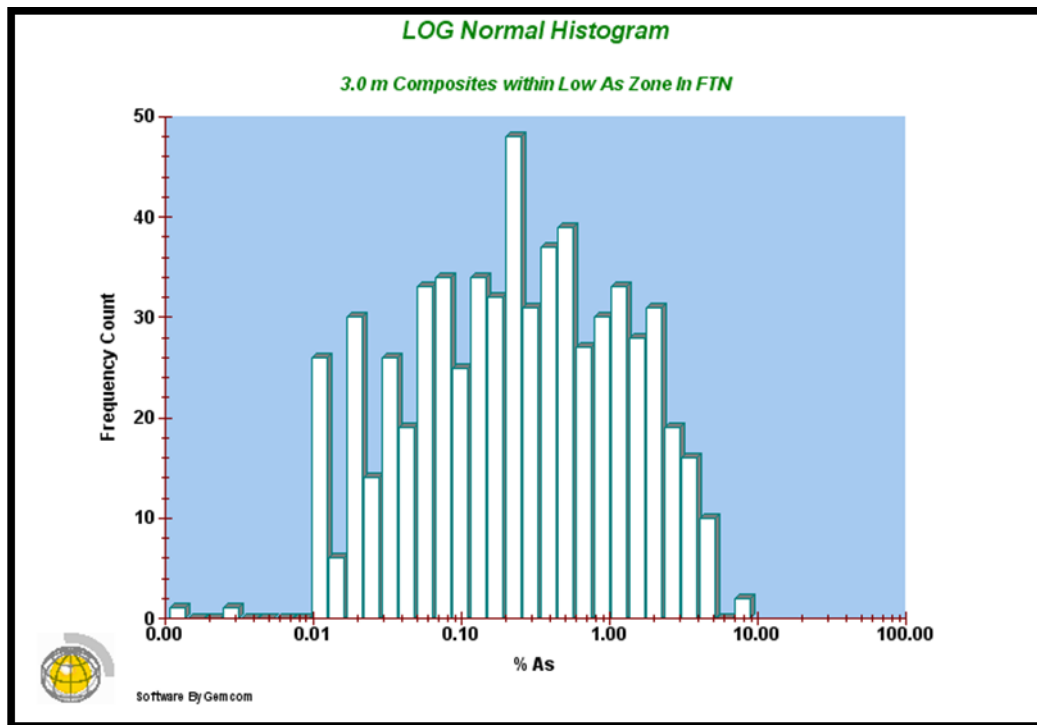


Figure 51. Histogram of As composites within the low As (<0.5 % As) zone in FTN



**14.6 VARIOGRAPHY**

Variograms were computed to characterize the spatial continuity of the mineralization in both the North and West zones. Table 43 presents the variogram models.

**TABLE 43.  
VARIOGRAM MODELS (FTZ)**

Zone	Element	Nugget	Structure 1	Range 1	Structure 2	Range 2	Az, Dip, Plunge
FT West	MoS <sub>2</sub>	0.00585	0.00875	65,37,37*	0	0	90,-25,0
	WO <sub>3</sub>	0.02873	0.02890	17.7	0.02226	35.0	Omnidirectional
	Bi	0.00223	0.00025	30.0	0.00255	99.0	Omnidirectional
Enriched	As	0.27500	0.33450	18.0	0.08210	75.0	Omnidirectional
	Low	As	0.01943	0.00126	34.0	0.01621	135.0
FT North	MoS <sub>2</sub>	0.00565	0.01037	30,35,30	0	0	0,70,0
	WO <sub>3</sub>	0.02567	0.03429	18.3	0.02025	62.0	Omnidirectional
	Bi	0.002500	0.00392	15.0	0.00228	45.0	Omnidirectional
Enriched	As	1.00000	1.17700	47.8,40,40	0	0	90,-20,0
Low	As	0.36570	0.15890	15.0	0.28910	92.0	Omnidirectional

**Note:** All the variograms above are modelled with the Spherical equation.

\* Range numbers refer to influence of anisotropy X,Y and Z.

It was noted that the MoS<sub>2</sub> is more continuous than the WO<sub>3</sub> in the West Zone. The WO<sub>3</sub> and Bi show isotropic distribution hence only omnidirectional variograms was calculated for these elements. This could be due to the shape of the ore bodies in the Fire Tower Project. Figures 52 to 55 present the variogram graphs for WO<sub>3</sub> and MoS<sub>2</sub> in each zone. Please refer to Appendix 2 for the full list of variogram graphs.

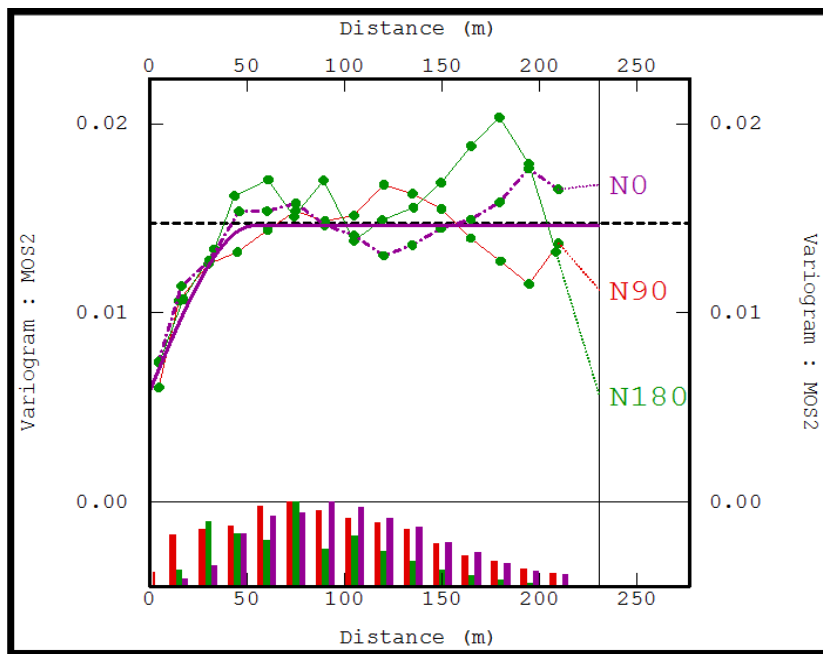


Figure 52. Variogram of MoS<sub>2</sub> in the FT West zone

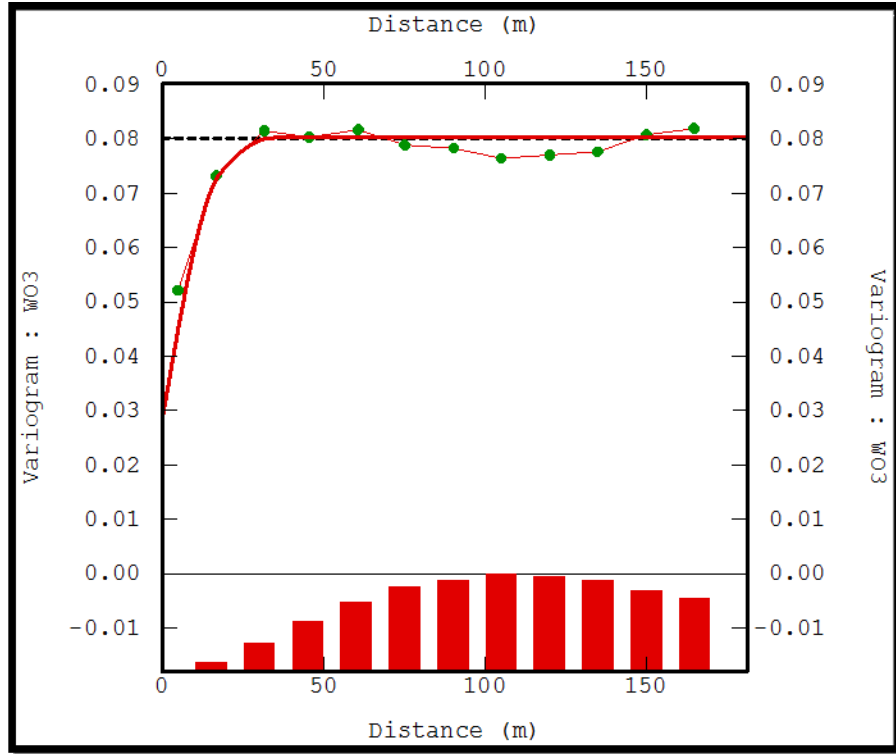


Figure 53. Omnidirectional variogram of  $WO_3$  in the FT West zone

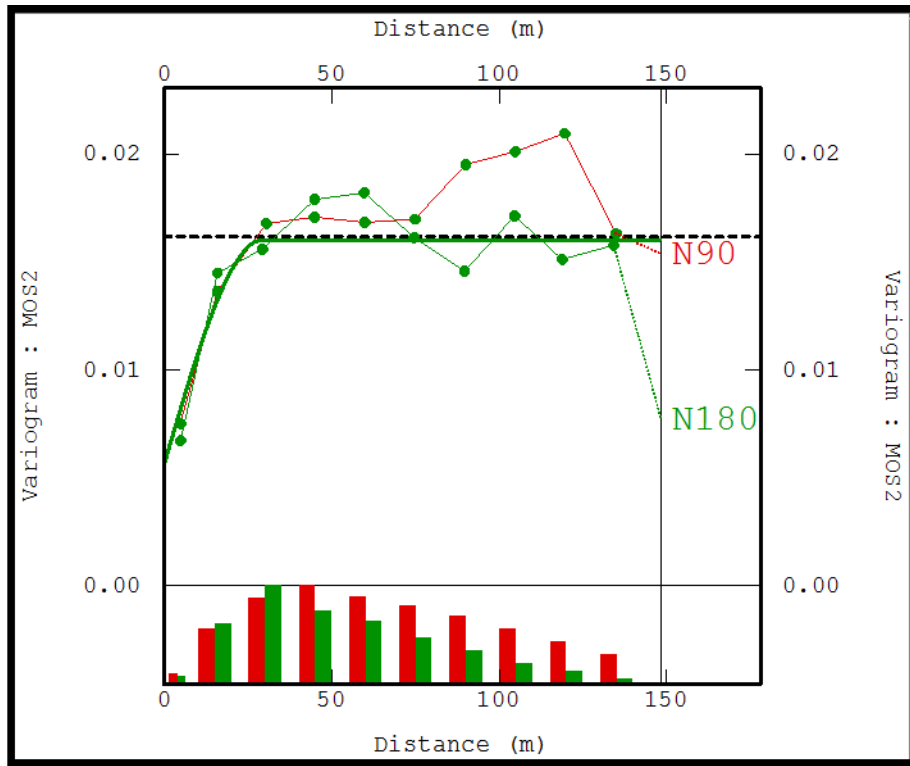


Figure 54. Variogram of  $MoS_2$  in the FT North Zone

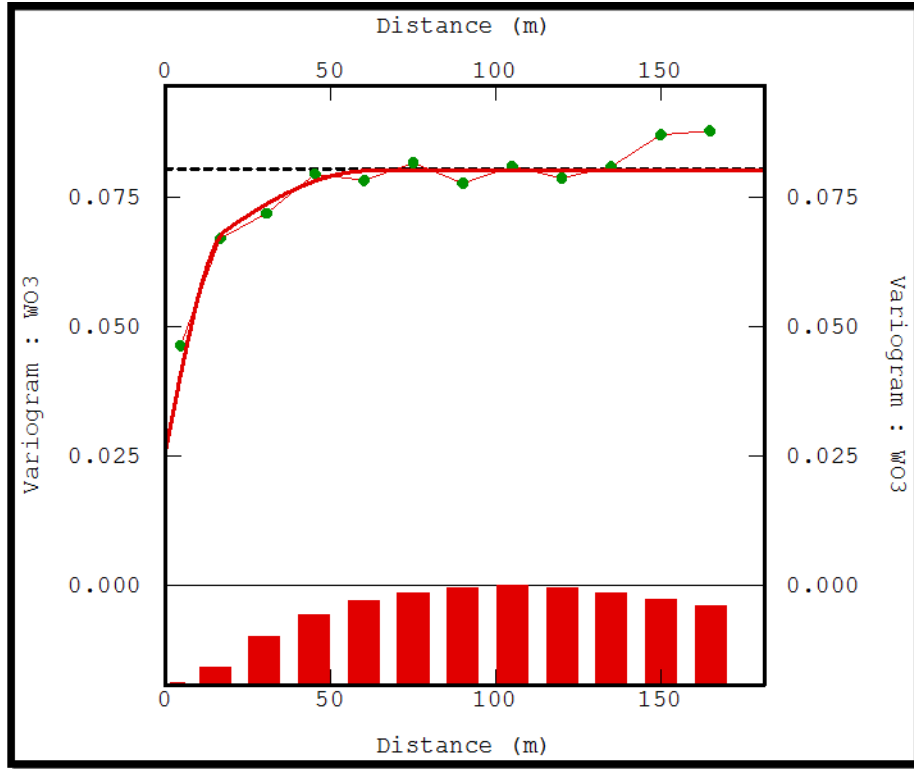


Figure 55. Omnidirectional variogram of WO<sub>3</sub> in the FT North Zone

## 14.7 RESOURCE ESTIMATION

The Mineral Resource block grades have been estimated with the Ordinary Kriging ("OK") geostatistical estimation technique. For comparison and cross checking purposes, Inverse Distance Squared ("ID<sup>2</sup>") estimation was applied.

### 14.7.1 BLOCK MODEL

The Mineral Resources have been estimated within a grid of regular five meter by five metre by five metre blocks. The block model grid covers both the West Zone and North Zone and is defined in Table 44.

**TABLE 44.**  
**BLOCK MODEL GRID PARAMETERS FOR FTZ**

Direction	Origin	Size	Minimum (index)	Maximum (index)
East-West	15,400E	5 m	15,400E (1)	15,875E (96)
North-South	12,200N	5 m	12,200N (1)	12,700N (101)
Vertical	900Z	5 m	900Z (1)	1,250Z (71)

## 14.7.2 GRADE INTERPOLATION

### **Kriging**

The principal Mineral Resource estimate model is derived from OK. The variograms modelled and summarized in the previous section of this report were used to estimate each zone separately.

#### Fire Tower West

1. Indicated Search:

- Spherical Search Ellipsoid – 35 m range
- o Maximum number of composites used to estimate a block: 10
- o Minimum number of composites used to estimate a block: 3
- o Octant search strategy was used with minimum octants of 2 and maximum of 8 composites per octant.

2. Inferred Search:

- Spherical Search Ellipsoid – 70 m range
- o Maximum number of composites used to estimate a block: 15
- o Minimum number of composites used to estimate a block: 2
- o Octant search strategy was used with minimum octants of 2 and maximum of 8 composites per octant.

#### Fire Tower North

1. Indicated Search:

- Spherical Search Ellipsoid – 30 m range
- o Maximum number of composites used to estimate a block: 10
- o Minimum number of composites used to estimate a block: 3
- o Octant search strategy was used with minimum octants of 2 and maximum of 8 composites per octant.

2. Inferred Search:

- Spherical Search Ellipsoid – 70 m range
- o Maximum number of composites used to estimate a block: 15
- o Minimum number of composites used to estimate a block: 2
- o Octant search strategy was used with minimum octants of 2 and maximum of 8 composites per octant.

### **Inverse Distance Squared ("ID<sup>2</sup>")**

This estimation technique was used to provide ADEX with a comparison to OK. In this case, both the West and North Zones were interpolated the same search parameters as in the Ordinary Kriging method.

## 14.8 MINERAL RESOURCE CLASSIFICATION AND TABULATION

### 14.8.1 MINERAL RESOURCE STATEMENT

The Mineral Resources are compiled by simple addition of the OK model blocks and by averaging the corresponding grade values. SRK has classified the Fire Tower Mineral Resource estimate as Indicated and Inferred. Summary of the Mineral Resource estimate is presented in Table 45. The mined out stope areas have been excluded from the resources calculations.

**TABLE 45.**  
**MOUNT PLEASANT MINERAL RESOURCE STATEMENT\*, FIRE TOWER ZONE**  
**(SRK, OCTOBER 11, 2008)**

Area	Tonnes	%WO <sub>3</sub>	%MoS <sub>2</sub>	%As	%Bi
<b>Indicated</b>					
Fire Tower West	9,148,900	0.32	0.21	0.29	0.04
Fire Tower North	<u>4,340,100</u>	<u>0.35</u>	<u>0.20</u>	<u>1.15</u>	<u>0.09</u>
<b>Total Indicated</b>	<b>13,489,000</b>	<b>0.33</b>	<b>0.21</b>	<b>0.57</b>	<b>0.06</b>
<b>Inferred</b>					
Fire Tower West	831,000	0.26	0.20	0.21	0.04
Fire Tower North	<u>10,700</u>	<u>0.26</u>	<u>0.17</u>	<u>0.26</u>	<u>0.05</u>
<b>Total Inferred</b>	<b>841,700</b>	<b>0.26</b>	<b>0.20</b>	<b>0.21</b>	<b>0.04</b>

\* Mineral Resources are not mineral reserves and do not have demonstrated economic viability. All figures have been rounded to reflect the relative accuracy of the estimates.  
Reported at a cutoff of 0.3%WO<sub>3</sub> Eq grade. WO<sub>3</sub> Eq (equivalent) = %WO<sub>3</sub> + 1.5 x %MoS<sub>2</sub>.

ADEX indicated that the Inferred Mineral Resource reported for the Fire Tower West zone was mostly defined from the 2008 Phase I drilling. ADEX believes that this is a new easterly extension on the east side of the Fire Tower West zone called the Fire Tower East zone.

Since the As is a known contaminant the Fire Tower West and North Zones were further subdivided into areas of low and high As (Table 46). The distribution of the As mineralization is useful in the future planning of the mill feed (the resource model is populated with As grades).

**TABLE 46.**  
**As DISTRIBUTION IN FT WEST AND NORTH (SUB)ZONES**

Area	Tonnes	%As
<0.5% As Fire Tower West	8,661,800	0.19
Fire Tower North	<u>1,861,400</u>	<u>0.52</u>
<b>Total</b>	<b>10,523,200</b>	<b>0.25</b>
>0.5% As Fire Tower West	1,318,100	0.92
Fire Tower North	<u>2,489,400</u>	<u>1.62</u>
<b>Total</b>	<b>3,807,500</b>	<b>1.38</b>

Reported at a cutoff of 0.3%WO<sub>3</sub> Eq grade.

The sensitivity of the Mineral Resources to WO<sub>3</sub> Eq cutoff, is tabulated at various cutoff levels for both Indicated and Inferred Resources in Table 47 and 48. Eleven cutoffs, ranging from 0% to 1.0% WO<sub>3</sub> Eq (in increments of 0.1%) were applied. A grade tonnage curve representing total Indicated Resources is presented in Figure 56.

**TABLE 47.**  
**FTZ INDICATED MINERAL RESOURCES GRADE SENSITIVITIES**

Cutoff (WO <sub>3</sub> Eq)	Tonnage	%WO <sub>3</sub>	%MoS <sub>2</sub>	%As	%Bi
<b>West Zone Indicated</b>					
0.0	9,391,828	0.31	0.21	0.29	0.04
0.1	9,335,719	0.31	0.21	0.29	0.04
0.2	9,281,108	0.31	0.21	0.29	0.04
<b>0.3</b>	<b>9,148,912</b>	<b>0.32</b>	<b>0.21</b>	<b>0.29</b>	<b>0.04</b>
0.4	8,487,233	0.33	0.22	0.29	0.04
0.5	6,552,197	0.36	0.23	0.29	0.04
0.6	4,362,858	0.41	0.25	0.30	0.04
0.7	2,669,859	0.47	0.27	0.33	0.05
0.8	1,566,478	0.54	0.28	0.37	0.06
0.9	885,926	0.61	0.30	0.39	0.07
1.0	473,516	0.67	0.32	0.41	0.08
<b>North Zone Indicated</b>					
0.0	4,473,814	0.34	0.19	1.14	0.09
0.1	4,473,097	0.34	0.19	1.14	0.09
0.2	4,459,377	0.34	0.20	1.14	0.09
<b>0.3</b>	<b>4,340,129</b>	<b>0.35</b>	<b>0.20</b>	<b>1.15</b>	<b>0.09</b>
0.4	3,753,591	0.38	0.21	1.23	0.09
0.5	2,843,273	0.43	0.22	1.35	0.10
0.6	2,112,474	0.48	0.24	1.44	0.11
0.7	1,508,729	0.54	0.26	1.51	0.11
0.8	993,335	0.60	0.27	1.58	0.12
0.9	652,196	0.66	0.29	1.68	0.13
1.0	418,329	0.72	0.31	1.75	0.14
<b>Total West and North Zones Indicated</b>					
0.0	13,865,642	0.32	0.20	0.57	0.05
0.1	13,808,816	0.32	0.20	0.57	0.05
0.2	13,740,485	0.32	0.21	0.57	0.05
<b>0.3</b>	<b>13,489,041</b>	<b>0.33</b>	<b>0.21</b>	<b>0.57</b>	<b>0.05</b>
0.4	12,240,824	0.34	0.21	0.58	0.05
0.5	9,395,470	0.38	0.23	0.61	0.06
0.6	6,475,333	0.43	0.25	0.67	0.06
0.7	4,178,588	0.50	0.26	0.76	0.07
0.8	2,559,813	0.56	0.28	0.84	0.08
0.9	1,538,122	0.63	0.30	0.94	0.09
1.0	891,845	0.70	0.31	1.04	0.11

TABLE 48.  
FTZ INFERRED MINERAL RESOURCES GRADE SENSITIVITIES

Cutoff (WO <sub>3</sub> Eq)	Tonnage	%WO <sub>3</sub>	%MoS <sub>2</sub>	%As	%Bi
<b>West Zone Inferred</b>					
0.0	964,206	0.23	0.18	0.21	0.04
0.1	954,238	0.24	0.18	0.21	0.04
0.2	894,044	0.25	0.19	0.21	0.04
<b>0.3</b>	<b>831,012</b>	<b>0.26</b>	<b>0.20</b>	<b>0.21</b>	<b>0.04</b>
0.4	699,164	0.28	0.21	0.22	0.04
0.5	464,852	0.32	0.22	0.23	0.05
0.6	264,611	0.39	0.24	0.26	0.05
0.7	138,317	0.46	0.26	0.27	0.05
0.8	73,221	0.53	0.26	0.25	0.04
0.9	30,351	0.63	0.28	0.21	0.03
1.0	18,349	0.72	0.26	0.23	0.02
<b>North Zone Inferred</b>					
0.0	10,745	0.26	0.17	0.26	0.04
0.1	10,745	0.26	0.17	0.26	0.04
0.2	10,745	0.26	0.17	0.26	0.04
<b>0.3</b>	<b>10,745</b>	<b>0.26</b>	<b>0.17</b>	<b>0.26</b>	<b>0.05</b>
0.4	8,822	0.28	0.17	0.18	0.05
0.5	5,599	0.32	0.18	0.13	0.05
0.6	2,007	0.39	0.18	0.15	0.05
0.7	391	0.57	0.14	0.25	0.05
0.8	391	0.57	0.14	0.25	0.05
0.9	109	0.73	0.12	0.30	0.06
<b>Total West and North Zones Inferred</b>					
0.0	974,951	0.23	0.18	0.21	0.04
0.1	964,983	0.24	0.18	0.21	0.04
0.2	904,789	0.25	0.19	0.21	0.04
<b>0.3</b>	<b>841,757</b>	<b>0.26</b>	<b>0.20</b>	<b>0.21</b>	<b>0.04</b>
0.4	707,986	0.28	0.21	0.22	0.04
0.5	470,451	0.32	0.22	0.23	0.05
0.6	266,618	0.39	0.24	0.26	0.05
0.7	138,708	0.46	0.26	0.27	0.05
0.8	73,612	0.53	0.26	0.25	0.04
0.9	30,460	0.63	0.28	0.21	0.03
1.0	18,349	0.72	0.26	0.23	0.02

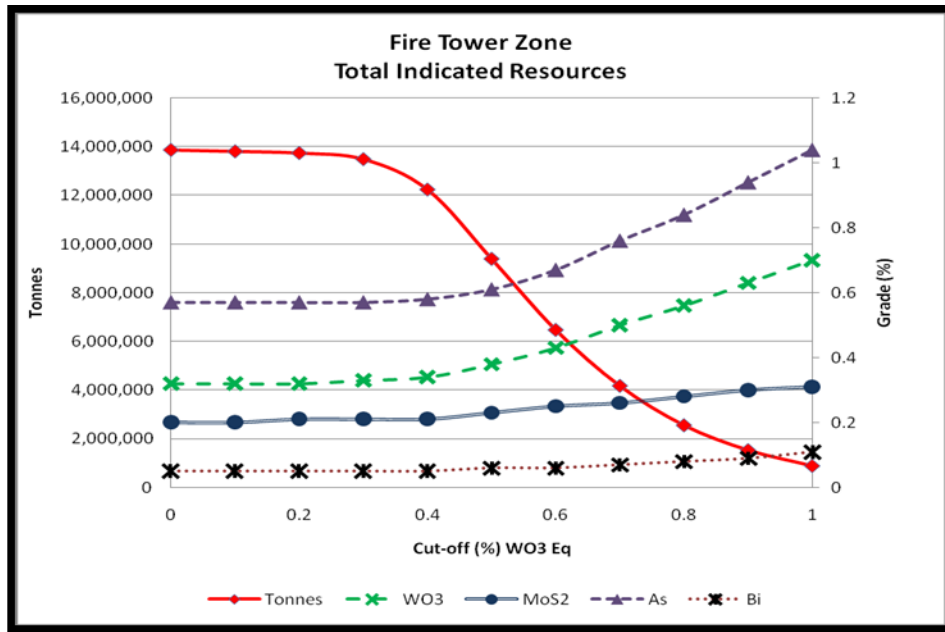


Figure 56. FTZ Indicated Resource grade-tonnage curve based on OK model

The specific gravity used to derive tonnes from the block volumes is constant at 2.65. This value was provided by ADEX and is based on historic measurements. SRK has applied this specific gravity; however, it is recommended that more density analysis to be carried out in the future to support this number.

#### 14.8.2 RESOURCE MODEL VALIDATION

As a validation check of the OK-derived resource model, the ID<sup>2</sup> grade estimation method was applied (Table 49). The ID<sup>2</sup> method is a distance-weighted interpolation class of methods, similar to OK, whereby the grade of a block is interpolated from several composites within a defined distance range of that block. ID<sup>2</sup> uses the inverse of the distance squared between a composite and the block as the weighting factor.

**TABLE 49.**  
**THE MINERAL RESOURCE OF THE FTZ ESTIMATED USING ID<sup>2</sup> METHODS**

Area	Tonnes	%WO <sub>3</sub>	%MoS <sub>2</sub>	%As	%Bi
<b>Indicated</b>					
Fire Tower West	9,110,400	0.32	0.21	0.29	0.04
Fire Tower North	<u>4,321,900</u>	<u>0.35</u>	<u>0.20</u>	<u>1.15</u>	<u>0.09</u>
<b>Total Indicated</b>	<b>13,432,300</b>	<b>0.33</b>	<b>0.21</b>	<b>0.57</b>	<b>0.06</b>
<b>Inferred</b>					
Fire Tower West	813,000	0.26	0.20	0.21	0.04
Fire Tower North	<u>10,700</u>	<u>0.26</u>	<u>0.16</u>	<u>0.23</u>	<u>0.04</u>
<b>Total Inferred</b>	<b>823,700</b>	<b>0.26</b>	<b>0.20</b>	<b>0.21</b>	<b>0.04</b>

(using a 0.3% WO<sub>3</sub> Eq\* cutoff grade)

Both methods gave very similar results, however SRK has elected to use the OK model since the continuity of the grades can be modelled from the variograms.

#### 14.9 PREVIOUS MINERAL RESOURCE ESTIMATES OF THE NORTH ZONE BY ADEX

In 1996, ADEX contracted Kvaerner Metals Davey Ltd. ("**Kvaerner**") to prepare a "mineral resource" estimate, which included an audit and verification of ADEX's previous "reserve" estimates of the North Zone. Kvaerner (1997) estimated an audited "probable resource" for the North Zone of 3,645,429 tonnes with an average grade of 0.801% Sn, 107.15 ppm In, 0.114% WO<sub>3</sub>, 0.055% MoS<sub>2</sub>, 0.187% Cu, 0.063% Pb and 0.869% Zn (Table 50). At a planned mining rate of 2,500 tonnes/day, the projected mine life would have been four years. Kvaerner (1997) recommended a mixture of SLC and long-hole stoping, with mining of ore from the North Zone and Deep Tin Zone (subzone) at a rate of 2,500 t/d. SLC would be used for 90% of the deposits and long hole for the remainder.



**TABLE 50.**  
**TIN-INDIUM "RESOURCES" OF THE North Zone**

Deposit	Total (tonnes)	% Sn	ppm In	% WO <sub>3</sub>	% MoS <sub>2</sub>	% Cu	% Pb	% Zn
North Zone	1,877,260	0.859	30.31	0.156	0.065	0.139	0.07	0.357
Deep Tin Subzone	<u>1,768,169</u>	<u>0.742</u>	<u>188.74</u>	<u>0.07</u>	<u>0.045</u>	<u>0.237</u>	<u>0.055</u>	<u>1.412</u>
<b>TOTAL</b>	<b>3,645,429</b>	<b>0.802</b>	<b>107.15</b>	<b>0.114</b>	<b>0.055</b>	<b>0.187</b>	<b>0.063</b>	<b>0.869</b>

*(Source: Kvaerner, 1997)*

Note: 0.2% Sn cutoff; Mo% is 60% of MoS<sub>2</sub>; Specific Gravity = 2.75

The study indicated that the North Zone deposits were uneconomic due to declining tin prices and high capital costs. This historic "resource" estimate was prepared prior to the implementation of NI 43-101. WGM has neither audited these estimates nor made any attempt to classify them according to NI 43-101 standards, which are the resource and reserve definitions of the Canadian Institute of Mining, Metallurgy and Petroleum (CIM 2010). This estimate should not be relied upon.

In 2008, WGM contracted SGS-Geostat Limited to do a Mineral Resource estimate of the North Zone using ADEX's 2008 diamond drilling results. Indicated and Inferred Mineral Resource estimates are provided in Table 51. The Technical Report (Dunbar and de L'Etoile, 2009) that describes these estimates can be obtained from SEDAR's website [[http://www.sedar.com/homepage\\_en.htm](http://www.sedar.com/homepage_en.htm)], under "Company Profiles", then "Adex Mining Inc.", and "View this Public Company's Documents".

**TABLE 51.**  
**INDICATED AND INFERRRED MINERAL RESOURCE ESTIMATES OF THE North Zone**

Deposit	Tonnes	% Sn	g/t In	g/t In (capped)	% Zn	% As	%WO <sub>3</sub>	%MoS <sub>2</sub>	% Cu	% Bi
Deep Tin	5,006,000	0.39	101	95	0.86	1.25	0.08	0.06	0.14	0.08
Endogranitic	4,336,000	0.55	22	20	0.28	0.85	0.12	0.06	0.10	0.09
Upper Deep Tin	838,000	0.22	103	95	1.36	0.76	0.08	0.06	0.07	0.05
#4 Tin Lode	<u>702,000</u>	<u>0.25</u>	<u>74</u>	<u>74</u>	<u>1.00</u>	<u>0.19</u>	<u>0.01</u>	<u>0.01</u>	<u>0.09</u>	<u>0.00</u>
<b>Total Indicated</b>	<b>10,882,000</b>	<b>0.43</b>	<b>68</b>	<b>64</b>	<b>0.67</b>	<b>0.98</b>	<b>0.09</b>	<b>0.06</b>	<b>0.11</b>	<b>0.08</b>
#1-3 Tin Lode	2,345,000	0.18	77	74	1.08	0.28	0.02	0.03	0.09	0.01
#5 Tin Lode	1,267,000	0.15	115	111	1.50	0.70	0.07	0.04	0.08	0.03
North Adit	3,076,000	0.27	62	62	0.83	1.16	0.09	0.06	0.09	0.07
North W-Mo	<u>915,000</u>	<u>0.26</u>	<u>54</u>	<u>50</u>	<u>0.58</u>	<u>1.14</u>	<u>0.25</u>	<u>0.12</u>	<u>0.12</u>	<u>0.10</u>
<b>Total Inferred</b>	<b>7,603,000</b>	<b>0.22</b>	<b>75</b>	<b>72</b>	<b>0.99</b>	<b>0.80</b>	<b>0.08</b>	<b>0.05</b>	<b>0.09</b>	<b>0.05</b>

*(from Dunbar and de L'Etoile 2009)*

## **14.10 MINERAL RESOURCE ESTIMATE FOR THE NORTH ZONE**

The Mineral Resource estimates for the North Zone have been prepared by John Reddick, M.Sc., P.Geo., who is the President of Reddick Consulting Inc. (“RCI”), and a Senior Geological Associate of Watts, Griffis and McOuat Limited. Mohan Srivastava, M.Sc., P.Geo., of FSS Canada Consultants Inc. provided assistance with some aspects of the data analysis and establishment of the estimation parameters. Mr. Srivastava and Mr. Reddick are Consulting Geologists and are independent of ADEX.

