NI 43-101 TECHNICAL REPORT ON UPDATED MINERAL RESOURCE AND RESERVE ESTIMATE OF THE KENO HILL SILVER DISTRICT

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FORWARD LOOKING INFORMATION

This report contains forward-looking statements or forward-looking information under applicable securities laws (hereinafter collectively referred to as "forward-looking statements"). All statements, other than statements of historical fact regarding Alexco Resource Corp. or the Keno Hill Silver District Project, are forward-looking statements. The words "believe", "expect", "anticipate", "contemplate", "target", "plan", "intend", "project", "continue", "budget", "estimate", "potential", "may", "will", "can", "could" and similar expressions identify forward-looking statements. In particular, this report contains forward-looking statements with respect to cash flow forecasts, projected capital, operating and exploration expenditure, targeted cost reductions, mine life and production rates, potential mineralization and metal or mineral recoveries, mineral reserve estimates and any information pertaining to potential improvements to financial and operating performance and mine life at the Keno Hill Silver District Project. All forward-looking statements in this report are necessarily based on opinions and estimates made as of the date such statements are made and are subject to important risk factors and uncertainties, many of which cannot be controlled or predicted. Material assumptions regarding forward-looking statements are discussed in this report, where applicable. In addition to such assumptions, the forward-looking statements are inherently subject to significant business, economic and competitive uncertainties, and contingencies. Known and unknown factors could cause actual results to differ materially from those projected in the forward-looking statements. Such factors include, but are not limited to: fluctuations in the spot and forward price of commodities (including gold, copper, silver, lead, zinc, diesel fuel, natural gas and electricity); the speculative nature of mineral exploration and development; changes in mineral production performance, exploitation and exploration successes; risks associated with the fact that the Keno Hill Silver District Project is still in the early stages of evaluation and additional engineering and other analysis is required to fully assess their impact; diminishing quantities or grades of reserves; increased costs, delays, suspensions, and technical challenges associated with the construction of capital projects; operating or technical difficulties in connection with mining or development activities, including disruptions in the maintenance or provision of required infrastructure and information technology systems; damage to Alexco Resource Corp's or Keno Hill Silver District Project's reputation due to the actual or perceived occurrence of any number of events, including negative publicity with respect to the handling of environmental matters or dealings with community groups, whether true or not; risk of loss due to acts of war, terrorism, sabotage and civil disturbances; uncertainty whether the Keno Hill Silver District Project will meet Alexco Resource Corp's capital allocation objectives; the impact of global liquidity and credit availability on the timing of cash flows and the values of assets and liabilities based on projected future cash flows; the impact of inflation; fluctuations in the currency markets; changes in interest rates; changes in national and local government legislation, taxation, controls or regulations and/or changes in the administration of laws, policies and practices, expropriation or nationalization of property and political or economic developments in Canada; failure to comply with environmental and health and safety laws and regulations; timing of receipt of, or failure to comply with, necessary permits and approvals; litigation; contests over title to properties or over access to water, power and other required infrastructure; increased costs and physical risks including extreme weather events and resource shortages, related to climate change; and availability and increased costs associated with mining inputs and labor. In addition, there are risks and hazards associated with the business of mineral exploration, development, and mining, including environmental hazards, industrial accidents, unusual or unexpected formations, pressures, cave-ins, flooding and gold bullion, copper cathode or gold or copper concentrate losses (and the risk of inadequate insurance, or inability to obtain insurance, to cover these risks).

Many of these uncertainties and contingencies can affect Alexco Resource Corp's actual results and could cause actual results to differ materially from those expressed or implied in any forward-looking statements made in this report. All of the forward-looking statements made in this report are qualified by these cautionary statements. Alexco Resource Corp and Mining Plus Canada . and the Qualified Persons who authored this report undertake no obligation to update publicly or otherwise revise any forward-looking statements whether as a result of new information or future events or otherwise, except as may be required by law.

TABLE OF CONTENTS

1. SUMMARY 1-1
1.1 EXECUTIVE SUMMARY 1-1
1.2 TECHNICAL SUMMARY 1-4
1.2.1 Property Description and Ownership 1-4
1.2.2 History 1-5
1.2.3 Geology 1-6
1.2.4 Exploration and Drilling 1-6
1.2.5 Mineral Resource Estimate 1-7
1.2.6 Mineral Reserve Estimate 1-8
1.2.7 Mining Methods 1-10
1.2.8 Metallurgy and Mineral Processing 1-14
1.2.9 Project Infrastructure 1-15
1.2.10 Market Studies and Contracts 1-16
1.2.11 Environmental Studies, Permitting, and Social or Community Impact 1-16
1.2.12 Capital and Operating Costs 1-18
1.2.13 Economic Analysis 1-19
1.2.14 Cash Flow Analysis 1-20
1.2.15 Sensitivity Analysis 1-20
1.3 RECOMMENDATIONS 1-23
2. INTRODUCTION 2-1
2.1 TERMS OF REFERENCE AND PURPOSE OF THIS REPORT 2-1
2.2 QUALIFICATIONS OF CONSULTANTS 2-1
2.3 SOURCES OF INFORMATION 2-3
3. RELIANCE ON OTHER EXPERTS 3-1
4. PROPERTY DESCRIPTION AND LOCATION 4-1
4.1 LOCATION 4-1
4.2 MINERAL TENURE 4-1
4.3 UNDERLYING AGREEMENTS 4-5
4.3.1 Alexco/ERDC Purchase Agreement 4-5
4.3.2 Other Underlying Agreements and Contracts 4-6
4.4 PERMITS AND AUTHORIZATIONS 4-6
4.5 ENVIRONMENTAL LIABILITIES 4-7
5. ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE 5-1
5.1 ACCESSIBILITY 5-1
5.2 CLIMATE 5-1
5.3 LOCAL RESOURCES 5-1
5.4 INFRASTRUCTURE 5-1
5.5 PHYSIOGRAPHY 5-2

6. EXPLORATION AND DEVELOPMENT HISTORY 6-1
6.1 HISTORY OF THE BELLEKENO MINE 6-3
6.2 HISTORY OF THE LUCKY QUEEN DEPOSIT 6-5
6.3 HISTORY OF FLAME & MOTH DEPOSIT 6-5
6.4 HISTORY OF ONEK DEPOSIT 6-6
6.5 HISTORY OF BERMINGHAM DEPOSIT 6-7
6.6 PAST PRODUCTION 6-8
7. GEOLOGICAL SETTING AND MINERALIZATION 7-1
7.1 REGIONAL GEOLOGY 7-1
7.2 PROPERTY GEOLOGY 7-2
7.3 MINERALIZATION 7-6
7.4 BELLEKENO MINE MINERALIZATION 7-6
7.5 LUCKY QUEEN MINERALIZATION 7-8
7.6 FLAME & MOTH MINERALIZATION 7-9
7.7 ONEK MINERALIZATION 7-10
7.8 BERMINGHAM MINERALIZATION 7-11
8. DEPOSIT TYPES 8-1
9. EXPLORATION 9-1
9.1 EXPLORATION OF BELLEKENO DEPOSIT 9-5
9.2 EXPLORATION OF LUCKY QUEEN DEPOSIT 9-5
9.3 EXPLORATION OF FLAME & MOTH DEPOSIT 9-5
9.4 EXPLORATION OF ONEK DEPOSIT 9-6
9.5 EXPLORATION OF BERMINGHAM DEPOSIT 9-6
10. DRILLING AND TRENCHING 10-1
10.1 TRENCHING 10-1
10.2 DRILLING 10-1
10.3 HISTORICAL DRILLING AT THE BELLEKENO MINE 10-2
10.4 2006–2013 ALEXCO DRILLING AT THE BELLEKENO MINE 10-3
10.5 HISTORICAL DRILLING AT LUCKY QUEEN 10-8
10.6 2006 – 2017 ALEXCO DRILLING AT LUCKY QUEEN 10-8
10.7 HISTORICAL DRILLING AT FLAME & MOTH 10-9
10.8 2010 – 2018 ALEXCO DRILLING AT FLAME & MOTH 10-10
10.9 HISTORICAL DRILLING AT ONEK 10-11
10.10 2010–2014 ALEXCO DRILLING AT ONEK 10-11
10.11 HISTORICAL DRILLING AT BERMINGHAM 10-12
10.12 2009–2018 ALEXCO DRILLING AT BERMINGHAM 10-12
11. SAMPLE PREPARATION, ANALYSES AND SECURITY 11-1
11.1 SAMPLE PREPARATION AND ANALYSES 11-1
11.1.1 Historical Sampling (Pre-Alexco) 11-1
11.2 ALEXCO CORE DRILLING SAMPLING - EXPLORATION PROGRAMS (2006–2018) 11-1

11.3 QUALITY ASSURANCE AND QUALITY CONTROL PROGRAMS 11-3
11.3.1 Historical Core Drilling Data 11-3
11.3.2 Bellekeno Historical Core Drilling Data 11-3
11.3.3 Lucky Queen Historical Core Drilling Data 11-4
11.3.4 Flame & Moth Historical Core Drilling Data 11-4
11.3.5 Onek Historical Core Drilling Data 11-4
11.3.6 Bermingham Historical Core Drilling Data 11-4
11.3.7 Historical Chip Sample Data 11-4
11.3.8 Bellekeno Historical Chip Sample Data 11-5
11.3.9 Lucky Queen Historical Chip Sample Data 11-6
11.3.10 Flame & Moth Historical Chip Sample Data 11-6
11.3.11 Onek Historical Chip Sample Data 11-6
11.3.12 Bermingham Historical Chip Sample Data 11-6
11.3.13 Verification of 2006 to 2018 Data by Alexco 11-6
12. DATA VERIFICATION 12-1
12.1 SITE VISITS 12-1
12.2 VERIFICATIONS OF ANALYTICAL QUALITY CONTROL DATA FOR LUCKY QUEEN 12-1
12.3 VERIFICATION OF ANALYTICAL QUALITY CONTROL DATA FOR ONEK 12-1
12.4 VERIFICATION OF ANALYTICAL QUALITY CONTROL DATA FOR BERMINGHAM 12-2
13. MINERAL PROCESSING AND METALLURGICAL TESTING 13-1
13.1 BACKGROUND 13-1
13.2 METALLURGICAL TESTING SAMPLE DESCRIPTION 13-2
13.2.1 Master Composites 13-2
13.3 SAMPLE PHYSICAL CHARACTERISTICS TESTWORK 13-4
13.4 MINERALOGICAL ANALYSIS 13-5
13.4.1 Mineralogy Analysis on Bellekeno Samples 13-5
13.4.2 Mineralogy Analysis on Bermingham Samples 13-6
13.4.3 Mineralogy Analysis on Flame & Moth and Lucky Queen Samples 13-7
13.4.4 Mineralogy Analysis Comparison among Flame & Moth, Bermingham, Lucky Queen and Bellekeno Samples 13-9
13.5 FLOTATION TESTWORK OVERVIEW 13-9
13.5.1 Bellekeno Samples 13-9
13.5.2 Bermingham Samples 13-10
13.5.3 Flame & Moth Samples and Blended composites (Bermingham with Flame & Moth) 13-12
13.5.4 Lucky Queen Samples 13-16
13.6 MISCELLANEOUS TESTWORK 13-16
13.7 METAL RECOVERY PROJECTIONS 13-17
14. MINERAL RESOURCE ESTIMATE 14-1
14.1 INTRODUCTION 14-3
14.2 RESOURCE ESTIMATION PROCEDURES 14-4

14.3 RESOURCE DATABASE 14-4
14.3.1 Database for the Bellekeno Mine 14-4
14.3.2 Database for the Lucky Queen Mine 14-5
14.3.3 Database for the Flame & Moth Deposit 14-6
14.3.4 Database for the Onek Deposit 14-8
14.3.5 Database for the Bermingham Deposit 14-9
14.4 SOLID BODY MODELLING 14-10
14.4.1 Solid Body Modelling for the Bellekeno Mine 14-11
14.4.2 Solid Body Modelling for the Lucky Queen Mine 14-12
14.4.3 Solid Body Modelling for the Flame & Moth Deposit 14-12
14.4.4 Solid Body Modelling for the Onek Deposit 14-14
14.4.5 Solid Body Modelling for the Bermingham Deposit 14-16
14.5 BULK DENSITY DATA 14-18
14.5.1 Bulk Density for the Bellekeno Mine 14-18
14.5.2 Bulk density for the Lucky Queen Mine 14-19
14.5.3 Bulk density for the Flame & Moth Deposit 14-20
14.5.4 Bulk density for the Onek Deposit 14-21
14.5.5 Bulk density for the Bermingham Deposit 14-23
14.6 COMPOSITING 14-24
14.6.1 Compositing for the Bellekeno Mine 14-24
14.6.2 Compositing for the Lucky Queen Mine 14-25
14.6.3 Compositing for the Flame & Moth Deposit 14-25
14.6.4 Compositing for the Onek Deposit 14-26
14.6.5 Compositing for the Bermingham Deposit 14-27
14.7 EVALUATION OF OUTLIERS 14-28
14.7.1 Evaluation of Outliers for the Bellekeno Mine 14-28
14.7.2 Evaluation of Outliers for the Lucky Queen Mine 14-29
14.7.3 Evaluation of Outliers for the Flame & Moth Deposit 14-29
14.7.4 Evaluation of Outliers for the Onek Deposit 14-31
14.7.5 Evaluation of Outliers for the Bermingham Deposit 14-32
14.8 STATISTICAL ANALYSIS AND VARIOGRAPHY 14-35
14.8.1 Statistical Analysis and Variography for the Bellekeno Mine 14-35
14.8.2 Statistical Analysis and Variography for the Lucky Queen Mine 14-43
14.8.3 Statistical Analysis and Variography for the Flame & Moth Deposit 14-46
14.8.4 Statistical Analysis and Variography for the Onek Deposit 14-48
14.8.5 Statistical Analysis and Variography for the Bermingham Deposit 14-52
14.9 BLOCK MODEL AND GRADE ESTIMATION 14-54
14.9.1 Block Model and Grade Estimation for the Bellekeno Mine 14-54
14.9.2 Block Model and Grade Estimation for the Lucky Queen Mine 14-56

14.9.3 Block Model and Grade Estimation for the Flame & Moth Deposit 14-57
14.9.4 Block Model and Grade Estimation for the Onek Deposit 14-59
14.9.5 Block Model and Grade Estimation for the Bermingham Deposit 14-61
14.10 MODEL VALIDATION AND SENSITIVITY 14-66
14.10.1 Model Validation and Sensitivity for the Bellekeno Mine 14-66
14.10.2 Model Validation and Sensitivity for the Lucky Queen Mine 14-68
14.10.3 Model Validation and Sensitivity for the Flame & Moth Deposit 14-70
14.10.4 Model Validation and Sensitivity for the Onek Deposit 14-73
14.10.5 Model Validation for the Bermingham Deposit 14-77
14.11 MINERAL RESOURCE CLASSIFICATION 14-81
14.11.1 Mineral Resource Classification for the Bellekeno Mine 14-81
14.11.2 Mineral Resource Classification for the Lucky Queen Mine 14-82
14.11.3 Mineral Resource Classification for the Flame & Moth Deposit 14-82
14.11.4 Mineral Resource Classification for the Onek Deposit 14-82
14.11.5 Mineral Resource Classification for the Bermingham Deposit 14-83
14.12 MINERAL RESOURCE STATEMENTS 14-83
14.12.1 Mineral Resource Statement for the Bellekeno Mine 14-85
14.12.2 Mineral Resource Statement for the Lucky Queen Mine 14-86
14.12.3 Mineral Resource Statement for the Flame & Moth Deposit 14-87
14.12.4 Mineral Resource Statement for the Onek Deposit 14-88
14.12.5 Mineral Resource Statement for the Bermingham Deposit 14-89
14.13 PREVIOUS MINERAL RESOURCE ESTIMATES 14-91
14.13.1 Bellekeno Previous Resource Estimates 14-91
14.13.2 Flame & Moth Previous Resource Estimates 14-91
14.13.3 Onek Previous Resource Estimates 14-92
14.13.4 Bermingham Previous Resource Estimates 14-92
15. MINERAL RESERVE ESTIMATE 15-1
15.1 MINERAL RESERVE BLOCK MODEL PREPARATION 15-1
15.2 CUTOFF GRADE AND NSR CALCULATION 15-2
15.3 MINERAL RESERVE ESTIMATE 15-2
16. MINING METHODS 16-1
16.1 INTRODUCTION 16-1
16.2 GEOTECHNICAL ANALYSIS 16-3
16.2.1 Geotechnical Database 16-3
16.2.2 Geotechnical Domains 16-3
16.2.3 Mining Methods and Locations 16-3
16.2.4 Ground Water 16-5
16.2.5 Rock Quality Designation (RQD) 16-5

16.2.6 NGI Q Values....16-5
16.2.7 Empirical Ground Support Design....16-6
16.2.8 Stope Stability Analysis – Empirical Assessment....16-7
16.2.9 Stope Over-Break....16-9
16.2.10 Stope Stability Analysis – Numerical Assessment....16-9
16.2.11 Pillar Sizing....16-10
16.3 MINING METHODS....16-10
16.3.1 Mechanized Cut and Fill (MCF)....16-11
16.3.2 Longhole Open Stoping (LHOS)....16-13
16.4 DILUTION AND RECOVERY....16-15
16.4.1 Development Dilution....16-15
16.4.2 Stoping and MCF Dilution....16-15
16.4.3 Recovery....16-16
16.4.4 Minimum Mining Width....16-17
16.5 NET SMELTER RETURN (NSR)....16-17
16.6 MINE DESIGN....16-19
16.6.1 Bellekeno Mine Plan....16-19
16.6.2 Flame & Moth Deposit....16-23
16.6.3 Bermingham Mine....16-27
16.6.4 Lucky Queen Mine....16-31
16.7 PRODUCTION SCHEDULE....16-35
16.8 MINE EQUIPMENT....16-38
16.9 MANPOWER....16-40
16.10 MINE OPERATIONS....16-41
16.11 BACKFILLING....16-41
16.12 VENTILATION....16-41
16.12.1 Mine Air Heating....16-42
16.12.2 Ventilation Modelling....16-42
16.12.3 Flame & Moth Mine....16-43
16.12.4 Bermingham Mine....16-44
16.12.5 Lucky Queen Mine....16-46
16.13 MINE SERVICES....16-47
16.13.1 Compressed Air....16-47
16.13.2 Dewatering....16-47
16.13.3 Electrical....16-48
16.13.4 Maintenance Facilities....16-48
17. RECOVERY METHODS....17-1
17.1 INTRODUCTION....17-1
17.2 PROCESS DESIGN CRITERIA....17-1

17.3 LOM PREDICTED MILL FEED 17-2
17.4 PROCESS FLOWSHEET MODIFICATIONS 17-3
17.4.1 Previous Operation 17-3
17.4.2 Mill Modifications and Upgrades 17-4
17.5 PROCESS UNIT OPERATION DESCRIPTION 17-6
17.5.1 Simplified Process Flowsheet 17-7
17.5.2 ROM Ore Crushing, Ore Storage, and Reclaim 17-8
17.5.3 Primary Grinding Circuit 17-8
17.5.4 Classification 17-9
17.5.5 Lead Flotation Circuit 17-9
17.5.6 Zinc Flotation Circuit 17-10
17.5.7 Lead and Zinc Concentrates Dewatering And Loadout 17-12
17.5.8 Tailings Dewatering and Handling 17-13
17.5.9 Reagent Handling and Storage 17-14
17.6 PLANT SERVICES 17-14
17.6.1 Water Supply 17-14
17.6.2 Air Supply 17-15
17.6.3 Instrumentation and Process Control 17-15
17.6.4 Quality Control 17-15
17.7 ANNUAL PRODUCTION ESTIMATE 17-15
18. PROJECT INFRASTRUCTURE 18-1
18.1 OFF-SITE FACILITIES 18-1
18.2 CONCENTRATE SHIPMENT INFRASTRUCTURE 18-1
18.3 SUPPORT FACILITIES 18-1
18.4 FLAT CREEK CAMP FACILITIES 18-1
18.5 MILL FACILITY 18-2
18.6 AREA HAUL ROAD SYSTEM 18-4
18.7 BELLEKENO MINE SURFACE INFRASTRUCTURE 18-4
18.8 LUCKY QUEEN MINE SURFACE INFRASTRUCTURE 18-6
18.9 FLAME & MOTH MINE SURFACE INFRASTRUCTURE 18-8
18.10 BERMINGHAM MINE SURFACE INFRASTRUCTURE 18-8
18.11 ELECTRICAL POWER 18-10
19. MARKET STUDIES AND CONTRACTS 19-1
19.1 MARKETS 19-1
19.2 CONTRACTS 19-1
19.2.1 Concentrate Sales 19-1
19.2.2 Wheaton Precious Metals Agreement 19-2
19.2.3 Other Agreements 19-3

19.2.4 Other Contracts 19-3

20. ENVIRONMENTAL STUDIES, PERMITTING, AND SOCIAL OR COMMUNITY IMPACT 20-1

20.1 SITE CONTEXT 20-1
20.2 ENVIRONMENTAL AND SOCIO-ECONOMIC SETTING 20-1
20.3 PERMITS AND REGULATORY CONTEXT 20-2
20.4 WATER MANAGEMENT 20-4
20.4.1 Mine Water 20-4
20.4.2 Water Treatment 20-5
20.4.3 Mill Water Supply 20-5
20.4.4 Receiving Environment 20-5
20.5 WASTE MANAGEMENT 20-6
20.5.1 Waste Rock 20-6
20.5.2 Tailings 20-6
20.6 COMMUNITY AND FIRST NATION RELATIONS 20-9
20.6.1 First Nations Relations 20-9
20.6.2 Community Relations 20-9
20.7 CLOSURE PLAN AND SECURITY 20-10

21. CAPITAL AND OPERATING COSTS 21-1

21.1 CAPITAL & SUSTAINING CAPITAL COST ESTIMATE 21-1
21.1.1 Capital Cost Assumptions and Basis of Estimate 21-1
21.1.2 Capital Cost Summary 21-2
21.1.3 Mine Capital Cost Estimate 21-3
21.1.4 Mill Capital Cost Estimate 21-4
21.2 OPERATING COST ESTIMATE 21-5
21.2.1 Operating Cost Assumptions and Basis of Estimate 21-5
21.2.2 Operating Cost Summary 21-6
21.2.3 Mining Operating Cost Estimate 21-7
21.2.4 Mill Operating Cost Estimate 21-9
21.3 ALL-IN SUSTAINING COST ESTIMATE 21-11

22. ECONOMIC ANALYSIS 22-1

22.1 METHODOLOGY USED 22-1
22.2 ECONOMIC CRITERIA 22-2
22.2.1 Wheaton Precious Metals Corp Streaming Agreement 22-2
22.2.2 Operating Costs 22-2
22.2.3 Treatment, Refining and Transport 22-3
22.2.4 Capital Costs 22-3
22.2.5 Closure Cost and Salvage Value 22-4
22.2.6 Taxation and Royalties 22-4

22.3 CASH FLOW ANALYSIS 22-4
22.4 FINANCIAL RESULTS 22-6
22.5 SENSITIVITY ANALYSIS 22-10
23. ADJACENT PROPERTIES 23-1
24. OTHER RELEVANT DATA AND INFORMATION 24-1
25. INTERPRETATION AND CONCLUSIONS 25-1
25.1 PROPERTY DESCRIPTION AND OWNERSHIP 25-1
25.2 EXPLORATION AND MINERAL RESOURCES 25-1
25.3 MINERAL RESERVES, MINE PLANNING AND MINE DEVELOPMENT 25-1
25.4 METALLURGICAL TESTING AND MINERAL PROCESSING 25-2
25.5 ENVIRONMENT, COMMUNITY, PERMITTING AND CLOSURE 25-3
25.6 CAPITAL AND OPERATING COSTS AND ECONOMIC EVALUATION 25-3
25.7 ECONOMIC ANALYSIS 25-4
26. RECOMMENDATIONS 26-1
26.1 MINERAL RESOURCES 26-1
26.2 PROCESSING AND METALLURGY 26-1
26.3 MINING AND GEOMECHANICS 26-1
26.4 ENVIRONMENT AND PERMITTING 26-2
26.5 DELIVERY ON COST ASSUMPTIONS AND PROJECT ECONOMICS 26-2
27. REFERENCES 27-1
28. CERTIFICATE OF QUALIFIED PERSON 28-1

LIST OF TABLES

Table 1-1 Keno Hill Mineral Resources at January 01, 2021 1-2
Table 1-2 Summary of Mineral Resource Estimates at January 01, 2021 1-8
Table 1-3 Mineral Reserves, Alexco Resource Corp. – Keno Hill Silver District Project 1-9
Table 1-4 Mine Design Criteria – NSR Cutoff Values 1-12
Table 1-5 Mine Production Summary 1-13
Table 1-6 LOM Expected Concentrate Production 1-15
Table 1-7 LOM Expected Metal Recovery to Concentrate 1-15
Table 1-8 Life of Mine Direct Operating Cost Summary 1-18
Table 1-9 After-Tax Results of Sensitivity Analysis 1-21
Table 4-1 Relevant Assessment and Regulatory Approvals 4-7
Table 6-1 District Production through to 1989 (Cathro, 2006) 6-2
Table 6-2 Historical Resource Estimate for Silver King Property [1] 6-2
Table 6-3 Bellekeno Mine Production Summary, 1919 to 2013 (Data compiled from internal documents) 6-4
Table 6-4 Past Production Records for the Lucky Queen Property 6-5
Table 6-5 Past Production Records for the Flame & Moth Property 6-6
Table 6-6 Past Production Records for the Onek Property 6-7
Table 6-7 Past Production Records for the Bermingham Property 6-8
Table 9-1 Distribution of Drill Holes 2006 to December 2020, Alexco Resource Corp 9-1
Table 10-1 2006 to 2013 Bellekeno Property Core Drilling Summary 10-4
Table 10-2 Summary of Bellekeno Surface and Underground Core Recovery Statistics 1996 – 2009 10-5
Table 10-3 Summary of Bellekeno Underground Core Recovery Statistics 2009 – 2012 10-6
Table 11-1 Statistical Review of UKHM Bellekeno Production Chip Data 11-6
Table 11-2 Commercial Standard Reference Material Used by Alexco for Drilling Programs for the KHSD Project 11-7
Table 11-3 Standard Reference Material Used by Alexco developed from the Bellekeno Mine 11-8
Table 11-4 Quality Control Data Produced by Alexco from 2006 to 2013 for Bellekeno 11-8
Table 11-5 Quality Control Data Produced by Alexco from 2006 to 2010 for Lucky Queen 11-9
Table 11-6 Quality Control Data Produced by Alexco from 2010 to 2014 for Flame & Moth 11-9

Table 11-7 Quality Control Data Produced by Alexco from 2007 to 2014 for Onek 11-9

Table 11-8 Quality Control Data Produced by Alexco from 2009 to 2018 for Bermingham 11-10

Table 13-1 Metallurgical Test Work Programs – 1996 to 2019 13-1

Table 13-2 Bermingham Composites for Metallurgical Testing 13-3

Table 13-3 Flame & Moth Composites for Metallurgical Testing 13-4

Table 13-4 Grindability Test Results 13-5

Table 13-5 Mineral Liberation and Exposure of Bermingham Master Composite 13-7

Table 13-6 Mineral Liberation and Exposure of Flame & Moth and Lucky Queen Samples 13-8

Table 13-7 Locked Cycle Testing Summary (2016-2019) 13-9

Table 13-8 Locked Cycle Flotation Test Results on Bellekeno Samples 13-10

Table 13-9 Open Cycle Cleaner Flotation Test Results on Bermingham Sample – SGS 2019 13-11

Table 13-10 Locked Cycle Flotation Test Results on Bermingham Samples 13-12

Table 13-11 Open Cycle Cleaner Flotation Test Results on Flame & Moth Samples 13-13

Table 13-12 Locked Cycle Flotation Test Results on Flame & Moth and Blended Flame & Moth with Bermingham 13-15

Table 13-13 Open Cycle Cleaner Flotation Tests on Lucky Queen Test Samples 13-16

Table 13-14 Concentrate Metal Production 13-18

Table 14-1 Summary of Mineral Resource Estimates at January 01, 2021 14-2

Table 14-2 Bellekeno Mine Sample Database 14-4

Table 14-3 Bellekeno Mine Samples Used for Mineral Resource Estimation 14-5

Table 14-4 Lucky Queen Deposit Sample Database 14-5

Table 14-5 Flame & Moth Deposit Sample Database 14-6

Table 14-6 Flame & Moth Deposit Core Drill Hole Vein Intercepts 14-6

Table 14-7 Original and Adjusted Narrow Mineralized Zones Drill Hole Intersections 14-7

Table 14-8 Sample Gaps in Mineralized Zones 14-7

Table 14-9 Examples of Sample Intervals Assumed to Have No Recoveries 14-8

Table 14-10 Onek Deposit Sample Database Average Assay Values Inside Veins 14-8

Table 14-11 Summary Statistics for Mineralized Assay Data (length weighted) Grouped by Vein System 14-10

Table 14-12 Bermingham Deposit Geological Model 14-16

Table 14-13 Bellekeno Bulk Density Measurements 14-19
Table 14-14 Lucky Queen Bulk Density Measurements 14-19
Table 14-15 Flame & Moth Bulk Density Measurements within Mineralized Zones 14-20
Table 14-16 Onek Bulk Density Measurements 14-22
Table 14-17 Composite Capping Levels for the Bellekeno Mine 14-29
Table 14-18 Composite Capping Levels for Lucky Queen 14-29
Table 14-19 High Grade Thresholds in the Flame & Moth Deposit 14-30
Table 14-20 High Grade Search Radii 14-31
Table 14-21 Sample Capping Levels for Onek 14-32
Table 14-22 Sample Capping Levels for Bermingham 14-33
Table 14-23 Summary Statistics for Bellekeno Composited and Weighted Data 14-35
Table 14-24 Summary of Variography for Bellekeno 14-37
Table 14-25 Composite Data Summary Statistics for the Lucky Queen Mine 14-45
Table 14-26 Modelled Semi-Variogram for Silver 14-45
Table 14-27 Correlogram Models in the Lightning Zone 14-48
Table 14-28 Correlogram Models in the Christal Zone 14-48
Table 14-29 Composite Data Summary Statistics for Onek 14-49
Table 14-30 Modelled Correlograms for Onek Veins 14-52
Table 14-31 Summary Statistics for Composited Assay Data Grouped by Vein System for Bermingham 14-53
Table 14-32 Variogram Details for the Bermingham Main, Bear and Footwall Vein Systems 14-54
Table 14-33 Block Model Location and Setup (MinePlan convention) 14-55
Table 14-34 Search Ellipse Parameters for the Bellekeno Mine 14-56
Table 14-35 Block Model Location and Setup for the Lucky Queen Mine 14-56
Table 14-36 Search Ellipse Parameters for the Lucky Queen Mine 14-57
Table 14-37 Block Model Location and Setup for the Flame & Moth Deposit 14-57
Table 14-38 Search Ellipse Parameters for the Flame & Moth Deposit in the Lightning Zone 14-58
Table 14-39 Search Ellipse Parameters for the Flame & Moth Deposit in the Christal Zone 14-59
Table 14-40 Onek Block Model Location and Setup 14-59

Table 14-41 Search Ellipse Parameters for Onek Vein 1 14-60

Table 14-42 Search Ellipse Parameters for Onek Vein 1F 14-60

Table 14-43 Search Ellipse Parameters for Onek Vein 2 14-61

Table 14-44 Bermingham Block Model Location and Setup Table 14-61

Table 14-45 Estimation Parameters for Silver 14-62

Table 14-46 Estimation Parameters for Gold 14-63

Table 14-47 Estimation Parameters for Lead 14-64

Table 14-48 Estimation Parameters for Zinc 14-65

Table 14-49 Estimation Parameters for Specific Gravity 14-66

Table 14-50 Comparison Statistics for Ordinary Kriging Estimate versus Inverse Distance Squared Estimate 14-67

Table 14-51 Comparison Statistics for Ordinary Kriging Estimate versus Nearest Neighbour Estimate 14-67

Table 14-52 Comparison Statistics for Ordinary Kriging Estimate versus Declustered Nearest Neighbour Estimate 14-68

Table 14-53 Nearest Neighbor Block Model Validation 14-69

Table 14-54 Lucky Queen Mine Indicated and Inferred Block Model Quantity and Grade Estimates at Various Cut-off Values 14-70

Table 14-55 Flame & Moth Indicated and Inferred Block Model Quantity and Grade Estimates at Various Cut-off Values 14-73

Table 14-56 OK and ID2 Estimate at $185 Dollar Value cut-off 14-75

Table 14-57 Onek Global Block Model Quantity and Grade Estimates at Various Dollar Cut-Off Values 14-75

Table 14-58 Criteria used to Define Indicated and Inferred Mineral Resource Categories 14-82

Table 14-59 Assumptions Considered for Preparing the Bellekeno Mineral Resource Statement 14-84

Table 14-60 Assumptions Considered for Preparing the Lucky Queen, Flame & Moth, and Onek Mineral Resource Statement (SRK, 2013) 14-84

Table 14-61 Assumptions Considered for Preparing the Bermingham Mineral Resource Statement 14-85

Table 14-62 Mineral Resource Statement, Bellekeno Deposit. January 1, 2021 14-86

Table 14-63 Mineral Resource Statement, Lucky Queen Deposit, SRK Consulting (Canada) Inc., January 3, 2017 14-87

Table 14-64 Mineral Resource Statement, Flame & Moth Deposit, SRK Consulting (Canada) Inc., January 3, 2017 14-88

Table 14-65 Mineral Resource Statement, Onek Deposit, SRK Consulting (Canada) Inc., January 3, 2017 14-89

Table 14-66 Mineral Resource Statement, Bermingham Deposit, SRK Consulting (Canada) Inc. March 28, 2019 14-90

Table 14-67 Consolidated Mineral Resource Statement for the Bellekeno Deposit, GeoStrat Consulting Services Inc. September 30, 2013 14-91

Table 14-68 Mineral Resource Statement for the Flame & Moth Deposit, April 28, 2015 14-92

Table 14-69 Mineral Resource Statement for the Onek Deposit, SRK Consulting (Canada) Inc., October 15, 2014 14-92

Table 14-70 Mineral Resource Statement for the Bermingham Deposit, SRK Consulting (Canada) Inc., January 3, 2017 ... 14-92

Table 15-1 Mineral Reserves, Alexco Resource Corp. – Keno Hill Silver District Project 15-3

Table 16-1 Summary of RQD Values for Flame & Moth and Bermingham deposits by Geotechnical Domain 16-5

Table 16-2 Summary of NGI Q Values for Flame & Moth and Bermingham Deposits by Geotechnical Domain 16-6

Table 16-3 General Summary of Rock Mass for Keno Hill 16-6

Table 16-4 Stope Design Parameters-Flame & Moth Deposit 16-8

Table 16-5 Stope Design Parameters-Bermingham Deposit 16-8

Table 16-6 Total Dilution by Mine 16-16

Table 16-7 NSR Commodity and Exchange Price 16-17

Table 16-8 NSR Parameters* 16-18

Table 16-9 Initial Operating Cost Estimate by Mine 16-18

Table 16-10 NSR Cut off Values 16-19

Table 16-11 Bellekeno Mine Production Quantities 16-20

Table 16-12 Flame & Moth Production Quantities 16-26

Table 16-13 Bermingham Production Quantities 16-31

Table 16-14 Lucky Queen Production Schedule 16-32

Table 16-15 Plant Feed 16-35

Table 16-16 Underground Equipment Fleet 16-39

Table 16-17 Surface Equipment Fleet 16-40

Table 16-18 Annual Manpower Estimate 16-41

Table 17-1 Modified Mill Design Criteria 17-2

Table 17-2 Summary of LOM Mill Feed By Deposit 17-3

Table 17-3 Summary of Plant Modifications to Achieve LOM Planned Throughput 17-5

Table 17-4 Summary of Reagents 17-14

Table 17-5 LOM Projected Concentrate Grades 17-16

Table 17-6 LOM Projected Concentrate Production 17-17

Table 17-7 LOM Projected Concentrate Production - Metal Quantities 17-18

Table 19-1 Metal Prices by Year for LOM 19-1

Table 19-2 Assumed Lead Concentrate Sales Terms 19-2

Table 19-3 Assumed Zinc Concentrate Sales Terms 19-2

Table 19-4 Production Payment 19-3

Table 20-1 Keno Hill Silver District Environmental Setting Summary 20-2

Table 20-2 Relevant Assessment and Regulatory Approvals 20-3

Table 20-3 Waste Rock Storage 20-6

Table 21-1 Working Capital Costs 21-2

Table 21-2 Sustaining Capital Cost Summary 21-3

Table 21-3 Mine Capital Cost Summary (Inclusive of Working Capital Cost) 21-3

Table 21-4 Life of Mine Direct Operating Cost Summary 21-6

Table 21-5 Project Operating Cost by Area (not including working capital production or costs) 21-7

Table 21-6 Flame and Moth Mine Operating Cost by Activity 21-8

Table 21-7 Bermingham Mine Operating Cost by Activity 21-8

Table 21-8 Lucky Queen Mine Operating Cost by Activity 21-9

Table 21-9 Summary of Mill Operating Costs 21-10

Table 21-10 Reagent Costs (based on LOM average 480 tonnes per day operation) 21-10

Table 21-11 Cost Component Summary with Study Metal Prices 21-11

Table 22-1 Summary of LOM Operating Costs (unit costs averaged over LOM) 22-3

Table 22-2 Treatment, Refining and Transport Cost Statistics (unit costs averaged over mine life) 22-3

Table 22-3 Inputs to the Economic Model 22-3

Table 22-4 Valuation Metrics 22-6

Table 22-5 LOM Production Summary 22-6

Table 22-6 Financial Result Summary 22-7

Table 22-7 Discounted Cash Flow Model (Includes Working Capital Period) 22-8

Table 22-8 After-Tax NPV and IRR Sensitivity Analysis Result Table 22-11

LIST OF FIGURES

Figure 1-1 View of the Existing District Mill Showing the Dry Stack Tailings Facility and Christal Lake 1-5

Figure 1-2 View of the Bellekeno Portal (2018) 1-10

Figure 1-3 View of the Current Bermingham Portal 1-10

Figure 1-4 Metal Price Projection 1-19

Figure 1-5 After-Tax 5% NPV Sensitivity 1-22

Figure 1-6 After-Tax IRR Sensitivity 1-22

Figure 4-1 Keno Hill Silver District Location Map 4-2

Figure 4-2 Keno Hill Silver District Mining Operations Area Overview 4-3

Figure 4-3 Alexco Quartz Mining Claim and Lease Holdings in the Keno Hill Silver District Excluding the Tailings Property 4-4

Figure 7-1 Regional Geology 7-2

Figure 7-2 Keno Hill Silver District Simplified Stratigraphy 7-3

Figure 7-3 Geology of the Keno Hill Silver District 7-5

Figure 7-4 Schematic Long Section of the 48 Vein Bellekeno Mine showing Workings 7-7

Figure 7-5 48 Vein Structures and Mineralogy, Bellekeno Mine 7-8

Figure 7-6 Vein-Fault Intercept in Drill Hole K-07-0114, Lucky Queen 7-9

Figure 7-7 Vein-Fault Intercept in Drill Hole K-12-0432, Flame & Moth 7-10

Figure 7-8 Vein-Fault Intercept in Drill Hole K-10-0306, in the Onek Deposit 7-11

Figure 7-9 Vein-Fault Intercept in Drill Hole K-15-0580, in the Bermingham Deposit 7-13

Figure 9-1 Keno Hill Silver Project Distribution of Surface Exploration Drill Holes 9-3

Figure 9-2 Underground Drill Hole Locations 9-4

Figure 10-1 Bellekeno Mine Long Section, 1986–1996 UKHM Core Drill Holes. view to northwest 10-3

Figure 10-2 Bellekeno Mine Long Section, Surface Core Drill Holes, 2006–2013. view to northwest 10-5

Figure 10-3 Bellekeno Mine Long Section, Underground Core Drill Holes, 2006–2013. view to northwest 10-6

Figure 10-4 Photographic Section of 48 Vein Heterogeneity, Bellekeno Mine 10-7

Figure 10-5 Location of Surface Drill Holes Drilled from 2006 to 2010 at Lucky Queen. view to northwest 10-9

Figure 10-6 Location of Surface Drilling from 2010 to 2014 at Flame & Moth Used in Resource Estimation. view to northwest 10-10

Figure 10-7 Location of Surface and Underground Drilling from 2007 to 2013 at Onek, view to northwest 10-12

Figure 10-8 Location of Bermingham drilling from 2009 to 2018 (Oblique longitudinal view to northwest) 10-15

Figure 13-1 Source of Metallurgical Samples from Bermingham 13-3

Figure 13-2 Source Metallurgical Samples from Flame & Moth 13-4

Figure 13-3 Mineral Abundance of Bermingham Master Composite 13-6

Figure 13-4 Mineral Abundance of Flame & Moth and Lucky Queen Samples 13-8

Figure 13-5 Open Cycle Cleaner Flotation Test Results on Bermingham Master Composite Samples 13-11

Figure 13-6 Locked Cycle Flotation Tests Flowsheet on Bermingham Master Composite Samples 13-12

Figure 13-7 Locked Cycle Flotation Tests Flowsheet on Flame & Moth and Blended Samples 13-14

Figure 13-8 Metal Recoveries at Head Grades for Recovery Projection 13-17

Figure 14-1 Bellekeno Mine Long Section, Wireframes, Looking North-Northwest (top) and Looking South-Southeast (bottom) 14-11

Figure 14-2 Section of Lucky Queen Wireframes Looking Northwest 14-13

Figure 14-3 Vein Wireframes and Location of Surface Drilling at Flame & Moth Used in Resource Estimation, Section (Looking North-Northwest) 14-13

Figure 14-4 Long Section of Onek Wireframes Looking South 14-15

Figure 14-5 Long Section of Onek Wireframes Looking North 14-15

Figure 14-6 Bermingham Geological Model (Plan View) 14-17

Figure 14-7 Bermingham Geological Model (3D Isometric looking North East) 14-17

Figure 14-8 Cross-cutting Faults (View looking North West) 14-18

Figure 14-9: Bulk Density vs All Metal (%) for Bellekeno 14-19

Figure 14-10 Scatter Plot of Lead Assay Results and Bulk Density Measurements 14-20

Figure 14-11 Pulp Versus Core SG Values 14-21

Figure 14-12 Correlation Between Bulk Density and Metal Content for Onek Veins 14-22

Figure 14-13 Comparison of Core and Pulp Density Measurements for Onek 14-23

Figure 14-14 Comparison between Pulp and Core Density Measurements 14-24

Figure 14-15 Histogram of Sample Lengths for the Mineralized Zones for Bellekeno Mine 14-25

Figure 14-16 Histogram of Sample Lengths in the Mineralized Zones for Flame & Moth Deposit 14-26

Figure 14-17 Histogram of Sample Lengths within Onek Veins 14-27

Figure 14-18 Histogram of Sample Lengths within Bermingham Veins 14-28

Figure 14-19 Continuity of High Grade Ag Assays at High Grade Thresholds in Lightning Zone 14-31

Figure 14-20: Quantile-Quantile Plot of Silver Values in Drillhole Versus Chip Samples Coded to Bellekeno Veins 14-36

Figure 14-21 Normal Score Variograms for Capped Silver, Southwest Zone 14-38

Figure 14-22 Normal Score Variograms for Capped Lead, Southwest Zone 14-39

Figure 14-23 Normal Score Variograms for Capped Zinc, Southwest Zone 14-40

Figure 14-24 Normal Score Variograms for Capped Silver, 99 Zone 14-41

Figure 14-25 Normal Score Variograms for Capped Lead, 99 Zone 14-42

Figure 14-26 Normal Score Variograms for Capped Zinc, 99 Zone 14-43

Figure 14-27 Q-Q Plot of Chip and Drill Hole Silver Assay Sample Data 14-44

Figure 14-28 Statistics of Ag Composite Grades in the Mineralized Zones 14-46

Figure 14-29 Statistics of Silver Composite Grades in the Mineralized Zones 14-47

Figure 14-30 Statistics of Zinc Composite Grades in the Mineralized Zones 14-47

Figure 14-31 Modelled Directional and Downhole Correlograms for Vein 1 and Vein 1FW 14-50

Figure 14-32 Modelled Omnidirectional Correlograms for Vein 2 14-51

Figure 14-33 Swath Comparison of ID^2 and NN Estimation 14-69

Figure 14-34 Comparison of (a) Silver and (b) Zinc Block Estimates with Borehole Assay Data Contained Within Blocks in the Lightning Zone 14-71

Figure 14-35 Lightning Zone Declustered Average Silver Composite Grades Compared to Silver Block Estimates 14-72

Figure 14-36 Lightning Zone Declustered Average Zinc Composite Grades Compared to Zinc Block Estimates 14-72

Figure 14-37 Comparison of OK and ID^2 Estimation for Onek 14-74

Figure 14-38 Silver Grade Tonnage Curve for Onek 14-76

Figure 14-39 Zinc Grade Tonnage Curve for Onek 14-76

Figure 14-40 Swath Plot of Silver Grade for the Bear Vein System 14-77

Figure 14-41 Swath Plot of Silver Grade for the Footwall Vein System 14-78

Figure 14-42 Comparison of Block Model Silver Grades to Nearest Neighbor Model 14-79

Figure 14-43 Comparison of Block Model Gold Grades to Nearest Neighbor Model 14-79

Figure 14-44 Comparison of Block Model Lead Grades to Nearest Neighbor Model 14-80

Figure 14-45 Comparison of Block Model Zinc Grades to Nearest Neighbor Model 14-80

Figure 16-1 Deposit Location 16-2
Figure 16-2 Bermingham Zone and Mining Method Domains (Looking NW) 16-4
Figure 16-3 Flame & Moth Mine Zone and Mining Method Domains (Looking SW) 16-4
Figure 16-4 MCF lifts with Uphole Stopes Section 16-12
Figure 16-5 Shanty MCF Development Shapes Example 16-13
Figure 16-6 (Downhole) Longhole Stoping 16-14
Figure 16-7 Uphole Longhole Stoping 16-15
Figure 16-8 Bellekeno Long Section (Looking NW) 16-21
Figure 16-9 Bellekeno Area Plan View 16-22
Figure 16-10 Flame & Moth Isometric View (Looking NW) 16-23
Figure 16-11 Main Access Ramp Development Section Profile 16-24
Figure 16-12 Flame & Moth and Mill Area Surface Layout 16-25
Figure 16-13 Bermingham Mine Isometric View (Looking SE) 16-28
Figure 16-14 Bermingham Mine Isometric View Showing FW Zone (Looking NE) 16-29
Figure 16-15 Bermingham Mine As-Built and Surface Layout 16-30
Figure 16-16 Lucky Queen Isometric View (Looking South) 16-33
Figure 16-17 Lucky Queen Mine Plan View 16-34
Figure 16-18 Mined and Recovered Silver Oz Distribution by Mining Method 16-36
Figure 16-19 Ore Tonnes Mined Distribution by Mining Method 16-36
Figure 16-20 Ore and Waste Tonnes – Combined Mines 16-37
Figure 16-21 Ore Tonnes vs Ag Grade 16-37
Figure 16-22 Ore Tonnes vs Base Metal Grade 16-38
Figure 16-23 Mayo, YT Monthly Average Temperature 16-42
Figure 16-24 Flame & Moth Primary Airflow Schematic 16-43
Figure 16-25 Flame & Moth Project Ventilation Demand 16-44
Figure 16-26 Bermingham Mine Primary Airflow Schematic 16-45
Figure 16-27 Bermingham Project Ventilation Demand 16-45
Figure 16-28 Lucky Queen Primary Airflow Schematic 16-46

Figure 16-29 Lucky Queen Project Ventilation Demand 16-47

Figure 17-1 Source of Mill Feed in Tonnes per Year 17-3

Figure 17-2 Simplified Process Flow Diagram of the Mill Complex 17-8

Figure 18-1 Site Layout - Keno District Mill and Flame & Moth 18-3

Figure 18-2 Existing Infrastructure at the Bellekeno East Portal (note shop was removed in 2020) 18-4

Figure 18-3 Site Layout at Bellekeno 18-5

Figure 18-4 Existing Infrastructure at Lucky Queen Mine Portal 18-6

Figure 18-5 Site Layout at Lucky Queen 18-7

Figure 18-6 Site Layout at the Bermingham Portal 18-9

Figure 20-1 Aerial View of DSTF at Keno Hill 20-8

Figure 21-1 Mine Capital Cost Breakdown by Mine Operations 21-4

Figure 21-2 LOM Capital Cost Summary by Mine 21-4

Figure 22-1 Metal Price Projection 22-1

Figure 22-2 Cumulative Cash Flow After Tax ($ '000) 22-5

Figure 22-3 Revenue Distribution of Metals 22-5

Figure 22-4 After-Tax 5% NPV Sensitivity (±30% project variables) 22-12

LIST OF APPENDICES

Appendix A Alexco Quartz Mining Claim and Lease Holdings in the Keno Hill Silver District Excluding the Tailings Property

LIST OF ACRONYMS AND ABBREVIATIONS

$ '000	thousands of dollars
$/tonne	cost per tonne
AEG	Alexco Environmental Group Inc.
AES	atomic emission spectroscopy
Ag	silver
AgEq	silver equivalent
AISC	all-in sustaining costs
AKHM	Alexco Keno Hill Mining Corp.
Alexco	Alexco Resource Corp.
ANFO	ammonium nitrate/fuel oil
ARSA	Amended and Restated Subsidiary Agreement
Au	gold
BK	Bellekeno mine
BM	Bermingham mine
BWI	Bond Ball Mill Work Index
°C	degrees Celsius
C&F	cut and fill
CA$	Canadian Dollar
CBD	core bulk density
CCBA	Comprehensive Cooperation and Benefits Agreement
CER	Christal Exhaust Raise
cfm	cubic feet per minute
CIRNAC	Crown Indigenous Relations and Northern Affairs Canada
cm	centimeter
CRF	cemented rock fill
D&F	drift and fill
DCF	discounted cash flow
DIAND	Department of Indian Affairs and Northern Development
DMT	dry metric tonne
DSTF	dry stack tailings facility
ELOS	Equivalent Linear Over-break / Slough
ERDC	Elsa Reclamation & Development Company Ltd.
FEM	finite element method
FM	Flame & Moth mine
FNNND	First Nation of Na-Cho Nyäk Dun
ft	foot
FW	footwall
g	grams
G&A	general and administrative
g/t	grams per tonne
GSI	Geological Strength Index
H	height

HW	hanging wall
HR	hydraulic radius
ICP	inductively coupled plasma
ID^2	inverse distance squared
IRR	internal rate of return
k	thousand
kg/t	kilograms per tonne
KHSD	Keno Hill Silver District
km	kilometer
koz	thousand ounces
kW	kilowatt hours
L	length
lb	pound
LH	longhole stoping
LHD	load haul dump machine
LHOS	longhole open stoping
LOM	life of mine
LQ	Lucky Queen mine
L/S	litres per second
m	meter
M	million
m/s	meters per second
m^3/s	cubic meters per second
MCF	mechanized underground mining methods of cut and fill
mm	millimeter(s)
MP	Mining Plus Canada Consulting Ltd.
MSO	mineable shape optimizer
MW	megawatt
My	million years ago
N-AML	non-acid metal leaching
NPV	net present value
NSR	net smelter return
OpEx	operating expense, operating expenditure
oz	troy ounce
P-AML	potential acid metal leaching
PAG	potential acid generation
Pb	lead
PEA	preliminary economic assessment
PFS	Preliminary Feasibility Study
PP&E	property, plant and equipment
ppm	parts per million
QP	Qualified Persons
RCP	Reclamation and Closure Plan
RQD	Rock Quality Designation

RWI	Bond Rod Mill Work Index
SPA	Silver Purchase Agreement
SRM	standard reference material
t	metric tonnes
tpd	metric tonnes per day
tpy	metric tonnes per year
UKHM	United Keno Hill Mines Ltd.
URF	unconsolidated waste rock fill
US$	United States Dollar
UTM	Universal Transversal Mercator
µm	micrometer
WPM	Wheaton Precious Metals
WRSF	waste rock storage facility
yd	yard
YESAA	Yukon Environmental & Socio-economic Assessment Act
YESAB	Yukon Environmental & Socio-economic Assessment Board
YG	Yukon Government
Zn	zinc

1. SUMMARY

1.1 Executive Summary

Mining Plus Canada Consulting Ltd. (Mining Plus) was retained by Alexco Resource Corp. (Alexco) to update the Prefeasibility Study (PFS) and independent technical report on the Keno Hill Silver Project (the Project) that was published in February 2020 (Alexco, 2020). The purpose of this independent report, entitled "Technical Report on Updated Mineral Resource and Reserve Estimate of the Keno Hill Silver District", is to disclose the results of that work and replace the preceding Alexco, 2020 report. This Technical Report conforms to NI 43-101 Standards of Disclosure for Mineral Projects.

Alexco is a public company with its headquarters in Vancouver, B.C. Alexco, through wholly owned subsidiaries, owns the mineral rights for the Keno Hill Silver District (KHSD, Keno Hill or the District) following its successful bid for the assets of United Keno Hill Mines Ltd in 2006. Alexco acquired the properties with all pre-existing liabilities subject to indemnification from the federal Government of Canada (GoC).

The Project contemplates the conventional mining and milling of silver-lead-zinc ore from four deposits in the District. There is an existing conventional flotation mill which will process high grade silver-lead-zinc ore from four deposits across the District. Over the eight-year mine life contemplated in this report, the mines will produce 1.44 million (M) tonnes (t) of mill feed (the Probable Mineral Reserves) at an average 804 grams per tonne (g/t) silver (Ag), 2.64% lead (Pb), 3.84% zinc (Zn) and 0.31 g/t gold (Au). The mill will produce two concentrates: a high grade silver-lead concentrate averaging 18,186 g/t Ag, 54% Pb, and 3.9 g/t Au, and a zinc-silver concentrate averaging 750 g/t Ag and 52.8% Zn. The total Ag production is 35.5 M ounces (oz) over the mine life, corresponding to an annualized silver product in concentrate of 4.4 M oz.

The KHSD is a historic mining district, with the first production recorded in 1913. Since that time, an estimated 200 M oz of Ag has been produced from over 30 small mines across the District. Due to the high grade, steeply dipping veins which host the mineralization, the historic mines were typically small underground operations "chasing the vein", followed by open pit operations beginning in the 1970's to recover selected crown pillars.

In the late 1980's, the then-owner United Keno Hill Mines Limited (UKHM) declared bankruptcy and the site was eventually declared abandoned in 2001, reverting to the GoC. Alexco was the successful bidder in a commercial sale and purchase process and in 2006 became the 100% owner of the assets. Through this transaction, Alexco has the right to mine the deposits and the obligation to develop, permit and implement a reclamation and closure plan for the legacy liabilities across the District. Alexco is fully indemnified for the historic liabilities.

Alexco has been actively developing the District since 2006. Alexco built a new mill complex in 2010, which operated for three years, processing material from the Bellekeno Mine. Since suspending mining operations in 2013, Alexco has maintained the District on a care and maintenance status and focused on additional exploration which led to increases in the estimated Mineral Resources for the Bermingham and Flame & Moth deposits. Phased underground development of these deposits commenced in 2018 and, as of the date of this report, Alexco has completed over 1,000 meters (m) of underground development work including a new portal and decline at the Bermingham deposit and a new portal and ramp at the Flame & Moth deposit. In Q4 of 2020 the District mill returned to operation and Alexco began shipping concentrate in Q1 2021.

The estimated Mineral Resource for the KHSD includes the Bellekeno, Lucky Queen, Flame & Moth, Onek, and Bermingham deposits. The total estimated Mineral Resource inclusive of estimated Probable Mineral Reserves is shown in Table 1-1.

Table 1-1 Keno Hill Mineral Resources at January 01, 2021

Category	Tonnes (t)	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)	Contained Ag (oz)
Indicated	3,826,800	596	0.34	2.1	5.4	73,352,000
Inferred	1,719,600	442	0.2	1.4	3.9	24,413,000

Notes:
1. All Mineral Resources are classified following the CIM Definition Standards for Mineral Resources and Mineral Reserves (May 2014) of NI 43-101.
2. Indicated Mineral Resources are inclusive of Probable Mineral Reserves estimates.
3. Mineral Resources are not Mineral Reserves and do not have demonstrated economic viability. All numbers have been rounded to reflect the relative accuracy of the estimates.
4. The Mineral Resource estimates comprising Lucky Queen and Flame & Moth, Onek and Bermingham are supported by disclosure in the news release dated March 28, 2019 entitled "Alexco Announces Positive Pre-Feasibility Study for Expanded Silver Production at Keno Hill Silver District" and the Technical Report filed on SEDAR dated February 13, 2020 with an effective date of March 28, 2019.
5. The Mineral Resource estimate for the Bermingham deposit is based on Mineral Resource estimates having an effective date of March 28, 2019.
6. The Mineral Resource estimate for the Lucky Queen, Flame & Moth and Onek deposits have an effective date of January 3, 2017.
7. The Mineral Resource estimate for the Bellekeno deposit is based on an internal Mineral Resource estimate completed by Alexco Resource Corp. and externally audited by SRK Consulting Inc., having an effective date of January 01, 2021. This Mineral Resource estimate has been depleted to reflect all mine production from Bellekeno to the end of December 2020.

The estimated Probable Mineral Reserves calculated by the Qualified Person (from Mining Plus) for this Project are 1.44 Mt grading 804 g/t Ag, 2.64% Pb, 3.84% Zn and 0.31 g/t Au for an overall Ag equivalent (AgEq) grade of 1,035 g/t as of April 1, 2021.

The mine plan for this Project comprises mining from four deposits (also referred to as "mines"); Bermingham, Flame & Moth, Bellekeno, and Lucky Queen. The majority of the mill feed (over 94%) will come from Bermingham and Flame & Moth deposits. Two mines will be operating at any given time, with the exception of the initial ramp up period of ore from Bellekeno only.

The mine plan is based on conventional mechanized mining methods. Based on the orientation, width of the veins, review of historic mining in the District, and geotechnical information, a combination of mechanized overhand cut and fill, and longhole stoping with cemented rock fill have been selected as the appropriate mining methods for all four deposits. The deposits require the use of mining methods that can adequately support the vein and that are flexible and selective while minimizing the direct mining costs. The backfill is planned to be a mixture of waste rock fill and tailings from the dry stack tailings facility (DSTF) with cement added as required.

The District mill has been recommissioned at the currently permitted average throughput of 400 tonnes per day (tpd) or 157,000 tonne per year (tpy) with a planned increase in throughput in Year 3, for an overall life-of-mine (LOM) average throughput of 483 tpd. Tailings are thickened, filtered, and placed in a conventional DSTF, which will be progressively reclaimed.

The Bellekeno, Bermingham, and Flame & Moth mines have all permits and authorizations in place to commence full scale mine production. An amendment to the Water Licence will be required to bring Lucky Queen into production.

The Project risks are substantially minimized compared to a greenfields project by a combination of Alexco's previous operations at Keno Hill, the recently completed underground development and drilling, the existing and well-maintained infrastructure both onsite and offsite (including grid power) and the safe jurisdiction of the Yukon.

The working (pre-positive monthly cash flow) capital cost of $10.0 M comprises the following cost components: $13.0 M of mine development, PP&E (property, plant and equipment), mill upgrades, site-wide infrastructure modifications and contingency costs, plus an additional $19.3 M of capitalized operating costs. The costs incurred during the working capital period are offset by the $22.3 M in revenue generated to produce a net working capital of $10.0 M prior to reaching positive cash flow. This net working capital covers the first five month period of mine development and mill ramp up. The LOM sustaining capital cost, following the working capital expenditure period, is $95.6 M comprising primarily underground development costs.

The direct operating costs for the Project are estimated at a total of $436 M or $310 per milled tonne of ore. This comprises $277 M direct mine costs, $80 M of direct mill costs, and $79 M for site general and administrative (G&A) costs (excluding working capital period operating costs and corporate costs). AISC life-of-mine average $11.59 per ounce of silver, including corporate costs and working capital. The AISC is a non-GAAP (generally accepted accounting principles) financial measure that does not have any standardized meaning. Alexco has adopted the practice of calculating this performance measure as the net cost of producing an ounce of Ag (our primary payable metal) after deducting revenues gained from incidental by-product production.

Revenue derives from selling four metals (Ag as main product and Pb, Zn, and Au as by-products), reporting to two concentrates; a Ag-Pb concentrate and a Zn-Ag concentrate. The Project will produce a total of 62,053 t of Ag-Pb concentrate and 76,398 t of Zn-Ag concentrate over the eight year mine life. Over the LOM , the total payable of these metals in these concentrates totals 33.5 M oz Ag, 69.8 M pounds ("lbs") Pb, 75.8 M lbs Zn and 5,082 oz Au.

Metal pricing was based on information from external sources. The LOM net revenue (Net Smelter Return) is $831 M and the total pre-tax cash flow is at $263 M. These are based on metal pricing assumptions as follows:

- Ag ranging from US$25.50/oz in 2021, US$24.10/oz in 2022, US$22.60/oz in 2023, US$21.80/oz in 2024 to the long-term price of US$21.00/oz;
- Zn: US$1.17/lb in 2021, US$1.10/lb in 2022 and 2023, US$1.12/lb in 2024 and US$1.09/lb thereafter;
- Pb: US$0.91/lb in 2021, US$0.92/lb in 2022, US$0.93/lb in 2023, US$0.92/lb in 2024 and US$0.93/lb thereafter; and
- Au: US$1,910/oz in 2021, US$1,870/oz in 2022, US$1,760/oz in 2023, US$1,710/oz in 2024 and US$1,600/oz thereafter.

The Project economics show this to be a robust project with low capital and high returns with a pre-tax net present value at a 5% discount rate (NPV_5) of $210.4 M and after-tax NPV_5 of $154.3 M. The pre-tax internal rate of return (IRR) is 326% and after-tax IRR is 295%. Considering the Project on a stand-alone basis, the undiscounted after-tax cash flow totals $189.7 M over the mine life, simple payback occurs approximately 15 months from start of production.

Exploration will continue at Keno Hill, with the objective to expand current resources and in the short term is particularly focused on the Bermingham deposit. Alexco plans approximately 25,000 m of surface diamond drilling at Bermingham and other areas in Galena Hill; this exploration drilling is not included in the Project costs summarized in this Technical Report. It is recognized that there remains estimated Mineral Resources in the Indicated category after extraction of the Probable Mineral Reserves considered herein.

1.2 TECHNICAL SUMMARY

1.2.1 PROPERTY DESCRIPTION AND OWNERSHIP

The Keno Hill Silver District is located in the central Yukon. The site is located approximately 350 km north of Whitehorse, Yukon, Canada in central Yukon and is in the traditional territory of First Nation of Na-Cho Nyäk Dun (FNNND). Access to the property is via the Alaska, Klondike and Silver Trail highways from Whitehorse to Mayo (407 km) and an all-weather gravel road northeast from Mayo to Elsa (45 km); a total distance of 452 km.

Alexco Keno Hill Mining Corp. (AKHM) is a wholly-owned subsidiary of Alexco and has been incorporated for operation of mineral extraction and development in the KHSD. Elsa Reclamation and Development Company Ltd. (ERDC), a wholly owned subsidiary of Alexco, continues to advance the development and eventual implementation of the District wide closure plan (the Reclamation Plan), which addresses the historic environmental liabilities of the District from past mining activities. The potential liabilities associated with the historic operations in the KHSD are indemnified by the GoC under the terms and conditions of the commercial agreement subject to the requirement for ERDC to develop, permit and implement the site Reclamation Plan. The Reclamation Plan for the historic liabilities is currently being reviewed by the Yukon Environmental and Socio-economic Assessment Board (YESAB).

Alexco has been actively developing the KHSD since 2006 under this unique contractual arrangement with the GoC whereby it can enter into production at historic and newly discovered deposits within the District while it undertakes reclamation activities to remediate historic environmental impacts.

The KHSD quartz mining claims and quartz mining leases are held by one of two wholly-owned subsidiaries of Alexco: ERDC or AKHM. The current property ownership, access and licences cover the areas included in the geological model, Mineral Resources and Mineral Reserves in this study.

Alexco has exploration, maintenance, and camp facilities near the location of the historic mining town of Elsa, which is located just off the Silver Trail Highway, and administration, mill and mine facilities at the mill complex located near Keno City, as shown in Figure 1-1. The KHSD is well connected by a network of public and private gravel roads. A large number of roads constructed for past mining operations are still serviceable. The KHSD is supplied with electrical power by Yukon Energy Corporation from two hydroelectric plants near Mayo as well as an interconnection to the larger Whitehorse hydropower generating facility. The area is covered by NTS map sheets 105M/13 and 105M/14.

The central Yukon is characterized by a subarctic continental climate with cold winters and warm summers. Exploration and mining work can be carried out year-round. Annual precipitation averages 28 centimeters (cm). Half of this amount falls as snow, which starts to accumulate in October and remains into May or June. The landscape surrounding the KHSD is characterized by rolling hills and mountains with a relief of up to 1,600 m. The highest elevation is Keno Hill at 1,975 m. Slopes are gentle except the north slopes of Keno Hill and Sourdough Hill.

Figure 1-1 View of the Existing District Mill Showing the Dry Stack Tailings Facility and Christal Lake

1.2.2 HISTORY

The Keno Hill mining camp area has a rich history of exploration and mining dating back to the beginning of the 1900s. Notable periods of interest in the historic evolution of the Keno Hill mining camp included:

- Early gold prospecting near Mayo, particularly after the Klondike gold rush of 1898;
- The first silver was found in 1903 and small-scale mining commenced in 1913 at the Silver King mine;
- The end of the First World War and high silver prices led to renewed exploration and production activity by the Yukon Gold Company and later Keno Hill Limited;
- In the early 1920s, the Treadwell Yukon Company Limited (TYC) started mining.
- After the Second World War there was a sharp decline in activity in the Keno Hill camp until a new company, Keno Hill Mining Company Ltd., later United Keno Hill Mines Ltd. (UKHM, purchased all TYC properties, started production and sparked increased exploration activity. Production was primarily from underground mining, following the silver veins;
- The peak activity occurred in the 1950s and early 1960s, with new discoveries across the district adding to mineral inventory and production from the larger underground complexes such as the Hector Calumet camp;
- Open pit mining began in the late 1970's, mainly to recover crown pillars; from 1982 to 1985 Sadie-Ladue and Shamrock were mined on a small scale basis, and from 1989 to 1990 Shamrock, Silver King, Hector-Calumet, Lucky Queen, and Keno were mined;
- UKHM stopped production from the KHSD permanently in early 1989; and
- The mine was declared abandoned in 2001 by the GoC and the assets reverted to the Crown.

Alexco acquired the KHSD in 2006 and produced from Bellekeno mine from 2011 to 2013. Exploration has resulted in development and identification of the Lucky Queen, Flame & Moth, Onek, and Bermingham deposits.

1.2.3 GEOLOGY

The Keno Hill mining camp is located in the northwestern part of the Selwyn Basin in an area characterized by the Robert Service and Tombstone Thrust Sheets that are overlapping and trend northwest. The area is underlain by Upper Proterozoic to Mississippian rocks that were deposited in a shelf environment during the formation of the northern Cordilleran continental margin. The KHSD geology is dominated by the Mississippian Keno Hill Quartzite comprising the Basal Quartzite Member and conformably overlying Sourdough Hill Member. The unit is overthrust in the south by the Upper Proterozoic Hyland Group Yusezyu Formation and is conformably underlain in the north by the Devonian Earn Group (McOnie and Read, 2009).

Mineralization is of the polymetallic silver-lead-zinc vein type that typically exhibits a succession of hydrothermally precipitated minerals from the vein wall towards the vein centre. However, in the KHSD, multiple pulses of hydrothermal fluids or fluid boiling, probably related to repeated reactivation and breccia formation along the host fault structures, have formed a series of vein stages with differing mineral assemblages and textures. Supergene alteration may have further changed the nature of the mineralogy in the veins. Much of the supergene zone may have been removed due to glacial erosion.

In general, common gangue minerals include (manganiferous) siderite and, to a lesser extent, quartz and calcite. Silver predominantly occurs in argentiferous galena and argentiferous tetrahedrite (freibergite). In some assemblages, silver is also found as native silver, in polybasite, stephanite, and pyrargyrite. Lead occurs in galena and zinc in sphalerite, which at the KHSD can be either an iron-rich or iron-poor variety. Other sulphides include pyrite, pyrrhotite, arsenopyrite, and chalcopyrite.

The Keno Hill mining camp has long been recognized as a polymetallic silver-lead-zinc vein district with characteristics possibly similar to other well-known mining districts in the world. Examples of this type of mineralization include the Kokanee Range (Slocan), British Columbia; Coeur d'Alene, Idaho; Freiberg and the Harz Mountains, Germany; and Príbram, Czech Republic.

In the KHSD, the largest accumulation of minerals of economic interest occur in areas of increased hydrothermal fluid flow in structurally prepared competent rocks such as the Basal Quartzite Member and Triassic Greenstone. Incompetent rocks like phyllites tend to produce fewer and smaller (if any) open spaces, limiting fluid flow and resulting mineral precipitation.

1.2.4 EXPLORATION AND DRILLING

The exploration conducted by Alexco since 2005 is the first comprehensive exploration effort in the KHSD since 1997. The work has included a program of geologic data compilation, aerial geophysical surveying, and surface core drilling. Alexco converted the historic maps and documents from nearly 70 years of mining in the District to digital form. The digital data has been used to construct district scale maps and three-dimensional (3D) mine models.

Since acquiring the Keno Hill property, Alexco has completed a total of 782 surface diamond drill holes for a total of 205,503 m. In addition, a total of 431 underground holes for 29,673 m has also been completed, mainly at Bellekeno, but also includes 24 holes for 4,213 m drilled in 2018 from the Bermingham exploration decline.

Exploration drilling by Alexco has primarily been conducted to test targets immediately adjacent to historic resource areas and, to a lesser extent, to evaluate targets based on interpretation of exploration data. The objective has been to locate structurally controlled vein mineralization.

Standard logging and sampling conventions are used to capture information from the drill core. Since 2010 all core logging data has been directly digitally entered to the geology database with data including comments captured in separate tables including lithology, structure, mineralization type, intensity of oxidation, phases and abundance of veining, alteration, stratigraphy, and geotechnical.

1.2.5 MINERAL RESOURCE ESTIMATE

Definitions for resource categories used in this report are consistent with the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) definitions incorporated by reference into NI 43-101. The Mineral Resources have been estimated in conformity with the generally accepted CIM *Estimation of Mineral Resources and Mineral Reserves Best Practices Guidelines* (CIM, 2014) and are reported in accordance with NI 43-101. Mineral Resources are not Mineral Reserves and have not demonstrated economic viability.

In the opinion of the Qualified Persons (QPs) from SRK Consulting (Canada) Inc. (SRK), the resource evaluations reported herein are a reasonable representation of the global polymetallic Mineral Resources in the Bellekeno, Lucky Queen, Flame & Moth, Onek, and Bermingham deposits given the current level of sampling. The databases used to update the Bellekeno mine and Flame & Moth Mineral Resource estimates were audited by the QPs. The QPs are of the opinion that the current drilling information is sufficiently reliable to interpret with confidence the boundaries for the polymetallic mineralization and that the assay data are sufficiently reliable to support Mineral Resource estimation.

Mintec's MineSight software was used to construct the geological shapes model for all five deposits. The Lucky Queen and Onek, geological models and database were imported into GEMS format Access databases for geostatistical analysis, block model construction, metal grades estimates, and the tabulation of the Mineral Resources. Maptek's Vulcan software was used for geostatistical analysis and block model estimation for the Bermingham Mineral Resource estimate. Isatis was used for geostatistical analysis and variography, block model construction, estimating metal grades, and Mineral Resource tabulation for Bellekeno. The Lucky Queen, Flame & Moth, and Onek block models were estimated using GEMS.

Methodology for the five deposits employed the following procedures:

- Database compilation and verification;
- Construction of wireframe models for the boundaries of the polymetallic mineralization;
- Definition of resource domains;
- Estimation of bulk density;
- Data conditioning (compositing and capping) for geostatistical analysis and variography;
- Block modelling and grade interpolation;
- Resource classification and validation;
- Assessment of "reasonable prospects for economic extraction" and selection of appropriate cutoff grades; and
- Preparation of the Mineral Resource Statement.

A summary of the Mineral Resource estimate for the Project is shown in Table 1-2.

Table 1-2 Summary of Mineral Resource Estimates at January 01, 2021

Category	Deposit	Tonnes	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)	Contained Ag (oz)
Indicated	Bellekeno	213,000	620	*n/a*	5.5%	5.5%	4,246,0004,
	Lucky Queen	132,300	1,167	*0.2*	2.4%	1.6%	964,000
	Flame & Moth	1,679,000	498	*0.4*	1.9%	5.3%	26,883,000
	Onek	700,200	191	*0.6*	1.2%	11.9%	4,300,000
	Bermingham	1,102,300	930	*0.1*	2.4%	1.7%	32,959,000
Total Indicated		**3,826,800**	**596**	**0.34**	**2.1%**	**5.4%**	**73,352,000**
Inferred	Bellekeno	302,000	359	n/a	2.5%	5.4%	3.486.000
	Lucky Queen	257,900	473	0.1	1.0%	0.8%	3,922,000
	Flame & Moth	365,200	356	0.3	0.5%	4.3%	4,180,000
	Onek	285,100	118	0.4	1.2%	8.3%	1,082,000
	Bermingham	509,400	717	0.2	1.7%	1.5%	11,743,000
Total Inferred		**1,719,600**	**442**	**0.2**	**1.4%**	**3.9%**	**24,413,000**

Notes:

1. All Mineral Resources are classified following the CIM Definition Standards for Mineral Resources and Mineral Reserves (May 2014) of NI 43-101.
2. Indicated Mineral Resources are inclusive of Probable Mineral Reserves estimates.
3. Mineral Resources are not Mineral Reserves and do not have demonstrated economic viability. All numbers have been rounded to reflect the relative accuracy of the estimates.
4. The Mineral Resource estimates comprising Lucky Queen and Flame & Moth, Onek and Bermingham are supported by disclosure in the news release dated March 28, 2019 entitled "Alexco Announces Positive Pre-Feasibility Study for Expanded Silver Production at Keno Hill Silver District" and the Technical Report filed on SEDAR dated February 13, 2020 with an effective date of March 28, 2019.
5. The Mineral Resource estimate for the Bermingham deposit is based on Mineral Resource estimates having an effective date of March 28, 2019.
6. The Mineral Resource estimate for the Lucky Queen, Flame & Moth and Onek deposits have an effective date of January 3, 2017.
7. The Mineral Resource estimate for the Bellekeno deposit is based on an internal Mineral Resource estimate completed by Alexco Resource Corp. and externally audited by SRK Consulting Inc., having an effective date of January 01, 2021. This Mineral Resource estimate has been depleted to reflect all mine production from Bellekeno to the end of December 2020.

1.2.6 MINERAL RESERVE ESTIMATE

The Mineable Shape Optimizer (MSO) tool was used to create mineable shapes using the NSR values coded into the block models. The results generated from the MSO process were used as guidance to generate detailed development layouts and crosscut designs. The economic viability of all stope blocks and levels were tested to ensure that all the Probable Mineral Reserves are economically viable.

The Mineral Reserves (Table 1-3) show the total Mineral Reserves for the KHSD; all Mineral Reserves are Probable Mineral Reserves. External dilution and mineable recovery has been applied to the Mineral Reserves. Please note that rounding of tonnes, average grades, and contained metal may result in apparent discrepancies with totals rounded.

Table 1-3 Mineral Reserves, Alexco Resource Corp. – Keno Hill Silver District Project

Deposit[3]	Category	Tonnes	Ag (g/t)	Pb (%)	Zn (%)	Au (g/t)	Contained Metal			
							Ag (000 oz)	Au (000 oz)	Pb (M lbs)	Zn (M lbs)
Bellekeno	Proven	-	-	-	-	-				
	Probable	12,809	936	13.00	7.30	0	385	0	4	2
Bellekeno Surface Stockpile	Proven									
	Probable	3,397	1150	21.70	4.50	0	126	0	2	0
Lucky Queen	Proven	-	-	-	-	-	-		-	-
	Probable	70,648	1,269	2.71	1.56	0.13	2,883	0	4	2
Flame and Moth	Proven	-	-	-	-	-	-		-	-
	Probable	721,322	672	2.69	6.21	0.49	15,590	11	43	99
Bermingham	Proven	-	-	-	-	-	-		-	-
	Probable	630,173	899	2.26	1.30	0.13	18,209	3	31	18
Total	**Proven**	**-**	**-**	**-**	**-**	**-**	**-**		**-**	**-**
	Probable	**1,438,349**	**804**	**2.64**	**3.84**	**0.31**	**37,193**	**14**	**84**	**122**

Notes:
1. Mineral Reserves are reported herein based on an NSR cutoff value using estimated metallurgical recoveries, assumed metal prices and smelter terms, which include payable factors, treatment charges, penalties, and refining charges
2. Tonnage and grade measurements are in metric units. Contained gold and silver ounces are reported as troy ounces
3. The Bellekeno, Lucky Queen, Flame & Moth and Bermingham deposits are incorporated into the current mine plan supported by disclosure in the news release dated May 26, 2021 entitled "Alexco Announces 22% Increase to Silver Reserves; Updated Technical Report Demonstrates Robust Economics at Keno Hill".
4. Rounding as required by reporting guidelines may result in apparent summation differences between tonnes, grade and contained metal content.

The Mineral Reserves identified comply with CIM definitions and standards for a NI 43-101 technical report. Detailed information on mining, processing and other relevant factors are contained in the following sections and combined demonstrate that the KHSD Project is an economically viable project.

1.2.7 MINING METHODS

The Project contains four separate deposits: Bellekeno, Bermingham, Flame & Moth, and Lucky Queen. All are characterized by high-grades and narrow vein widths. A photo of the existing Bellekeno portal is shown in Figure 1-2, and similarly of the current Bermingham portal in Figure 1-3.

Figure 1-2 View of the Bellekeno Portal (2018)

Figure 1-3 View of the Current Bermingham Portal

The KHSD is historically known for locally challenging ground conditions encountered that limit the applicable mining methods to fully supported methods with limited spans, such as cut and fill or small scale longhole. For most of its historic mining life, the most successful method was square set stoping with timber.

Historical mining methods used in the KHSD have included cut and fill, small scale longhole stoping, shrinkage stoping, and square set stoping. The veins typically have dips around 70 to 80 degrees but vary between deposits from approximately 50 degrees at Lucky Queen to 80 degrees at Flame & Moth.

Numerous geotechnical studies have been carried out on the KHSD most recently by Jacobs Engineering (Jacobs, 2019). Geotechnical data for this study was only available for the Flame & Moth and Bermingham deposits which comprise approximately 94% of the Project mill feed. Operational experience gained during previous production mining at the Lucky Queen and Bellekeno deposits has been used to guide (but not directly influence) the development of geotechnical mine design parameters for the report. At a feasibility level the geotechnical conditions of the Lucky Queen and Bellekeno would need to be verified.

To understand the ground conditions at the KHSD Project, geotechnical domains were created for the Bermingham and Flame & Moth deposits. Preliminary geotechnical parameters were assessed using major lithology types as identified by Alexco geology personnel. The geotechnical domains are outlined below on which ground support designs have been based:

- Domain 1: Quartzite (waste development);
- Domain 2 Schist (waste development);
- Domain 3: Faults (waste and production development); and
- Domain 4: Mineralization (production development).

Based on the estimated rock mass classification Q values, ground support classes were developed for standard lateral development and production drifts for the Flame & Moth and Bermingham deposits. Mining of the Lucky Queen and Bellekeno deposits will exploit existing underground development. For this study, previously used ground support standards or the standards outlined for the Flame & Moth and Bermingham deposits (whichever provides greater capacity) will be used in the limited additional development that is planned. The ground support uses conventional technology; a combination of shotcrete, rock bolts and mesh.

In general, the infrastructure and development excavations are open for the long-term, and support has been designed accordingly. The infrastructure has been designed to avoid areas with potential poor ground conditions; in some situations, this is unavoidable, and support will be increased to provide long term stability.

The mine design strategy for the Project was to design as many areas as practical using small scale longhole mining methods while planning mechanized overhand cut and fill for areas where ground conditions were poor, or where the combination of vein dip and true width was not compatible with longhole stoping methods. A 3D design of the development and stope shapes was completed for all four deposits using Deswik Software.

Based on the orientation, width of the veins, review of historic mining in the District, and geotechnical information, a combination of mechanized overhand cut and fill, and longhole stoping with cemented rock fill has been selected as the appropriate mining methods for all four deposits. The deposits require the use of mining methods that can adequately support the vein and that are flexible and selective while minimizing the direct mining costs. The backfill is planned to be a mixture of waste rock fill and tailings from the DSTF with cement added as required.

For the majority of the mine life two deposits will be providing mill feed at all times. The only exceptions are early in the mine life when only the Bellekeno mine will be producing the mill feed and late in the mine life when the Lucky Queen deposit will be contributing ore feed to the mill. There will be a four month development period at Flame & Moth and a one month development period at Bermingham with steady state production being reached in Year 1 of the 8 year mine life. Steady state production over the 8-year mine life will average about 175,000 tpy.

Revenue comes from selling four metals (silver as main product and lead, zinc and gold as by-products), reporting to two concentrates; a silver lead concentrate and a zinc-silver concentrate. Stope shapes and mining areas were created and manually validated based upon an NSR value per tonne cut-off that was variable by mine and method as shown in Table 1-4. This NSR cut-off value was calculated by using the operating cost estimate. Mining recovery was applied at 95% for Bellekeno, Flame & Moth, Bermingham and Lucky Queen which is in line with Alexco's historic operational experience. All stope shapes and mining areas were reviewed to remove any unprofitable areas.

Table 1-4 Mine Design Criteria – NSR Cutoff Values

Mine	Cutoff Value - MCF ($/t)	Cutoff Value - LHOS ($/t)
Bellekeno	-	365
Lucky Queen	460	-
Bermingham	350	275
Flame & Moth	350	275
Notes; 1.The NSR cutoff value was based on estimated metallurgical recoveries, assumed metal prices and smelter terms, which include payable factors, treatment charges, penalties, and refining charges		

Stope dilution was determined based on available geotechnical data and the use of empirical methods to produce an estimate of the Equivalent Linear Overbreak Slough (ELOS) and contains both planned and unplanned dilution. To factor in unplanned dilution outside of the stope shape boundaries, a dilution skin of 0.5 m was applied to both the hanging wall (HW) and footwall (FW) during the stope optimizer process. This dilution was considered when evaluating whether or not shapes are economic to ensure only diluted economic stope shapes are included in the mine plan.

Internal dilution (Planned Dilution) is primarily a function of the width of the orebody and minimum mining width. Minimum mining width for cut and fill method in both Bermingham and Flame & Moth deposits is 3.5 m wide and for the Lucky Queen deposit is 2.5 m wide which is determined from the size of the equipment selected and consistent with the geotechnical design parameters. For longhole stoping, the minimum mining width is planned at 1.8m. Dilution for the three deposits is: Flame & Moth 11%, Bermingham 33%, Lucky Queen 33%.The underground mine design for all four deposits results in total Probable Mineral Reserves of 1,438,349 t (diluted and recovered) with an average grade of 804 g/t Ag, 2.64% Pb, 0.31 g/t Au, and 3.84% Zn. The overall NSR value for the reserve is $578/t.

A monthly production schedule was generated for each task associated with mine development and production. This schedule was created using Deswik Scheduling software and targeted approximately 12,000 t ore per month coming from two deposits at any given time increasing to 16,000 t ore per month in Q3 2023 to LOM. The total annual mill feed and waste production from the four mines are summarized in Table 1-5 below.

Table 1-5 Mine Production Summary

	TOTAL	2021	2022	2023	2024	2025	2026	2027	2028	2029
ORE TONNES[1]	**1,438,349**	62,057	137,120	166,380	199,980	199,980	199,980	199,980	199,980	72,892
WASTE TONNES	**873,825**	99,456	160,192	187,627	193,520	98,864	48,984	54,876	26,337	3,969
TOTAL TONNES	**2,312,174**	161,513	297,312	354,007	393,500	298,844	248,964	254,856	226,317	76,861
Calculated Average Grade										
Ag (g/t)	**804**	947	1077	909	863	721	777	678	730	623
Au (g/t)	**0.31**	0.16	0.29	0.27	0.34	0.33	0.32	0.31	0.33	0.28
Pb (%)	**2.64%**	5.93%	2.93%	2.92%	3.41%	2.55%	2.23%	2.08%	1.93%	1.41%
Zn (%)	**3.84%**	4.85%	4.63%	3.24%	2.85%	3.52%	3.35%	3.46%	5.02%	5.52%
Calculated Contained Metal										
Ag (Oz)	**37,193,561**	1,889,879	4,748,832	4,861,275	5,551,396	4,636,248	4,995,172	4,360,131	4,691,092	1,459,536
Au (Oz)	**14,196**	313	1,289	1,443	2,156	2,138	2,080	1,987	2,127	662
Pb (lbs)	**83,764,141**	8,116,443	8,843,200	10,702,737	15,041,045	11,260,131	9,829,401	9,179,275	8,522,110	2,269,799
Zn (lbs)	**121,661,361**	6,636,926	13,995,628	11,874,903	12,565,811	15,537,261	14,788,743	15,248,353	22,136,629	8,877,106

Notes:

1. The term “ore” in this document means the total Probable Mineral Reserves as presented in Chapter 15 of this report.

Key equipment requirements during the development and production period will include jumbos, load-haul-dumps (LHDs), haulage trucks, bolters, shotcrete sprayers and longhole drills. Raise development will be carried out using alimaks. Alexco currently owns a large portion of the mining equipment required; the additional major equipment required is assumed to be leased for the Project.

Manpower will consist of technical staff, mining crews, mechanics, electricians, and other support staff. Manpower reaches 225 personnel at full production with up to 130 personnel on site at any given time.

The ventilation system for each deposit is designed to meet Yukon regulations. Permanent fans will be located on surface at the raise collars. All intake air entering the mine workings will be heated above freezing point during the winter months.

1.2.8 METALLURGY AND MINERAL PROCESSING

The KHSD property is of a polymetallic silver-lead-zinc vein type mineralization. There are four deposits included in the mine plan and mill feed. Production will commence with feed from the Bellekeno deposit during the ramp up, followed by ore from both the Flame & Moth and Bermingham deposits, and finally from Lucky Queen. The mill will ramp up to process ore at 400 tpd in the first two years before reaching the peak capacity 550 tpd at year three. Bellekeno material was processed in the District mill at 250 tpd from 2011 and 2013.

Metallurgical test work has been conducted independently on each of the four deposits included in the production plan. Testwork performed from 1996 through 2009 was the basis for the design and construction of the mill facility in 2010. The Bellekeno mine and mill complex achieved commercial production in January 2011, processing an average of 253 tpd in 2012. Since 2011, samples from Lucky Queen, Flame & Moth, and Bermingham deposits were tested to assess flotation performance and inform mill or process modifications.

Based on metallurgical test work described in Section 13.0 and previous operation experience, a conventional sequential flotation process with regrinding stages on both lead and zinc rougher concentrates has been selected for this Project to produce silver-lead concentrate and zinc concentrate. The target primary grind size P80 was designed to be 100 to 120 µm to recover liberated lead and zinc minerals in rougher flotation circuits. A regrind mill in each of the lead and zinc cleaner flotation circuits will be included for further liberation and upgrading.

Based on the mill capacity/modification reviews, modifications to the existing District mill were required in three areas including grinding circuit, flotation circuit, and tailings dewatering circuit. Since the PFS (Alexco, 2020), two regrind mills have been purchased and will be installed prior to processing Bermingham ore, and the new ball mill has been installed and is to be tied in with the new grinding circuit when the higher throughput is required. The larger tailings filter has also been installed and commissioned. To reach the higher rate 550 tpd, campaigns will be run to identify additional modifications in the initial operation. An allowance of $1.1 M has been included in this Project for this purpose.

Ore will be crushed and then processed in a conventional flotation mill producing two concentrates. Concentrates will be thickened, filtered, and trucked off site for sale. Tailings will be also thickened, filtered, and stored in a dry stack tailing facility adjacent to the mill. Process water will be stored in the mill pond adjacent to the mill complex and recycled to the plant for varied applications. A simplified process flowsheet is included in Section 17.0 (Figure 17-2). The primary makeup water source is from the Flame & Moth underground mine which will be treated within the already constructed water treatment plant.

The total concentrate production and grades over the life of mine are shown in Table 1-6. The corresponding expected metallurgical recoveries and total recovered metal are shown in Table 1-7.

Table 1-6 LOM Expected Concentrate Production

	LOM
Ag-Pb Concentrate	
Dry tonnes	62,053
Ag g/t	18,186
Pb %	54.0
Au g/t	3.9
Zn Concentrate	
Dry tonnes	76,398
Ag g/t	750
Zn %[2]	52.8
Notes:	
Notes: 1. Based on the rs presented in Section 15 and mine plan (Section 16). 2. Grades are calculated weighted averages	

Table 1-7 LOM Expected Metal Recovery to Concentrate

	Average Recovery (%)	Total Recovery
Into Ag-Pb Concentrate		
Ag	91.0	33.8 M oz
Pb	88.2	33,508 tonnes
Au	49.0	6,956 oz
Into Zn-Ag Concentrate		
Ag	4.6	1.70 M oz
Zn	73.4	40,491 tonnes
Notes: 1. Based on the total Probable Mineral Reserves presented in Section 15 and mine plan presented in Section 16, metallurgical testing presented in Section 13.		

1.2.9 PROJECT INFRASTRUCTURE

There is considerable infrastructure on site from the previous Alexco mining operations, from 2011 to 2013. This infrastructure has remained either in use (by the site activities for Care and Maintenance) or has been regularly maintained.

In Elsa, there are administrative, training and exploration offices. The nearby Flat Creek camp facilities include bunkhouses, a kitchen facility, recreation facilities, two miners dry facilities, as well as houses at the old Flat Creek town site (part of Elsa).

At the District mill, to the east of Elsa and adjacent to the Flame & Moth portal, there are mine and mill offices and dry facilities, an assay lab, equipment maintenance facility, and the mill and DSTF complex as shown in Figure 1-1 above. A new warehouse will be constructed in Q2 2021.

Power, water, roads, and communications are in place and maintained throughout the site. There is a network of access roads and haul roads throughout the district. Haul roads have been upgraded between Bermingham and the mill, and a bypass constructed around Keno City to reduce traffic and noise for the residents.

There is minimal additional infrastructure required. The capital projects required for mine development, such as ventilation raises, are included in the mine planning and costing.

Offsite infrastructure includes highway access to between Whitehorse and the Keno Hill site as well as to Skagway (for concentrate shipping). Alexco has an administrative office in Whitehorse. No additional offsite infrastructure is required for this Project.

1.2.10 MARKET STUDIES AND CONTRACTS

The principal commodities at KHSD are freely traded at prices that are widely known, so that prospects for sale of any production are virtually assured. Future production will continue to be sold in concentrate form and revenue will be based on terms provided by traders or smelters to which the concentrate is sold. For the economic analysis herein, concentrate sales terms were developed from discussions with various traders or smelters, and compared with other current projects.

Alexco has entered into a number of contracts to support the operations of the Project including:

- Transportation of lead and zinc concentrates to a smelter in North America and to back haul supplies to the site;
- Yukon Energy Corp. provides power under contract to various substations located across Keno Hill;
- Consumables such as propane, fuel, and reagents; and
- Services including camp and catering services, drilling (exploration) and mine development.

1.2.11 ENVIRONMENTAL STUDIES, PERMITTING, AND SOCIAL OR COMMUNITY IMPACT

Alexco and its wholly-owned subsidiary, ERDC, have a unique commercial agreement with the GoC in which Alexco is responsible for the care, maintenance, and closure of the historical mines, with government and company funding provided to address the historical liabilities. Under the agreement, Alexco is indemnified from the historic environmental liabilities. Alexco, along with territorial, federal, and First Nation governments, is responsible for developing a District-wide closure plan that addresses these historic environmental liabilities arising from past mining activities. The Reclamation Plan completed the Yukon environmental assessment process under the Yukon Environment and Socio-economic Assessment Act (YESAA) in 2020 and is currently entering into water licencing. That work is not part of this Technical Report.

All permitting and licencing applications are complete for the activities contemplated in this report.

1.2.11.1 Environment and Water Quality

The KHSD has an extensive database of environmental monitoring and environmental impacts assessments, going back twenty years in some areas. This is in large part due to the historic operations and the reclamation planning requirements. The additional environmental requirements for both operations and closure have been clearly defined through the permitting processes.

Geochemical and water quality studies consistently show that the site is not a source of acid rock drainage. However, oxidation of sulphides and metal leaching under circumneutral conditions does occur, with local zones of acidity in areas of higher sulphide material, particularly proximal to the mineralized veins. The tailings are neither net acid generating nor a source of metal leaching. Tailings are deposited in a lined dry stack tailings facility which is progressively reclaimed during operations. There are comprehensive waste management, water management and monitoring programs defined by permits and in effect on site to ensure compliance with water licence requirements.

1.2.11.2 Environmental Assessment and Permitting

The Bellekeno, Bermingham, and Flame & Moth mines have all permits and authorizations in place for full scale mine production. The Quartz Mining Licence is in place for Lucky Queen, however a minor amendment will be required to the Water Licence to commence production from Lucky Queen. The Quartz Mining Licence is also in place for Onek, although there are currently no plans to bring this deposit into production. The existing approvals and amendments are for mill throughput of 400 tpd (based upon a 12-month average); an amendment to the QML would be required to increase mine throughput to 550 tpd.

1.2.11.3 Community and First Nations

The KHSD is situated in the traditional territory of the First Nation of Nacho Nyak Dun (FNNND). Alexco meets regularly with stakeholders and First Nations regarding their ongoing operations as well as the new plans, presenting detailed information about the site operations, and seeking expression of concerns and interests.

Alexco has signed a Comprehensive Cooperation and Benefits Agreement (CCBA) with the FNNND that recognizes the rights, obligations, and opportunities of the two parties. The Agreement includes detailed discussion about respecting and protecting the environment, including enhanced opportunities for FNNND to be involved in environmental management of all operations, from mining through to closure and reclamation. There are regular business meetings between Alexco and the FNNND to review matters under the Agreement.

1.2.11.4 Mine Reclamation and Closure

An updated AKHM Reclamation and Closure Plan was approved by the Government of Yukon (YG) in 2018 that encompasses all of the active mining and processing activities in the KHSD (Alexco, 2018). Alexco will have a site presence for many years while reclamation of the historical liabilities occurs. Therefore, monitoring of the Bellekeno, Lucky Queen, Flame & Moth, and Bermingham mine areas can be integrated with KHSD monitoring programs over the long term. This is expected to improve the efficiency of these ongoing water treatment and monitoring activities.

YG requires financial security in the form of a letter of credit to cover potential liabilities associated with the cost of reclamation and closure. Alexco has posted a total of $10.2M of security for the Bellekeno, Bermingham, Lucky Queen, Flame & Moth, and Onek mine operations, the mill area, and the DSTF. This total follows a third-party review of Alexco's costs under the QML-0009 and all requirements under Water Licence QZ18-044.

1.2.12 CAPITAL AND OPERATING COSTS

Capital costs were developed by Alexco, and the QPs from Mining Plus and Tetra Tech (process plant only). The QPs from Mining Plus and Tetra Tech reviewed the costs in detail and modified as required to be consistent with a PFS level study and the Project. All costs are in Canadian (CA$) dollars unless otherwise noted. Mining Plus considers the accuracy of capital cost estimate components to be at a prefeasibility level of +/- 25%. A 12.5% contingency has been included in the capital cost estimate based upon a review of the capital estimate details.

The capital cost estimates are based primarily on quotations by vendors on equipment, mill modifications, materials, and supplies. The remaining estimates were developed from first principles and previous site experience. Escalation has not been included in the estimate. The capital cost estimates were generated by Alexco and were reviewed and modified based upon detailed review by the QP.

The capital costs include the completion of development of the Flame & Moth deposit, completion of development of the Bermingham deposit and the reopening of the Lucky Queen plus the necessary modifications to process plant and infrastructure for ramping up operations. The working (pre-positive monthly cash flow) capital cost of $10.0 M comprises the following cost components: $13.0 M of mine development, PP&E (property, plant and equipment), mill upgrades, site wide infrastructure modifications and contingency costs, plus an additional $19.3 M of capitalized operating costs. The costs incurred during the working capital period are offset by the $22.3 M in revenue generated to produce a net working capital of $10.0 M prior to reaching positive cash flow. This net working capital covers the first five month period of mine development and mill ramp up from April 2021 to Aug 2021.

Total sustaining capital including underground development and PP&E is estimated to be $95.6 M which excludes the working capital of $10.0 M. The sustaining capital is mainly the major mine development in the deposits to be mined.

The LOM direct operating costs total $436 M comprising $277 M of direct mine costs (primarily mine development), $80.0 M of direct processing costs, and $79 M for site G&A costs (excluding corporate) as shown in Table 1-8. This corresponds to a LOM unit cost of $310 per tonne of ore. These costs were developed by Alexco and reviewed by the QPs from Mining Plus (model and all components except processing plant) and Tetra Tech (processing plant only). Operating costs do not include contingency and are in Canadian dollars. Operating costs are based on vendor quotations or build up from first principles estimates.

Table 1-8 Life of Mine Direct Operating Cost Summary

Area	LOM Site Opex ($ M)	Unit Cost ($/tonne milled)
Mine	$277	$196
Mill	$80	$57
G&A	$79	$56
LOM Total Site	$436	$310

Notes:
1. Excludes working capital period from April 2021 to Aug 2021

1.2.13 ECONOMIC ANALYSIS

The Project presented herein will process 1.44 M t of mill feed (the Probable Mineral Reserves) and produce two concentrates; 62,053 t of Ag-Pb concentrate and 76,398 t of Zn-Ag concentrate. The LOM total payable Ag in concentrate is 33.5 M oz. At the upgraded processing throughput averaging 483 tpd over the mine life, the current project life totals 8 years and 2 months. The Project economics are based on assumptions for marketing of concentrate directly to a smelter. This financial analysis does not include any sunk costs for exploration and project advancement prior to the effective date of this study.

The project value is determined on a pre-tax and after-tax basis at 5% discount rate with the following additional economic criteria:

- Metal prices as shown in Figure 1-4;
- 25% of silver is sold to Wheaton Precious Metals Corp. (Wheaton) under a streaming agreement at a price ranging from US$2.41/oz to US$5.46/oz silver;
- NSR includes shipping, treatment, and refining costs;
- There is a 1.5% NSR (to a maximum of $4 M) to the GoC;
- Revenue is recognized at the time of production; and
- Revenue is generated in Month 1 and a further 5 month Working Capital period (Apr 2021 – Aug 2021) will be required until the operation is cash-flow positive.

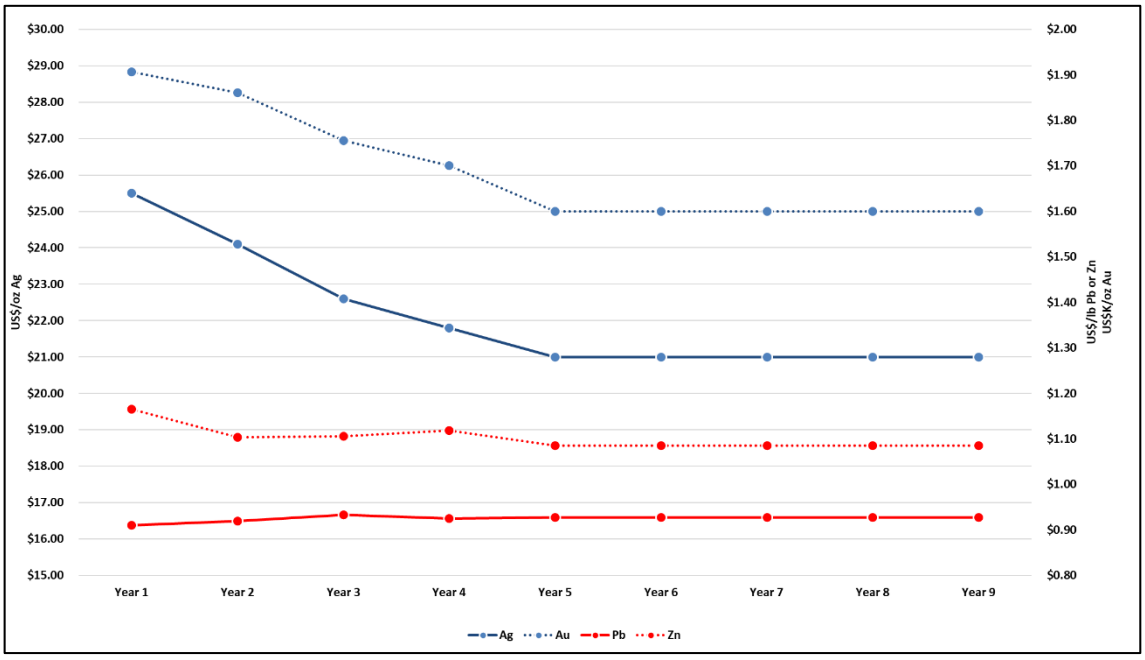


Figure 1-4 Metal Price Projection

An exchange rate of $0.781 US$/CA$ in Year 1, increasing to $0.787 US$/CA$ in Year 2, decreasing to $0.781 US$/CA$ in Year 3 and then holding at $0.775 US$/CA$ from Year 4 for long-term was assumed to convert US$ market price projections and particular components of the initial capital cost estimates into CA$. No provision was made for the effects of inflation. Current Canadian tax regulations were applied within the financial model by Alexco Management with support from Alexco's tax advisors.

1.2.14 CASH FLOW ANALYSIS

Considering the Project on a stand-alone basis, the undiscounted after-tax cash flow totals $189.7 M over the mine life. Simple payback occurs approximately 15 months from start of production, approximately 10 months after the project start date of April 1, 2021.

An estimate of the LOM AISC per contained Ag oz on a by-product basis was calculated. Corporate G&A after mine closure is not considered in the project economic evaluation. All costs below are calculated in United States Dollars (US$). Metal price and foreign exchange assumptions are presented in Section 22.1. The AISC is US$11.59/contained oz Ag. Pricing and AISC assumptions are detailed in Section 21.3.

The after-tax NPV_5 is $154.3 M, and the after-tax IRR is 295%. The pre-tax NPV_5 is $210.4 M, and the pre-tax IRR is 326%.

1.2.15 SENSITIVITY ANALYSIS

Project risks can be identified in both economic and non-economic terms. Key economic risks were examined by running cash flow sensitivities:

- Silver price;
- Silver recovery;
- Exchange rate;
- Silver head grade;
- Operating costs; and
- Capital costs.

After-tax NPV and IRR sensitivity over the base case has been calculated for a range of variations. The after-tax sensitivities are shown in Table 1-9. The after-tax sensitivities are shown in Table 1-1, Figure 1-5, and Figure 1-6.

From both NPV and IRR analysis, project value is most sensitive to Ag head grade and Ag recovery. For ±10% variance in Ag head grade, project NPV can vary by ±26%. For ±10% variance in Ag recovery, project NPV can vary by ±25%. With the historical data from Alexco on mill performance, there is sufficient confidence in the recovery estimation. It is recognized that the various mill feed ore sources considered in this evaluation (from different properties) represent slight variances in mineral composition, however this does not constitute major risk in terms of silver recovery or project cashflows.

Project value is also sensitive to silver price, a ±10% variance in silver price resulted in a ±24% variance in NPV.

Table 1-9 After-Tax Results of Sensitivity Analysis

Project Variables	Factors (%)	5% NPV ($M)	IRR (%)
Silver Price (US$/oz)	-30%	$27	29%
	-20%	$77	83%
	-10%	$117	164%
	0%	$154	295%
	10%	$191	509%
	20%	$228	879%
	30%	$265	1549%
Silver Recovery (%)	-30%	$25	28%
	-20%	$75	85%
	-10%	$116	168%
	0%	$154	295%
	10%	$192	489%
	20%	$230	792%
	30%	$267	1281%
Silver Head Grade (g/t)	-30%	$18	22%
	-20%	$72	78%
	-10%	$114	160%
	0%	$154	295%
	10%	$194	519%
	20%	$234	912%
	30%	$273	1646%
Operating Cost ($'000)	-30%	$225	720%
	-20%	$202	525%
	-10%	$178	391%
	0%	$154	295%
	10%	$131	221%
	20%	$107	165%
	30%	$83	122%
Capital Cost ($'000)	-30%	$182	661%
	-20%	$173	488%
	-10%	$164	374%
	0%	$154	295%
	10%	$145	237%
	20%	$135	194%
	30%	$126	160%

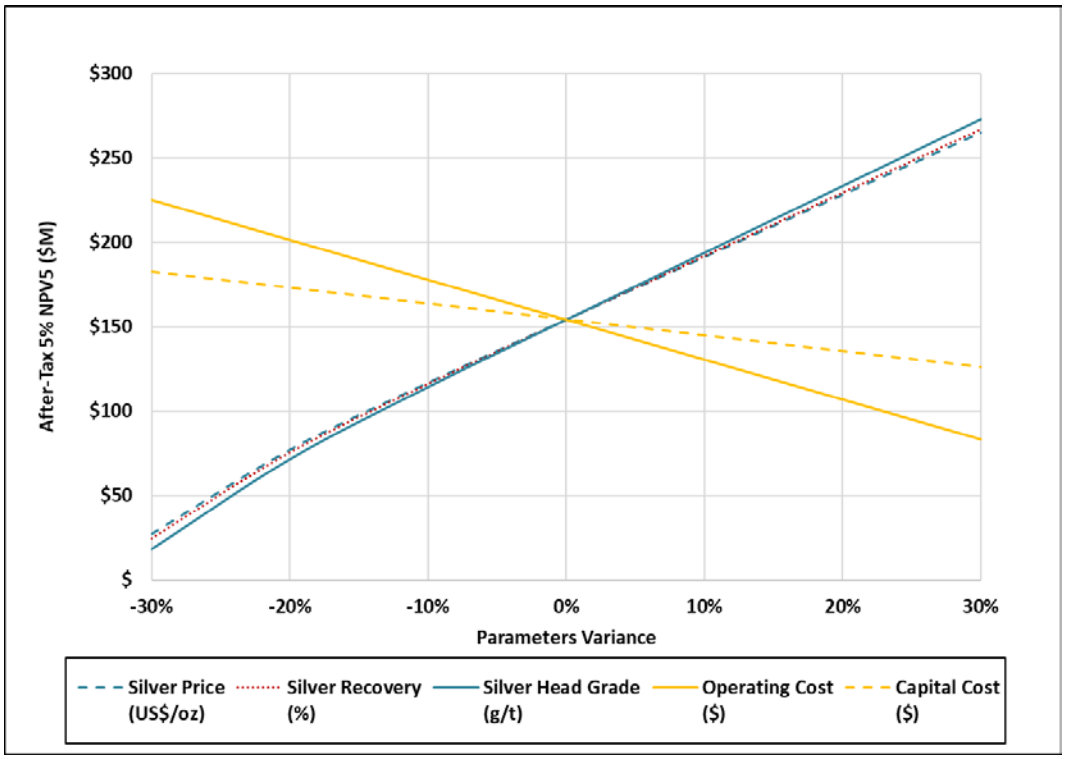


Figure 1-5 After-Tax 5% NPV Sensitivity

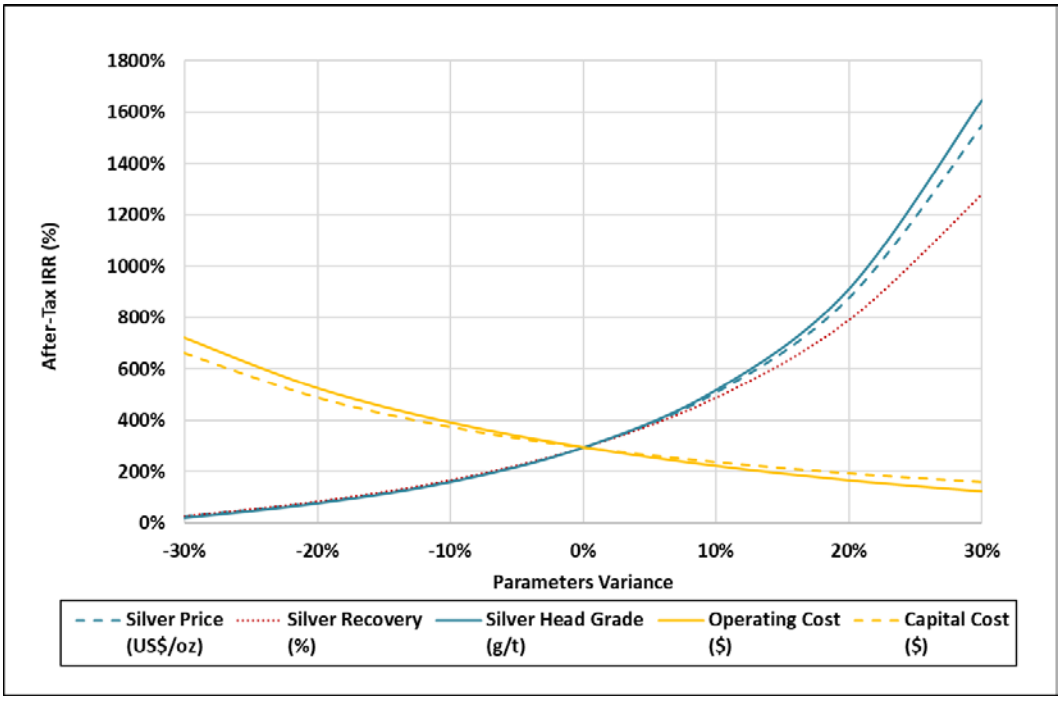


Figure 1-6 After-Tax IRR Sensitivity

Amongst the selected parameters, project value is least sensitive to capital cost. The result is reflective of the low project capital requirements, leveraging the existing development and infrastructure.

1.3 RECOMMENDATIONS

The authors provide the following recommendations, the majority of which are opportunities to improve the level of detail for the next stage of project study:

- The QP's from Mining Plus and SRK consider that there is an opportunity to extend the mine life via an update of the Mineral Resources. Additional drilling and sampling may enable the *in situ* remaining Resources (net of Reserves) to be converted to Reserves;
- The QPs from Tetra Tech consider that more detailed metallurgical predictions of production could be achieved with additional variability locked cycle testing of different blends (that is, of ore from different mines) according to the LOM production plan. There may be an opportunity to improve concentrate grades with further testing;
- During the first year of operation, it is recommended that the Company conduct campaigns of higher plant throughout above the 400 tpd to identify potential bottlenecks and requirements for mill modifications to achieve 550 tpd throughput;
- Additional work on the geomechanics is recommended at a feasibility level including verification of the geotechnical conditions of the LQ and BK, and 3D inelastic modeling to confirm stope geometry stability and extraction sequence. It is recommended that geotechnical mapping and estimation of Q values, along with collection of excavation performance should commence once development begins; and,
- The QP from Mining Plus recommends that due to the multiple orebodies to be mined, along with their varying grade, that a comprehensive global optimization process be done. This should consider timing of Lucky Queen orebody development as well as the timing of increasing the mill capacity.

2. INTRODUCTION

2.1 TERMS OF REFERENCE AND PURPOSE OF THIS REPORT

Mining Plus was retained by Alexco to update the PFS and Independent Technical Report on the Keno Hill Silver Project that was published in February 2020. The purpose of this independent report, entitled 'Technical Report on Updated Mineral Resource and Reserve Estimate of the Keno Hill Silver District', is to disclose the results of that work and replace the preceding Alexco 2020 report. This Technical Report conforms to NI 43-101 Standards of Disclosure for Mineral Projects.

Alexco is a public company with its headquarters in Vancouver, B.C. Alexco, through wholly owned subsidiaries, owns the mineral rights for the Keno Hill Silver District (KHSD) following its successful bid for the assets of the bankrupt United Keno Hill Mines Ltd. in 2006. Alexco Keno Hill Mining Corp. (AKHM) is a wholly-owned subsidiary of Alexco and has been incorporated for operation of mineral extraction and development in the KHSD. Elsa Reclamation and Development Company Ltd. (ERDC), a wholly owned subsidiary of Alexco, continues to advance the development and eventual implementation of the District Wide Closure Plan (ESM Reclamation Plan) which addresses the historic environmental liabilities of the district from past mining activities. The potential liabilities associated with the historic operations in the KHSD are indemnified by the Government of Canada under the terms and conditions of the commercial agreement subject to the requirement for ERDC to develop, permit and implement the site Reclamation Plan.

In 2010, Alexco constructed a 408 tpd capacity conventional flotation processing plant and the commenced mining at the Bellekeno deposit. In 2014, a PEA was published for the Bellekeno, Flame & Moth, and Lucky Queen deposits (SRK, 2014). With low metal prices, Alexco maintained the Project on a care and maintenance status and focused on additional exploration leading to increases in the Mineral Resources for the Bermingham and Flame & Moth deposits.

In 2017, Alexco published an updated Preliminary Economic Assessment (PEA) for the Bellekeno, Flame & Moth, Lucky Queen and Bermingham deposits. Continued exploration and drilling resulted in updates to the Mineral Resources, with the most recent Mineral Resource Statement issued in the news release of Sept 20, 2018. The revised Bermingham Mineral Resource was included in the PFS (Alexco, 2020) and this study for a 400 tpd operation including the Flame & Moth, Bellekeno, Bermingham, and Lucky Queen deposits. The Bellekeno resource was updated to deplete material mined up to end of December 2020, and for metal price and foreign exchange.

This report is considered by Mining Plus to meet the requirements of a PFS level Technical Report as defined in Canadian NI 43-101 regulations. This report provides Mineral Resource and Mineral Reserve estimates. Classification of resources and reserves prepared in accordance with the Canadian Institute of Mining, Metallurgy and Petroleum Standards on Mineral Resources and Reserves: Definitions and Guidelines, May 10, 2014. (CIM, 2014). There is no certainty that economic forecasts on which this technical report is based will be realized.

2.2 QUALIFICATIONS OF CONSULTANTS

The consultants preparing this technical report are specialists in the fields of geology, exploration, Mineral Resource and Mineral Reserve estimation and classification, underground mining, geotechnical, environmental, permitting, metallurgical testing, mineral processing, processing design, capital and operating cost estimation, and mineral economics.

All Qualified Persons (QPs) listed are deemed independent according to 43-101 guidelines. The results of this technical report are not dependent upon any prior agreements about the results or the conclusions to be reached. All work completed for this report has been done in accordance with normal professional consulting practice.

The following individuals, by virtue of their education, experience, and professional association, are considered QPs as defined in the NI 43-101 standard, for this report, and are members in good standing of appropriate professional institutions. The QPs responsible for this technical report are:

Mr. Zach Allwright, P.Eng., MBA, and Director - North America for Mining Plus Canada Consulting Ltd., is the author of the Technical Report and responsible for the preparation of Sections 21 pertaining to Mining Capital and Operating Costs and Section 22 of the Technical Report.

Mr. Kourosh Tarighi, P.Eng., Principal Mining Consultant for Mining Plus Canada Consulting Ltd. Mr. Tarighi is responsible for the preparation of Sections 1-5, 15-16 (with the exception of 16.2), 18-20 and 23-27 (with the exception of 26.3) of the Technical Report.

Dr. Paul Hughes. PhD, P.Eng., and Principal Geotechnical Consultant for Mining Plus Canada Consulting Ltd is responsible for Sections 16.2 and 26.3 of this report.

Dr. Gilles Arseneau reviewed the geology, exploration, drilling sampling, assaying, and resource estimate work. He is responsible for Sections 6 through 12, and the portions of Section 14 of the report related to the Flame & Moth, Lucky Queen, and Onek deposits and relevant portions of Section 26.

Mr. Cliff Revering, P.Eng, reviewed the geology, sampling protocols, and assay data for the Bermingham deposit, and inspected the geology and mineralization exposed within the Bellekeno underground workings. Mr. Revering conducted the 2018 Mineral Resource estimate for the Bermingham deposit and was responsible for relevant portions of Section 14 and Section 26 pertaining to the Bermingham deposit. Mr. Revering has also peer reviewed the 2021 updated Mineral Resource estimate for the Bellekeno deposit completed by Alexco Resource Corp., and has reviewed the relevant portions of Section 14 pertaining to the Bellekeno deposit.

Mr. Hassan Ghaffari, P.Eng, M.A.Sc., and Director, Metallurgy for Tetra Tech Canada, reviewed the metallurgical testwork and performance and was responsible for Section 13, 17 and the portions of Sections 1, 21, 22, 25, and 26 related to the metallurgy and mill performance.

Site visits in 2019 were carried out by representatives of Mining Plus as follows:

- Mr. Kourosh Tarighi, Principal Mining Consultant, on February 13, 2019 and included site tours and discussions with Mr. Neil Chambers, Senior Mining Engineer from Alexco.

Site visits have previously been carried out by SRK Consulting Canada as follows:

- Dr. Gilles Arseneau, most recently from September 12 to 14, 2016, and included discussions with Alexco personnel Mr. Seymour Iles (Keno District Exploration Manager), Mr. Al McOnie, Vice President Exploration FAusIMM, and Mr. Brad Thrall, President of Alexco; and,
- Mr. Cliff Revering, P.Eng., Principal Consultant, SRK (Canada) Consulting from July 24 to 27, 2018 and included discussions with Alexco's Mr. Seymour Iles (Keno District Exploration Manager), Mr. Alan McOnie, FAusIMM, Alexco's Vice President, Exploration and Mr. Brad Thrall, President of Alexco.

The site visit and inspection by Tetra Tech were completed by Mr. Hassan Ghaffari from March 31 to April 2, 2008, and included discussions with Mr. Brad Thrall, President of Alexco and Alexco's process team at the time.

The documentation reviewed, as well as other sources of information, are included in Section 27.

2.3 SOURCES OF INFORMATION

This report has been prepared by Mining Plus Canada Consulting Ltd. (Mining Plus) of Vancouver for Alexco Resource Corp. (Alexco). The information, conclusions, opinions, and estimates contained herein are based on:

- Information available to Mining Plus at the time of preparation of this report including supporting information from the Alexco PFS 2020 and internal (Alexco) technical reports;
- Documentation for licencing and permitting, published government reports, and public information as included in the References section of this report (Section 27) and cited in this report;
- Assumptions, conditions, and qualifications as set forth in this report; and
- Data, reports, and other information supplied by Alexco and other third-party sources as listed below.

Discussions in relation to past and current operations at the KHSD were held with the following personnel:

- Brad Thrall, President, Alexco;
- Linda Broughton, Vice President Technical Services, Alexco;
- Neil Chambers, Chief Mining Engineer, Alexco;
- Seymour Iles, Keno Hill District Exploration Manager, Alexco; and
- Al McOnie; Vice President Exploration, Alexco.

The third-party sources providing information in support of this document are:

- SRK Consulting (Canada) Inc.;
- Tetra Tech (Canada);
- Geotechnical Parameters:
    - Keno Hill Silver District-Pre-Feasibility Study Geotechnical Engineering. Project No. DMNY5500 Rev #2 March 21, 2019, prepared by Jacobs Engineering Group Inc;
- Metallurgical laboratory testing including:
    - An Investigation into The Flotation of Samples from The Bermingham and Christal Zone Deposits, prepared for Alexco Resource Corp. Project 15774-002 – SGS Final Report #2 March 15, 2019 prepared by SGS Canada Inc.;
    - An Investigation into the Flotation of Samples from the Bermingham Deposit, prepared for Alexco Resource Corp. Project 15774-001 – SGS Final Report October 25, 2018 prepared by SGS Canada Inc.; and
    - An Investigation into The Comminution and Flotation of Samples from the Lucky Queen and Flame & Moth Deposits prepared for Alexco Resource Corp. Project 15774-002 – SGS Final Report, November 29, 2018.

3. RELIANCE ON OTHER EXPERTS

This report has been prepared by Mining Plus Canada Consulting Ltd. (Mining Plus) of Vancouver for Alexco Resource Corp. (Alexco). For the purpose of this report, Mining Plus has relied on ownership and land tenure information as of December 22, 2020 provided by Alexco, for Sections 1 and 4 of this Technical Report. Mining Plus has not researched property title or mineral rights for the District and expresses no opinion as to the ownership status of the property.

Mining Plus has relied on Alexco for guidance on applicable taxes, royalties, and other government levies or interests that are, or may be, applicable to revenue or income from the Project.

Except for the purposes legislated under provincial securities laws, any use of this report by any third party is at that party's sole risk.

4. PROPERTY DESCRIPTION AND LOCATION

4.1 LOCATION

The Keno Hill Silver District is located in the central Yukon. The site covers an area of approximately 15,000 ha and is located approximately 350 km north of Whitehorse, Yukon, Canada (Figure 4-1) in central Yukon (63° 54' 32" N, 135° 19' 18" W; NTS 105M/14 & 105M/13). The site is located in the traditional territory of the First Nation of Na-Cho Nyäk Dun (FNNND).

Access to the property is via the Alaska, Klondike and Silver Trail highways from Whitehorse to Mayo (407 km), and an all-weather gravel road northeast from Mayo to Elsa (45 km); a total distance of 452 km.

The property lies along the broad South McQuesten River valley on three prominent hills to the south of the valley; on and around Galena Hill, Keno Hill, and Sourdough Hill, collectively known as the KHSD. The Bermingham deposit is located on Galena Hill (Figure 4-2). The Lucky Queen and Onek mines are located on Keno Hill, while the Bellekeno mine is located on Sourdough hill. The Flame & Moth mine and the Keno Hill District Mill are located at the headwaters of Christal Creek.

Alexco has exploration, maintenance, and camp facilities near the location of the historic mining town of Elsa, which is located just off the Silver Trail Highway, and administration, mill and mine facilities at the mill complex located near Keno City. The KHSD is supplied with electrical power by Yukon Energy Corporation from two hydroelectric plants near Mayo as well as an interconnection to the larger Whitehorse hydropower generating facility. The area is covered by NTS map sheets 105M/13 and 105M/14.

4.2 MINERAL TENURE

Mineral exploration in the KHSD area was initially permitted under the terms and conditions set out by the Government of Yukon (YG) in the Class 3 Quartz Mining Land Use Permit LQ-00186, issued on July 5, 2006 and valid until July 4, 2011. Alexco subsequently obtained a Class 4 Quartz Mining Land Use Permit – LQ-00240 on June 17, 2008. The two permits were amalgamated on December 8, 2008 under LQ-00240, which has subsequently been renewed as Class 4 Mining Land Use Approval LQ00476 on June 17, 2018.

All quartz mining leases and Crown Grants have been legally surveyed; the quartz mining claims have not been legally surveyed. The KHSD quartz mining claims and quartz mining leases are held by one of two wholly-owned subsidiaries of Alexco: Elsa Reclamation & Development Company Ltd. (ERDC) or Alexco Keno Hill Mining Company Ltd. (AKHM), except for holding a 50% share with third party individuals in three leases (Rico, Kiddo and Argentum). Details are included in Appendix A.

The total Alexco Keno Hill property quartz mineral holdings as of December 22, 2020, excluding the mineral claims that are the subject of the separate technical report titled Mineral Resource Estimation Elsa Tailings Project Yukon, Canada, by SRK dated June 16, 2010, covers an area of 238.12 km^2, and comprises 703 quartz mining leases, 867 quartz mining claims and two Crown Grants as shown in Figure 4-3 (also attached separately with claim label detail in Appendix A).