The North Zone Mineral Resources occur in a zone of variable mineralisation which has the potential for economic extraction of several elements. The elements reported for this estimate include Sn, Zn and In. Values for other elements are tabulated in this report as they have potential implications for metallurgical purposes but those elements are not considered as part of the current NI 43-101 compliant resource estimate and they do not contribute to any of the economic parameters used for the estimate. The minimum cutoff grade and block size used for the estimate were applied with the assumption that a resource with potential bulk mineable characteristics has been appropriately estimated using these parameters. Mineral Resource estimates are summarised in Table 52 and contained metal is summarised in Table 53.

**TABLE 52.**  
**FEBRUARY 2012 MINERAL RESOURCES – North Zone, MOUNT PLEASANT PROPERTY**

Mineral Resource Class	Tonnage (Millions of tonnes)	Cut Sn Grade (%)	Cut Zn Grade (%)	Cut In Grade (ppm)
Indicated	12.4	0.38	0.86	63.5
Inferred	2.8	0.30	1.13	69.8

- Resources were estimated using composites within a Block Model with block dimensions of 5x5x5 m and using an inverse distance squared grade interpolation method. Top cuts were applied to Sn, Zn and In assays before compositing. A cutoff of US\$75 Gross Metal Value (“GMV”) was applied and a recovery of 100% is assumed;
- Mineral resources which are not mineral reserves do not have demonstrated economic viability. The estimate of mineral resources may be materially affected by environmental, permitting, legal, title, socio-political, marketing, or other relevant issues;
- The quantity and grade of reported inferred mineral resources in this estimation are uncertain in nature and there has been insufficient exploration to define these inferred resources as an indicated or measured mineral resource and it is uncertain if further exploration will result in upgrading them to an indicated or measured mineral resource category; and
- The mineral resources in this press release were estimated using the Canadian Institute of Mining, Metallurgy and Petroleum (CIM), CIM Standards on Mineral Resources and Reserves, Definitions and Guidelines prepared by the CIM Standing Committee on Reserve Definitions and adopted by CIM Council November 27, 2010.

**TABLE 53.**  
**CONTAINED METAL, North Zone, MOUNT PLEASANT PROPERTY (CAPPED\*)**

Mineral Resource Class	Contained Sn (kg)	Contained Zn (kg)	Contained In (kg)
Indicated	47,000,000	107,000,000	789,000
Inferred	8,600,000	32,000,000	198,000

- Top cuts of 3% Sn and 4% Sn were applied to Sn assays before compositing; top cuts of 5% Zn and 8% Zn were applied to Zn assays before compositing and top cuts of 500 ppm In and 600 ppm In were applied to In assays before compositing. The top cuts applied varied according to the domain. A cutoff of US\$75 GMV was applied and a recovery of 100% is assumed; and
- Figures may not total due to rounding.

## **14.11 DRILLHOLE DATABASE**

The North Zone Mineral Resource estimate is based on surface and underground diamond drilling done from the 1950s to 2011. The database provided to WGM covers an area larger than that for which resources are estimated and the unfiltered drillhole data provided covers an area of about 2.0 km in an east-west direction by 2.0 km in a north-south direction. A filter was applied by RCI to define an area that covers a smaller area but still includes the entire North Zone (Mine Grid 15000E to 15800E and Mine Grid 13200N to 14100N). Within this filtered area there are a total of 640 drillholes with an aggregate length of 85,515 m. The coring has been at diameters ranging from 23 to 27 mm (AQ, AX, E and XRT wireline core) for early drilling, 36.5 mm core (BQ wireline) in the 1970s and 36.5 to 47.5 mm diameter core (BQ to NQ wireline) from the 1980s to present. There was a check sampling program of historic drill samples done for the May 2009 Technical Report (Dunbar and l'Etoile, WGM, May 2009) and those authors concluded that the historic sampling results were repeatable.

The drill pattern is irregular; recent drilling has been entirely from surface and is less clustered than older underground drilling. In addition, the suite of elements analysed has varied over time. Holes extend from surface to a maximum depth of about 580 m below surface but the majority test areas less than 450 m below surface. The area previously explored by means of underground development and drilling focused on the Endogranite Zone, the #1-3 Tin Zone and the #4 Tin Zone at elevations of roughly 250 to 400 m below surface for the Endogranite zone and elevations of roughly 50 to 150 m below surface for the #1-3 Tin Zone and the #4 Tin Zones. Drilling done by ADEX from 1996 to 2011 accounts for 81 surface holes totalling about 19,027 m. Almost all of these holes are drilled vertically, and generally directed at defining zones of better grade Sn mineralisation. Tin remains the metal that makes the greatest contribution to the Gross Metal Value (“GMV”) in the current resource estimate.

RCI has not undertaken any studies to determine the sensitivity of the resource estimates to drilling by date or by core size. A total of 377 holes totalling ~41,679 m that were used for this resource were drilled prior to 1985 and presumably these holes are mostly smaller diameter (<36.5 mm). This represents a little over one half of the metres of drilling in the database used for this estimate. Of the older holes about 8,114 m of core is from underground drilling and that core was likely less than 30 mm in diameter. Of the holes drilled since 1985, 103 holes totalling about 26,075 m were drilled from surface and 160 holes totalling about 14,761 m were drilled from underground and are reported to be BQ size ((Dunbar and l'Etoile, WGM, May 2009, p. 36).

Collar coordinates are recorded in the mine grid coordinate system. Vertical and angled holes from surface, and horizontal and angled ones from underground, are at highly variable azimuths. The areas drilled are projected on vertical sections on 25 m centres that are oriented north-south and also on another set of sections on 25 m centres that are oriented southwest-northeast.

Drillholes are collared at varied or various spacings. Underground holes were drilled on 6 to 25 m centres and surface drillholes are generally tens of metres apart.

Surface drillhole collars from 1996 to 2011 were located using differential GPS survey instrumentation. ADEX reports that holes drilled prior to 1996 were located by means of conventional surveying and many of the collars of surface holes drilled before 1996 have been located by differential GPS. Figure 57 shows a 3D view of the traces of all the drillholes used for this estimate. RCI is of the opinion that the drillhole collar locations and down-hole survey information is reliable for the purposes of resource estimation. RCI estimated the Mineral Resources for the North Zone of the Mount Pleasant Property using block modelling methods in Gemcom software.

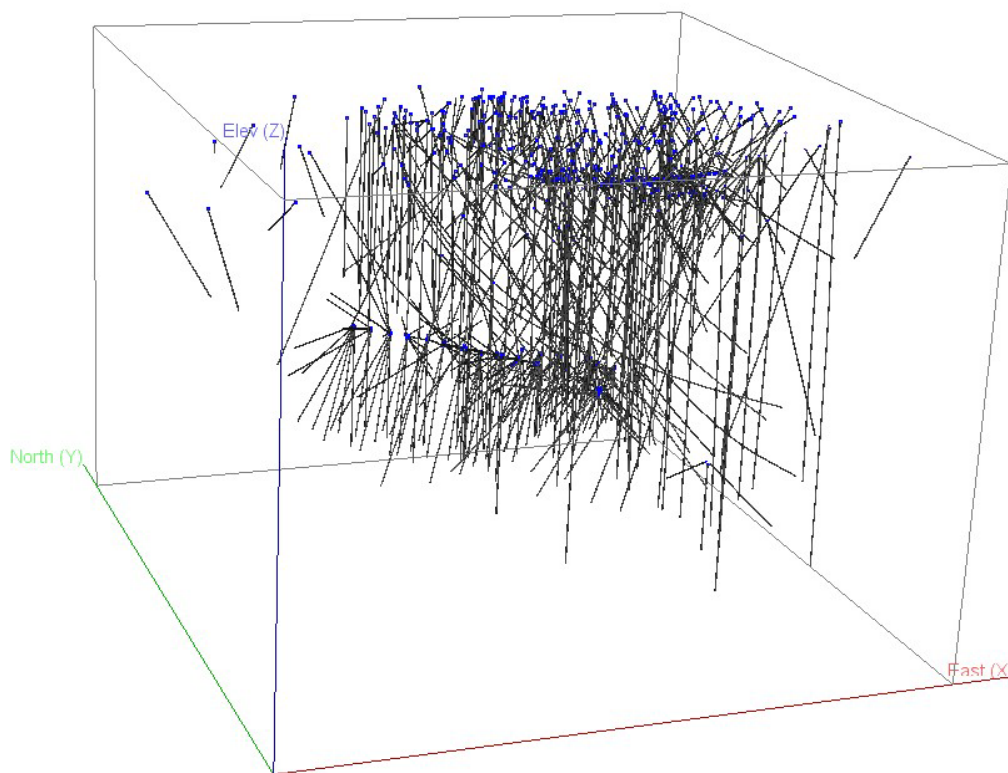


Figure 57. 3D View - Traces of Surface and Underground Drillholes

#### 14.11.1 ASSAYS, GEOLOGICAL INFORMATION AND OTHER DRILLHOLE DATA

Drillhole assay data were provided to RCI in the form of spreadsheets with drillhole collar locations, borehole deviation survey data and assay data and these data were imported into a Gemcom database. The data from earlier drilling by other companies that worked on the North Zone have been incorporated into the database used by ADEX. Lithology, Rock Quality Determinant (“RQD”) and core recovery data for the drillholes are not recorded in the digital database, although lithology is recorded on archived, hard copy drill logs. RCI recommends that pertinent summary lithology data be entered into the digital database.

The drillhole database was filtered by RCI to limit the holes being used to those in the immediate vicinity of the North Zone, as there were a number of holes that were some distance away from the area being estimated. The filtered drillhole database used by RCI for resource estimation was produced using a Gemcom key index filter. Only data from drillholes passing this filter were utilised for this resource estimate.

RCI is satisfied that the filtered data used for the estimates are sufficiently free of error to be adequate for resource estimation. Initial error checking in 2011 found there were some mistakes in the assay database. ADEX revisited the hard copy records for assay data in late 2011 and early 2012 and made corrections as warranted before the estimation was done. These corrections largely related to changing entries that were entered as zero values to either not sampled or below detection limit entries.

#### 14.11.2 BULK DENSITY

According to the January 2010 Preliminary Economic Assessment done for the North Zone by Thibault and Associates “*the last measurements on a selection of core by the wax immersion method were done in 1985. Specific gravities ranged from 2.29 to 3.25 with an average of 2.70*” (Thibault and Associates, 2010). RCI assigned a bulk density factor of 2.70 t/m<sup>3</sup> and is of the opinion that this bulk density factor forms a reliable basis for the purposes of calculating tonnages for this resource estimate. RCI recommends additional bulk density data be collected.

Database records for rock quality designation (“RQD”) measurements and core recoveries are not recorded in the drillhole database. RCI recommends that these data be entered into the digital database for future drillholes.

### 14.11.3 TOPOGRAPHY

A digital topographic surface was generated from surface drillhole data. As all the drillhole data is associated with the areas for which the resources are reported, RCI is of the opinion that the data accurately reflects the topographic surface. Insufficient lithology data were available to generate a viable bedrock surface so the topographic surface was copied 5 m below and this copied surface was used to represent the bedrock surface.

## 14.12 DATA ANALYSIS

### 14.12.1 SAMPLE LENGTHS

As a result of different assay protocols over time, not all drillhole intervals have been sampled and further, the sampled intervals have not all been sampled for the complete suite of elements for which there are data. There are a total of 27,527 sample intervals that were assayed for Sn and Zn in the filtered drillhole database used for estimation and 74,684.27 m of the core was sampled for those elements (87.3% of the total drilled length of 85,515.16 m for the holes in the filtered database). The mean sample length for the Sn and Zn samples is 2.71 m, the median sample length is 3.04 m and the mode for sample lengths is at 3.05 m. There are 68 samples analysed for Sn and Zn that are 5.0 m or longer with three samples 7.0 m or longer. There are 229 sample intervals that are shorter than 0.5 m.

There are substantially fewer samples analysed for In than for Sn and Zn (9,435 samples over 27,813m in the filtered data which represents about 33% of the drill core). For samples with In analyses, the mean sample length is 2.95 m, the median sample length is 3.04 m and the mode is at 3.00 m. There are 10 samples analysed for In that are 5.0 m or longer with two samples 7.0 m or longer. There are 13 sample intervals that are shorter than 0.5 m.

Tables 54 and 55 show the sample length statistics for Sn, Zn and In assays, including a breakdown by domains. A normal histogram of sample lengths for Sn and Zn is shown in Figure 58 and for In by Figure 59. A description of the domains is given in the following section.

**TABLE 54.  
NORTH ZONE FILTERED DRILLHOLE DATA – SN AND ZN SAMPLE LENGTH  
STATISTICS**

	All Sn and Zn Data Length (m)	100 domain Length (m)	200 domain Length (m)
Mean	2.71	2.98	2.65
Median	3.04	3.05	3.04
Mode	3.05	3.05	3.05
Standard Deviation	0.76	0.32	0.82
Coefficient of Variation	0.28	0.11	0.31
Minimum	0.01	0.01	0.01
Maximum	9.00	6.00	9.00
Count	27,527	4,980	22,547
<b>Values at Percentiles</b>			
P 0.1	1.52	3.04	1.52
P 0.25	3.00	3.04	1.83
P 0.5	3.04	3.05	3.04
P 0.75	3.05	3.05	3.05
P 0.9	3.05	3.05	3.05
P 0.95	3.05	3.05	3.05
P 0.99	4.57	3.05	4.57
P 0.995	4.57	3.11	4.57

**TABLE 55.  
NORTH ZONE FILTERED DRILLHOLE DATA – IN SAMPLE LENGTH STATISTICS**

	ALL In Data Length (m)	100 Domain Length (m)	200 Domain Length (m)
Mean	2.95	2.96	2.95
Median	3.04	3.05	3.00
Mode	3.00	3.05	3.00
Standard Deviation	0.40	0.40	0.40
Coefficient of Variation	0.14	0.13	0.14
Minimum	0.01	0.01	0.21
Maximum	9.00	6.00	9.00
Count	9,435	1,318	8,117
<b>Values at Percentiles</b>			
P 0.1	3.00	3.00	3.00
P 0.25	3.00	3.04	3.00
P 0.5	3.04	3.05	3.00
P 0.75	3.05	3.05	3.05
P 0.9	3.05	3.05	3.05
P 0.95	3.05	3.05	3.05
P 0.99	3.05	3.05	3.06
P 0.995	4.47	3.05	4.47

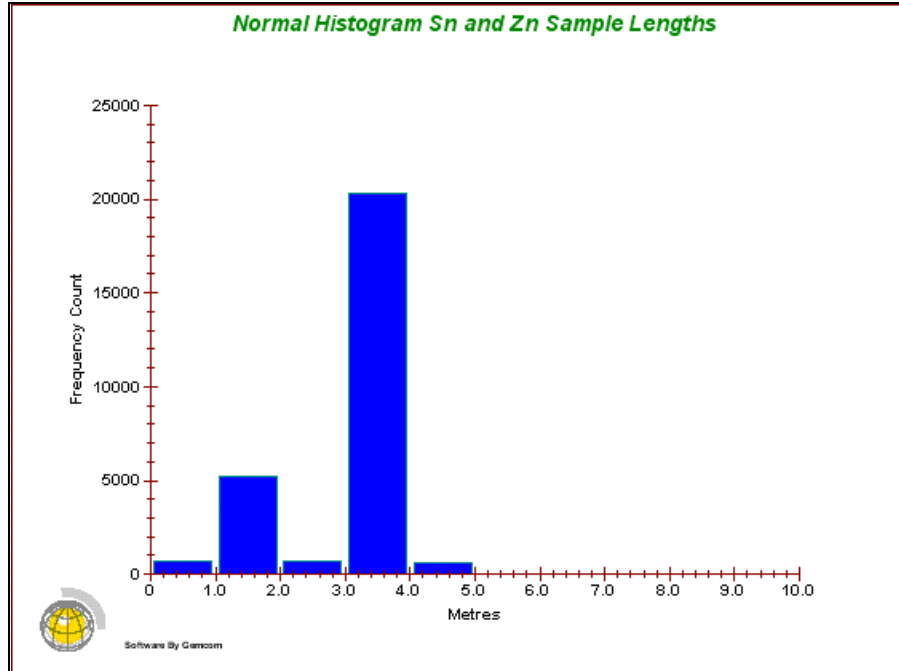


Figure 58. Histogram of Sample Lengths for Sn and Zn in the Resource Area

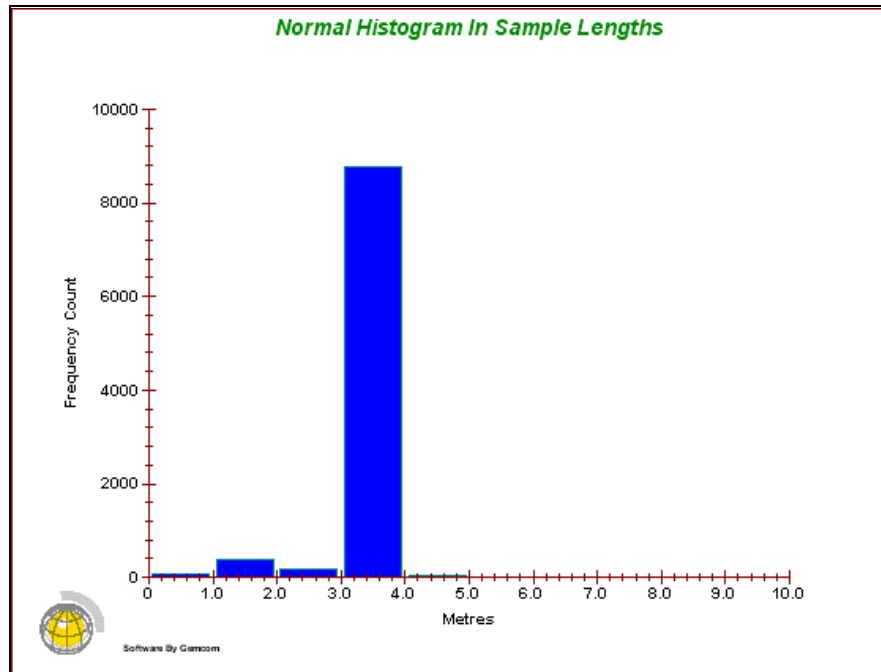


Figure 59. Histogram of Sample Lengths for In for the Resource Area



#### 14.12.2 LITHOLOGY

There are no lithology records in the digital database. It is recommended that lithology from the archived hard copy logs be included in the database.

#### 14.12.3 GEOLOGICAL DOMAINS

The North Zone was divided into a number of domains when estimated in 2009. A review of those domains and the underlying data led to a simpler domain model for the current estimate. The Endogranite zone was identified as unique domain on the basis of significantly different metal values and metal ratios than the rest of the North Zone and is assigned as the 100 Domain. It is characterised by significantly higher Sn grades and lower Zn and In grades than the rest of the North Zone. The other domains used in the 2009 estimate are generally characterised by lower Sn and higher Zn and In values relative to the Endogranite Zone. However, the ratio of these metals to one another is highly variable. The manner in which the domains were modelled in 2009 resulted in a large number of isolated blocks that had no continuity with other blocks in the same domain or with other domains. Further, the boundaries of these blocks were defined in such a manner that there were gaps between domains where no grades were estimated, even though elevated values for Sn, Zn and In existed for drillhole intervals in these gaps. Therefore for this estimate the balance of the North Zone was grouped as one larger domain that excluded the Endogranite Zone but included all other data; this was designated as the 200 Domain.

#### 14.12.4 ASSAYS GRADE DISTRIBUTIONS AND STATISTICS

Only Sn, Zn and In values contribute to the current resource estimates. Table 56 shows summary statistics for all the Sn, Zn and In assays from holes used in the area of the resource estimates.

**TABLE 56.**  
**NORTH ZONE SUMMARY STATISTICS - SN, ZN AND IN ASSAYS BY DOMAIN**

	Sn % 100 Domain	Sn % 200 Domain	Zn % 100 Domain	Zn % 200 Domain	In % 100 Domain	In % 200 Domain
Mean	0.24	0.11	0.19	0.48	0.00262	0.00502
Median	0.06	0.03	0.04	0.12	0.00047	0.00086
Mode	0.04	0.01	0.03	0.00	0.00010	0.00007
Std. Deviation	0.61	0.39	0.73	1.29	0.00800	0.01677
CV	2.57	3.72	3.97	2.67	3.05	3.34
Minimum	0.00	0.00	0.00	0.00	0.00001	0.00001
Maximum	14.94	14.15	14.72	39.66	0.11300	0.58400
Count	4,980	22,547	4,980	22,547	1,318	8,114
<b>Value at Percentiles</b>						
P 0.1	0.02	0.00	0.00	0.00	0.00008	0.00009
P 0.25	0.03	0.01	0.02	0.05	0.00016	0.00022
P 0.5	0.06	0.03	0.04	0.12	0.00047	0.00086
P 0.75	0.16	0.07	0.08	0.36	0.00164	0.00334
P 0.9	0.55	0.19	0.25	1.10	0.00570	0.01040
P 0.95	1.05	0.38	0.63	2.05	0.01191	0.02140
P 0.99	3.10	1.48	3.83	6.36	0.03506	0.07099
P 0.995	4.48	2.53	5.46	8.65	0.05705	0.10000

Figures 60 to 65 show lognormal plots for the Sn, Zn and In assays in both domains. Review of histograms shows primarily log-normal distribution but the plots also suggest considerable effects from what is attributed to be imprecise results at lower detection limits.

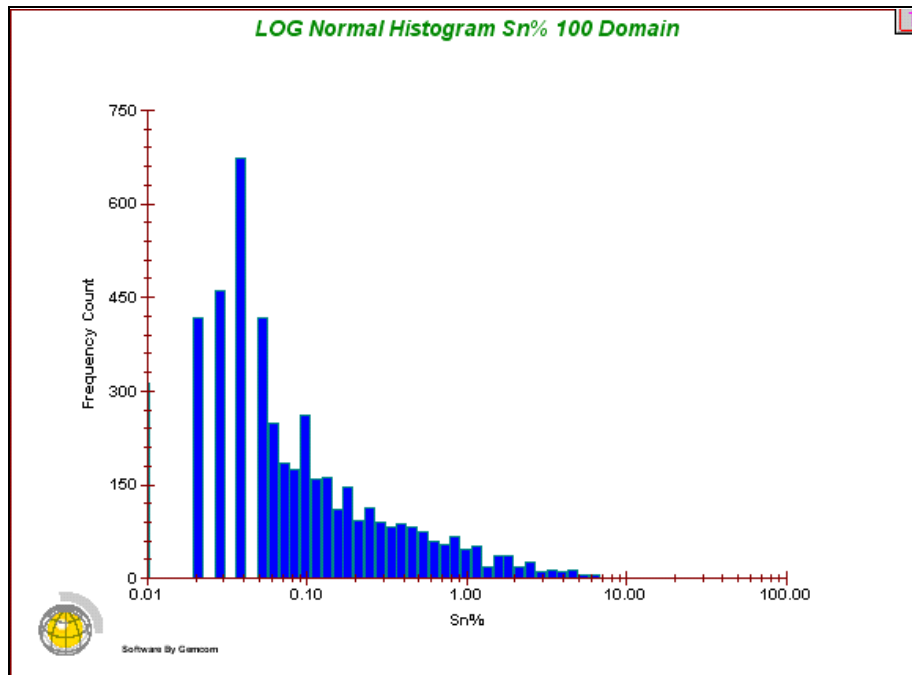


Figure 60. Histogram of Uncut Sn Assays in 100 Domain

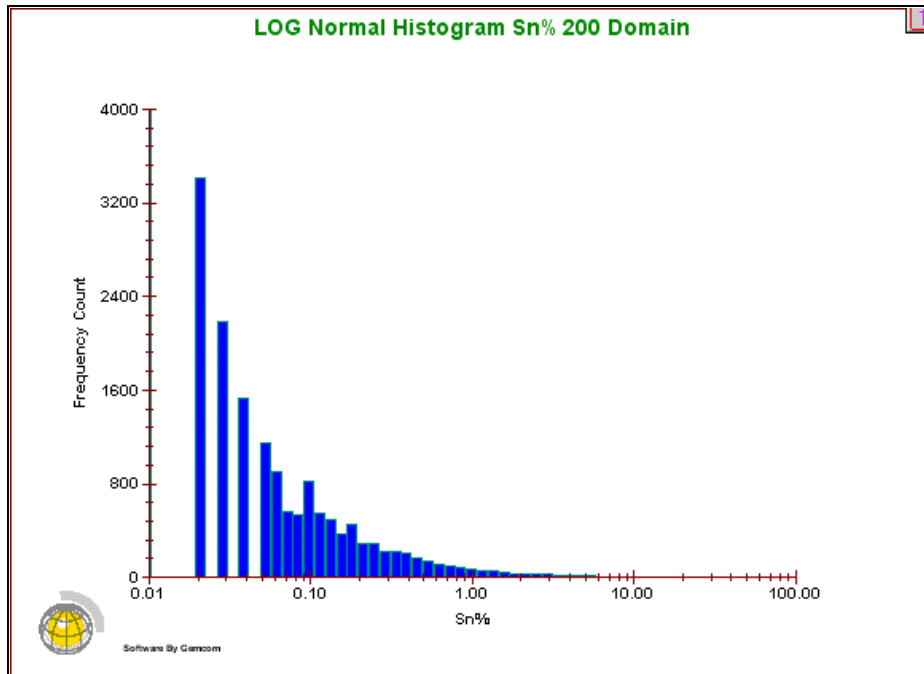


Figure 61. Histogram of Uncut Sn Assays in 200 Domain

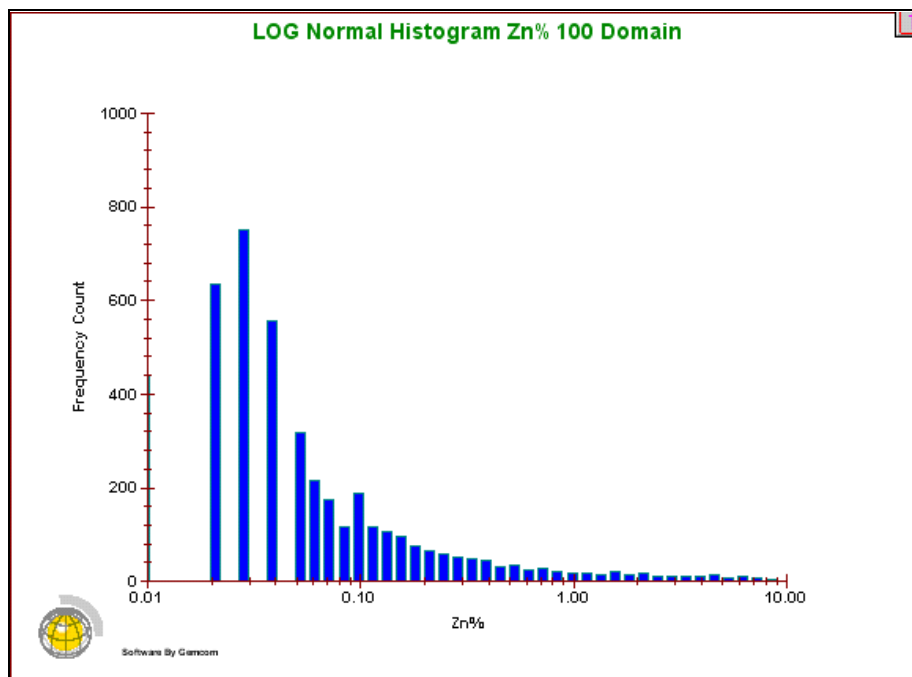


Figure 62. Histogram of Uncut Zn Assays in 100 Domain

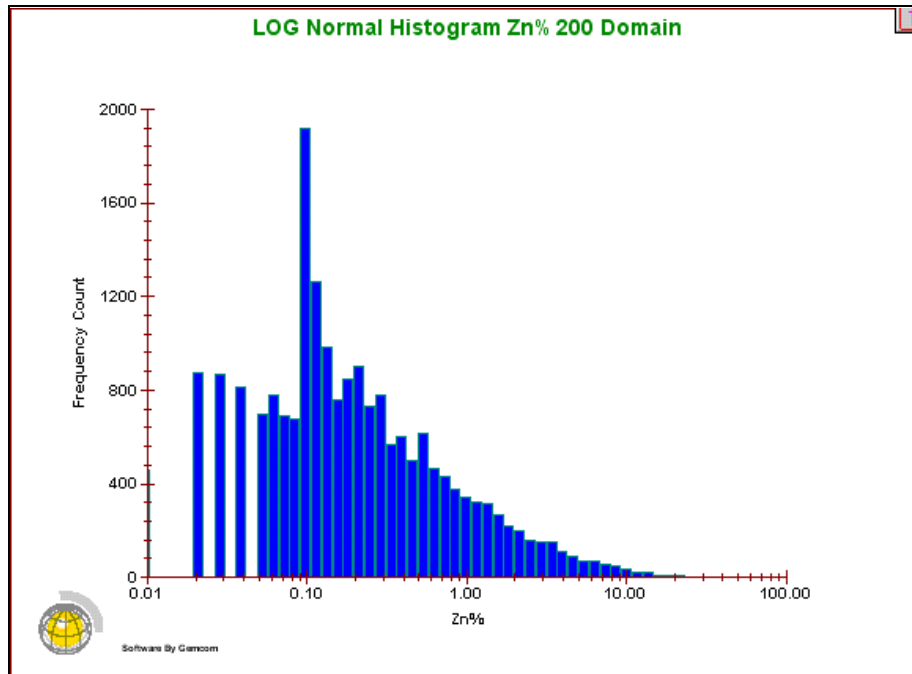


Figure 63. Histogram of Uncut Zn Assays in 200 Domain

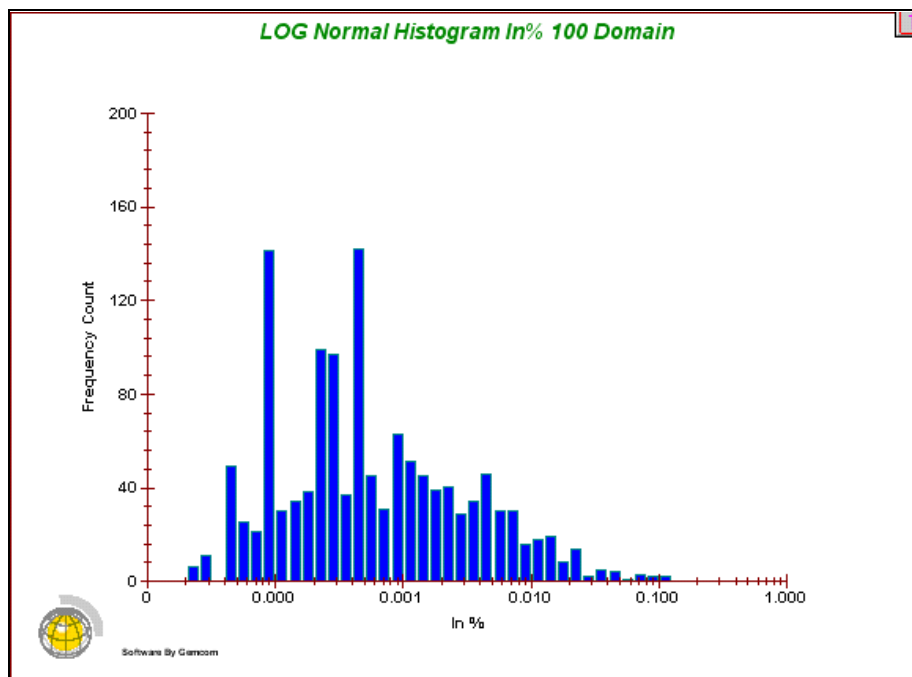


Figure 64. Histogram of Uncut In Assays in 100 Domain

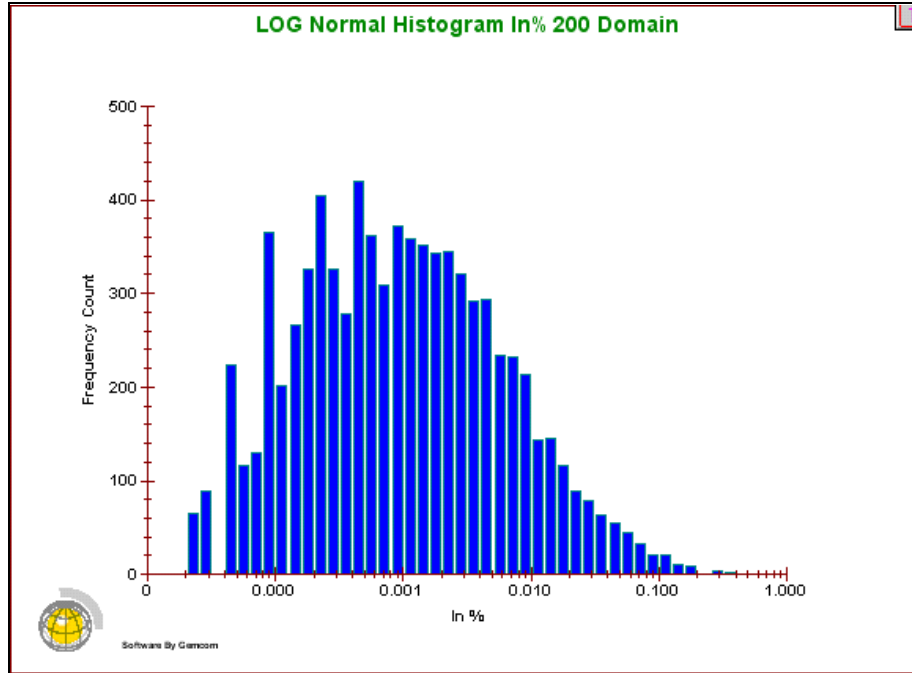


Figure 65. Histogram of Uncut In Assays in 200 Domain

Figures 66 to 68 show boxplots to summarize the distribution assay values for Sn, Zn and In for each domain.

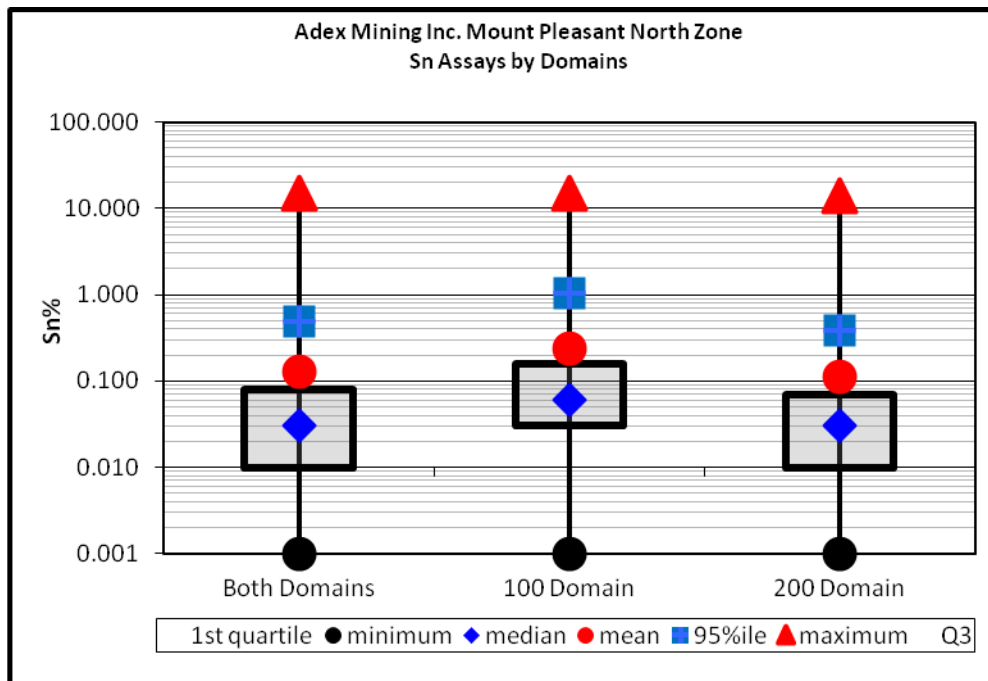


Figure 66. Boxplot Showing Sn Grades by Domain

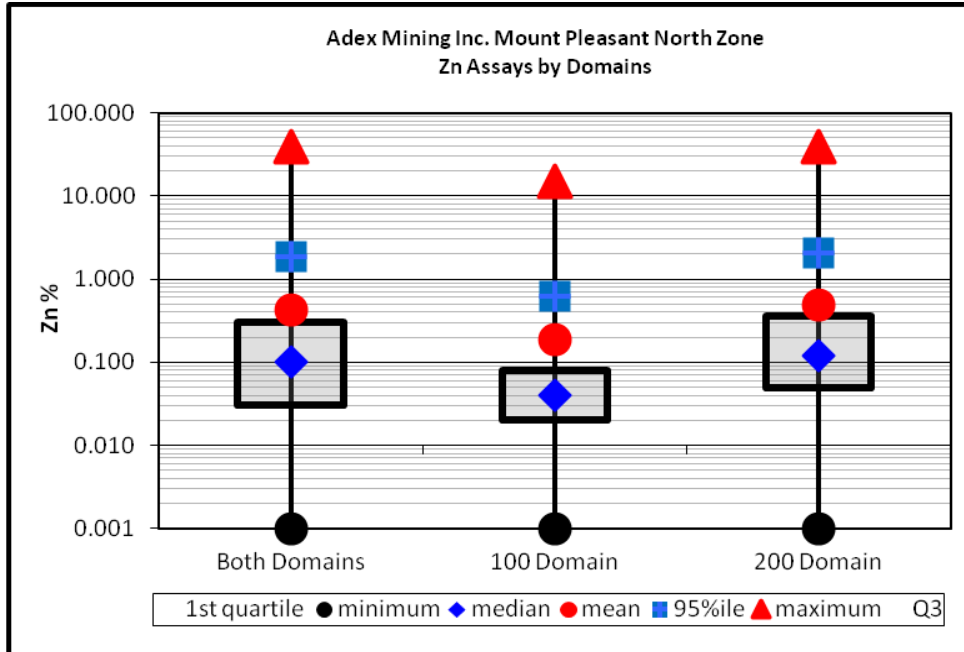


Figure 67. Boxplot Showing Zn Grades by Domain

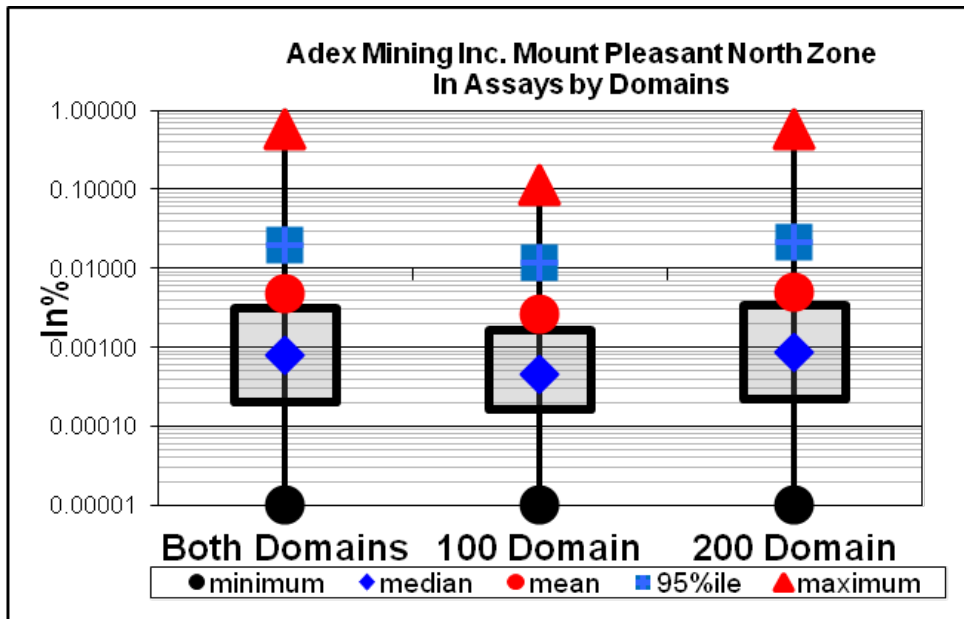


Figure 68. Boxplot Showing In Grades by Domain

#### 14.12.5 OTHER ELEMENTS OF INTEREST

In addition to the elements that are reported for the current resource estimate, there is a suite of additional elements of interest that are also discussed in this report as they potentially have an impact on metallurgical results. These elements do not contribute to, nor do they form any

part of the current NI 43-101 compliant mineral resource estimate. The summary statistics for the assays for these elements are presented in Tables 57 and 58.

**TABLE 57.**  
**NORTH ZONE SUMMARY STATISTICS - OTHER ELEMENTS IN THE 100 DOMAIN**

	As%	Bi%	Ca%	Cu%	Fe%	MoS <sub>2</sub> %	Pb%	WO <sub>3</sub> %
Mean	0.76	0.09	0.06	0.05	4.75	0.07	0.04	0.11
Median	0.29	0.05	0.00	0.01	4.69	0.04	0.01	0.04
Mode	0.07	0.02	0.00	0.00	0.00	0.01	0.00	0.00
Std. Deviation	1.31	0.11	0.45	0.15	3.34	0.10	0.29	0.20
CV	1.73	1.21	7.14	2.91	0.70	1.27	6.43	1.85
Minimum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum	24.78	1.56	10.10	4.98	47.52	1.40	6.20	3.36
Count	4,980	4,980	4,981	4,980	4,981	4,980	4,980	4,980
<b>Value at Percentiles</b>								
P 0.10	0.05	0.01	0.00	0.00	0.00	0.01	0.00	0.00
P 0.20	0.08	0.02	0.00	0.00	2.58	0.01	0.00	0.00
P 0.30	0.13	0.03	0.00	0.00	3.49	0.02	0.00	0.01
P 0.40	0.20	0.04	0.00	0.01	4.13	0.03	0.00	0.03
P 0.50	0.05	0.05	0.00	0.01	4.69	0.04	0.01	0.04
P 0.60	0.08	0.07	0.00	0.02	5.32	0.06	0.01	0.07
P 0.70	0.65	0.10	0.00	0.03	5.98	0.08	0.01	0.10
P 0.80	1.07	0.14	0.00	0.06	6.77	0.11	0.02	0.16
P 0.90	1.99	0.22	0.00	0.13	8.16	0.14	0.04	0.29
P 0.95	3.14	0.31	0.00	0.24	9.83	0.26	0.09	0.44
P 0.990	5.93	0.54	2.30	0.62	15.24	0.44	0.91	0.89
P 0.995	7.94	0.63	3.30	0.86	18.51	0.57	2.22	1.16

**TABLE 58.**  
**NORTH ZONE SUMMARY STATISTICS - OTHER ELEMENTS IN THE 200 DOMAIN**

	As%	Bi%	Ca%	Cu%	Fe%	MoS <sub>2</sub> %	Pb%	WO <sub>3</sub> %
Mean	0.59	0.04	0.21	0.05	0.57	0.05	0.05	0.05
Median	0.16	0.02	0.00	0.01	0.00	0.03	0.01	0.01
Mode	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00
Std. Deviation	1.15	0.08	0.77	0.18	1.82	0.06	0.32	0.14
CV	1.96	1.83	3.73	3.77	3.14	1.28	6.95	2.56
Minimum	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximum	23.00	3.20	13.20	9.60	54.48	2.19	29.08	8.45
Count	14,963	14,962	22,540	21,315	22,549	20,692	21,318	18,264
<b>Value at Percentiles</b>								
P 0.10	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P 0.20	0.03	0.00	0.00	0.00	0.00	0.02	0.00	0.00
P 0.30	0.05	0.01	0.00	0.01	0.00	0.02	0.00	0.00
P 0.40	0.09	0.01	0.00	0.01	0.00	0.02	0.01	0.01
P 0.50	0.16	0.02	0.00	0.01	0.00	0.03	0.01	0.01
P 0.60	0.27	0.03	0.00	0.02	0.00	0.04	0.02	0.03
P 0.70	0.47	0.04	0.00	0.03	0.00	0.05	0.02	0.04
P 0.80	0.83	0.07	0.00	0.04	0.00	0.07	0.03	0.07
P 0.90	1.64	0.10	0.00	0.09	2.50	0.10	0.06	0.15
P 0.95	2.60	0.15	1.80	0.18	4.81	0.14	0.13	0.24
P 0.990	5.51	0.30	3.80	0.60	7.90	0.27	0.65	0.53
P 0.995	7.03	0.41	4.80	1.03	9.21	0.33	1.21	0.72

### **14.13 GRADE CAPPING**

On the basis of the point at which the ragged tail appears on the lognormal histogram, reviews of the probability plots and on the total metal carried by the higher grade samples, the following top cuts were applied. The difference in contained metal between the uncut and cut grades for the resource estimates ranges from about 4% to 12% depending on the metal and the domain. Tin is the metal that has the largest economic contribution to the resource. The twenty highest grade uncut Sn samples in the 100 Domain, ranging from 4.73% Sn to 14.94% Sn, account for 9.9% of the total metal as determined by a grade times length basis. The forty highest grade uncut Sn samples in the 200 Domain, ranging from 4.60% Sn to 14.15% Sn, account for 9.2% of the total metal as determined by a grade times length basis.

<b>Metal and Domain</b>	<b>Sn% 100 Domain</b>	<b>Sn% 200 Domain</b>	<b>Zn% 100 Domain</b>	<b>Zn% 200 Domain</b>	<b>In% 100 Domain</b>	<b>In% 200 Domain</b>
Top Cut	4%	3%	5%	8%	0.05%	0.06%
Difference in Length-Weighted Metal Due to Top Cut	-3.8%	-6.2%	-7.2%	-11.8%	-6.3%	-11.9%

### **14.14 COMPOSITES**

All elements were composited to 3.0 m run-length composites. Except for a number of very short and a few long assay intervals the 3.0 m composites are not substantially different in length than the majority of assay intervals. The presence of some very short assay intervals in the data was the primary reason for compositing. Assays were cut before compositing.

Table 59 shows summary statistics for all the Sn, Zn and In composites for holes used in the resource estimates. When composites were created, the grade of any unassayed sample intervals was assumed to be zero. This has almost no effect on the Sn and Zn composites, since virtually every sample interval in the 100 and 200 Domains has Sn and Zn assays. But it has a significant effect on the Indium composites, since many of the sample intervals do not have Indium assays. Previous resource estimates for the Mount Pleasant Project have in-filled the missing Indium assays by predicting the Indium grade from the grades of other metals, principally relying on Zinc. The use of zeros where Indium is not assayed is conservative, but limits the risk of incorrectly predicting good Indium grades where no direct assays of Indium support this.



**TABLE 59.**  
**NORTH ZONE SUMMARY STATISTICS - SN, ZN AND IN COMPOSITES BY DOMAIN**

	Sn % 100 Domain	Sn % 200 Domain	Zn % 100 Domain	Zn % 200 Domain	In ppm 100 Domain	In ppm 200 Domain
Mean	0.21	0.08	0.16	0.38	0.00059	0.00152
Median	0.06	0.03	0.01	0.01	0.00004	0.00004
Mode	0.04	0.00	0.00	0.00	0.00000	0.00000
Std. Deviation	0.43	0.22	0.50	0.80	0.00279	0.00546
CV	2.09	2.66	3.13	2.09	4.72	3.60
Minimum	0.00	0.00	0.00	0.00	0.00000	0.00000
Maximum	4.00	3.00	5.00	8.00	0.05000	0.06000
Count	5,319	22,212	5,319	22,212	5,319	22,212
<b>Value at Percentiles</b>						
P 0.1	0.01	0.00	0.00	0.00	0.00000	0.00000
P 0.25	0.03	0.01	0.02	0.04	0.00000	0.00000
P 0.5	0.06	0.03	0.04	0.12	0.00000	0.00000
P 0.75	0.14	0.07	0.08	0.34	0.00006	0.00045
P 0.9	0.51	0.18	0.26	0.94	0.00088	0.00328
P 0.95	0.94	0.32	0.64	1.68	0.00296	0.00766
P 0.99	2.41	1.12	3.01	4.32	0.01218	0.02964
P 0.995	3.18	1.73	3.87	5.50	0.01926	0.04150

#### **14.15 HISTORICAL PRODUCTION**

There has been no historical production from the North Zone although there has been underground development for exploration and to provide platforms for underground drilling at the 955 m level (mine elevation) for the Endogranite Zone and the 1,185 m level (mine elevation) for the #1-3 Tin Zone and #4 Tin Zone.

#### **14.16 VARIOGRAPHY**

##### **14.16.1 100 DOMAIN**

Figures 69 to 71 show experimental variograms using the assay data for Sn, Zn and In from the 100 Domain and, in the case of indium, using only the sample intervals that had actual assays (i.e. not using the intervals where an indium grade of zero had been assigned because no indium assay had yet been done). These figures show that the continuity is slightly longer in the sub-horizontal direction, with a range of approximately 35 m, and slightly shorter in the vertical direction, with a range of approximately 20 m.

Nugget effects are roughly 40-50% of the sill, which reflects a combination of genuine short-scale variation (the erratic and unpredictable occurrence of the higher grade values) and additional variability due to noise from sampling and assaying procedures. The lower nugget effect component seen in the vertical direction is partly attributed to the availability of a

relatively large number of closely spaced samples in vertical holes drilled by ADEX that, by virtue of being relatively recent data, likely have lower analytical noise than assays from holes drilled by previous operators. This has been confirmed by downhole variograms calculated for older drill holes versus the more recent ADEX drill holes; these show a higher nugget effect for the older drilling for both Sn and Zn. With very few Indium data in the older drill holes, the downhole variogram for the Indium assays in the older holes has few data pairs, and does not present a clear structure.

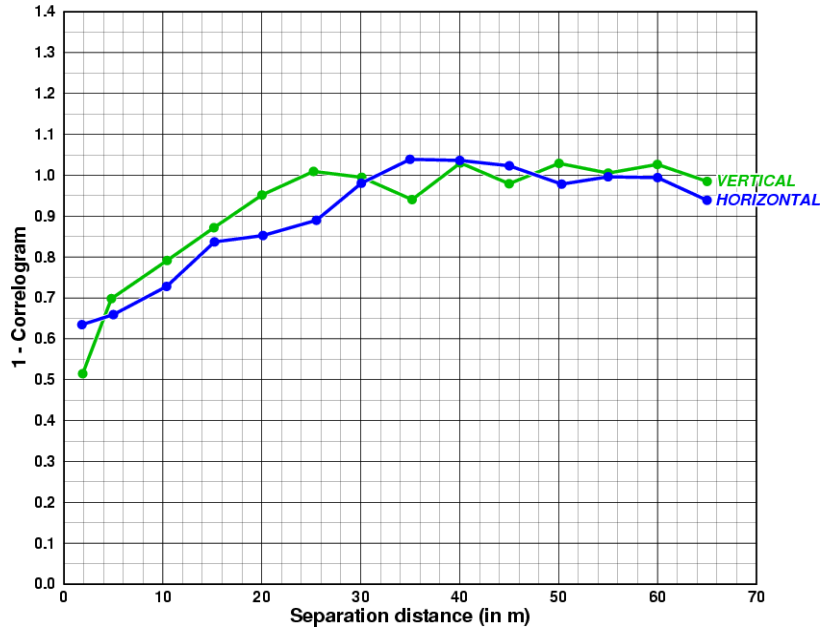


Figure 69. Experimental Variograms for Sn in the 100 Domain

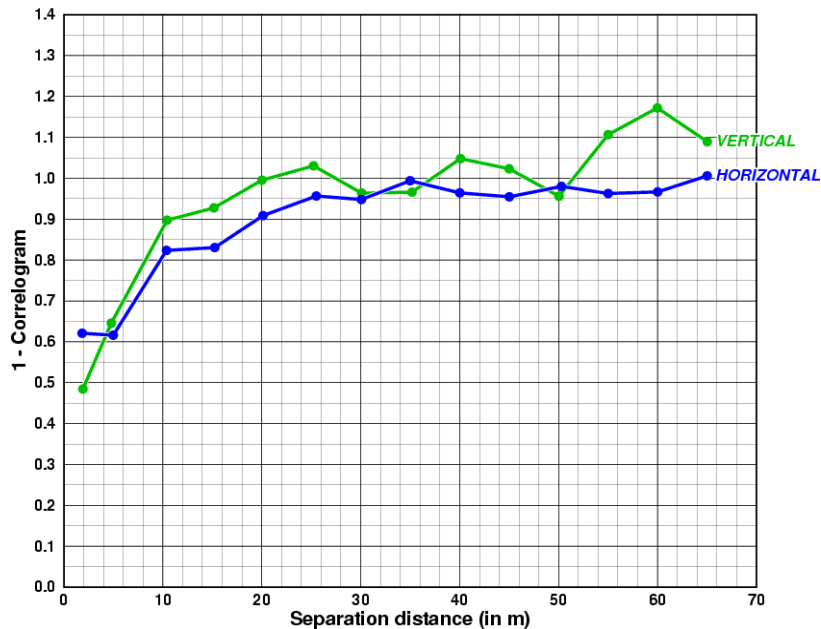


Figure 70. Experimental Variograms for Zn in the 100 Domain

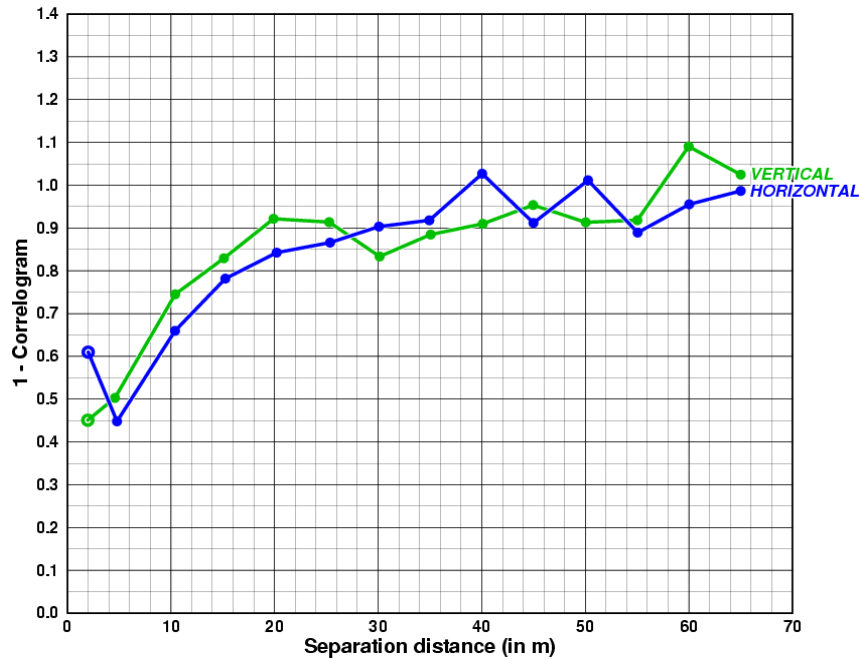


Figure 71. Experimental Variograms for In for the 100 Domain

The older drill holes and the more recent holes both show similar ranges: 35 m horizontally and 20 m vertically.

14.16.2 200 DOMAIN

Figures 72 to 74 show experimental variograms calculated in several different directions using the assay data for Sn, Zn and In for the 200 Domain and, in the case of indium, using only the sample intervals that had actual assays (i.e. not using the intervals where an indium grade of zero had been assigned because no Indium assay had yet been done). These figures show a similar pattern of spatial continuity as seen in the 100 Domain, with the grades being more continuous in sub-horizontal directions, but with a weaker directional anisotropy than in the 100 Domain. For all three metals, the horizontal ranges are approximately 30 m and the vertical range is approximately 20 m.

Nugget effects are similar to those seen in the 100 Domain, roughly 40-50% of the sill, and, as with the 100 Domain, are slightly lower in the vertical direction, likely because many of the vertical assay pairs are from holes drilled recently by ADEX.

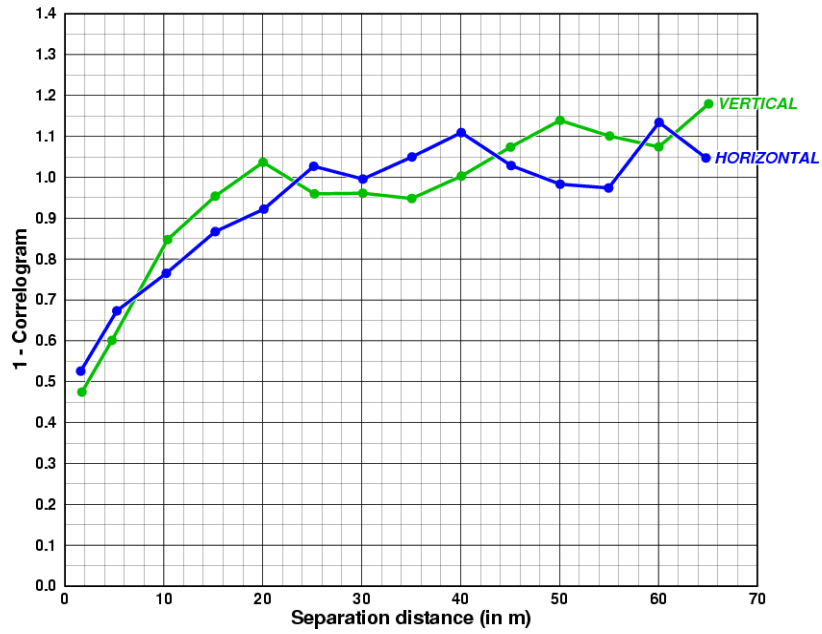


Figure 72. Experimental Variograms for Sn in the 200 Domain

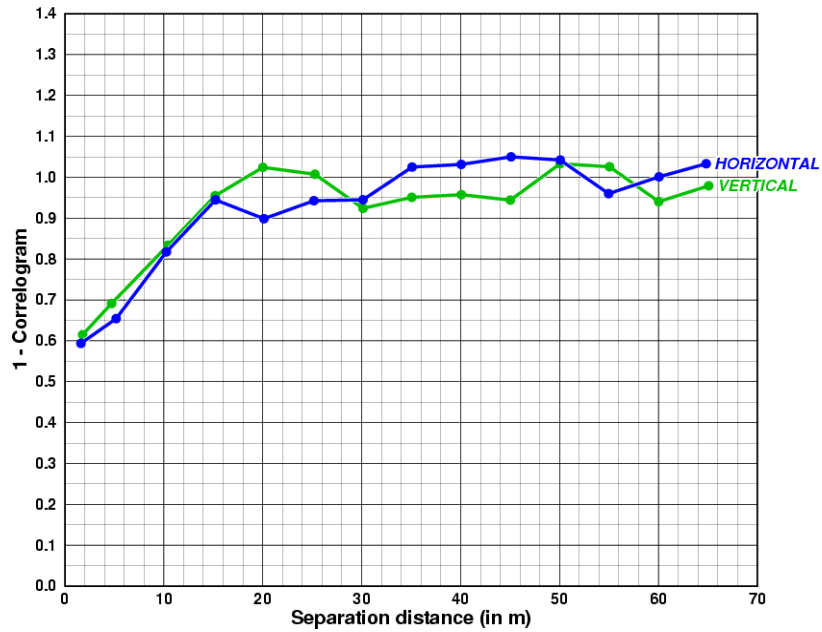


Figure 73. Experimental Variograms for Zn in the 200 Domain

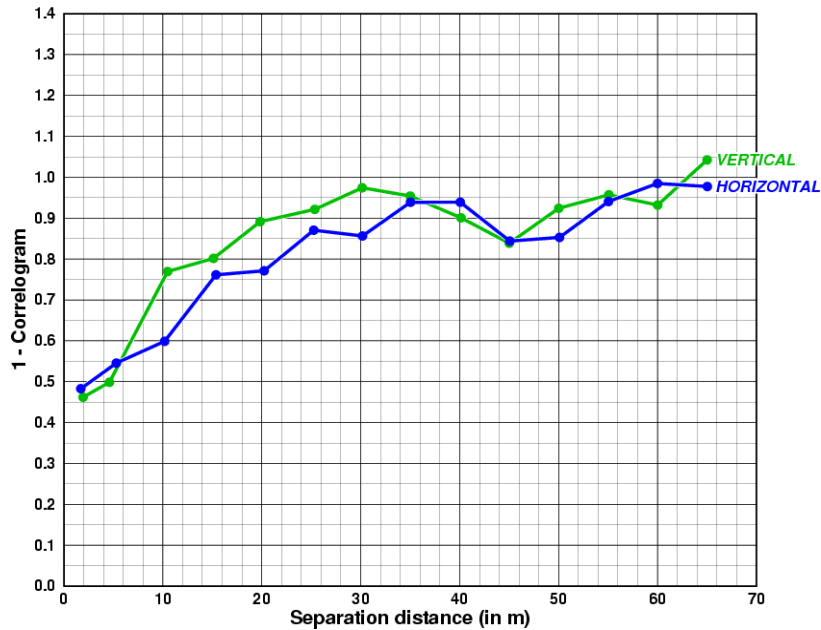


Figure 74. Experimental Variograms for In for the 200 Domain

**14.17 ESTIMATION APPROACH**

**14.17.1 COMPOSITES**

For the purposes of resource estimation, assay data were capped and then composited into 3.0 m intervals, roughly corresponding to 50% of the dimensions used for blocks in the block model. All un-assayed intervals for all elements were assigned a grade of zero, including unsampled intervals at the top of each hole, and any unsampled interval in the last 3.0 m composite at the bottom of each hole.

Composites were assigned a domain code according to the domain in which the centre of the composite lies: either the 100 or 200 domain.

**14.17.2 BLOCK MODEL CONFIGURATION**

Table 60 describes the block model configuration. The vertical and horizontal dimensions covered by the block model reflect the extent of regular surface and underground drilling in the North Zone; from an elevation of 800 to 1400 m, mine grid easting 15200E to 15725E and northing 13350N to 14025N.

**TABLE 60.**  
**BLOCK MODEL CONFIGURATION**

Direction	Block size (m)	Number of blocks	Minimum	Maximum
East-West	5	105	15200E	15725E
North-South	5	135	13350N	14025N
Vertical	5	120	800	1400

#### 14.17.3 INTERPOLATION USING GEOLOGICAL DOMAINS

The data analysis presented earlier in this section indicates that Sn, Zn and In grades are not distributed evenly between the 100 Domain (Endogranite) and the 200 Domain. Sn grades tend to be higher in the 100 Domain and Zn and In tend to be lower in the 100 Domain. Lithology data has not been entered into the database so the distinction between the Endogranite Domain and the other areas is largely based on incorporation of geological data from past interpretations. In many areas the distinction between the two domains is arbitrary.