Figure 4-1 Keno Hill Silver District Location Map

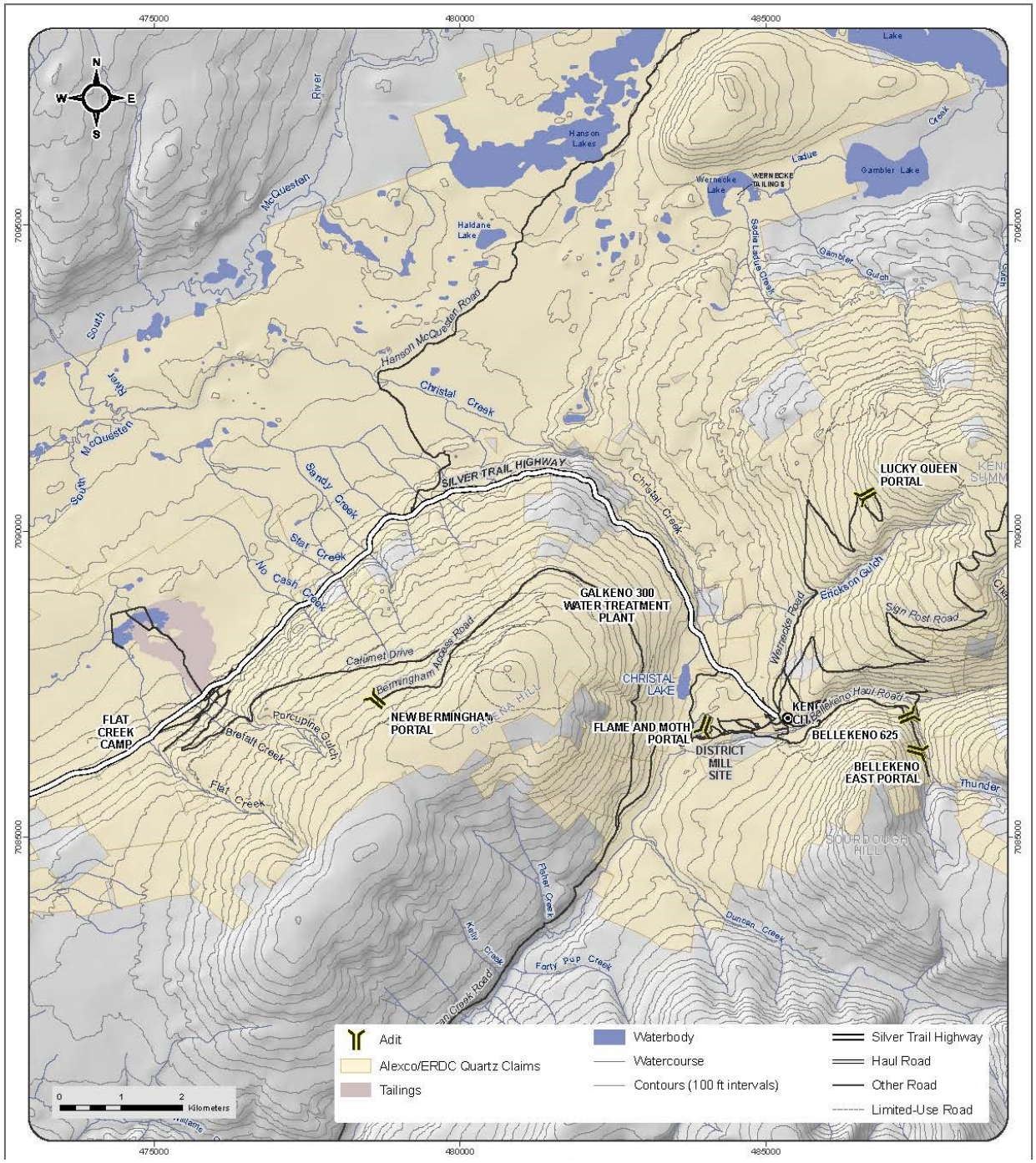


Figure 4-2 Keno Hill Silver District Mining Operations Area Overview

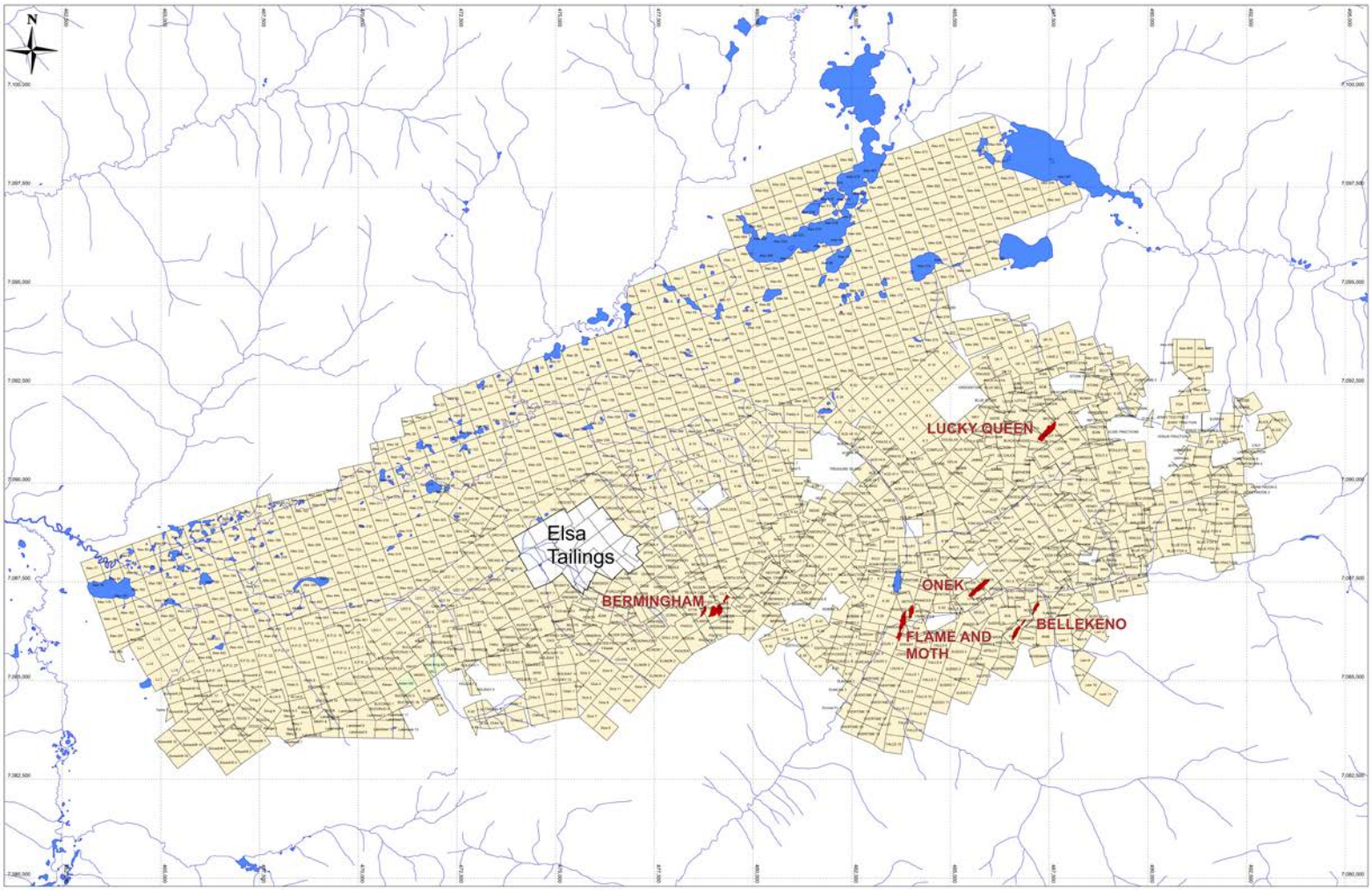


Figure 4-3 Alexco Quartz Mining Claim and Lease Holdings in the Keno Hill Silver District Excluding the Tailings Property

The Bellekeno mine is centred at Latitude 63.90853 degrees north; Longitude 135.26201 degrees west. The mineral Resources for the Bellekeno deposit reported herein are located on the following quartz mining leases: SAM 55327, TUNDRA 12838, WHIPSAW 14081, and NOD FR. 16170.

The Lucky Queen deposit is centred at Latitude 63.94786 degrees north; Longitude 135.25421 degrees west. The Mineral Resources for the Lucky Queen deposit are located on the following quartz mining leases: ANTHONY 12909, OK FRACTION 13094, UNCLE SAM 12923, MATHOLE 12937, and MAYO 12919.

The Flame & Moth deposit is centred at Latitude 63.90588 degrees north; Longitude 135.32931 degrees west. The Mineral Resources for the Flame & Moth deposit are located on the MOTH, FLAME, FRANCES 5, and FRANCES 7 quartz mining leases and the BLUE claim.

The Onek deposit is centred at Latitude 63.91293 degrees north; Longitude 135.29134 degrees west. The Mineral Resources for the Onek deposit are located on the following quartz mining leases: FISHER, ELI, GALENA FARM, and LONE STAR.

The Bermingham deposit is centred at Latitude 63.908° N, Longitude 135.434° W. The Mineral Resources for the Bermingham prospect reported herein are located on the ATLANTIC, ARCTIC, ETTA, and MASTIFF quartz mining leases.

4.3 UNDERLYING AGREEMENTS

4.3.1 ALEXCO/ERDC PURCHASE AGREEMENT

Alexco's rights to the majority of the KHSD are held through the ERDC and AKHM, both wholly-owned subsidiaries of Alexco Resource Corp.

United Keno Hill Mines (UKHM), the previous owner of the properties ceased operations in 1989. In January 2001, the Minister of the Department of Indian Affairs and Northern Development (DIAND) exercised his authority under the *Yukon Waters Act* by issuing a determination that the mine had been abandoned. In October 2001, the site was declared a Type II Site under the Devolution Transfer Agreement, which meant that Yukon would manage the property, but financial responsibility for environmental liabilities would remain with the Government of Canada.

In June 2005, PricewaterhouseCoopers (PwC), a court appointed interim receiver and receiver-manager of United Keno Hill Mines Limited and UKH Minerals Limited (collectively UKHM), selected Alexco as the preferred purchaser of the assets of UKHM. In February 2006, following the negotiation of a Subsidiary Agreement between the Government of Canada, the Government of Yukon, and Alexco, the Supreme Court of Yukon approved the purchase of the assets of UKHM by Alexco through its wholly-owned subsidiary ERDC.

The UKHM assets comprised two Crown grants, 674 mining leases, 289 mineral claims, a concentration plant, various buildings and equipment, as well as partial ownership interest in three mining leases, 36 mineral claims, in addition to a leasehold interest in one mineral claim. Title to all UKHM assets was transferred to Alexco in late November 2007, following the approval of a Type B Water Licence by the Yukon Water Board. All quartz mining leases have been legally surveyed, whereas most of the quartz mining claims have not.

Under the agreement, ERDC is responsible for ensuring that the site remains in compliance with the terms and conditions of the Water Licence, and all applicable environmental laws. The commercial agreement requires ERDC to

develop and implement a Reclamation Plan for the District, and to retain the liabilities of the UKHM site subject to indemnification by the Government of Canada. Under the commercial agreement, Government of Canada, as represented by Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC), retain the obligation for funding for the Reclamation Project.

The commercial agreement also allows Alexco to undertake exploration of the UKHM site and undertake active mining. In the event that Alexco wishes to designate a portion of the UKHM site for development and production (a "Production Unit"), agreements between CIRNAC and ERDC will govern which party is responsible for the costs of reclamation and water-related components of that Production Unit. One such Production Unit was declared in 2011 for the Bellekeno mine and the District Mill effective as of the start of commercial production.

4.3.2 OTHER UNDERLYING AGREEMENTS AND CONTRACTS

Future production from the Project is subject to a 1.5% NSR royalty, capped at $4.0 M, payable to the Government of Canada. This royalty is a condition of the Subsidiary Agreement. Payment of the royalty does not begin until all pre-production capital has been recouped plus an additional allowance for the Project exploration of approximately $6.2 M.

Alexco and Wheaton Precious Metals Corp. (Wheaton) entered into a Share Purchase Agreement on October 2, 2008 whereby 25% of all future silver production from the KHSD properties owned or controlled by Alexco at the time of the consummation of the SPA will be delivered to Wheaton in exchange for a payment of US$3.90/oz as well as a payment by Wheaton of US$50 M for use in the development and construction of the Bellekeno mine.

Subsequently, on March 29, 2017 and August 5, 2020, Alexco and Wheaton amended the SPA (the Amended SPA), which ultimately culminated in Wheaton continuing to receive 25% of the life of mine payable Ag from the Keno Hill with a new production payment to be based on a new payment formula (the Amended Production Payment) as outlined below:

i. During the earlier of the initial two years ending August 4, 2022, or eight million ounces of payable Ag production (the Initial Period), the Amended Production Payment from Wheaton to Alexco will be adjusted on a curve. The Amended Production Payment formula during the Initial Period is a linear equation that pays 90% of spot price at US$15 per ounce Ag (and below) and 10% of spot price at US$23 per ounce Ag (and above); and,

ii. Following the Initial Period, the Amended Production Payment formula remains a linear equation and will pay 90% of spot price at US$13 per ounce Ag (and below) and 10% of spot price at US$23 per ounce Ag (and above).

Other underlying agreements and contracts are discussed in Section 19.

4.4 PERMITS AND AUTHORIZATIONS

The Bellekeno, Bermingham, and Flame & Moth mines have all permits and authorizations in place to commence full scale mine production. The Lucky Queen deposit has in place a Quartz Mining License (QML-0009) which authorizes mining operations, but Water Licence QZ18-044 would require an amendment before water based activities for Lucky Queen can proceed. The key permits for the activities at KHSD are summarized in Table 4-1.

Table 4-1 Relevant Assessment and Regulatory Approvals

Purpose	YESAA Approval	Quartz Mining Act Approval	Water Use Licence
Alexco Keno Hill Mining Permits			
Bellekeno Advanced Exploration	Project # 2008-0039 Decision Document	Class 4 Mining Land Use Approval (LQ00476, expires 2028)	Type B Water Use Licence QZ07-078/Amendment 1 QZ10-060, licence cancelled in 2015 as authorizations moved to amended type A Water Licence in 2015[2]
Bermingham Advanced Exploration	Project#2017-0086 Decision Document	Class 4 Mining Land Use Approval (LQ00476, expires 2028)	Schedule 3 Notice of Water Use/Deposit of a Waste without a Licence
Bellekeno Mine Production	Project # 2009-0030 Decision Document	Quartz Mining Licence (QML-0009, amendment 2, expires 2037)[1]	Type A Water Use Licence QZ18-044 issued, , Expires 2037[2]
Onek and Lucky Queen Mine Production	Project#2011-0315 Decision Document	Quartz Mining Licence (QML-0009, amendment 2, expires 2037)[1]	Type A Water Use Licence QZ09-092, amendment 2 expires 2020[2]
Flame & Moth Mine Production	Project # 2013-0161 Decision Document	Quartz Mining Licence (QML-0009, Amendment 2, expires 2037)[1]	Type A Water Use Licence QZ18-044 issued, Expires 2037[2]
Bermingham Mine Production	Project#2017-0176 Decision Document	Quartz Mining Licence (QML-0009, Amendment 2, expires 2037)[1]	Type A Water Use Licence QZ18-044 issued, Expires 2037[2]
Elsa Reclamation and Development Company Permits			
Care and Maintenance	Project # 2006-0293 and 2012-0141	N/A	Type B Water Use Licence QZ17-076 expires 2022[b]
Reclamation Plan	Project #2011-0187 Decision Document (construction and operation of land treatment facility) Project #2012-0077 Decision Document (building demolition) Project #2018-0169 Decision Document (Reclamation Plan implementation)	N/A	Submitted application QZ21-012 to Water Board following issuance of YESAB Decision Document for Project #2018-0169

Notes:
1. https://emr-ftp.gov.yk.ca/emrweb/COMM/major-mines/keno-hill/mml-keno-qml-0009-nov2019.pdf
2. http://www.yukonwaterboard.ca/waterline/

4.5 ENVIRONMENTAL LIABILITIES

Under the commercial agreement with the Government of Canada, responsibility for the historic environmental liabilities within the KHSD is assigned to ERDC, a wholly owned subsidiary of Alexco Resource Corp., as tenure holder of the District. However, under the commercial agreement between ERDC, Alexco and Government of Canada, dated July 18, 2013, Canada agrees to indemnify ERDC in respect of the environmental state of the District known and unknown as at April 14, 2006. Determination of this Existing State of the Mine was the subject of a Baseline Environmental Study. This Study remains a living document in that historical liabilities are incorporated into the Study and into the Existing State of Mine Reclamation Plan.

The commercial agreement contains a provision that addresses the liability for the Existing State of the Mine if Alexco brings either historic mines or newly discovered deposits into production/operation. Under the agreement, ERDC must give notice to Canada commercial production of ore for commercial purposes commences in respect of such area and a Production Unit is created which terminates the indemnity for the Production Area. However, the Indemnity continues to apply to any contamination that may migrate from the District onto a Production Unit.

YG requires financial security in the form of a letter of credit to cover potential liabilities associated with the cost of reclamation and closure. As part of QML-0009, YG currently holds $7,871,492 in security for the Bellekeno, Bermingham, Lucky Queen, Flame & Moth, and Onek mine operations, the mill area, and the DSTF. This amount was set in 2019, following a third-party review of Alexco's costs. Additional security of $2,361,463 was posted to YG in 2020 as a requirement of Water Licence QZ18-044.

Mining Plus is not aware of any other environmental liabilities on the property. The permits and licences are discussed in Section 20.

Alexco has all required permits to conduct the proposed work on the property to commence production with the exception of the amendments noted in Section 4.4. Mining Plus is not aware of any other significant factors and risks that may affect access, title, or the right or ability to perform the proposed work program on the property.

5. ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE

5.1 ACCESSIBILITY

The Project is located in central Yukon, Canada. The closest sizable town is Mayo, which is located on the Stewart River, approximately 40 km to the southwest of the Project location. Mayo is accessible from Whitehorse via a 460 km all-weather road and is also serviced by the Mayo airport, which is located just to the north of Mayo. An all-weather gravel road known as the Silver Trail Highway leads from Mayo to the Project, the historic company town of Elsa, and the village of Keno City.

5.2 CLIMATE

The central Yukon is characterized by a subarctic continental climate with cold winters and warm summers. Average temperatures in the winter are between -15 and -20 degrees Celsius (°C), but can reach -60°C. The summers are moderately warm with average temperatures in July approximately 15°C. Exploration and mining work can be carried out year-round.

Because of its northern latitude, winter days are short with the sun low on the horizon such that north-facing slopes can experience 10 weeks without direct sunlight throughout the winter solstice. Conversely, summer days are very long, especially in early summer throughout the summer solstice. Annual precipitation averages 28 centimetres (cm); half of this amount falls as snow, which starts to accumulate in October and remains into May or June.

5.3 LOCAL RESOURCES

The KHSD is well connected by a network of public and private gravel roads including the Silver Trail Highway and the Bellekeno haul road, which was built to bypass the mining traffic around the village of Keno City. A large number of roads constructed for past mining operations are still serviceable. Local resources in terms of manpower, rental equipment, materials, and supplies are limited and demand high depending on other resource activity.

5.4 INFRASTRUCTURE

The existing infrastructure at the site includes:

- A network of public and private roads connecting the mines, process plants, and other facilities, including the Silver Trail Highway;
- Administration, maintenance, and camp facilities near the town of Elsa;
- Mine workings and infrastructure including water treatment at the Bellekeno mine,
- Mine workings and minor buildings at the Lucky Queen mine;
- Portal and decline development at both Flame & Moth mine and at Bermingham mine completed in 2018;
- Mine workings and minor surface buildings at Lucky Queen mine;
- Waste rock storage facility at the Lucky Queen, Bellekeno, Bermingham mines;
- Crushing plant and flotation processing plant with a design capacity of 408 tpd;
- DSTF located adjacent to the process plant;

- Process and potable water sources; and
- Electrical power is available in the area from the Yukon Electrical Company Limited grid.

5.5 PHYSIOGRAPHY

The landscape surrounding the KHSD is characterized by rolling hills and mountains with a relief of up to 1,600 metres (m). The highest elevation is Keno Hill at 1,975 m. Slopes are gentle except the north slopes of Keno Hill and Sourdough Hill.

6. EXPLORATION AND DEVELOPMENT HISTORY

The history of the Keno Hill mining camp is described in Cathro (2006); the information presented in this section draws heavily from that source.

The Keno Hill mining camp area has a rich history of exploration and mining dating back to the beginning of the 1900s. Earliest prospectors had been working the area in the vicinity of Mayo for gold, especially after the Klondike gold rush of 1898. The first silver was found in 1903; however, interest was low due to the prospector's interest in gold alone — despite an assay from 1905 yielding more than 11 kilograms per tonne (kg/t) silver. Small-scale mining finally commenced in 1913 at the Silver King mine with the first shipment of 50 tonnes (t) of vein material to a smelter in San Francisco.

In the ensuing 100 years of mining, activity peaked and decreased with changes in silver prices, world events, and operating companies in the Yukon. Notable periods of interest in the historic evolution of the Keno Hill mining camp included:

- After WWI, success at the Keno mine led to a staking rush, resulting in the discovery of a number of rich deposits. In the early 1920's, the Treadwell Yukon Company Limited (TYC) acquired a number of claims and started mining;
- Peak mining activity occurred in the 1950's through to the 1970's, with new discoveries across the district adding to mineral inventory and production from the larger underground complexes such as the Hector Calumet camp;
- Open pit mining began in the late 1970's, mainly to recover selected crown pillars; from 1982 to 1985 Sadie-Ladue and Shamrock were mined on a small scale basis, and from 1989 to 1990 Shamrock, Silver King, Hector-Calumet, Lucky Queen, Bermingham and Keno were mined;
- UKHM stopped production from the Keno Hill Silver District permanently in early 1989; and,
- In June 2005, Alexco was selected as the preferred purchaser of the assets of UKHM by PwC, the court-appointed interim receiver and receiver-manager of the Project holdings. In February 2006, the Supreme Court of the Yukon approved Alexco's purchase of UKHM's assets through Alexco's wholly-owned subsidiary ERDC.

The production history for the district has been document in Cathro (2006) and reproduced in Table 6-1. Note, the original reference is presented in imperial units and reproduced as such in the table.

Dominion Mineral Resources and Sterling Frontier Properties Company of Canada Limited (Dominion) acquired a 32% interest in UKHM, and between 1990 and 1998 carried out both reclamation work across the district as well as exploration at the Bellekeno, Husky Southwest, and Silver King mines in order to reopen the camp. A historical resource estimate completed for the Silver King deposit during this time is shown in Table 6-2.

Financial difficulties in the late 1990s caused Dominion to abandon its right; in effect reverting back the rights to UKHM. Environmental liabilities and site maintenance costs drove UKHM into bankruptcy. In 2001 the site was declared abandoned by the GoC, and the federal government inherited the assets.

Table 6-1 District Production through to 1989 (Cathro, 2006)

Mine	Tons ('000)	Recovered Grades			Ag ('000 oz)	Pb ('000 lb)	Zn ('000 lb)
		Ag (oz/ ton)	Pb (%)	Zn (%)			
Hector-Calumet	2,721.3	35.4	7.5	6.1	96,220	406,913	334,571
Elsa	491.0	61.4	4.9	1.4	30,158	47,708	13,485
Husky	429.4	41.7	3.9	0.4	17,889	33,290	3,309
Sadie Ladue	244.3	52.1	6.5	4.5	12,726	31,924	22,029
Keno	283.8	44.4	10.7	3.7	12,602	60,549	21,189
Lucky Queen	123.6	89.2	7.0	2.7	11,019	17,223	6,653
Silver King	207.6	53.0	7.7	0.8	10,996	31,918	3,510
No Cash	166.5	29.8	3.6	1.9	4,969	11,912	6,188
Galkeno	167.1	27.2	5.2	2.7	4,544	17,437	8,999
Bermingham	186.3	20.3	4.2	0.6	3,778	15,576	2,158
Bellekeno	40.5	42.6	9.8	2.3	1,724	7,967	1,829
Black Cap	48.6	27.4	1.6	0.3	1,331	1,560	269
Onek	95.3	13.6	5.5	3.4	1,299	10,456	6,452
Ruby	40.7	25.2	3.0	1.3	1,024	2,421	1,023
Shamrock	5.3	180.3	37.6	0.3	962	4,013	37
Comstock	22.9	39.7	10.7	3.8	907	4,891	1,719
Dixie	23.9	20.2	3.8	5.1	482	1,813	2,456
Husky Southwest	10.5	39.6	0.3	0.1	414	56	17
Townsite	18.6	16.4	4.3	2.0	305	1,583	730
Mt. Keno	1.6	139.3	17.7	-	221	562	-
Miller (UN & Dragon)	9.4	15.1	2.2	0.7	141	420	140
Flame & Moth	1.6	18.3	1.1	0.9	29	35	29

Table 6-2 Historical Resource Estimate for Silver King Property

Class	Tonnes	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)
Proven, Probable and Indicated	98,998	1,354	n/a	1.6	0.1
Inferred	22,581	1,456	n/a	0.1	n/a

The historical resources for Silver King estimated by UKHM (as shown in the table above) were documented in an internal report entitled "Mineral Resources and Mineable Ore Reserves" dated March 9, 1997 and supported by the disclosure noted above. These resources were estimated based on a combination of surface and underground drill holes and chip samples taken on the vein and calculated using the polygonal (block) model and the 1997 CIM definitions for resource categories. These estimated historical resources include a total of 55,674 t classified as proven and probable reserves and 43,324 t classified as indicated resources, plus an additional 22,581 t classified as Inferred Resources. Verification of the estimate would require new drill holes into a statistically significant number of the historical resource blocks and/or a combination of on-vein sampling. A qualified person has not done sufficient work to classify this estimate of historical resources as current, nor is Alexco treating this historical estimate as a current Mineral Resource.

In June 2005, Alexco was selected as the preferred purchaser of the assets of UKHM by PwC, the court-appointed interim receiver and receiver-manager of the Project holdings. In February 2006, following lengthy negotiations with federal and territorial governments, the Supreme Court of the Yukon approved Alexco's purchase of UKHM's assets through Alexco's wholly-owned subsidiary ERDC.

Under the Keno Hill Subsidiary Agreement, ERDC/Alexco are indemnified against all historical liability, has property access for exploration and future development, and are not required to post security against pre-existing liabilities. ERDC will also be reimbursed for its future environmental reclamation activities — estimated at more than $50 M — while itself contributing $10 M to the reclamation works. To finalize the Project acquisition, ERDC applied for and received a water licence in November 2007. Upon receipt of the water licence, ERDC received clear title to surface and subsurface claims, leases, free-hold land, buildings, and equipment at the Project.

During 2006, Alexco embarked on an aggressive exploration program in the Project, targeting the historical resources at Bellekeno and Husky Southwest, and subordinately other former mines in the Project.

6.1 HISTORY OF THE BELLEKENO MINE

The Bellekeno area hosts ten veins on the north facing slope of Sourdough Hill across the Lightning Creek valley from the Keno mine. Initially staked in 1919 by Andrew Johnson following the discovery of the Tundra vein, the nearby Ram vein was staked the following year. During 1921, Alex Gordon staked the Eureka, Whipsaw, and Extension mining claims. Combined, these five claim groups covered all the known veins in the Bellekeno deposit.

The Bellekeno deposit was mined during four periods between 1921 and 2011. Each period of mining was followed by a period of extensive exploration to replace exhausted mineral inventory. Between 1921 and 1928, 495 t of hand-sorted vein material grading 9,621 grams per tonne (g/t) silver was sacked and shipped to San Francisco.

The Depression, World War II, and perhaps some litigation marked the transition into larger scale mining. In 1947, the claims were purchased by Mayo Mines Ltd. After extensive exploration and adit development, production briefly recommenced. Under the ownership of Mayo Mines, the Bellekeno mine extracted two products: a direct shipping high grade product, and a lower grade concentrate that was processed at the nearby Mackeno mill. With high development requirements, small deposits and poor milling recovery (<70%), the company operated at a net loss between 1947 and 1954.

Between 1955 and 1965, the property changed owners a number of times, as production attempts proved unsuccessful, before it was purchased by UKHM. After acquiring the deposit, UKHM began intermittent exploration, development, and rehabilitation programs, and the development of the Bellekeno 625 adit. Exploration programs included surface overburden drilling, soil and geophysics surveys, trenching, and core drilling. Bellekeno was in production between 1988 and 1989, until UKHM was forced into bankruptcy in 2000 and its assets were inherited by the Canadian federal government. Purchased in 2006 by Alexco, the small mineral inventory has been expanded and it was in commercial production from 2011 to 2013. Mining to date by Alexco has extracted 5.6 M oz of silver along with lead, zinc, and gold. Production results are summarized in Table 6-3.

Table 6-3 Bellekeno Mine Production Summary, 1919 to 2013 (Data compiled from internal documents)

Year	Shipper	Claims	Tonnes (t)	Ag (g/t)	Pb (%)[3]	Ag (oz)
1921-27	Gordon	Eureka	186	10,900	73.9	65,200
		Whipsaw	6.8	8,280	61.9	1,810
		Extension	0.9	7,820	75.4	230
		Chance	1.4	5,420	71.1	240
1927-28	Johnson	Ram	266	8,850	64.0	75,690
Subtotal			**460**	**9,660**	**68.0**	**143,100**
1947-52	Mayo Mines	Ram	several 100			
	Bellekeno - DS[1]		113	6,000	70.0	21,800
1953	Bellekeno - DS		131	6,690	72.0	28,200
	Bellekeno - MK[2]		4,690	1,880	11.6	283,500
1954	Bellekeno - DS		91	7,280	74.0	21,300
	Bellekeno - MK		4,980	2,030	9.3	325,000
Subtotal			**10,010**	**2,110**	**12.5**	**679,800**
1966	UKHM		3,450	250		27,700
			170	2,430		13,300
Subtotal			**3,620**	**352**		**41,000**
1988	UKHM		11,600	1,510		563,200
1989	UKHM		17,100	1,510		830,100
Subtotal			**28,700**	**1,510**		**1,393,300**
2010	Alexco		18,600	210	9.2	125,600
2011	Alexco		71,992	834	10.2	1,930,400
2012	Alexco		86,354	760	9.6	2,110,000
2013	Alexco		65,206	705	7.7	1,478,000
			242,150	**725**	**9.2**	**5,644,000**
Grand Total			**284,940**	**862**	**8.4**	**7,901,200**

Notes:
1. Direct shipping
2. Material processed at the historic Mackeno Mill
3. Pb grade based on tonnes with known production grades

6.2 HISTORY OF THE LUCKY QUEEN DEPOSIT

The Lucky Queen deposit was mined from 1927 to 1932 when mineral inventory was exhausted, producing 112,100 t of vein material at 3,060 g/t Ag from two mineralized shoots. Four levels of underground workings (50, 100, 200, and 300) totalling approximately 1,085 m, were developed, with level development roughly coincident with extensive stoping, resulting in the Lucky Queen production totals listed in Table 6-4. There were no historical Mineral Resources or Mineral Reserves remaining at the Lucky Queen mine.

Table 6-4 Past Production Records for the Lucky Queen Property

Mine	Tonnes	Ag	Pb	Zn	Ag	Pb	Zn
		(g/t)	(%)	(%)	('000 oz)	('000 lb)	('000 lb)
Lucky Queen	112,100	3,060	7.0	2.7	11,020	17,220	6,650

The Lucky Queen vein and strike extensions were explored intermittently by surface overburden drilling, trenching, and soil sampling throughout the decades from 1950 to the early 1980s.

A 500-level exploration drift, collared near the Black Cap prospect and totalling approximately 1,800 m, was developed by UKHM in 1985-1987. It was designed to come in underneath the historical Lucky Queen workings and to drive a raise up to the 300 level and connect with the No 2 inclined shaft. Poor ground conditions near the shaft, combined with difficulty in locating the vein and an urgent need for miners elsewhere in the KHSD caused the adit to be abandoned.

Drilling by Alexco in the Lucky Queen prospect area totalled four surface core drill holes (875 m) in 2006, three surface core drill holes (557 m) in 2007, 12 surface core drill holes (2,999 m) in 2008, 14 surface core drill holes (3,048 m) in 2009, and 14 surface core drill holes (3,625 m) in 2010.

Following rehabilitation of most of the 500 level, four underground core holes (210 m) were drilled in 2012 outside of the resource area.

6.3 HISTORY OF FLAME & MOTH DEPOSIT

Claim staking and prospecting began at Flame & Moth in 1920. By 1923, numerous surface workings and a 13 m inclined shaft had been sunk with a 4.6 m crosscut developed from it on the Moth claim. It is believed that a second shaft to a depth of 30.5 m was also sunk in this vicinity. An adit was developed to a length of 12.2 m on the Frances 7 claim. Production for this period is not known.

Subsequent to this early work, little or nothing appears to have happened on the property until the acquisition by UKHM just prior to 1950. A 27.4 m inclined shaft was sunk to a vertical depth of 21.3 m along the footwall of what was likely the Moth vein. A crosscut, through the zone 13.7 m below surface and 42.7 m of drifting 22.9 m below surface, identified quartz-carbonate vein hosted mineralization averaging 343 g/t Ag, 1.6% Pb, and 5% Zn developed in quartzite and greenstone along a zone approximately 30.5 m long and up to 9.1 m wide. Thirteen horizontal core drill holes totalling 193 m were drilled from the drift, but the core recovery was poor.

During 1954 and 1955, mineralization of pyrite and minor arsenopyrite was reported up to 240 m along strike to the north. This was explored by bulldozer trenching, soil sampling, and ground geophysics, but was unsuccessful because of the depth of gravel overburden, reported to a 12 m depth.

UKHM returned to Flame & Moth in 1961 with a program of soil sampling and ground geophysics (self-potential, magnetics, Ronka EM), and drilled five surface core drill holes located near the shaft to test the mineralization at depth. The soil samples and geophysics yielded little information, and no veining was intercepted in the drilling.

In 1965, 28 vertical overburden drill holes were drilled, along with another attempt at soil sampling and geophysics. A proposal to excavate an open pit was first made at this date, based on a calculated resource of 3,360 t grading 573 g/t silver (Ag), 1.4% lead (Pb), and 5.6% zinc (Zn). The pit would have reached to 18.3 m below the surface.

In 1974, four lines of angled overburden drill holes totalling 989 m were drilled for extensions along a 180 m strike length with limited success due to deep overburden and broken ground conditions, although a weakly mineralized structure was located at 76 m in the footwall of the main vein.

More overburden drilling was completed along strike in 1984 and four core drill holes were sited to test the downward projection of the known mineralization. The deeper drilling (60 to 90 m below surface) returned only very low values from a wide but diffuse pyritic vein zone. A small amount of vein material (368 t grading 699 g/t Ag, 1.39% Pb, and 0.72% Zn) was sent to the mill, which may have come from vein material exposed during stripping of overburden in preparation for the open pit development. In May 1987, the open pit Mineral Resources were re-evaluated at 12,600 t grading 699 g/t Ag and 4.0% Pb to a depth of 24.4 m. The key assumptions used to estimate this historical estimate are not known. This historical estimate was prepared before the adoption of NI 43-101 and therefore should not be relied upon. That estimate is superseded by the Mineral Resources reported herein.

Total production at the Flame & Moth property is listed (Table 6-5) as 1,440 t grading 627 g/t Ag, 1.1% Pb, and 0.9% Zn (Cathro, 2006). It is assumed most of these figures came from the underground work in the 1950s.

Table 6-5 Past Production Records for the Flame & Moth Property

Mine	Tonnes (t)	Ag (g/t)	Pb (%)	Zn (%)	Ag (oz)	Pb (lb)	Zn (lb)
Flame & Moth	1,440	627	1.1	0.9	29,100	35,400	28,900

Surface core drilling by Alexco in the Flame & Moth resource area totalled 14 drill holes (3,986.2 m) in 2010, 32 drill holes (7,149.2 m) in 2011, and 48 drill holes (10,106.5 m) in 2012, eight drill holes (1,835 m) in 2013, and 49 drill holes (12,166.4 m) in 2014.

6.4 HISTORY OF ONEK DEPOSIT

The Onek Mining Company Ltd. was organized in 1922 to explore the core Onek claims via a number of open cuts and shallow underground workings in two shafts. In 1950 to 1952, UKHM reopened the shafts and drove an adit in from the northwest to drift along the vein strike at the 400 level for approximately 396 m, driving raises up into the historic workings along the way. Some developmental mineralized material was removed. The Onek deposit was revisited in the early 1960s with limited success due to manpower shortages and poor ground support, as the timbers from the 1950s had been left in place. All mining at Onek ceased in 1965 until the late 1980s when a 20 m to 40 m deep open pit was developed over the length of the majority of the Onek workings near the historical shafts. Historical production from the Onek deposit is shown in Table 6-6.

Surface exploration consisted of extensive overburden drilling along the vein strike as exploration stepouts and as infill drilling for open pit delineation.

Table 6-6 Past Production Records for the Onek Property

Mine	Tonnes (t)	Ag (g/t)	Pb (%)	Zn (%)	Ag (oz)	Pb (lb)	Zn (lb)
Onek	86,447	466	5.5	3.4	1,299,333	10,456,254	6,452,107

Drilling by Alexco in the Onek prospect area totalled 13 surface core drill holes (2,803 m) in 2007, 29 surface core drill holes (5,127 m) in 2008, 25 surface core holes (2,913 m) in 2010, 12 surface core holes (1,138 m) in 2011, and two surface core holes (531.98 m) in 2012.

A 220 m decline was driven towards the Onek deposit in 2012 and 2013 following the drilling of a single 236.77 m surface core portal cover hole. In 2013, 12 underground core holes (738.50 m) were drilled.

6.5 HISTORY OF BERMINGHAM DEPOSIT

The first claims in the Bermingham area were staked in 1921, within a decade of commercial production starting in the Keno Hill Silver District. Shallow underground workings were initiated in 1923 with the discovery of vein float and limited production of high-grade silver and lead from the Bermingham Vein ensued. When TYC optioned the Mastiff claim group in 1928, a 30 m shaft and 223 m of drifting had been completed on three separate levels. The underground workings showed a structure with a maximum width of 17 m on the 100 level that contained multiple bands of mineralization with interstitial waste that was cut off at its southwest extent by the Mastiff fault.

The TYC optioned the ground in 1928 and completed additional underground workings and identified a fault offset vein portion but dropped the lease in 1930 due to low silver prices and a lack of ore grade material. Trenching and prospect shafts identified the offset vein approximately 91 m to the west-northwest, where TYC sank the No. 1 shaft and completed 22 m of drifting. An oxidized siderite-pyrite vein with some galena was located below the position of the future main Bermingham pit but no mineralized material was reported from 127 m of drifting completed on the 200 level. TYC relinquished the lease in 1930 due to low silver prices and the absence of economic grade material. A variety of individual workers extracted another 676 t grading 7,875 g/t Ag and 70% Pb between 1930 and 1940. This work was poorly documented but is known to include considerable trenching, shafting, and drifting during 1930, 1932 to 1937, and 1939 to 1940.

UKHM subsequently purchased the property as part of the district consolidation, and during 1948 to 1951 drove an adit and drift approximately 9 m below the bottom of the TYC workings. In 1952, many of the old Treadwell workings were surveyed and sampled, but the adit level was subsequently abandoned in 1954 after very little ore grade material was realized. During this time, UKHM reportedly milled 5,165 tons of ore at 47.3 oz/ton (opt) Ag, 8% Pb, and 1.3% Zn, of which all but 60 tons was recovered from the old dumps.

Between 1965 and 1982, 874 overburden drill-holes totalling 19,931 m, and 27 core holes totalling 2,407 m were drilled in the Bermingham area, a small portion of which occurred in the present resource area. Poor ground conditions prevented many of these holes from adequately penetrating the vein zone, however they outlined an open pit resource and stripping began in 1977.

Stripping on the main Bermingham pit began in 1977 and until 1983 reportedly producing 82,649 t grading 572 g/t Ag. Overburden drilling and open pit mining led to a much better understanding of the geology. The feasibility of deepening the Bermingham pit was evaluated during 1980 to 1982 with several percussion drill holes testing the vein below the pit and two diamond drill holes testing the Bleiler extension to the northeast. The drill holes indicated a narrowing of the vein to 3.0 m to 4.5 m wide and did not encounter ore grade.

To the southwest of the open pit and in the hangingwall of the Mastiff Fault, several historic shafts had tested the offset extension of the Bermingham Vein. These included the No. 3 shaft, sunk by TYC, which included 22 m of drifting on the 45 level. The vein was reported to be 2.4 m wide and to mainly consist of siderite with small bunches of galena; however, no ore was encountered. A small open pit did operate on this segment of the vein in the mid-1980s, and an intended second pit located 150 m to the southwest was stripped to bedrock in 1983. However, the veins exposed there appeared weak and un-mineralised. The historical mineral resource estimate does not use Mineral Resource categories stipulated by NI 43-101. The historical estimate should not be relied upon; it is only stated here for historical completeness.

The exploration conducted by Alexco is the first comprehensive exploration effort in the district since 1997. The first holes drilled by Alexco in the Bermingham area were in 2009 (two core holes totalling 523 m), targeting the Bermingham Vein at depth in the hanging wall of the Mastiff Fault below an area with a historic shallow open pit resource. Results of this drilling were sufficiently encouraging to continue exploration in 2010 and 2011. Alexco conducted further diamond drilling programs at Bermingham in 2012, 2014, 2015 and 2016 in the Bermingham deposit and surrounding area.

Between 2009 and 2018, a total of 56,324 m surface core diamond drilling has been completed by Alexco at Bermingham, with a total of 169 drill holes, including two drill holes (523 m) in 2009, nine drill holes (3,046 m) in 2010, 25 drill holes (6,888 m) in 2011, 17 drill holes (5,576 m) in 2012, eight drill holes (2,668 m) in 2014, eight drill holes (2,606 m) in 2015, 50 drill holes (17,371 m) in 2016, 38 drill holes (13,277 m) in 2017 and 12 drill holes (4,369 m) in 2018. In addition, 24 underground drill holes (4,214 m) were completed from the exploration decline in 2018. All holes were diamond cored in HQ/HTW apart for a few reduced to NQ/NTW because of ground conditions.

6.6 PAST PRODUCTION

In total, the Bermingham property reportedly produced 3,777,932 oz of silver from 168,979 tonnes of material milled (Cathro, 2006).

Table 6-7 Past Production Records for the Bermingham Property

Mine	Tonnes (t)	Ag (g/t)	Pb (%)	Zn (%)	Ag ('000 oz)	Pb ('000 lb)	Zn ('000 lb)
Bermingham	168,979	695	4.2	0.6	3,778	15,575	2,158

7. GEOLOGICAL SETTING AND MINERALIZATION

7.1 REGIONAL GEOLOGY

The Keno Hill Silver District (KHSD) is located within the northwestern part of the Selwyn Basin in the central Yukon. The area is underlain by Upper Proterozoic to Mississippian metasedimentary rocks that were originally deposited in a marine shelf environment along the northern Cordilleran continental margin (Figure 7-1).

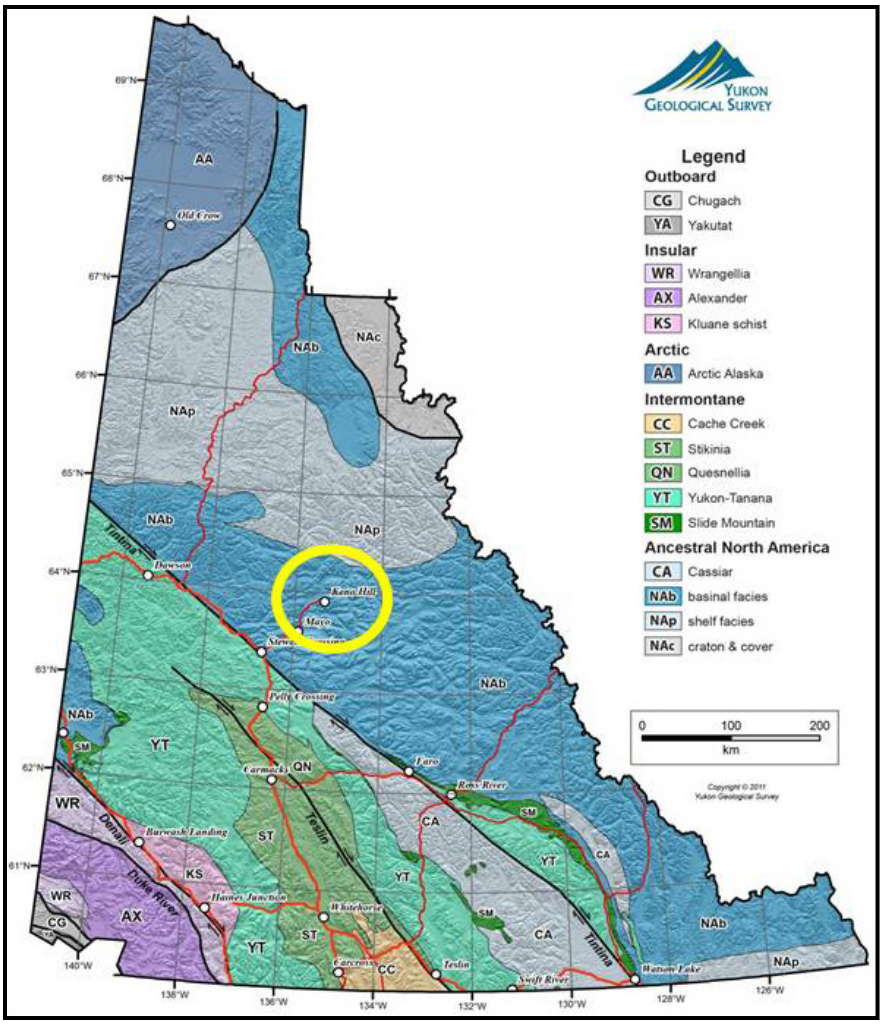
A compressional regime that existed during the Jurassic and Cretaceous produced thrusts, folds, and penetrative fabrics of various scales, with the geological structure in the area dominated by the highly deformed northwest trending Robert Service and Tombstone Thrust Sheets. Early large-scale deformation (D1 and D2) produced recumbent folds, resulting in local structural thickening of strata. A third deformational event (D3) produced gentle southwest-plunging synform and antiform pairs (Roots, 1997). The dominant structural fabric (foliation) is essentially axial planar to the early recumbent folds.

The Robert Service Thrust Sheet lies immediately to the south of the Keno Hill Silver District and is composed of a Late Proterozoic to Cambrian coarse-grained quartz rich turbidite sequence containing interbedded shales and locally limestone of the Hyland Group Yusezyu Formation.

The Tombstone Thrust Sheet underlies the KHSD and consists of basal Devonian phyllite, felsic meta-tuffs, and metaclastic rocks of the Earn Group that are conformably overlain by the Mississippian Keno Hill Quartzite Formation. The stratigraphy is locally thickened due to folding and/or thrusting and the basal part of the Keno Hill Quartzite is the predominant host of the silver-lead-zinc mineralization.

Four periods of intrusive rocks are recognized. During the Late Triassic, at about 232 million years ago (My), gabbro to diorite formed sills within the Tombstone Thrust Sheet. A second phase of plutonism took place approximately 92 My ago in the early Cretaceous and resulted in the widespread and voluminous felsic Tombstone intrusions of granitic to granodioritic composition that are regionally associated with gold mineralization. Cretaceous lamprophyre dated at 89 My occurs as metre scale dykes and sills. The youngest intrusions are peraluminous megacrystic potassium feldspar granite of the Upper Cretaceous McQuesten suite dated at approximately 65 My.

In addition to the polymetallic silver – lead – zinc mineralization occurring at Keno Hill, the region also hosts a number of other mineral occurrences and showings of tungsten, copper, gold, lead, zinc, antimony, and barite.

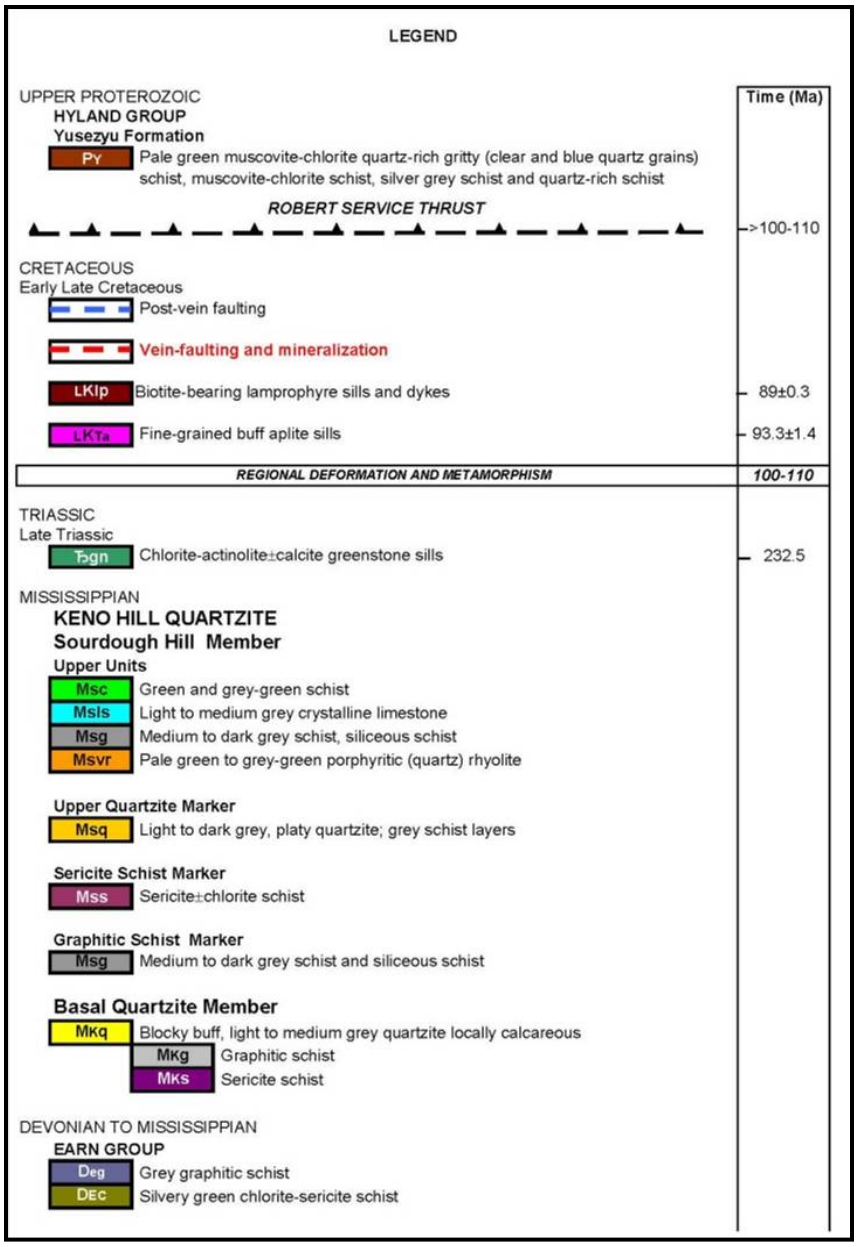


Source: Yukon Geological Survey 2011

Figure 7-1 Regional Geology

7.2 PROPERTY GEOLOGY

The KHSD geology is dominated by the Mississippian Keno Hill Quartzite Formation comprising the Basal Quartzite Member and conformably overlying Sourdough Hill Member. The sequence is overthrust from the south by the Upper Proterozoic Hyland Group Yusezyu Formation and is conformably underlain in the north by the Devonian Earn Group as shown in the simplified local stratigraphic column in Figure 7-2 (McOnie and Read, 2009).



Source: SRK 2013

Figure 7-2 Keno Hill Silver District Simplified Stratigraphy

The Yusezyu Formation of the Precambrian Hyland Group comprises greenish quartz-rich chlorite-muscovite schist with locally clear and blue quartz-grain gritty schist and is separated from the Keno Hill sequence by the regionally extensive Robert Service Thrust Fault that occurs immediately south of the area.

The Earn Group, formerly mapped as the "lower schist formation" (Boyle, 1965), is typically composed of recessive weathering grey graphitic schist and green chlorite-sericite schist with an upper siliceous graphitic schist found locally.

Within the Keno Hill Quartzite Formation, the Basal Quartzite Member that is the dominant host to the silver mineralization, comprises commonly calcareous, thick to thin-bedded quartzite and graphitic schist and may be up to approximately 1,100 m thick where structurally thickened. The overlying Sourdough Hill Member, formerly mapped

as the "upper schist formation" (Boyle, 1965), is up to approximately 900 m in thickness and comprises predominantly graphitic and sericitic schist, chloritic quartz augen schist some of which may be of volcanogenic origin, and minor thin bedded limestone.

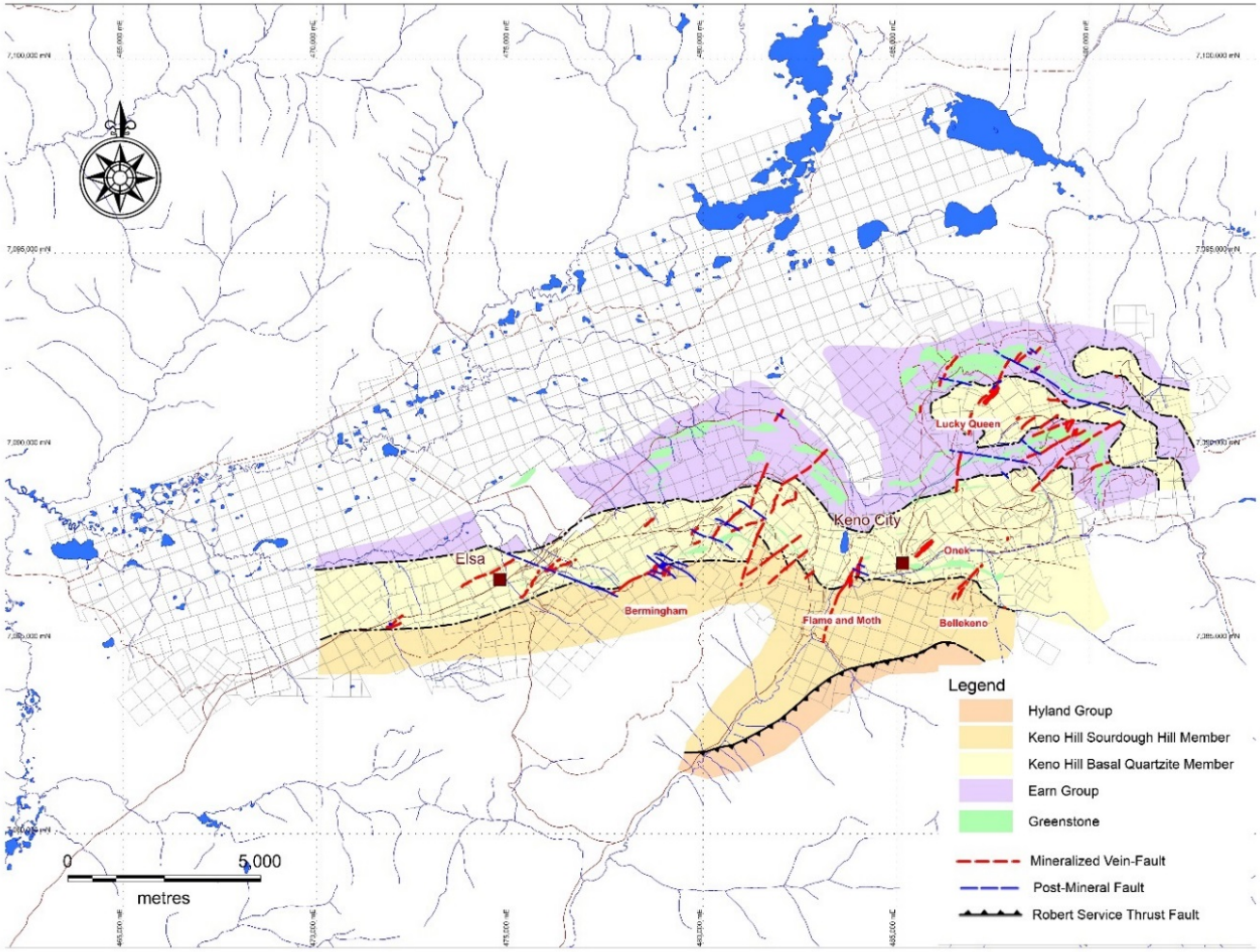
The Earn Group and Keno Hill Quartzite are locally intruded by stratigraphically conformable, although lensoidal, Middle Triassic greenstone sills, for which any feeder dykes are unrecognizable. The sequence was metamorphosed to greenschist facies assemblages during Cretaceous regional deformation at about 100 My, and subsequently intruded by aplite sills or dikes considered to be related to the Tombstone intrusive suite.

Three phases of folding are identified with the two earliest phases consisting of isoclinal folding with subhorizontal, east or west trending fold axes, the axial plane forming the dominant regional foliation. The later fold phase displays subvertical axial planes and moderate southeast-trending and plunging fold axes. The first phases of folding formed structurally dismembered isoclinal folds of which the Basal Quartzite Member outlines synforms at Monument Hill where the Lucky Queen mine is located and at Caribou Hill, while between Galena Hill and Sourdough Hill the Bellekeno mine, the Flame & Moth and Bermingham deposits are located on the upper limb of a large-scale anticline that closes to the north.

Up to four main periods of faulting are recognized with the oldest fault set consisting of south dipping foliation parallel structures that developed contemporaneously with the first phases of folding, sometimes shown as "low angle bedding faults". The Robert Service Thrust Fault truncates the top of the Keno Hill Quartzite Formation and sets the Precambrian schist of the Yusezyu Formation above the Mississippian Sourdough Hill Member. The silver mineralization in the Keno Hill Silver District is hosted by a series of northeast oriented, southeasterly dipping veins formed in pre- and syn-mineral faults referred to as vein-faults (Boyle, 1965) that display left lateral normal oblique displacement. There are two related sets locally recognized as either a more easterly trending "longitudinal" vein set that, depending on the competency of the host rock, can form up to a 30 m wide zone of anastomosing subparallel veins, or a more northerly trending "transverse" vein set that can reach up to 5 m in thickness.

The mineralized vein-faults are commonly offset by northwest striking, steeply southwest dipping, post-mineral cross faults, that display right lateral normal oblique displacement.

The simplified geology of the Keno Hill Silver District and location of the mineral deposits is shown in Figure 7-3 (Alexco, 2018).



Source: RPA 2017

Figure 7-3 Geology of the Keno Hill Silver District

7.3 MINERALIZATION

Mineralization in the KHSD comprises carbonate vein hosted polymetallic silver-lead-zinc as described by Boyle (1965), Cathro (2006), Murphy (1997) and Roots (1997). It typically exhibits a succession of hydrothermally precipitated minerals deposited in veins or veinlets as a result of multiple pulses of hydrothermal fluid boiling events, probably related to repeated depressurization due to movement along the host fault structures. As a result, a progressive series of differing mineral depositional stages, assemblages and textures can be identified. To a minor extent, supergene alteration may have further changed the nature of the mineralogy in the veins, although this may have been largely removed due to glacial erosion.

In general, common gangue minerals include (manganiferous) siderite and, to a lesser extent, quartz and calcite. Silver occurs predominantly in argentiferous galena and argentiferous tetrahedrite (freibergite) with associated native silver, and the silver-bearing sulphosalts polybasite, stephanite and pyrargyrite being other important silver bearing minerals. Lead occurs in galena and zinc in sphalerite, which can be either an iron-rich or iron-poor variety. Other sulphides include pyrite, pyrrhotite, arsenopyrite and chalcopyrite.

Historically, it was believed that economic mineralization in the Keno Hill mining camp was restricted to a shallow zone of approximately 120 m thickness. However, the 370 m depth of production from the Hector-Calumet mine and drill indicated mineralization to over 350 m depth at Flame & Moth and Bermingham demonstrate that silver rich veins do exist over greater vertical intervals and suggests that other known veins may exhibit exploration potential at depth. It has been suggested (Cathro, 2006) that the mineralization may exhibit a vertical zonation with a typical mineralized shoot displaying a high silver and lead-rich top down to a low silver zinc-rich base; however, this has not been verified.

Across the district, favourable environments for mineralization are considered to occur where:

- Competent quartzite or greenstone host rock is present on one wall of the vein-fault as it can be observed that veins pinch down significantly in schist bound structures;
- The vein-fault splits to form a more northerly striking orientation; and
- The vein-fault changes to a steeper dip.

Wide veining with development of high-grade silver mineralization is spatially associated with vein-fault domains exhibiting steeper dip and/or more northerly strike.

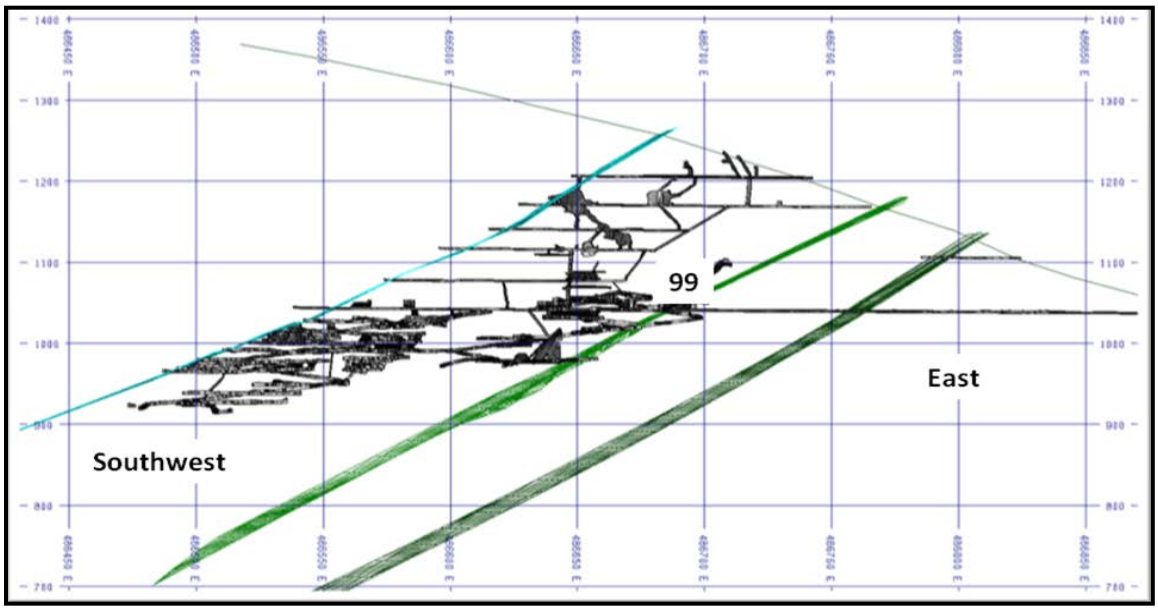
7.4 BELLEKENO MINE MINERALIZATION

The Bellekeno vein system consists of ten known veins with variable characteristics. Vein material has been extracted from the Ram, Eureka, Tundra, 48, 49, and 50 veins that generally strike 030° to 040°, with dip directions varying 60° southeast to 80° northwest. Recent mechanized mining has focused on the stronger 48 Vein structure, while conventional historical narrower mining focused on the smaller, higher grade vein structures.

There are three main zones within the 48 Vein structure: the Southwest, 99, and East zones, each with distinctive silver to lead ratios, zinc content, and accessory mineral assemblages (Figure 7-4).

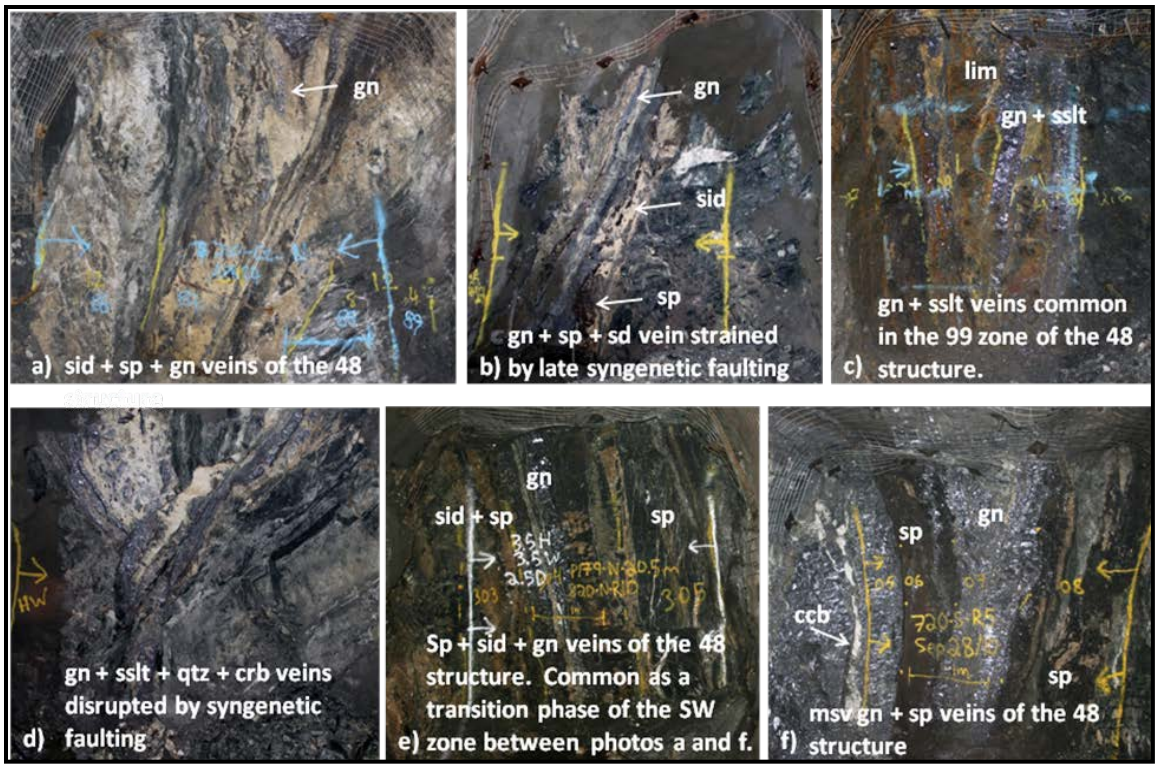
The thickness of the vein ranges between a few cm to upwards of 5.5 m. Post-mineral faulting typically shows intense iron carbonate alteration and local brecciation while the distribution of syn-mineral faulting is observed to have a strong impact on silver grades and mineral textures (Figure 7-5). Left oblique-normal movement along the 48 Vein structure is estimated from stratigraphic offset to be approximately 35 m.