Although the domains have significant internal or local variations on grade and metal ratios, they are important to the resource estimation for two reasons:

1. As shown by the exploratory data analysis the distribution of metals is different in the two domains (mean, median etc.).
2. As shown by the variogram analysis, the pattern of spatial continuity in 100 Domain is different than that of the 200 Domain.

For these reasons, the resource estimation uses a “hard” boundary between the 100 and 200 Domains.

#### 14.18 CLASSIFICATION

The classification of mineral resources and mineral reserves used in this report conforms with the definitions standards provided in the final version of National Instrument 43-101 ("NI 43-101"), which came into effect on February 1, 2001, as revised on December 11, 2005. The Definitions Standards includes further changes to maintain compatibility with the new version of National Instrument 43-101, effective June 30, 2011. We further confirm that, in arriving at our classification, we have followed the guidelines and standards by the Canadian Institute of Mining Metallurgy and Petroleum ("CIM") Council adopted on November 27, 2010.

The relevant definitions for the CIM Standards/NI 43-101 are as follows:

A **Mineral Resource** is a concentration or occurrence of diamonds, natural solid inorganic, or natural solid fossilized organic material including base and precious metals, coal, and industrial minerals in or on the Earth's crust in such form and quantity and of such a grade or quality that it has reasonable prospects for economic extraction. The location, quantity, grade, geological characteristics and continuity of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge.

An **Inferred Mineral Resource** is that part of a Mineral Resource for which quantity and grade or quality can be estimated on the basis of geological evidence and limited sampling and reasonably assumed, but not verified, geological and grade continuity. The estimate is based on limited information and sampling gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drillholes.

An **Indicated Mineral Resource** is that part of a Mineral Resource for which quantity, grade or quality, densities, shape and physical characteristics can be estimated with a level of confidence sufficient to allow the appropriate application of technical and economic parameters, to support mine planning and evaluation of the economic viability of the deposit. The estimate is based on detailed and reliable exploration and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drillholes that are spaced closely enough for geological and grade continuity to be reasonably assumed.

A **Measured Mineral Resource** is that part of a Mineral Resource for which quantity, grade or quality, densities, shape, and physical characteristics are so well established that they can be estimated with confidence sufficient to allow the appropriate application of technical and economic parameters, to support production planning and evaluation of the economic viability of the deposit. The estimate is based on detailed and reliable exploration, sampling and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drillholes that are spaced closely enough to confirm both geological and grade continuity.

#### **14.19 GRADE ESTIMATION PARAMETERS**

For all blocks whose centres fall within either of the domains, Sn, Zn and In grades were estimated by an inverse distance squared (“ID<sup>2</sup>”) method. A minimum of 6 composites were needed within the search ellipsoid for a block in order for that block to be included in Indicated Mineral Resources. Additionally, a block needed to have composites present within the search range in at least two different octants to be classified as Indicated to limit the impact due to clustering of sample data. Further, composites had to be available from a

minimum to two drillholes in order for a block to be classified as Indicated. If a block did not have enough composites within the search radius to be classified as Indicated a second interpolation was made to estimate Inferred Mineral Resources.

### **Estimation Parameters for Indicated Resources Common to Both Domains**

The following search parameters were used for the estimation of Indicated Resources in the 100 Domain and in the 200 Domain:

Minimum # of composites: 6  
Maximum # of composites: 16  
Minimum # of holes: 2  
Minimum # of octants with data: 2

Both domains also used the same orientation for the axes of the variogram model and for the search ellipsoid. The search was isotropic in the horizontal plane.

Direction 1: North-South, horizontal  
Direction 2: East-West, horizontal  
Direction 3: Vertical, no inclination from horizontal

The only differences in the estimation parameters used for the 100 Domain and those used for the 200 Domain are the size of the search ellipsoid.

### **Estimation Parameters for Inferred Resources Common to Both Domains**

A second grade interpolation pass was done to identify Inferred Resources. The search parameters were modified using the same parameters for domains, search range, orientation and composites as for the Indicated Resources. An ID<sup>2</sup> estimation method was used with the same search parameters as for Indicated except that a minimum of only two composites and a maximum of 16 composites were used which could come from as few as one drillhole. The closest composites were used. Only blocks that had not had a grade value assigned during the pass for the Indicated Resources, as determined by a flag, were estimated in this pass. The use of a flag prevented blocks that were interpolated at a “0” grade during the first pass from being populated by a different value during the second pass.



### **Estimation Parameters for Sn, Zn and In for the 100 Domain**

The search ellipse used in the 100 Domain uses the directions given above for the search ellipsoid, with the following parameters:

Range in 1<sup>st</sup> direction: 35 m  
Range in 2<sup>nd</sup> direction: 35 m  
Range in 3<sup>rd</sup> direction: 20 m

The search ellipse was based on the spatial continuity shown by the experimental variograms (Figures 46 to 48), with greatest continuity in the both horizontal directions and the least continuity in the vertical direction.

### **Estimation Parameters for the 200 Domain**

The search ellipse used in the 200 Domain uses the directions given above for the search ellipsoid, with the following parameters:

Range in 1<sup>st</sup> direction: 30 m  
Range in 2<sup>nd</sup> direction: 30 m  
Range in 3<sup>rd</sup> direction: 20 m

The search ellipse was based on the spatial continuity shown by the experimental variograms (Figures 49 to 51), with greatest continuity in the both horizontal directions and the least continuity in the vertical direction.

## **14.20 BULK DENSITY AND TONNAGE**

On the basis of the 2010 Thibault and Associates Report, a bulk density of 2.70 t/m<sup>3</sup> was assigned to all lithology units. A bulk density of 2.00 t/m<sup>3</sup> was assumed for overburden. There are no grades interpolated in the blocks assigned as overburden.

## **14.21 GRADE INTERPOLATION**

A dollar equivalent value, designated as the Gross Metal Value (“GMV”), was calculated for each mineralized block by performing a simple manipulation of the block model grade parameters based on prices as listed below and as determined by the following formula:

$$\text{GMV} = \text{Sn}(\%) \times 183.72 + \text{Zn}(\%) \times 20.00 + \text{In}(\%) \times 6,000.00$$

The GMV values of 183.72 for Sn, 20.00 for Zn and 6,000.00 for In represent the USD value per tonne for those metals assuming the 3 year average of US\$18.37 per kg of Sn, US\$2.00 per kg of Zn and US\$600.00 per kg of In (the imperial equivalents of these are US\$8.33 per pound for Sn and US\$0.91 per pound for Zn). Recoveries are assumed to be 100%. Using these values, the relative contribution for the individual metals for the resources reported in Table 36 is as follows:

- For the Indicated Resources, approximately 56% of the GMV value is derived from Sn, 14% from Zn and 30% from In; and
- For the Inferred Resources, approximately 46% of the GMV value is derived from Sn, 18% from Zn and 35% from In.

## **14.22 SOFTWARE**

RCI estimated the Mineral Resources for the North Zone using the block model estimation tools available in GEMS version 6.1.4 of Gemcom Software International Inc. In-house proprietary software from FSS was used to check the GEMS results and for specific side-studies aimed at establishing appropriate resource estimation parameters.

## **14.23 CHECKS OF MINERAL RESOURCE ESTIMATES**

### **14.23.1 VISUAL INSPECTION ON CROSS SECTIONS**

Figure 75 is a vertical north-south cross section through the deposit on Section 15500E that shows the boundary between the 100 and 200 Domains (the irregular solid grey line at the lower centre part of the figure) and the typical distribution of composites along drillholes. Composites with Sn grades of 0.3% or better and estimated blocks showing Sn grades of 0.3% or better are colour coded. The figure shows that the distribution of the better grade blocks matches very well in terms of location, shape and grade with that of the composites. Figure 76 is a plan view at the 950 m elevation that shows the same data as in Figure 75. Figure 77 is a 3D view showing composited Sn values over 0.3% Sn.

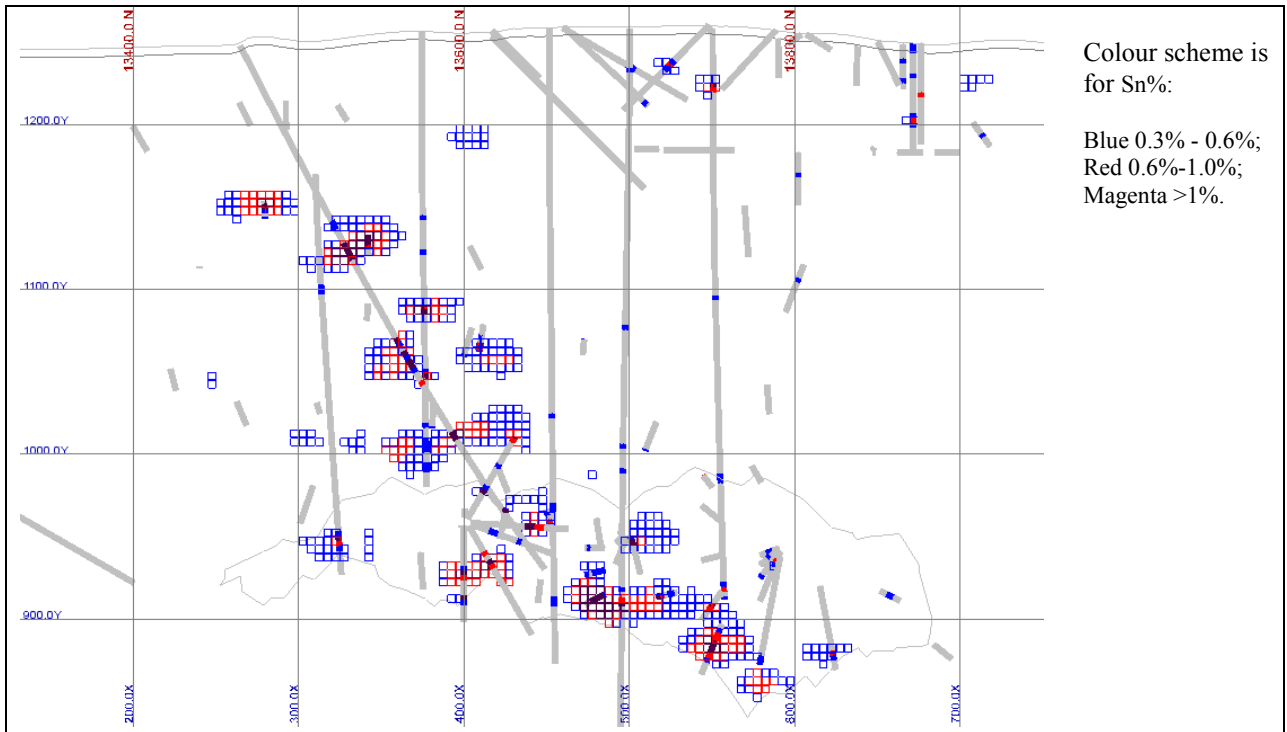


Figure 75. Vertical Cross-Section 15500E, Looking West and Showing Drillholes with 3m Composites for Sn Values and the Interpolated Indicated Block Grades for Sn

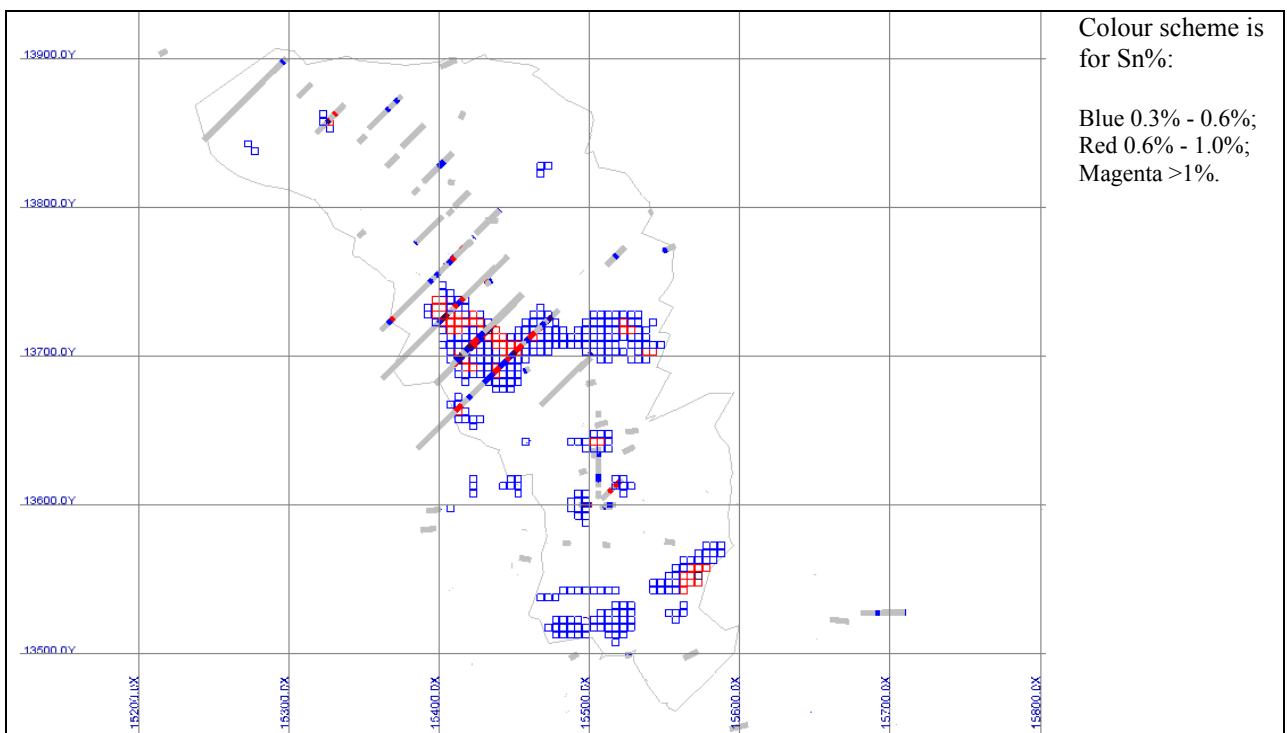


Figure 76. Plan View at the 950 m Elevation, Showing Drillholes with 3m Composites for Sn Values and the Interpolated Indicated Block Grades for Sn

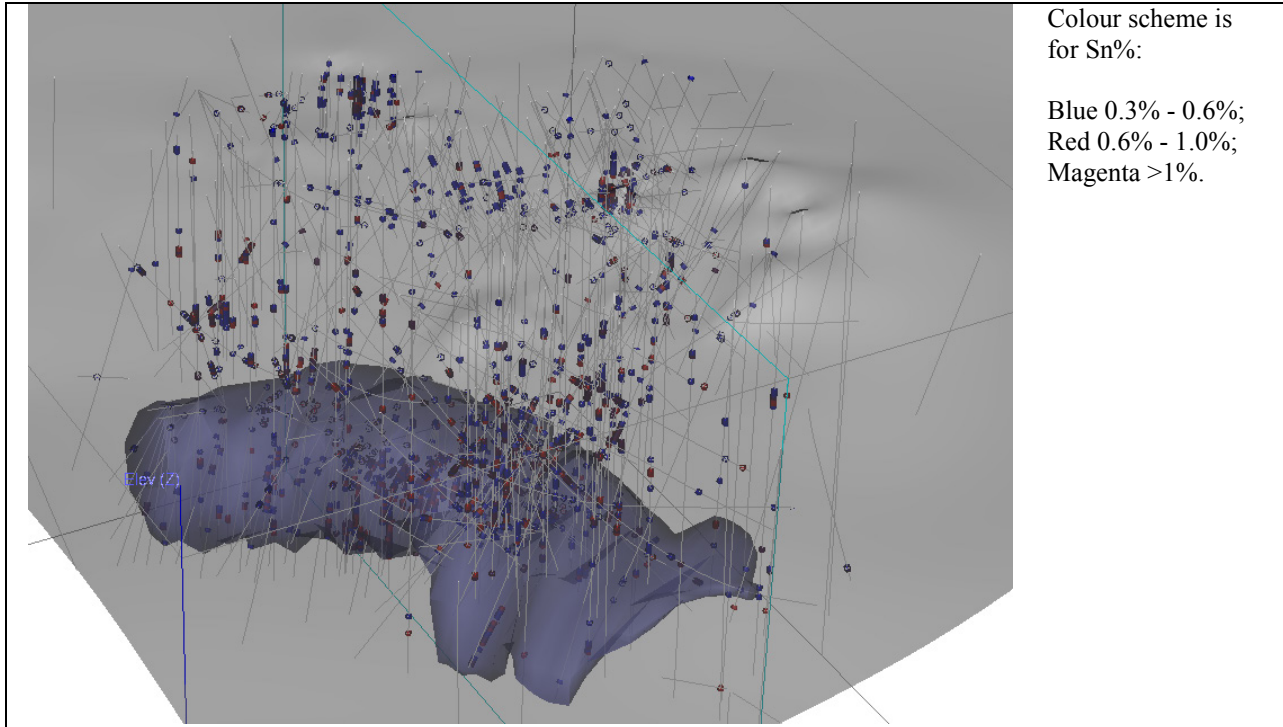


Figure 77. 3D View of the North Zone and 100 Domain Solid, Looking North-West

#### 14.23.2 ESTIMATION METHOD

Estimates were also done using alternative methodologies. Using the GEMS software, estimates for Sn, Zn and In were done using an ordinary kriging interpolation and also the same metals were estimated using a nearest neighbour interpolation. An additional check estimate using an ID<sup>2</sup> interpolation was done independently by FSS Canada Consultants Inc. All of the alternative interpolations matched well with the resources that were generated using the ID<sup>2</sup> estimate in GEMS.

#### 14.23.3 ORIGINAL DATA

Figure 78 shows “swath plots”: comparisons of the average grade of each column, row and level in the block model versus the length-weighted average grade of the assay data on each column, row and level. The block model is well constrained by the drillhole data, picking up local peaks and valleys in grade. The block model grades show less variability than the drillhole data, as they should since they are intended to reflect grades of selective mining units that are larger than the volume of the drillhole sample intervals (i.e. 3 m of drill core).

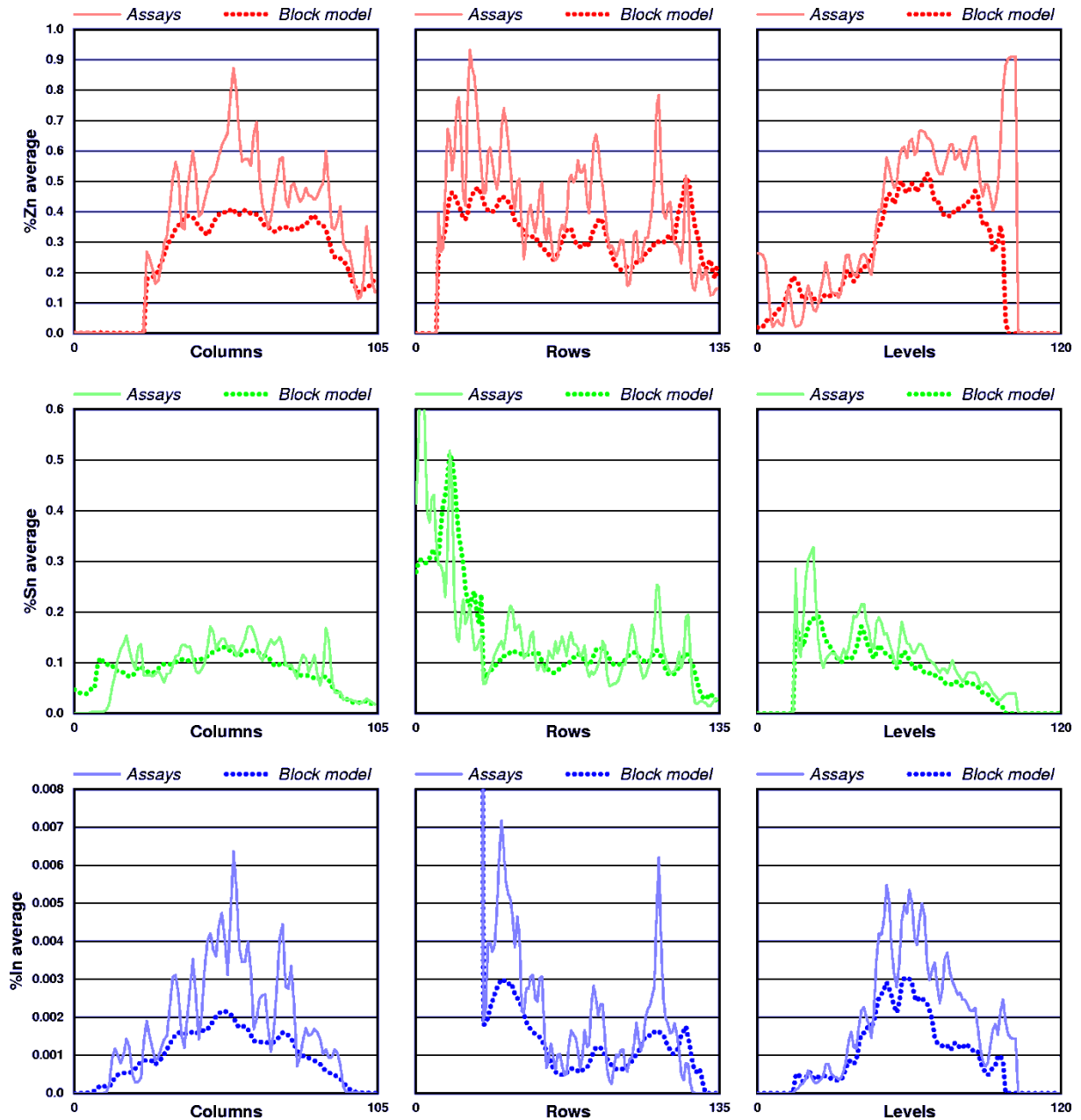


Figure 78. Swath Plots Comparing Average Zn, Sn and In Grades from the Block Model's Indicated Blocks to Length-weighted Average Grades of Assays along the Columns, Rows and Levels of the Block Model

## **14.24 SENSITIVITY STUDIES**

### **Effect of Cutoff Grade**

Tables 61 and 62 summarize the grade and tonnage of the classified resources for cutoffs other than the \$75 GMV cutoff selected for reporting. In the case of the Indicated Resources, at a lower cutoff of \$55 GMV, the tonnage increases by about 64% and the GMV drops by about 25%. For a higher cutoff at \$95 GMV, the tonnage drops by about 37% and the GMV value per tonne increases by about 18%. Similar impacts are seen when the GMV cutoff is changed for the Inferred Resources.

**TABLE 61.**  
**EFFECT OF CHANGING GMV CUTOFF ON INDICATED RESOURCES**

Cutoff Grade (USD GMV)	Tonnage (millions of tonnes)	Capped Grade (Sn%)	Capped Grade (Zn%)	Capped Grade (In ppm)	AVG GMV USD/T
\$55	20.3	0.30	0.76	50.5	\$100
\$65	15.8	0.34	0.81	57.2	\$113
\$75	12.4	0.38	0.86	63.5	\$125
\$85	9.9	0.41	0.91	69.5	\$135
\$95	7.9	0.45	0.95	75.6	\$147

**TABLE 62.**  
**EFFECT OF CHANGING GMV CUTOFF ON INFERRED RESOURCES**

Cutoff Grade (USD GMV)	Tonnage (millions of tonnes)	Capped Grade (Sn%)	Capped Grade (Zn%)	Capped Grade (In ppm)	AVG GMV USD/T
\$55	4.6	0.25	0.97	54.8	\$98
\$65	3.6	0.28	1.07	63.0	\$111
\$75	2.8	0.30	1.13	69.8	\$120
\$85	2.3	0.33	1.20	76.4	\$131
\$95	1.8	0.36	1.28	83.9	\$142

## **14.25 RECONCILIATION**

The North Zone had a previous resource estimate prepared in 2009 by WGM and the results of that were filed in a Technical Report that is available on SEDAR (Dunbar and de l'Etoile, 2009). The 2009 estimates were used for the 2010 Preliminary Economic Assessment that which is contained in a Technical Report that is also available on SEDAR (Thibault and Associates, 2010). **Note: This report is no longer current and should not be relied upon.** The 2009 estimates did not include Zn, used substantially different domains to constrain the estimates, used fewer assay data as the 2010 and 2011 ADEX drilling had not yet been undertaken, and finally, the 2009 estimates employed different estimation parameters.

The cutoff grade for the 2009 estimates used a Sn equivalent (“SNEQ”) grade of 0.25% Sn and converted In grades to a Sn equivalent using a factor of:

$$\text{SNEQ}\% = \text{Sn}\% + 41.67 \text{ In}\%$$

At the metal prices assumed for the current estimate, a SNEQ% of 0.25% Sn is about the same as a GMV cutoff of about US\$46/T. The higher cutoff used for the current estimates in part is based on the estimated operating cost breakdown as presented in Table 26-1 of Thibault et al (2010).

If a comparable cutoff to the 2009 cutoff is employed on the 2012 estimates, they report considerably more tonnes for material that would be classified as Indicated and somewhat less tonnes for material that would be classified as Inferred relative to the 2009 estimate (the US\$55 GMV listed in Tables 42 and 43 is approximately equivalent to a SNEQ cutoff of 0.3%). The 2009 estimate reported Indicated Resources of 10.9 m T @ 0.43% Sn and 67.8 gpt In and Inferred Resources of 7.6 m T @ 0.22% Sn and 74.6 gpt In. The relative increase in the percentage of Indicated to Inferred Resources in the 2012 estimate relative to the 2009 estimate reflects the impact of:

- the infill drilling done by ADEX on 2010 and 2011; and
- differing domain models and estimation procedures.

#### **14.26 OTHER METALS**

There are a number of other elements that occur in the North Zone and these may have potential importance in regard to metallurgical recoveries. However, these elements have not been given any consideration in the current resource estimate and the results of the interpolations for these metals as presented here are not NI 43-101 compliant resource estimates. Detailed data analysis, data verification, QA/QC checks and variography were not done for these metals. This, is part of the reason they are not included as part of the resource estimates. Further, the ability (or inability) to recover some of these elements when recovering Sn-Zn-In, mitigates against the inclusion of these elements as part of the current resource estimate. Table 63 presents the results of a series of ID<sup>2</sup> interpolations for these elements.

The data in Table 63 were derived using the same interpolation parameters as for the inferred resource estimates for Sn, Zn and In. Those parameters included search ranges of 35 m in all horizontal directions and 20 m in the vertical direction for the 100 Domain and 30 m in all horizontal directions and 20 m in the vertical direction for the 200 Domain. Only two

composites were needed to inform a block and a maximum of 16 composites were allowed. For the interpolation method used for Table 44, unsampled intervals were treated as zero grade entries and samples that had been entered as Below Detection Limits (“BDL”) were reported by ADEX to be entered at half the detection limit. RCI cautions that it has not verified the data that supports these results.

**TABLE 63.  
OTHER ELEMENTS OF INTEREST**

	Tonnage	MoS <sub>2</sub> %	WO <sub>3</sub> %	Cu%	Pb%	Bi%	As%	Ca%	Fe%
	(millions)								
Blocks Matching Those Classified as Indicated, February 2012	12.4	0.06	0.09	0.11	0.05	0.07	0.99	0.35	1.80
Blocks Matching Those Classified as Inferred, February 2012	2.8	0.06	0.08	0.11	0.07	0.06	1.04	0.26	1.26

#### **14.27 DISCUSSION ON OTHER MATERIAL FACTORS**

The reader is referred to Sections 4, 13 and 19 to 23 of this Report for information regarding the extent to which the mineral resource estimates could be materially affected by any known environmental, permitting, legal, title, taxation, socio-economic, marketing, political or other relevant factors. Recovery of the metals reported, and the impact of other economic factors required to convert the mineral resources to mineral reserves would need to be addressed in order to facilitate a meaningful review of all factors that might impact the current mineral resources, however, the author is of the opinion that the mineral resources reported are consistent with the 2010 CIM definitions, viz. “*A Mineral Resource is an inventory of mineralization that under realistically assumed and justifiable technical and economic conditions might become economically extractable*”.



## **15. MINERAL RESERVE ESTIMATES**

Due to the preliminary nature of this project, there are no Mineral Reserves on the Property.

## **16. MINING METHODS**

There is no current information available on the mining methods for the Property.

## **17. RECOVERY METHODS**

There is no current information available for the recovery methods for the Property.

## **18. PROJECT INFRASTRUCTURE**

The Mount Pleasant Property is the proposed site for production from both the North Zone and the Fire Tower Zone. As discussed in the Mount Pleasant North Zone Preliminary Assessment Report of January 22, 2010, there is an existing infrastructure for Fire Tower Zone mine and surface operations.

The existing site infrastructure includes a tailings pond, site administrative and warehouse buildings, A-Frame ore storage building, a concentrator building from previous operations, a site substation and access roads to the site.

The Fire Tower Zone mine was developed during previous operations by Billiton Exploration Canada Limited. Studies to define the mine development plan based on the revised Mineral Resource estimate and surface infrastructure requirements for the North Zone have not been completed.

A semi-detailed design and budget cost assessment for the installation of a wastewater treatment facility (for treatment of wastewater from the production of both zones and mine water) is in progress and not completed as of this date.

## **19. MARKET STUDIES AND CONTRACTS**

There is no current information available for product market or sales contracts for the Property.

## 20. ENVIRONMENTAL STUDIES, PERMITTING, AND SOCIAL OR COMMUNITY IMPACT

### 20.1 BACKGROUND

The Mount Pleasant property is a formerly producing tungsten-molybdenum mine, which also hosts tin-indium-zinc mineralization within an adjacent ore zone on the same property. The tungsten-molybdenum deposit is commonly referred to as the Fire Tower Zone (“FTZ”) and the indium-zinc-tin deposit is referred to as the North Zone (“NZ”). The existing underground mine workings used to extract ore from the FTZ during the previous operation are physically connected to the NZ by means of the North Zone Access Ramp, which was driven to advance exploration activities within the North Zone.

The property has been under care and maintenance since 1985, when the mine was closed due to a down-turn in tungsten prices. Mine water which overflows from the flooded Fire Tower Zone mine workings is currently treated by neutralization with lime followed by a settling pond to precipitate and store metal hydroxide sludge prior to the treated mine water being discharged into the existing tailings pond. Effluent from the mine continues to be managed such that there is a single point of effluent discharge from the tailings pond to Hatch Brook through the tailings pond decant structure.

The mine water treatment plant is currently operated under New Brunswick Approval to Operate I-6154, which requires that the Mount Pleasant mine site be operated in such a way as to meet the following water quality objectives for discharge of effluent from the tailings impoundment area (“TIA”):

- the pH is between 6.5 and 9.0 at all times;
- the total suspended solids are less than 10 mg/L at all times;
- the aluminum concentration is less than 0.4 mg/L at all times;
- the arsenic concentration is less than 0.3 mg/L at all times;
- the fluoride concentration is less than 3.0 mg/L at all times;
- the zinc concentration is less than 0.4 mg/L at all times; and
- the effluent is non-acutely lethal to aquatic life at all times.

Under the current approval to operate (dated October 31, 2007), ADEX has monitored and reported the tailings pond discharge water quality on a monthly basis to the New Brunswick Department of Environment (“NBDOE”). Water quality parameters analyzed in monthly grab samples have typically been in compliance with the prescribed limits. The current approval to operate is valid to September 30<sup>th</sup>, 2012.

The Decant Structure, Tailings Dam and Emergency Spillway structures were repaired and upgraded in 2008 to meet Canadian Dam Safety Guidelines (Canadian Dam Association, 2007). New piezometers were also installed in 2008 to monitor dam stability. The new decant structure will allow for the water level and rate of discharge from the tailings pond to be controlled via a system of wooden stop logs. Currently, there are no stop logs installed in the decant structure and the effluent overflows through the decant structure to maintain the water level within the TIA at approximately 122.5 m (mine datum). At this water level, there are both flooded and un-flooded zones of previously placed tailings present within the TIA.

Condition 13(c) of Approval to Operate I-6154 states that, “*prior to flooding the tailings in the TIA, Adex shall submit to the Project Assessment and Approvals Branch for review and approval, a Tailings Flooding Contingency Plan in case the flooding begins to release metal concentrations greater than shown in Condition 15(g)*”. In 2008, ADEX commissioned Jacques Whitford Limited (“JWL”) to complete a study identifying environmental issues that may arise upon flooding of the exposed tailings entitled “*Background Documentation for Tailings Flooding Contingency Plan – Mount Pleasant Mine*”. The study concluded that the majority of the metals that may be released during flooding can be controlled by maintaining the pH of the tailings pond between pH 8.0 and 9.0; however, mitigation measures for the potential release of fluoride from the tailings were not identified and it was concluded that control of soluble fluoride concentrations in the tailings pond is not pH dependant. As a result, further research and testing on the mobility and leachability of fluoride would be required to fully understand and prepare a mitigation plan for the potential release of fluoride into the tailings pond water upon flooding the tailings.

A subsequent study entitled, “*Mount Pleasant Property Tailings Leachability and Wastewater Treatability*”, was completed by Thibault & Associates Inc. in 2010 and confirmed the potential for release of high concentrations of soluble fluoride upon flooding of the exposed tailings. Furthermore, the study concluded that the release of fluoride was greater from samples of exposed tailings than from samples of previously submerged tailings and that higher solid to liquid ratios and the presence of mixing increase the rate of fluoride leaching from the tailings. Bench scale tests were completed on the exposed tailings samples to determine the effect of mitigation measures that could be readily implemented to control the release of fluoride in the tailings pond during flooding. From these tests it was determined that at pH greater than 8.0, soluble fluoride concentrations in the supernatant water increased with both the use of lime and caustic for pH control. At constant pH, adjustment of the supernatant water hardness using calcium chloride also failed to adequately control the release of fluoride.

Based on the results of the study completed by Thibault, it was concluded that adsorption using activated alumina is considered to be the best available control technology for removal of fluoride from the tailings pond water or other wastewater sources generated from future operation of the mine. Furthermore, sub-aerial tailings (beach tailings) disposal was proposed as an alternative to sub-aqueous disposal for future operation of the mine, subject to a comprehensive review of available options for tailings and solid waste disposal. An overall water, wastewater and solid waste management concept has not yet been defined for the site and is the subject of on-going study and review.

Detailed engineering design of a new sludge pond to accommodate lime neutralization (metal hydroxide) sludge generated from continued mine water treatment, mine dewatering wastewater treatment, or for future mine operations was also completed in 2008 by Jacques Whitford Limited. Although approval was granted by the NBDOE Project Assessment and Approvals Branch for construction of the new sludge cell, the project was put on hold pending the outcome of a Preliminary Assessment Report on the North Zone (completed in 2010) and more detailed feasibility studies.

Revisions to the design concept and cost estimate for construction of the proposed new sludge storage cell were completed by Dillon Consulting Limited (“**Dillon**”) in 2011 and construction of the sludge cell will be deferred until definitive plans for mine dewatering and re-commencement of mine production at the Mount Pleasant site are finalized.

The existing sludge pond is considered to provide adequate suspended solids removal for treatment of mine water while the site is operated under Care and Maintenance. Approximately 2,500 cubic metres of settled sludge was removed from the pond during the summer of 2010 to restore sufficient retention time for settling of precipitated solids from the treated mine water. This sludge was disposed in the flooded mine workings by pumping the slurry through the vent shaft opening at EL. 1,150 metres.

## **20.2 RELATED ENVIRONMENTAL STUDIES**

### **20.2.1 WASTEWATER TREATABILITY STUDIES**

As an integral part of development of the Mount Pleasant property, discussions regarding environmental standards for operation of the mine were initiated with members of New Brunswick's Standing Committee on Mining and the Environment, which includes officials from the New Brunswick Department of Natural Resources (“**NBDNR**”), NBDOE and Environment Canada. Through these meetings, and based on the fact that a specific effluent limit for fluoride has been imposed for the operation of the existing mine water treatment

system / tailings pond discharge, it is recognized that fluoride removal from both the mine water and concentrator plant will be required for wastewater treatment related to re-commencement of operations at the site.

Currently, fluoride levels in the raw mine water range between 5.0 and 8.0 mg/L and the existing lime neutralization treatment process does not have the capability to remove dissolved fluoride. Furthermore, fluoride has historically been added to the flotation circuit at Mount Pleasant in the form of sodium silicofluoride and/or hydrofluorosilicic acid as a gangue suppressant and this was the case during the previous operation producing tungsten and molybdenum concentrates. During the previous operation of the mine in the early 1980s, the maximum level of soluble fluoride in the discharge from the tailings pond was defined as 12.0 mg/L. The current discharge limit as defined by Approval to Operate I-6154 is 3.0 mg/L and the basis upon which these limits were established is unknown.

In June, 2008, an independent study by ADI Limited was commissioned to identify a wastewater treatment process that would be capable of treating the raw mine water for removal of both heavy metals and fluoride to levels that would be safely below the limits set out in the current approval to operate at the point of discharge from the mine water treatment plant. The ADI study (ADI Limited, 2008) determined that effluent metals concentration limits could be met by pH adjustment with lime to pH 8.5 and that the effluent zinc and arsenic concentrations could be further reduced by addition of soluble ferric iron to the metals precipitation stage in a commercially proven wastewater treatment process referred to as co-precipitation.

The ADI report identified two technically viable means of reducing effluent fluoride concentrations to below 3.0 mg/L - alum coagulation (Nalgonda technique) and adsorption with activated alumina. Alum coagulation is commonly used for defluoridation of drinking water in developing countries and is relatively simple and easy to implement; however, the high operating cost associated with the procurement of aluminum sulphate reagent does not support its use for industrial wastewater treatment. Activated alumina systems are commercially proven for large-scale defluoridation of drinking water; however, limited testing has been done on industrial or mining effluents.

Subsequently, ADEX commissioned a second study by Thibault & Associates Inc. (Thibault & Associates Inc., 2010) to i) assess the treatability of simulated high concentration wastewater that could potentially be generated from hydrometallurgical processing of the North Zone ore, ii) assess the technical feasibility of removing fluoride from the effluent using the activated alumina process; and, iii) assess leachability of fluoride from previously submerged and un-submerged tailings and from a sample of ore from the North Zone. The

results of the tailings leachability portion of the study have been previously discussed in this section.

Both bench scale testing and a mini-pilot simulation of the proposed treatment process, involving lime neutralization, co-precipitation of heavy metals by addition of soluble ferric iron and removal of fluoride by adsorption onto activated alumina, successfully demonstrated the technical viability of the process for treatment of both raw mine water and a sample of simulated high concentration wastewater containing several times the normal concentration of heavy metals, including aluminum, zinc and arsenic.

The effluent from the mini-pilot simulation of the proposed wastewater treatment process met all of the discharge water quality guidelines defined by the current approval to operate and was determined to be non-acutely lethal to rainbow trout (zero mortalities were observed during the standard 96-hour test period).

#### 20.2.2 DETERMINATION OF A SITE SPECIFIC ENVIRONMENTAL DISCHARGE OBJECTIVE FOR FLUORIDE

The Province of New Brunswick does not have an established environmental discharge objective (“EDO”) for fluoride. Environmental discharge objectives represent effluent quality guidelines that are protective of the receiving environment and, traditionally, Metals Mining Effluent Regulations (“MMER”) required that these limits be set such that the whole effluent (or concentration of any specific contaminant) was not acutely lethal to rainbow trout based on a 96-hour exposure period. More recently, environmental discharge objectives have been determined based on meeting environmental quality objectives (“EQOs”) that represent the maximum concentration of a substance in the surface water of the downstream aquatic habitats that would have no adverse chronic, or long-term, effects on aquatic species. In a practical setting, the determination of a site-specific EDO for fluoride should consider both of these endpoints.

In 2011, ADEX commissioned a study to be completed jointly by Thibault & Associates Inc. and Dillon Consulting Limited that would provide a basis for establishing a reasonable environmental discharge objective for fluoride for the Mount Pleasant site. The recommended discharge limit for fluoride to be established from the study would be observant of the traditional MMER guideline (i.e. effluent is non-acutely lethal to aquatic life) while also being respectful of the chronic effect level.

The study relied primarily on the results of Whole Effluent Toxicity (“WET”) tests and included completion of a number of single concentration and multi-concentration acute

toxicity tests on both rainbow trout and *Daphnia magna*, as well as a multi-concentration test to determine the chronic sub-lethal effects of fluoride exposure on *Ceriodaphnia dubia*. All aquatic life toxicity testing was completed in accordance with Environment Canada standard methods EPS1/RM/14, EPS1/RM/13 and EPS1/RM/21 by a Standards Council of Canada accredited laboratory on samples of treated minewater obtained by mini-pilot scale simulation of the proposed wastewater treatment process using untreated mine water collected from the open portal at the Mount Pleasant site. Samples of simulated treated wastewater were neutralized with lime and treated for removal of dissolved metals but were not subjected to any form of treatment for fluoride removal.

Results of aquatic toxicity testing have indicated that the effluent samples, containing up to 9.8 mg/L of dissolved fluoride were non-acutely lethal (zero mortalities) to rainbow trout and *daphnia magna*. Results of chronic effects testing, completed on simulated treated effluent containing 7.0 mg/L fluoride, also resulted in zero mortalities of the test organism at 100% sample concentration, suggesting that both the the 50% lethality (LC50) level and the Lowest Observable Effect Concentration (“LOEC”) for fluoride is greater than 7.0 mg/L for all species tested. These results were compared with acute lethality data for fluoride available from the USEPA EcoTox Database, which includes the results of over 140 WET tests on more than 20 different species of aquatic plant, invertebrates and fish. The concentration of fluoride that would have an acutely lethal effect on 5% of aquatic species was found to be approximately 10 mg/L, based on the data available from the EcoTox database.

The results of the chronic sub-lethal effects test indicated that a reduction in the reproductive success was observed within the undiluted effluent and the concentration that would resulted in 25% inhibition (IC25) was reported as 3.85 mg/L (55% of whole sample) by the test laboratory. Further review of the chronic sub-lethal effects data by Ulysses Klee, an ecotoxicologist with Dillon Consulting Limited, concluded that the this endpoint was misleading given that there was no significant difference between the reproductive success of the control sample and that quantified in the 50% dilution sample and therefore, 50% dilution, or 3.5 mg/L fluoride, actually represents the No Observable Effect Concentration (“NOEC”). According to the USEPA EcoTox database, the lowest NOEC for growth was 2.5 mg/L based on the response of the caddisfly and a 21-day NOEC of 14 mg/L was reported for reproductive success in *Daphnia magna*.

The study concluded that the current effluent discharge limit of 3.0 mg/L for fluoride is both practically achievable using available technology and will be suitably protective of the receiving aquatic environment, both in terms of acute toxicity and chronic sub-lethal effects.

### 20.2.3 BASELINE ENVIRONMENTAL EFFECTS MONITORING

In September of 2008, a Baseline Aquatic Survey for Environmental Effects Monitoring ("EEM") was conducted in Hatch Brook by Jacques Whitford Stantec (Jacques Whitford Stantec, 2009) in order to document present environmental and aquatic conditions in the area of the Mount Pleasant property. The study was conducted in a manner consistent with the federal EEM program administered by Environment Canada such that the results could be used to support future EEM studies, as would be required under MMER in the event that the mine re-opens.

The baseline aquatic survey included sampling and analysis of water and sediment chemistry, benthic community analysis, assessment of fish habitat and analysis of fish tissues for metals at three sampling stations along Hatch Brook including a i) reference station - located upstream from the former Mount Pleasant mine site, ii) exposure station - located immediately downstream of the discharge from the tailings pond, and iii) far field exposure station located approximately 1.6 km downstream from the tailings pond discharge.

Overall, water quality in Hatch Brook was considered to be good and most general water quality parameters, as well as trace metals and mercury, were similar across all sampling stations.

The fish and fish habitat assessment showed that there is abundant suitable fish habitat in the study locations and nine species of fish were collected for analysis, with the catch per unit effort being highest at the exposure station. There were no exceedances of the Health Canada guideline for mercury in fish for human consumption.

Benthic invertebrate assemblage structure showed no evidence of adverse effects and was noted as being "rich, diverse and similar to assemblages elsewhere in the brook" at all three stations.

### 20.2.4 TAILINGS IMPOUNDMENT FACILITY FISH PRESENCE SURVEY

In 2008, following the tailings dam upgrade construction project, the Department of Fisheries and Oceans Canada ("DFO") became aware of the potential presence of fish in the tailings pond and formally requested that ADEX conduct a fish presence survey to encompass the areal extent of the tailings impoundment area.

The tailings impound facility fish presence survey was conducted in the Spring of 2009 by Jacques Whitford Stantec Limited and included an assessment of: i) water quality,



ii) sediment quality, and iii) fish tissue sample analysis on brook trout, lake chub and longnose sucker. The data collected was compared to data obtained during the 2008 Baseline Aquatic Survey for Environmental Effects Monitoring to ascertain if there were significant statistical differences between the fish found to be present in the tailings pond and fish tissues sampled from the surrounding environment outside of the tailings impoundment structure.

The presence of the following species of fish was confirmed within the tailings impoundment area: brook trout (*Salvelinus fontinalis*), longnose sucker (*Catostomus catostomus*), lake chub (*Couesius plumbeus*), golden shiner (*Notemigonus crysoleucas*) and pumpkinseed sunfish (*Lepomis gibbosus*).

Water quality within the tailings pond was generally below the CCME guidelines for protection of Freshwater Aquatic Life (FWAL, CCME 1999) and was found to contain elevated levels of arsenic, cadmium, copper, molybdenum and zinc (relative to CCME guidelines). Sediment quality was also generally below the CCME Probable Effect Level for trace elements in sediment (CCME 1999) and contained elevated levels of arsenic, cadmium and zinc. These results were not unexpected due to the nature of the tailings pond and its intended function as a permitted waste stabilization pond used for deposition of tailings during the former mine operation and its current function as an integral part of the mine water treatment plant permitted under Approval to Operate I-6154.

No abnormalities were observed in the external condition of the fish sampled in the tailings impoundment area; however, 33% of the longnose suckers were observed to have lumps and discoloured livers. No other internal abnormalities were observed in any of the other fish caught, overall condition factors of all the fish fell within a normal range and no significant visual differences were noted between fish in the tailings pond and fish collected at the reference station (upstream of the tailings pond decant structure) and the exposure station (downstream of the tailings pond decant structure) during the Baseline EEM study.

Statistical comparison of fish tissue sample analysis confirmed that the fish sampled from the tailings pond, the reference station and the exposure station in Hatch Brook were all chemically distinct. Concentrations of arsenic, copper, molybdenum and rubidium were generally higher in fillet samples collected from fish within the tailings pond, whereas mercury and strontium concentrations were generally higher in fillet samples from fish collected from the reference and exposure stations during the 2008 EEM study.

Concentrations of arsenic, rubidium, selenium and thallium were generally higher in livers of fish collected from the tailings impoundment area, while cadmium, iron, lead, manganese,

mercury, potassium, silver and sodium were generally higher in livers of fish collected from the reference and exposure stations in Hatch Brook.

This study also concluded that, since mercury is released very slowly from fish tissues, the fish population in the tailings pond is not mixing with the fish population in Hatch Brook. This conclusion was based on the finding that concentrations of mercury in tissue samples collected from fish in the tailings pond were significantly lower and statistically different from those collected from fish in Hatch Brook during the Baseline EEM Study.

Although none of the fish sampled contained levels of mercury above the Health Canada guideline for mercury in fish for human consumption, concentrations of several elements including arsenic, copper, molybdenum, rubidium, selenium and thallium were found to be elevated in tissue samples collected from fish within the tailings pond and the study further concluded that human consumption of the fish from the tailings pond should be avoided.

#### 20.2.5 ADDITIONAL ENVIRONMENTAL FIELD STUDIES

In the Fall of 2011, Dillon Consulting Limited conducted additional field studies to further investigate and establish existing environmental conditions at the site. The studies focused on the areas surrounding the existing tailings pond and were completed by qualified terrestrial and aquatic biologists employed by Dillon Consulting Limited. The completed field surveys specifically included an aquatic habitat survey and study of fish assemblages, late growing vegetation survey, preliminary wetland identification survey, mammal survey and preliminary herpetile survey. The results of these studies are pending and further environmental field studies planned for the Spring of 2012 include a migratory bird survey and an early flowering plant survey.

### 20.3 ENVIRONMENTAL IMPACT AND MANAGEMENT

#### 20.3.1 PROPOSED PLAN FOR WATER MANAGEMENT AND OPERATION OF TAILINGS IMPOUNDMENT AREA

The development plan for the proposed re-commencement of operations at the Mount Pleasant mine is based on integrated management of process water, wastewater and tailings, which will all be controlled through the operation of the existing tailings impoundment area such that all treated effluent from the mine operations will be discharged to Hatch Brook from a single point at the site.

All process water required for the concentrator plant will be reclaimed from the tailings pond to minimize the need for extracting fresh water from ground or surface water sources. Process wastewater from the various concentrator process unit operations and mine water will be collected and treated in a central, integrated wastewater treatment (“WWT”) facility. The new wastewater treatment process will be designed such that treated effluent at the discharge from WWT will meet the water quality objectives set out in the current approval to operate I-6154 and applicable MMER standards.

The overall tailings deposition and water management plan is not yet finalized and on-going studies are aimed to develop an appropriate tailings management and disposal strategy that is well-suited to the characteristics of the deposit and the existing conditions at the site.

### 20.3.2 WASTEWATER TREATMENT SLUDGE MANAGEMENT

Solids generated in the wastewater treatment process are mainly comprised of excess lime, metal hydroxide precipitates and calcium fluoride sludge generated from periodic regeneration of activated alumina media. The wastewater treatment sludge will be concentrated in the clarifier underflow stream prior to being disposed in the proposed new sludge storage cell, which would be constructed within the perimeter of the existing tailings impoundment area.

### 20.3.3 RECLAMATION PLAN

A scoping level reclamation plan approach was developed by Jacques Whitford as part of the Fire Tower Zone Scoping Study (Aker Solutions, 2008) that would meet the requirements of Regulation 86-98, Sections 30(2) and 30(3) under the provincial Mining Act. The reclamation plan developed by Jacques Whitford assumed that the existing buildings at site would be re-used for re-commencement of operations from the FTZ and no new buildings would be required. As a result, the scope of the preliminary reclamation plan does not include remediation activities for any new buildings or site infrastructure that may be associated with future activities at the site related to i) potential future production from the North Zone, ii) expansion of existing buildings and site infrastructure, iii) expansion or changes to the existing tailings pond, and iv) expansion or changes to the existing mine water treatment system.

For the purpose of future preliminary assessment or feasibility reports, it is assumed that a similar approach would be used for reclamation of the site; however, the reclamation plan will need to be updated to account for any changes to the scope of the project from that stated in the 2008 Aker Solutions Fire Tower Zone Scoping Study. The following points summarize

the goals and major processes associated with the reclamation plan developed by Jacques Whitford:

- removal and/or capping and revegetation of the majority of the physical features and structure associated with the site;
- establishment of vegetation that will facilitate the natural recovery of the area for use by local wildlife;
- control and mitigation of site drainage issues from surface waste materials and underground openings;
- control and mitigation of discharge water from the Tailings Impoundment Area;
- permanent closure of mine portals, access ramps, raises by back-filling and installation of structurally engineered plugs;
- removal of any environmentally hazardous materials from underground mine workings prior to closure;
- flattening of the downstream portions of both the Diversion Dam and the Tailings Dam to improve long-term stability of the unmonitored dams following closure;
- salvage of any equipment and building materials (e.g. processing equipment, mobile equipment, windows, doors, cable, transformers, etc.);
- demolition of all light frame buildings;
- demolition, removal and disposal of concrete structures and foundations;
- removal of any on-site power lines and electrical equipment; and
- implementation of a post-closure monitoring and treatment program.

Jacques Whitford estimated that, based on the reclamation plan approach as outlined above for the FTZ Scoping Study, financial securities in the amount of C\$2.87 million would be required for reclamation (Jacques Whitford, 2008b).

## **20.4 PERMITTING**

Requirements for obtaining provincial and federal permits related to the proposed re-commencement of operations at the Mount Pleasant mine and a review of applicable government regulations was completed by Jacques Whitford Stantec as part of the Fire Tower Zone Scoping Study completed by Aker Solutions for Adex Mining Inc. in 2008. A summary of the information contained in the Jacques Whitford Stantec report is contained in the following sections.

#### 20.4.1 PROVINCIAL REGULATIONS AND PERMITS

The following is a list of legislation, regulations and required permits that are administered by the Province of New Brunswick and are applicable to the current operation of the mine water treatment plant (care and maintenance related site activity), potential construction and pre-production activities associated with the re-opening of the mine.

***Clean Environment Act (Chapter C-6):***

The Clean Environment Act is administered by NBDOE and provides the general legislative framework for protection of the environment in New Brunswick. Handling, storage and disposal of hazardous wastes is managed as part of a stewardship program under this Act.

***Water Quality Regulation 82-126:***

This instrument is administered by NBDOE under the Clean Water Act (Chapter C-6.1) for regulation of discharge of liquid effluents to bodies of water in New Brunswick and requires that any operator of a source of contaminants or release of contaminants that may cause water pollution must obtain a Certificate of Approval to Operate. The Certificate of Approval to Operate defines the terms and conditions that the operator of the source must comply with in order to remain in compliance with the Regulation and to prevent pollution of the waters of the Province. The terms and conditions are specific to the operation in question and are determined by NBDOE on a case-by-case basis. An effluent sampling and analysis program is typically required and limits are imposed on concentrations of specific contaminants for that site. Provincial requirements for conducting Environmental Effects Monitoring studies are also mandated by the Certificate Approval to Operate.

***Air Quality Approvals Regulation 97-133:***

This regulation was implemented under the Clean Air Act and is analogous to Water Quality Regulation 82-126 in that the NBDOE requires that any operator of a source of contaminants or release of contaminants to the air that may cause air pollution must obtain a Certificate of Approval to Operate. The Mount Pleasant property currently does not require any Approvals under the Clean Air Act, as there are no sources of contaminants being released to the air on the site. If, during the project, one or more sources of emissions to the air are installed (e.g. boilers, kilns, vent scrubbers, etc.), an Approval will be required.

***Environmental Impact Assessment (EIA) Regulation 87-83:***

The EIA Regulation 87-83 is administered by NBDOE under the Clean Environment Act and is intended to assure that all "undertakings" in the province are identified, reviewed and that any potential adverse environmental effects associated with the proposals are mitigated in advance of their implementation. The term, "undertakings" includes proposed construction,

operation, modification, extension, abandonment, demolition or rehabilitation of projects or activities as described in Schedule A of the regulation. The proposed activities for resuming production at Mount Pleasant from the North Zone will have to be registered under the EIA Regulation, which requires that a registration document (report) be prepared and submitted to NBDOE for a Determination Review. The registration document must i) describe the project in a sufficient level of detail to allow for a full technical review and, ii) assess all potential environmental impacts and issues and describe mitigation measures that will be taken to minimize impacts to the environment.

***Mining Act (Chapter M-14.1):***

The Mining Act is administered by the New Brunswick Department of Natural Resources (NBDNR) and provides the legislative framework for regulation of all activities related to exploitation of mineral resources in New Brunswick. This Act addresses all issues related to prospecting, exploration, drilling, claim staking, ownership and allocation of minerals, land use, royalties, documentation of mining operations, damage and securities. The requirement for a person or company to produce a Feasibility Study, apply for a Mining Lease, produce a Reclamation Plan and provide NBDNR with a Reclamation Bond prior to producing minerals from a mineral claim is regulated through the New Brunswick Mining Act.

***Petroleum Product Storage and Handling Regulation 87-97:***

The regulation requires that the storage of petroleum products in excess of 2,000 litres on a site requires a licence to assure that petroleum products are stored in a safe manner in a registered storage vessel. The Mount Pleasant site does not currently hold any Petroleum Storage Site licences; however, it will require licences and a certificate of insurance for any propane, diesel fuel or heavy fuel oil to be stored on the site in the future.

***Crown Lands and Forests Act (C-38.1):***

Administered by NBDNR, this act provides legislation for activities related to development, utilization, protection and management of resources located on Crown Lands. The Crown Lands and Forests Act does not apply to the Mount Pleasant property, which is wholly owned by Adex Mining Inc.

***Other Provincial Acts and Regulations:***

Other Provincial acts and regulations that may apply to the care and maintenance, construction, pre-production and prospective operation of the Mount Pleasant property include:

- Water Classification Regulation (NB Regulation 2002-13 under the Clean Water Act);

- Watershed Protected Area Designation Order (NB Regulation 2001-83 under Clean Water Act);
- Wellfield Protected Area Designation Order (NB Regulation 2000-47 under Clean Water Act);
- Potable Water Regulation (NB Regulation 93-203 under Clean Water Act);
- Fees for Industrial Approvals Regulation (NB Regulation 93-201 under Clean Water Act);
- Protected Area Exemption Regulation (NB Regulation 90-120 under Clean Water Act);
- Watercourse and Wetland Alteration Regulation (NB Regulation 90-80 under Clean Water Act);
- Water Well Regulation (NB Regulation 90-79 under Clean Water Act);
- Used Oil Regulation (NB Regulation 2002-19 under Clean Environment Act);
- Public Participation Regulation (NB Regulation 2001-98 under Clean Air Act); and
- Ozone Depleting Substances Regulation (NB Regulation 97-132 under Clean Air Act).

All of the above referenced Provincial Acts and Regulation are available to be viewed on the government of New Brunswick website at <http://www.gnb.ca/0062/acts/acts-e.asp>.

#### 20.4.2 FEDERAL REGULATIONS AND PERMITS

The following is a summary of legislation, regulations and required permits that are administered at the Federal level in Canada and which may be applicable to the care and maintenance of the site and to any activities related the potential future operation of the mine.

##### ***Federal Fisheries Act:***

The Fisheries Act is jointly administered by both Environment Canada and the Department of Fisheries and Oceans Canada ("**DFO**") and provides legislation to protect aquatic environments, fish and fish habitat from the harmful effects of pollutants, termed "deleterious substances" in the Act. Deleterious substances can be interpreted to include a broad scope of materials, but is typically considered to be any substance (e.g. industrial effluent, tailings, refuse, etc.) that is or has the potential to be acutely lethal to fish. The Act also contains provisions for preventing the harmful alteration, disruption or destruction of fish habitat and enables DFO to impede "undertakings" or work that proposes to do this. Where the harmful alteration, disruption or destruction of fish habitat is proposed in the execution of an undertaking, DFO requires that the Owner complete an Environmental Assessment under the Canadian Environmental Assessment Act ("CEAA"). The outcome of such an assessment may require the Owner to implement certain measures and/or adhere to certain conditions to mitigate these effects, or the undertaking may be completely blocked from proceeding in the manner proposed.

The existing TIA or Tailings Pond is a fully permitted, man-made and self-contained structure that was constructed by Billiton Exploration Canada Ltd in the early 1980s to support the mineral production operation. In 1981, Billiton obtained Approval to Construct (No. 22-15-8) a "waste stabilization pond" (a.k.a the Tailings Pond) as well as a Permit for Watercourse Alteration from the New Brunswick Department of Environment. In this regard, all issues of compensation, water diversions and other regulatory requirements related to the deposition of tailings in the TIA were settled by the previous Owner in the early 1980s. Since 1985, the site has been placed on care and maintenance and the TIA, which currently receives mine water effluent and is fully permitted under NBDOE Approval to Operate I-6154, has not changed in purpose or character since production was suspended.

***Canadian Environmental Assessment Act:***

The requirement for completion of an Environmental Assessment under the federal Canadian Environmental Assessment Act ("CEAA") depends on the specific nature and scope of an undertaking as well as other factors such as i) sources of funding for the project, ii) permitting requirements, and iii) land requirements. In order for CEAA to apply the proposed undertaking must have a certain "trigger" under Section 5(1) of the Act. Triggers which could be applicable to the re-opening of the Mount Pleasant mine include:

- if a federal government department or agency is a proponent of the undertaking;
- if funding for the project or other forms of financial assistance are to be provided by a federal government department or agency;
- if the undertaking is to be constructed on federal lands or if federal lands must be transferred to allow the work to proceed; and
- if a permit, approval or authorization is required to be issued by a federal government department or agency to allow the project to proceed.

***Canadian Environmental Protection Act:***

The Canadian Environmental Protection Act ("CEPA") is administered by Environment Canada and contains the MMER, which is a federal guideline for maximum allowable contaminant concentrations for discharge of liquid effluent from mining and ore processing facilities (Table 64). For discharge of effluent to the environment, the MMER requires that:

- concentrations of deleterious substances in the effluent do not exceed the limits in Table 48;
- the pH is between 6.0 and 9.5; and
- the effluent is not acutely lethal to fish.



**TABLE 64.  
MMER AUTHORIZED LIMITS OF DELETERIOUS SUBSTANCES**

Deleterious Substance	Maximum Authorized Monthly Mean Concentration	Maximum Authorized Concentration In A Composite Sample	Maximum Authorized Concentration In A Grab Sample
Arsenic	0.50 mg/L	0.75 mg/L	1.00 mg/L
Copper	0.30 mg/L	0.45 mg/L	0.60 mg/L
Cyanide	1.00 mg/L	1.50 mg/L	2.00 mg/L
Lead	0.20 mg/L	0.30 mg/L	0.40 mg/L
Nickel	0.50 mg/L	0.75 mg/L	1.00 mg/L
Zinc	0.50 mg/L	0.75 mg/L	1.00 mg/L
Total suspended solids	15.00 mg/L	22.50 mg/L	30.00 mg/L
Radium 226	0.37 Bq/L	0.74 Bq/L	1.11 Bq/L

The MMER also defines specific conditions for depositing a deleterious substance in a Tailings Impoundment Area, including the requirement for the Owner to conduct Environmental Effects Monitoring studies. Refer to the Environment Canada website at <http://www.ec.gc.ca/nopp/docs/regs/MMER/MMER.pdf> to view the complete MMER. The Canadian Environmental Protection Agency also administers the National Pollutant Release Inventory (NPRI) and manages the Canadian Environmental Quality Guidelines, including the Canadian Water Quality Guidelines for the Protection of Aquatic Life, which can be applied to the release of industrial effluent to aquatic environments under certain circumstances.

## **20.5 SOCIAL COMMUNITY AND FIRST NATION ISSUES**

ADEX is currently engaged in discussions with the New Brunswick Department of Aboriginal Affairs and with the surrounding local communities in order to fully communicate our plans forward into production. To the best of our knowledge and belief, there are no outstanding issues relating to the surrounding communities; including the First Nations in New Brunswick.

## **21. CAPITAL AND OPERATING COSTS**

There is no current information available for Capital and Operating Costs for the Property.

## **22. ECONOMIC ANALYSIS**

There is no current information available for Economic Analysis for the Property.

## **23. ADJACENT PROPERTIES**

ADEX's Mount Pleasant Property is surrounded by mineral claims belonging to two other companies. Jubilee Gold Inc. (TSX symbol JUB) has claim blocks 3862, 4009 and parts of 4651 to the west and southeast, while Rockport Mining Corp. (private company) has claim blocks 4009, 4803, 4635 and parts of 4651 to the east, north, south and southwest of Mount Pleasant. Rockport is based in St. Andrews, New Brunswick.

## **24. OTHER RELEVANT DATA AND INFORMATION**

To the best of the author's knowledge, there is no other available technical information pertinent to the Property or to the current Mineral Resource estimate.

## 25. INTERPRETATION AND CONCLUSIONS

The Mount Pleasant Mine Property contains several tungsten, molybdenum, tin, indium, bismuth, zinc and copper polymetallic deposits. Much of the earlier exploration work was focused in the immediate vicinity of the former mine site. This exploration work included stream and soil sampling surveys, surface and underground drilling, IP, seismic, SP, magnetic, gravity, EM and radiation surveys, stripping, trenching and sampling, some surface geological mapping, previous feasibility studies, bulk sampling, metallurgical testing, underground development work and mining.