The mineralized zones appear as discontinuous steeply plunging shoots, hosted within manganese-rich siderite vein structures and may have pervasive secondary limonitic alteration where exposed to groundwater. Minerals of economic interest include very fine-grained silver-bearing sulphosalts associated with galena and sphalerite. Common accessory minerals include pyrite, arsenopyrite, and chalcopyrite while anglesite, cerrussite, smithsonite, malachite and azurite have been occasionally observed.



Source: SRK 2013

Figure 7-4 Schematic Long Section of the 48 Vein Bellekeno Mine showing Workings



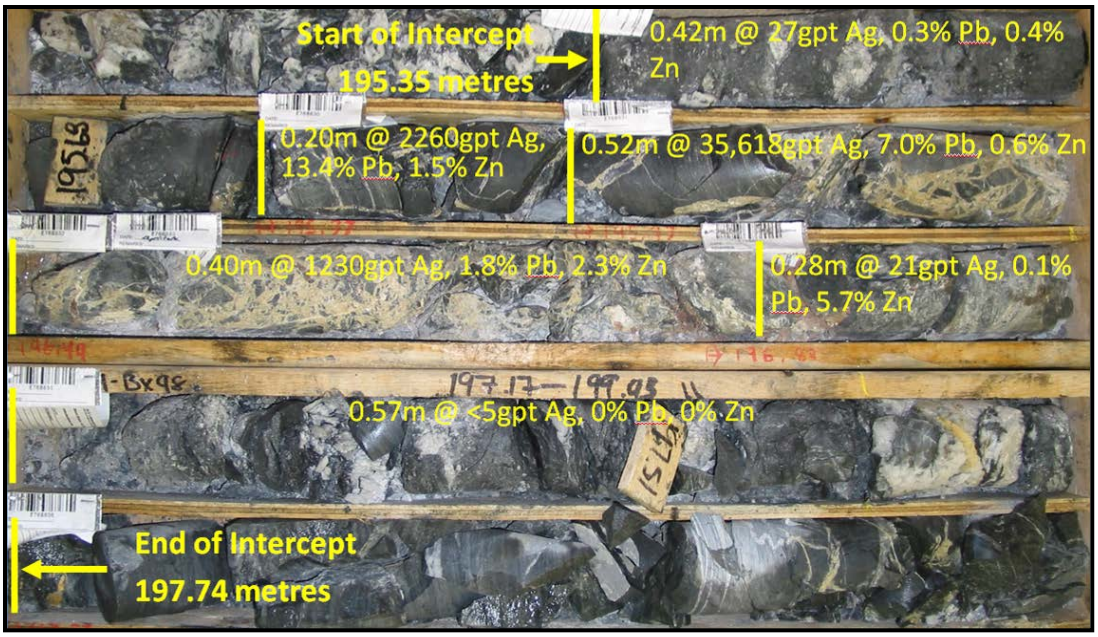
Source: SRK 2013

Note. (gn) galena; (sid) manganese rich siderite; (sp) iron rich; (Fe 65) sphalerite; (lim) limonitic oxidation of carbonate facies; (sslts) non-specific sulphosalts; (qtz) siliceous floods and concretions associated with late breccias; (crb) white carbonate

Figure 7-5 48 Vein Structures and Mineralogy, Bellekeno Mine

7.5 LUCKY QUEEN MINERALIZATION

The Lucky Queen vein-fault structure is essentially a singular structure with an average strike of approximately 043°, that locally varies between 025° to 060°, and has an average dip of approximately 045° to the southeast within a range of 30° to 55°. The main structure has a drill defined strike length of approximately 650 m with vein thicknesses ranging from just a few centimetres to several metres and is open along strike in both directions. Stratigraphic units correlated across the structure show a normal separation of approximately 30 to 35 m across the vein-fault. Mineralized zones are largely composed of brecciated wall rock, siderite (± limonite), vein quartz, with silver sulphosalts, galena, sphalerite, and native silver with minor arsenopyrite and pyrite (Figure 7-6).



Source: SRK 2013

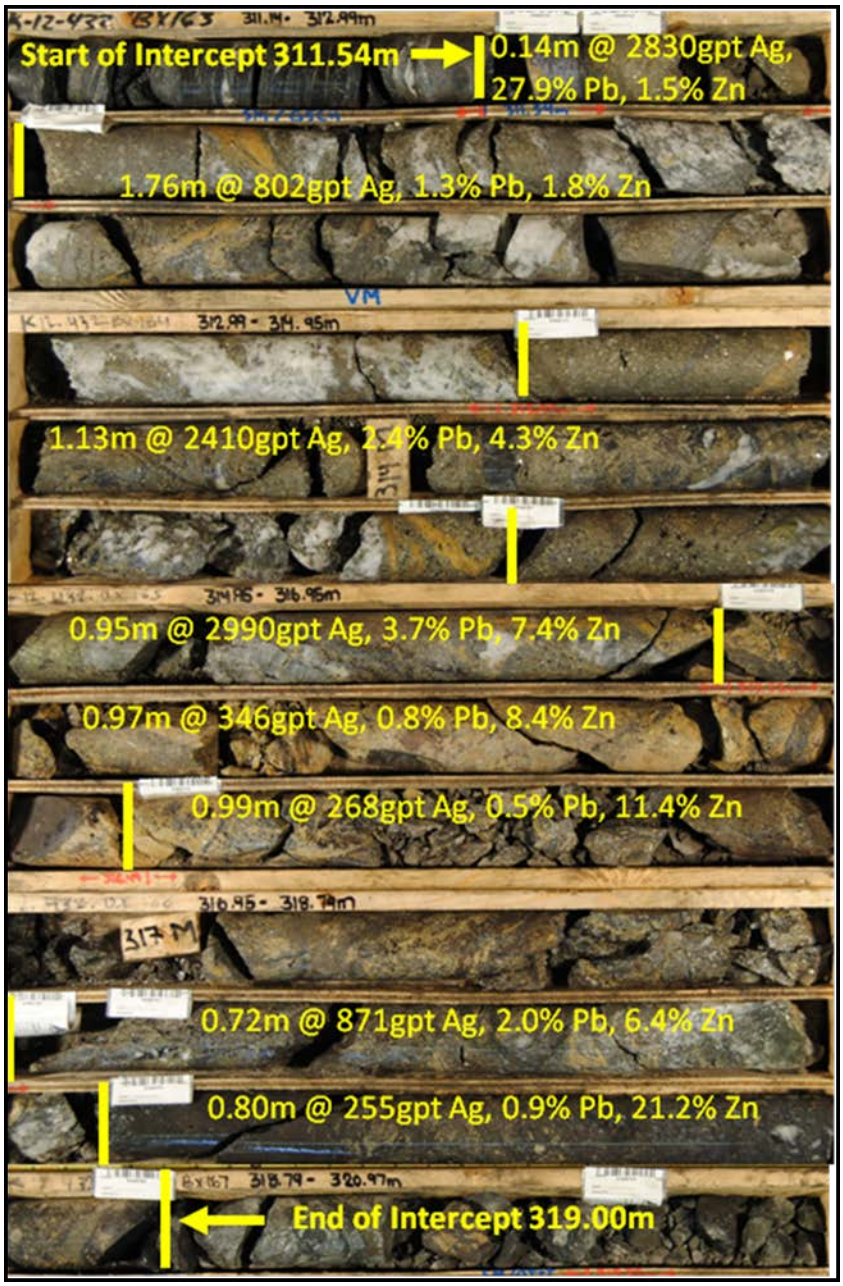
Figure 7-6 Vein-Fault Intercept in Drill Hole K-07-0114, Lucky Queen

7.6 FLAME & MOTH MINERALIZATION

The Flame Vein is unique because of its uniformly singular form, width, grade and length. It occurs over a one kilometre (km) strike length orientated at strike of 025° and dipping approximately 65° southeast and has been traced by drilling over to least 300 m depth extent. Two main styles of mineralized veining commonly with multiple banding, internal brecciation and often rehealed textures are observed (Figure 7-7). The early phase comprises dominantly quartz gangue with abundant but irregular amounts of pyrite, pyrrhotite, sphalerite and arsenopyrite, while a later phase comprises predominantly siderite containing abundant sphalerite, pyrite, galena, with minor chalcopyrite and trace amounts of tetrahedrite, pyrargyrite, jamesonite, boulangerite and cassiterite as identified in thin section samples.

The vein is divided into two parts by an approximate 90 m right lateral offset on the post-mineral Mill Fault that are referred to as the Lightning Zone in the southeast and the Christal Zone in the northwest.

The associated Moth Vein, the subject of historic prospecting, is considered to represent a footwall splay of the Flame Vein, although the relationship is not fully understood.



Source: SRK 2013

Figure 7-7 Vein-Fault Intercept in Drill Hole K-12-0432, Flame & Moth

7.7 ONEK MINERALIZATION

The Onek vein system comprises at least three individual vein-faults occurring within a broad northeast striking, southeast dipping structural zone. The vein-faults occur over a strike length of at least 600 m formed in brittle fractured or milled zones, locally containing massive sulphide vein material in, or associated with, siderite and comprising sphalerite and galena along with minor pyrite, and arsenopyrite. Mineralized breccia zones, consisting of wall rock fragments and siderite-sulphide cement are also present, and are often surrounded by brittle fractured zones cemented by siderite and minor sphalerite stringers (Figure 7-8).

Source: SRK 2014

Figure 7-8 Vein-Fault Intercept in Drill Hole K-10-0306, in the Onek Deposit

7.8 BERMINGHAM MINERALIZATION

The Bermingham zone comprises a closely spaced series of subparallel steeply southeast dipping vein sets related to the master Bermingham vein-fault system. These are identified (hangingwall to footwall) as the Bermingham, Bermingham Footwall and Bear veins that can be traced over a north easterly strike distance exceeding 850 m. In addition, a small resource is contained in a conjugate set of related West Dipping veins. In places less extensive, north-northeast striking vein geometries are observed within the mineralized system. Recent detailed underground and surface drilling work has focused on the Arctic and Bear Zones where the vein sets are connected either laterally or vertically within the wider Bermingham vein-fault structural corridor. Mineralization extends from between 90 m to 160 m below surface to a depth of approximately 450 m where veining remains open.

The mineralized veins are displaced by several post-mineral faults that essentially subdivide the system into several zones used for Mineral Resource estimation purposes, with the sequence from the southwest being Etta, Arctic, Bear and Northeast Zones separated by the Mastiff, Arctic and Ruby B faults respectively.

The early Aho Vein comprises predominantly quartz, that occurs over several metres width within a wide halo of structurally damaged rocks. Minor sulphides are present with arsenopyrite and pyrite being the most abundant, with accessory galena and sphalerite.

The Bermingham Vein has a strike between 029° and 042° and dips between 40° and 64° to the southeast and the structure accommodates approximately 65 m of the total Bermingham displacement. In the Etta Zone, and within the hangingwall of the post-mineral Mastiff fault, the Bermingham vein at its most southwestern extent is observed to converge with the Aho Vein structure; while to the northeast, it converges with the Bermingham Footwall vein.

The Bermingham Footwall Vein has a strike of between 040° and 060°, and dips between 67° and 73° to the southeast, and the structure accommodates approximately 70 m of the total Bermingham displacement. In the Etta Zone, the Bermingham Footwall Vein terminates against the Bermingham Vein up-dip and this intersection plunges moderately-steeply to the northeast into the Arctic Zone in the footwall of the post-mineral Mastiff fault. At depth the Bermingham Footwall Vein terminates against the Aho vein along a steep plunging north-easterly trajectory.

The Bermingham and Bermingham Footwall veins typically exist within a 5 m to 10 m wide structurally damaged zone containing numerous stringers, veinlets, breccias and gouge and generally forms a discrete silver mineralized vein 0.5 m to 2.5 m wide within this zone. It consists predominantly of carbonate (dolomite, ankerite, siderite and calcite), and quartz gangue, with the sulphides galena, sphalerite, pyrite, and arsenopyrite, and accessory, chalcopyrite, argentian tetrahedrite (freibergite), jamesonite, pyragyrite and native silver (Figure 7-9).

The Bear Vein strikes between 010°and 050° and dips between 65°and 80° to the southeast and accommodates approximately 30 m of the total Bermingham displacement. It occupies a position in the footwall of the system beneath a major flexure in the Bermingham Vein, with which it joins up-dip. At depth and to the southwest, the Bear Vein junctions with the Bermingham Footwall vein. Early phase mineralization is absent, and the Bear structure is considered a late response to the slip-impeding flexure in the Bermingham vein noted above, with the high-grade silver mineralization located on the more northerly striking and steeper dipping areas.

The West Dipping Vein is located between the Bear and Bermingham veins and it strikes 020° and dips 50° to the west. It displays only minor displacement that is considered to represent an adjustment due to a pronounced curvature in the hangingwall surface of the Bear Vein. Similarly, oriented veins were observed historically in the Keno Hill district in the Elsa, Husky, Runer, Black Cap mines and are also interpreted at Hector-Calumet and Lucky Queen (Boyle, 1965; Cathro 2006; UKHM, 1997). The Bear and West Dipping veins are structurally and mineralogically similar to the Bermingham Vein, although early quartz and calcite are less abundant or absent, whilst silver sulphosalts are more abundant. This difference is considered a product of a shorter period of later deformation on the Bear and West Dipping vein-faults that provided mineral depositional sites only during the latter stages of the mineralizing cycle.

The post-mineral faults that are recognized within the Bermingham resource area include the Mastiff, Hangingwall, Arctic, Ruby B and Super faults. The attitude of these southwest dipping faults appears bimodal, with one set striking between approximately 285° and another at approximately 315°, and likely represent end members of a single fault set. These northwest trending structures cut and displace all mineralized veins, and while they are typically non-mineralized, it is sometimes observed that mineralization may have been dragged into the later fault.

The Mastiff Fault has an attitude of 137° / 51° SW and displaces the hangingwall obliquely 131 m down to the northwest along a vector 302° / -23°. Its location is well constrained by drilling and exposure in the main pit. When discussing the location of the mineralization, the vein zones located to the east in the footwall of the Mastiff Fault are referred to as the Arctic, Bear and Northeast zones, and as the Etta Zone in the west in its hangingwall.

The Hangingwall Fault strikes between 000° and 025° and dips easterly at between 53° and 65° and is represented in drill core by very wide (10 - 30 m) zones of unconsolidated fault breccia and gouge, with sporadic weakly developed mineralization that occurs as trails of fragmented clasts interpreted to represent pre-fault material. The Hangingwall Fault extends to surface where it was intersected by historic trenching northeast of the current resource area.

The Arctic Fault strikes between 120° and 130° and dips between 45° and 68° to the southwest and displaces all veins 76 m down to the southwest along a vector 274° / -29°. It includes two sub-parallel splays and their generation is considered a response to a strong flexure in the main fault shape. A splay off the Arctic Fault, named the A Fault, is mapped in the open pit but this does not appear to have significant displacement and does not affect the current resource area.

The Super Fault is exposed in the eastern end of the open pit where the fault surface exhibits a thin skin of fault breccia on an undulating surface that has an average attitude of 133° / 25° SW with the hangingwall displaced approximately 42 m down to the southwest along a vector 272° / -15°. The structure is well represented in drill core and separates the mineralization in the shallow historic underground mine workings and open pit from the current resource area which is wholly situated in its footwall.

The Ruby B Fault strikes between 115° and 130° and dips between 60° and 70° to the southwest and separates the Bear Zone mineralization from the Northeast Zone by approximately 60 m right lateral offset. A similar separation of veining is observed on the fault within the historical underground Ruby mine located approximately 200 m to the northwest.

Figure 7-9 Vein-Fault Intercept in Drill Hole K-15-0580, in the Bermingham Deposit

Note: For the interval 307.82 – 313.16 m, being a 5.34 m interval that composited at 9,250 g/t (297.4 oz/t) Ag, 10.9 Pb and 0.4%Zn.

8. DEPOSIT TYPES

The Keno Hill deposits do not readily fit into a recognized mineral deposit model and attempts to classify a "deposit type" for the mineralization are questionable since the source(s) of metals and conditions related to ore-deposition are poorly understood.

Beaudoin and Sangster (1992) classified the Keno Hill as sediment-hosted veins, likened to the silver bearing deposits at Coeur d'Alene, USA and the Kokanee Range, Canada. A genetic relationship between silver-lead-zinc and intrusion related gold mineralization has also been postulated (Mair et al., 2006).

The mineralization has been more recently classified as belonging to the Lithogene genetic group (Greybeal and Vikre, 2010) which invokes a depositional environment of re-mobilized metals, with no magmatic contribution or associated gold.

Current information, however, shows that this latter classification is not correct, as there is some magmatic component, with local felsic intrusives acting at least in part as a heat source for hydrothermal fluid circulation and gold is associated with the mineralization.

Mineral precipitation occurred within the thick sequence of clastic metasedimentary rock from hydrothermal fluids at temperatures of between 250 to >400°C and estimated depths of up to 11 km. Mineral deposition probably occurred in multiple pulses in response to pressure and temperature changes as boiling or fluid mixing took place preferentially in structurally prepared open spaces primarily in the competent Basal Quartzite Member and Greenstone lithologies. The source of the metals is not fully known and could be leached from crustal rocks by hot circulating fluids or derived from late stage fractionation of the intrusives.

9. EXPLORATION

United Keno Hill Mines (UKHM) undertook extensive exploration in the Keno Hill Silver District until the mines closed in 1989 (Cathro, 2006). The bulk of this historic exploration work was completed by driving along vein structures complemented by underground drilling designed to explore and extend mining resources in the underground mines, as well as conducting extensive surface drilling, mapping and district scale geophysical surveys. It is beyond the scope of this report to describe all the historical exploration work completed in the district and only the relevant historical work is referred to below.

The exploration work conducted by Alexco since 2005 comprises the first comprehensive exploration effort in the Keno Hill Silver District since 1989, and commenced with a program of digitally scanning and compiling the large number of UKHM mining plans, geological maps and documents relating to nearly 70 years of historic mining into a coherent database with data combined from over 6,000 historic diamond and 16,000 overburden (RAB) drill holes. The data is available on a mapping platform that continues to be used to construct mine scale maps and three-dimensional (3D) mine models.

In 2006 a wide spaced district scale aerial magnetic and electromagnetic geophysical survey and air photography was undertaken. Diamond drilling of prospects ranked highly as having the potential to return mineable silver resources was also commenced that year with work focussing on the Bellekeno, Silver King and Lucky Queen mine areas.

Since acquiring the Keno Hill property, Alexco has completed a total of 782 surface exploration diamond drill holes for a total of 205,503 m as shown in Figure 9-1. In addition, a total of 431 underground holes for 29,673 m has also been completed, mainly at Bellekeno, but also includes 24 holes for 4,213 m drilled in 2018 from the Bermingham exploration decline. A further 34 RC holes and one sonic hole for a total of 1,242 m have been completed in the South McQuesten Valley area, exclusive of the resource definition drilling previously undertaken for the Elsa Tailings deposit. Table 9-1 provides an overview of all Alexco drilling across the District by area, from 2006 to December 2020.

Exploration drilling by Alexco has been primarily conducted to test targets immediately adjacent to historic resource areas, and to a lesser extent to evaluate structurally controlled narrow vein mineralization targets based on interpretation of historic exploration data (Figure 9-2).

Table 9-1 Distribution of Drill Holes 2006 to December 2020, Alexco Resource Corp.

Deposit	Surface Holes	Surface Metres	Underground Holes	Underground Metres	Total Holes	Total Metres
Bellekeno	73	20,236	374	23,703	447	43,940
Lucky Queen	49	11,538	4	210	53	11,748
Onek	87	13,455	12	975	99	14,430
Flame & Moth area	168	37,935	17	572	184	38,394
Bermingham area	204	71,380	24	4,213	193	60,535
Other*	202	64,888			192	50,155
RC	35	1,242			35	1,242
Total	**782**	**205,503**	**431**	**29,673**	**1,203**	**220,444**

Other prospects include: Black Cap, Brefalt, Bulldozer, Coral Wigwam, Eagle, Elsa, Galkeno, Hector-Calumet, Husky, Inca, Keno 700, Leo, Mackeno, McQuesten, Mom & Son, No Cash, Ruby, Runer, Shamrock, Silver King, Tick, Townsite.

In the western part of the district, initial drill programs have been completed at the McQuesten prospect (which is currently under active exploration by option holders Banyan Gold) and the Leo prospects. At Silver King, drilling of 10,453 m in 42 drill holes has mainly focused on extending the historic resource in the No. 5 Vein that is located in the hangingwall to the historically mined mineralization. Some significant intercepts indicate that further exploration is required on this structure, as well as along the extensions of the past producing No. 1 and No. 2 veins.

Along the Husky – Husky SW vein system, the northeastern extension of the Silver King structure, Alexco has completed 12,467 m of drilling in 46 drill holes. The results of this drilling have confirmed that in places the historically mined veins extend at depth below mine workings and thus the potential for locating additional mineralization is open.

The mineralized Bermingham vein structure first drilled by Alexco in 2009 is considered to be spatially related to the southwest extension of the major 96 M oz silver historic producing Hector-Calumet mine vein system and to extend further southwest to the Coral Wigwam and Brefalt offset area; however, the structure is complex and a number of different veins are known. To date Alexco has completed 14,473 m drilling in 54 surface drill holes on exploring the Galena Hill area beyond the Bermingham resource area, including several other subparallel mineralized vein structures such as Elsa, Townsite, No Cash and Ruby. This has resulted in the discovery of significant high-grade silver mineralization and importantly has possibly also located the Brefalt faulted offset to the Bermingham system to the southwest. Other targets drilled at the northeastern end of Galena Hill at Inca, Eagle and Galkeno have also obtained mineralized intercepts that will be followed up in the future.

In the Flame & Moth area, a new blind exploration discovery was made in 2010 based on following up on some historic drill results. Further exploration has been completed beyond the central resource zone to the Flame West, Mackeno, and Northeast Flame areas, with the total drilling in the wider Flame & Moth area comprising 42,695 m in 187 surface drill holes.

On Keno Hill, apart from within the Lucky Queen and Onek resource areas, Alexco has completed a total of drilling in 19 holes for 3,717 m on the Keno, Shamrock, Black Cap and Runer vein systems. In each of these locations results indicate that additional exploration work would be justified.

A district-wide surface geological mapping and structural study, started in 2007, was completed in 2018 with a revised Geological Map of the Keno Hill District being published in conjunction with the Yukon Geological Survey in 2021.

In late 2018, Alexco undertook a detailed aerial RESOLVE EM-Magnetic geophysical survey over Galena Hill, which was extended to cover Keno Hill in 2020, and these have provided detailed structural data that is assisting with the definition of future drill targets.

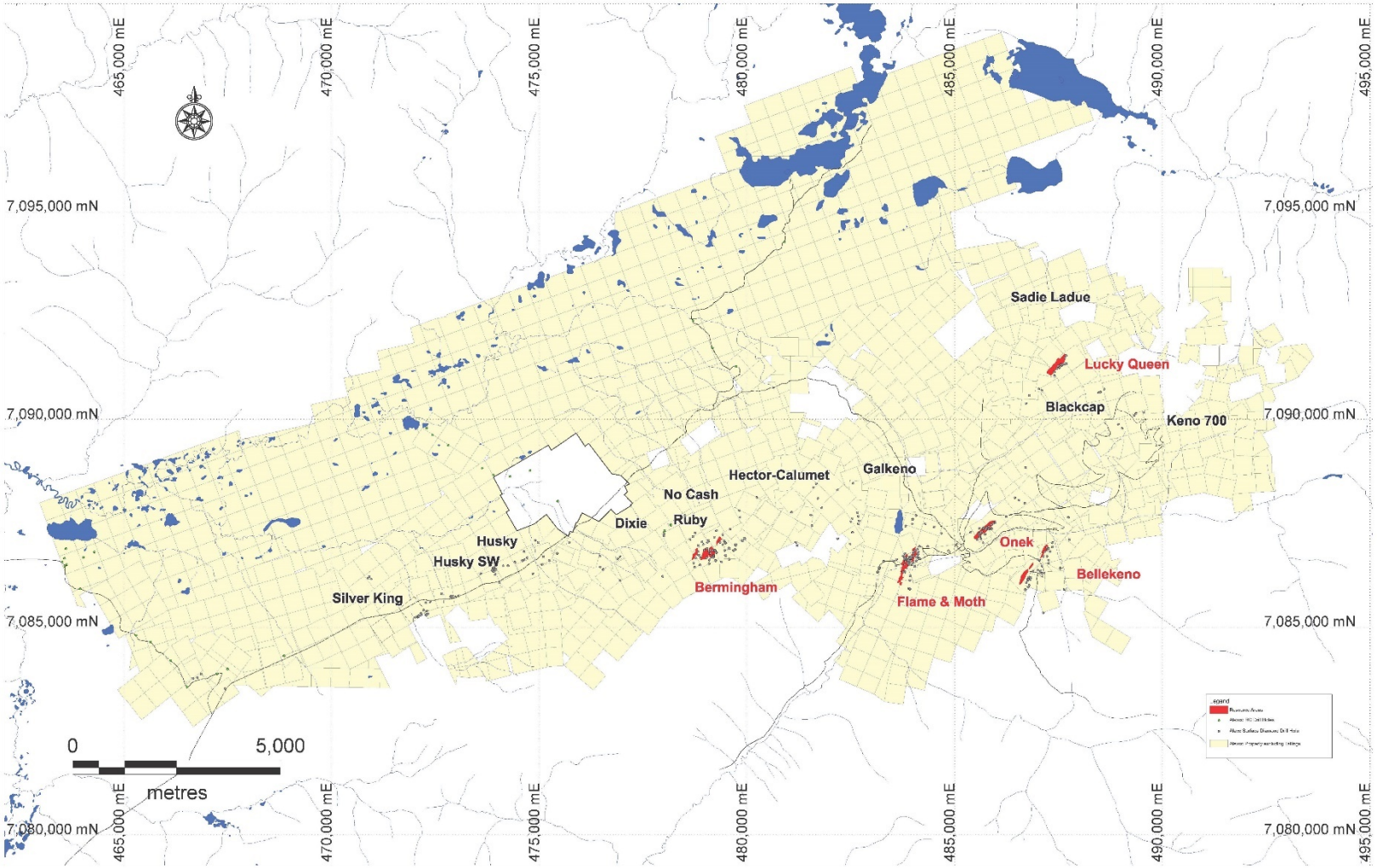


Figure 9-1 Keno Hill Silver Project Distribution of Surface Exploration Drill Holes

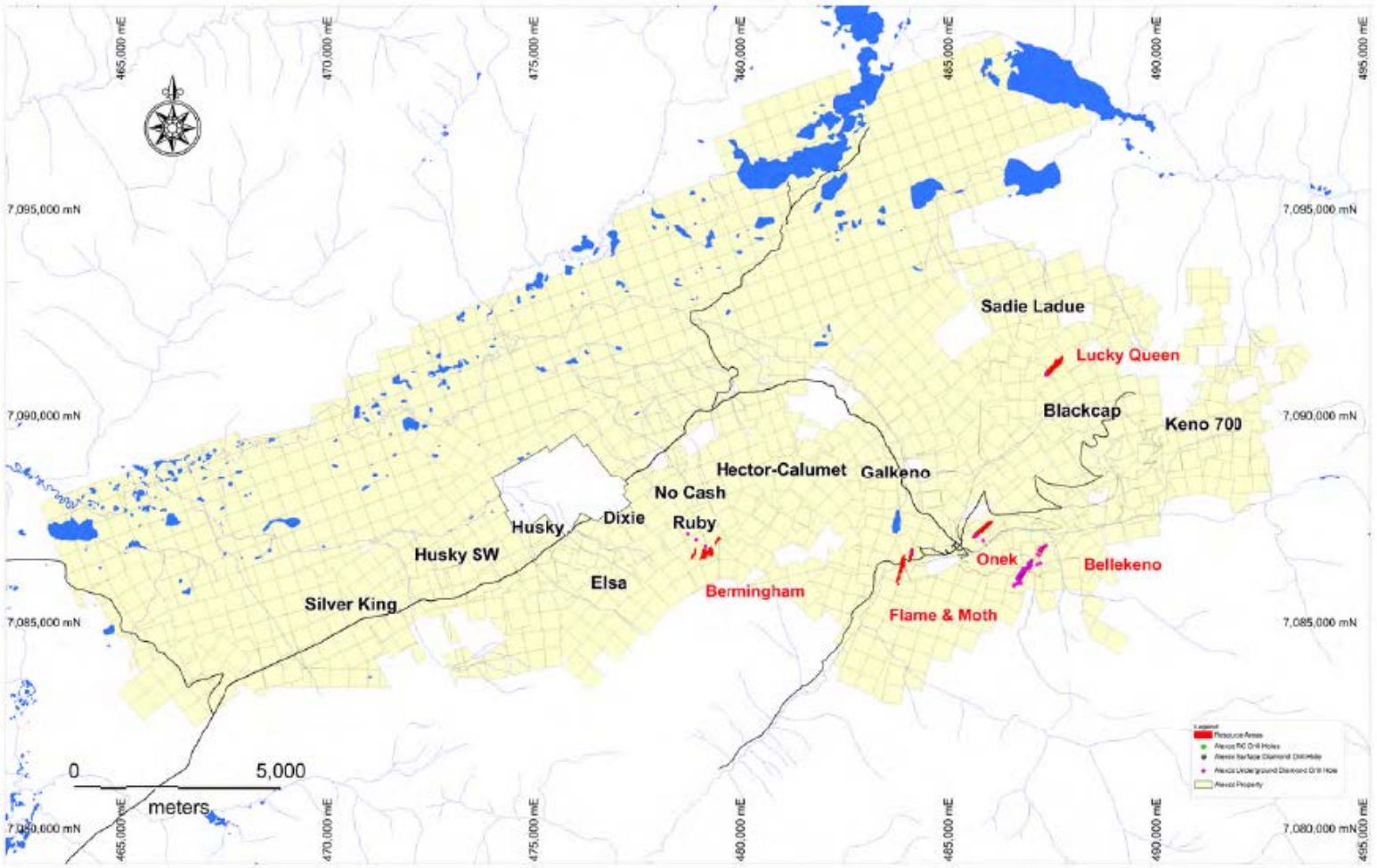


Figure 9-2 Underground Drill Hole Locations

9.1 EXPLORATION OF BELLEKENO DEPOSIT

A series of surface and underground core drilling programs and geophysical surveys have been conducted on the Bellekeno deposit since 2006. The combined drilling programs have produced 43,940 m of drill core from 447 drill holes targeting mineralized zone extensions including the Ram, Eureka, 48 Vein systems, including the projected southwest Thunder Zone extension of the 48 Vein and the northern extension at Balto. Results were used to verify historical results and for mineral resource estimation (Wardrop, 2009).

This includes surface drilling totalling 20,237 m HQ core in 73 surface holes and 23,703 m in 374 underground holes (with all HQ apart from 79 NQ for 5,095 m). Since the interim closure of the Bellekeno Mine in 2013, modelling of the mine geology has assisted in the development of a Keno district exploration model that has helped in obtaining an understanding of the structural controls of mineralization.

9.2 EXPLORATION OF LUCKY QUEEN DEPOSIT

Drilling in the Lucky Queen prospect area in 2006 totalled 875 m in four surface core drill holes that targeted the vein structure below the southwest end of the historical workings and around the lowermost reaches of the internal winze.

Further drilling late in the 2007 season consisted of 557 m in three surface core drill holes, however only one reached the target depth before inclement weather forced an end to the program. In 2008, a further twelve surface core drill holes totalling 2,999 m were completed as stepouts along the strike of the vein to the southwest. Closer spaced and infill drilling around the 2007 drill hole intercept was the focus of the 2009 and 2010 programs when a total of 6,673 m drilling was completed in 28 surface holes to form the basis for a resource estimate (SRK, 2011a).

Following partial rehabilitation of the historic 500 adit level in 2013, four underground core holes (211 m) were drilled outside of the resource area.

A district-wide surface geological mapping and structural study, started in 2007, was continued through the 2012 field season with findings incorporated into the Lucky Queen geologic model where applicable.

9.3 EXPLORATION OF FLAME & MOTH DEPOSIT

Field mapping in the vicinity of shallow historic prospect workings on the Moth Vein identified the presence of a north-northeast trending vein-fault thought to have displacement of approximately 450 m based on the offset of local stratigraphy (McOnie and Read, 2009). In conjunction with review of the past exploration results on the property, this led to the generation of drill targets with the completion of 3,986 m of drilling in 14 drill holes in 2010 that provided the Flame Vein discovery hole (K-10-0264) intercepting 693 g/t silver over a 4.64 m interval.

During 2010, a soil geochemical and a ground magnetic geophysical survey were also completed over the area. A further 32 drill holes for 7,150 m were drilled in 2011 with the results leading to the publication of the initial resource estimate (SRK, 2012a). Follow up drilling of 49 drill holes for 10,325 m completed in 2012 supported a revised resource estimate (Farrow and McOnie, 2013).

During 2013 a further eight drill holes completed for 1,835 m, extended the strike length of the mineralization for at least 220 m to the southwest to a total of over 900 m. Several ground geophysical surveys were also undertaken at this time; however, these were not particularly successful in delineating the mineralization.

Drilling completed in 2014 comprised 53 holes for 13,360 m that was largely designed to infill for an updated resource estimation (RPA, 2017) and to explore further along strike to the southwest.

Initial portal development of approximately 20 m was completed in 2016, followed by 17 geotechnical underground drill holes along the proposed decline trace, for a total of 572 m. At the end of September 2018, the decline had progressed for a distance of 312 m with a further 11 geotechnical and metallurgical drill holes completed for 1,167m and one for 113 m in 2020. The mine development is discussed in Section 15 and Section 16.

9.4 EXPLORATION OF ONEK DEPOSIT

Drilling on the Onek prospect in 2007 totalled 13 surface core drill holes for 2,803 m that targeted the down-plunge extension of the mineralization outlined in the historical workings. Twenty-nine surface core drill holes for 5,130 m were drilled in 2008 as infill and extension around the well mineralized 2007 intercepts, and also targeted the historical resource blocks. No work was completed in 2009, but renewed focus in 2010 saw a further twenty nine surface holes drilled for 3,694 m further along strike to the southwest of the historical workings. Infill drilling to the southwest was completed in 14 surface core holes for 1.295 m in 2011 and in 2012 a further two surface holes for 532 m were drilled further along strike to the southwest outside of the resource area.

The drill data and results of detailed open pit mapping were used to constructing the geological model that formed the basis of the initial resource estimate completed in 2011 (SRK, 2011b).

Following the drilling of a 237 m long surface core portal cover hole in 2012, a 220 m decline was driven northwest from the Lightning Creek valley and remains just short of the mineralized vein system. In 2013, eleven underground core holes for 739 m were drilled.

9.5 EXPLORATION OF BERMINGHAM DEPOSIT

The first targets generated in the Bermingham area were drilled by Alexco in 2009 with two holes completed for 523 m. The Bermingham Vein was targeted at depth in the hanging wall of the Mastiff Fault below an area where an historic shallow open pit resource had been outlined by UKHM and some unexplained silver drill hole anomalies existed. Results of this drilling were sufficiently encouraging to continue exploration in 2010 and 2011 when a further 34 holes were completed for 9,933 m.

In 2010, a soil-gas survey was conducted along a 2,200 m long by 175 m wide corridor stretching from Coral-Wigwam, over the historic Bermingham pit area, to the Townsite mine. An induced polarity and resistivity geophysical survey was conducted over the same area. As a result of these surveys, some anomalies were identified on the Bermingham trend along strike southwest of the historic open pit workings and these remain as future drilling targets.

Seventeen drill holes were completed for 5,576 m in 2012 to identify southwesterly extensions of the vein system and to also investigate vein continuity to the northeast into the footwall of the Mastiff fault. As a result of this drilling, an initial Mineral Resource estimate for the Etta and Arctic Zones was completed (SRK, 2012b).

Eight drill holes were completed for 2,667 m in 2014, to establish continuity to northeastern extensions to the mineralization, and in 2015 a further eight drill holes were completed for 2,606 m to follow up on a very high-grade intersection on what is now recognized as the Bear Vein located in the footwall of the Bermingham Vein. A revised resource estimate was prepared in 2015 (RPA, 2017).

Fifty drill holes were completed for 17,371 m in 2016, to define the extent of this high-grade Bear Vein and to better understand the vein geometries and position of some post-mineral faulting known in the area. As reported later, the drilling was completed at sufficient intercept spacing to allow a renewed resource estimate (RPA, 2017). In addition, because all holes had been drilled in a northwesterly direction against the dip of the target structures, and there were some unexplained mineralized vein intercepts that could not be readily correlated, the presence of a reverse dipping vein set as seen in some historic mines was suspected. To test this, a series of five holes for 1,729 m were deliberately drilled in a southeasterly direction and confirmed the presence of the mineralized West Dipping Vein.

In 2017 a drill program was dedicated to the infill and better definition of the mineralized vein structures previously outlined at Bermingham and a total of 38 drill holes for 13,277 m were completed. On the basis of these results confirming the geological interpretation and tenor of silver grades, a 550 m underground exploration decline was completed by June 2018 to provide a platform for close spaced infill resource drilling.

In 2018, the Bermingham exploration program comprised a 24-hole, 4,213 m infill underground drilling component as well as a 12-hole 4,369 m surface program for deeper and more extensive targets. Wide spaced step out exploration drilling comprising 25 holes for 12,965 m was completed on the Bermingham Northeast Deep zone in 2019 and 2020, and following the completion of a planned infill drill program in 2021, the results may warrant a re-estimation of the total Bermingham Mineral Resources.

The results of the district-wide surface geological mapping and structural study have been used in conjunction with the interpretation of the drill results and detailed remapping of the historic Bermingham open pit to resolve the stratigraphy and structural complications at Bermingham and to further refine vein targeting.

10. DRILLING AND TRENCHING

10.1 TRENCHING

Limited historical trenching work was completed along vein strike extensions, with very limited assaying and little geological information was documented.

In 2013 Alexco completed a six trench program totalling 375 m on Galena Hill between the Bermingham and Hector-Calumet historic mines.

10.2 DRILLING

In 2006, core drilling was performed by Peak Diamond Drilling, based out of Courtenay, British Columbia, utilizing two skid mounted drill rigs, a LF-70 drill, and an EF-90 drill. Drilling employed the wireline method using N-size equipment (NQ2).

In 2007 and 2008, core drilling was performed by Quest Diamond Drilling, based out of Abbotsford, British Columbia, utilizing four skid mounted drill rigs, two LF-70 drills, and two LF-90 drills in 2007; and two skid mounted drill rigs, one LF-90, and one QD-4 drills in 2008. Drilling employed the wireline method using H-size equipment (HQ).

The 2009 surface drilling was performed by Kluane Drilling of Whitehorse, Yukon, utilizing two skid mounted KD-1000 drills. Drilling employed the wireline method using N- and H-size equipment.

Surface drilling in 2010 was split among three contractors: Cabo Drilling based in Surrey, BC, Kluane Drilling out of Whitehorse, Yukon, and Ensign Encore Drilling from Calgary, Alberta.

Boart Longyear, based in Calgary, AB, have completed all subsequent surface drilling programs since 2011 using LF70, LF90 wireline drill rigs or a LX11 multipurpose RC/core drill rig. All core was recovered in PQ, HQ, or NQ sizes.

For all programs the drilling was well supervised, the drill sites were clean and safe, and the work was efficiently completed. Diamond drill operational safety inspections were conducted on each drill rig at various times throughout the drilling programs.

Underground core drilling at Bellekeno, Lucky Queen, and Onek in 2009, 2010, 2011, 2012, and 2016 was completed in NQ or HQ core size by Boart Longyear utilizing skid-mounted LM90 diamond drill rigs. Underground core drilling at Bermingham in 2018 was conducted by Boart Longyear utilizing two LM90 drill rigs and recovered in most cases HQ core.

Air rotary geotechnical/hydrological drilling programs completed at Flame & Moth and Bermingham in 2013 and 2016 were completed by Midnight Sun Drilling, based out of Whitehorse, Yukon, utilizing a Sandvik Marlin M5 Truck Mount rig. This drilling is not included in the drilling summary above.

Proposed surface drill hole collars were initially located using a handheld Garmin GPS device, with the completed collars being surveyed with either an Ashtech GPS device utilizing post-processing software or a Sokkia GRX1 RTK GPS.

All underground collars and drill stations were surveyed by underground surveyors (employed by Procon Mining & Tunnelling Ltd. or Alexco) using a total station survey instrument. In 2017 – 2018 all underground surveying was undertaken by Alexco personnel with drill hole collar orientations set by Reflex Gyrocompass.

All coordinates are recorded in the Universal Transverse Mercator (UTM) NAD 83 Zone 8 map projection system. Up until 2010 downhole surveys are recorded using Reflex survey tools at regular intervals of between 15 m and 30 m depending on the hole location and geologic conditions. Since 2011 surface holes have been surveyed progressively down hole at 24 m intervals using Reflex single shot tools, while underground surveys have been by Reflex Multishot at 12 m intervals obtained on pulling out of the hole.

Standard logging and sampling conventions are used to capture information from the drill core. Between 2006 and 2010 core was logged in detail using paper forms with the resulting data entered into a commercial computerized logging program either by the logging geologist or a technician. Since then all core logging data has been directly digitally entered into a SQL based database with data including comments captured in separate tables including:

- Lithology: rock type, including significant fault or mineralized vein-faults, and textural modifiers;
- Structure: type of structure and measurements relative to core axis;
- Mineralization to identify type and intensity of oxidation, metamorphic, hydrothermal, or disseminated phases, and abundance of veining;
- Alteration;
- Stratigraphy: units consistent with the surface mapping; and
- Geotechnical: percentage recovery and rock quality determination and fracture intensity. Additionally, more detailed geotechnical data has been recorded from the Flame & Moth and Bermingham drilling.

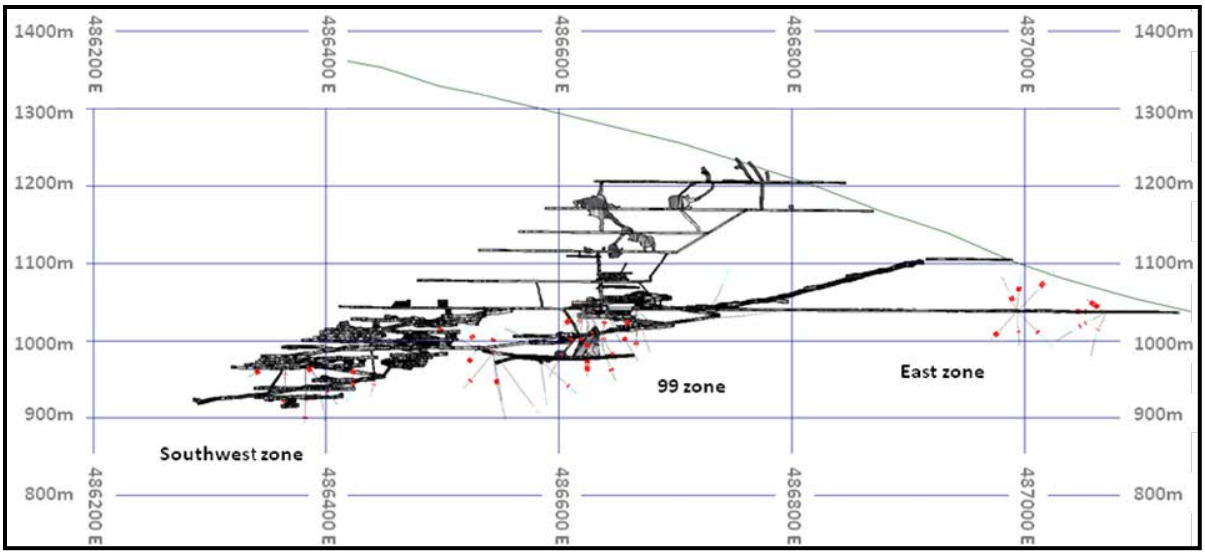
Alexco systematically measured core bulk density (CBD) of mineralized material as well as basic rock types. Bulk density was measured using a balance and measuring the weight of core pieces in air and in water. The core weighted in water was not covered by wax or plastic film. Pulp bulk density (PBD) measurements were obtained by pycnometry on select assay intervals of mineralized zones for Alexco drilling by ALS Laboratories (ALS) and AGAT Laboratories (AGAT).

10.3 HISTORICAL DRILLING AT THE BELLEKENO MINE

Historical percussion and core drilling for the Bellekeno area extended from 1975 to 1996, and although all of the data has been compiled, some sections are most likely incomplete.

Between 1975 and 1996, UKHM drilled four surface, and two underground percussion programs. These drill holes were logged, sampled, and assayed at four and five -foot intervals, respectively (1.22 m and 1.52 m). Originally, percussion drilling and sampling was undertaken to mitigate loss of vein material observed in coring programs. However, the nature of chip logging, recirculation of water and rock material within these types of drill holes are considered poor data sources for technical reports and were not used for the resource estimation.

Coring programs between 1986 and 1996 were drilled from underground totalling 4,944 m across 60 drill holes under UKHM. Drill holes were drilled with BQ and NQ bits, but generally resulted in moderate to poor recovery in areas where foliation and stratigraphy were subparallel to the core angle, heavily fractured, and or friable material was encountered. Drill holes were generally designed to test for the downward extension of the 99 Zone, and smaller programs for the Southwest and East zones, as illustrated in Figure 10-1.



Source: SRK 2013

Figure 10-1 Bellekeno Mine Long Section, 1986–1996 UKHM Core Drill Holes. view to northwest

Archived drilling data and procedures were briefly reviewed by G. David Keller, P.Geo., of SRK as part of the updated PEA technical report issued by Wardrop in 2009. As part of this review, Mr. Keller discussed the drill core sampling procedures with UKHM staff active during the mining operations at Bellekeno. The drilling procedures were deemed reasonable based upon the limited information available (Wardrop, 2009), and thus considered reliable for geologic interpretation and resource calculations.

10.4 2006–2013 ALEXCO DRILLING AT THE BELLEKENO MINE

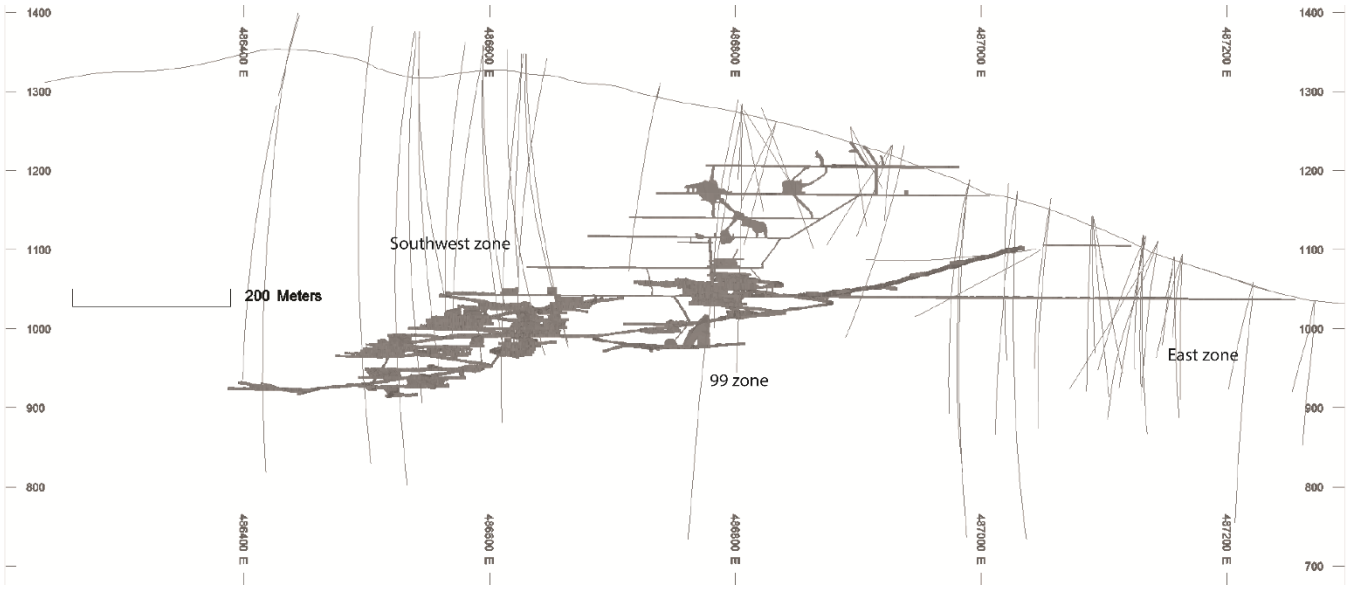
A total of 42,733 m of drilling from both surface and underground (excluding service holes) was completed at the Bellekeno deposit between 2006 and 2013 (Table 10-1).

Table 10-1 2006 to 2013 Bellekeno Property Core Drilling Summary

Year	No. of Drill Holes	Length (m)
Surface Drilling		
2006	10	3,737
2007	37	11,004
2008 (decline cover holes)	2	782
2009	17	2,730
2010	5	1,560
Total	**71**	**19,812**
Underground Drilling		
2009	136	7,728
2010	49	4,938
2011	89	4,610
2012	64	4,520
2013	36	1,908
Total	374	23,703

In 2006 Alexco commenced an aggressive core drilling program to confirm and test the 1997 historical mineral inventory and block model as well to extend the known mineralization in preparation for publishing an updated resource. Between 2006 and 2009, 200 drill holes of HQ and HQ3 size were drilled from underground and surface platforms, resulting in 25,199 m core focused on the 48 and 49 vein structures. The drill core sampling and logging procedures were reviewed, and later compared against the UKHM drilling programs and active mining. The larger core diameter, along with triple tube chambers helped to limit core loss in the vicinity of the vein but did not fundamentally change core recovery. Drill core programs, surveying, and sampling procedures were considered reliable for geological modelling and mineral resource estimation.

During 2010, five surface core drill holes were drilled for 1,560 m with two drill holes on the southern offset of the 48 Vein structure and three drill holes to the north of the 99 Zone. The drill holes ranged in length from 124 m to 615 m, generally oriented to the northwest at inclinations of between -55° and -72°, to provide intercepts almost perpendicular to the vein structure resulting in vein intercepts close to true thickness. Downhole surveys were generally taken every 30 m, using a Reflex downhole survey tool. The distribution of surface drill holes is illustrated in Figure 10-2.



Source: SRK 2013

Figure 10-2 Bellekeno Mine Long Section, Surface Core Drill Holes, 2006–2013. view to northwest

Underground core drilling programs undertaken at Bellekeno between 2010 and 2013 focused on infill resource definition, geotechnical and, to a lesser degree, extensional exploration programs. Over this period 238 drill holes for 15,976 m were drilled with completed lengths between 12 m and 285 m. Resource infilling drill holes were typically targeted on 15 m centres, while larger step outs of 25 m and 50 m were more common on exploratory drill holes. Attempts were made to intersect the vein structures at orientations that would provide intercepts close to true thickness. Drilling was generally along a northwest – southeast orientation, with declinations between +65° and -55°. The drilling pattern was considered consistent to operational requirements and sufficient to provide accurate resource estimations given the heterogeneity of the vein composition. The distribution of underground core drill hole traces is shown in Figure 10-3. A summary of core recovery by year is summarized in Table 10-2 and Table 10-3.

Drilling procedures and results have been reviewed and are considered reliable for geologic interpretations and resource calculations.

Table 10-2 Summary of Bellekeno Surface and Underground Core Recovery Statistics 1996 – 2009

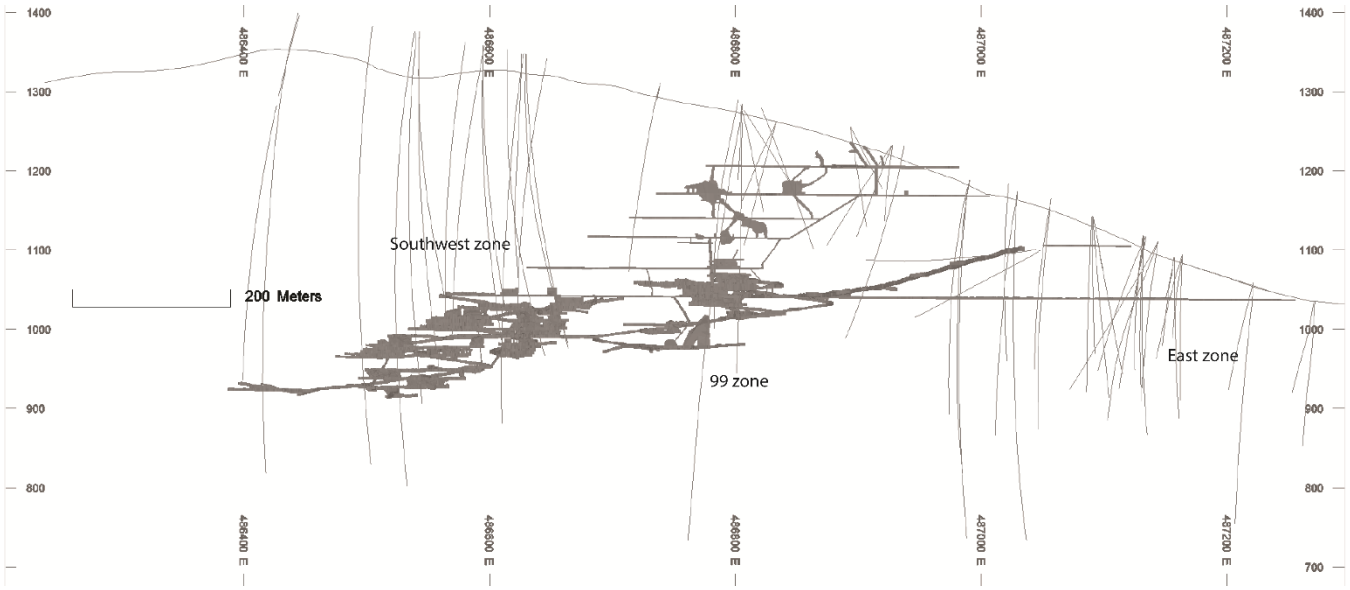
	Core Recovery		NQ Intervals	HQ Intervals
Zone	%*	%**		
East	81	83	5	0
99	67	75	30	5
SW	79	88	45	13
Average	76	83	Sum 80	18

* NR Zones are treated as 0% recovery.
** NR Zones are excluded.

Table 10-3 Summary of Bellekeno Underground Core Recovery Statistics 2009 – 2012

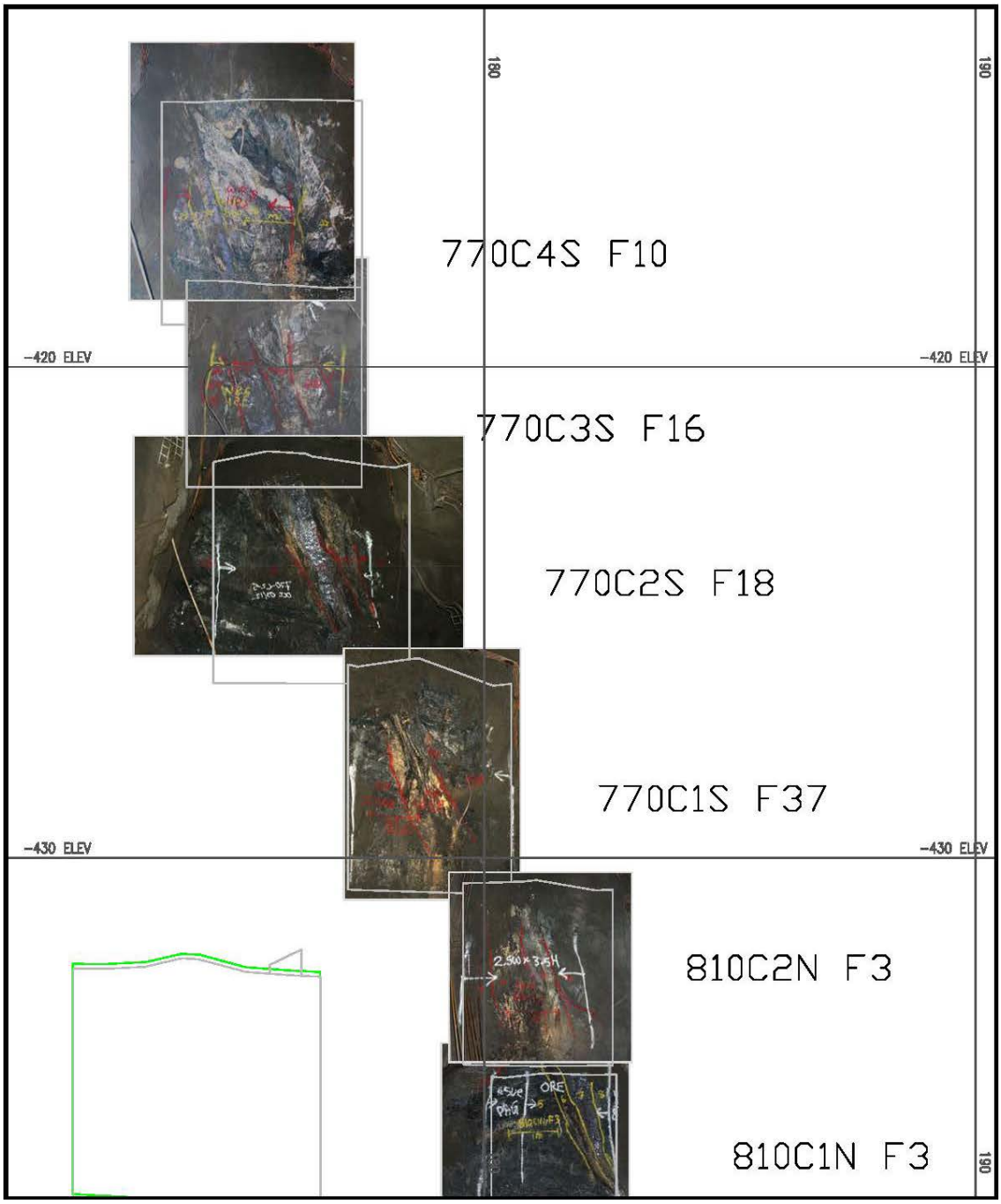
	Core Recovery (%)			
Headings	**2009**	**2010**	**2011**	**2012**
East Zone				
Number	14	3		
Average	67	21		
Min	24	2		
Max	91	34		
99 Zone				
Number	44		13	20
Average	72		58	62
Min	44		26	36
Max	89		99	86
Southwest Zone				
Number	64	27	53	4
Average	80	73	62	80
Min	25	16	36	74
Max	98	98	86	84

Vein heterogeneity and moderate to poor vein recovery during drilling was overcome by the incorporation of chip data into the geological model. An example of vein heterogeneity is illustrated in Figure 10-4.



Source: SRK 2013

Figure 10-3 Bellekeno Mine Long Section, Underground Core Drill Holes, 2006–2013. view to northwest



Source: SRK 2013

Figure 10-4 Photographic Section of 48 Vein Heterogeneity, Bellekeno Mine

10.5 HISTORICAL DRILLING AT LUCKY QUEEN

Historical drilling information is available for the Lucky Queen area from the 1950s through the 1980s. In 1957 UKHM drilled two surface core drill holes (Lucky Queen 2 and Lucky Queen 4) that intercepted the main Lucky Queen structure below the existing 300 level workings; however, core recovery was very poor. For example, across a 50.90 m interval (from a depth of 156.06 m to 206.96 m in drill hole Lucky Queen 4), recorded recovery averaged only 22% in the approximate vicinity of the vein because of the fractured and friable nature of vein material. No assays exist for these drill holes because vein material was either not intercepted or was not recovered and, thus, assaying was likely deemed unnecessary. In addition, survey control for these drill holes is sparse. For the above reasons the historical surface core drilling data was not used in the Lucky Queen resource estimate.

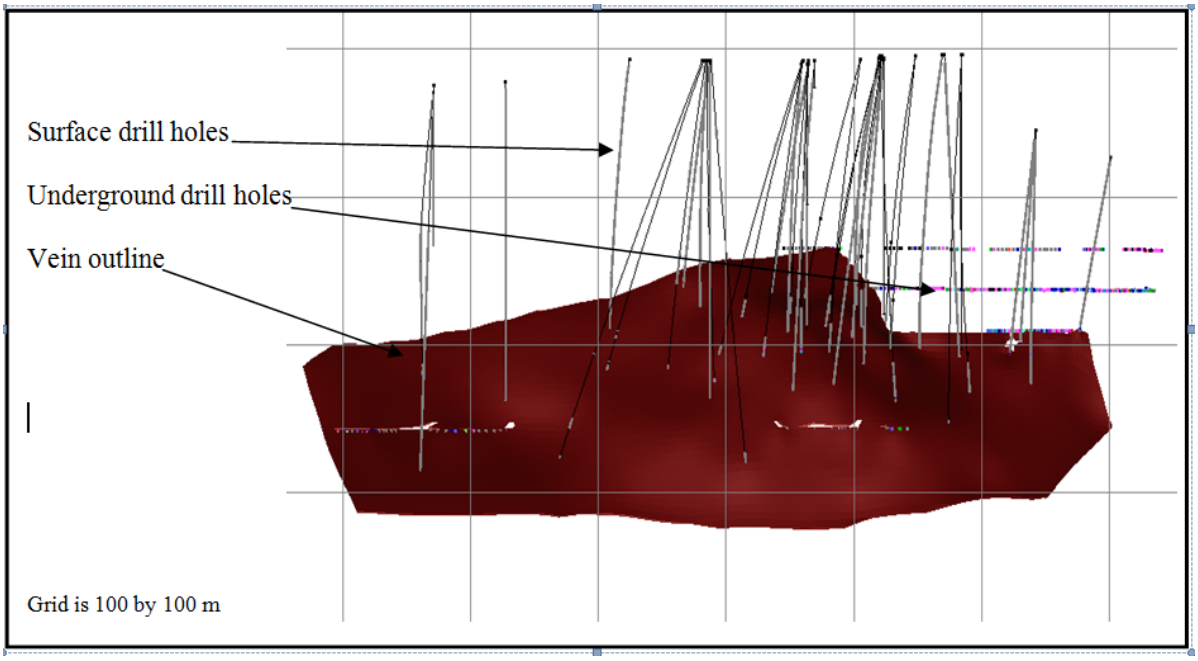
Between 1985–1987 UKHM drilled underground percussion test drill holes from the Lucky Queen 500 level adit that were sampled and assayed at 4 ft intervals. As percussion drilling does not reliably present the accurate location of a sample and no recovery data was obtained by UKHM. On this basis, historic assays were not used in this resource estimate. The test drill holes did however provide some useful geological information and were used to help constrain the geometry of the main Lucky Queen structure and associated splay structures during wireframe construction.

Shallow, rotary percussion surface drill holes were also drilled in the Lucky Queen area in the 1970's through 1980 totalling approximately 20,400 m in 507 drill holes. As with the underground rotary percussion drill holes, these data were not deemed reliable for Mineral Resource estimation although the data was used in select geostatistics (variography) and in construction of mineralization and geological models, where applicable.

10.6 2006 – 2017 ALEXCO DRILLING AT LUCKY QUEEN

Alexco conducted surface core drilling programs at Lucky Queen between 2006 and 2010 with 47 core drill holes totalling 11,105 m designed to test development of mineralization along strike and down-plunge of the historical workings (Figure 10-5).

In 2017 two core holes were completed for 433 m in the resource area for the purposes of obtaining fresh samples for metallurgical testwork.



Source: SRK 2011a

Figure 10-5 Location of Surface Drill Holes Drilled from 2006 to 2010 at Lucky Queen. view to northwest

Surface drill holes ranged in length from 18 m to 324 m, averaging 235 m, with most drill holes drilled on a northwest azimuth with an inclination of between 45° and 80°. In most cases the drill holes were designed to intercept the mineralized zones perpendicular to the strike direction to give as close as possible a true thickness to the mineralized interval. Downhole surveys were taken approximately every 60 m in 2006, 30 m in 2007 and 2008, and 15 m in 2009 and 2010 using a single shot Reflex survey tool.

Drilling was designed to have a regular grid pattern with vein pierce point spacing on the order of 20 m to 30 m.

Following rehabilitation of most of the 500 adit level in 2012, four underground core holes for 210 m were drilled, although these were outside the resource area.

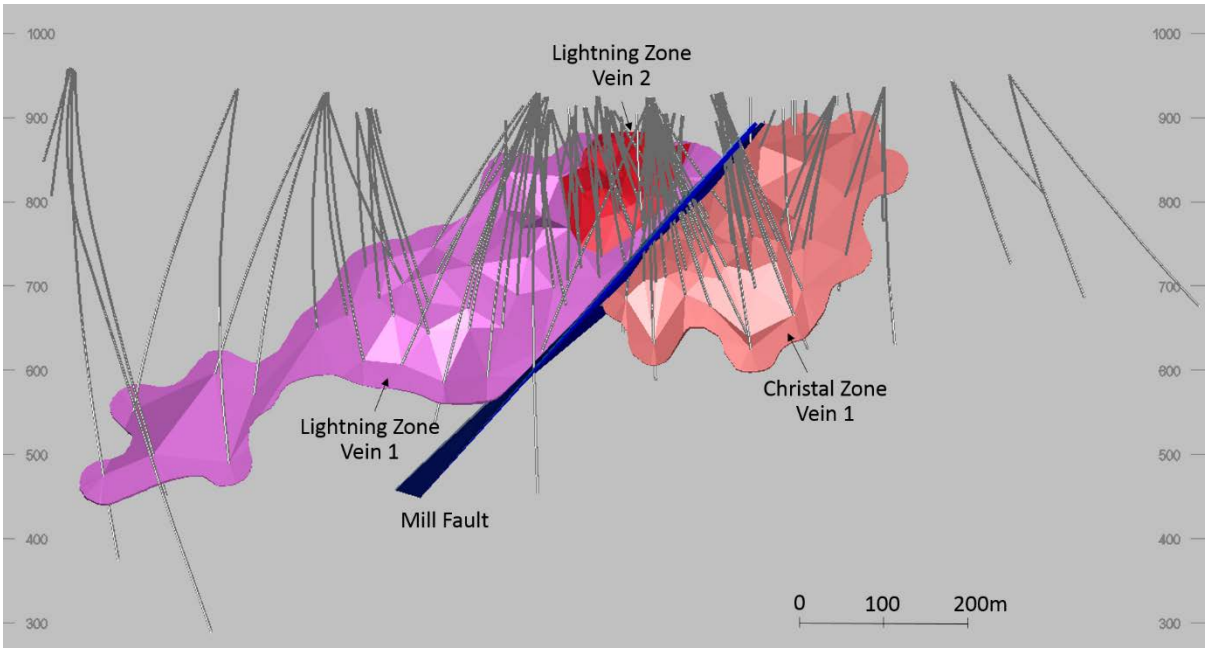
10.7 HISTORICAL DRILLING AT FLAME & MOTH

Historical drilling at Flame & Moth was predominantly shallow surface percussion overburden drill holes with 133 drill holes totalling 4,044 m drilled on an average azimuth of 320°. Nine core drill holes totalling 731 m were drilled from surface and 13 drill holes totalling 193 m were drilled from the shallow underground workings. Core recovery was generally poor, particularly in mineralized zones which were the only intervals assayed.

Due to recovery issues for the historical core drill holes, lack of careful sampling techniques, and the open hole nature of the percussion drilling, drilling data from these programs was not deemed reliable for use in the Mineral Resource estimation, although the data were used in the construction of geological models where applicable.

10.8 2010 – 2018 ALEXCO DRILLING AT FLAME & MOTH

Between 2010 and 2014, Alexco conducted surface core drilling programs within the resource area at Flame & Moth with a total of 151 holes for 35,244 m in the area wireframe modelled for resource estimation (Figure 10-6). The exploration drilling was initially designed to test geologically derived targets in the vicinity of the historical shallow Moth workings. Following the new blind discovery of the Flame Vein in 2010, additional drilling was successful in outlining two zones of silver-lead-zinc mineralization on the Flame Vein, offset by the post-mineral Mill Fault to the Lightning Zone in the southwest and the Christal Zone in the northeast (Chipman and McOnie, 2015). Sufficient density of drilling has been completed to support Mineral Resource estimation.



Source: RPA 2017

Figure 10-6 Location of Surface Drilling from 2010 to 2014 at Flame & Moth Used in Resource Estimation. view to northwest

In 2010, 14 drill holes for 3,986 m were collared to target deep below the historically recorded mineral occurrence on an inferred pre-mineral fault structure identified by surface mapping (McOnie and Read, 2009). After losing the first drill hole in deep overburden, 11 other drill holes intercepted silver-lead-zinc mineralization that defined a mineralized vein structure striking 025° and dipping 62° southeast. One drill hole that was drilled furthest to the southwest at that time, encountered mineralization much deeper than anticipated and implied a right lateral post mineral fault offset of the structure.

In 2011, 32 drill holes were collared; however, eight were lost or abandoned, largely due to the presence of a deep paleo-river channel containing unconsolidated running sands and boulder beds. The majority of the drill holes targeted the up-dip extension of the mineralized vein located in the hangingwall of the Mill Fault (Lightning Zone) that had been identified in the 2010 drilling campaign. In total, 24 drill holes were completed to target depth for a total of 6,708 m.

In 2012, a further 49 drill holes were collared to infill and extend the initially defined resource, although four were abandoned. Approximately half of the holes targeted the upper part of the Lightning Zone not previously drill tested,

while the remaining holes were drilled in the lower and southwestern part of that zone and in various infill areas in the Christal Zone. In total, 39 drill holes were drilled to target depth for a total of 8,610 m.

In 2013, eight drill holes were completed outside the resource area for a total of 1,835 m to better define the upper part of the Christal Zone and the southwest extension of the Lightning Zone. Three air rotary holes were also drilled for hydrogeological purposes for an additional 624 m.

In 2014, 59 drill holes were collared in and around the Flame & Moth area, of which nine were abandoned. A total of 46 drill holes were designed to infill in the Christal and Lightning Zones and follow the southwest extension of the Lightning Zone. Three drill holes were used to define the overburden depth over a potential decline location while another ten drill holes tested nearby vein targets and geophysical targets adjacent to the resource area. In total, 50 drill holes were drilled to target depth for a total of 14,560 m.

In 2016, following the initial development of the Flame portal, 17 underground geotechnical drill holes were completed along the proposed decline trace, for a total of 572 m.

In 2018, a series of six shallow drill holes for 346 m were drilled to better define the base of the overburden channel in the vicinity of the proposed underground development and four holes for 773 m were completed to provide fresh material for metallurgical testwork.

Surface core drill holes in the Mineral Resource area that were drilled to target depth ranged in length from 38 m to 715 m. Most drill holes were drilled on a northwest azimuth with an inclination of between 45° and 90°. In most cases, the drill holes were designed to intercept the mineralized zones perpendicular to the strike direction to give as close as possible a true thickness to the mineralized interval. Drill hole spacing is in the order of 25 m to 60 m, with a closer spaced grid pattern in the core of the higher-grade Mineral Resource areas.

10.9 HISTORICAL DRILLING AT ONEK

Historical core drilling at Onek is limited to 10 short horizontal underground drill holes that were drilled at various azimuths and did not include downhole surveys. Drill recovery was generally poor, particularly in mineralized zones and core assays were restricted to well mineralized zones.

Shallow, open-hole, surface percussion drilling was also undertaken in the Onek area, mainly in the historic open pit area, during the 1970s, with a total of approximately 13,000 m completed in 319 holes.

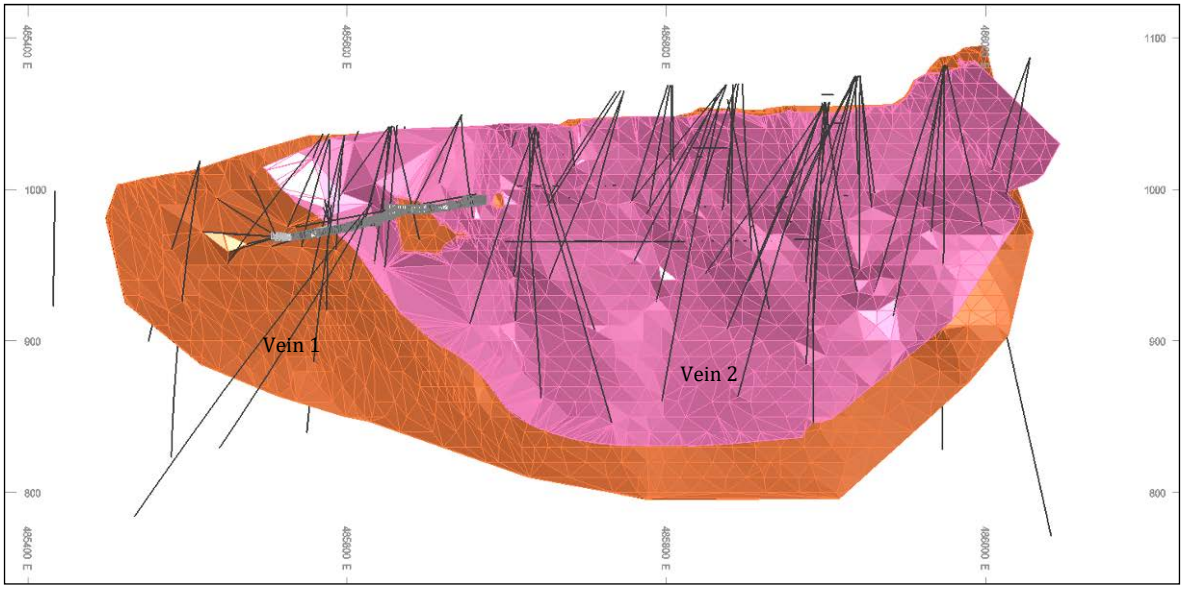
Due to recovery issues for the core holes, lack of careful sampling techniques, and the open-hole nature of the test/percussion, drilling data from these programs was not deemed reliable for use in the resource calculation. The data was used in select geostatistical analyses (variography) and in construction of mineralization/geologic models, where applicable.

10.10 2010–2014 ALEXCO DRILLING AT ONEK

Alexco conducted surface diamond drilling programs at Onek in 2007, 2008, 2010 and 2011 with a total seventy-eight core drill holes for 11,828 m completed in the resource area (Figure 10-7). The drilling was designed to confirm and test historic reserve/resource blocks and extend known mineralization along strike and down plunge in order to produce a robust geological model for a new resource calculation in keeping with current standards.

Two surface exploration core holes for 531.98 m were drilled along strike to the southwest outside of the resource area in 2012.

A 220 m decline was driven towards the Onek deposit in 2013 following the drilling of a single 236.77 m surface core portal cover hole, and eleven underground core holes for 739 m were drilled.



Source: SRK 2014

Figure 10-7 Location of Surface and Underground Drilling from 2007 to 2013 at Onek, view to northwest

10.11 HISTORICAL DRILLING AT BERMINGHAM

Historical core drilling at Bermingham is limited to 16 core drill holes dating from 1969 located in the resource estimation area. The holes were drilled at an average azimuth of 323° and were not surveyed downhole. The average hole length was approximately 80 m with several holes ranging up to 146 m. Drill recovery was generally poor, particularly in mineralized zones, and core assays were restricted to well mineralized zones.

A small portion of the 874 shallow, open-hole, surface percussion drill holes completed historically in the Bermingham area were focused on the present resource area, first as vertical holes in a grid pattern on approximately 30 m centers, followed later by a definition drill program of inclined holes along strike of the vein to define an open pit target.

Due to recovery issues for the core holes, lack of careful sampling techniques, and the open-hole nature of the percussion drilling, drilling data from these programs was not deemed reliable for use in the resource calculation. The data were used in construction of mineralization/geologic models, where applicable.

10.12 2009–2018 ALEXCO DRILLING AT BERMINGHAM

Alexco has conducted surface diamond drilling programs at Bermingham between 2009 and 2018 and underground drilling from the exploration decline in 2018. The database at Bermingham currently includes 193 drill holes for a total of 60,535 m of HQ core. Alexco commenced surface diamond drilling at Bermingham in 2009 with two core holes for a

total of 523 m that were designed to test the Bermingham Vein at depth in the hangingwall section of the Mastiff Fault below historic open pit workings (Iles and McOnie, 2017).

Silver-lead-zinc mineralization encountered in both holes and was deemed significant enough to warrant follow-up drilling the next year when nine core holes totalling 3,046 m were completed. Of these six intercepted the Bermingham Vein, one was abandoned due to bad ground and one missed the target due to unforeseen structural complexity. Interpretation of the data at this time led to the recognition of the subparallel Aho Vein located in the hangingwall of the Bermingham Vein.

Encouraging assays led to an expanded 2011 drill program with 25 holes for a total of 6,888 m completed, with 13 of these for 3,217 m completed in the hangingwall of the Mastiff Fault (Etta Zone) designed to explore and infill in the vicinity of the earlier drilling. The additional data obtained necessitated interpretation of a third vein structure developed in the footwall of the Bermingham Vein referred to as the Bermingham Footwall Vein. As well, nine holes for 2,466 m were completed in the footwall of the Mastiff Fault (Arctic Zone), partly to explore the intersection of the Bermingham and Aho veins as this structural configuration was thought to control the mineralization observed in the Mastiff hangingwall zone. Two of these holes were, however, abandoned due to poor ground conditions but the continuation of vein structures was traced several hundred metres to the northeast.

In 2012, 17 drill holes totalling 5,576 m were completed with one 314 m long hole drilled to follow up on 2011 drill holes that encountered structures carrying anomalous silver values to the northeast of the Bermingham open pit. As a result, the strike length of the Aho Vein was extended 440 m in this direction. Nine holes totalling 2,978 m were drilled in the Arctic Zone in the footwall of the Mastiff Fault to better define and extend mineralization encountered in this zone during 2011 drilling. One of these holes had to be abandoned due to poor ground conditions before reaching target depth and another missed the target vein due to fault complexity. The seven holes that successfully intercepted the Bermingham structures demonstrated the continuity of strong mineralization along a strike length of more than 200 m with one intercept of 1,639 g/t (52.7 oz/t) Ag over 4.04 m true thickness that contained pyrargyrite and native silver. Mineralization remained open at depth and along strike to the northeast. Four holes totalling 1,798 m were also drilled 200 m to the southwest of the resource area and intercepted vein extensions in the Etta Zone; however, the silver values were low grade.

In 2014, eight core holes were drilled for a total of 2,668 m, with four of these (1,192 m) drilled in the immediate footwall of the Mastiff Fault (Arctic Zone) to allow for resource estimation, and four holes (1,476 m) drilled to the northeast of this area to expand and infill around a well mineralized Bermingham Vein intercept in drill hole K-12-0477. All four holes intersected the mineralization, with one intercept returning a composite assay of 6,118 g/t (196.7 oz/t) Ag over 5.81 m true thickness in hole K-14-0537 on a vein that is now referred to as the Bear Vein.

Eight core holes targeting the area around the high-grade intercept in drill hole K-14-0537 were drilled in 2015 for a total of 2,606 m. Four of these holes intercepted similar grades to define a steeply plunging shoot in the newly recognized Bear Vein.

Fifty drill holes were completed in 2016 for 17,371 m, primarily to explore the Bear Vein that ranges in true width up to 6.4 m at 5,660 g/t (182 oz/t) Ag in drill hole K-14-0537 and in grade up to 7,465 g/t (240 oz/t) Ag over 5.0 m true width in drill hole K-15-0580.

In 2017, 38 core holes were completed for 13,277 m to extend mineralization in the Arctic Zone and to explore further northeast to the location where the Northeast Zone mineralization was discovered.

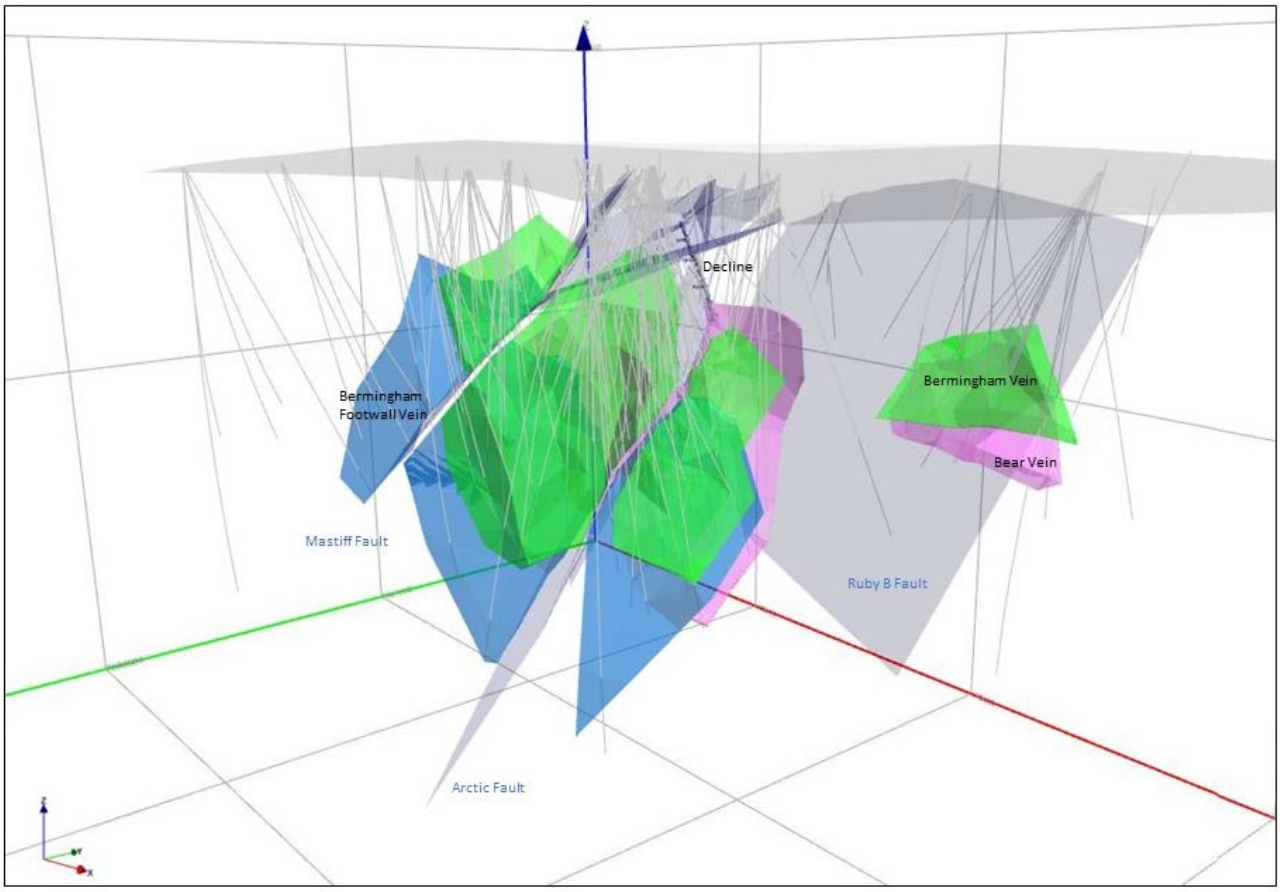
In 2018, a total of 38 core drill holes for 8,583 m was completed. This comprised 24 underground HQ holes collared from two sites in the exploration decline for 4,214 m that were designed to close space infill on the upper part of the high-grade Bear Vein, and 12 surface holes for 4,369 m designed to provide deeper intersections on the Bermingham and Bermingham Footwall veins and infill the area between the Etta and Arctic zones.

The Bear Vein mineralization has now been traced over a down-plunge extent of over 300 m (over a vertical range of 230 m) and a plunge width of up to about 100 m, with the top of the deposit being approximately 130 m below surface. Deeper exploration drilling has also been initiated with the objective to explore the set of mineralized veins known from Bermingham at the elevations where they can be expected to occur in the same competent host rock stratigraphy as seen in the nearby major Hector-Calumet deposit.

To date the interpretation of the consolidated drilling results has identified four significantly mineralized vein-fault sets that splay and change orientation along strike within the north-northeast striking and moderately to steeply southeast dipping Bermingham structural corridor. This structural corridor is divided into the Etta Zone in the hangingwall of the post-mineral Mastiff Fault and the Artic Zone in its immediate footwall, with the Bear Zone now identified between the post-mineral Arctic and Ruby B faults and the Northeast Zone to the northeast of the Ruby B Fault. The main Bermingham and Bermingham Footwall veins both occur in the Etta, Arctic, and Bear zones, while the Bear and associated conjugate West Dipping vein sets occur within the Arctic and Bear zones in a position controlled by a flexure in the Bermingham vein-fault, and the Bermingham and Bear veins are interpreted to occur in the Northeast Zone.

Surface drill holes in the area have been drilled to depths of up to 611 m. Most holes were drilled on a northwesterly azimuth with a declination of between 50° and 80° and were designed to intercept the primary mineralized zones as perpendicular as possible to the strike direction to give as close as possible a true thickness to the mineralized interval, although this was not always possible due to maximizing use of drill sites and the complexity of veining and several commonly being intercepted in a single drill hole. Downhole surveys for surface holes were taken at approximately 15 to 24 m intervals using a single shot Reflex survey tool, while the underground holes were surveyed with a multishot Reflex survey tool at 12 m intervals.

In addition to the core holes, two air rotary holes were drilled in 2016 for hydrogeological purposes.



Scale: 500m grid lines.

Figure 10-8 Location of Bermingham drilling from 2009 to 2018 (Oblique longitudinal view to northwest)

11. SAMPLE PREPARATION, ANALYSES AND SECURITY

11.1 SAMPLE PREPARATION AND ANALYSES

11.1.1 HISTORICAL SAMPLING (PRE-ALEXCO)

Information regarding historical (pre-Alexco) sampling approach and methodology is limited. The available documentation is outlined below.

A 1965 UKHM document outlines the sampling procedures for a newly purchased percussion drill. It was found that in most cases the frozen ground gave sufficient support for the drill hole without additional casing. In a few cases where the ground was not frozen, casing was advanced with the drill bit.

Drill cuttings were collected using a locally designed cone-shaped deflector with a catch pan shaped to fit around the casing. During drilling operations, cuttings were blown upwards between the drill rod and the casing, where they hit the deflector and were caught by the catch pan. Runs were 5 ft (1.5 m) in length and provided 10 lb to 15 lb of sample material. At the end of each shift, several hundred grams were split from each sample in the geochemical laboratory; the remainder of the sample material was screened to -14 mesh. Constituents of the fine and coarse fraction were identified separately.

A document dated 1994 by Watts Griffiths and McQuat (WGM) outlines sampling procedures for the reverse circulation drilling. Two samples were to be collected for each 5 ft interval. One sample was sent to the laboratory while the other sample stayed at the drill for reference. The samples were collected in porous plastic bags and were dried prior to analysis. The document stresses cleanliness during the sampling procedure in order to avoid contamination.

An undated UKHM document outlines underground chip sample procedures as well. In addition to the above information, emphasis is put on clean faces in order to prevent sample contamination from previous blasting activities. Samples were to be taken within a 1.5 ft (0.5 m) wide area across the rock face. In addition to separate samples per rock type, this undated document requires separate samples for a change in structure. The sample location was to be measured from the nearest survey station; the resulting distance measurement was used to plot the samples (and assay results) on level plans. More detailed information was listed regarding the direction in which samples were to be taken for various kinds of underground openings.

11.2 ALEXCO CORE DRILLING SAMPLING - EXPLORATION PROGRAMS (2006–2018)

The sampling protocol adopted by Alexco has remained relatively unchanged for the surface and underground drill programs conducted between 2006 and 2018.

Core logging and sampling is completed by Alexco staff, where a logging geologist marks the sample intervals and cutting orientation normal to veins on the core. After logging, the core is digitally photographed and for surface core sawn in half lengthwise using a diamond saw where possible and for broken core it is manually split in half. One half is returned to the core box for storage at the site and the other placed in a thick-walled plastic bag for sample shipment. At Bellekeno, whilst in production, some core was whole core sampled, and recently at Bermingham a proportion of the underground resource definition core was also whole core sampled to obtain more representative samples of the high-grade silver mineralization. No further on-site processing is undertaken.

Samples are a maximum of 2 m in length within unmineralized major rock types but are broken at lithological contacts and at significant mineralization changes. Intervals with no recovery due to core loss are recorded separately. Sample intervals within mineralized zones range from 0.10 to 1.0 m, based on consistency of mineralization. In initial work at the prospects, drill holes were sampled top to bottom; however, once a considerable body of geochemical data was available and the nature and distribution of the mineralization better understood, some intervals of barren material have not been sampled particularly in close proximity to adjacent drill holes that had been sampled continuously.

Some minor modification in the sample shipment procedure has occurred over time, primarily in response to changing laboratory locations and the logistics surrounding available commercial transport. In all cases, approximately four to five individual samples are placed in polyfibre bags for shipment.

In 2006, samples were sent to Whitehorse, Yukon by Kluane Transport then by Manitoulin Transport to the ALS Chemex facility in North Vancouver, British Columbia for preparation and analysis. Beginning in 2007, each shipping bag was sealed with a numbered security tag, before being placed on pallets and shrink wrapped for shipping.

In 2007/2008, samples were transported to the Canadian Freightways facility in Whitehorse, Yukon by Alexco personnel. Canadian Freightways then trucked the samples to the ALS Chemex facility in Terrace, British Columbia for preparation. Pulverized subsample splits were then sent to the ALS Chemex facility in North Vancouver, British Columbia for analysis.

In 2009, samples were transported to the Eco Tech Labs preparation facility in Whitehorse, Yukon by Alexco personnel. Pulverized subsample splits were then sent to the Eco Tech facility in Kamloops, British Columbia for analysis.

In 2010, samples were shipped via Manitoulin Transport to Whitehorse, Yukon where they were couriered to the preparation facilities of either AGAT or ALS Minerals in Whitehorse. The pulverized subsample splits were then sent to the AGAT facility in Mississauga, Ontario, or the ALS facility in North Vancouver, British Columbia, for analysis.

Between 2011 and 2013, samples were shipped via Manitoulin Transport to Whitehorse, Yukon where they were delivered directly to the preparation facilities of ALS Minerals in Whitehorse. The pulverized subsample splits were then sent under seal by the laboratory to the ALS facility in North Vancouver, British Columbia, for analysis.

Since 2014, samples have been shipped in sealed wooden boxes containing approximately 100 samples, directly by Alexco employees to the ALS Minerals sample preparation facility in Whitehorse and again the assay pulp is transported under seal by the laboratory to the North Vancouver analytical facility.

ALS Minerals, Eco Tech, and AGAT are all accredited to ISO 17025 by the Standards Council of Canada for a number of specific test procedures, including fire assay for gold and silver with atomic absorption and gravimetric finish; multi-element inductively coupled plasma optical emission spectroscopy; and atomic absorption assays for silver, copper, lead, and zinc. ALS Minerals laboratories also participate in a number of international proficiency tests, such as those managed by CANMET and Geostats.

Sample preparation and analyses have been consistent for the 2006–2018 Alexco programs. Sample preparation consists of initial fine crushing of the sample to better than 70% passing 2 mm with the crusher cleaned with “barren material” after every sample. A nominal 250 g split of this material is then pulverized to greater than 85% passing 75 m for analyses with the pulverizer cleaned with “barren material” after every sample. Duplicate samples are prepared at the preparation facility by collecting a second 250 g split from the crushed material taken from the preceding sample when noted.

Samples are analyzed for gold by fire assay and atomic absorption spectrometry on 30 g subsamples and for a suite of 27 to 48 elements by four acid digestion and either inductively coupled plasma atomic emission spectroscopy (ICP-AES) or induced coupled plasma mass spectroscopy (ICP-MS) (on 0.5 g subsamples). Elements exceeding the concentration limits of ICP-AES or ICP-MS are re-assayed by single element four acid digestion and atomic emission spectroscopy. Silver results exceeding ICP-AES limits are re-assayed by fire assay and gravimetric finish on 30 g subsamples. Lead and zinc results exceeding concentration limits are analyzed by volumetric titration.

Crush reject material and residue assay pulps are annually returned to the Elsa exploration base for storage.

In the opinion of the author, the sampling preparation, security, and analytical procedures used by Alexco are consistent with generally accepted industry best practices and are, therefore, adequate for inclusion in this study.

11.3 QUALITY ASSURANCE AND QUALITY CONTROL PROGRAMS

Alexco implements standard assay quality control procedures for all Keno Hill Silver District drilling campaigns. Each 20-sample batch sent for assaying includes three control samples: a commercial standard reference material (SRM), a blank, and a duplicate. The location of control samples in the sample stream is defined by the logging geologist (standard reference material or SRM, blank, and duplicate). Control samples are inserted when the core is sawn or when the whole core is sampled. The SRM is already processed to a pulp and is inserted as a 50 g to 100 g sample. The blank is commercially purchased "landscape rock," either dolomite or basalt with approximately 0.35 kg to 1.5 kg of this material inserted. An empty sample bag is inserted at the location of the duplicate, which is prepared during sample preparation at the laboratory prep facility. The duplicate consists of a coarse reject split of the preceding sample.

The quality control program developed by Alexco is considered mature and overseen by appropriately qualified geologists. The data collected by Alexco on the Project was acquired using adequate quality control procedures that generally met or exceeded industry best practices for an exploration property at the resource delineation stage.

11.3.1 HISTORICAL CORE DRILLING DATA

All accessible core drill hole logs were transcribed onto standardized spreadsheets as close to verbatim as possible; the original logs were scanned, and file names and numbers were recorded in the new spreadsheets as well. These first spreadsheets were then inspected by geologists for consistency. The next step was to "normalize" the original transcribed data in order to match current nomenclature; data verification was ongoing. Collar information, as well as survey, assay, and recovery data were then verified by a person other than the original data entry person; the final step was to amalgamate separate spreadsheets into one global database.

11.3.2 BELLEKENO HISTORICAL CORE DRILLING DATA

Bellekeno underwent three phases of core drilling: 1986, 1994–1996, and 2006–2013. Alexco's access to mine workings in 2009 allowed resurveying of the 1986 and 1994–1996 historical (UKHM) drill hole collars in UTM coordinates, thereby assuring all collar locations were tied to a common datum.

In instances where 2009 underground drilling and historical drilling were twinned, the positioning of the 2009 composite locations were honoured, as historically down-hole surveying was irregularly spaced or not done at all.

In instances where surface drilling and underground drilling had conflicting contact locations, 2009 underground drilling was honoured. This was the case in the Southwest zone with surface drill hole K-07-0101. The vein intercept in this drill hole is 376 m downhole. Within 15 to 20 m on each side are two Alexco underground drill holes of 15 m

length of similar grade and thickness. In this case, the grade from K-07- 0101 was used in the estimation but its position is assumed to be defined by the adjacent underground drill holes.

Drilling programs under the supervision of UKHM were given careful scrutiny prior to being incorporated into the Alexco resource estimation. Historic data was evaluated and checked by processing paper drilling logs into electronic formats, resurveying of underground drill hole collars, and twinning of historical vein pierce points. Early programs were deemed reasonably complete and accurate for the purpose of resource and geologic modelling.

Two phases of underground core drilling occurred at the Bellekeno mine under UKHM management, 1986 and 1994-1996. During this time, most of the drilling operated off the local Treadwell grid system. For verification purposes, Alexco resurveyed the collar positions of the core and percussion drill holes in 2009 on the areas where the mine rehabilitation had been completed. The collar data was then verified against the UTM NAD 83 Zone 8 map projection coordinates. Only minor discrepancies were found in the underground percussion drilling. While the collar positions were updated, these drill holes were not included in the resource evaluation.

As part of the due diligence for the 2009 updated preliminary economic assessment (PEA) conducted by Wardrop (2009), twinning of the core drill hole vein pierce points was conducted. Twinned intercepts were commonly within 0.5 m to 1.5 m of the original pierce point. In most cases, the intercepts of both drill holes were commonly useable for interpretations. However, in instances where the two pierce points were significantly different, the 2009 underground drilling was given precedence. Surface drill holes were assumed to have more deviation because of down-hole depth, and irregularly spaced or incomplete down-hole survey data.

11.3.3 LUCKY QUEEN HISTORICAL CORE DRILLING DATA

Historical drilling data are not deemed reliable and, therefore, was not considered for Mineral Resource estimation.

11.3.4 FLAME & MOTH HISTORICAL CORE DRILLING DATA

Historical drilling data are not deemed reliable and, therefore, was not considered for Mineral Resource estimation.

11.3.5 ONEK HISTORICAL CORE DRILLING DATA

Historical drilling data are not deemed reliable and, therefore, was not considered for Mineral Resource estimation.

11.3.6 BERMINGHAM HISTORICAL CORE DRILLING DATA

Historical drilling data are not deemed reliable and, therefore, was not considered for Mineral Resource estimation.

11.3.7 HISTORICAL CHIP SAMPLE DATA

Data verification by Alexco personnel and the QP was completed on the TYC and UKHM underground chip sample data from the assay plan maps for each deposit where they were available. The verification procedure consisted of cross-checking the assay values in the database to the values on the original scanned historic assay plan maps. The sample interval points and respective silver assays were imported from the database and overlain on the original maps. All points were visually inspected to ensure that chip sample lines fell within the boundaries of the drift outlines. Then all assay intervals in the database were checked to ensure they matched with what was originally written on the maps.

11.3.8 BELLEKENO HISTORICAL CHIP SAMPLE DATA

Both historical (UKHM) chip sample and Alexco chip sample data was used in the grade estimation. Historical chip samples were commonly analyzed for silver, lead, and zinc only. Chip samples were generally taken as cuts across the vein and into the hangingwall and footwall rocks. The wireframe was constructed regardless of chip sample location. Chip samples were not used to define wireframe contacts or wireframe width. The determination of which chip samples to use in the grade estimation was made by "capturing" the chip sample intervals within the wireframe and tagging those intervals for composite. An interval had to be at least 25% within the wireframe to be tagged and used for compositing. The 25% rule was used because of the location uncertainty in the historical surveying of upper levels and stopes that were inaccessible to Alexco.

The high density of chip sample composites warranted declustering so that drill hole data influence on estimation would be honoured and chip sampling bias would be reduced. Chip sample composites were declustered on a 10 m x 6 m x 10 m grid.

Historical chip sample data was extensively reviewed by Alexco and the QP as part of the 2009 updated PEA. Chip assay values and string traces were visually referenced against the grades plotted on level plan view maps. During this early review, chip data was accepted if:

a. the chip lines matched the UTM co-ordinates in the database within 0.1 m;
b. the chip lines fell within the boundaries of the drift outline;
c. the assays were real values; and
d. the grades checked against the face grade sheets.

Literary reviews of UKHM practices suggest a strong emphasis was placed on chip sampling, and chip sample protocols were well established by the time stoping began at Bellekeno in 1988. Mine correction factors issued across the KHSD suggest the chip samples from Bellekeno were very representative of the vein material received; the mine was assigned a correction factor of 1.0.

Chip samples collected by UKHM were commonly analyzed for silver, lead, and zinc, while chip samples above the 400 level were commonly only analyzed for silver. Data tracking for Bellekeno during 1988–1989 included car sampling of the vein material before it was transported to the mill. A production review of the data showed a 12% variance between the car and chip data. Further analyses of the chip data using declustered data by zones are summarized in Table 11-1. This table summarizes a 14% to 40% variance in silver assay by zone. Results are significantly higher than anticipated, and do not reflect the chip sample to mill sample variations currently observed with active production. Sampling tests conducted by the QP in 2011 showed a good mixing trend between chip samples, truck samples, and belt samples taken at the mill over a one-month period. After reviewing the historical statistical data, the declustering analysis was considered excessively conservative given the reconciliation of the active chip samples with smelter products, and the chip- truck-belt cut mixing curves observed. The QP considers the historical chip data from the Bellekeno resource area to be reliable.

Table 11-1 Statistical Review of UKHM Bellekeno Production Chip Data

Area	Ag (ppm)	Pb (%)	Zn (%)
	Mean		
99 Zone			
Chip Sample Data	1,269	6.93	2.89
Declustered Chip Sample Data	897	5.19	2.31
Difference	-29%	-25%	-20%
Southwest Zone			
Chip Sample Data	1,047	10.15	3.53
Declustered Chip Sample Data	626	5.85	2.58
Difference	-40%	-42%	-27%
East Zone			
Chip Sample Data	391	0.57	6.83
Declustered Chip Sample Data	338	0.49	6.2
Difference	-14%	-14%	-9%

11.3.9 LUCKY QUEEN HISTORICAL CHIP SAMPLE DATA

No historical chip data were used for Mineral Resource estimation. The data were used in select geostatistical analyses (variography) and in the construction of mineralization and geological models, where applicable.

11.3.10 FLAME & MOTH HISTORICAL CHIP SAMPLE DATA

No historical chip data were available for the Flame & Moth deposit.

11.3.11 ONEK HISTORICAL CHIP SAMPLE DATA

The QP reviewed the historical chip data for the Onek deposit and because of the apparent bias associated with the chips sample data, The QP decided only to use the chip data to model the vein contacts. None of the historical chip samples were used to estimate the Mineral Resource.

11.3.12 BERMINGHAM HISTORICAL CHIP SAMPLE DATA

No historical chip data were available for the Bermingham deposit.

11.3.13 VERIFICATION OF 2006 TO 2018 DATA BY ALEXCO

Alexco maintains an SQL database of all the Project drill and sample data. Each property is assigned an identifier to extract property specific subsets from the master database. Until 2010, all data was entered or imported into the database via Datashed database management software, and subsequently through customized GeoSpark software. The data for individual properties is exported from the SQL database by scripted routine to Excel files, which are imported into MineSight or MapInfo Discover. The following drill hole files are generated: collar, survey, drill hole assay, chip sample assay, lithology, stratigraphy, mineralization, structure and geotechnical. During the drilling programs, Alexco personnel conducted routine visual verifications to ensure the reliability of the drilling data, including a 100% check of

the collar and survey tables and a minimum 10% verification of the remaining exported tables. The process uncovered a low level of data entry errors, which were corrected. Subsequently, all drill collar and survey data are validated by a senior geologist and through computer plotting.

Three control samples (standard, blank, duplicate) are included in each 20-sample batch sent for assaying. Alexco originally used one of 16 standard reference material (SRM) purchased from WCM Sales Limited of Burnaby, British Columbia: eight polymetallic copper, lead, zinc, and silver reference materials (PB 111, PB 112, PB 113, PB 116, PB 129, PB 131, and PB 137) and eight silver reference materials (PM 1107, PM 1108, PM 1116, PM 1117, PM 1128, and PM 1133) for inclusion in each 20-sample batch (Table 11-2).

Table 11-2 Commercial Standard Reference Material Used by Alexco for Drilling Programs for the KHSD Project

SRM	Cu (%)	SD	Pb (%)	SD	Zn (%)	SD	Ag (g/t)	SD	Ag (oz/t)	SD	Au (g/t)	SD
PB111	0.69	0.01	2.12	0.04	0.45	0.02	195	6	-	-	-	-
PB112	0.85	0.01	0.92	0.02	1.27	0.03	222	2	-	-	-	-
PB113	0.47	0.01	1.11	0.02	1.40	0.05	22	1	-	-	-	-
PB116	0.43	0.01	1.40	0.06	0.85	0.02	22	1	-	-	-	-
PB129	0.28	0.01	1.24	0.02	2.00	0.06	23	1.7	-	-	-	-
PB131	0.47	0.01	1.04	0.04	1.89	0.06	262	11	-	-	-	-
PB137	0.21	0.01	2.62	0.09	2.69	0.115	111	2	-	-	-	-
PB141	1.02	0.013	6.68	0.146	3.78	0.136	173	3	-	-	-	-
PM1107	-	-	-	-	-	-	1,194	34	34.8	1.0	-	-
PM1108	-	-	-	-	-	-	658	10	19.2	0.3	-	-
PM1116	-	-	-	-	-	-	769	23	22.4	0.7	-	-
PM1117	-	-	-	-	-	-	386	16	11.3	0.5	-	-
PM1123	0.31	0.0082	-	-	-	-	31	1.2851	-	-	1.42	0.046
PM1127							1580	36				
PM1128	-	-	-	-	-	-	592	12	17.3	0.4	-	-
PM1129							34	1.7				
PM1130							101	3				
PM1132	-	-	-	-	-	-	2287	54.334	66.69	1.5847	-	-
PM1133	-	-	-	-	-	-	757	19	22.1	0.5	-	-

In 2012, Alexco also started using a series of certified standard reference material developed from the Bellekeno deposit: polymetallic standards (Table 11-3), that were certified by Smee & Associates Consulting Ltd. (Bellekeno-C, Bellekeno-M, Bellekeno-S, Bellekeno-R and Bellekeno-W) that were initially tested as internal lab standards at the on site Bellekeno Mine assay laboratory along with CDN Resource Laboratories Ltd. Standards (ME-4, ME-5). The Bellekeno derived standards are now commercially available as the KHP series below and continue to be used routinely with the range of WCM standards.

Table 11-3 Standard Reference Material Used by Alexco developed from the Bellekeno Mine

SRM	Pb (%)	SD	Zn (%)	SD	Ag (g/t)	SD	Ag (oz/t)	SD
KHP-C	14.62	0.58	12.32	0.23	1,162	23.5	-	-
KHP-M	14.02	0.63	7.85	0.20	971	19	-	-
KHP-R	36.19 (Provisional)	2.33	5.08	0.13	2,224	47	-	-
KHP-S	12.47	0.38	13.17	0.41	1,094	20	-	-
KHP-W	3.06	0.06	1.79	0.05	270	10	-	-
ME-4	4.25	0.12	1.10	0.03	402	12.5	-	-
ME-5	2.13	0.06	0.579	0.01	206.1	6.55	-	-

Assay results for quality control samples are monitored on an ongoing basis during all drill programs with each potential quality control failure investigated, and resolved through batch re-assaying, prior to the assay results being imported to the SQL database.

For the Bellekeno Mine, all mineralized chip samples collected concurrent with mining activities between 2011 and 2012 that were included in the Bellekeno Mineral Resource were sent to external laboratories for check assays. Duplicate pulp samples were made at the on site Alexco laboratory facility from coarse reject material and submitted for external assay checks. All standards submitted with the chip sample assaying returned within ±2 standard deviations of the mean. Duplicate pulp sample results suggest the silver, lead and zinc grades are reasonably reproducible.

The Bellekeno 2006–2013 analytical quality control data produced by Alexco are summarized in Table 11-4.

Table 11-4 Quality Control Data Produced by Alexco from 2006 to 2013 for Bellekeno

Quality Control Type	Count	Ratio
Core Samples	4,627	
Blanks	230	5.0% (1:20)
Standards	313	6.8% (1:15)
Duplicates	380	8.2% (1:12)
Chip Samples	2,078	
Blanks	21	1.0% (1:100)
Standard Reference Material	228	11.0% (1:9)
Coarse Reject Duplicate	109	5.2% (1:19)

The Lucky Queen 2006 to 2010 external analytical quality control data produced by Alexco are summarized in Table 11-5.

Table 11-5 Quality Control Data Produced by Alexco from 2006 to 2010 for Lucky Queen

Quality Control Type	Count	Ratio
Core Samples	3,144	-
Blanks	185	1:17 (5.9%)
Standard Reference Material	183	1:17 (5.8%)
Coarse Reject Duplicate	186	1:17 (5.9%)

The Flame & Moth quality control data produced by Alexco are summarized in Table 11-6.

Table 11-6 Quality Control Data Produced by Alexco from 2010 to 2014 for Flame & Moth

Quality Control Type	Count	Ratio
Core Samples	3,996	-
Blanks	248	1:16 (6.2%)
Standard Reference Material	240	1:16 (6.0%)
Coarse Reject Duplicate	251	1:16 (6.3%)

All standards consistently returned values within ±2 standard deviations of the mean, with only occasional values falling outside this limit, but then within ±3 standard deviations of the mean.

Analysis of assays from coarse reject duplicate samples suggests that silver, lead, and zinc grades can be reasonably reproduced with no apparent bias.

The Onek quality control data produced by Alexco are summarized in Table 11-7.

Table 11-7 Quality Control Data Produced by Alexco from 2007 to 2014 for Onek

Quality Control Type	Count	Ratio
Core Samples	4,730	-
Blanks	282	1:16 (6.0%)
Standard Reference Material	302	1:16 (6.4%)
Coarse Reject Duplicate	286	1:16 (6.1%)

All standards consistently returned values within ±2 standard deviations of the mean with only occasional values within ±3 standard deviations of the mean.

Analysis of assays from coarse reject duplicate samples suggests that silver, lead and zinc grades can be reasonably reproduced from the coarse reject split of the original samples with no apparent bias.

The external analytical quality control data produced by Alexco for the Bermingham area between 2009 to 2018 are summarized in Table 11-8.

Table 11-8 Quality Control Data Produced by Alexco from 2009 to 2018 for Bermingham

Quality Control Type	Count	Ratio
Core Samples	8,924	-
Blanks	483	1:18 (5.4%)
Standard Reference Material	451	1:19 (5.1%)
Coarse Reject Duplicate	466	1:19 (5.2%)

The QP reviewed the QA/QC data prepared by Alexco, standards, blanks and duplicate performance over time, and has concluded that the result of the QA/QC data supported the inclusion of the assay data in the estimation of Mineral Resources and Mineral Reserves.

Overall, two standard reference material assays were just outside of the +3SD range of acceptable limits from intervals that were not material to the resource, and one other was below the -3SD range but was from a standard that has been found to be unreliable and is not commonly used.

12. DATA VERIFICATION

12.1 SITE VISITS

Dr. Gilles Arseneau and Chris Elliott of SRK carried out a visit to examine the Lucky Queen, Bellekeno, and Onek deposits. In total, Dr. Arseneau and Mr. Elliot spent two and a half days at the sites between July 26 and 28, 2010 examining drill core, core logging and sampling procedures; visiting drill sites; and examining the mineralization exposed in surface cuts. Alexco provided the SRK representatives with information related to these activities during the site visit. Dr. Arseneau carried out a second site visit on May 7 and 8, 2012 and a third site visit on September 12, 13, and 14, 2016 to examine the surface geology and drill core for the Bermingham deposit.

Cliff Revering, P.Eng., of SRK conducted a site visit from July 24 to 27, 2018 to examine the Bermingham deposit. The site visit focused on examining drill core, core logging and sampling procedures, as well as visiting geology and mineralization exposures within available historical open pit cuts and underground development headings. Inspections of both surface and underground drill rigs was undertaken during this site visit.

12.2 VERIFICATIONS OF ANALYTICAL QUALITY CONTROL DATA FOR LUCKY QUEEN

Dr. Arseneau reviewed and verified the Lucky Queen drill hole data and quality control assay data from 2006 to 2010 and found the data to be reliable for resource estimation purposes.

The 2006 to 2010 quality control data collected by Alexco was considered comprehensive and the assaying results delivered by ALS Chemex and AGAT laboratories are considered reliable for the purpose of resource estimation.

The QP aggregated the assay results for the external quality control samples and duplicate assay pairs. Time series bias charts and assay pair precision plots were constructed for applicable elements.

A total of 185 samples of unknown composition designated as blanks were submitted by Alexco during the drilling operations. Performance of the blank samples was reasonably good, with no systematic failures noted for silver, lead, or zinc. For gold assays, 6% of the submitted blanks returned a grade higher than 0.01 g/t Au.

A total of 183 commercial standard reference samples were submitted by Alexco during the drilling operations. All reference standards used by Alexco were purchased from WCM Minerals, Burnaby, British Columbia. Performance of the commercial standard reference samples was reasonably good, with only the analytical results for one standard (PM-1107) being consistently less than the average grade of the standard.

A total of 186 samples were analyzed as duplicates by Alexco. No significant discrepancies were noted between the original and duplicate analyses, and the correlation between samples is good.

Upon completion of the review, the QP considered that the analytical data produced by Alexco are sufficiently reliable to support Mineral Resource estimation.

12.3 VERIFICATION OF ANALYTICAL QUALITY CONTROL DATA FOR ONEK

In November 2010, June 2011 and August 2014, Dr. Arseneau completed audits of the Alexco analytical and quality control data acquired with the sampling of the Onek deposit. This involved analysis of the drill hole and assay database,

review of the assay certificates received directly from the ALS Chemex and AGAT, and review of assay results for blank, standard, and duplicate samples.

The QP conducted routine verifications to ascertain the reliability of the electronic borehole database provided by Alexco. All assays in the current database were verified against the independently sourced sample certificates from ALS Chemex and AGAT. The silver, lead, zinc and gold values in the assay table were found to match the laboratory certificates. In addition, the QP verified the conversion of units between different methods utilized in the laboratories and believes the conversions were done correctly.

Several assay batches were received from AGAT in 2010, where any one or more of the standards, blanks and duplicates included in the batch did not pass Alexco's quality control standards and were sent for re-assay either through AGAT or submitted to ALS Chemex. A very minor number of batches showed sample preparation errors that were either resolved through the lab in question or by quarter-coring the remaining core and submitting new samples to ALS Chemex.

The review of analytical quality control data produced by ALS Chemex, AGAT and Alexco, suggests that silver, gold, lead and zinc grades can be reasonably reproduced, suggesting that the final assay results reported by ALS Chemex and AGAT are generally reliable for the purpose of resource estimation.

After the review, the QP was of the opinion that the Onek drilling database is sufficiently reliable for resource estimation.

12.4 VERIFICATION OF ANALYTICAL QUALITY CONTROL DATA FOR BERMINGHAM

In 2018, the QP completed an audit of the Alexco analytical and quality control data acquired during the sampling of the Bermingham deposit; this audit conducted of routine verifications to ascertain the reliability of the electronic drill hole database provided by Alexco. All assays in the current database were verified against independently sourced sample certificates from ALS Chemex, Echo-Tech, and AGAT. The silver, lead, zinc, and gold values in the assay table were found to match the laboratory certificates with a few exceptions where samples had been re-assayed and the database had not been updated with the re-assay certificate number. Alexco corrected this and the samples values were found to match the re-assay certificates.

After the review, the QP is of the opinion that the drilling database is sufficiently reliable for resource estimation.

13. MINERAL PROCESSING AND METALLURGICAL TESTING

13.1 BACKGROUND

The metallurgical response of Keno Hill mineralization is well understood through testwork and operational experience. Previous test work on the varied mineralization at the Property can be traced back prior to 1996 until 2017 as indicated from the multiple studies by Rescan (1996), Wardrop (2009), SRK (2013/2014), and RPA (2017). The Bellekeno deposit was widely investigated between 1996 and 2009 with the test results compiled to form the basis for the design and construction of Keno Hill District Mill in 2010. From 2011 to 2013, samples from deposits of Lucky Queen and Flame & Moth were tested to assess their flotation performance. Since 2018, additional metallurgical testwork has been conducted on samples from these deposits and from the Bermingham mineralization area to support the mine plan (discussed in more detail in Section 16). Table 13-1 lists the test work assessed herein.

Table 13-1 Metallurgical Test Work Programs – 1996 to 2019

Year	Laboratory/Simulation Report	Samples Domain	Hardness	Mineralogy	Rougher/ Cleaner Flotation	Locked Cycle Flotation	Other Tests
1996	PRA	Bellekeno (BK), Silver King (SK), blended BK/SK (85%/15%)	✓				✓
2008	SGS – Lead, Zinc and Silver Flotation Testing on Bellekeno Samples	BK	✓	✓			
2009	Inspectorate (PRA)	BK, East/Southwest Zones of BK, and Onek	✓	✓			✓
2011	Inspectorate (PRA)*	Lucky Queen (LQ) and Onek			✓		
2013	Inspectorate (PRA)*	Flame & Moth (F&M)			✓		
2013	Starkey & Associates (S&A) – Bellekeno Grinding Circuit Comminution Throughput Analysis Report	Grinding circuit survey of Keno Hill District Mill	✓				
2017	SGS – The Flotation of Samples from the Bermingham and Christal Zone Deposits (Appendix B)	F&M and LQ		✓			
2018	SGS – The Flotation of Samples from the Bermingham Deposit	Bermingham (BM)		✓	✓	✓	
2018	SGS – The Comminution and Flotation of Samples from the Lucky Queen and Flame & Moth Deposits	LQ, F&M (combined Christal and Lightning Zones), F&M (Christal Zone), F&M (Lightning Zone), BM-F&M (Christal Zone), and BM-F&M (Lightning Zone)	✓		✓	✓	
2019	SGS - The Flotation of Samples from the Bermingham and Christal Zone Deposits	Blended F&M (Christal Zone)/BM (70%/30%)			✓	✓	

*Results provided to Tetra Tech in Excel sheet as compilation of results

13.2 METALLURGICAL TESTING SAMPLE DESCRIPTION

13.2.1 MASTER COMPOSITES

The Flame & Moth metallurgical sampling programs from Lightning Zone and Christal Zone are considered to be representative of its respective geological rock -type domain. The samples used for composites were collected from exploration drilling programs. The samples for each of the composites were spatially distributed throughout each of the deposits and contained head grades consistent with typical ranges observed in the exploration programs.

The initial metallurgical composites for Bermingham and Lucky Queen were each prepared from samples from exploration drill holes throughout the deposit representing high-grade domains. These were used for testing completed prior to 2018, including both batch and locked cycle testing as reported in the PEA (RPA, 2017).

In 2018, two drill holes were completed in each of the two zones of Flame & Moth (four holes totaling 60 m of drilling) specifically to provide fresh unoxidized material for metallurgical testing on composites representative of each of the Lightning and Christal zones. These composites were then combined with Bermingham composites to test locked cycle metallurgical response to the flowsheet. Two Bermingham composites were used: the master composite in 2017 from previous testwork and a second new composite in 2018 with lower head grade which would be more typical LOM metals content in order to evaluate expected conditions and evaluate fluctuations in plant feed. The Bermingham, Flame & Moth and Lucky Queen metallurgical testing results to date have contained similar head grades and have behaved metallurgically similar within each respective deposit.

The Bermingham Master Composite and New Bermingham Composite were prepared from samples collected from the drilled intervals shown in Figure 13-1.

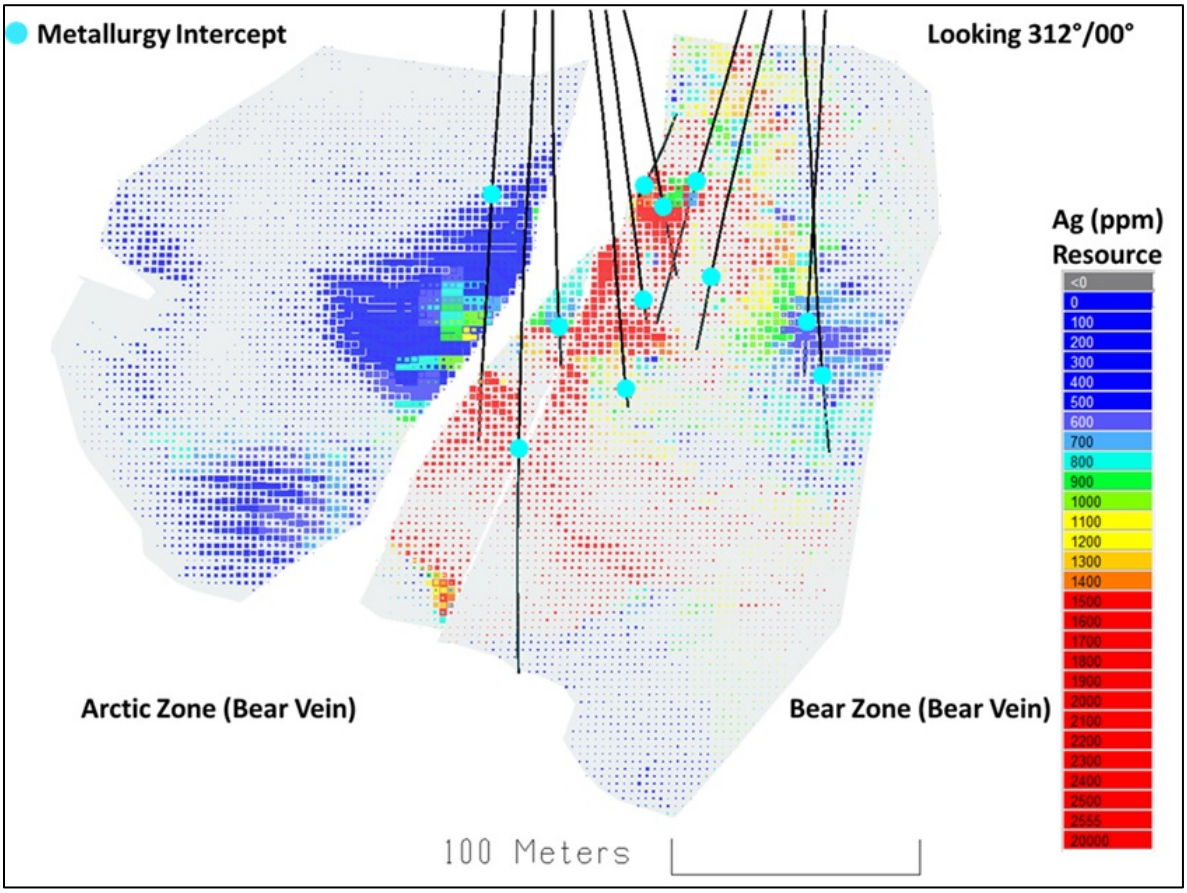


Figure 13-1 Source of Metallurgical Samples from Bermingham

The assayed characteristics of each of the two composites are shown in Table 13-2.

Table 13-2 Bermingham Composites for Metallurgical Testing

Sample	Pb	Zn	Ag	Au
	%	%	g/t	g/t
Master Composite	6.09	1.77	3308	0.37
New Composite	3.57	2.95	1712	-

The Flame & Moth composites were prepared from samples collected from the drilled intervals shown in Figure 13-2.

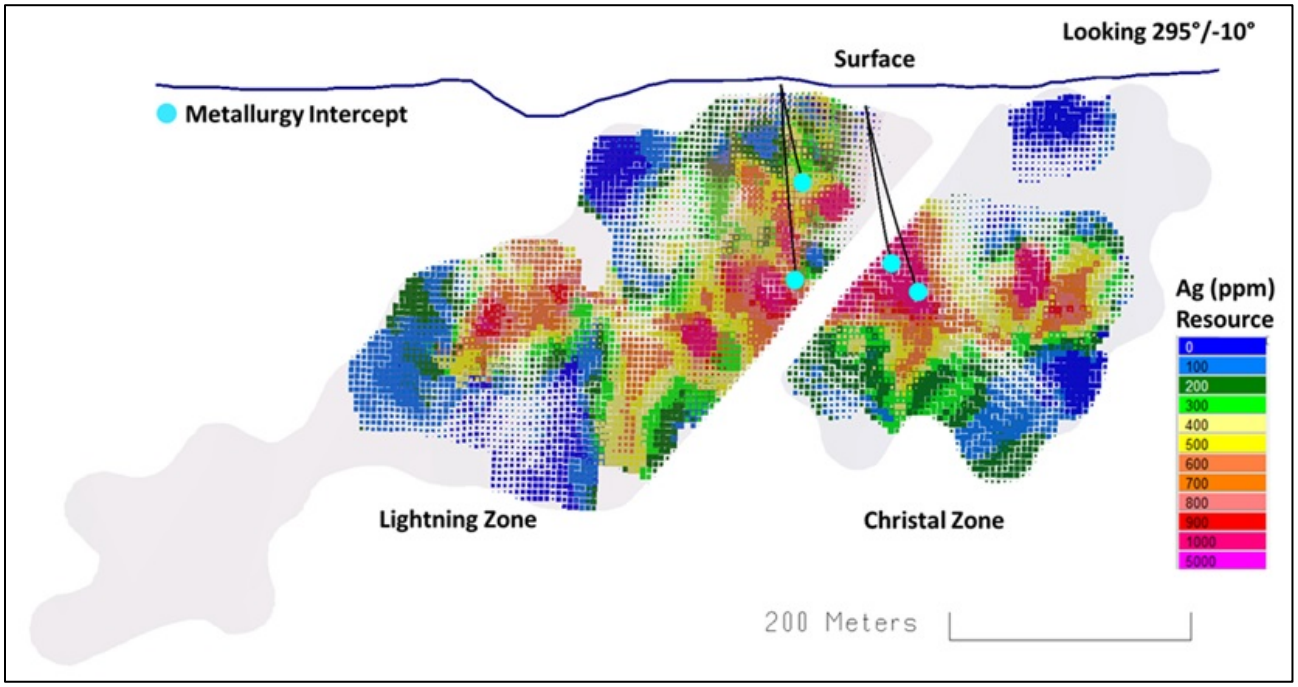


Figure 13-2 Source Metallurgical Samples from Flame & Moth

The assays of each of the composites are shown in Table 13-3.