Updated Mineral Resource estimates have been made for the North Zone and Fire Tower Zone.

Based upon work done for this report and the previous experience at Mount Pleasant, the authors make the following interpretations and conclusions:

- Mineralization is related to inward-cooling of a small-volume, granitic magma that was emplaced along the margin of the dormant Mount Pleasant Caldera in the Late Devonian (*circa*. 368 Ma);
- Mineralization is focused in the highest parts of the roof zone of this ancient magma chamber (granite body), in cupolas or cusps, which occur beneath the North Zone, Saddle Zone and Fire Tower Zone at Mount Pleasant, as well as at Hornet Hill;
- Mineralization is structurally controlled, in fractures that were produced by hydro-fracturing; i.e., magmatic-hydrothermal fluids evolved from the cooling magma under pressure, accumulated in apical parts (cupolas) of the magma chamber, became over pressured and shattered the overlying rocks, including the early cooled parts of the granite cupolas;
- Both porphyry tin (Sn) and porphyry tungsten (W) deposit types are present at Mount Pleasant; the older tungsten-molybdenum mineralization, which has associated silicic alteration, is partly overprinted (spatially and temporally) by the tin-zinc (indium-bearing) mineralization, which has associated chloritic alteration. The metals were transported by the same magmatic-hydrothermal fluids that caused the fracturing;
- The tin mineralization mainly occurs as cassiterite and two populations are present – large single crystals and crystal aggregates (>100 microns) and small individual crystals (<20 microns). The former population is amenable to a coarser grind and gravity separation, whereas the latter population requires a finer grind and flotation in order to

recover the cassiterite. Over-grinding must be avoided; “Mt. Isa mills” should be considered as a possible way to prevent this from happening;

- The 2008 drilling program was successful in upgrading the resource estimate of the FTZ from the “Inferred” category to “Indicated” category. The total “indicated” tonnage and grades for tungsten and molybdenum remain almost the identical with old "inferred" resources for the FTW and FTN sub-zones. There is also an additional “inferred” resource for the FTW based upon the results of the Phase I drilling;
- Exploration potential still remains for future definition drilling to add additional mineral reserves within the FTZ. The FTW subzone remains open on the southeast side in an area now referred to as the Fire Tower East ("FTE") sub-zone. This area was drill tested by Phase II drillholes AM-08-15 and AM-08-16, with narrower and lower grade intersections. Phase II hole AM-08-21 also tested mineralization in the same area as the FTE. Additional drilling will be required to close off this zone;
- It also appears that the mineralization within the FTN sub-zone extends farther north of hole AM-08-11. Phase II hole AM-08-24 was collared around 100 m north-northwest of hole AM-08-11 resulting in the extension of the FTN sub-zone a farther 40-50 m in that direction. This hole intersected 0.12% Bi, 0.29% WO<sub>3</sub>, 0.15% MoS<sub>2</sub> over a core length of 18.0 m. Further diamond drilling is necessary to define the northern limit of the FTN sub-zone, which may close off to the north and then re-open again into the Saddle Zone;
- Further drilling is required to delineate W-Mo-Bi mineralization in the southern and the eastern parts of the North Zone;
- Further drilling is required to fully delineate the resources of the Saddle Zone and to determine if tungsten-molybdenum mineralization is continuous with that in the Fire Tower Zone to the south;
- ADEX completed repeat analyses on historical drill core and pulp samples using two different laboratories, SGS and Actlabs, which employ different analytical methods for the determination of In, Sn, W, Mo, Bi, As, Cu, Pb and Zn concentrations. Preliminary conclusions by ADEX regarding which analytical methods should be used in future drill programs are as follows (per. comm. Trevor Boyd): it was found that the SGS sodium peroxide fusion ICP and ICP-MS method recovers the most metals, including tin and tungsten, especially for the lower grade samples (between 0.05 to 0.2 Wt% grades), but the Fusion XRF technique of Actlabs appears to be more precise and should be seriously considered as the technique to be used in future exploration work;
- For the 2010 drilling program, check assays done by ADEX at SGS on original Actlabs pulps agree reasonably well, with R<sup>2</sup>-values  $\geq 0.92$  for arsenic, bismuth, tin, molybdenum,

and zinc; copper, indium and tungsten have R2-values of 0.87, 0.70 and 0.61, respectively;

- For the 2011 drilling program, check assays done by ADEX at SGS on original Actlabs pulps agree very well (R2-values  $\geq 0.98$ ) for all metals;
- Comparison of Actlabs' analytical results on 32 split-core samples with SGS' results for quartered-core samples from the same intervals, shows reasonable correlation between the two analytical laboratories for arsenic, copper, molybdenum, tin, and zinc, with R2-values  $\geq 0.90$ ; however, R2-values for bismuth, lead, indium and tungsten are 0.85, 0.85, 0.77, and 0.04, respectively. The low R2-values most likely reflect inhomogeneous distribution of mineralization in the core, because the two laboratories are in good agreement for results on the same samples; and
- Actlabs' analytical data for the 2010 and 2011 drilling programs are quite good for most elements, with the following caveats. Arsenic values are likely a bit too high; molybdenum values, especially in molybdenum-rich samples, and zinc values are probably too low.

For the Mineral Resource estimates, the following conclusions are made:

### **The North Zone**

The North Zone Mineral Resources occur in a zone of variable mineralisation, which has the potential for economic extraction of several elements. The elements reported for this estimate include Sn, Zn and In. Values for other elements are tabulated in this report as they have potential implications for metallurgical purposes but those elements are not considered as part of the current NI 43-101 compliant Mineral Resource estimate and they do not contribute to any of the economic parameters used for the estimate. The minimum cut-off grade and block size used for the estimate were applied with the assumption that a resource with potential bulk mineable characteristics has been appropriately estimated using these parameters. Mineral Resource estimates are summarised in Tables 65 and 66.

**TABLE 65.**  
**FEBRUARY 2012 MINERAL RESOURCES – North Zone,**  
**MOUNT PLEASANT PROPERTY**

Mineral Resource Class	Tonnage (Millions of tonnes)	Cut Sn Grade %	Cut Zn Grade %	Cut In Grade (ppm)
Indicated	12.4	0.38	0.86	63.5
Inferred	2.8	0.3	1.13	69.8

**TABLE 66.**  
**CONTAINED METAL, North Zone, MOUNT PLEASANT PROPERTY (CAPPED\*)**

Mineral Resource Class	Contained Sn (kg)	Contained Zn (kg)	Contained In (kg)
Indicated	47,000,000	107,000,000	789,000
Inferred	8,600,000	32,000,000	198,000

### The Fire Tower Zone

Tungsten-molybdenum deposits in the Fire Tower Zone mainly occur in the lower part of the breccia pipe and the upper part of the underlying fine-grained granite, and to a lesser extent in associated volcanic rocks (Kooiman et al, 2005)

Mineralization occurs as veinlets and disseminated grains in breccias mainly located within the Mount Pleasant porphyry. The principal "economic-type" minerals are fine-grained wolframite and molybdenite, along with minor amounts of native bismuth and bismuthinite. The gangue minerals consist of cassiterite, arsenopyrite, löllingite, quartz, topaz and fluorite.

SRK has classified the Fire Tower Mineral Resource estimate as Indicated and Inferred. Summary of the Mineral Resource estimate is presented in Table 67. The mined out stope areas have been excluded from the resources calculations.

**TABLE 67.**  
**MOUNT PLEASANT MINERAL RESOURCE STATEMENT\*, FIRE TOWER ZONE**  
**(SRK, OCTOBER 11, 2008)**

Area	Tonnes	%WO <sub>3</sub>	%MoS <sub>2</sub>	%As	%Bi
<b>Indicated</b>					
Fire Tower West	9,148,900	0.32	0.21	0.29	0.04
Fire Tower North	<u>4,340,100</u>	<u>0.35</u>	<u>0.20</u>	<u>1.15</u>	<u>0.09</u>
<b>Total Indicated</b>	<b>13,489,000</b>	<b>0.33</b>	<b>0.21</b>	<b>0.57</b>	<b>0.06</b>
<b>Inferred</b>					
Fire Tower West	831,000	0.26	0.20	0.21	0.04
Fire Tower North	<u>10,700</u>	<u>0.26</u>	<u>0.17</u>	<u>0.26</u>	<u>0.05</u>
<b>Total Inferred</b>	<b>841,700</b>	<b>0.26</b>	<b>0.20</b>	<b>0.21</b>	<b>0.04</b>

\* Mineral Resources are not mineral reserves and do not have demonstrated economic viability. All figures have been rounded to reflect the relative accuracy of the estimates.

Reported at a cutoff of 0.3%WO<sub>3</sub> Eq grade. WO<sub>3</sub> Eq (equivalent) = %WO<sub>3</sub> + 1.5 x %MoS<sub>2</sub>.

## 26. RECOMMENDATIONS

Based upon the authors' knowledge of the Mount Pleasant Property, the following recommendations are offered.

The proposed work plan and budget for the Mount Pleasant Property, excluding the Fire Tower Zone, as prepared by the authors in collaboration with ADEX, amounts to **\$4,000,000**. This plan is outlined below and further documented in Table 68:

- Re-assay more historical drill core samples obtained by Mount Pleasant Mines in the 1960s-70s because descriptions from drill logs and recorded Zn and Sn assays suggest potential for expanding the size of the indium resource in the North Zone. Focus will be on re-sampling and assaying of core from the vicinity of the #1-3 and #5 Tin Lode subzones, where few assays for In exist. Since 2008, the re-assaying of pulps and sampling of historical core has increased the In coverage of the North Zone from approximately 15% to 33%; however within the identified mineralized subzones, the In coverage is approximately 43%. The assaying of an additional 1,500 samples will raise this coverage to approximately 50% and allow WGM to make a reasonable estimate of the In content in the remaining holes that are missing In analyses within the mineralized bodies;
- Re-assay sample pulps that returned poor assay repeats at SGS or Actlabs, i.e., those samples identified in Section 12.0 (Data Corroboration), at the alternate ISO certified laboratory to determine which assay results are the most accurate;
- Additional re-sampling and re-analysis of historical underground drill core and other sample material from Lac Minerals Tin Project in the late 1980s should be undertaken since the original data are suspect because of quality control issues at the on-site laboratory facility used by Lac. Specifically, focus should be on those LNZ series samples that were not re-analysed during 2008-09 Technical Review;
- Re-assay selected samples that reported anomalously high Pb, Zn and Cu for their Ag and Au contents, which include historical and 2008-11 drill core intersections plus bulk sample material collected in 2009;
- Continue environmental monitoring of Mount Pleasant mine site and tailings pond infrastructure;

**TABLE 68.**  
**MOUNT PLEASANT PROPERTY (EXCLUDING FIRE TOWER ZONE)**  
**PROPOSED WORK PLAN AND BUDGET**

Work Type	Units	Unit Cost (\$)	Subtotal (\$)
Additional assaying of historical cores and underground samples, which were not previously analysed for indium	1,500 samples	80/sample	120,000
Environmental Monitoring - Mount Pleasant mine site and tailings pond			50,000
Diamond drilling of the eastern and southeastern parts of the North Zone and southern Saddle Zone (cost includes geologist, helper labour and assaying).	7,500 metres	200/metre	1,500,000
Pre-feasibility study on Sn-In-Zn resources of the North Zone, not including costs of surface infrastructure or any required underground development.			1,500,000
Upgrade of company's GEMCOM modelling software and training of personnel.			60,000
Input of lithological data from historical drill logs, sample tag numbers, certificate numbers and referee analyses into GEMCOM			50,000
Specific gravity measurements of drill core and bulk sample material, including collection and interpretation, re-analysis of core samples as part of internal QA/QC procedure.			\$10,000
Re-opening of the 600 Adit, including regulatory permitting, implementation of safety standards and underground examination of workings.			\$100,000
Holding costs and land taxes			\$50,000
Transportation, meals and accommodations of technical and supervisory personnel			\$50,000
<b>TOTAL</b>			<b>\$3,470,000</b>
Contingency (~15%):			\$530,000
<b>GRAND TOTAL</b>			<b>\$4,000,000</b>

- A 7,500 metre diamond drilling program is recommended to further define the North Zone to the Northeast, East and Southeast towards the Saddle Zone; to delineate the limits of the Saddle Zone and determine its continuity with the Fire Tower Zone; and to test the Mount Pleasant East area for the presence of another Saddle Zone type intrusion. This drilling program is to follow up on wide, high grade WO<sub>3</sub>-MoS<sub>2</sub>-Bi intersections encountered during the 2011 drill program, and its main purpose is to increase the amount of WO<sub>3</sub>-MoS<sub>2</sub>-Bi resource on the Mount Pleasant Property. Based upon the results of this technical review it will be necessary to plan a drill spacing of no greater than 30 metres in order to potentially qualify these mineralized bodies as 43-101 Indicated Resources and thus qualify the resources for feasibility study.



- Open and re-activate the 600 Adit, which drives through the North Zone at approximately 80 metres depth, in order to improve access to the #1-3 and #4 Tin Lode subzones. The adit workings will serve as a platform for underground drilling of the North Zone at <200 metres depth and re-sampling of underground workings in order to increase understanding of the In distribution in these areas where coverage is historically poor;
- Conduct a pre-feasibility study of the North Zone based upon the results of the Preliminary Assessment (Thibault et al. 2010) but with a much larger production scenario in mind. This study would utilize environmental work, market studies, geotechnical and definition drilling, and bench and pilot metallurgical work completed to-date on the North Zone. **Note: The PEA Study is no longer current and should not be relied upon;**
- Upgrade ADEX's GEMCOM modelling software in order to complete pre-feasibility level work and mine planning at Mount Pleasant. Training of personnel to operate the program at basic to intermediate levels will be required;
- Input lithological information from both recent and historical drillholes into the GEMCOM database to better understand the rock associations in the mineralized zones and allow for the better interpretation of their local trends. In addition, RQD and core recovery data, drill core sample tag numbers, assay certificate numbers, referee samples and other check assays should be added to this database; and
- Carry out detailed specific gravity measurements of drill core and bulk sample material to validate the historical information and to characterize each zone or rock type accordingly.

The following recommendations are specific to the current Mineral Resource estimates for the North Zone:

- Assay unsampled intervals for In (covered in part by the general recommendations above);
- Enter pertinent litho data from old and future holes into the database to aid in the subsequent modelling of the mineralized zones;
- Enter pertinent RQD and core recovery data from old holes (if available) and record and enter pertinent RQD and core recovery data from future holes; and
- Sample previously un-sampled, archived core intervals for additional elements that may be of interest in holes that might contribute to potential Mineral Resources.

The proposed work plan and budget for the Mount Pleasant Property Fire Tower Zone, as prepared by the authors in collaboration with ADEX, amounts to **\$4,400,000**. This plan is outlined below and further documented in Table 69:

- Additional diamond drilling is required to further define the limits of the FTN and FTW sub-zones where the zones currently remain open; and,
- Quantitative section (deep penetration) IP surveying to determine if the tungsten-molybdenum mineralization is continuous between the Fire Tower Zone and Saddle Zone, and to explore for deeper mineralization beneath Granite II (explore for stacked porphyry deposits at depth under Mount Pleasant). Also, to explore for additional mineralization at Hornet Hill. IP surveying may also be useful in conjunction with the evaluation of near-surface tin-indium potential.

WGM recommends that ADEX considers carrying out additional exploration programs on the Property in the future. To date, there has been no significant effort to explore for gold mineralization on the Property. Freewest Resources continues to explore for gold mineralization on the Clarence Stream Property 10 km west of Mount Pleasant. In the short-term, ADEX should consider cutting an exploration grid and conducting a geological mapping and sampling program on the Property in search of new mineralized targets.

Most of the exploration work has been concentrated on the Fire Tower Zone and North Zone (including the Deep Tin Zone). ADEX believes that the Granite II is continuous between the Fire Tower Zone and the North Zone where limited drilling has taken place and where a number of tin mineralized cupolas may exist. Therefore, additional exploration work to identify drill targets along this trend may be warranted.

ADEX should also consider initiating a base line environmental study of the Property in the near future.

**TABLE 69.**  
**MOUNT PLEASANT FIRE TOWER ZONE, PROPOSED WORK PLAN AND BUDGET**

Work Type	Units	Unit Cost (\$)	Cost (\$)
Diamond Drilling (including geologist, helper labour & assaying)	1,500 m	200	\$300,000
Additional core splitting and assaying of historical core	500 samples	80	\$40,000
Environmental Monitoring - Mine Site and tailings pond			\$50,000
Metallurgical test work, four samples to undergo testing of FTZ mineralization sampled from 2008 drill cores	4 samples	50,000	\$200,000
Feasibility Study of the FTZ - decision to proceed to feasibility dependant upon results and recommendations of future Scoping Studies			\$3,040,000
IP Surveying - explore at from depths of 500 to 800 m			\$90,000
Geological mapping program (Property exploration)			\$40,000
Consulting Fees	100 days	1,000	\$100,000
GEMCOM (or similar Software & training)			\$40,000
Holding costs and land taxes			\$50,000
Transportation, meals and accommodations			\$50,000
<b>TOTAL</b>			<b>\$4,000,000</b>
Contingency (~10%)			\$400,000
<b>GRAND TOTAL</b>			<b>\$4,400,000</b>

## 27. DATE AND SIGNATURE PAGE

This report titled “*Amended Technical Report of the Mount Pleasant Property, Including Mineral Resource Estimates, Southwestern New Brunswick for Adex Mining Inc.*” and dated April 13, 2012 and amended October 11, 2013, was prepared and signed by the following authors:



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Michael Kociumbas, P.Geo.  
Senior Geologist and Vice-President  
Watts, Griffis and McOuat Limited



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Steven McCutcheon, Ph.D., P.Geo.,  
McCutcheon Geo-Consulting



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John Reddick, M.Sc., P.Geo.  
Reddick Consulting Inc.  
Senior Associate Geologist,  
Watts, Griffis and McOuat Limited



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Tim McKeen, P. Eng.  
Lead Process Design Engineer  
Thibault & Associates Inc.



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Stephanie Scott, P. Eng.  
Lead Process Design Engineer  
Thibault & Associates Inc.



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Dorota El-Rassi, P.Eng.  
SRK Consulting


## CERTIFICATE

I, Michael Kociumbas, do hereby certify that:

1. I reside at 420 Searles Court, Mississauga, Ontario, Canada, L5R 2C6.
2. I am a Senior Geologist and Vice-President with Watts, Griffis and McOuat Limited, a firm of consulting geologists and engineers, which has been authorized to practice professional engineering by Professional Engineers Ontario since 1969, and professional geoscience by the Association of Professional Geoscientists of Ontario.
3. This certificate accompanies the report titled “*Amended Technical Report of the Mount Pleasant Property, Including Mineral Resource Estimates, Southwestern New Brunswick for Adex Mining Inc.*” dated April 13, 2012 and Amended October 11, 2013.
4. I am a graduate from the University of Waterloo, Waterloo, Ontario with an Honours B.Sc. Degree in Applied Earth Sciences, Geology Option (1985), and I have practised my profession continuously since that time. My relevant experience includes extensive experience with poly-metallic and base metal deposits, Mineral Resource estimation techniques and preparation of technical reports.
5. I am a licenced Professional Geologist of the Association of Professional Geoscientists of Ontario (Membership # 0417). I am Member of: Canadian Institute of Mining, Metallurgy and Petroleum (Membership #94100); Prospectors and Developers Association of Canada (Membership #10463). I am an Associate of Geological Association of Canada.
6. I have read the definition of “qualified person” set out in the National Instrument 43-101 (“NI 43-101”) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a “qualified person” for the purposes of NI 43-101.
7. I have not visited the Property.
8. I am responsible for the coordination, consolidation and review of this report. I am responsible for Sections 15 to 19 and 21 to 24. I have co-authored Sections 1 to 6 and 25 and 26 and I am jointly responsible for these sections.
9. I am independent of the issuer as described in Section 1.5 of NI 43-101.
10. My relevant experience includes 25 years of field exploration and project management for both gold and base metal projects in Canada and internationally. I have extensive experience with Mineral Resource estimation techniques and the preparation of technical reports. I have had no prior involvement with the Property that is the subject of this technical report.

11. I have read NI 43-101, Form 43-101F1 and the technical report and have prepared the technical report in compliance with NI 43-101, Form 43-101F1.
12. As of the date of the technical report, to the best of my knowledge, information and belief, the technical report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.

  
Michael Kociumbas, P. Geo.  
As of April 13, 2012

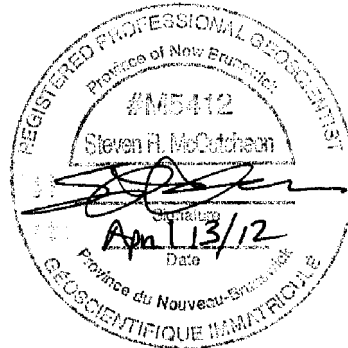


## CERTIFICATE

I, Steven McCutcheon of McCutcheon Geo-Consulting, do hereby certify that:

1. I, **Steven R. McCutcheon**, reside at 1935 Palmer Drive, Bathurst, New Brunswick, Canada.
2. This certificate accompanies the report titled “*Amended Technical Report of the Mount Pleasant Property, Including Mineral Resource Estimates, Southwestern New Brunswick for Adex Mining Inc.*” dated April 13, 2012 and amended October 11, 2013.
3. I am a graduate of the University of New Brunswick, Fredericton, NB, where I obtained a BSc. Geol. in 1971. In addition, I am a graduate of Acadia University, Wolfville, NS, where I obtained a MSc. Geol. in 1981, and I am a graduate of the Dalhousie University, Halifax, NS, where I obtained a PhD. Geol. in 1990. I have been engaged in mapping and mineral deposit studies since 1971. I worked for 38 years with the New Brunswick Geological Surveys Branch on a variety of deposit types and have been consulting for the mineral industry and government since 2009
4. I am a Professional Geoscientist licensed by the Association of Professional Engineers and Geoscientists of New Brunswick (member # M5412) since 1997 and by the Association of Professional Geoscientists of Ontario (member # 2029) since 2011.
5. I have read the definition of “qualified person” set out in the National Instrument 43-101 (“NI 43-101”) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a “qualified person” for the purposes of NI 43-101.
6. I visited the Mount Pleasant property in September (28–30<sup>th</sup>), October (17<sup>th</sup>), November (3–4<sup>th</sup>), and December (2–3<sup>rd</sup>) of 2011 to gather information relevant to this technical report.
7. I am solely responsible for Sections 7 to 12. With the co-authors of this report, I am jointly responsible for Sections 1 to 6 and 25 and 26.
8. I am independent of the issuer as described in Section 1.5 of NI 43-101.
9. The Mount Pleasant Property constitutes part of the Mount Pleasant Caldera Complex, which was the subject of my PhD thesis. I visited the Property many times in the 1980s and mapped the rocks in and around the Property in the course of my thesis, which was done while on educational leave from my employer, the New Brunswick Department of Natural Resources.

10. I have read NI 43-101, Form 43-101F1 and the technical report and have prepared the technical report in compliance with NI 43-101, Form 43-101F1.
11. As of the date of the technical report, to the best of my knowledge, information and belief, the technical report contains all scientific and technical information that is required to be disclosed to make the technical report clear and not misleading.



Steven McCutcheon, Ph.D., P.Ge.  
McCutcheon Geo-Consulting  
As of April 13, 2012

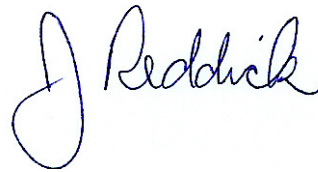


## CERTIFICATE

I, John Reddick, do hereby certify that:

1. I reside at 27 Collins Court, R.R. #2, Inverary, Ontario, Canada, K0H 1X0.
2. I am an Associate Geologist with Watts, Griffis and McOuat Limited, a firm of consulting geologists and engineers, which has been authorized to practice professional engineering by Professional Engineers Ontario since 1969, and professional geoscience by the Association of Professional Geoscientists of Ontario. I am also President of Reddick Consulting Inc. which is authorized to engage in the provision of geoscience services by the Association of Professional Geoscientists of Ontario.
3. This certificate accompanies the report titled “*Amended Technical Report of the Mount Pleasant Property, Including Mineral Resource Estimates, Southwestern New Brunswick for Adex Mining Inc.*” dated April 13, 2012 and amended October 11, 2013.
4. I am a graduate of Queen’s University, Kingston, Ontario, Canada in 1982 with a B.Sc. Honours Geology degree, and of Queen’s University, Kingston, Ontario, Canada in 1995 with a M.Sc. in Honours Geology degree in Mineral Exploration. I have extensive experience with mining and the estimation of base and precious metal deposits, Mineral Resource estimation techniques and preparation of technical reports.
5. I am a Practising Member of the Association of Professional Geoscientists of Ontario (#643) and a member of the Society of Economic Geologists.
6. I have read the definition of “qualified person” set out in the National Instrument 43-101 (“NI 43-101”) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfil the requirements to be a “qualified person” for the purposes of NI 43-101.
7. I have not visited the Property.
8. I am responsible for the North Zone information in Section 14 of the Report. With the co-authors of this report, I am jointly responsible for Sections 1, 25 and 26.
9. I am independent of the issuer as described in Section 1.5 of NI 43-101.
10. My relevant experience includes over 25 years of field exploration, work in production, resource estimation and consulting. I have over 25 years of experience in mineral exploration, mine production or consulting. I have over 25 years of experience in mineral resource estimation and I have over 15 years experience preparing mineral resource estimates using block-modelling software and have over 15 years experience as an independent consultant.

11. I have read NI 43-101, Form 43-101F1 and the technical report and have prepared the technical report in compliance with NI 43-101, Form 43-101F1.
12. As of the date of the technical report, to the best of my knowledge, information and belief, the technical report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.



John Reddick, P.Ge.,  
President of **Reddick Consulting Inc.**  
Senior Associate Geologist of  
**Watts, Griffis and McOuat Limited**  
As of April 13, 2012

## CERTIFICATE

I, Tim McKeen, do hereby certify that:

1. I reside at 45 Lyndsay Lane, New Market, New Brunswick, Canada
2. I am a Lead Process Design Engineer with Thibault & Associates Inc., which is authorized to practice professional engineering by the Association of Professional Engineers and Geoscientists of New Brunswick.
3. This certificate accompanies the report titled "*Amended Technical Report of the Mount Pleasant Property, Including Mineral Resource Estimates, Southwestern New Brunswick for Adex Mining Inc.*" dated April 13, 2012 and amended October 11, 2013.
4. I am a graduate of the University of New Brunswick, Fredericton, NB, with a B.Sc. in Chemical Engineering in 2000. In addition, I am a graduate of University of Saskatchewan, Saskatoon, SK, with a M.Sc. in Chemical Engineering in 2003. I have practiced my profession as a process chemical engineer continuously since graduation.
5. I am a Professional Engineer licensed by the Association of Professional Engineers and Geoscientists of New Brunswick (member #M6082).
6. I have read the definition of "qualified person" set out in the National Instrument 43-101 ("NI 43-101") and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.
7. I visited the Mount Pleasant property on several occasions with the most recent visit on September 29, 2009.
8. I am solely responsible for Section 13.
9. I am independent of the issuer as described in Section 1.5 of NI 43-101.
10. My relevant experience includes process design at various levels of detail from conceptual to detailed design for several mineral processing projects involving flotation and hydrometallurgical operations as well as past experience on scoping, pre-feasibility and feasibility studies for mining projects. Since 1998, I have worked on various studies, bench scale and pilot test programs, and the 2010 NI43-101 Technical Report related to the Mount Pleasant property.

11. I have read NI 43-101, Form 43-101F1 and the technical report and have prepared the technical report in compliance with NI 43-101, Form 43-101F1.
12. As of the date of the technical report, to the best of my knowledge, information and belief, the technical report contains all scientific and technical information that is required to be disclosed to make the technical report clear and not misleading, with the exception of information relating to the Fire Tower Zone in Section 13, which is only included up to the date of December 8, 2008.



Tim McKeen, P.Eng.  
**Thibault & Associates Inc.**  
As of April 13, 2012

## CERTIFICATE

I, Stephanie Scott, do hereby certify that:

1. I reside at 39 Declaration Drive, Killarney Road, New Brunswick, Canada.
2. I am a Lead Process Design Engineer with Thibault & Associates Inc., which is authorized to practice professional engineering by the Association of Professional Engineers and Geoscientists of New Brunswick.
3. This certificate accompanies the report titled "*Amended Technical Report of the Mount Pleasant Property, Including Mineral Resource Estimates, Southwestern New Brunswick for Adex Mining Inc.*" dated April 13, 2012 and amended October 11, 2013.
4. I am a graduate of the University of New Brunswick, Fredericton, NB, with a B.Sc. in Chemical Engineering in 2002. I have practiced my profession as a process chemical engineer continuously since graduation.
5. I am a Professional Engineer licensed by the Association of Professional Engineers and Geoscientists of New Brunswick (member #M6565).
6. I have read the definition of "qualified person" set out in the National Instrument 43-101 ("NI 43-101") and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfil the requirements to be a "qualified person" for the purposes of NI 43-101.
7. I visited the Mount Pleasant property on several occasions with the most recent visit on September 19, 2011.
8. I am solely responsible for Section 20.
9. I am independent of the issuer as described in Section 1.5 of NI 43-101.
10. My relevant experience for the purpose of the Technical Report includes process design at various levels of detail from conceptual to detailed design for several mineral processing and wastewater treatment projects as well as past experience on preparation of scoping, pre-feasibility and feasibility studies for mining projects. Since 2008, I have worked periodically on various studies, bench scale and pilot test programs related to the development of the Mount Pleasant property; including providing technical input to 2008 report on "Adex Minerals Corp. Mount Pleasant Fire Tower Zone Scoping Study" (Aker, 2008) and the 2010 NI43-101 Technical Report related to the Mount Pleasant property.

11. I have read NI 43-101, Form 43-101F1 and the technical report and have prepared the technical report in compliance with NI 43-101, Form 43-101F1.
12. As of the date of the technical report, to the best of my knowledge, information and belief, the technical report contains all scientific and technical information that is required to be disclosed to make the technical report clear and not misleading.



Stephanie Scott, P.Eng.  
**Thibault & Associates Inc.**  
As of April 13, 2012

## CERTIFICATE

I, Dorota A. El-Rassi, P.Eng., of SRK Consulting, do hereby certify that:

1. I reside at 70 Portsdown Road, Scarborough, Ontario, M1P 1V1.
2. I am a former Geological Engineer with Watts, Griffis and McOuat Limited, a firm of consulting geologists and engineers, which has been authorized to practice professional engineering by Professional Engineers Ontario since 1969, and professional geoscience by the Association of Professional Geoscientists of Ontario.
3. This certificate accompanies the report titled “*Amended Technical Report of the Mount Pleasant Property, Including Mineral Resource Estimates, Southwestern New Brunswick for Adex Mining Inc.*” dated April 13, 2012 and amended October 11, 2013.
4. I graduated from the University of Toronto, Toronto, Ontario in 1997 with a B.A.Sc. in Mining Engineering (Honours), and in 2000 with a M.Sc. in Geology and Mechanical Engineering and have been practicing my profession since 1997.
5. I am a Professional Engineer licensed by Professional Engineers Ontario (Registration Number 100012348).
6. I have read the definition of “qualified person” set out in the National Instrument 43-101 (“NI 43-101”) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a “qualified person” for the purposes of NI 43-101
7. I did not visit the Property. In 2006, I also co-authored a NI 43-101 technical report on the Mount Pleasant Property, Fire Tower Zone.
8. I am responsible for the Fire Tower Zone information in Section 14 of the Report. With the co-authors of this report, I am jointly responsible for Sections 1, 25 and 26.
9. I am independent of the issuer as described in Section 1.5 of NI 43-101.
10. My relevant experience includes 16 years as a professional engineer. I have worked extensively on projects in the exploration for gold, other precious metal and base metal deposits, including VMS-type and porphyry-type deposits. I have previously prepared NI 43-101 reports to be filed with various regulatory authorities across Canada.