Table 13-3 Flame & Moth Composites for Metallurgical Testing

Sample	Pb	Zn	Ag	Au
	%	%	g/t	g/t
Lightning Zone Composite	3.16	5.24	749	0.53
Christal Zone Composite	3.56	5.21	857	0.98

No new composites were prepared for either the Bellekeno or Lucky Queen testwork since the PEA.

13.3 SAMPLE PHYSICAL CHARACTERISTICS TESTWORK

Values for the initial Bond Rod Mill Work Index (RWi), Bond Ball Mill Work Index (BWi), and Bond Abrasion Index (Ai) were determined for Bellekeno samples during the 1996 and 2009 test programs. The measured RWi on the single Bellekeno composite sample was 8.7 kWh/t, while BWi values on four samples ranged from 7.9 kWh/t to 9.5 kWh/t. This indicated that the Bellekeno samples can be categorized as soft materials with low variability. The abrasion index (AI) was measured on a single Bellekeno sample with the value of 0.438 g, which was considered moderately abrasive.

In 2013 a benchmark survey on the grinding circuit of Keno Hill District Mill was conducted by Starkey & Associates (S&A) to assess the circuit operation to debottleneck the grinding circuit throughput limitation. Stream samples from the ball mill discharge, pump sump, and ball mill screen oversize and undersize were taken and tested to determine their RWi and BWi values. The RWi was found to be 12.4 kWh/t and the BWi was found to be 10.2 kWh/t. Both results

are significantly higher than previous test results from 1996 to 2009. S&A then modelled the grinding circuit operation based on these results, which is summarized in Section 17.0 of this report.

In 2018 BWi test work was conducted on samples from other zones, namely the Christal and Lightning zones within the Flame & Moth deposit. The BWi values obtained were consistent at 10.5 kWh/t and 10.4 kWh/t, respectively, which indicated that the test materials were soft. The test results are summarized in Table 13-4.

The specific gravity values for the head samples were determined in 1996 by Inspectorate America Corporation (PRA), which was 3.57 for the Bellekeno sample and 2.81 for the SK sample. PRA completed an additional specific gravity test with the flotation concentrates samples, which was reported to be 6.49 for Ag-Pb concentrate and 3.95 for Zn concentrate. The 2018 measurement by SGS Canada Inc. (SGS) showed a range between 2.78 and 4.36 for Lightning Zone drill samples and 2.75 and 4.71 for Christal Zone drill samples.

Table 13-4 Grindability Test Results

Test Program	Sample	Bond Ball Mill Work Index (kWh/t)	Bond Rod Mill Work Index (kWh/t)	Abrasion Index (g)	Specific Gravity
1996 PRA	Bellekeno Comp	9.3 **			3.57
	Silver King Comp	10.3**			2.81
2007 SGS	Bellekeno Comp	9.5*			
2008/2009 PRA	Bellekeno Master Comp	-	8.7	0.438	
	Bellekeno East Zone Comp	7.9*			
	Bellekeno SW Zone Comp	8.2*			
2013	Grinding circuit survey of Keno Hill District Mill	10.2	12.4		
2018 SGS	Christal Zone Composite	10.5**			2.75 – 4.71
	Lightning Zone Composite	10.4**			2.78 – 4.36
* at a closing mesh size of 106 µm. ** at a closing mesh size of 149 µm.					

13.4 MINERALOGICAL ANALYSIS

Mineralogical investigations were conducted in several test programs on different samples. A recent comparison of the results from the Flame & Moth, Bermingham, Lucky Queen, and Bellekeno deposits was made by Alexco in 2018.

13.4.1 MINERALOGY ANALYSIS ON BELLEKENO SAMPLES

Both SGS and PRA studied the mineralogy characteristics of the Bellekeno mineralization samples in the 2007 and 2009 test programs. In 2007, SGS completed a QEMSCAN™ analysis that indicated that galena and sphalerite were the principal lead and zinc minerals, respectively. Pyrite accounted for less than 4% of the mass, while trace sulphide minerals included chalcopyrite, bornite, chalcocite, tetrahedrite, and arsenopyrite.

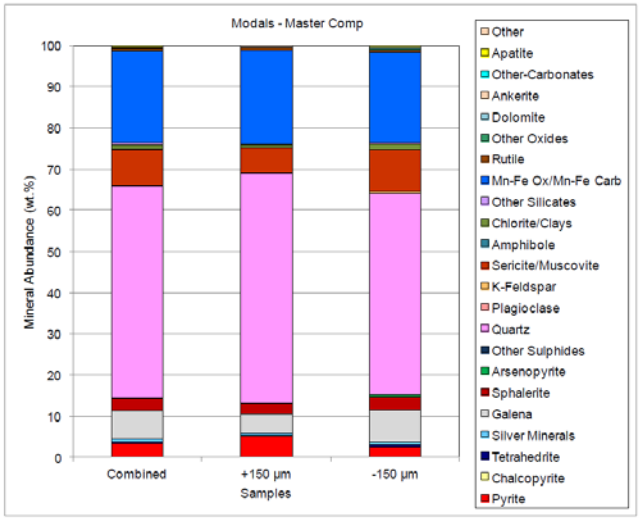
Both the SGS and PRA studies reported on the general coarse texture for the galena and sphalerite minerals, specifically, with the SGS data indicating liberation at a relatively coarse size. At an 80% passing (P80) grind size of 170 µm, 96% of the sphalerite and 95% of the galena particles analyzed were present as liberated phases.

PRA's 2009 tests included a microscopic examination of the composite samples from the Bellekeno Southwest zone and the Bellekeno East zone. The results confirmed galena and sphalerite as the main economic minerals. The Southwest zone composite contained more galena, while the East zone contained predominantly sphalerite. Proustite-pyrargyrite was identified as the only specific silver mineral and was present as small inclusions in galena. Tennantite-tetrahedrite

and sphalerite were identified as being additional silver carriers. Native gold was also found as fine inclusions of less than 5 µm in chalcopyrite from the Southwest zone composite sample. In addition, a part of the Bellekeno East zone sample showed the presence of secondary minerals including limonite, covellite, and a minor portion of colloform pyrite that can decompose to sulphate. The PRA study also confirmed the texture of the galena and sphalerite minerals were coarse in general.

13.4.2 MINERALOGY ANALYSIS ON BERMINGHAM SAMPLES

In 2018 SGS conducted a QEMSCAN analysis on the Bermingham Master Composite ground to 80% passing 250 µm and screened at 150 µm. Similar observations were made from both the fractions of +150 µm and -150 µm showing that lead was present predominantly as galena and zinc as sphalerite. Silver minerals were also identified from the analyses and examined as a group without specifying the individual silver mineral. The minerals of interest contained in the sample included 6.9% galena, 3.0% sphalerite, and 0.67% silver minerals. The major gangue minerals included 51.2% quartz, 22.3% Fe-Mn oxides, and 8.5% sericite/muscovite, with minor gangue minerals composed of 3.4% pyrite and 1.1% chlorite. Other gangue minerals such as K-feldspars, dolomite, and rutile were low in content with each type less than 1%. Figure 13-3 shows the mineral abundance of the Bermingham sample tested.



Source: SGS 2018a

Figure 13-3 Mineral Abundance of Bermingham Master Composite

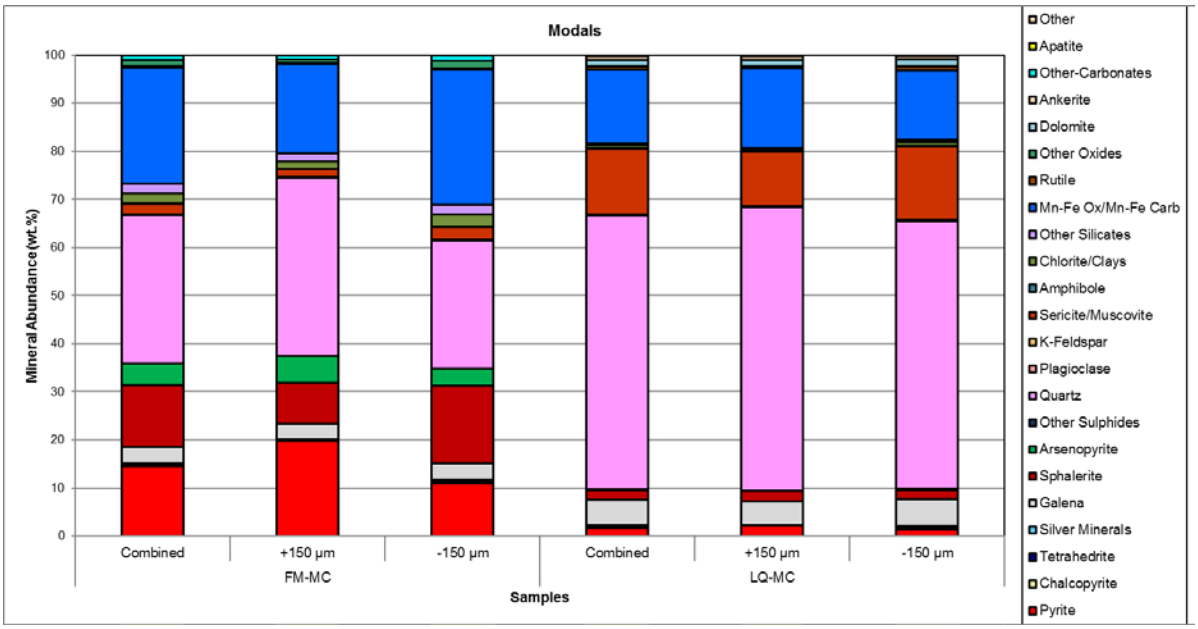
The liberation and exposure information of galena, sphalerite, pyrite, and silver minerals are summarised in Table 13-5. At a grind size of approximately 80% passing 250 µm, high values of free/liberated galena and sphalerite were observed with high exposure percentages, namely 86% and 95%, respectively, were fully liberated. About 82% of pyrite was found free or liberated and with a low association with galena and sphalerite. Fully exposed pyrite accounts for 75% of the total, with 95% of the pyrite >20% exposed. Free and liberated silver mineral grains accounted for 65% of the total, while 13% of the silver minerals were found associated with galena, and another 13% of silver minerals were present in complex mineral assemblages. Fully exposed silver mineral grains accounted for 64% of the total and 91% of the silver grains were >20% exposed.

Table 13-5 Mineral Liberation and Exposure of Bermingham Master Composite

Minerals*	Free (%)	Liberated (%)	Complex (%)	Exposure	
				100%	20%
Galena	80.5	11.4	4.2	86.0	97.7
Sphalerite	87.5	9.44	1.49	94.8	98.9
Pyrite	64.1	17.9	9.33	74.5	95.2
Silver Minerals	48.3	16.4	12.8	63.9	91.1
*combination of + 150 µm and – 150 µm fractions					

13.4.3 MINERALOGY ANALYSIS ON FLAME & MOTH AND LUCKY QUEEN SAMPLES

In 2017 SGS conducted QEMSCAN examinations on the Flame & Moth and Lucky Queen samples. The mineral distributions are shown in Figure 13-4 for both samples. The minerals of interest contained in the samples included galena at about 3.4% for the Flame & Moth sample and 5.3% for the Lucky Queen sample, sphalerite at 13.0% for the Flame & Moth sample and 1.9% for the Lucky Queen sample, while silver minerals were present at 0.19% for the Flame & Moth sample and 0.22% for the Lucky Queen sample. The major gangue minerals included quartz, Fe-Mn oxides, and pyrite/arsenopyrite for both samples. The Flame & Moth sample contained a much higher pyrite content of 14.5% as compared with the Lucky Queen sample, which had a pyrite content of 1.6%. Similarly, arsenopyrite in the Flame & Moth sample was about 4.4%, which is higher than that of the Lucky Queen sample at a level of 0.2%. About 2.2% and 4.5% sericite/muscovite was identified in the Flame & Moth sample and Lucky Queen sample, respectively. Other gangue minerals such as K-feldspars, dolomite, and rutile was low in content, with each type less than 1%.



Source: SGS 2019

Figure 13-4 Mineral Abundance of Flame & Moth and Lucky Queen Samples

The liberation and exposure information of galena, sphalerite, pyrite, and silver minerals are summarized in Table 13-6. As compared with the Lucky Queen sample, the Flame & Moth sample showed a lower content of the free and liberated galena, as well as a smaller portion of exposed rate. In addition, galena in the Flame & Moth sample had a greater association with sphalerite and complex mineralogy, which means more than two mineral types in the grain.

Table 13-6 Mineral Liberation and Exposure of Flame & Moth and Lucky Queen Samples

Minerals*	Flame & Moth Sample						Lucky Queen Sample					
	Association				Exposure		Association				Exposure	
	Free (%)	Liberated (%)	Sphalerite (%)	Complex (%)	100%	20%	Free (%)	Liberated (%)	Sphalerite (%)	Complex (%)	100%	20%
Galena	47.0	19.7	6.2	15.1	53.5	86.3	82.3	10.6	0.5	2.1	87.0	98.7
Sphalerite	61.3	17.5	n/a	10.6	68.9	95.1	84.1	5.0	n/a	3.0	86.0	97.7
Pyrite	71.9	18.4	0.9	5.8	79.7	98.0	58.5	17.3	0.0	14.9	59.3	85.7
Silver Minerals	34.1	13.8	4.2	30.7	45.6	75.3	45.9	10.7	6.7	2.29	53.1	90.7

*combination of + 150 µm and – 150 µm fractions

13.4.4 MINERALOGY ANALYSIS COMPARISON AMONG FLAME & MOTH, BERMINGHAM, LUCKY QUEEN AND BELLEKENO SAMPLES

Alexco compared the mineralogical analyses of the samples collected from the Flame & Moth, Bermingham, Lucky Queen, and Bellekeno deposits for the purpose of explaining the inferior metallurgical performance observed on the Flame & Moth samples. The conclusions from the QEMSCAN comparison indicated that the Flame & Moth sample had a smaller portion of exposed galena and a greater association of sphalerite and pyrite complex mineralogy. This observation was in line with a much higher ratio of zinc to lead in the Flame & Moth sample as compared with the other deposit samples. The petrographic comparison further indicated that Flame & Moth samples presented a less coarse size of galena, which was more closely intergrown with sphalerite.

13.5 FLOTATION TESTWORK OVERVIEW

Rougher, cleaner, and locked cycle flotation tests were initially performed on samples representing Bellekeno deposit to develop the original process flowsheet used in historical operations. To recommission the mill, similar flotation tests following the same processing philosophy were carried out on individual and blended samples from Flame & Moth, Bermingham, and Lucky Queen deposits. More extensive locked cycle testing was completed on these samples to provide additional data as the basis for the PFS study. The locked cycle testing on the composites is outlined in Table 13-7 and referencing the samples previously described in Section 13.2.1.

Table 13-7 Locked Cycle Testing Summary (2016-2019)

Locked Cycle Test	Sample	Year
LCT1 – 2017	Bermingham Master Composite	2017
LCT2 – 2017	Bermingham Master Composite	2017
LCT1 – 2018	Christal Zone Composite	2018
LCT2 – 2018	Lightning Zone Composite	2018
LCT3 – 2018	30% Bermingham Master Composite – 70% Christal Zone Composite Blend	2018
LCT4 – 2018	30% Bermingham Master Composite - 70% Lightning Zone Composite Blend	2018
LCT5 – 2019	30% New Bermingham Composite - 70% Christal Zone Composite Blend	2019

13.5.1 BELLEKENO SAMPLES

The batch flotation testwork program for Bellekeno samples was completed between 2007 and 2009 and included rougher flotation tests to assess the impacts of primary grind size, reagent schedule, and other test conditions, open cycle cleaner flotation tests to investigate the quality of the cleaner concentrates produced at various conditions, as well as bench-scale locked cycle flotation tests. The major conclusions are summarized as follows:

- Lead and zinc recoveries in the rougher flotation tests were not sensitive to the primary grind size in a P80 size range between 79 µm to 174 µm; and
- Regrinding of the lead rougher concentrate prior to the cleaner flotation stages could improve the zinc rejection in the lead cleaner flotation stage. While for the zinc rougher concentrate regrind tests, only a slight or no improvement on the upgrading of the zinc rougher concentrate were observed.

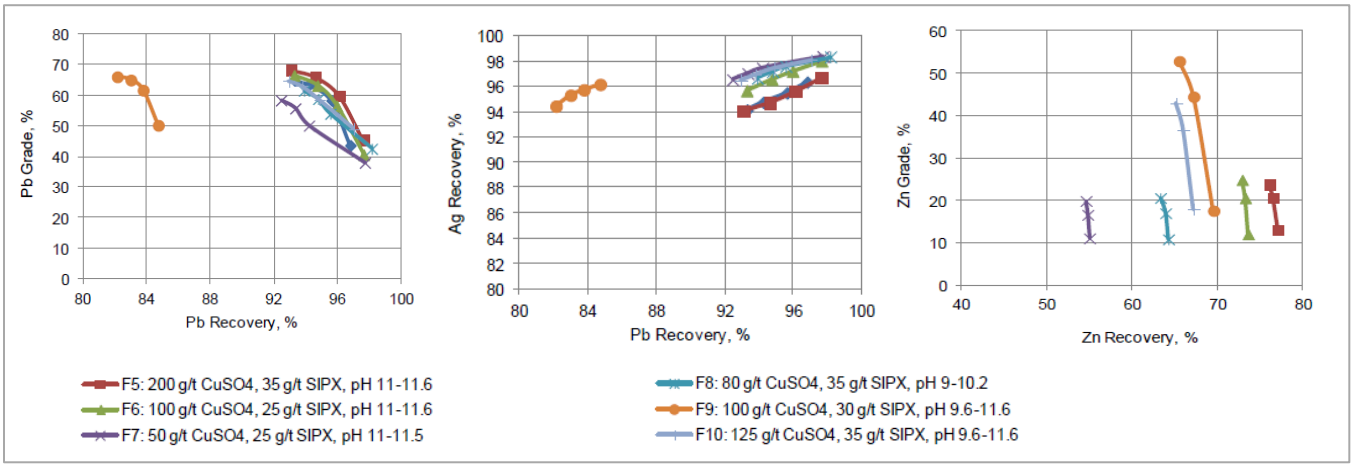
The locked cycle flotation tests on Bellekeno samples are described in detail in the 2009 PEA report by Wardrop. Of the five tests, the optimum results were obtained from LCT1 test reported by PRA in 2008/2009, which was based on the common sequential lead and zinc flotation circuits with a regrinding stage for each circuit. . The results are provided in Table 13-8. The anticipated mill recoveries for Bellekeno are based on this testwork and the actual results during previous operation. All the five locked cycle tests produced qualified lead and zinc concentrates. High recoveries of silver, lead, and zinc were obtained in the 1996 PRA test and 2008/2009 PRA -LCT1 and LCT 2 tests. SGS testwork produced lower recoveries of silver and zinc that may be related to the regrind size and the lack of zinc rougher concentrate regrind. The LCT 3 test program by PRA also produced a low silver recovery that can be attributed to the low silver head grade of the tested sample.

Table 13-8 Locked Cycle Flotation Test Results on Bellekeno Samples

Test No.	Head Grade			Lead Cleaner Concentrate							Zinc Cleaner Concentrate						
				Mass	Grade			Recovery			Mass	Grade			Recovery		
	Ag g/t	Pb %	Zn %	%	Ag g/t	Pb %	Zn %	Ag %	Pb %	Zn %	%	Ag g/t	Pb %	Zn %	Ag %	Pb %	Zn %
PRA 1996	1,022	12.73	4.51	15.6	6,253	77.6	0.88	95.7	95.3	3.1	8.2	233	2.56	52.1	1.9	1.6	94.3
SGS 2007	1,227	12.2	11.6	16.4	5,864	72.5	5.37	78.4	97.6	7.6	14.9	750	0.45	56.0	9.1	0.6	71.7
PRA 2008/2009 – LCT1	933.1	13.1	11.2	18.0	4,874	72.0	2.2	94.0	98.8	3.6	17.1	200.7	0.4	61.5	3.7	0.5	94.4
PRA 2008/2009 – LCT2	963.5	13.8	10.5	18.8	4,878	72.0	3.1	95.2	98.2	5.6	18.2	157.9	0.3	53.1	3.0	0.4	92.2
PRA 2008/2009 – LCT3	270.2	1.9	17.0	3.2	5,705	53.1	5.0	68.3	89.6	1.0	28.1	254.8	0.5	59.1	26.5	7.0	97.6

13.5.2 BERMINGHAM SAMPLES

The batch flotation testwork on Bermingham samples was completed between 2017 and 2019 by SGS on one master composite sample. The 2017 open cycle cleaner flotation tests are plotted in Figure 13-5, which shows that although high grade lead concentrate can be produced, the grade of zinc concentrates were found to be low.



Source: SGS 2018a

Figure 13-5 Open Cycle Cleaner Flotation Test Results on Bermingham Master Composite Samples

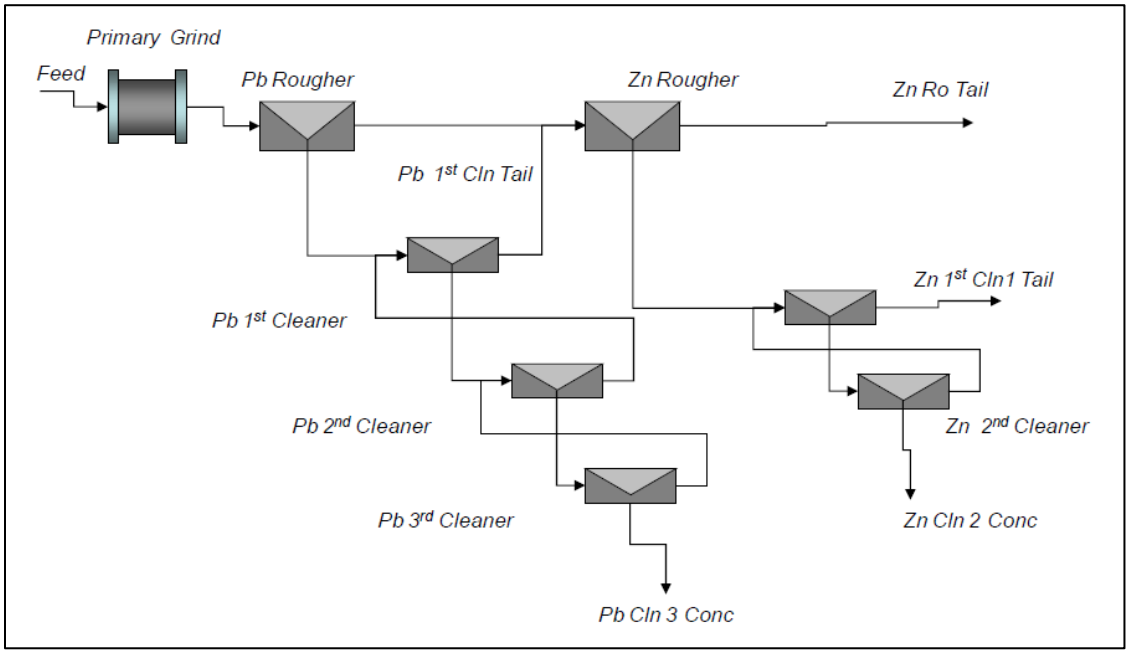
In the 2019 optimization batch flotation tests, SGS included two regrinding stages on both lead and zinc rougher concentrates. As shown in Table 13-9, satisfactory results were obtained - the lead concentrate was grading at over 32,000 g/t silver and 60% lead; the zinc concentrate was grading at 58.4% zinc.

Table 13-9 Open Cycle Cleaner Flotation Test Results on Bermingham Sample – SGS 2019

Test No.	Calc Head Grades			Lead Rougher Concentrate							Lead Cleaner Concentrate						
				Mass	Grade			Recovery			Mass	Grade			Recovery		
	Ag g/t	Pb %	Zn %	%	Ag g/t	Pb %	Zn %	Ag %	Pb %	Zn %	%	Ag g/t	Pb %	Zn %	Ag %	Pb %	Zn %
Bermingham -F1	1,712	3.57	2.95	19.5	8,393	17.6	5.34	95.5	96.1	35.3	4.7	32,484	60.5	4.1	88.5	79.1	6.6

Test No.	Head Distribution			Zinc Rougher Concentrate							Zinc Cleaner Concentrate						
				Mass	Grade			Recovery			Mass	Grade			Recovery		
	Ag %	Pb %	Zn %	%	Ag g/t	Pb %	Zn %	Ag %	Pb %	Zn %	%	Ag g/t	Pb %	Zn %	Ag %	Pb %	Zn %
BM-F1	100	100	100	12.9	508	0.66	14.4	3.8	2.4	63.3	2.7	1,405	0.63	58.4	2.2	0.5	52.9

Two locked cycle flotation tests were completed on the Bermingham Master Composite sample by SGS in 2017. The flowsheet used in the test is shown in Figure 13-6. The feed samples were ground to particle size P80, approximately 150 µm, which was followed by a silver-lead rougher flotation. The silver-lead rougher concentrate reported to a three-stage cleaner flotation circuit to produce a final silver-lead cleaner concentrate. The lead second cleaner tailings and third cleaner tailings were returned to the previous circuit to further recover silver and lead. $ZnSO_4$ was used in the silver-lead circuit to depress sphalerite and 3418A was used as the lead collector. The silver-lead rougher tailings and first cleaner tailings fed the lead circuit composed of a zinc rougher flotation and a two-stage zinc cleaner flotation. $CuSO_4$ was used in the zinc circuit to activate the previously depressed sphalerite and SIPX was used as the zinc circuit collector.



Source: SGS 2018a

Figure 13-6 Locked Cycle Flotation Tests Flowsheet on Bermingham Master Composite Samples

The test results are listed in Table 13-10. With LCT 1 test, high-grade silver-lead concentrates were generated containing 35,972 g/t Ag and 58.4% Pb at the corresponding recoveries of 95.9% for silver and 86.7% for lead. The zinc concentrate was graded at 48.3% Zn at a recovery of 60.0%. The LCT2 test was performed with a modified reagent scheme, including a higher dosage of 3418 A to increase lead recovery, more $CuSO_4$, and a higher pH level to improve lead recovery. The resulted silver-lead concentrates contained 31,597 g/t Ag and 56.7% Pb with the corresponding recoveries of 97.5% for silver and 95.3% for lead. The zinc concentrates were graded as 52.8% Zn at a recovery of 63.6%. The flotation performance of lead and zinc were improved with the LCT2 test.

Table 13-10 Locked Cycle Flotation Test Results on Bermingham Samples

Test No.	Sample	Head Grade			Lead Cleaner Concentrate							Zinc Cleaner Concentrate						
					Mass	Grade			Recovery			Mass	Grade			Recovery		
		Ag g/t	Pb %	Zn %	%	Ag g/t	Pb %	Zn %	Ag %	Pb %	Zn %	%	Ag g/t	Pb %	Zn %	Ag %	Pb %	Zn %
LCT1	Bermingham Master Composite	3,446	6.2	1.8	9.2	35,972	58.4	3.8	95.9	86.7	19.4	2.3	1,324	3.0	48.3	0.9	1.1	60.0
LCT2	Bermingham Master Composite	3,574	6.6	1.9	11.0	31,597	56.7	4.1	97.5	95.3	24.0	2.3	1,283	2.4	52.8	0.8	0.8	63.6

13.5.3 FLAME & MOTH SAMPLES AND BLENDED COMPOSITES (BERMINGHAM WITH FLAME & MOTH)

The initial batch flotation test on Flame & Moth samples was completed in 2013 by Inspectorate Labs and then subsequently was optimized in 2018 in t SGS testwork. The 2018 batch cleaner flotation test results are listed in Table 13-11, together with the optimum batch cleaner flotation test results. These results suggest that Flame & Moth material

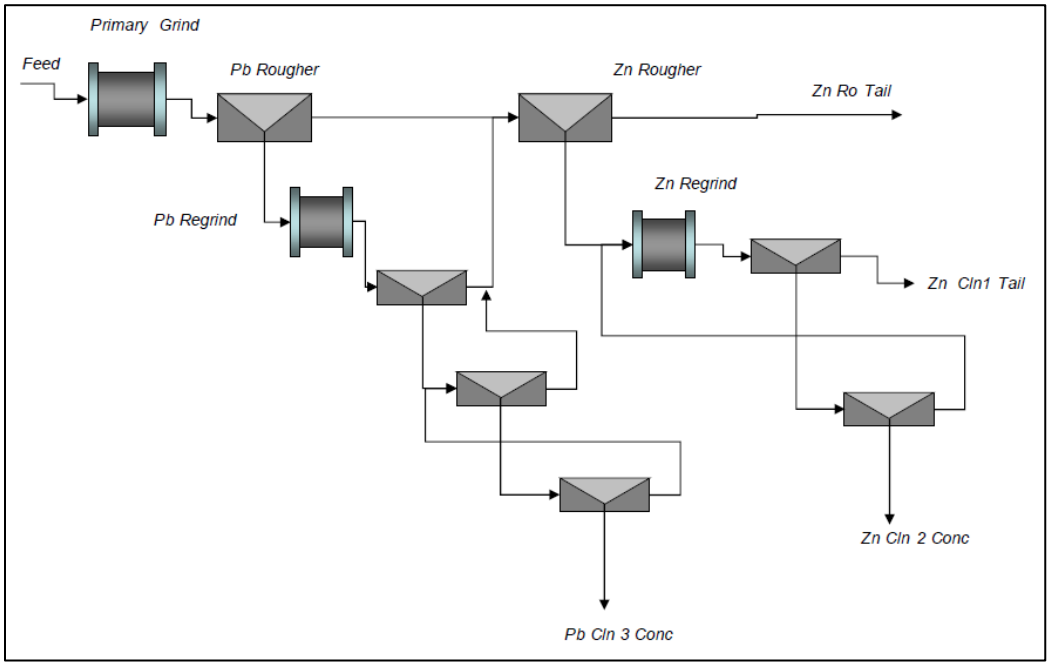
could be sensitive to regrinding. This agrees with the mineralogy observations on Flame & Moth samples, which showed a smaller portion of exposed galena with a greater association of sphalerite and pyrite complex mineralogy. Regrinding for both concentrates is included in the mill modifications for the PFS study.

Table 13-11 Open Cycle Cleaner Flotation Test Results on Flame & Moth Samples

Test No.	Head Grade			Lead Rougher Concentrate							Lead Cleaner Concentrate						
				Mass	Grade			Recovery			Mass	Grade			Recovery		
	Ag g/t	Pb %	Zn %	%	Ag g/t	Pb %	Zn %	Ag %	Pb %	Zn %	%	Ag g/t	Pb %	Zn %	Ag %	Pb %	Zn %
F&M-F8	751	2.3	7.2	16.0	4,159	12.8	9.26	88.8	88.7	20.7	3.3	16,963	53.1	5.0	73.9	75.1	2.3
Lightning Zone-F1	646	3.3	5.3	12.4	4,725	21.0	10.5	90.7	80.2	24.3	4.3	12,645	53.6	7.4	83.7	70.5	5.9
Lightning Zone-F2	671	3.3	5.6	16.0	3,855	17.4	10.4	92.0	85.3	29.8	5.1	11,228	49.4	8.4	85.2	76.9	7.6
Lightning Zone-F3	679	3.1	5.5	16.9	3,643	16.1	11.2	90.7	89.1	34.3	3.5	15.110	58.3	4.5	77.1	66.0	2.8
Christal Zone-F1	786	3.4	5.2	16.7	4,468	19.6	7.0	95.0	96.2	22.7	2.4	11,685	50.1	5.0	91.3	90.6	5.9
Test No.	**Head Distribution**			**Zinc Rougher Concentrate**							**Zinc Cleaner Concentrate**						
				Mass	Grade			Recovery			Mass	Grade			Recovery		
	Ag %	Pb %	Zn %	%	Ag g/t	Pb %	Zn %	Ag %	Pb %	Zn %	%	Ag g/t	Pb %	Zn %	Ag %	Pb %	Zn %
F&M-F8	100	100	100	18.8	273	0.6	29.5	6.8	4.6	77.3	8.7	384	0.5	54.0	4.4	1.8	65.2
Lightning Zone-F1	100	100	100	17.2	310	1.3	22.3	8.2	6.8	71.9	6.3	417	1.0	50.8	4.1	2.0	60.1
Lightning Zone-F2	100	100	100	19.8	239	0.9	19.1	7.1	5.7	67.8	6.9	380	0.9	51.2	3.9	1.9	63.2
Lightning Zone-F3	100	100	100	20.4	201	0.7	17.2	6.0	4.9	63.5	6.4	358	0.8	51.0	3.4	1.7	59.4
Christal Zone-F1	100	100	100	20.6	130	0.3	19.2	3.4	1.8	76.5	7.2	242	0.3	52.1	2.2	0.6	72.2

The locked cycle flotation test on Flame & Moth samples from each of the were performed by SGS between 2018 and 2019. SGS conducted five locked cycle flotation tests: one Christal Zone composite sample, one Lightning Zone composite sample, one Bermingham -Flame & Moth (Lightning Zone) blended sample , and two Bermingham -Flame & Moth (Christal Zone) blended samples (30% Bermingham to 70% Lightning or Christal Zone).

The basic flowsheet used in the locked cycle flotation tests is shown in Figure 13-7. The ground feed samples had a particle size of P80 between 107 µm to 132 µm, which were first treated in a two-stage silver-lead rougher flotation. Then, the silver-lead rougher concentrate was reground to approximately 80% passing 23 µm to 31 µm, prior to a three-stage cleaner flotation circuit to produce a final silver-lead cleaner concentrate. $ZnSO_4$ was used in the lead circuit to depress sphalerite and 3418A was used as the lead collector. The silver-lead rougher tailings, first cleaner tailings, and second cleaner tailings from the lead circuit were combined and sent to the zinc circuit, which included a two-stage zinc rougher flotation, followed by a regrinding to approximately 80% passing 25 µm to 35 µm and a two-stage zinc cleaner flotation. $CuSO_4$ was used to activate the previously depressed sphalerite and SIPX was used as the zinc circuit collector.



Source: SGS 2018b, 2019

Figure 13-7 Locked Cycle Flotation Tests Flowsheet on Flame & Moth and Blended Samples

The test results are listed in Table 13-12. All the five locked cycle tests generated high-grade silver-lead concentrates containing 10,853 g/t to 23,191 g/t Ag and 47.6% to 53.3% Pb. The corresponding recoveries ranged from 85.2% to 96.1% for silver and 77.8% to 92.7% for lead.

The blended samples (Flame & Moth plus Bermingham) produced better silver-lead concentrates with higher recoveries than composite samples for Flame & Moth alone. These tests on the blended mill feed are considered more representative for future mill operation as the expected mill production will be based on blended material of Flame & Moth with Bermingham or Lucky Queen deposit.

The zinc concentrates produced from all the locked cycle tests ranged from 49.8% to 54.2% Zn with recoveries ranging from 73.6% to 88.5%. All samples produced similar zinc concentrate grades and recoveries. The blended feed samples (i.e., Bermingham plus Flame & Moth) samples produced similar grade zinc concentrates and recoveries as compared with individual mine composite samples. Zinc contents recovered to the silver-lead concentrates were between 5.9% to 12.8% grading at 4.8% to 9.1% Zn, while lead contents reported to zinc concentrates ranged from 1.4% to 4.6% grading at 0.9% to 1.9% Pb. Gold recovery to the lead concentrate was 36.2% to 41.6% with a grade from 2.2 g/t to 3.9 g/t Au.

Table 13-12 Locked Cycle Flotation Test Results on Flame & Moth and Blended Flame & Moth with Bermingham

Test No.	Calc Head Grade				Lead Cleaner Concentrate									Zinc Cleaner Concentrate								
					Mass	Grade				Recovery				Mass	Grade				Recovery			
	Ag g/t	Pb %	Zn %	Au g/t	%	Ag g/t	Pb %	Zn %	Au g/t	Ag g/t	Pb %	Zn %	Au g/t	%	Ag g/t	Pb %	Zn %	Au g/t	Ag g/t	Pb %	Zn %	Au g/t
LCT1	811	3.7	5.4	-	6.3	12,049	52.1	5.0	5.5	91.9	89.4	5.9	36.2	8.4	344	0.9	54.2	0.33	3.4	2.1	83.8	2.9
LCT2	645	3.3	5.7	-	5.4	10,853	47.6	9.1	-	85.2	77.8	8.7	-	8.6	515	1.8	49.8	-	6.4	4.6	75.5	-
LCT3	1,596	4.5	4.3	0.71	8.1	19,270	51.6	4.8	3.4	96.1	92.7	9.1	36.8	6.8	443	1.0	53.5	0.44	1.9	1.4	84.7	4.0
LCT4	1,769	4.3	4.4	0.37	7.2	23,191	51.7	7.8	2.2	94.2	86.5	12.8	41.6	6.5	564	1.9	49.8	0.26	2.07	2.8	73.6	4.4
LCT5	1,115	3.7	4.6	0.66	6.3	16,266	53.3	5.2	3.9	92.3	90.7	7.1	37.5	7.7	524	1.0	53	0.65	3.6	2.0	88.5	7.6

Notes:

1. LCT1 - Christal Zone Composite; LCT2 - Lightning Zone Composite; LCT3 – Bermingham Master Composite-Christal Zone Blend; LCT4 - Bermingham Master Composite -Lightning Zone Blend; LCT5 - New Bermingham Composite-Christal Zone Blend.

13.5.4 LUCKY QUEEN SAMPLES

The batch flotation tests on Lucky Queen samples were completed in 2013 and 2018. The 2013 tests were performed by Inspectorate using an open circuit cleaner sequential flotation method with no regrinding stages. The testwork results were the best of the four deposits. On average, the lead concentrate contained 68% Pb and 33,960 Ag at a silver recovery of 89% and lead recovery of 91%. The zinc recovery was 73% at a concentrate grade of 59% zinc. Table 13-13 shows the cleaner flotation test results.

Table 13-13 Open Cycle Cleaner Flotation Tests on Lucky Queen Test Samples

Test No.	Calc Head Grades			Lead Rougher Concentrate							Lead Cleaner Concentrate						
				Mass	Grade			Recovery			Mass	Grade			Recovery		
	Ag g/t	Pb %	Zn %	%	Ag g/t	Pb %	Zn %	Ag %	Pb %	Zn %	%	Ag g/t	Pb %	Zn %	Ag %	Pb %	Zn %
F9	2,322	4.5	3.4	11.4	20,144	39.1	5.2	99.1	98.5	17.3	6.6	33,084	65.9	3.0	93.3	95.1	5.7
F10	4,965	9.7	4.8	20.0	24,637	48.0	5.0	99.1	98.5	21.0	12.1	34,837	70.5	1.9	84.6	87.3	4.8

Test No.	Head Distribution			Zinc Rougher Concentrate							Zinc Cleaner Concentrate						
				Mass	Grade			Recovery			Mass	Grade			Recovery		
	Ag %	Pb %	Zn %	%	Ag g/t	Pb %	Zn %	Ag %	Pb %	Zn %	%	Ag g/t	Pb %	Zn %	Ag %	Pb %	Zn %
F9	100	100	100	8.3	160	0.3	33.2	0.6	0.5	80.3	4.3	215	0.2	58.8	0.4	0.2	73.6
F10	100	100	100	12.3	233	0.7	30.3	0.6	0.9	78.2	5.9	301	0.7	58.9	0.4	0.4	72.5

The 2018 flotation tests by SGS included five cleaner flotation tests with no regrinding stages. Good silver-lead cleaner concentrates were produced, which contained 15,893 g/t to 18,963 g/t Ag, 50.8% to 58.2% Pb. The zinc cleaner concentrate showed a lower grade, ranging from 30.6% to 41.5% Zn, which may be improved by regrinding the zinc rougher concentrates since the primary grind size was around 90 µm, which was much coarser as compared with other samples reground to 20 µm in cleaner tests. No locked cycle flotation tests have been performed on Lucky Queens samples.

13.6 MISCELLANEOUS TESTWORK

The 1996 and 2008/2009 test programs by PRA included a series of miscellaneous tests, namely settling tests, filtration tests, and an analysis of flotation tailings. Since then, no further similar tests were conducted. A summary of the previous testwork by PRA is presented in this report. Details can be found in the 2009 PEA report by Wardrop (Wardrop, 2009).

Settling tests were performed on samples of both Bellekeno lead and zinc concentrates and the tailings. Two flocculants, Percol 156 and Percol 351, were tested in the two test programs. An average unit thickener area of 0.02 m^2/tpd was identified for the mill design criteria. Vacuum filtration tests were performed in the 2008/2009 testing on samples of lead and zinc concentrates without any issues reported.

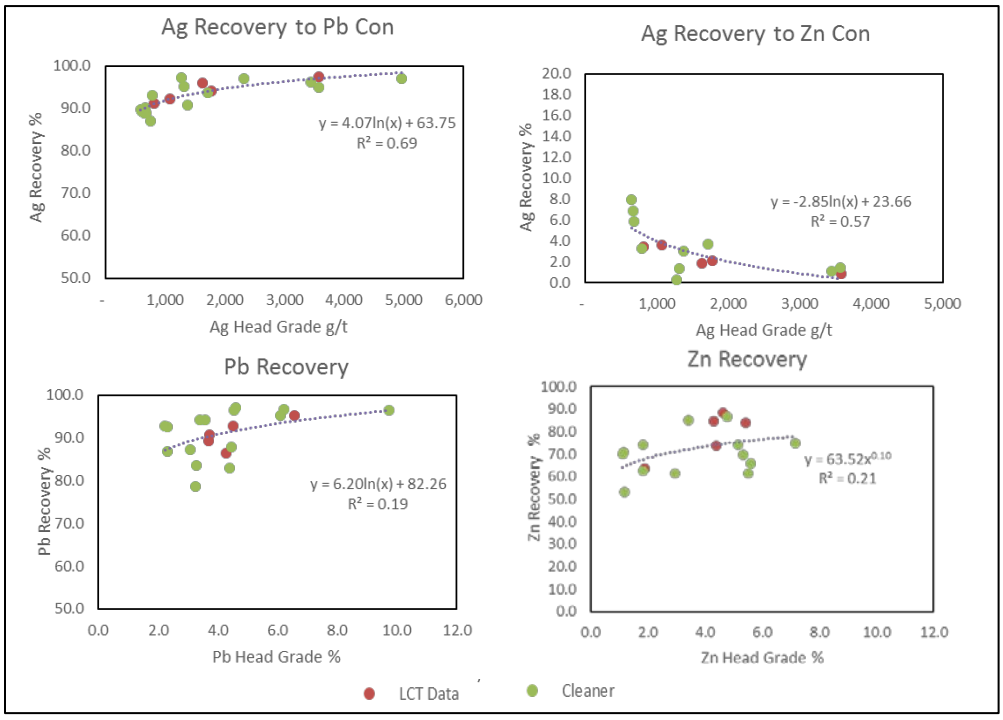
Whole rock assay and inductively coupled plasma (ICP) analysis were performed by PRA in 2008 on bulk tailings samples to determine the chemical characteristics. The main components identified were silicon and iron. The tailings water was also assayed by the ICP scan. Acid base accounting tests were performed on low and high sulphide tailings samples to determine their acid generating potential. The results indicated that the bulk tailings (low sulphide) was not likely acid-generating; however, the zinc cleaner scavenger tailings may pose some acid generation potential.

13.7 METAL RECOVERY PROJECTIONS

From the mineralogy comparison, the deposits of Bellekeno, Bermingham and Lucky Queen can be considered as high-grade and coarse-grained in nature; while the deposit of Flame & Moth were found less coarse grained with a greater association of sphalerite and pyrite complex. Blending of Flame & Moth deposit with other deposits could produce good flotation response which has been illustrated in the locked cycle flotation tests on the blended samples. In addition, the optimized lead rougher recovery of the four individual deposits tends to range from 89% to 98%. This indicates that a well cleaner flotation performance can be expected. As a result, the overall flotation recovery for this Project can be estimated by using both the open circuit flotation test results and the locked cycle test data which can also provide confirmation or validity for the former data.

Specifically, metal recoveries of silver, lead, and zinc were projected based on the optimised test results obtained from the locked cycle and open cycle flotation test programs on the representative samples under the LOM mine plan reported herein, while test data from the potentially oxidised samples, the samples with higher head grades than the LOM's estimates, or the samples collected from locations beyond the planned mine areas were not included in this projection. Metal recoveries from the batch open cleaner flotation tests were adjusted according to locked cycle results to reflect the middling recirculation and regrinding effects on overall metallurgical performances.

The metal recoveries with varied head grades on the selected samples are plotted in Figure 13-8. The red dots represent the data from the locked cycle tests, while the green dots represent the data from the batch open cleaner flotation tests. The trendline was developed from both the locked cycle test data and the batch open cleaner test data.



Source: Alexco 2019a

Figure 13-8 Metal Recoveries at Head Grades for Recovery Projection

In general, a reasonable relationship can be observed between silver head grades and silver recoveries. For lead recovery to lead concentrates, a weak dependence on the feed grade was observed. This may be caused by various test

conditions used by different laboratories. However, when considering the locked cycle test data only, which were drawn from SGS tests, the lead grade-recovery relationship appears to be better. With zinc recovery to zinc concentrates, the dependence on feed grade is also weak as part of zinc reporting to lead concentrates. Variability locked cycle tests are therefore recommended to verify the observed trends using blended samples according to the LOM production plan.

For this study, regression analysis was used to model the metal recoveries with varied head grades. Table 13-14 summarizes the projected metal recoveries for all the deposits included in this Project. When the feed grades beyond the ranges specified in the table, constant metal recovery is recommended in the projection. A Zn to Pb concentrate recovery formula was not generated; instead, an overall recovery of 82% Zn was applied and the quantity in the Pb concentrate is the difference between the 82% recovery and the calculated Zn to Zn concentrate recovery using the formula presented in Table 13-14.

Table 13-14 Concentrate Metal Production

Ag Recovery			
Ag Head Grade	**< 500 g/t Ag**	**500 -3000 g/t Ag**	**> 3000 g/t Ag**
Ag Recovery to Pb Con	80%	= 4.07*ln(Ag head grade, g/t) + 63.75	96.5%
Ag Recovery to Zn Con	6%	= -2.85*ln(Ag head grade, g/t) + 23.66	0.5%
Total Ag Recovery	86%		97%
Pb Recovery to Pb Concentrate			
Pb Head Grade	**<1% Pb**	**1-10% Pb**	**>10% Pb**
Pb Recovery to Pb Con, %	75%	= 6.2*ln(Pb head grade, %) + 82.26	96.7%
Zn Recovery to Zn Concentrate			
Zn Head Grade	**<1% Zn**	**1-10% Zn**	**>10% Zn**
Zn Recovery to Zn Con, %	55%	= 63.52*(Zn head grade, %)$^{0.10}$	85%
Pb Recovery to Zn Concentrate			
Pb Head Grade	**<2.68% Pb**	**>2.68% Pb**	
Pb Recovery to Zn Con, %	5%	= 34.31*(Pb head grade, %)$^{(-1.96)}$	

Note:
Equation coefficients are displayed as rounded to 2 decimal places for edition purpose; more digits are required to generate the projected results in Section 17

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14. MINERAL RESOURCE ESTIMATE

Definitions for resource categories used in this report are consistent with Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Definition Standards for Mineral Resources and Mineral Reserves dated May 10, 2014 (CIM definitions) incorporated by reference into NI 43-101. In the CIM classification, a Mineral Resource is defined as "a concentration or occurrence of solid material of economic interest in or on the Earth's crust in such form, grade or quality and quantity that there are reasonable prospects for eventual economic extraction". Mineral Resources are classified into Measured, Indicated, and Inferred categories. A Mineral Reserve is defined as the "economically mineable part of a Measured and/or Indicated Mineral Resource" demonstrated by studies at prefeasibility or feasibility level as appropriate. Mineral Reserves are classified into Proven and Probable categories.

A summary of the Mineral Resource at the KHSD is shown in Table 14-1.

Table 14-1 Summary of Mineral Resource Estimates at January 01, 2021

Category	Deposit	Tonnes (t)	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)	Contained Ag (oz)
Indicated	Bellekeno[7]	213,000	620	*n/a*	5.5%	5.5%	4,246,000
	Lucky Queen	132,300	1,167	*0.2*	2.4%	1.6%	4,964,000
	Flame & Moth	1,679,000	498	*0.4*	1.9%	5.3%	26,883,000
	Onek	700,200	191	*0.6*	1.2%	11.9%	4,300,000
	Bermingham	1,102,300	930	*0.1*	2.4%	1.7%	32,959,000
Total Indicated		**3,826,800**	**596**	**0.34**	**2.1%**	**5.4%**	**73,352,000**
Inferred	Bellekeno	302,000	359	n/a	2.5%	5.4%	3.486.000
	Lucky Queen	257,900	473	0.1	1.0%	0.8%	3,922,000
	Flame & Moth	365,200	356	0.3	0.5%	4.3%	4,180,000
	Onek	285,100	118	0.4	1.2%	8.3%	1,082,000
	Bermingham	509,400	717	0.2	1.7%	1.5%	11,743,000
Total Inferred		**1,719,600**	**442**	**0.2**	**1.4%**	**3.9%**	**24,413,000**

Notes:

1. All Mineral Resources are classified following the CIM Definition Standards for Mineral Resources and Mineral Reserves (May 2014) of NI 43-101.
2. Indicated Mineral Resources are inclusive of probable Mineral Reserves estimates.
3. Mineral Resources are not Mineral Reserves and do not have demonstrated economic viability. All numbers have been rounded to reflect the relative accuracy of the estimates.
4. The Mineral Resource estimates comprising Lucky Queen and Flame & Moth, Onek and Bermingham are supported by disclosure in the news release dated March 28, 2019 entitled "Alexco Announces Positive Pre-Feasibility Study for Expanded Silver Production at Keno Hill Silver District" and the Technical Report filed on SEDAR dated February 13, 2020 with an effective date of March 28, 2019.
5. The Mineral Resource estimate for the Bermingham deposit is based on Mineral Resource estimates having an effective date of March 28, 2019.
6. The Mineral Resource estimate for the Lucky Queen, Flame & Moth and Onek deposits have an effective date of January 3, 2017.
7. The Mineral Resource estimate for the Bellekeno deposit is based on an internal Mineral Resource estimate completed by Alexco Resource Corp. and externally audited by SRK Consulting Inc., having an effective date of January 01, 2021. This Mineral Resource estimate has been depleted to reflect all mine production from Bellekeno to the end of December 2020.

14.1 INTRODUCTION

The assumptions and methodologies used to prepare the Mineral Resource estimates for the four deposits included in this updated technical report and one additional deposit not included in the economic analysis (Section 22):

- Bellekeno deposit;
- Lucky Queen deposit;
- Flame & Moth deposit;
- Onek deposit (not part of this updated technical report economic analysis); and
- Bermingham deposit.

The Mineral Resources have been estimated in conformity with the generally accepted CIM *Estimation of Mineral Resources and Mineral Reserves Best Practices Guidelines* (CIM, 2003) and are reported in accordance with NI 43-101. Mineral Resources are not Mineral Reserves and have not demonstrated economic viability.

In the opinion of the QP, the resource evaluations reported herein are a reasonable representation of the global polymetallic Mineral Resources in the Bellekeno, Lucky Queen, Flame & Moth, Onek, and Bermingham deposits given the current level of sampling.

An updated Bellekeno Mineral Resource represented here is the fourth Mineral Resource evaluation prepared for the Bellekeno deposit in accordance with CIM definitions. The Mineral Resource model and estimation work was prepared by Alexco personnel under the supervision of a third-party consulting geologist. It considers 424 drillholes drilled by Alexco during the 2006-2013 period along with chip sampling during the mining period of 2009-2013. It also includes historic drilling and chip samples collected historically.

The updated resource model for the Bellekeno mine was reviewed by Mr. Cliff Revering, P.Eng., of SRK and found to be completed to a standard acceptable to SRK and in accordance with NI 43-101.

The Mineral Resource model for the Lucky Queen deposit was prepared by SRK and published in an independent technical report on September 8, 2011. The author of the report was Dr. Arseneau. The report is entitled "Technical Report on the Lucky Queen Deposit, Lucky Queen Property, Keno Hill District, Yukon."

The Mineral Resource model for the Flame & Moth deposit was prepared by Marek Nowak, P.Eng., SRK Consulting (Canada) Inc. (SRK), and published in a News Release dated April 29, 2015.

The Mineral Resource estimate for the Onek deposit was prepared by SRK and published in an independent technical report on September 8, 2011. The author of the report was Dr. Arseneau. The report is entitled "Technical Report on the Onek Deposit, Onek Property, Keno Hill District, Yukon." The Onek Mineral Resource has been updated in this report to include the results of additional drilling carried out in 2012 and 2013.

The most recent Mineral Resource estimate for the Bermingham deposit was prepared by SRK in 2019 and published in a news release dated March 28, 2019 entitled "Alexco Announces Positive Prefeasibility Study for Expanded Silver Production at Keno Hill Silver District".

The databases used to update the Flame & Moth Mineral Resource estimate was audited by the QPs. The QPs are of the opinion that the current drilling information is sufficiently reliable to interpret with confidence the boundaries for the polymetallic mineralization and that the assay data are sufficiently reliable to support Mineral Resource estimation.

Hexagon Mining's MineSight software was used to construct the geological solids for all five deposits. The Lucky Queen and Onek, geological models and database were imported into GEMS format Access databases for geostatistical analysis, block model construction, metal grades estimates, and the tabulation of the Mineral Resources. Maptek's Vulcan software was used for geostatistical analysis and block model estimation for the Bermingham Mineral Resource estimate. Geostatistical analysis and variography for the Bellekeno Mineral Resource estimate used Snowden Supervisor software, and Hexagon Mining's MinePlan and Reserves tools for generating block models, estimating metal grades and Mineral Resource tabulation. The Lucky Queen, Flame & Moth, and Onek block models were estimated using GEMS.

14.2 RESOURCE ESTIMATION PROCEDURES

Methodology for the five deposits employed the following procedures:

- Database compilation and verification;
- Construction of wireframe models for the boundaries of the polymetallic mineralization;
- Definition of resource domains;
- Estimation of bulk density;
- Data conditioning (compositing and capping) for geostatistical analysis and variography;
- Block modelling and grade interpolation;
- Resource classification and validation;
- Assessment of "reasonable prospects for economic extraction" and selection of appropriate cut-off grades; and
- Preparation of the Mineral Resource Statement.

14.3 RESOURCE DATABASE

14.3.1 DATABASE FOR THE BELLEKENO MINE

The Bellekeno database includes all samples taken during both historic and more recent sampling campaigns, up to and including samples collected November 2013. This data includes surface and underground drilling, underground face and wall (chip) samples, both recent and historical. A summary of the data is listed in Table 14-2 and samples from within the defined geological solids are listed in Table 14-3.

Table 14-2 Bellekeno Mine Sample Database

Sample Type	Count	Number of Samples	Length(m)
Chip	2,739	10,217	9,722
Core (Surface)	65	8,541	15,274
Core (Underground)	379	8,128	10,607
Total	3,183	26,886	35,603

Table 14-3 Bellekeno Mine Samples Used for Mineral Resource Estimation

Sample Type	Count	Number of Samples	Length(m)
Chip	1,856	4,926	4,006
Core (Surface)	38	217	185
Core (Underground)	310	1,914	1,352
Total	2,204	7,057	5,543

The Mineral Resource database was inspected for inconsistencies in naming conventions, duplicate entries, lengths and distance values. A few assays marked as below detection limit, zeros, and missing or non-sampled intervals were investigated and adjusted prior to further analysis. Drillhole assays below detection limits were given one-half the lower detection limit at 0.05ppm. Non-sampled chip intervals were given a value of 0.01ppm and flagged. All drillhole missing sample intervals were a result of non-recovered core due to poor ground conditions and were incorporated as "missing samples" in the compositing stage.

14.3.2 DATABASE FOR THE LUCKY QUEEN MINE

The Lucky Queen data were exported from the SQL database by scripted routine to CSV files, which were imported into MineSight. The following drill hole files were generated: collar, survey, drill hole assay, chip sample assay, geology, and geotechnical.

The Lucky Queen database comprises descriptive information and assay values both from historical underground sampling and from exploration drilling carried out by Alexco from 2006 through 2010. The database was provided to SRK as an Excel format spreadsheet and contains a total of 558 records encompassing 47 core drill holes and 511 historical underground channel samples (Table 14-4). From the drilling results, Alexco has identified a total of 106 core drill hole intervals as primary vein intercepts and 26 intervals as secondary splay intercepts, based on a combination of geological logging and assay grades.

Table 14-4 Lucky Queen Deposit Sample Database

Type	Count	Ag (g/t)	Au (g/t)	Pb (ppm)	Zn (ppm)	Vein Width (m)
Historical Chip	511	2,175	NA	50,661	39,216	1.20
Alexco Core Vein	106	1,426	0.19	36,523	21,222	0.67
Alexco Core Splays	26	1,128	0.06	18,340	6,905	0.78
Alexco Core other	3,012	3.6	0.02	322	378	1.84

The Mineral Resource database was imported into a GEMS format Access database and validated by checking for:

- inconsistencies in naming conventions or analytical units;
- duplicate entries;
- overlapping intervals;
- length or distance values less than or equal to zero;
- blank or zero-value assay results;
- out-of-sequence intervals;

- intervals or distances greater than the reported drill hole length;
- inappropriate collar locations; and
- missing interval and coordinate fields.

Two trivial terminal interval survey distances were noted and corrected; no other significant validation errors were noted in the supplied database. Assay intervals marked as below detection limit were assigned a nominal grade of 0.001 ppm prior to importing into GEMS.

14.3.3 DATABASE FOR THE FLAME & MOTH DEPOSIT

The Flame & Moth drill hole database comprises descriptive information and assay values from exploration drilling carried out by Alexco from 2010 through 2014. The database was provided to SRK as an Excel format spreadsheet and contains 149 core drill holes (Table 14-5) drilled in the Flame & Moth area, of which 112 drill holes intercepted mineralized domains (Table 14-6).

Table 14-5 Flame & Moth Deposit Sample Database

Drill Hole Type	Drill Hole		Number of
	Number	Length (m)	Samples
Core	149	36,659	6,038

Table 14-6 Flame & Moth Deposit Core Drill Hole Vein Intercepts

Vein	Drill Hole		Number of
	Number	Length (m)	Samples
Flame Vein - Christal Zone	66	326	496
Flame Vein - Lightning Zone 1	46	242	366
Flame Vein - Lightning Zone 2	15	50	83
Total	**1128**	**618**	**945**
Note. The total is not the sum of drill holes intersecting each zone. One drill hole may intersect two zones			

The Mineral Resource database was imported into GEOVIA GEMS™ and validated with a focus on checking for narrow mineralized intersections, sampling gaps, and sample intervals with no assay data within mineralized intersections.

For resource estimation a small number of narrow drill hole intersections of the mineralized zones were expanded to at least 1.5 m mining widths. This resulted in some adjustments to the original mineralized solids (Table 14-7).

Table 14-7 Original and Adjusted Narrow Mineralized Zones Drill Hole Intersections

Hole-ID	From Orig	To Orig	Length Orig	From Adj.	To Adj.	Length Adj.	Rock Name
K-10-0303	302.15	303.66	1.51	301.19	304.51	3.32	V1C
K-11-0343	156.36	156.68	0.32	155.37	157.65	2.28	V2
K-12-0396	103.91	104.09	0.18	103.14	104.7	1.56	V1L
K-12-0398	96.65	96.88	0.23	95.55	97.63	2.08	V2
K-12-0404	37.08	38.6	1.52	37.08	38.6	1.52	V1L
K-12-0414	148.05	148.5	0.45	147.44	149.14	1.70	V2
K-12-0417	163.86	165.25	1.39	163.71	166.05	2.34	V1L
K-12-0420	120.43	120.58	0.15	119.56	121.4	1.84	V1L
K-12-0421	133.86	134.71	0.85	133.42	135.15	1.73	V2
K-12-0425	162.79	163.26	0.47	162.03	164	1.97	V1L
K-13-0498	77.73	79.17	1.44	77.16	79.7	2.54	V1C
K-14-0540	368.46	369.7	1.24	368.2	369.89	1.69	V1L
K-14-0561	206.56	207.82	1.26	206.33	208.03	1.70	V1C
K-14-0572	279.4	281.05	1.65	279.18	281.23	2.05	V1C

There are a small number of sampling gaps within mineralized intersections. These are related to gaps with no recovery or fault intersections (Table 14-8).

Table 14-8 Sample Gaps in Mineralized Zones

Hole-ID	From	To	Adjacent From	Adjacent To	Gap Length	Code
K-12-0404	32.34	32.49	32.74	33.16	0.25	V2
K-12-0404	32.74	33.16	33.24	33.63	0.08	V2
K-12-0406	45	45.35	45.65	46.06	0.30	V1L
K-12-0409	135.5	135.6	135.65	136.1	0.05	V2
K-12-0438	344.53	345.8	346.80	347.25	1.00	V1L
K-14-0528	230.52	230.93	231.45	232.35	0.52	V1L
K-14-0548	481.3	482	482.40	483	0.40	V1L

There are 90 additional intervals inserted by loggers at sample locations with lower recoveries. A review of those intervals showed that they occurred primarily in zones of slight to moderate core loss, and the intervals may not reflect actual no recovery locations. An example of those intervals is presented in Table 14-9. Alexco has reviewed core photos and logged data and commented on each one of the intervals in question. As a result of this review, the QP proceeded with assignment of missing assay values from adjacent assays. Only in a few cases where extremely low recoveries were logged, the missing assay values were excluded from the resource estimation process (10 intervals).

Table 14-9 Examples of Sample Intervals Assumed to Have No Recoveries

Hole-ID	From	To	Ag (g/t)	Code
K-12-0406	33.39	33.76	463	V2
K-12-0406	33.76	34.65		V2
K-12-0406	34.65	35.06	147	V2
K-12-0406	47	47.55	546	V1L
K-12-0406	47.55	48.05		V1L
K-12-0406	48.05	48.23	29.8	V1L
K-12-0406	48.23	48.53		V1L
K-12-0406	48.53	48.65	217	V1L
K-12-0406	48.65	49.35		V1L
K-12-0406	49.35	49.52	1225	V1L

All assays below detection limit entered in the database as negative values were assigned as follows: Ag - 0.02 g/t, Au – 0.001 g/t, Pb – 0.5 g/t.

14.3.4 DATABASE FOR THE ONEK DEPOSIT

The Onek data were exported from the SQL database by scripted routine to CSV files, which were imported into MineSight. The following drill hole files were generated: collar, survey, drill hole assay, chip sample assay, geology, and geotechnical.

The Onek database comprises descriptive information and assay values both from historical underground sampling and from exploration drilling carried out by Alexco from 2007 through 2013. The database was provided to SRK as a Microsoft Excel format spreadsheet and contains a total of 1,567 records encompassing 92 core drill holes and 1,302 historical underground channel samples, 10 historical drill holes, 29 percussion holes and 134 test holes (Table 14-10). From the drilling results, Alexco has identified a total of 106 core drill hole intervals as primary vein intercepts and 26 intervals as secondary splay intercepts, based on a combination of geological logging and assay grades.

Table 14-10 Onek Deposit Sample Database Average Assay Values Inside Veins

Type	Count	Sample inside Veins	Ag (g/t)	Au (g/t)	Pb (ppm)	Zn (ppm)
Historical Chip	1,302	1156	275	NA	23,283	111,645
Alexco Drilling	92	633	215	0.57	17,134	112,434
Historical Drilling	10	8	NA	NA	6	3,250
Percussion Test holes	29	72	NA	NA	NA	29,014
Test Holes	134	97	NA	NA	3,277	32,439
Total	1,567	1,966				

The Mineral Resource database was imported into a GEMS format Access database and validated by checking for:

- inconsistencies in naming conventions or analytical units;
- duplicate entries;
- overlapping intervals;

- length or distance values less than or equal to zero;
- blank or zero-value assay results;
- out-of-sequence intervals;
- intervals or distances greater than the reported drill hole length;
- inappropriate collar locations; and
- missing interval and coordinate fields.

A few minor inconsistencies were noted and corrected by Alexco. No other significant validation errors were noted in the supplied database. Assay intervals marked as below detection limit were assigned a nominal grade of 0.001 ppm prior to importing into GEMS.

14.3.5 DATABASE FOR THE BERMINGHAM DEPOSIT

The Bermingham drill hole database was exported from the SQL database by scripted routine to Microsoft Excel format, and consisted of 201 drillholes with requisite data related to collar location, down-hole deviation survey, sample assays and specific gravity/density measurements, lithology and structural geology. The drill hole data was imported into Maptek Vulcan software and vetted for inconsistencies. No significant inconsistencies were noted.

The assay table contained a total of 8,920 sample intervals with associated assay data totalling 9,608.3 m of sampled drill core length. Of this total, 1,114 intervals (723.3 m) were located within the interpreted mineralized wireframes. An additional 50 intervals totaling 32.8 m of drill core length located within the mineralized wireframes were labeled as "NR" referring to intervals of core loss with no associated assay data. Summary statistics (length weighted) for mineralized assay intervals contained within the mineralized wireframes are provided in Table 14-11.

Table 14-11 Summary Statistics for Mineralized Assay Data (length weighted) Grouped by Vein System

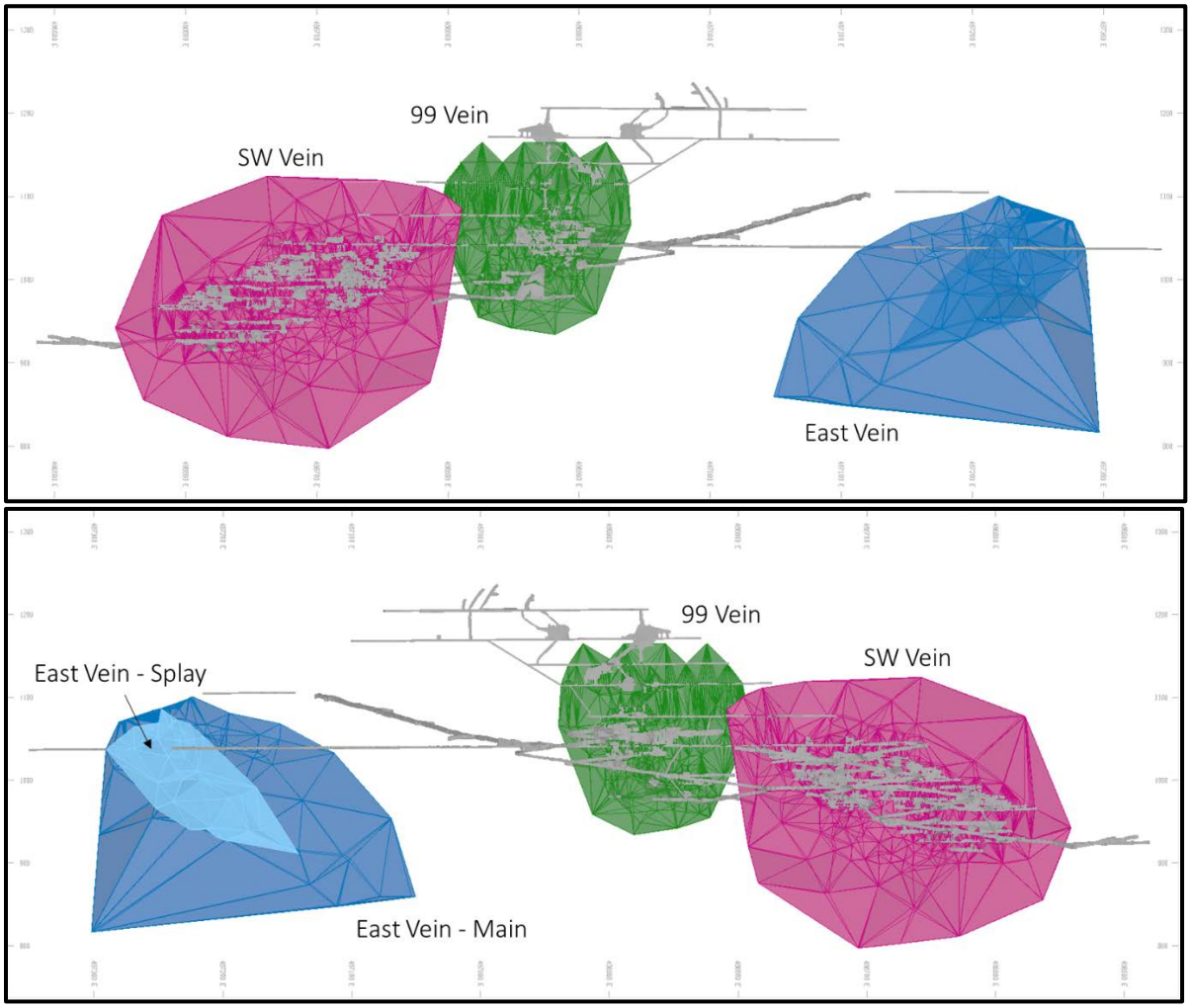
METAL	STATISTIC	BERMINGHAM MAIN				BEAR				FOOTWAL			WEST DIPPER		
		Arctic	Bear	Etta	North East	Arctic	Bear	Bear South	North East	Arctic	Bear	Etta	WD2	Bear	Bear South
Ag (g/t)	**Sample Numbers**	**198**	**45**	**75**	**21**	**52**	**241**	**51**	**33**	**129**	**99**	**70**	**21**	**60**	**19**
	Mean	780	1,201	697	669	437	3,566	2,258	1,476	1,226	1,282	532	993	858	2,288
	Std Dev	1,152	3,176	1,087	1,182	632	4,880	3,381	2,241	1,770	2,966	811	1,029	1,586	2,452
	CV	148	264	156	177	145	137	150	152	144	231	152	104	185	107
	25th Percentile	106	97	120	43	34	199	363	58	135	75	73	328	31	199
	Median	306	355	272	226	190	1190	1100	161	494	466	332	792	262	1785
	75th Percentile	1,303	963	1,220	788	528	6,670	5,180	2,353	1,535	1,410	886	1,400	1,375	4,070
Au (g/t)	Mean	0.18	0.22	0.08	0.11	0.07	0.31	0.37	0.21	0.18	0.16	0.08	0.12	0.12	0.28
	Std Dev	0.23	0.38	0.10	0.15	0.07	0.37	0.47	0.20	0.18	0.20	0.07	0.10	0.18	0.26
	CV	129	169	124	131	104	119	127	99	100	122	95	80	146	93
	25th Percentile	0.04	0.05	0.02	0.04	0.02	0.04	0.06	0.04	0.04	0.03	0.03	0.06	0.01	0.03
	Median	0.09	0.14	0.05	0.06	0.05	0.14	0.14	0.11	0.11	0.12	0.05	0.13	0.07	0.23
	75th Percentile	0.22	0.24	0.13	0.20	0.09	0.52	0.82	0.31	0.26	0.22	0.10	0.22	0.20	0.57
Pb (%)	Mean	1.74	1.87	2.85	2.03	1.12	7.74	6.57	2.60	4.75	2.56	1.34	4.58	1.30	10.55
	Std Dev	2.86	2.86	4.12	2.82	1.83	9.26	9.82	3.17	9.57	5.59	2.16	7.52	2.29	13.80
	CV	165	153	145	139	164	120	150	122	202	218	161	164	175	131
	25th Percentile	0.14	0.10	0.29	0.28	0.08	0.31	0.37	0.15	0.23	0.15	0.12	1.51	0.08	0.09
	Median	0.54	0.53	1.09	1.04	0.38	3.43	1.86	0.58	1.04	0.70	0.63	3.60	0.35	0.93
	75th Percentile	2.69	2.02	4.52	2.52	1.36	13.25	14.20	3.83	4.77	3.29	2.00	6.81	2.94	20.99
Zn (%)	Mean	2.06	1.63	2.57	1.08	0.90	2.70	2.08	2.87	1.74	2.10	1.99	2.41	1.64	4.10
	Std Dev	2.70	2.28	2.26	0.79	1.41	3.94	3.22	2.81	2.49	3.87	2.28	2.73	3.48	4.77
	CV	131	140	88	73	157	146	155	98	144	185	115	113	213	116
	25th Percentile	0.23	0.20	0.90	0.55	0.17	0.21	0.19	0.34	0.10	0.19	0.38	0.57	0.22	0.28
	Median	1.03	0.70	1.77	0.69	0.39	1.04	0.89	1.11	0.50	0.66	1.42	1.75	0.70	1.33
	75th Percentile	3.36	1.90	4.07	1.67	1.17	3.83	2.23	4.84	1.71	3.82	3.52	4.08	2.01	6.96

14.4 SOLID BODY MODELLING

3D wireframe solids were constructed by Alexco with oversight by the QP to accurately represent the geometry of the Bellekeno mine, Lucky Queen, Flame & Moth, Onek, and Bermingham vein structures. These wireframes were further reviewed and validated by the QP before Mineral Resource estimation.

14.4.1 SOLID BODY MODELLING FOR THE BELLEKENO MINE

Wireframes were constructed for three portions of the Bellekeno deposit: the Southwest (SW) vein, 99 vein, and the East vein and splay (Figure 14-1). The wireframes were constructed using Mintec's MineSight 3D software by Alexco in 2013. All points of construction on the veins are from Alexco' s core drilling and mapping of underground exposure during mining. Individual points were constructed on the hangingwall and footwall of each drill hole vein/structure intercept. These points were chosen based on the fault/vein structure where, in most cases, the hangingwall and footwall contacts were clear and the mineralization was contained within a well-defined structure.



Source: Alexco 2021

Figure 14-1 Bellekeno Mine Long Section, Wireframes, Looking North-Northwest (top) and Looking South-Southeast (bottom)

14.4.2 SOLID BODY MODELLING FOR THE LUCKY QUEEN MINE

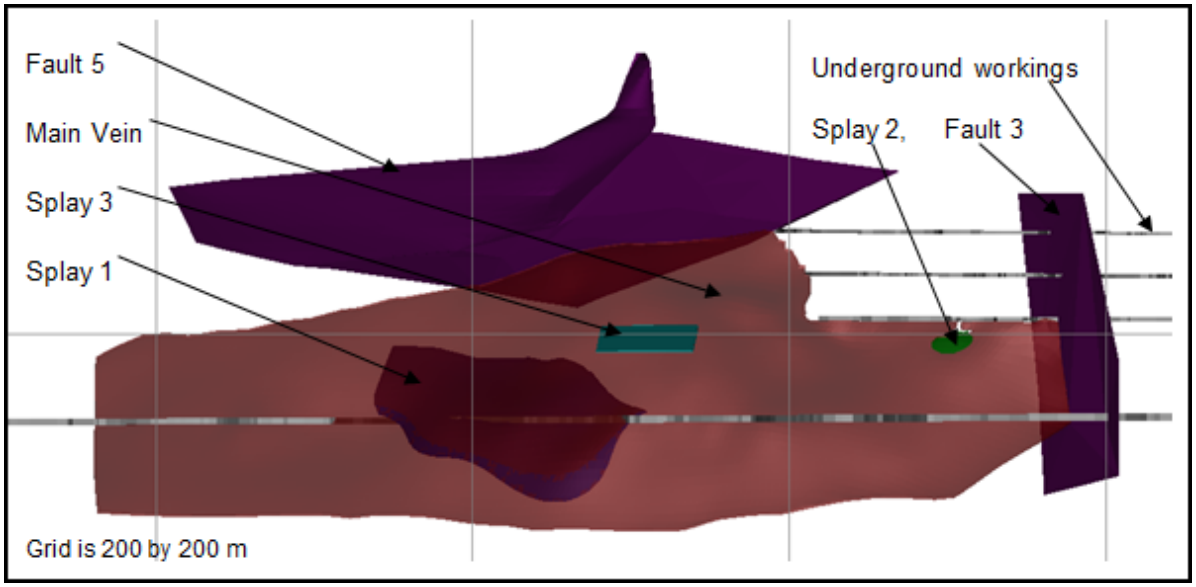
At Lucky Queen, the majority of high-grade, silver-bearing vein material is confined between relatively intact rock of the hangingwall and footwall and is manifested as vein mineral and highly deformed fault rock (in varying proportions). High silver values are only rarely found outside the main structure as stringer zones or splays. Coincidence of high-grade mineralization within identifiable structural limits made it sensible to base the wireframe interpretation on structural and geological controls, and contacts were chosen accordingly. In addition to Alexco drill hole data, historical drill hole data and geological mapping conducted by UKHM were used to constrain the geometry of the main Lucky Queen structure and associated splay structures, where applicable.

Historical drift and stope mapping is considered by Alexco to be accurate and representative. Field verification of the mapping could not be performed by Alexco geologists because the underground workings are inaccessible. However, historical maps of other mines in the KHSD have been verified and found to be generally accurate in their representation of the geology. Historical maps were scanned, geo-referenced, and imported into MineSight. The images were then draped onto drift solids at the appropriate elevation. This mapping was used to tag hangingwall and footwall contacts on the wireframe.

The main Lucky Queen mineralized body occupies a central part of the primary wireframe and the most important constraints delineating it are the lower grade drill intercepts that occupy locations above, below, and to the northeast. Beyond these drill holes, the wireframe is cut off (approximately) along the deepest extents of the 200 and 300 level historic workings. Faults 3 and 5 cut off the wireframe to the northeast and at shallow elevations, respectively. The earlier Lucky Queen workings included extensive stoping. As a result, it was decided to exclude the entire area containing the 50, 100, 200, and 300 level workings from the wireframe solid. Those areas of the 500 level workings that intersect the wireframes were also removed from the wireframe solid (Figure 14-2).

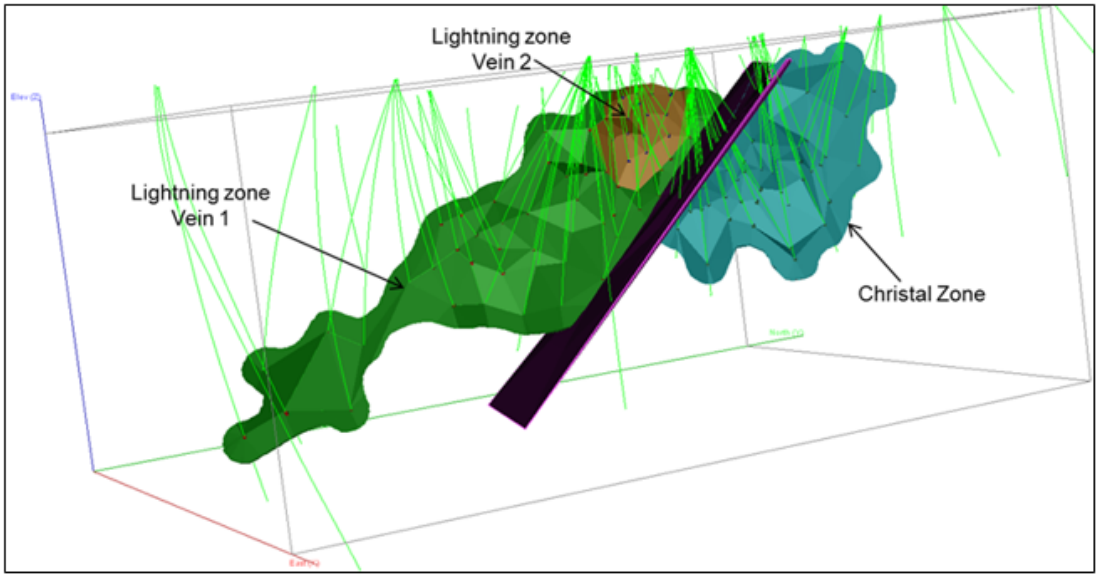
14.4.3 SOLID BODY MODELLING FOR THE FLAME & MOTH DEPOSIT

Wireframes were constructed for two portions of the Flame vein offset along the Mill fault in the geology model for the Flame & Moth prospect. The Flame vein in the hangingwall of the Mill fault was termed the Lightning zone while the portion in the footwall of the Mill fault was termed the Christal zone (Figure 14-3).



Source: SRK 2011a

Figure 14-2 Section of Lucky Queen Wireframes Looking Northwest



Source: RPA 2017

Figure 14-3 Vein Wireframes and Location of Surface Drilling at Flame & Moth Used in Resource Estimation, Section (Looking North-Northwest)

The QP reviewed and validated the wireframes and concluded that the wireframes of the Flame & Moth deposit are fair representations of the mineralized veins. The wireframes were constructed using MineSight software. All points of construction on the Flame vein are from Alexco's core drilling. Individual points were constructed on the hangingwall and footwall of each drill hole vein/structure intercept. These points were chosen based on the fault/vein structure where in most cases, the hangingwall and footwall contacts are clear and the mineralization is contained

within a well-defined structure. The Flame vein strikes between 025° and 027° and dips between 62° and 66° to the southeast.

14.4.4 SOLID BODY MODELLING FOR THE ONEK DEPOSIT

Three-dimensional wireframe solids for the Onek deposit were constructed by Alexco to accurately represent the geometry of Onek vein structures. The QP reviewed and validated the wireframes before resource estimation. The QP concluded that the wireframes of the Onek deposit were fair representations of the mineralized veins and acceptable for resource estimation.

Wireframes for three separate veins were constructed for Onek: Vein 1, Vein 2, and Vein 1FW. Vein 1 is the dominant vein-fault structure at Onek, extending over 600 m in length and up to 260 m in depth. The vein is interpreted to extend through all drilling done to date and to encompass the drifts, stopes, and raises of the historical workings. The vein-fault thickness varies from approximately 7.5 m to less than 1 m but, on the whole, is fairly thick and persistent. The farthest southwest drilling contains very little grade and acts as a constraint to the strike extent of the mineralization. On the northeastern end of the deposit, the underground mapping on the 400 level shows the vein narrowing and splitting into two, with the likely more dominant structure curving to the south-east and ending with sporadic mineralization in a possible cross fault (Figure 14-4).

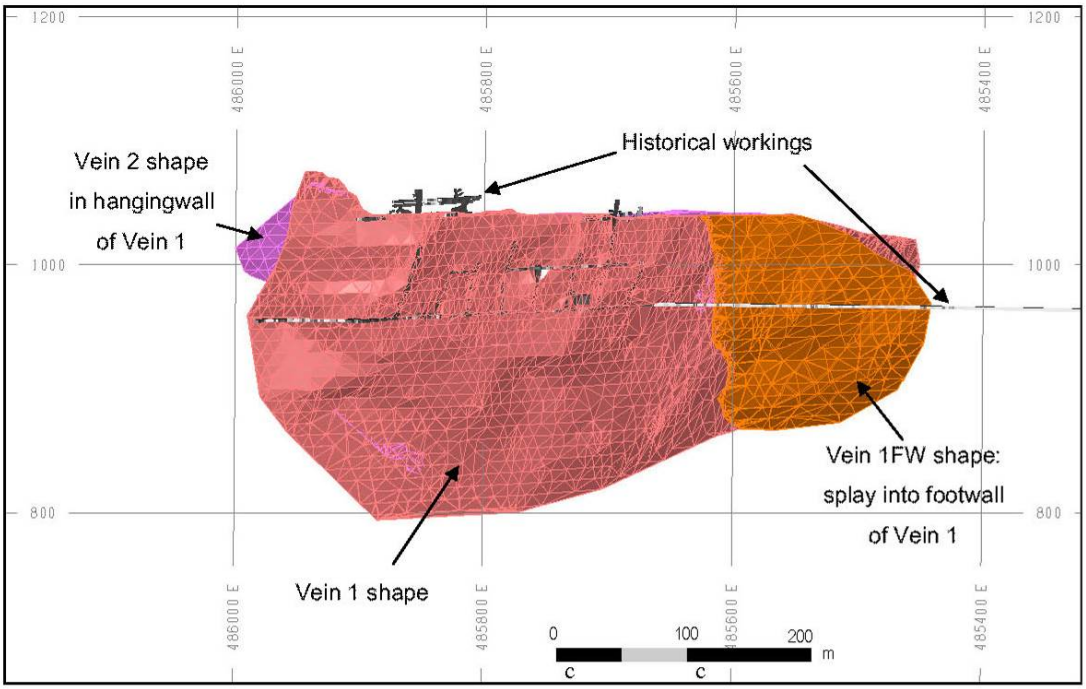
Vein 2 forms an anastomosing structure in the hangingwall of Vein 1, with repeated convergence and divergence from the Vein 1 structure, as seen in the drill holes and underground level plan mapping. Vein 2 thickness is much smaller and less consistent than Vein 1 and the mineralization has much less continuity. This is regarded as a secondary structure in the Onek deposit. Vein 2 also bends sharply to the east at the northeastern end of the deposit where intercepts in the drill holes are much more sporadic. Several small weakly mineralized vein intercepts were noted in the hangingwall of Vein 2 but continuity of mineralization could not be established and they are not modeled at this time (Figure 14-5).

Two drill holes, K-08-0149 and K-10-0244, were drilled from separate collar locations but passed within 0.5 m of each other within the Vein 2 shape. As the location of Vein 2 in hole K-08-0149 could not be reconciled with the Vein 2 location in hole K-10-0244 without significant deviation in the wireframe, and since the K-10-0244 intercept had better survey control and was less oblique to the vein surface, the K-08-0149 Vein 2 intercept was excluded from the wireframe.

A third vein, Vein 1FW, was identified in several drill holes at the southwestern end of the deposit, likely splaying sharply off Vein 1, and was modelled for resource estimation.

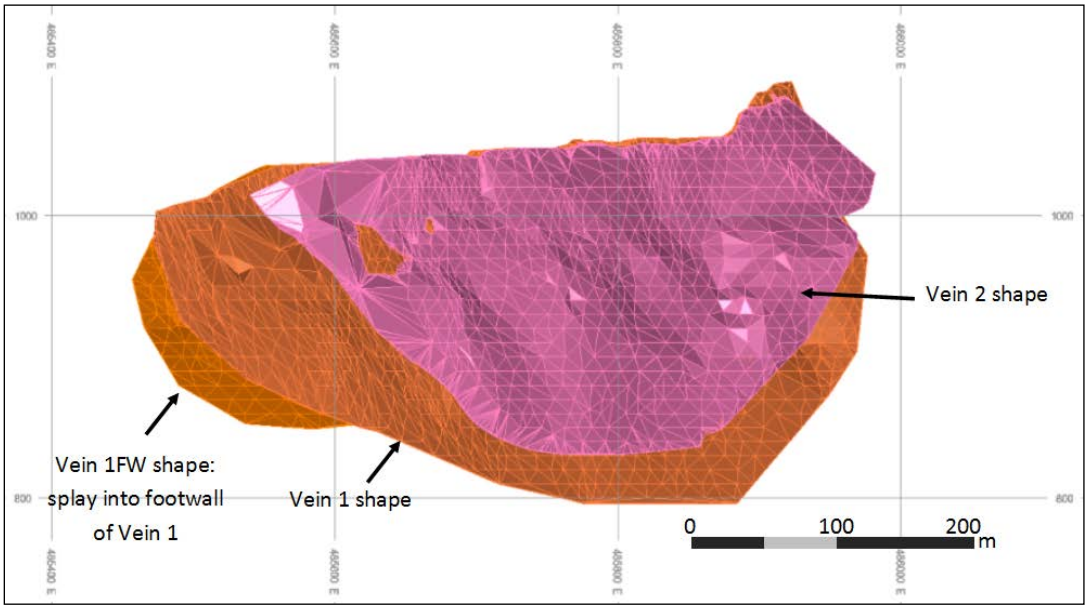
Several weakly mineralized vein fault intercepts were identified in drill holes in the footwall to Vein 1 in the central portion of the deposit, in the vicinity of the historical workings. The continuity of these intercepts could not be established with the information available and these veins are regarded as small splays off the main Vein 1 structure. These intercepts were not modeled for resource purposes at this time.

Each of the vein shapes were wireframed independently, with a hangingwall surface and a footwall surface constructed using the drill hole intercepts, the shapes of the veins mapped in the levels and raises, and surface pit mapping. Where there was less information available, a contour tool was used to interpolate the vein shape and width every 10 m in elevation and to smooth the vein surface. The vein shapes were extended to approximately 50 m beyond known drilling and given a nominal vein thickness. Veins 2 and 1FW were clipped against the Vein 1 shape. Veins 1 and 1FW were also clipped against the topographic that was based on casing depth in nearby diamond drill holes and interpreted overburden depths in proximal historic overburden (rotary) holes.



Source: SRK 2014

Figure 14-4 Long Section of Onek Wireframes Looking South



Source: SRK 2014

Figure 14-5 Long Section of Onek Wireframes Looking North

Historical drift and stope mapping is considered by Alexco to be accurate and representative. Field verification of the mapping could not be performed by Alexco geologists because of the current inaccessibility of the underground workings, however; historical maps of other mines in the Keno Hill district have been verified and found to be generally accurate in their representation of the geology. Historical maps were scanned, geo-referenced and imported into MineSight. The images were then draped onto drift solids at the appropriate elevation. This mapping was used to tag

hangingwall and footwall contacts on the wireframe. Historical (UKHM) chip sample data were not used to define wireframe contacts or wireframe width.

14.4.5 SOLID BODY MODELLING FOR THE BERMINGHAM DEPOSIT

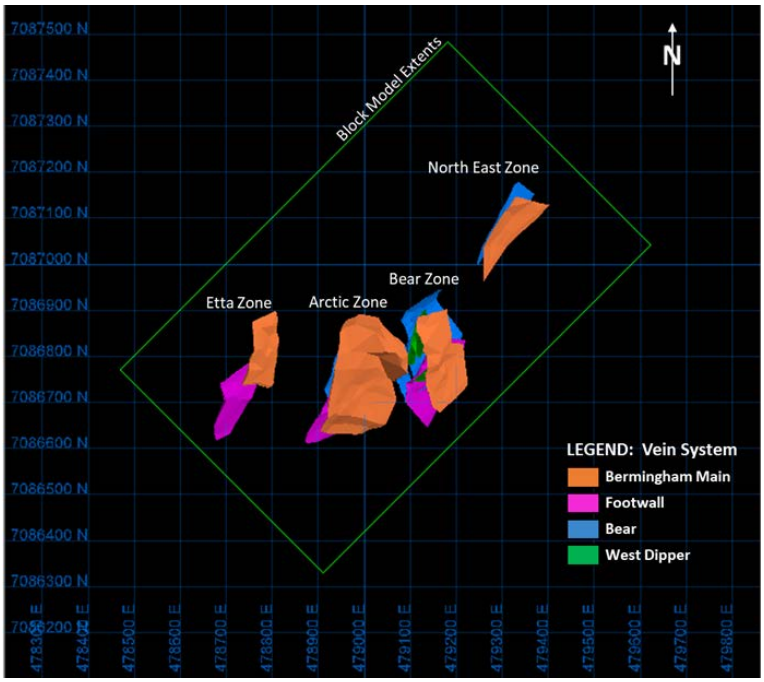
The geological interpretation of the Bermingham deposit was developed by Alexco and provided to SRK in dxf format. The geological model consists of 14 wireframes representing mineralized veins that are grouped into 5 main zones of mineralization. Table 14-12 provides a summary of the geological model nomenclature for the Bermingham deposit, with depictions of the model provided in Figure 14-6 and Figure 14-7.

The 4 main vein systems within the Bermingham deposit are known as the Bermingham Main vein, Bear vein, Footwall vein and West Dipper veins. Three of these vein systems (i.e., Bermingham Main, Bear and Footwall veins) have a strike orientation of approximately 40° to the North East and dip to the South East at approximately 55° to 75°. The West Dipper veins have a strike orientation between 20° to 40° to the North East and dip approximately 57° to the North West. The veins are segregated (and offset) by cross-cutting fault structures into four distinct mineralized zones known as the Etta, Arctic, Bear and North East zones (Figure 14-8).

The potentially economic mineralization occurs within structural corridors characterized by a damaged zone surrounding the mineralization. The mineralized veins within these structural corridors were interpreted using a silver grade cut-off of 100 g/t. The QP reviewed the wireframes relative to the drill hole data supplied by Alexco and concluded the interpretation of the mineralized veins was a reasonable representation of the mineralization system and were of sufficient quality to use for Mineral Resource estimation.

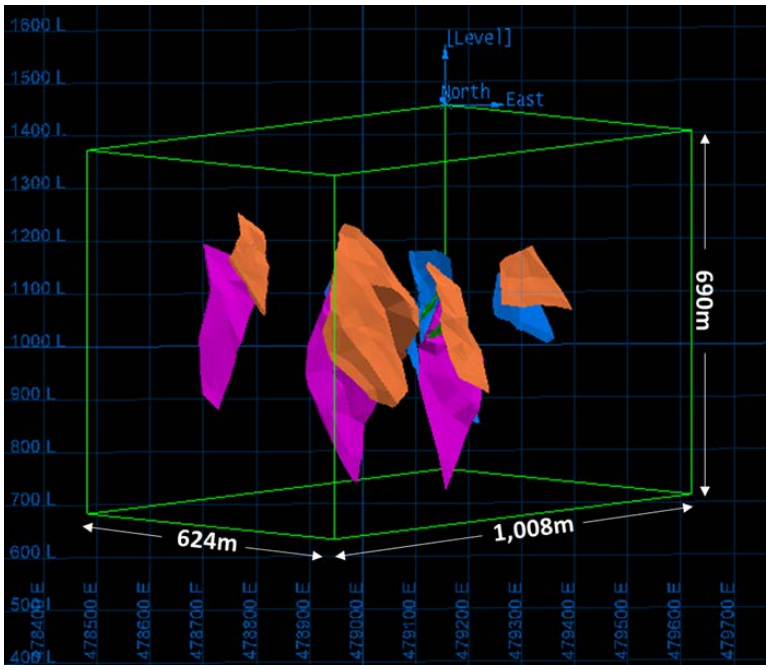
Table 14-12 Bermingham Deposit Geological Model

Zone	Vein	Wireframe Volume (m^3)
Arctic	Bermingham Main	114,235
	Bear	47,034
	Footwall	83,944
Bear	Bermingham Main	28,932
	Bear	44,532
	Bear South	6,907
	Footwall	57,403
Etta	Bermingham Main	33,520
	Footwall	79,999
North East	Bermingham Main	17,099
	Bear	26,212
West Dipper	Bear	5,249
	Bear South	1,652
	WD2	6,417



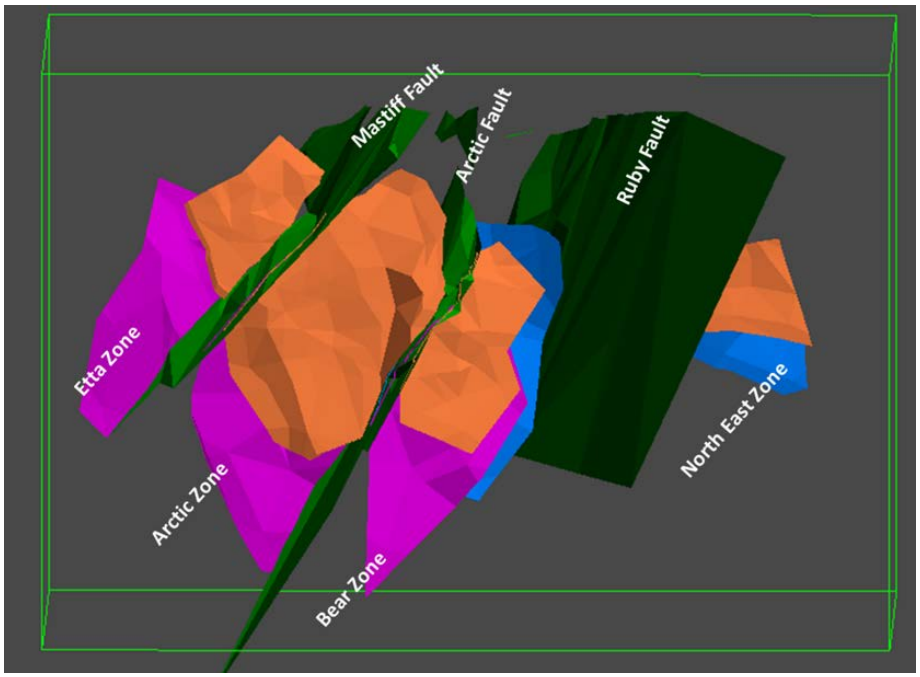
Source: SRK 2018

Figure 14-6 Bermingham Geological Model (Plan View)



Source: SRK 2018

Figure 14-7 Bermingham Geological Model (3D Isometric looking North East)



Source: SRK 2018

Figure 14-8 Cross-cutting Faults (View looking North West)

14.5 BULK DENSITY DATA

14.5.1 BULK DENSITY FOR THE BELLEKENO MINE

Bulk density samples were collected during assay analysis for 1,450 of the core drillhole samples that were coded within the wireframe veins. Pulp bulk density measurements were made by pycnometer at ALS Chemex in Vancouver. An 'All Metal %' value was calculated for each of the silver, lead and zinc values corresponding to these:

$$All\ Metal\ \% = [\frac{Ag(ppm) + Pb(ppm) + Zn(ppm)}{10{,}000}]$$

The All Metal % result for each of the samples was then plotted against the density values (Figure 14-9) to determine the polynomial regression formula:

$$Density = 0.0002(All\ Metal\%)^2 + 0.0263(All\ Metal\%) + 2.9812$$

Of the comparisons plotted, six were capped at density = 7.0, three were removed during initial sample checks, and two were removed as outliers (Table 14-13).

The QP acknowledges that pulp measurements will typically result in slightly higher density values of approximately 3% - 5% when compared to measurements taken on core samples as demonstrated on other deposits within the Keno Hill project area. Additional core bulk density measurements should be collected for the Bellekeno deposit to assess the relationship between pulp and core density measurements specific to the Bellekeno deposit. The potential discrepancy in density estimation related to the use of pulp measurements is not considered to be material.

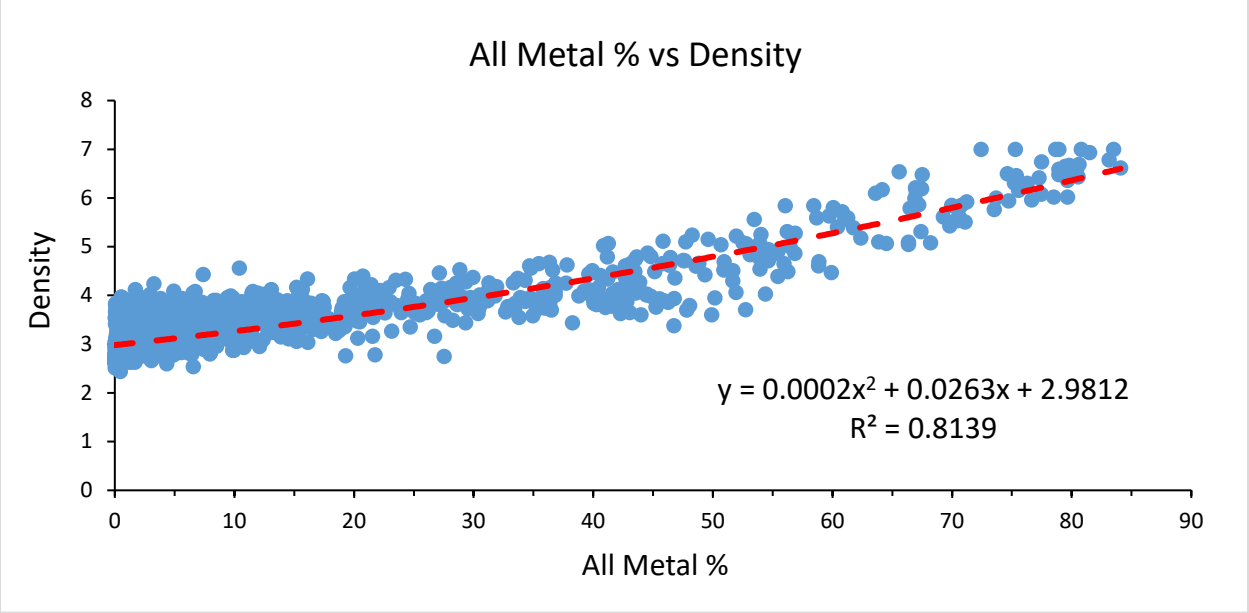


Figure 14-9: Bulk Density vs All Metal (%) for Bellekeno

Table 14-13 Bellekeno Bulk Density Measurements

Count	Bulk Density Measured on Core			
	Minimum	Maximum	Average	Median
1445	2.44	7.00	3.40	**3.11**

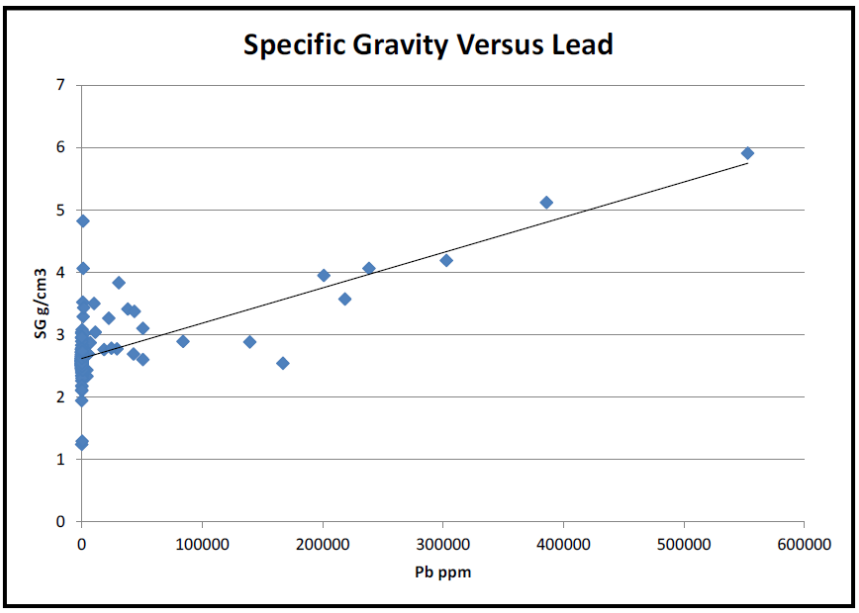
14.5.2 BULK DENSITY FOR THE LUCKY QUEEN MINE

The bulk density data for Lucky Queen included a total of 191 bulk density measurements (Table 14-14) on core samples. Bulk density was measured by Alexco using a laboratory scale and recording the mass of core pieces in air and in water. Core was not covered by wax or plastic film prior to immersion. Regression analysis of the bulk density measurements shows a moderately strong correlation between the lead assay results and the reported bulk density, with a correlation coefficient of 0.62 (Figure 14-10). Therefore, a linear correlation was used to assign a bulk density value to each block based on the following relationship:

$$\text{Bulk density} = \text{Pb (ppm)} \times 0.00006 + 2.617$$

Table 14-14 Lucky Queen Bulk Density Measurements

Count	Bulk Density Measured on Core			
	Minimum	Maximum	Average	Median
191	1.24	6.81	2.74	2.60



Source: SRK 2011a

Figure 14-10 Scatter Plot of Lead Assay Results and Bulk Density Measurements

14.5.3 BULK DENSITY FOR THE FLAME & MOTH DEPOSIT

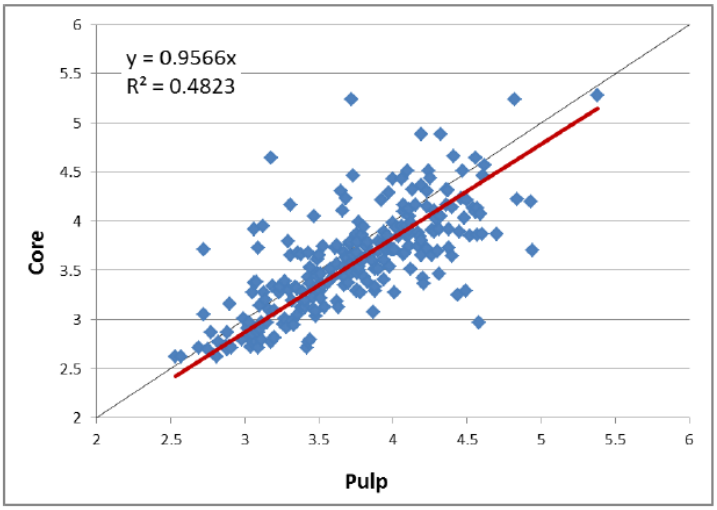
The data supplied by Alexco for Flame & Moth included a total of 691 bulk density measurements on core samples and 3,340 pulp density measurements, 304 and 724 of which, respectively, fall within the modelled vein solids (Table 14-15).

Table 14-15 Flame & Moth Bulk Density Measurements within Mineralized Zones

Zone	Type of material	Count	Bulk Density		
			Minimum	Maximum	Average
Christal	Pulp	290	2.53	5.6	3.79
	Core	114	2.6	5.28	3.63
Lightning V1	Pulp	365	2.65	5.71	3.51
	Core	169	2.54	5.24	3.48
Lightning V2	Pulp	69	2.84	4.6	3.46
	Core	21	2.79	4.23	3.5
Total	**Pulp**	**724**	**2.54**	**5.71**	**3.62**
	Core	**304**	**2.54**	**5.28**	**3.54**

Bulk density was measured on core samples by Alexco using a laboratory scale and recording the mass of core pieces in air and in water. Core was not covered by wax or plastic film prior to immersion. Pulp bulk density measurements were measured by pycnometry at ALS in North Vancouver. A linear regression between core and pulp bulk density measurements has been used to adjust the pulp density values by a factor of 0.957 as shown in Figure 14-11.

For estimates of block SG values, a combination of core bulk density and adjusted pulp density values was used.



Source: RPA 2017

Figure 14-11 Pulp Versus Core SG Values

14.5.4 BULK DENSITY FOR THE ONEK DEPOSIT

The data supplied by Alexco for Onek included a total of 626 bulk density measurements on core samples and 1,549 pulp density measurements. Of the density measurement from core, 182 were from the mineralized veins and of the 1,549 pulp density measurements, 521 were from inside the mineralized veins (Table 14-16).

Bulk density was measured on core samples by Alexco using a laboratory scale and recording the mass of drill hole core pieces in air and in water. Drill hole core was not covered by wax or plastic film prior to immersion. Pulp bulk density measurements were measured by pycnometer at ALS Chemex in Vancouver.

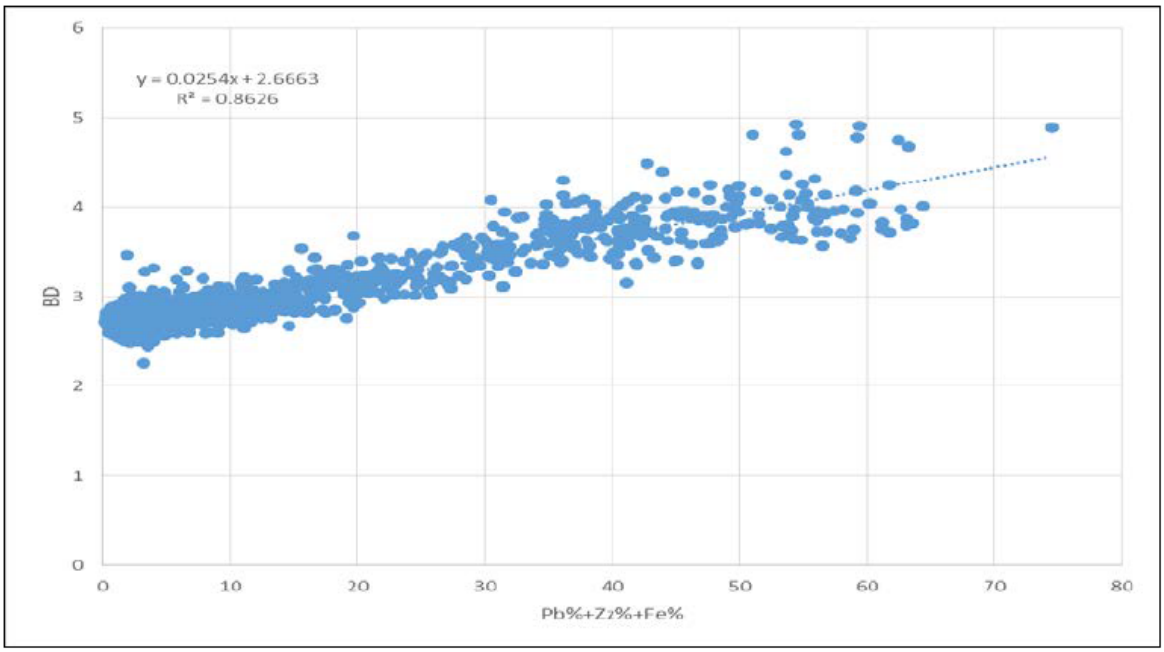
A linear regression of the core versus pulp bulk density measurements for samples was calculated, where:

Core Bulk density = 0.8532*Pulp Bulk density + 0.408

Table 14-16 Onek Bulk Density Measurements

Vein	Type	No of Samples	Minimum	Maximum	Average	Median
Vein 1	Pulp	385	2.54	4.92	3.44	3.47
	Core	140	2.47	7.32	2.67	3.45
Vein 1FW	Pulp	12	2.25	4.08	3.25	3.22
	Core	1	3.75	3.75	3.75	3.75
Vein 2	Pulp	124	2.59	4.90	3.17	2.96
	Core	41	2.55	5.07	3.28	3.21
All Samples	Pulp	521	2.25	4.92	3.37	3.35
	Core	182	2.47	7.32	3.36	3.42

The QP evaluated the bulk density data to see if there existed a correlation between SG and metal content. Figure 14-12 shows the correlation between the bulk density of samples collected from the Onek vein plotted against lead, zinc, and iron content. As can be seen from the figure there is a strong positive correlation between bulk density and metal content. For this reason, SRK decided to weight the composites against density as well as length for the resource estimation.



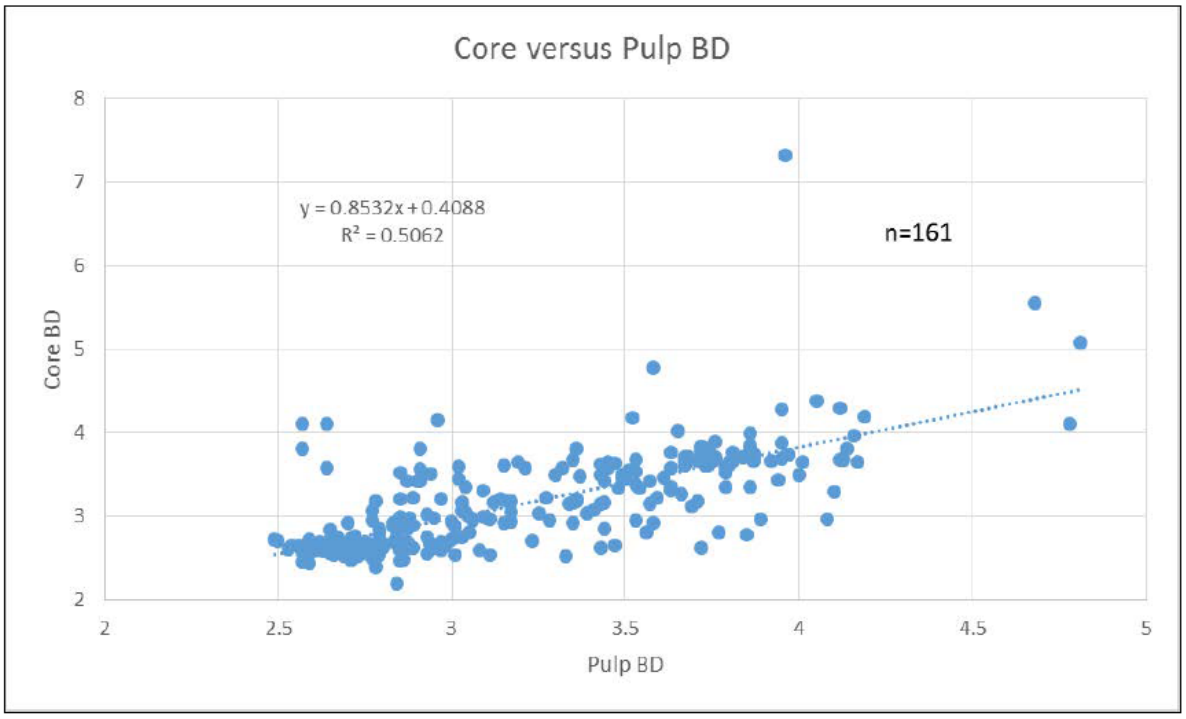
Source: RPA 2017

Figure 14-12 Correlation Between Bulk Density and Metal Content for Onek Veins

There are 633 assay intervals within the veins at Onek containing 703 bulk density measurements. Of the 633 assay intervals, 91 intervals have no density measurements leaving 542 intervals with density measurements and 161 of these intervals contain BD measurements from both core and pulp.

For the estimation of bulk density into the block model the QP used core measurement if both core and pulp measurements were present, pulp measurements where core measurements were missing and the QP calculated a bulk density based on the metal content where both core and pulp measurements were absent.

The QP acknowledges that pulp measurements are slightly higher than core density measurements where both sample types are present and that using pulp measurement without correction could lead to a slight (3% to 5%) over estimation of the bulk density (Figure 14-13). However, the QP is of the opinion that the difference is minimal and not material.



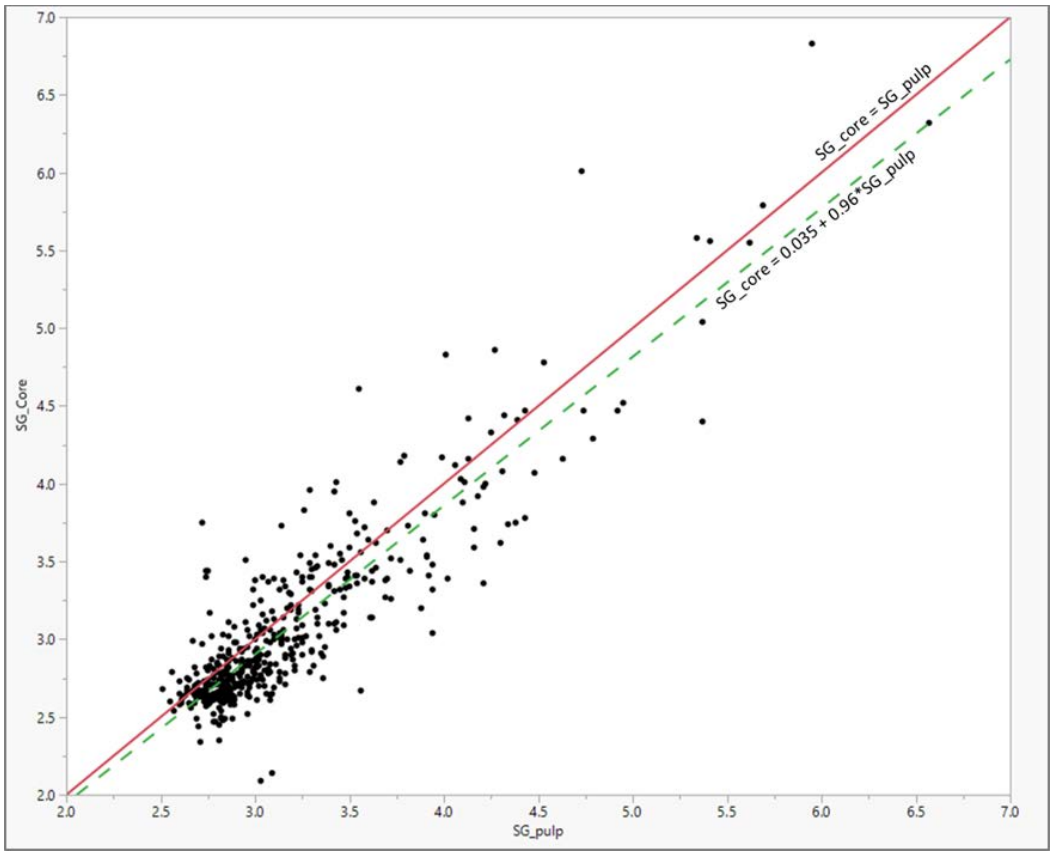
Source: RPA 2017

Figure 14-13 Comparison of Core and Pulp Density Measurements for Onek

14.5.5 BULK DENSITY FOR THE BERMINGHAM DEPOSIT

The data supplied by Alexco for Bermingham included a total of 4,999 specific gravity measurements (derived from the pycnometer method for SG determination on pulps) collected on assay samples, of which 953 were located within the mineralized wireframes. Alexco also collected a total of 835 bulk density field measurements on core using the water immersion method.

A direct comparison of the data obtained from the 2 methodologies is not possible since the sample intervals are not consistent between the datasets. Field measurements were obtained on sample intervals that have corresponding pycnometer measurements; however, field measurements represent single pieces of intact core that fall within a larger assay sample interval for which the pulp SG represents. Nevertheless, when aligning sample intervals as best as possible it appears that pycnometer measurements provide SG measurements slightly higher than the field obtained bulk density measurements (Figure 14-14).



Source: SRK 2018

Figure 14-14 Comparison between Pulp and Core Density Measurements

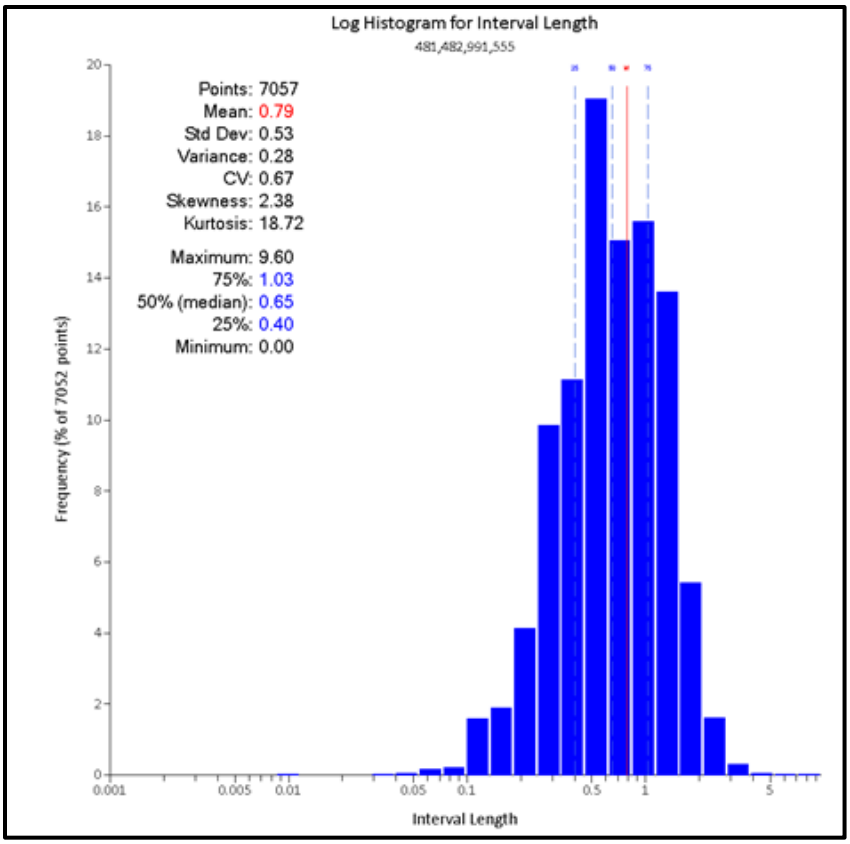
Based on the observations noted above, SG measurements derived using the pycnometer technique were used for interpolating bulk density into the block model. However, density weighting of assay composites during grade interpolation was not used to compensate for the apparent higher densities obtained from the pycnometer technique.

14.6 COMPOSITING

14.6.1 COMPOSITING FOR THE BELLEKENO MINE

Alexco identified a total of 7,057 sample intervals as vein intercepts. Using Hexagon MinePlan Drillhole Manager software, samples were composited to 1.5 m lengths within the defined vein intervals. A histogram of sample lengths for the mineralized zones can be seen in Figure 14-15.

A total of 3,815 composites were derived the Bellekeno deposit: 2,334 for SW Vein, 1,214 for 99 Vein, and 267 for East Vein. Any composite lengths that were less than 0.75 m were attached to the previous composite length. One percent of total composited lengths remained below 0.35 m and were removed. A reduced length-weighting factor was applied to all samples less than 1.5 m, and a maximum length-factor of 1.0 was applied to any lengths greater than 1.5 m.



Source: Alexco 2021

Figure 14-15 Histogram of Sample Lengths for the Mineralized Zones for Bellekeno Mine

14.6.2 COMPOSITING FOR THE LUCKY QUEEN MINE

Alexco identified a total of 106 core drill hole assay intervals as primary vein intercepts and 26 intervals as secondary splay intercepts. These assay intervals were imported into GEMS, and assays were then composited to one metre length-weighted intervals within the defined vein wireframes. Terminal composites with a length of less than 50 cm were merged with the preceding composite in order to avoid a short sample bias during estimation. Missing sample intervals were assigned a nominal value of 0.001 during compositing.

14.6.3 COMPOSITING FOR THE FLAME & MOTH DEPOSIT

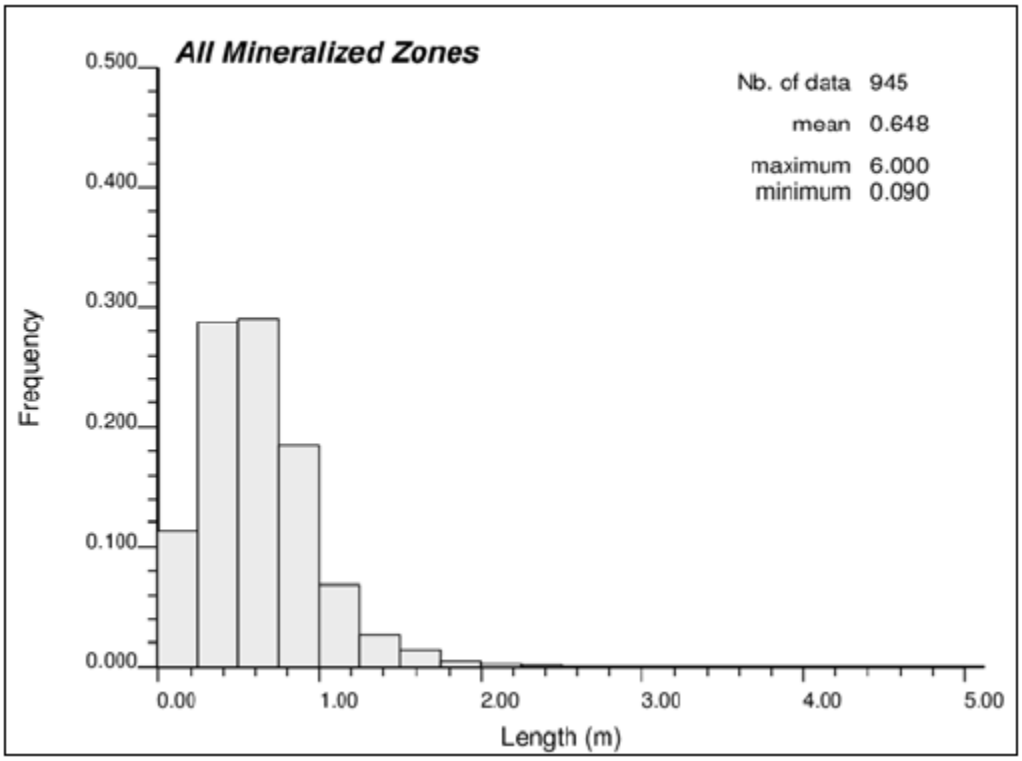
Before compositing, four very extreme assay values were capped: two for Ag at 7,500 g/t and two for Zn at 30%. Assays were composited to one metre intervals within the defined zone wireframes. All composites shorter than 0.5 m were attached to the previous composite assay. A histogram of sample lengths within the mineralized zones is presented in Figure 14-16.

Two sets of composited data were produced:

1. Composites within original wireframes of the mineralized areas with occasional very narrow intersections; and

2. Composites within adjusted wireframes of mineralized areas with narrow intersections expanded to a minimum of 1.5 m mining widths. This expansion had very minimal effect on the Lightning and Christal zones but had a substantial effect of increased volume in the V2 zone.

The two sets of composites were used to estimate block grades in two block models: (1) for resource reporting with mineralized zones expanded to a minimum of 1.5 m, and (2) for further engineering analysis and design of stopes based on originally designed wireframes.

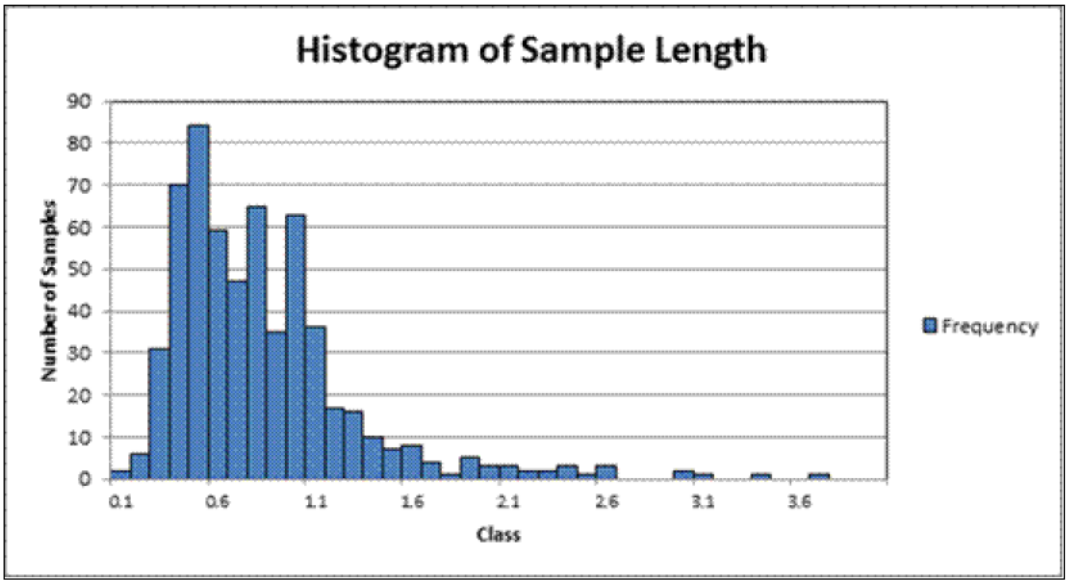


Source: SRK 2014

Figure 14-16 Histogram of Sample Lengths in the Mineralized Zones for Flame & Moth Deposit

14.6.4 COMPOSITING FOR THE ONEK DEPOSIT

Alexco identified a total of 633 diamond drill hole assay intervals as vein intercepts. These assay intervals were imported into GEMS, and assays were then composited to one metre length and density-weighted intervals within the defined vein wireframes. A histogram of sample lengths within the mineralized zones can be seen in Figure 14-17.