11. I have read NI 43-101, Form 43-101F1 and the technical report and have prepared the technical report in compliance with NI 43-101, Form 43-101F1.
  
13. As of the date of the technical report, to the best of my knowledge, information and belief, the technical report contains all scientific and technical information that is required to be disclosed to make the technical report not misleading.



Dorota A. El-Rassi, M.Sc., P.Eng.

**SRK Consulting**

As of December 1, 2008



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**APPENDICES**



**APPENDIX 1:  
ASSAY CERTIFICATES – FIRE TOWER ZONE**



## Certificate of Analysis

Work Order: TO101373

To: **Watts, Griffis & McQuat Ltd.**  
Attn: Paul Dunbar  
8 King Street East  
Suite 400  
TORONTO  
ONTARIO M5C 1B5

Date: Sep 08, 2008

P.O. No. : AMG REV 0468  
Project No. : AMG REV 0468  
No. Of Samples : 14  
Date Submitted : Jul 02, 2008  
Report Comprises : Pages 1 to 3  
(Inclusive of Cover Sheet)

**Distribution of unused material:**

STORE: 14 Rocks

Certified By :

Gavin McGill  
Operations Manager

*SGS Minerals Services (Toronto) is accredited by Standards Council of Canada (SCC) and conforms to the requirements of ISO/IEC 17025 for specific tests as indicated on the scope of accreditation to be found at <http://www.scc.ca/en/programs/lab/mineral.shtml>*

Report Footer: L.N.R. = Listed not received I.S. = Insufficient Sample  
n.a. = Not applicable -- = No result  
\*INF = Composition of this sample makes detection impossible by this method  
M after a result denotes ppb to ppm conversion, % denotes ppm to % conversion  
Methods marked with an asterisk (e.g. \*NAA08V) were subcontracted  
Methods marked with the @ symbol (e.g. @AAS21E) denote accredited tests

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Order: AHC FTV 0400

Element Method Det.Lim. Units	Au FAI505 1 PPB	As @ICP90Q 0.01 %	Bi @ICP90Q 0.01 %	Cu @ICP90Q 0.01 %	Mo @ICP90Q 0.01 %	Pb @ICP90Q 0.01 %	Sn @ICP90Q 0.01 %	W @ICP90Q 0.01 %	Zn @ICP90Q 0.01 %	In @ICM90A 0.2 PPM
2281	65	0.24	0.05	<0.01	0.02	0.05	0.01	0.14	0.41	0.4
*Rep 2281	70	0.24	0.05	<0.01	0.02	0.05	0.01	0.14	0.41	0.4
2282	35	0.53	0.06	<0.01	0.11	<0.01	<0.01	0.44	<0.01	<0.2
2283	11	2.15	0.11	<0.01	0.03	<0.01	0.01	0.19	0.19	8.9
2284	15	0.99	0.13	<0.01	0.16	<0.01	0.02	0.28	0.02	1.5
2285	24	0.66	0.05	<0.01	0.11	<0.01	<0.01	0.33	0.15	5.4
2286	67	6.81	0.20	0.18	0.18	<0.01	0.17	0.46	0.49	109
2287	103	0.20	0.23	0.08	0.28	0.04	0.04	0.62	0.34	4.4
2289	34	0.02	0.02	<0.01	0.12	<0.01	<0.01	0.03	0.02	0.2
2289B	16	0.98	0.04	<0.01	0.05	<0.01	<0.01	0.34	0.03	0.8
2290	47	0.07	0.10	<0.01	0.16	<0.01	<0.01	0.41	0.02	1.1
2291	23	1.55	0.12	0.03	0.06	0.02	<0.01	0.05	0.52	28.9
2292	52	1.43	0.06	0.03	0.05	<0.01	0.02	0.19	0.25	3.3
2293	22	3.15	0.24	0.21	0.01	0.05	5.61	0.49	0.03	10.9
*Rep 2293	21	3.17	0.24	0.21	0.02	0.04	5.81	0.50	0.03	12.2
2288	18	0.29	<0.01	<0.01	0.07	<0.01	<0.01	0.18	0.02	0.6

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Order: AMG REV 0400

Element	Ag
Method	AAA50
Det.Lim.	10
Units	G/T
2281	<10
*Rep 2281	<10
2282	<10
2283	<10
2284	<10
2285	<10
2286	<10
2287	<10
2289	<10
2289B	<10
2290	<10
2291	<10
2292	<10
2293	<10
*Rep 2293	<10
2288	<10

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## Certificate of Analysis

Work Order: TO101089

To: **Watts, Griffis & McOuat Ltd.**  
Attn: Paul Dunbar  
8 King Street East  
Suite 400  
TORONTO  
ONTARIO M5C 1B5

Date: Aug 08, 2008

P.O. No. :  
Project No. : ADEX MP  
No. Of Samples 15  
Date Submitted Jun 09, 2008  
Report Comprises Pages 1 to 3  
(Inclusive of Cover Sheet)

### Distribution of unused material:

Discard after 90 days: 15 Cores

Certified By :

Gavin McGill  
Operations Manager

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Report Footer: L.N.R. = Listed not received I.S. = Insufficient Sample  
n.a. = Not applicable -- = No result  
\*INF = Composition of this sample makes detection impossible by this method  
M after a result denotes ppb to ppm conversion, % denotes ppm to % conversion  
Methods marked with an asterisk (e.g. \*NAA08V) were subcontracted  
Methods marked with the @ symbol (e.g. @AAS21E) denote accredited tests

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Order:

Element Method Det.Lim. Units	Au FAI505 1 PPB	Ag @AAS21E 0.3 G/T	As @ICP90Q 0.01 %	Bi @ICP90Q 0.01 %	Cu @ICP90Q 0.01 %	MoS2 @ICP90Q 0.01 %	Pb @ICP90Q 0.01 %	Sn @ICP90Q 0.01 %	WO3 @ICP90Q 0.01 %	Zn @ICP90Q 0.01 %
MP001	53	4.1	18.5	0.72	<0.01	0.12	<0.01	0.04	2.08	0.03
*Rep MP001	50	4.1	18.5	0.72	<0.01	0.12	<0.01	0.04	2.08	0.03
MP002	16	1.8	4.09	0.16	<0.01	0.03	<0.01	<0.01	0.20	0.02
MP003	38	1.2	0.46	0.18	<0.01	0.29	<0.01	0.01	0.23	0.03
MP004	4	2.8	0.19	0.01	0.42	0.03	<0.01	7.37	0.33	0.01
MP005	58	2.2	0.37	0.06	0.03	0.13	<0.01	0.02	0.14	0.35
MP006	17	1.6	0.11	0.08	0.04	0.13	<0.01	0.37	0.19	0.02
MP007	11	4.7	6.85	0.02	0.25	<0.01	<0.01	0.27	0.15	13.5
MP008	9	5.9	3.44	0.02	0.22	0.01	<0.01	0.32	0.10	10.7
MP009	6	6.6	3.43	0.08	0.21	<0.01	<0.01	0.15	0.16	10.5
MP010	30	3.3	0.70	0.02	0.39	0.07	<0.01	0.41	0.09	0.52
MP011	2	2.7	0.16	<0.01	0.02	<0.01	0.10	0.03	0.02	0.80
MP012	34	1.6	0.10	0.02	0.01	0.04	0.01	0.02	0.10	0.35
MP013	2	<0.3	0.10	0.02	<0.01	0.01	<0.01	0.01	0.09	0.03
*Rep MP013	2	<0.3	0.11	0.03	<0.01	0.01	<0.01	0.01	0.09	0.03
MP014	111	4.6	2.15	0.13	0.02	0.13	0.02	0.02	0.21	0.17
MP015	57	1.3	0.25	0.05	0.01	0.27	<0.01	<0.01	0.48	0.03

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Order:

Element	In
Method	@ICP90Q
Det.Lim.	0.01
Units	%
MP001	<0.01
*Rep MP001	<0.01
MP002	<0.01
MP003	<0.01
MP004	<0.01
MP005	<0.01
MP006	<0.01
MP007	0.11
MP008	0.12
MP009	0.10
MP010	<0.01
MP011	<0.01
MP012	<0.01
MP013	<0.01
*Rep MP013	<0.01
MP014	<0.01
MP015	<0.01

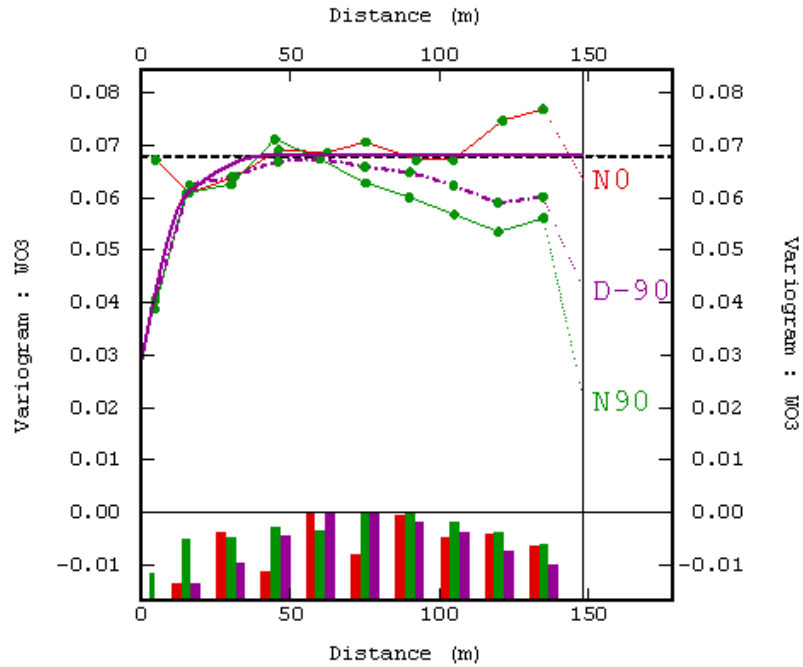
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**APPENDIX 2:  
VARIOGRAMS – FIRE TOWER ZONE**

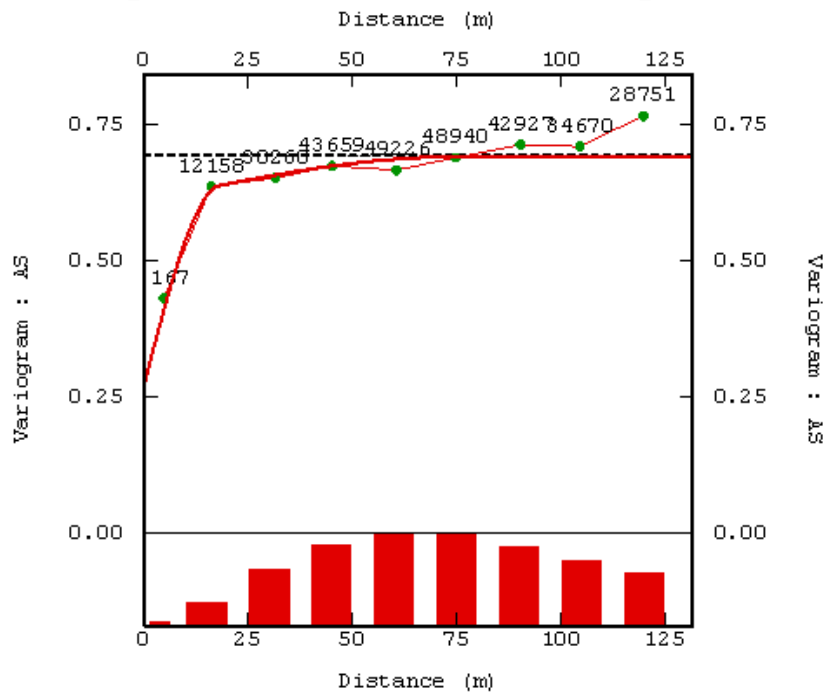


### Variogram Model - Global Window



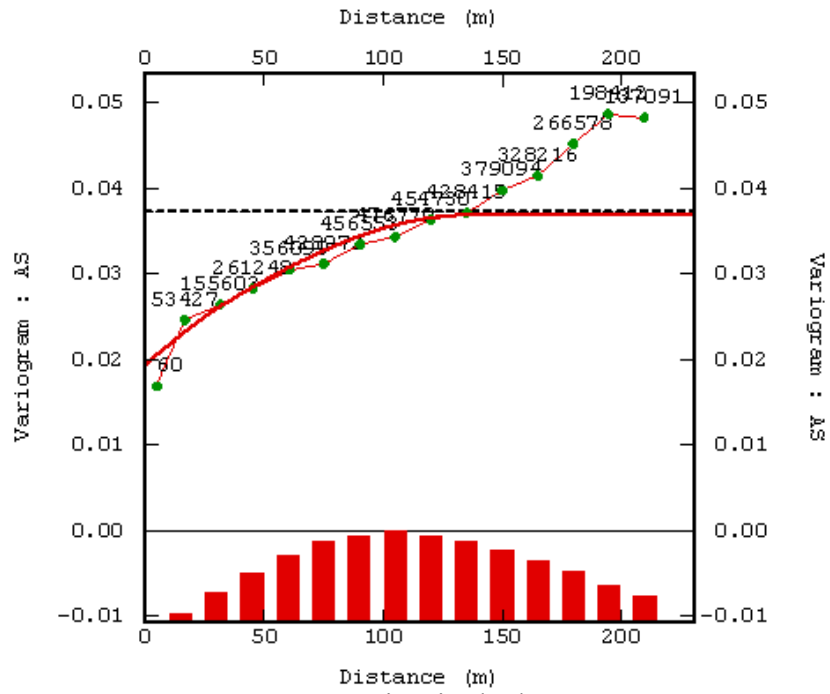
Ft West Variogram of W<sub>03</sub> Composites Showing Isotropic Distribution.

### Variogram Model - Fitting Window



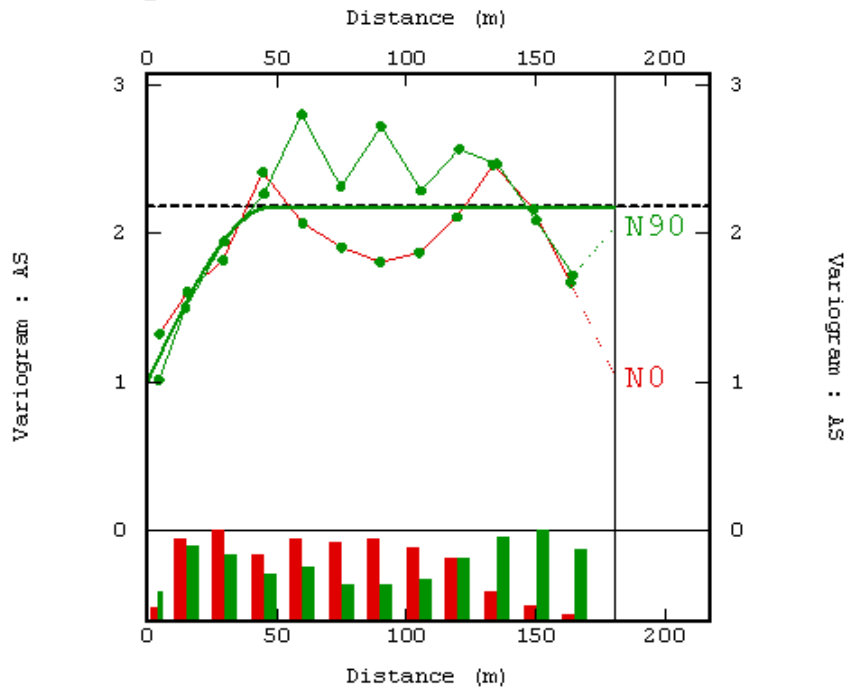
Ft West As Composites in the As Rich Zone.

### Variogram Model - Fitting Window



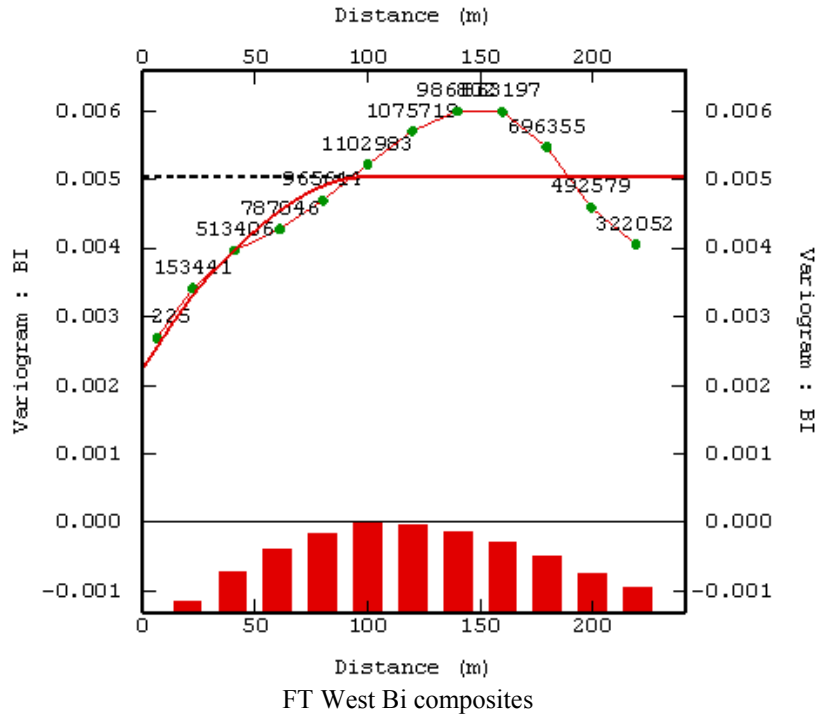
FT West As composites in the low As zone.

### Variogram Model - Global Window

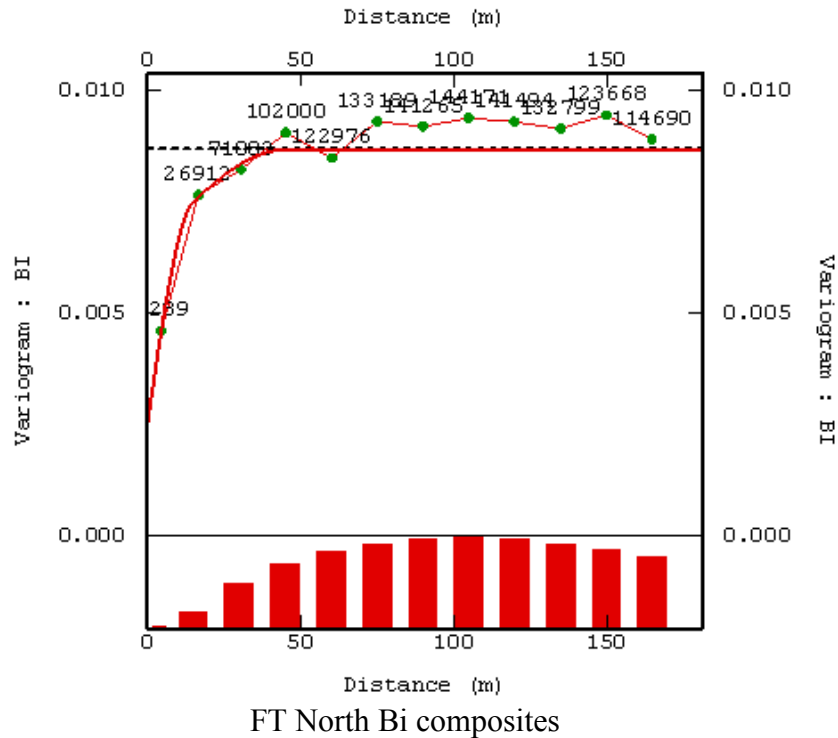


FT North As composites in the As rich zone.

### Variogram Model - Fitting Window



### Variogram Model - Fitting Window



**APPENDIX 3:  
SUMMARY OF 2010 DIAMOND DRILLHOLES**

## SUMMARY OF 2010 DIAMOND DRILLHOLES

The following drillhole summaries were prepared by ADEX consulting geologist, Mr. Gustaaf Kooiman.

### **Hole AM10-01 (North Zone, #4 Lode)**

***Mine Coordinates: E 15448.986 N 13875.778 Elev. 1245 m***

AM10-01 was drilled vertically, 7.5 m west of AM08-44, to probe the western extension of the #4 lode. The hole intersected quartz-feldspar porphyry (QFP) from surface to the contact with feldspar porphyry (FP) at 11.40 m; FP from 11.40 – 93.35 m; granite and granite porphyry (GP) from 93.35 – 127.81 m; more FP from 127.81 – 223.5 m, and granite again from 223.5 m to the end of hole at 231 m.

Weak, widespread tin-zinc-indium mineralization was encountered in FP from 132 -177 m assaying 0.11% Sn, 1% Zn and 58 ppm In.

### **AM10-02 (west of North Zone)**

***Mine Coordinates (estimated): E 14715 N 13500 Elev. 1165 m***

Geotechnical hole AM10-02 was drilled to investigate the thickness of overburden and ground conditions at a potential portal site for a new North Zone decline. The proposed ramp is to be driven -16%, magnetic east to intersect historical hole MPS-227, which is located approximately 723 m east of AM10-02 at E15438.

The track drill augured 6 m of overburden, consisting mostly of sandy ablation till (including some gravel) and a compact basal till (clay rich) from 4.8 – 5.4 m. Ground water was encountered at a depth of 3 m. Coring started at 6.35 m in broken sedimentary rocks of the Sand Brook Formation. Core recovery was poor at the start, was approximately 40% at 20 m, and improved to 50% by the end of the hole at 35 m.

The terrain around AM10-02 is relatively flat, the area is relatively wet and the ground conditions are not particularly good. Consequently, this site is considered unsuitable as a location for a new portal into the North Zone.

### **AM10-03 (west of Saddle Zone)**

***Mine Coordinates: E 15063.423 N 13066.239 Elev. 1191 m***

Geotechnical hole AM10-03 was drilled to investigate overburden thickness and ground conditions near another potential portal site for a new North Zone decline. In this case, the new decline is to be driven northeast to intersect historical hole MPS-227.

The track drill encountered only 3 m of overburden, comprising silt and sand. Coring began at 3.05 m and continued to the end of hole at 50 m. Broken sedimentary rocks of the Sand Brook Formation were encountered in the upper part of the hole and core recovery was poor but it improved with depth to 60 % at the end of hole.

The terrain in the vicinity of AM10-03 is more favourable for a portal site than that in the vicinity of AM10-02. Furthermore, the area is not as wet. This site is considered to be suitable for the new portal and North Zone decline.

**AM10-04 (North Zone, #1 Lode)**

***Mine Coordinates: E 15516.151 N 13741.271 Elev. 1262 m***

AM10-04 was drilled at -45° south (magnetic) to undercut the #1 lode encountered in historical hole DDH-91 (drilled in 1963 by Mount Pleasant Mines). AM10-04 is approximately 19 m southeast of hole E-9 (drilled in 1985 by Billiton). The hole intersected highly altered and brecciated feldspar porphyry (FP) that is intruded by narrow dikes of granite porphyry (GP). The hole bottomed at 91 m.

Tin-zinc-indium mineralization was intersected from 40 – 67 m, assaying 0.44% Sn, 1.61% Zn and 63 ppm In over the 27 m. This intersection is 26 – 47 m vertical depth from surface and correlates well with the shallower intersection (10 – 25 m vertical depth) in hole DDH-91. This 27 m intersection contains a core, from 52 – 58 m, that assayed 3.03% Zn and 128 ppm In. Within this 6 m interval, sphalerite is abundant in the matrix of brecciated FP and as banded masses filling late cavities.

**AM10-05 (North Zone, #1 Lode)**

***Mine Coordinates: E 15551.477 N 13730.241 Elev. 1261 m***

AM10-05 was drilled at -50° south (magnetic) to undercut the #1 lode beneath the quarry where this lode was bulk sampled in 1963. This hole, similar to AM10-04, was entirely in altered and brecciated feldspar porphyry (FP) that is intruded by narrow dikes of granite porphyry (GP). The hole bottomed at 52 m.

Low grade, tin-zinc-indium mineralization was intersected in AM10-05 over a 36 m interval, from 13 – 49 m, which assayed 0.21% Sn, 1.81% Zn and 35 ppm In. This intersection occurs at 11 to 42 m vertical depth, and correlates with a 19 m wide interval of low grade mineralization in Trench 4 (2010), which assayed 0.20% Sn, 0.45% Zn and 21 ppm In. Trench 4 starts 9 m south of the collar of AM10-05, and the mineralized zone is 19 – 38 m south of the collar.

**AM10-06 (North Zone, #1 Lode)**

**Mine Coordinates:** *E 15567.652 N 13752.944 Elev. 1267 m*

AM10-06 was also drilled in the quarry area of the #1 lode. The hole was drilled at -41° south (magnetic) to probe the down-dip continuation of good tin mineralization found in Trench 3, dug in October 2010. This trench started 27 m south of the collar of AM10-06 and encountered a 15 m wide zone, starting at the beginning of the trench, which assayed 0.47% Sn, 0.79% Zn and 31 ppm In. The hole bottomed at 72 m.

Hole AM10-06 intersected a 3 m interval, from 51 – 54 m, assaying 0.15% Sn, 0.47% Zn, 0.46% Cu and 159 ppm In. This interval starts at a vertical depth of 35 m below surface.

**AM10-07 (North Zone, North Adit Subzone or “zone”)**

**Mine Coordinates:** *E 15346.921 N 13850.604 Elev. 1239 m*

AM10-07 was collared approximately 25 m east of hole AM08-01 to further investigate mineralization previously encountered in the North Zone Adit. The hole mostly intersected feldspar porphyry (FP), with granite sections from 141 – 164.85 m and 186 – 194.68 m. The hole bottomed at 207 m.

Tin mineralization is limited to a 6 m interval, from 117 – 123 m within FP, which assayed 0.97% Sn and 1.91% As. Cassiterite occurs as fine grained aggregates in pale brown fluorite-arsenopyrite veins; it also occurs within feldspar pseudomorphs, as disseminations and clusters.

Two intervals of W-Mo-Bi mineralization, mostly within stockwork veins, occur from 129 – 147 m and 189 – 207 m. These two 18 m intervals assayed 0.32% WO<sub>3</sub>, 0.15% MoS<sub>2</sub> and 0.1% Bi, and 0.31% WO<sub>3</sub>, 0.19% MoS<sub>2</sub> and 0.05% Bi, respectively. They constitute part of the “Y body” W-Mo-Bi mineralization in the western part of the North Zone (Brunswick Tin Mines 1976).

**AM10-08 (North Zone, #1 Lode)**

**Mine Coordinates:** *E 15629.019 N 13764.654 Elev. 1269 m*

AM10-08 was drilled -50° south (magnetic) to undercut two mineralized zones encountered in hole DDH-166, drilled -42.5° south in 1964. This historical hole intersected one 6 m interval, from 9 – 15 m, assaying 0.27% Sn, 3.87% Zn, 0.20% Cu and 168 ppm In, and a second 9.2 m interval, from 79.2 – 88.4 m, assaying 0.29% Sn, 2.97% Zn, 0.26% Cu and 372 ppm In. Hole AM10-08 bottomed at 108 m.

Hole AM10-08 intersected both mineralized intervals, which are hosted by brecciated feldspar porphyry (FP) wall rock and a granite porphyry (GP) dike, i.e. typical lode-style mineralization. An upper 3 m interval, from 9 – 12 m, yielded 0.12% Sn, 3.46% Zn, 0.10% Cu and 215 ppm In, and a lower 6 m interval, from 96 – 102 m, yielded 0.24% Sn, 0.89% Zn, 0.12% Cu and 118 ppm In. The lower interval occurs approximately 20 m vertically below the intercept in hole DDH-166.

**AM10-09 (North Zone, #3 Lode)**

***Mine Coordinates: E 15634.914 N 13671.959 Elev. 1276 m***

AM10-09 was drilled at -67° south (magnetic) to intersect #3 lode mineralization that was encountered in underground hole U-111 and surface hole DDH-60. This hole intersected feldspar porphyry (FP) that is cut by granite porphyry (GP) dikes and plugs from 25.61 – 70.83 m, 108.39 – 124.08 m, 127.75 – 128 m, and 134.40 – 135.42 m. End of hole was at 141 m. No significant mineralization was encountered in hole AM10-09.

**AM10-10 (North Zone, northeast)**

***Mine Coordinates: E 15695.281 N 13565.161 Elev. 1284 m***

AM10-10 was collared at the site of historical hole MPS-112 in the northeast part of the North Zone. It was drilled at -60° toward 260° (magnetic), the same azimuth as MPS-112 that was drilled at -45°. Hole MPS-112 intersected a 57.91 m interval, from 45.72 – 103.63 m, assaying 0.07% Sn, 2.81% Zn and 0.09% Cu. No indium assays are available for this intercept.

Hole AM10-10 encountered feldspar porphyry (FP) from surface to 64.67 m, granite porphyry (GP) from 64.67 – 149.05 m, and siliceous granite from 149.05 m to the end of hole at 160 m. A 4 m, massive sulphide interval, from 110 – 114 m, within chloritized GP assayed 4.67% Sn, 14.5% Zn, 0.56% Cu, and 984 ppm In. This intersection also yielded 0.83% Bi and 5.28% As.

**AM10-11 (North Zone, North Adit Subzone or “zone”)**

***Mine Coordinates: E 15333.832 N 13814.098 Elev. 1238 m***

AM10-11 was collared approximately 35 m SSW of AM10-07 to further delineate mineralization previously encountered in the North Zone Adit. This vertical hole started in feldspar porphyry (FP) and entered granite at 75.8 m and stayed in granite to the end of hole at 210 m.

AM10-11 intersected a 21 m interval, from 138 – 159 m, assaying 0.35% Sn. Cassiterite in this intercept is associated with arsenopyrite and some fluorite. The mineralization occurs in granite adjacent to granite porphyry (GP) dikes with unidirectional solidification textures (USTs).



**AM10-12 (North Zone, #1 Lode)**

**Mine Coordinates:** *E 15614.593 N 13707.015 Elev. 1272 m*

AM10-12 was drilled vertically to further investigate widespread tin-copper mineralization near the 101-East Drift, which is off the 600 Adit. Underground holes U-24, U-84 and U-87 also intersected this mineralization.

Hole AM10-12 was collared in feldspar porphyry (FP) and stayed in FP to the end of hole at 90 m. The bottom 23 m (67 – 90 m) assayed 0.52% Sn, 0.35% Zn, 0.21% Cu and 62 ppm In. This intercept is within brecciated (angular fragments) and siliceous FP. Cassiterite, some of it colloform, occurs in stockwork veins cutting FP or as disseminations in FP and is associated with sphalerite, chalcopyrite and arsenopyrite.

**AM10-13 (North Zone, North Adit Subzone or “zone”)**

**Mine Coordinates:** *E 15286.865 N 13825.971 Elev. 1235 m*

AM10-13 was collared approximately 30 m southwest of hole E-12 (drilled in 1985 by Billiton) to further delineate mineralization in the North Zone Adit area. This vertical hole collared in feldspar porphyry (FP) and entered granite at 123.34 m and stayed in granite to the end of hole at 210 m. The FP/granite contact dips at 40° with respect to the core axis.

Tin mineralization occurs in veins within granite from 135 – 162 m. This 27 m interval assayed 0.79% Sn, 0.19% Zn, 0.23% Cu, and 50 ppm In. The veins are steeply dipping and contain purple fluorite, abundant arsenopyrite, and coarse grained cassiterite. One 3 m intercept, from 141 – 144 m, within this interval assayed 0.39% Bi.

The vein mineralization in AM10-13 is similar to two intersections in historical hole E-12. The first 5.19 m intercept, from 222.50 – 227.69 m, assayed 3.88% Sn, 0.19% Cu and 0.69% As. The second 9.14 m intercept, from 310.90 – 320.04 m, assayed 1.10% Sn and 1.71% As.

**AM10-14 (North Zone, #1 Lode)**

**Mine Coordinates:** *E 15614.354 N 13722.960 Elev. 1272 m*

AM10-14 was collared approximately 16 m north of hole AM10-12 in the quarry area of the #1 lode. This hole was drilled at -75° south (magnetic); it intersected the 101-East Drift (off the 600 Adit) at 88.5 m and ended there. Hole AM10-14 encountered chloritic, silicified and sericitized feldspar porphyry (FP) that is cut by a granite porphyry (GP) dike, from 49.32 – 53.45 m.

Significant tin mineralization was intersected from 75 – 88.5 m; this 13.5 m intercept assayed 0.76% Sn. Within this intercept, sphalerite, galena and chalcopyrite are distributed erratically and some cassiterite was observed. Some of the tin mineralization may be contained in stannite, rather than cassiterite.

Hole AM10-14 undercut Trench 1 (2010) that started near the collar of this hole and extended south towards, and past, the collar of AM10-12. A 2 m interval within the trench, from approximately 0 – 2 m south of the collar of AM10-14, yielded 0.34% Sn, 0.63% Zn, 0.12% Cu, and 162 ppm In.

**AM10-15 (North Zone, North Adit Subzone or “zone”)**

***Mine Coordinates: E 15274.599 N 13875.810 Elev. 1232 m***

AM10-15 was collared 25 m west of AM08-27 and drilled vertically to further delineate mineralization in the North Zone Adit area. It intersected feldspar porphyry (FP) from surface to 136.4 m; quartz-feldspar porphyry (QFP) from 136.4 – 196.95 m; and sedimentary breccia (Bx) from 196.95 m to the end of hole at 202 m.

One 9 m interval in hole AM10-15, from 69 – 78 m, assayed 0.27% Sn. The mineralization consists of disseminated cassiterite in siliceous FP.

**AM10-16 (North Zone, Deep Tin Subzone or “zone”)**

***Mine Coordinates: E 15573.126 N 13593.244 Elev. 1260 m***

AM10-16 was drilled vertically to help delineate the Deep Tin Subzone. The hole collared in highly altered granite and stayed in granite to the end of hole at 118 m, where the hole was abandoned because of bad ground that started at 112 m.

The only significant mineralization in AM10-16 is near the end of the hole, from 112 – 118 m. This 6 m interval assayed 0.44% Sn, 6.5% Zn, 0.4% Cu, and 753 ppm. The core recovery in this interval was approximately 40%.

**AM10-17 (North Zone, North Adit Subzone or “zone”)**

***Mine Coordinates: E 15303.061 N 13909.210 Elev. 1235 m***

AM10-17 was collared approximately 31 m north of hole AM08-27 and drilled vertically to further delineate mineralization in the Adit subzone. The hole intersected feldspar porphyry (FP) from surface to 193.15 m and quartz-feldspar porphyry (QFP) to the end of the hole at 230 m.

The only significant mineralization in hole AM10-17 occurs near the FP/QFP contact in a chlorite-fluorite replacement. This replacement contains abundant arsenopyrite, some sphalerite and fine grained cassiterite aggregates. Some mineralization extends from the replacement into the adjacent FP. One 3 m interval, from 192 – 195 m, assayed 0.94% Sn, 0.68% Zn, 7.06% As, and 63 ppm In.

**AM10-18 (North Zone, Deep Tin Subzone or “zone”)**

***Mine Coordinates: E 15543.164 N 13528.680 Elev. 1255 m***

AM10-18 was collared approximately 52 m southwest of AM10-16 and drilled vertically to help delineate the Deep Tin subzone. This hole intersected variably altered granite, ranging from sericitized and chloritized to highly silicified and brecciated, from surface to the end of hole at 250 m.

Tin mineralization was intersected in hole AM10-18 from 202 – 208 m. This 6 m interval assayed 1.74% Sn, 7.01% Zn, 0.21% Cu, and 520 ppm In. The mineralization is hosted by chloritic and brecciated granite that is cut by stockwork veins and replacement patches that contain fine grained, locally colloform, cassiterite. Some of the veins are dominantly composed of chlorite and cassiterite; others are sulphide-fluorite rich with abundant sphalerite, and minor chalcopyrite, arsenopyrite, and fine-grained bismuth minerals.

Significant W-Mo-Bi mineralization was encountered at the bottom of hole AM10-18, which is part of the “Y body” of Brunswick Tin Mines (1976). The last 6 m of this hole, from 244 – 250 m, assayed 0.31% WO<sub>3</sub>, 0.08% MoS<sub>2</sub> and 0.17% Bi. This mineralization occurs in chlorite-brown-fluorite-bearing veins, pods and disseminations in the matrix of brecciated granite.

**AM10-19 (North Zone, North Adit Subzone or “zone”)**

***Mine Coordinates: E 15324.628 N 13907.429 Elev. 1236 m***

AM10-19 was collared approximately 22 m east of AM10-17 and drilled vertically as a “delineation hole” for the North Adit Subzone. It was the sixth and last hole to be drilled in this area during the 2010 program. Hole AM10-19 intersected feldspar porphyry (FP) from surface to 196.67 m and quartz-feldspar porphyry (QFP) from there to the end of hole at 200 m. A granite porphyry (GP) dike cuts FP from 46.93 – 56.20 m.

The only mineralization in AM10-19 occurs in an interval from 57 – 63 m. This 6 m intercept assayed 0.26% Sn, 3.58% Zn, 0.29% Cu, and 205 ppm In. This mineralization is situated in the footwall of the GP dike, within quartz-purple fluorite-chlorite replacements and massive sulphide pods containing minor arsenopyrite and pale brown, fine grained cassiterite.

**AM10-20 (North Zone, Deep Tin Subzone or “zone”)**

***Mine Coordinates: E 15460.305 N 13470.735 Elev. 1245 m***

AM10-20 was collared approximately 16 m west of AM08-03 and drilled vertically to test the continuity of the best zinc-indium mineralization found (in the latter hole) during the 2008 drill program. Hole AM10-20 collared in altered granite and stayed in altered, and locally brecciated, granite to the end of hole at 200 m.

Hole AM10-20 also intersected significant zinc-indium mineralization as follows:

<b>Interval (m)</b>	<b>Length (m)</b>	<b>Sn%</b>	<b>Zn%</b>	<b>Cu%</b>	<b>In ppm</b>
42 – 45	3	0.06	5.92	0.13	330
63 – 69	6	0.03	3.43	0.13	412
81 – 84	3	0.40	4.40	0.24	658
<b>(42 – 84)</b>	<b>42</b>	<b>0.06</b>	<b>1.47</b>	<b>0.05</b>	<b>140</b>
111 -117	6	0.49	9.42	0.46	212
183 – 189	6	0.26	10.52	0.91	1856

The best intersection in the hole, the 6 m intercept from 183 – 189 m, is within siliceous granite that is cut by stockwork veins and replacements, containing chlorite, purple fluorite, sphalerite (locally massive in short sections), and minor chalcopyrite. There is also some brecciated granite that contains disseminated mineralization. Weakly altered, stockwork veined, yellowish to pinkish grey granite occurs in both the hanging wall and footwall of this intercept.

**AM10-21 (North Zone, Deep Tin Subzone or “zone”)**

**Mine Coordinates:** *E 15477.084 N 13485.607 Elev. 1246 m*

AM10-21 was collared approximately 15 m north of AM08-03 and drilled vertically to further test the continuity of the zinc-indium mineralization in the latter hole. Hole AM10-21 also collared in altered granite and stayed in it to the end of hole at 225 m.

The best intersections in AM10-21 are as follow:

<b>Interval (m)</b>	<b>Length (m)</b>	<b>Sn%</b>	<b>Zn%</b>	<b>Cu%</b>	<b>In ppm</b>
69 – 129	60	0.13	2.94	0.09	131
204 – 207	3	0.92	0.23	0.10	67

**AM10-22 (North Zone, #1 Lode)**

**Mine Coordinates:** *E 15442.468 N 13769.634 Elev. 1251 m*

AM10-22 was drilled at -60° south (magnetic) to a depth of 65 m to undercut historical hole DDH-156 at -44° south. The latter hole had a near-surface, 10 m intercept grading 0.26% Sn and 3.69% Zn. No indium values are available for DDH-156. AM10-22 intersected typical lode-style tin mineralization near the bottom of the hole, where a granite porphyry (GP) dike cuts brecciated and silicified feldspar porphyry (FP).

A 5 m interval, from 60 – 65 m, assayed 0.17% Sn, 2.12% Zn, 0.31% Cu, and 235 ppm In. This mineralization is in the GP dike and adjacent FP, where it occurs as disseminated sphalerite, as replacements of purple fluorite and kaolin containing assemblages of sphalerite, arsenopyrite and pyrite, and as aggregates of fine grained arsenopyrite and sphalerite.

**AM10-23 (North Zone, #1 Lode)**

**Mine Coordinates:** *E 15461.478 N 13779.470 Elev. 1265 m*

AM10-23 was drilled at -55° south (magnetic) to a depth of 90.2 m to undercut historical hole DDH-91 at -45° south. The latter hole intersected widespread tin-zinc mineralization at 34 – 58 m (vertical) below surface. AM10-23 collared in and ended in feldspar porphyry (FP). A few thin granite porphyry (GP) dikes cut the FP.

Hole AM10-23 intersected mineralization similar to that in DDH-91. An 18 m interval, from 50 – 68 m, assayed 0.16% Sn, 1.65% Zn, 0.12% Cu, and 280 ppm In. A check-assay (SGS) of the same interval yielded 0.19% Sn, 1.52% Zn, 0.13% Cu, and 274 ppm In. This mineralization is within GP and adjacent FP wall rocks, both of which are brecciated, and it consists of disseminated sphalerite in the breccia matrix, associated with arsenopyrite, fluorite, pyrite, and minor chalcopyrite. The same mineral assemblage also occurs as small replacements. This interval correlates with, and is comparable in thickness to, the one in DDH-91 indicating an approximate dip of 60° to the north for the zone and a true width of approximately 18 m.

**AM10-24 (North Zone, #1 Lode)**

**Mine Coordinates:** *E 15496.360 N 13660.737 Elev. 1259 m*

AM10-24 was drilled at -45° north (magnetic) to a depth of 70.4 m to undercut historical hole DDH-72 (Mount Pleasant Mines 1963). The latter hole, drilled in at -30° north, intersected 20 m of tin-zinc mineralization at approximately 25 m (vertical) below surface. Hole AM10-24 encountered feldspar porphyry (FP) cut by two granite porphyry (GP) dikes, from 23.9 - 32.5 m and 42.16 – 44.7 m.

Disseminated sphalerite mineralization was intersected over a 9 m interval in hole AM10-24. This interval, from 60 – 69 m, is within brecciated and silicified FP; it assayed 0.22% Sn, 2.92% Zn and 104 ppm In. This interval correlates with the shallower intersection in DDH-72, indicating a steep dip for the zone.

**AM10-25 (North Zone, northeast)**

**Mine Coordinates:** *E 15674.439 N 13562.926 Elev. 1281 m*

AM10-25 was collared approximately 20 m west of AM10-10 in the northeast part of the North Zone, and drilled at -45° towards 260° (magnetic) to a depth of 120 m. It was drilled to duplicate a significant intersection reported in historical hole MPS-112, also drilled at -45° towards 260°. Hole AM10-25 encountered feldspar porphyry (FP) to 40 m, and then granite from there to the end of the hole.

The only significant mineralization in AM10-25 is near the granite contact. A 3 m interval, from 66 – 69 m, assayed 0.32% Sn, 15.3% Zn, 0.27% Cu, and 291 ppm In. The mineralization occurs in veins, veinlets and replacements containing reddish brown sphalerite, purple fluorite, and minor amounts of arsenopyrite, chalcopyrite and pyrite. This interval

correlates with an intercept of similar apparent thickness in hole AM10-10 and with a much wider intercept in MPS-112.

**AM10-26 (west of North Zone)**

***Mine Coordinates: E 15222.668 N 13251.651 Elev. 1210 m***

AM10-26 was drilled vertically in the path of a proposed new decline into the North Zone, to investigate ground conditions and to determine if any mineralization occurs in this area. The hole was collared approximately 330 m southwest of target hole MPS-227, located at the end of the proposed new decline. Hole AM10-26 intersected feldspar porphyry (FP) from surface to 34.16 m; quartz-feldspar porphyry (QFP) from 34.16 – 66.0 m; sedimentary breccia (Bx) from 66.0 – 123.53 m and then more QFP to the end of the hole at 200 m.

Minor mineralization was encountered in hole AM10-26 but no assays are available. A few fluorite veins containing some galena, chalcopyrite, pyrite, arsenopyrite, and sphalerite were observed. Some W-Mo mineralization occurs in the last 11 m of the hole, from 189 – 200 m. This mineralization is in veins and veinlets within chloritized and sericitized QFP.

**APPENDIX 4:  
SUMMARY OF 2011 DIAMOND DRILLHOLES**

## SUMMARY OF 2011 DIAMOND DRILLHOLES

The following drillhole summaries were prepared by ADEX consulting geologist, Mr. Gustaaf Kooiman.

### **AM11-01 (North Zone)**

***Mine Coordinates: E 15554.883 N 13575.548 Elev. 1264 m***

AM11-01 was drilled 5 m ENE of AM96-10 to obtain samples for future metallurgical test-work. The 1996 hole intersected widespread tin-zinc-indium mineralization grading 0.30% Sn, 1.16% Zn and 175 ppm In over 106.68 m, from 143.26 – 249.94 m. Similar mineralization was intersected in hole AM11-01 but it is of lower grade at 0.23% Sn, 0.59% Zn and 107 ppm In over 75 m, from 162 – 237 m.

Tin mineralization is mostly in sulphides that occur in narrow veins, veinlets, replacement zones, and as disseminations in silicified granite. Minor coarse-grained cassiterite (up to 4 mm) was observed in fluorite-filled vugs.

### **AM11-02 (North Zone)**

***Mine Coordinates: E 15647.406 N 13456.215 Elev. 1281 m***

AM11-02 was drilled 48.4 m east of hole E-16 (Billiton, 1985), to explore the southern part of the North Zone. This hole encountered granite porphyry (GP) and granite II (G2) to a depth of 200 m; sedimentary breccia (Bx) from 200.4 – 271.25 m; and quartz-feldspar porphyry (QFP) from 271.25 m to the contact with granite III (G3) at 397.75 m. The hole continued in this granite until the end-of-hole at 426 m.

The best mineralization in AM11-02 was found from 351 -357 m. This 6 m interval assayed 1.73% Sn, 0.24% Cu and 38 ppm In. Abundant fine-grained cassiterite occurs in greenish black chlorite-fluorite-garnet filled, stockwork-veins associated with chalcopyrite.

### **AM11-03 (Saddle Zone)**

***Mine Coordinates: E 15849.368 N 12988.047 Elev. 1302 m***

AM11-03 intersected quartz-feldspar porphyry (QFP) from surface to the contact with granite II (GR2) at 396.43 m. The QFP/granite contact is sub-horizontal with unidirectional solidification textures (USTs) immediately below the contact. Minor cassiterite, including some wood tin at 406 m, occurs in the top 10 m of the granite. A granite/granite contact (possibly GR2a/GR2b) was noted at 537.37 m. The hole bottomed at 540 m.

Most of the mineralization is up-hole from the granite in silicified and chloritized QFP. A 6 m interval, from 159 – 165 m, assayed 0.31% Sn, 1.82% Zn and 171 ppm In and a 3 m interval, from 222 -225 m, yielded 0.36% Sn, 19% Zn and 354 ppm In. One 12 m interval, from 294 -306 m, assayed 0.13% Sn, 3.65% Zn and 191 ppm In; another 12 m interval, from 345 – 357 m, yielded 0.68% Sn, 0.27% Zn and 31 ppm In.



**AM11-04 (North Zone)**

**Mine Coordinates:** *E 15600.030 N 13407.602 Elev. 1270 m*

AM11-04, collared approximately 44 m south of Billiton hole E-16, was drilled to look for a southern extension to the known mineralization. The hole intersected feldspar porphyry (FP) from surface to 87.90 m; quartz-feldspar porphyry (QFP) from 87.90 – 176.80 m; sedimentary breccia (Bx) from 176.80 – 220.40 m; granite from 220.40 – 240.95 m; another QFP from 240.95 – 340.45 m; granite II (GR2) from 340.45 – 397.30 m, and granite III (GR3) from 397.30 to the end of hole at 402 m.

Historical hole E-16 intersected a 36.6 m zone, from 350.5 – 387.1 m, of granite-hosted W-Mo-Bi mineralization, which assayed 0.44% WO<sub>3</sub> and 0.17% MoS<sub>2</sub>. Hole AM11-04 intersected similar mineralization, from 342 – 372 m, grading 0.47% WO<sub>3</sub>, 0.28% MoS<sub>2</sub> and 0.21% Bi. This zone is characterized by coarse-grained wolframite (up to 4.5 cm), in steeply dipping veins, and a moderate arsenopyrite content (0.55% As). At shallower depth, from 114 – 132 m, an 18 m wide Sn-As zone was intersected, which assayed 0.78% Sn and 6.5% As. Several 3 m intercepts were also encountered, with the best interval, from 270 – 273 m, grading 2.0% Sn.

**AM11-05 (North Zone)**

**Mine Coordinates:** *E 15648.779 N 13506.370 Elev. 1279 m*

AM11-05 was collared approximately 50 m north of hole AM11-02. Granite porphyry (GP)/ granite II (GR 2) was intersected from surface to 192.40 m; quartz-feldspar porphyry (QFP), from 192.40 – 206.95 m; sedimentary breccia (Bx) from 206.95 – 255.10 m; and QFP from 255.10 m to the end of hole at 404 m.

The only significant mineralization in the hole was a 3 m massive sulphide zone, from 53 -56 m, which assayed 1.17% Sn, 10.4% Zn, 1.41% Cu, and 505 ppm In.

**AM11-06 (North Zone)**

**Mine Coordinates:** *E 15697.270 N 13452.498 Elev. 1287 m*

AM11-06 was collared 50 m east of AM11-02 and approximately 100 m east of hole E-16. It is the most eastern hole drilled to date in the southern part of the North Zone. This hole intersected feldspar porphyry (FP) from surface to 67.55 m; granite porphyry (GP) and granite from 67.55 – 116.80 m; quartz-feldspar porphyry (QFP) from 116.8 – 203.20 m; sedimentary breccia (Bx) from 203.20 – 244.95 m; more QFP from 244.95 – 371.20 m; and chloritic granite from 371.20 m to the end of hole at 426 m.

No significant mineralization was encountered in hole AM11-06.

**AM11-07 (Saddle Zone)**

**Mine Coordinates:** *E 15749.880 N 13000.759 Elev. 1292 m*

AM11-07 was collared 50 m west of discovery hole LNZ-15 (1988), approximately half way between LNZ-15 and LNZ-17. This hole intersected quartz-feldspar porphyry (QFP) from surface to 289 m, where a brecciated and silicified contact with granite was observed. A granite/granite contact (possibly 2a/2b) at 473.95 m is marked by “feathery” feldspar layers and well developed unidirectional solidification textures (USTs) in the rock just below the contact. The rock immediately up-hole from the contact has a pinkish orange colour due to feldspathic alteration. The hole bottomed at 513.5 m in granite (GR2b).

Significant tin mineralization was intersected in silicified granite immediately below the QFP/GR2a contact. A 33 m interval, from 290 – 323 m, assayed 0.34% Sn and 1.35% As, including an upper 18 m interval (from 290 – 308 m) that yielded 0.47% Sn and 1.18% As. The cassiterite in this interval is fine grained, pale coloured, and associated with arsenopyrite. A second interval was intersected deeper in the hole, from 371 – 383 m, which assayed 0.8% Sn over 12 m and 1.24% Sn over the upper 6 m. The fine grained cassiterite in this interval is hosted by steeply dipping fluorite-chlorite veins that also contain minor arsenopyrite, sphalerite and chalcopyrite.

Up-hole from the QFP/GR2a contact, low-grade zinc mineralization is widespread. A 129 m interval, from 158 – 287 m, assayed 0.57% Zn and 28 ppm In. Both zinc and indium values drop off rapidly below this contact.

#### **AM11-08 (Saddle Zone)**

***Mine Coordinates: E 15799.705 N 12947.163 Elev. 1300 m***

AM11-08 was collared approximately 50 m south of hole LNZ-15 (1988) and approximately 50 m north of hole NMR-89-1 (drilled by NovaGold). It intersected quartz-feldspar porphyry (QFP) from surface to 251.82 m, where granite was encountered. The contact dips at a 60° angle indicating that the hole entered the apical part of the granite cupola in the Saddle Zone. A granite/granite contact (possibly 2a/2b) was encountered at 473 m and the hole bottomed at 500 m.

A wide interval of bismuth-arsenopyrite mineralization was intersected near the QFP/granite contact, from 233 – 260 m. This 27 m interval assayed 0.19% Bi and 1.25% As. Also, two sphalerite-rich intervals were encountered within the granite; one from 272 – 275 m and the second from 353 – 362 m. The first 3 m interval assayed 0.44% Sn, 3.27% Zn and 132 ppm In, whereas the second 9 m interval yielded 0.36% Sn, 1.09% Zn and 231 ppm In.

#### **AM11-09 (North Zone)**

***Mine Coordinates: E 15551.498 N 13401.293 Elev. 1254 m***

AM11-09 was collared 46.5 m south of hole AM08-06; it is one of the deepest and most southerly holes in the North Zone. This hole intersected feldspar porphyry (FP) from surface to 85.64 m; quartz-feldspar porphyry (QFP) that is cut by thin granite dikes, from 85.64 – 175.15 m, sedimentary breccia (Bx), from 175.15 – 195.85 m; more QFP, from 195.85 – 315 m; chloritized and silicified granite (GR2), from 315.0 – 386.44 m; and relatively unaltered granite (GR3), from 386.44 m to the end of hole at 414 m.

Molybdenite mineralization, from 171 – 204 m, occurs in Bx and QFP. This 33 m interval assayed 0.21% MoS<sub>2</sub> but other metal values are low, i.e. 0.08% As, 0.47% Zn and negligible amounts of tin and tungsten.

Both tin and tungsten mineralization are restricted to narrow intervals. The best tin intersection, from 204 – 207 m in QFP, assayed 0.18% Sn, 10.1% Zn, 0.29% Cu, and 694 ppm In. The best tungsten intersection, from 357 – 360 m in granite, assayed 0.25% WO<sub>3</sub>, 0.22% MoS<sub>2</sub> and 0.15% Bi. The latter intersection probably correlates with wider W-Mo-Bi intersections in holes E-16 and AM11-04, which are farther east of AM11-09 and also hosted by granite.

#### **AM11-10 (North Zone)**

***Mine Coordinates: E 15482.218 N 13464.536 Elev. 1246 m***

AM11-10, drilled to obtain samples for metallurgical test work, was collared approximately 6 m south of historical hole MPS-195 and 7 m southwest of AM08-03, drilled in 1973 and 2008, respectively. This hole intersected fine-grained granite at surface and stayed in granite until it bottomed at 377 m. Granite porphyry (GP) dikes cut fine grained granite in the upper part of the hole and a diffuse or gradational granite/granite contact (GR2a/2b) occurs around 372.20 m. The contact is not sharp because GR2b appears to have partially assimilated GR2a.

The two historical holes intersected high grade tin mineralization in the Deep Tin Zone and AM11-10 also intersected extensive tin-zinc-indium mineralization. The mineralization is mostly in sulphide-rich, magmatic-hydrothermal breccia, massive sulphide replacement zones, and veins. Sphalerite, arsenopyrite and chalcopyrite are the main sulphide minerals, with fluorite and chlorite as the principal gangue minerals. The best intercepts, based on visual examination, are as follow: 17 – 20 m, 32 – 38 m, 56 – 59 m, 83 – 86 m, 140 – 143 m, 164 -167 m, 179 – 182 m, and 221 -230 m. The core has not been split or assayed yet.

#### **AM11-11 (North Zone)**

***Mine Coordinates: E 15482.116 N 13465.899 Elev. 1246 m***

AM11-11 was collared 1.4 m north of AM11-10 to obtain additional material for metallurgical test work. This hole bottomed at 75 m and is entirely in brecciated and silicified granites.

AM11-11 intersected a few narrow intervals with tin-bearing, sulphide-rich breccia and replacements. Based on visual inspection, the best intervals are as follow: 12 -15 m, 18 -21 m, 36 – 39 m, and 72 -75 m. The core has not been split or assayed yet.

**AM11-12 (North Zone)**

**Mine Coordinates:** *E 15435.308 N 13557.825 Elev. 1246 m*

AM11-12 was collared half way between historical hole MPS-189 and its twin AM08-35. The latter two holes, which are approximately 5 m apart, intersected some of the best tin mineralization (Deep Tin Zone) on the property. Hole AM11-12 only intersected granite, mostly brecciated, silicified and chloritized fine grained granite that is intruded by granite porphyry bodies from 19 – 54 m and 156 – 178 m.

Tin mineralization is invariably associated with massive sulphide veins and replacements, consisting mostly of sphalerite, arsenopyrite and minor chalcopyrite. Fluorite and chlorite are the most common gangue minerals. The best intercepts, based on visual inspection, are as follow: 122 -137 m, 179 – 182 m, 212 – 215 m, 236 – 239 m, and 263 – 269 m. The core has not been split or assayed yet.

**AM11-13 (Saddle Zone)**

**Mine Coordinates:** *E 15800.723 N 13048.131 Elev. 1301 m*

AM11-13 was collared approximately 51 m north of hole LNZ-15. It intersected quartz-feldspar porphyry (QFP) from surface to 293.52 m, where granite was encountered. The hole bottomed in granite at 491 m. Unidirectional solidification textures (USTs) are abundant in the top 12 m of granite; they are mostly at a very low angle to the core axis, indicating a very steeply dipping granite contact.

The best tin mineralization in the hole is in granite, from 296 – 317 m. This 21 m interval assayed 0.36% Sn. However, a second narrow intercept occurs in QFP, from 125 – 128 m. This intercept assayed 0.34% Sn, 1.36% Zn, 0.36% Cu, and 251 ppm In.

**AM11-14 (North Zone)**

**Mine Coordinates:** *E 15574.367 N 13598.356 Elev. 1271 m*

AM11-14 was collared approximately 5 m north of abandoned hole AM08-16 that ended at 118 m due to bad ground conditions. This hole also encountered bad ground at 106 m and drilling was suspended until the end of the 2011 drilling program. At that time, the hole was re-entered and successfully completed to a depth of 405 m as AM11-14 Ext. The hole mostly intersected highly altered granite and granite porphyry (GP) dikes, but one interval, from 277.75 – 320.54 m, of sedimentary breccia (Bx) was also encountered.

Both tin and tungsten mineralization occur in AM11-14. A sulphide-rich replacement zone, from 189 -192 m, assayed 0.59% Sn, 6.32% Zn, 0.35% Cu, and 1480 ppm In. A W-Mo-Bi bearing porphyry zone (the tungsten zone) was intersected from 234 – 309 m. This 75 m interval assayed 0.19% WO<sub>3</sub>, 0.33% MoS<sub>2</sub>, 0.21% Bi, and 0.83% As. Two tin-bearing zones are superimposed on this W-Mo-Bi zone, one in granite from 234 -246 m and the other in Bx from 267 – 279 m. These 12 m intercepts assayed 0.58% Sn and 0.90% Sn, respectively.

**AM11-15 (North Zone)**

**Mine Coordinates:** *E 15653.398 N 13548.574 Elev. 1279 m*

AM11-15 was collared 42 m north of AM11-05 and approximately 26 m south of historical hole MPS-160 (drilled in 1971 and deepened in 1972), in the eastern part of the North Zone. It intersected feldspar porphyry (FP) from surface to 38.60 m; granite and granite porphyry, from 38.60 – 176.10 m; quartz-feldspar porphyry (QFP) from 176.10 – 228.75 m; sedimentary breccia (Bx) from 228.75 – 270.35 m; more QFP from 270.35 – 430.69 m; and granite (GR3) from 430.69 m to the end of hole at 444 m.

Mineralization was encountered in three intervals in AM11-15. One 3 m interval within FP, from 24 – 27 m, assayed 0.50% Sn, 4.92% Zn, 0.48% Cu, and 335 ppm In. This interval may correlate with similar type mineralization in holes AM10-10 and AM10-25. A 6 m interval within Bx, from 255 – 261 m, yielded 0.43% Sn and 1.12% Zn but no indium; the mineralization is actually in garnet-chlorite-fluorite veins that cut the Bx. Another 6 m interval, from 363 – 369 m, in similar veins cutting QFP assayed 0.88% Sn.

**AM11-16 (Saddle Zone)**

**Mine Coordinates:** *E 15752.124 N 12954.860 Elev. 1292 m*

AM11-16 was collared on the west side of a topographic high, approximately 46 m south of AM11-07 and 48 m west of AM11-08. It intersected quartz-feldspar porphyry (QFP) from surface to 216.55 m, which is cut by a number of granite porphyry (GP) dikes, from 177.75 – 189.30 m, 189.66 – 189.78 m, 191.33 – 193.22 m, and 213.59 – 214.90 m. Granite was encountered at 216.55 – 335.12 m, 365.60 -367.40 m, 373.50 – 373.73 m, and from 383.28 m to the end of hole at 501 m. The missing intervals from 335.12 – 383.28 m are occupied by QFP indicating that the QFP/granite contact is steeply dipping in this area.

Hole AM11-16 has several narrow mineralized intervals, both in QFP and granite. The most important ones are:

from 12 – 15 m assaying 0.25% Sn, 2.76% Zn, 0.34% Cu, and 51 ppm In;  
from 42 – 45 m assaying 0.17% Sn, 2.12% Zn, 0.23% Cu, and 155 ppm In;  
from 246 – 249 m assaying 0.95% Sn, 1.84% Zn, 1.84% Cu, and 378 ppm In;  
from 288 – 291 m assaying 0.25% Sn, 1.06% Zn, 0.11% Cu, and 147 ppm In; and  
from 339 – 342 m assaying 0.88% Sn, 0.08% Zn, 0.01% Cu, and 5 ppm In.

**AM11-17 (Saddle Zone)**

**Mine Coordinates:** *E 15750.338 N 12903.176 Elev. 1292 m*

AM11-17 was collared 51.7 m south of hole AM11-16. The hole was abandoned at 84 m because the drill rods got stuck. It intersected quartz-feldspar porphyry (QFP) from surface to the end of the hole.

Mineralization occurs as disseminations, in stockwork veins, and as small massive-sulphide replacements that also contain fluorite and chlorite. One 6 m interval, from 39 – 45 m, assayed 0.20% Sn, 1.91% Zn, 0.27% Cu, and 78 ppm In.

**AM11-17a (Saddle Zone)**

***Mine Coordinates: E 15754.478 N 12901.222 Elev. 1293 m***

AM11-17A was collared approximately 54 m south of AM11-16, and 40 m west of hole NMR-89-1 (drilled by NovaGold). It was drilled to test the southwestern part of the Saddle Zone. This hole intersected quartz-feldspar porphyry (QFP) from surface to 402.10 m, and granite from there to the end of hole at 455 m.

Mineralization mostly occurs within the QFP. Sphalerite-cassiterite mineralization was encountered at two intervals from 206 – 209 m and 227 – 230 m. The first assayed 0.60% Sn, 1.8% Zn and 42 ppm In; the second assayed 0.38% Sn, 6.51% Zn and 179 ppm In. Significant W-Mo-Bi mineralization was encountered within silicified and brecciated QFP from 308 – 365 m. This 57 m interval assayed 0.29% WO<sub>3</sub>, 0.20% MoS<sub>2</sub>, 0.17% Bi, and 2.97% As. The style and setting of this mineralized interval are similar to that of W-Mo-Bi bodies in the Fire Tower North Zone. Fine to coarse-grained wolframite crystals occur as disseminations in stockwork veins and within massive sphalerite-arsenopyrite pods and replacements. The veins and veinlets also contain abundant fluorite. Visible bismuth (bismuthinite?) is also present in this interval.