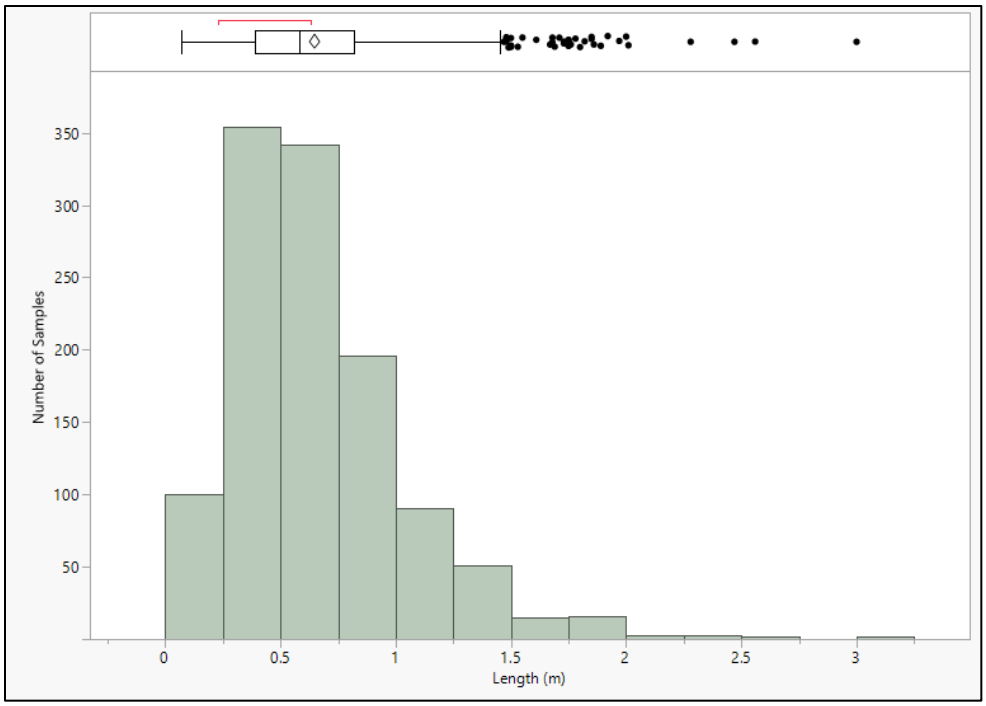


Source: RPA 2017

Figure 14-17 Histogram of Sample Lengths within Onek Veins

14.6.5 COMPOSITING FOR THE BERMINGHAM DEPOSIT

A target composite internal length of 1m was selected for Bermingham based on the average raw assay sample length being 0.65 m, and approximately 90% of mineralized assay samples consisting of sample lengths of 1.0 m or less. Wireframes of the mineralized veins were used to constrain assay data composting, and intervals of missing sample data recorded as "NR" (i.e., not recovered) due to core loss were ignored during data compositing. Due to vein geometry and missing data intervals, composite intervals of less than 0.5 m were either incorporated with the adjacent composite interval or removed from the final composite data set.



Source: SRK 2018

Figure 14-18 Histogram of Sample Lengths within Bermingham Veins

14.7 EVALUATION OF OUTLIERS

14.7.1 EVALUATION OF OUTLIERS FOR THE BELLEKENO MINE

Grade capping analysis was conducted on the domain-coded composited assay data in order to limit the influence of extreme assay values during estimation. The assay composites were examined using histograms and cumulative frequency plots for each commodity in each vein. A summary table of the selected capping thresholds and corresponding impacts on average grade and metal loss is provided in Table 14-17. This capping threshold value was selected to minimize changes in the sample distribution. Composites were capped prior to estimation.

It should be noted that the East Main and East Splay veins were assessed as one data population due to the limited number of data in both veins.

Table 14-17 Composite Capping Levels for the Bellekeno Mine

Vein	Commodity	Maximum Value	Cap Value	Number Capped	Average Grade (Uncapped)	Average Grade (Capped)	Lost Metal*
Southwest Vein	Ag (g/t)	9,832	4,500	21	852	839	1.5%
	Pb %	82.51	65	25	10.73	10.65	0.7%
	Zn %	46.67	33	26	6.87	6.82	0.8%
99 Vein	Ag (g/t)	19,450	7,600	6	1,118	1,103	1.3%
	Pb %	73.36	55	13	7.08	6.98	1.4%
	Zn %	45.22	20	23	3.53	3.41	3.3%
East Vein (Main and Splay)	Ag (g/t)	4,790	2,000	9	282	247	12.4%
	Pb %	38.40	15	6	1.48	1.22	17.4%
	Zn %	49.16	20	11	3.37	2.94	12.9%

Note.

* Lost metal is (Average – Averaged Capped)/Average * 100 where Average is the average grade of the assays before capping and Average Capped is the average grade of the assays after capping.

14.7.2 EVALUATION OF OUTLIERS FOR THE LUCKY QUEEN MINE

Grade capping analysis was conducted on the domain-coded and composites data in order to limit the influence of extreme assay values during estimation. The combined composite sample population for the main Lucky Queen vein and splay was examined using histograms, probability graphs, and capping plots. Capping threshold values were selected that minimize changes in the sample distribution, and sample values were capped to these values prior to compositing and estimation (Table 14-18). For lead, the capping threshold was set to the percentile used for grade capping of silver in order to maintain the observed correlation between these two elements.

Table 14-18 Composite Capping Levels for Lucky Queen

Element	Maximum Value	Cap Value	Mean	Mean Capped	Number Capped	Lost Metal*
Ag (g/t)	13,998	6,300	960	834	2	13.1%
Au (g/t)	3.00	2.00	0.16	0.15	1	10.0%
Pb (ppm)	303,963	148,000	20,831	18,461	2	11.4%
Zn (ppm)	210,100	70,000	13,944	10,143	3	27.2%

Note.

* Lost metal is (Average – Averaged Capped)/Average * 100 where Average is the average grade of the assays before capping and Average Capped is the average grade of the assays after capping.

14.7.3 EVALUATION OF OUTLIERS FOR THE FLAME & MOTH DEPOSIT

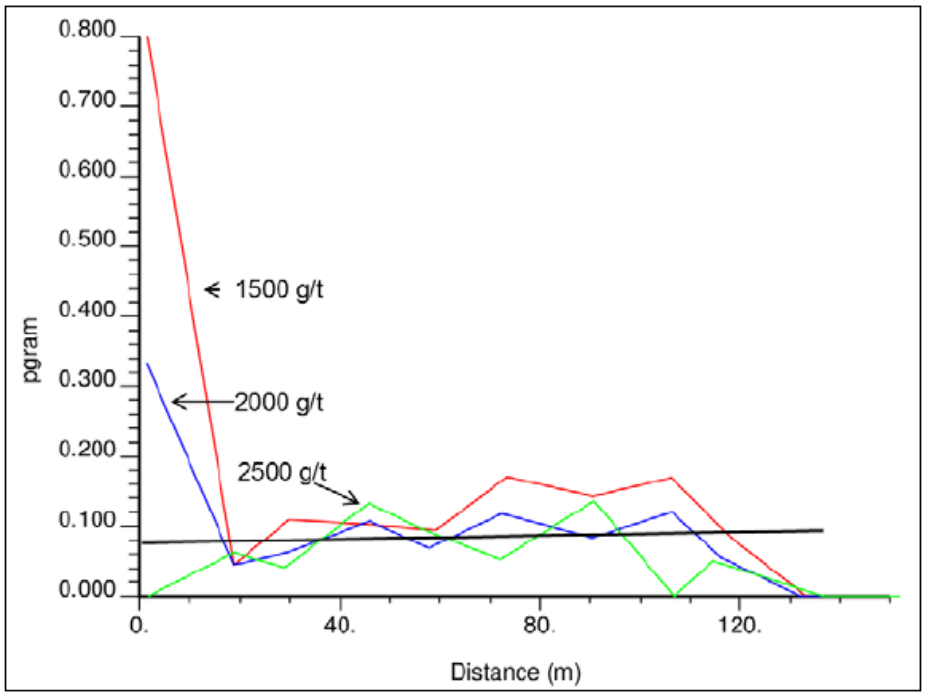
Block grade estimates may be unduly affected by very high-grade assays. Instead of capping the composites for high grade assays, the QP elected to limit the influence of the high grade intersections during the estimation process. For each estimation domain and each metal, a probability plot of composite assay grades was used to select a high grade threshold. Table 14-19 shows the high grade thresholds selected in the Flame & Moth deposit.

Table 14-19 High Grade Thresholds in the Flame & Moth Deposit

Domain	Metal	Max Assays	Cap	Cap Extreme	Num Extreme Capped	High Grade Threshold Defined from Comps	Num All Comps	Number above threshold	%Dat above Threshold
Lightning	Au (g/t)	6.85		No		1.5	330	13	4
	Ag (g/t)	13,365	7,500	Yes	2	2,000.0	330	14	4
	Pb (%)	48.80		No		8.0	330	12	4
	Zn (%)	35.63	30	Yes	2	18.0	330	20	6
Christal	Au (g/t)	4.02		No		1.5	245	12	5
	Ag (g/t)	6,270		No		2,000.0	245	12	5
	Pb (%)	52.30		No		12.0	245	12	5
	Zn (%)	22.40		No		10.0	245	10	4
V2	Au (g/t)	1.65		No		1.0	52	2	4
	Ag (g/t)	3,390		No		1,500.0	52	3	6
	Pb (%)	23.30		No		3.0	52	4	8
	Zn (%)	26.20		No		10.0	52	5	10

Continuity of the high grade assays was studied with a technique called “p-gram”. To construct p-grams, composites above a high grade threshold were coded with an indicator. Using a process similar to that for indicator variography, the data were paired over a series of lag distances. Only those pairs of data that are found in economic mineralization (above the threshold) were considered. The proportion of those pairs relative to the total number of pairs that started in high grade was determined. The higher the proportion, the greater continuity of the high grade assays.

Figure 14-19 shows the continuity of high grade silver composite assays at different thresholds in the Lightning zone. High grade continuities can be indicated up to a distance where plotted curves roughly level off. It is apparent that in this specific example the curves level off at distances higher than 20 m. The continuity of the high grade mineralization is very short. The p-grams were produced only for silver and zinc in the Lightning and Christal zones and the results were translated to a design of search radii in for all zones and all metals (Table 14-20). The direction of the high grade search ellipsoid was aligned with the overall direction of grade continuity in each zone.



Source: RPA 2017

Figure 14-19 Continuity of High Grade Ag Assays at High Grade Thresholds in Lightning Zone

Table 14-20 High Grade Search Radii

Metal	Radii		
	X-Rot	Y-Rot	Z-Rot
Au	30	30	15
Ag	20	15	15
Pb	30	30	15
Zn	30	40	15

14.7.4 EVALUATION OF OUTLIERS FOR THE ONEK DEPOSIT

Before compositing, grade capping analysis was conducted on the domain-coded sample assay data in order to limit the influence of extreme assay values during estimation. The assays from Vein 1 and Vein 1FW and, separately, the assays from Vein 2 were examined using histograms, and cumulative frequency plots. Capping threshold values were selected that minimize changes in the sample distribution, and sample values were capped to these values prior to compositing and estimation (Table 14-21).

Table 14-21 Sample Capping Levels for Onek

Vein	Commodity	Maximum Value	Cap Value	Number Capped	Average	Average Capped	Lost Metal*
Vein 1 and Vein 1FW	Ag (g/t)	3,440	3,000	2	210	208	0.7%
	Au (g/t)	10.2	5	4	0.65	0.63	4.8%
	Pb %	48.36	35	2	1.61	1.57	2.5%
	Zn %	55.92	35	56	13.36	12.46	7.3%
Vein 2	Ag (g/t)	4,080	3,000	4	238	221	7.8%
	Au (g/t)	3.1	2	1	0.33	0.32	2.3%
	Pb %	46.13	25	4	2.08	1.9	16.3%
	Zn %	40.45	20	4	4.48	4.22	6.1%

Note.

* Lost metal is (Average – Averaged Capped)/Average * 100 where Average is the average grade of the assays before capping and Average Capped is the average grade of the assays after capping.

14.7.5 EVALUATION OF OUTLIERS FOR THE BERMINGHAM DEPOSIT

Grade capping analysis was conducted on the vein-coded composited assay data in order to limit the influence of extreme assay values during estimation. The composites from the Bermingham veins were examined using histograms and normal quantile plots. Capping threshold values were selected on the one metre composited data to minimize changes in the sample distribution, and composited values were capped prior to estimation (Table 14-22).

It should be noted that the Bear and Bear South veins were assessed as one continuous vein due to the limited structural offset observed between these two veins.

Table 14-22 Sample Capping Levels for Bermingham

METAL	STATISTIC	BERMINGHAM MAIN				BEAR				FOOTWALL			WEST DIPPER	
		Arctic	Bear	Etta	North East	Arctic	Bear	Bear South	North East	Arctic	Bear	Etta	WD2	Bear
Ag (ppm)	Sample Numbers	119	33	46	12	44	152	32	18	87	78	53	19	53
	Max Value (uncapped)	6,956	11,900	5,987	3,240	2,729	31,899	11,096	10,913	7,776	10,000	2,641	3,065	9,387
	Max Value (capped)	2,500	4,000	2,000	600	2,729	17,000	11,096	3,000	5,000	3,300	1,000	3,065	4,000
	Mean (uncapped)	766	1,305	769	474	424	3,128	2,098	1,399	1,204	1,168	514	1,008	1,073
	Mean (capped)	663	930	635	254	424	2,897	2,098	959	1,097	836	413	1,008	954
	CV (uncapped)	143	194	141	189	136	164	129	183	141	181	113	73	161
	CV (capped)	111	137	97	90	136	144	129	113	123	118	81	73	137
	Number Samples Capped	6	2	2	1	0	4	0	1	5	5	7	0	1
Au (ppm)	Max Value (uncapped)	1.80	1.49	0.68	0.30	0.20	2.21	1.84	0.95	0.96	1.16	0.30	0.34	0.84
	Max Value (capped)	0.93	0.90	0.36	0.30	0.20	2.21	1.84	0.46	0.68	0.48	0.30	0.34	0.52
	Mean (uncapped)	0.17	0.24	0.09	0.09	0.06	0.27	0.35	0.20	0.18	0.14	0.07	0.12	0.14
	Mean (capped)	0.16	0.22	0.08	0.09	0.06	0.27	0.35	0.17	0.18	0.13	0.07	0.12	0.13
	CV (uncapped)	148	126	133	97	76	144	133	115	100	127	87	66	131
	CV (capped)	120	105	105	97	76	144	133	87	95	103	87	66	116
	Number Samples Capped	3	2	1	0	0	0	0	1	1	2	0	0	2
Pb (%)	Max Value (uncapped)	17.49	15.21	18.77	6.67	8.76	46.73	32.65	15.60	65.95	19.14	13.94	18.22	41.14
	Max Value (capped)	6.80	6.80	8.00	3.00	4.00	46.73	32.65	6.30	18.40	9.20	5.60	9.00	7.10
	Mean (uncapped)	1.65	2.08	3.05	1.61	1.15	6.77	6.24	2.86	4.61	2.34	1.29	4.68	3.28
	Mean (capped)	1.43	1.72	2.69	1.30	0.97	6.77	6.24	2.15	3.38	1.96	1.13	4.20	1.51
	CV (uncapped)	164	156	125	117	159	142	145	142	218	168	167	86	254
	CV (capped)	131	121	101	86	127	142	145	103	145	132	121	62	145
	Number Samples Capped	5	2	2	1	2	0	0	2	4	3	1	1	4
Zn (%)	Max Value (uncapped)	17.44	7.67	10.20	3.56	3.74	23.75	14.25	8.86	12.82	19.61	13.28	7.42	17.53

METAL	STATISTIC	BERMINGHAM MAIN				BEAR				FOOTWALL			WEST DIPPER	
		Arctic	Bear	Etta	North East	Arctic	Bear	Bear South	North East	Arctic	Bear	Etta	WD2	Bear
	Max Value (capped)	7.40	7.67	10.20	1.60	2.20	23.75	14.25	6.00	8.30	9.80	5.00	3.50	4.90
	Mean (uncapped)	1.94	1.70	2.68	1.12	0.76	2.38	1.89	2.79	1.69	1.90	1.97	2.33	2.10
	Mean (capped)	1.74	1.70	2.68	0.95	0.64	2.38	1.89	2.49	1.59	1.77	1.72	1.96	1.36
	CV (uncapped)	138	112	85	79	132	149	141	100	152	160	119	82	177
	CV (capped)	108	112	85	51	110	149	141	88	139	138	90	61	115
	Number Samples Capped	4	0	0	1	4	0	0	2	2	1	2	3	5

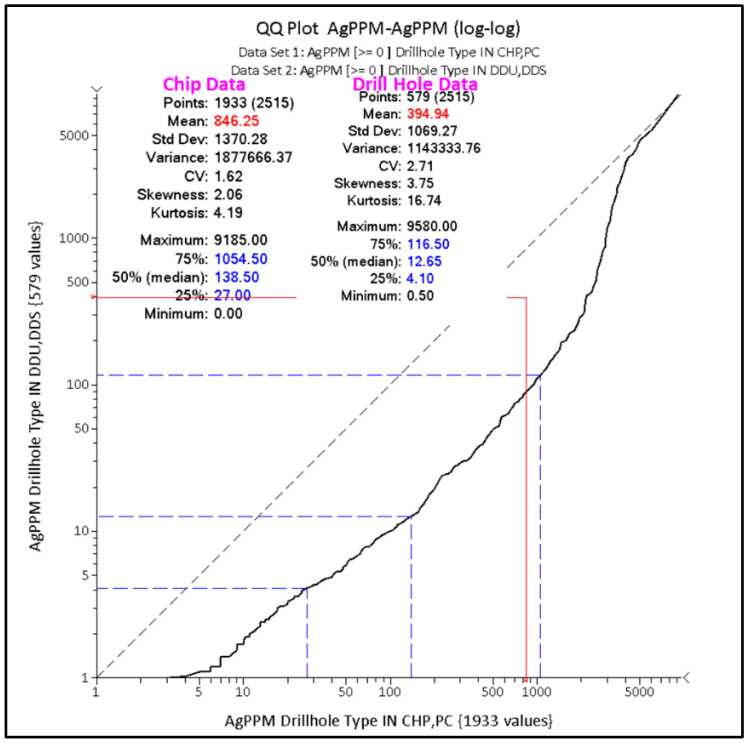
14.8 STATISTICAL ANALYSIS AND VARIOGRAPHY

14.8.1 STATISTICAL ANALYSIS AND VARIOGRAPHY FOR THE BELLEKENO MINE

Examination of the drill hole and chip assay sample data determined that there was a bias in the chip sample dataset as seen in Figure 14-20. To correct for this bias, a weight of 0.7 was applied to all chip data, while drillhole data remained at 1.0. Summary statistics for the final composite data set used for Mineral Resource estimation is provided in Table 14-23.

Table 14-23 Summary Statistics for Bellekeno Composited and Weighted Data

Vein	Statistic	Ag (g/t)	Pb (%)	Zn (%)
SW Vein	Number of Samples	2,334	2,334	2,334
	Average before weight applied	839	10.65	6.82
	Average after weight applied	559	7.11	4.61
	Minimum	0	0	0
	Maximum	4,500	65	33
	Coefficient of Variation	1.3	1.5	1.1
99 Vein	Number of Samples	1,214	1,214	1,214
	Average before weight applied	1,103	6.98	3.41
	Average after weight applied	750	4.84	2.48
	Minimum	0	0	0
	Maximum	7,600	55	20
	Coefficient of Variation	1.9	1.8	1.4
East Vein	Number of Samples	267	267	267
	Average before weight applied	247	1.22	2.94
	Average after weight applied	210	1.05	2.41
	Minimum	0	0	44
	Maximum	2,000	15	20
	Coefficient of Variation	2.0	2.7	1.9



Source: SRK 2021

Figure 14-20: Quantile-Quantile Plot of Silver Values in Drillhole Versus Chip Samples Coded to Bellekeno Veins

Continuity analysis (i.e., variogram analysis) for the Bellekeno data was analyzed by zone and variogram parameters are summarized in Table 14-24. Each commodity was assessed using a normal score variogram that was back-transformed prior to estimation.

Table 14-24 Summary of Variography for Bellekeno

Vein	Metal	Nugget C_0	Sill C_1, C_2	MinePlan Rotations			Ranges a_1, a_2		
				around Z	around X	around Y	X-Rot	Y-Rot	Z-Rot
SW	Ag	0.13	0.28	-164°	-33°	66°	15	10	5
			0.59				45	30	10
	Pb	0.17	0.38				10	5	5
			0.45				40	25	10
	Zn	0.11	0.61				5	5	5
			0.28				60	40	10
99	Ag	0.13	0.55	-155°	-44°	76°	7	5	5
			0.32				30	25	10
	Pb	0.14	0.48				5	5	4
			0.38				30	25	10
	Zn	0.13	0.52				15	15	5
			0.35				100	30	10
East	Ag	0.17	0.39	-172°	-46°	61°	15	10	5
			0.45				45	30	10
	Pb	0.20	0.54				10	5	5
			0.26				40	25	10
	Zn	0.17	0.19				5	5	5
			0.65				60	40	10

14.8.1.1 Southwest Zone Variograms

Figure 14-21 to Figure 14-23 present the results for the SW zone normal score variograms for silver lead and zinc.

In general, it is noted that reasonable variograms are obtained in normal score for silver, lead, and zinc, with a directional range of approximately 45 m to 60 m in the plane of the vein.

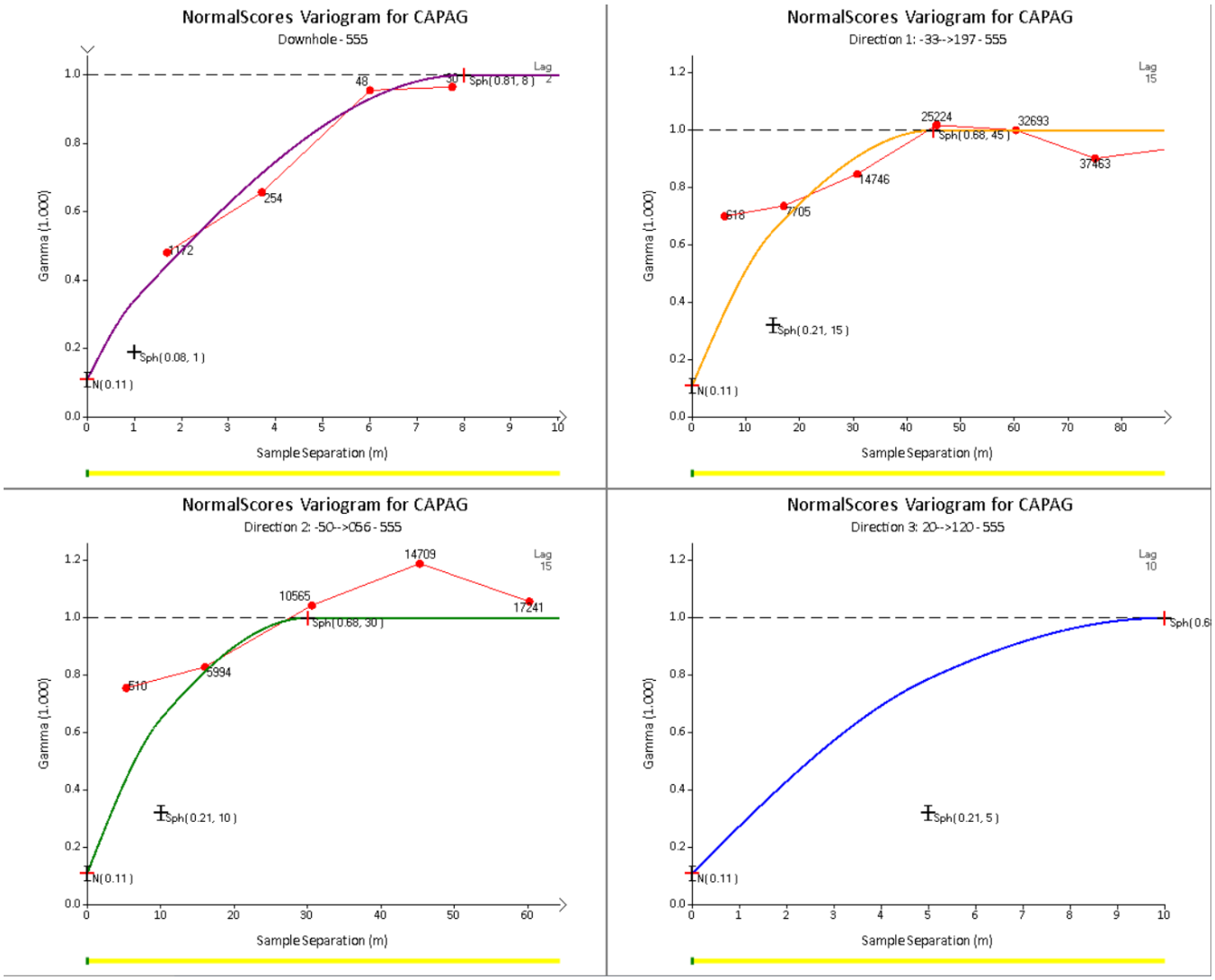
14.8.1.2 The 99 Zone Variograms

Figure 14-24 to Figure 14-26 present the results for the SW zone normal score variograms for silver, lead, and zinc.

In general, it is noted that reasonable variograms are obtained in log space for silver, lead, and zinc, with a directional range of approximately 40 m to 70 m in the plane of the vein.

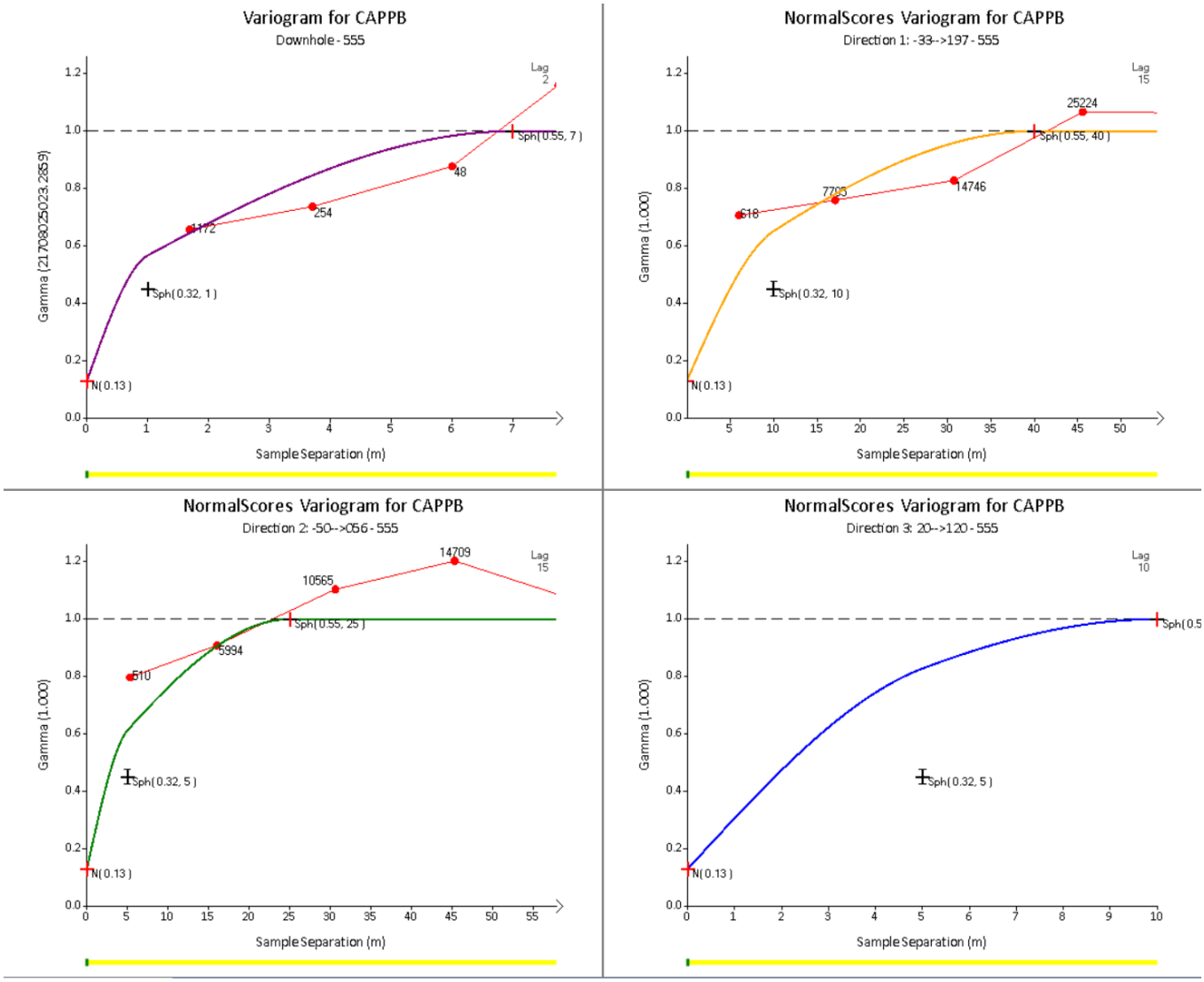
14.8.1.3 The East Vein Variograms

In general, robust variograms could not be obtained for the East Vein due to limited data. Therefore, directional ranges of approximately 45 m to 60 m within the plane of the vein based on variogram parameters determined from the Southwest Zone.



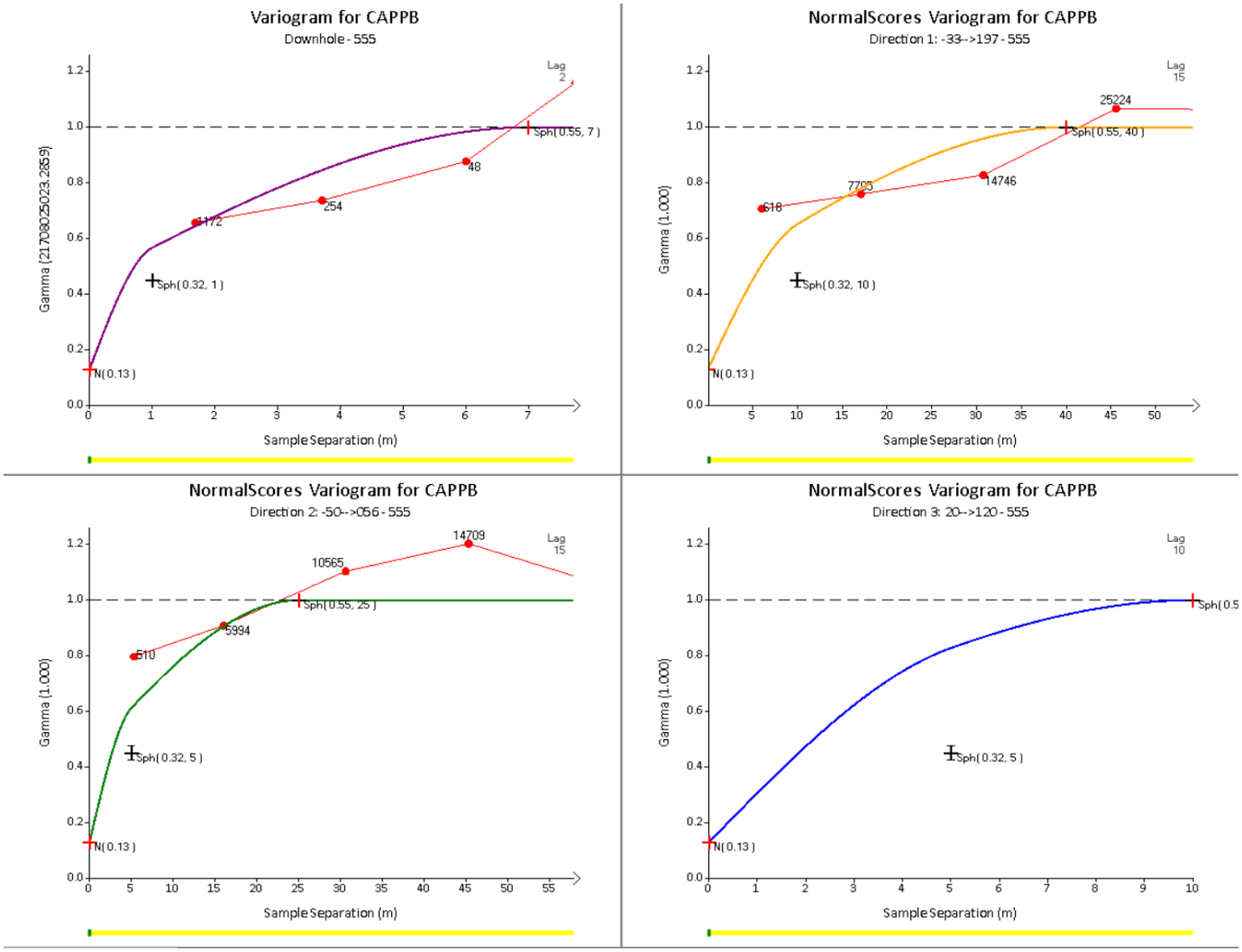
Source: Alexco 2021

Figure 14-21 Normal Score Variograms for Capped Silver, Southwest Zone



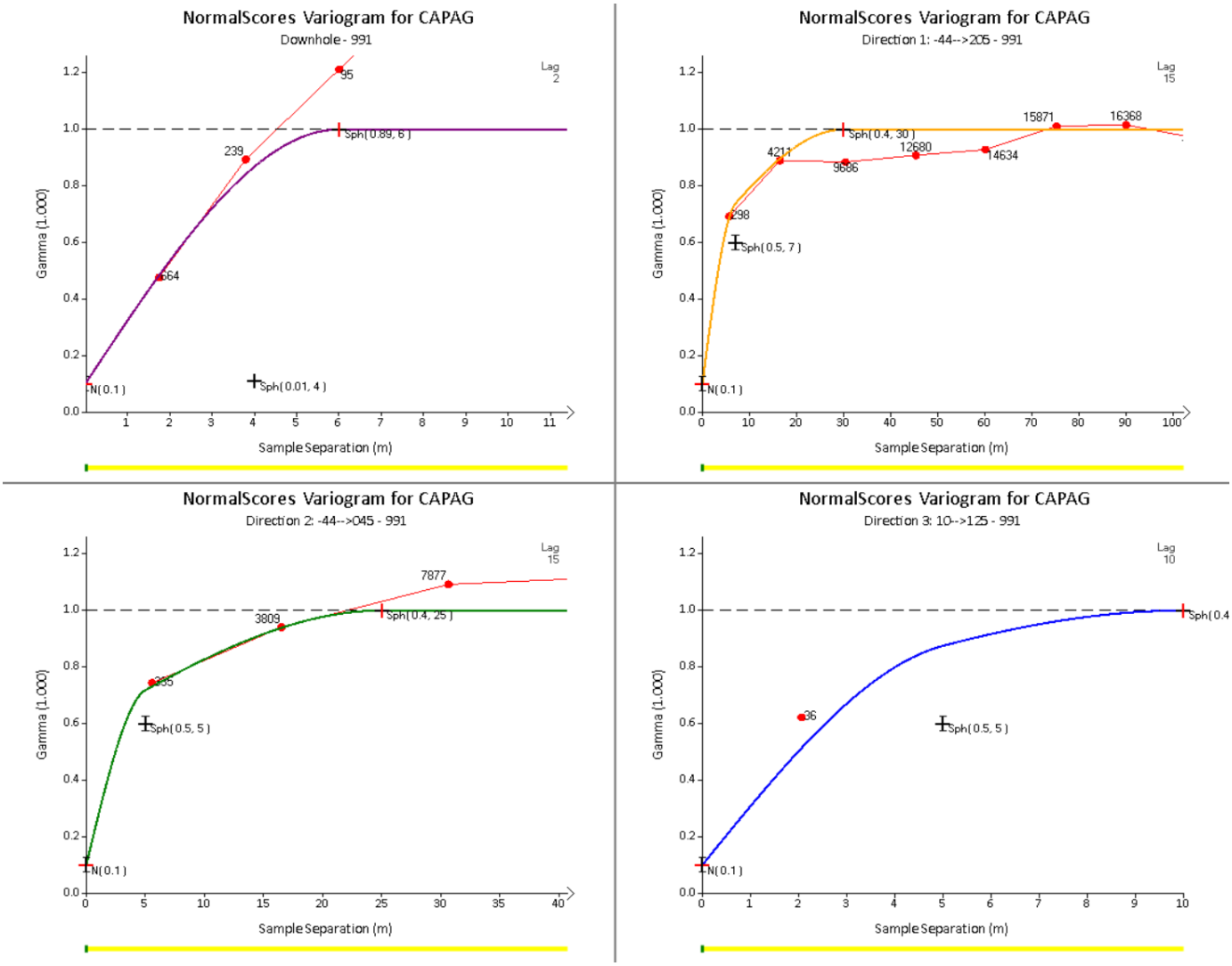
Source: Alexco 2021

Figure 14-22 Normal Score Variograms for Capped Lead, Southwest Zone



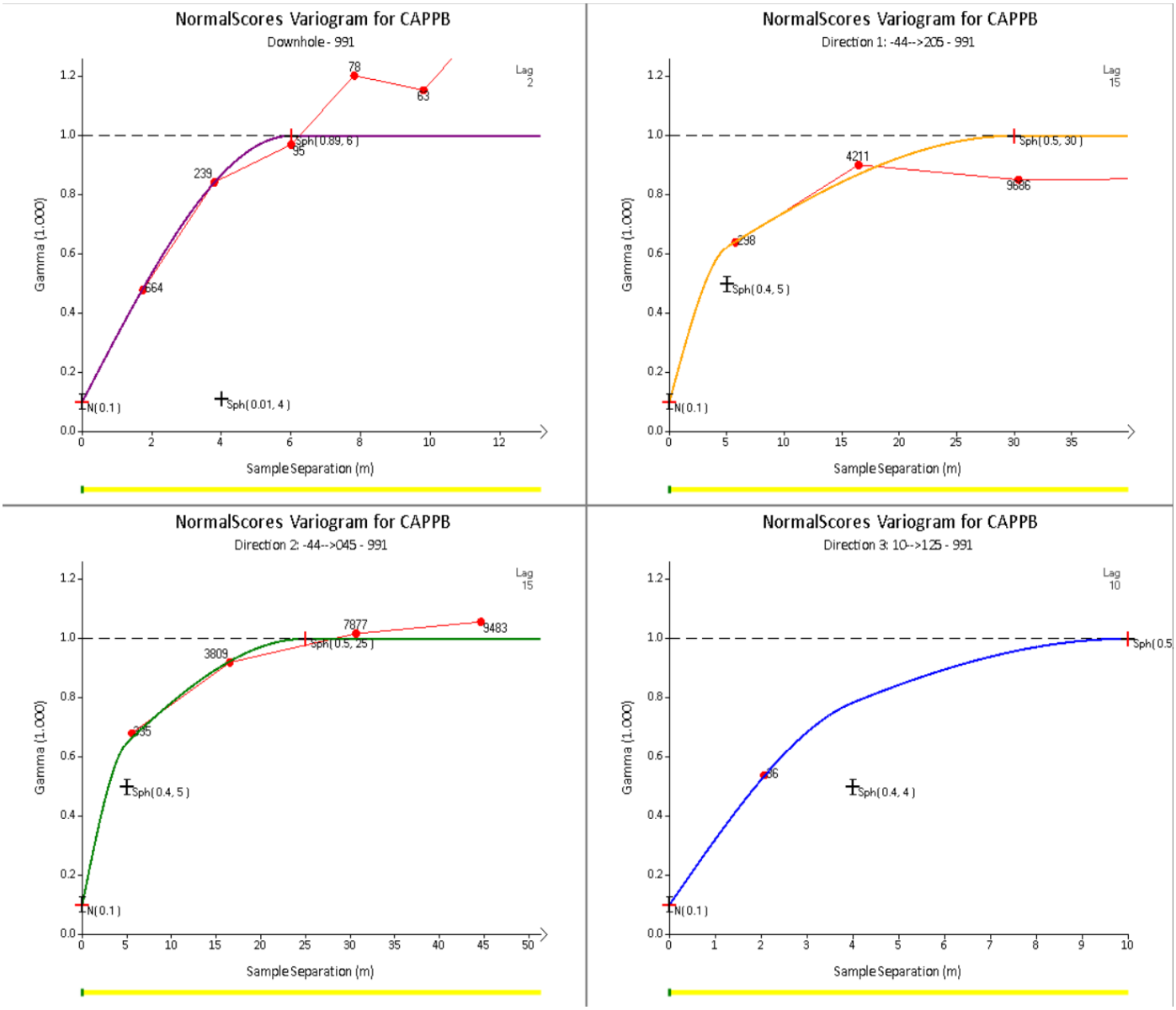
Source: Alexco 2021

Figure 14-23 Normal Score Variograms for Capped Zinc, Southwest Zone



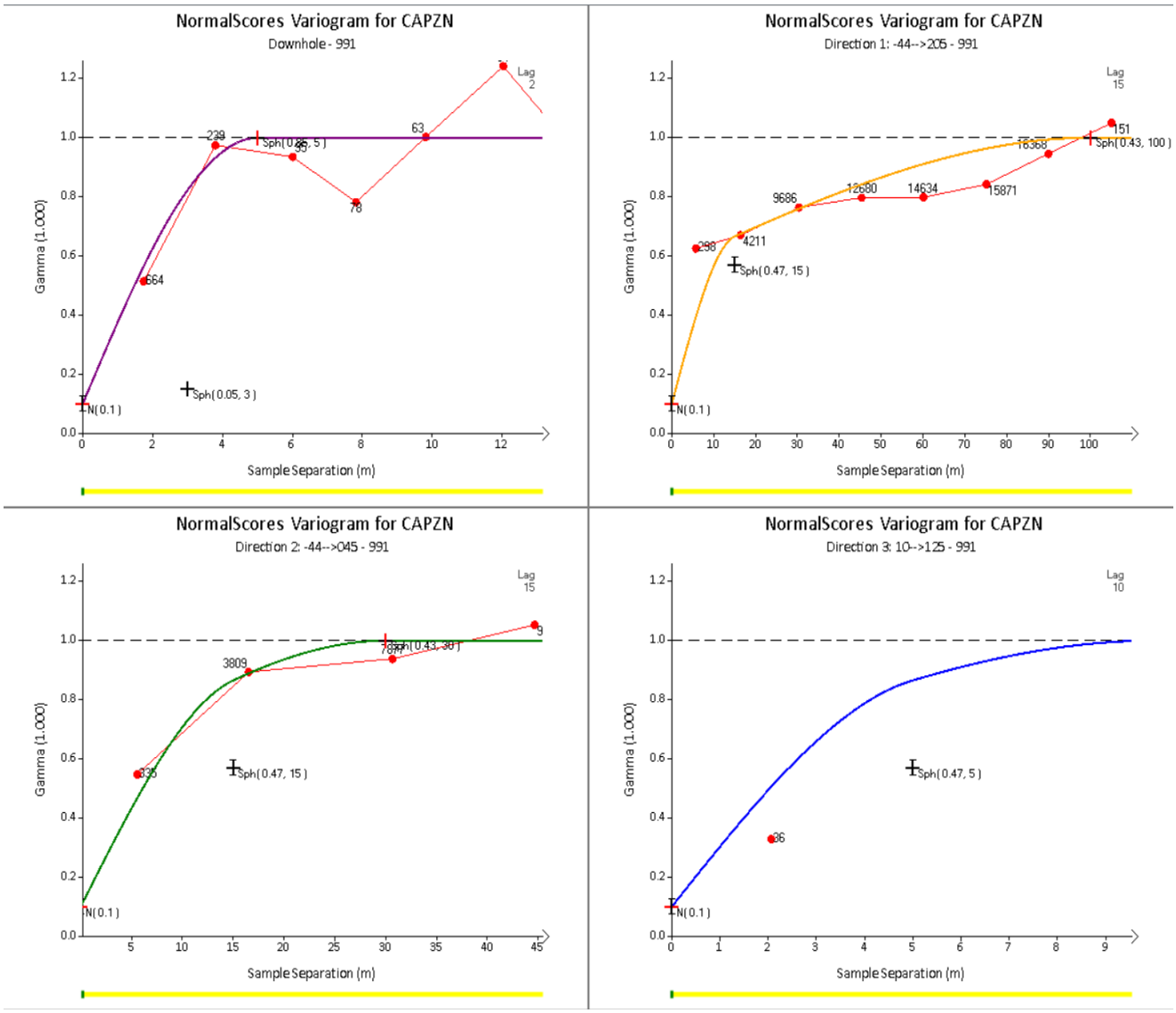
Source: Alexco 2021

Figure 14-24 Normal Score Variograms for Capped Silver, 99 Zone



Source: Alexco 2021

Figure 14-25 Normal Score Variograms for Capped Lead, 99 Zone

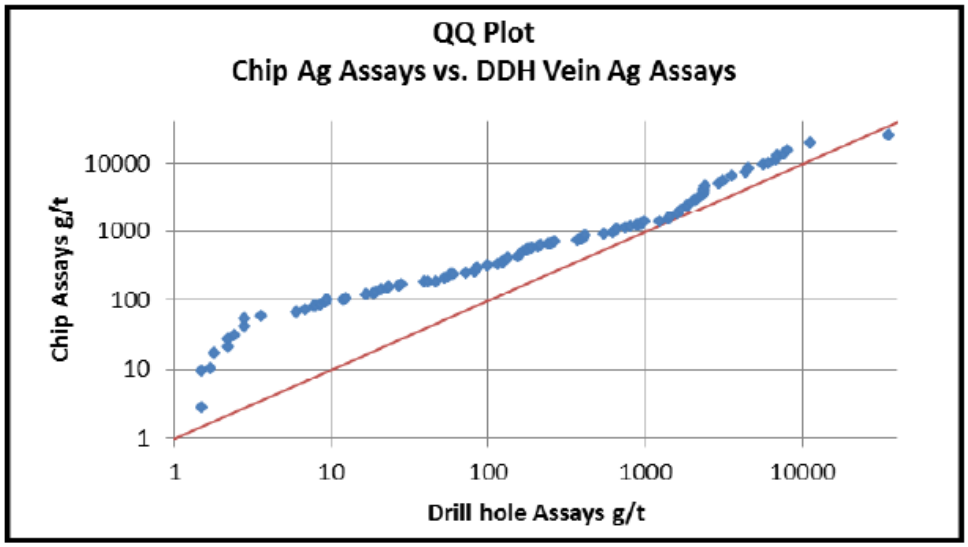


Source: Alexco 2021

Figure 14-26 Normal Score Variograms for Capped Zinc, 99 Zone

14.8.2 STATISTICAL ANALYSIS AND VARIOGRAPHY FOR THE LUCKY QUEEN MINE

Examination of the distribution of drill hole and chip assay sample populations suggests that drill hole assay data differ significantly from the chip assay data (Figure 14-27). The chip sample data were, therefore, used for continuity analysis, but were not used for Mineral Resource estimation.



Source: SRK 2011a

Figure 14-27 Q-Q Plot of Chip and Drill Hole Silver Assay Sample Data

Summary statistics were compiled for the composite data, both for the defined Lucky Queen vein and for a secondary splay identified by Alexco (Table 14-25). A total of 66 composites were derived for the Lucky Queen vein, and 15 composites for the secondary splay. An additional five composites averaging 1,591 g/t Ag have been identified by Alexco but were not assigned to the primary Lucky Queen vein or the secondary splay. Correlation analysis between elements indicates a strong correlation between silver and lead, with a correlation coefficient of 0.62.

Table 14-25 Composite Data Summary Statistics for the Lucky Queen Mine

Type	Statistic	Ag (g/t)	Au (g/t)	Pb (ppm)	Zn (ppm)
Total Composites	Number of Samples	81	81	81	81
	Average	814	0.14	17,909	12,080
	Minimum	0.2	0.001	2,327	44
	Maximum	13,998	3.00	303,963	210,100
	Standard Deviation	1,929	0.375	42,651	31.353
	Coefficient of Variation	2.4	2.8	2.4	2.6
Vein Composites	Number of Samples	66	66	66	66
	Average	960	0.161	20,831	13,944
	Minimum	0.6	0.001	32	44
	Maximum	13,998	3.00	303,963	210,010
	Standard Deviation	2,098	0.412	46,265	34,315
	Coefficient of Variation	2.2	2.6	2.2	2.5
Splay Composites	Number of Samples	15	15	15	15
	Average	174	0.022	5,054	3,877
	Minimum	0.2	0.001	23	116
	Maximum	2,125	0.155	60,714	27,195
	Standard Deviation	547	0.040	15,496	7,862
	Coefficient of Variation	3.2	1.8	3.1	2.0

3D continuity analysis was conducted on the composite data and underground chip sample data for the Lucky Queen vein. Downhole and directional un-transformed and normal-scores transformed and normalized experimental semi-variograms were examined for silver, with the horizontal and across-strike directions aligned with the modelled vein orientation (Table 14-26).

Rotation was defined by the GEMS ZYZ convention within the rotated block model coordinate space. Due to the spatial distribution of the data, only a strike experimental semi-variogram could be satisfactorily modelled, and the range of the resulting normal-scores experimental semi-variogram was used to define sample selection requirements and classification criteria.

Table 14-26 Modelled Semi-Variogram for Silver

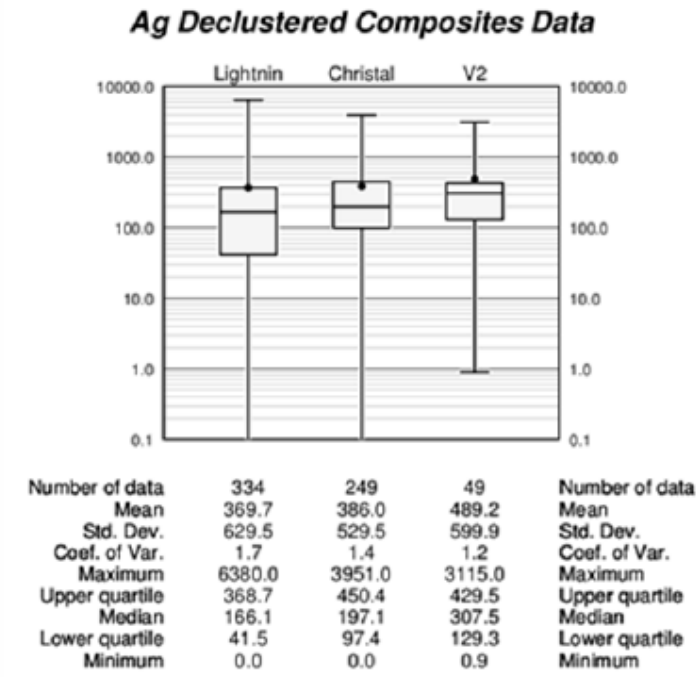
Direction	Experimental Semi-Variogram	Range
Nugget	0.2	
Sill 1	0.2	12
Sill 2	0.6	100

14.8.3 STATISTICAL ANALYSIS AND VARIOGRAPHY FOR THE FLAME & MOTH DEPOSIT

Summary statistics compiled for declustered composite data for Ag and Zn are presented in Figures 14-37 and 14-38. The QP tested the bivariate relationship between the metals used in the estimation process. In general, the correlation between different metals is quite weak. The only exception is the correlation between Ag and Pb. Figure 14-39 shows an example of the correlation between Ag and Zn and Ag and Pb assays in the Lightning zone.

Experimental correlograms were derived for Ag and Zn from one metre composites in the Lightning and Christal zones. This type of a model was preferred because it is less sensitive to very high values and is normalized to the variance of the data used for a given lag. Downhole correlograms were used to model nugget effects (i.e., assay variability at very close distances). Directional correlograms were used to model grade continuities for larger distances. Final correlogram models used in in the resource estimation are presented in Table 14-27 and Table 14-28. Note that, in view of a good correlation between Ag and Pb assays, the correlogram models for Pb were assumed to be identical to Ag assays.

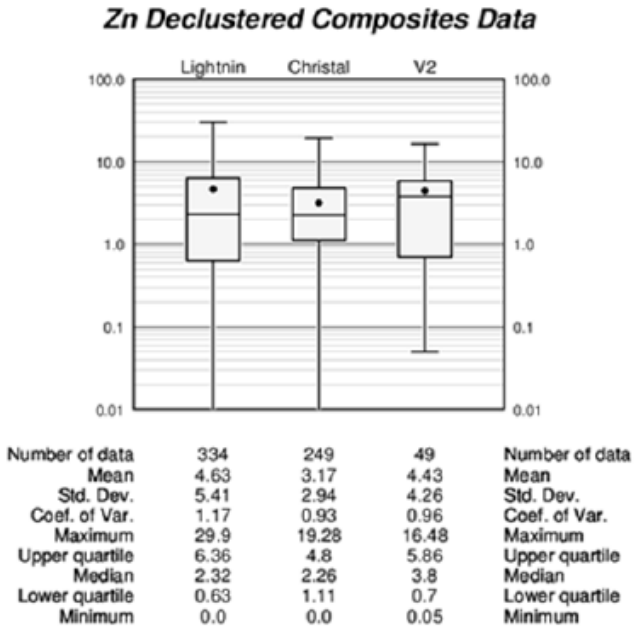
Block grades for all other metals were estimated by the Inverse Distance Squared procedure.



	Lightnin	Christal	V2	
Number of data	334	249	49	Number of data
Mean	369.7	386.0	489.2	Mean
Std. Dev.	629.5	529.5	599.9	Std. Dev.
Coef. of Var.	1.7	1.4	1.2	Coef. of Var.
Maximum	6380.0	3951.0	3115.0	Maximum
Upper quartile	368.7	450.4	429.5	Upper quartile
Median	166.1	197.1	307.5	Median
Lower quartile	41.5	97.4	129.3	Lower quartile
Minimum	0.0	0.0	0.9	Minimum

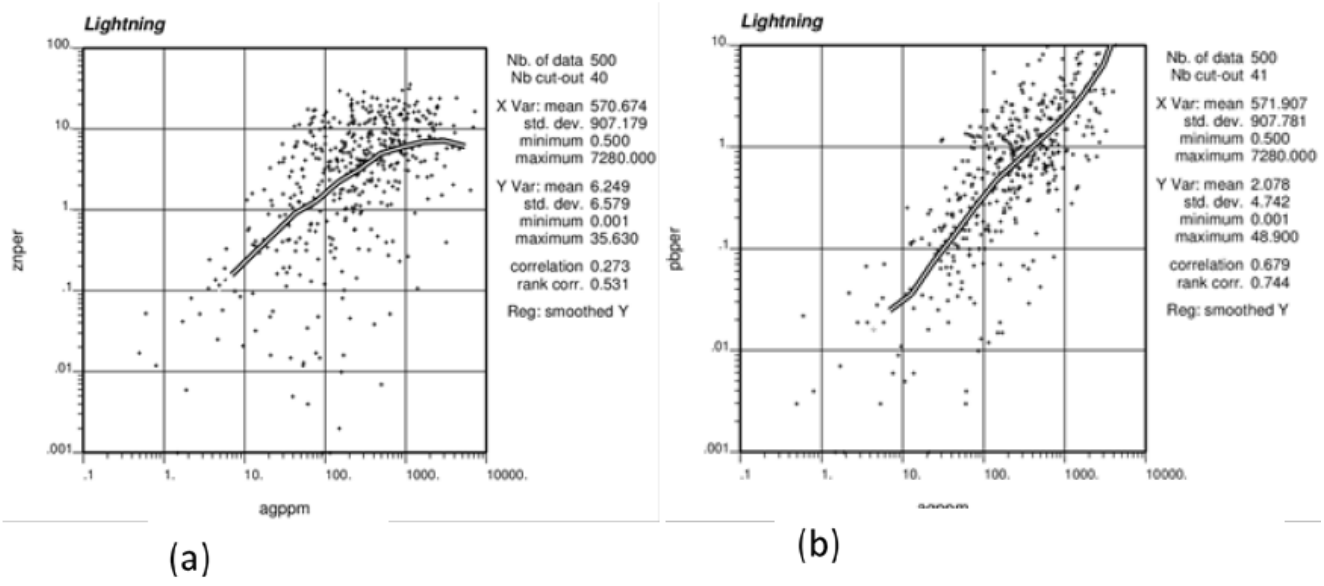
Source: RPA 2017

Figure 14-28 Statistics of Ag Composite Grades in the Mineralized Zones



Source: RPA 2017

Figure 14-29 Statistics of Silver Composite Grades in the Mineralized Zones



Source: RPA 2017

Figure 14-30 Statistics of Zinc Composite Grades in the Mineralized Zones

Table 14-27 Correlogram Models in the Lightning Zone

Metal	Nugget C_0	Sill C_1 and C_2	Gemcom Rotations (RRR rule)			Ranges a_1, a_2		
			around Z	around Y	around Z	X-Rot	Y-Rot	Z-Rot
Ag	0.20	0.60	-30	60	17	70	50	3
		0.20				100	80	10
Pb	0.20	0.60	-30	60	17	70	50	3
		0.20				100	80	10
Zn	0.05	0.60	-30	60	17	40	50	5
		0.35				80	150	10

Table 14-28 Correlogram Models in the Christal Zone

Metal	Nugget C_0	Sill C_1 and C_2	Gemcom Rotations (RRR rule)			Ranges a_1, a_2		
			around Z	around Y	around Z	X-Rot	Y-Rot	Z-Rot
Ag	0.28	0.30	-25	60	0	30	30	5
		0.42				85	85	10
Pb	0.28	0.30	-25	60	0	30	30	5
		0.42				85	85	10
Zn	0.05	0.40	-25	60	0	20	20	5
		0.55				60	60	10

14.8.4 STATISTICAL ANALYSIS AND VARIOGRAPHY FOR THE ONEK DEPOSIT

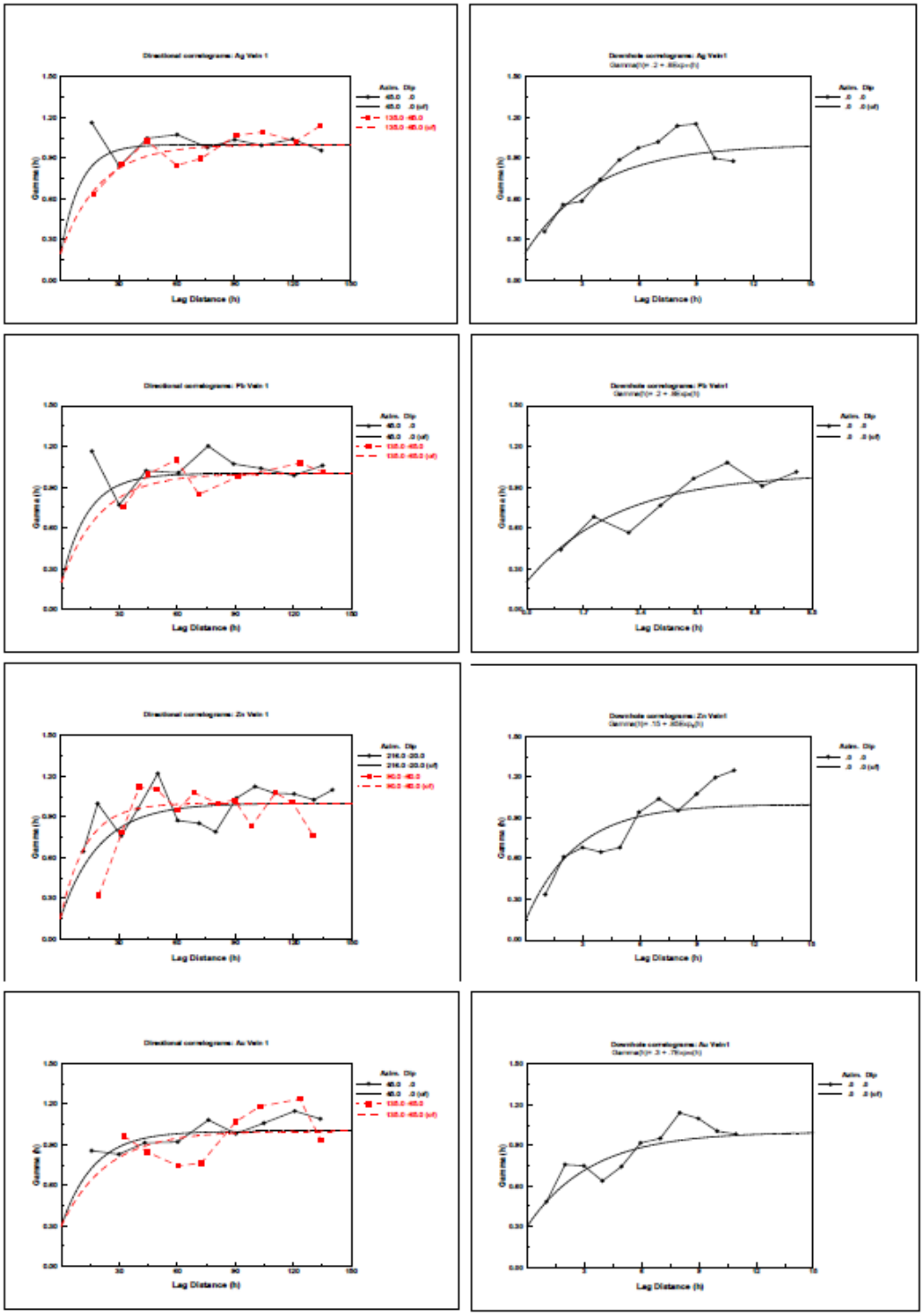
Examination of the distribution of the drill hole and chip assay sample populations suggests that the drill hole assay data differ significantly from the chip assay data. Therefore, the chip sample data were not used for Mineral Resource estimation.

Summary statistics were compiled for the composite data for the Onek veins (Table 14-29). A total of 351 composites were derived for Vein1, 16 composites for Vein 1FW and 147 composites for Vein 2. Any composites lengths that were less than 0.5 m in length were linked to the previous composite to assure equal weighting of all composites and to assure that all composites were between 0.5 m and 1.5 m in length. Correlation analysis between commodities indicates a strong correlation between Ag and Pb, with a correlation coefficient of 0.83.

Table 14-29 Composite Data Summary Statistics for Onek

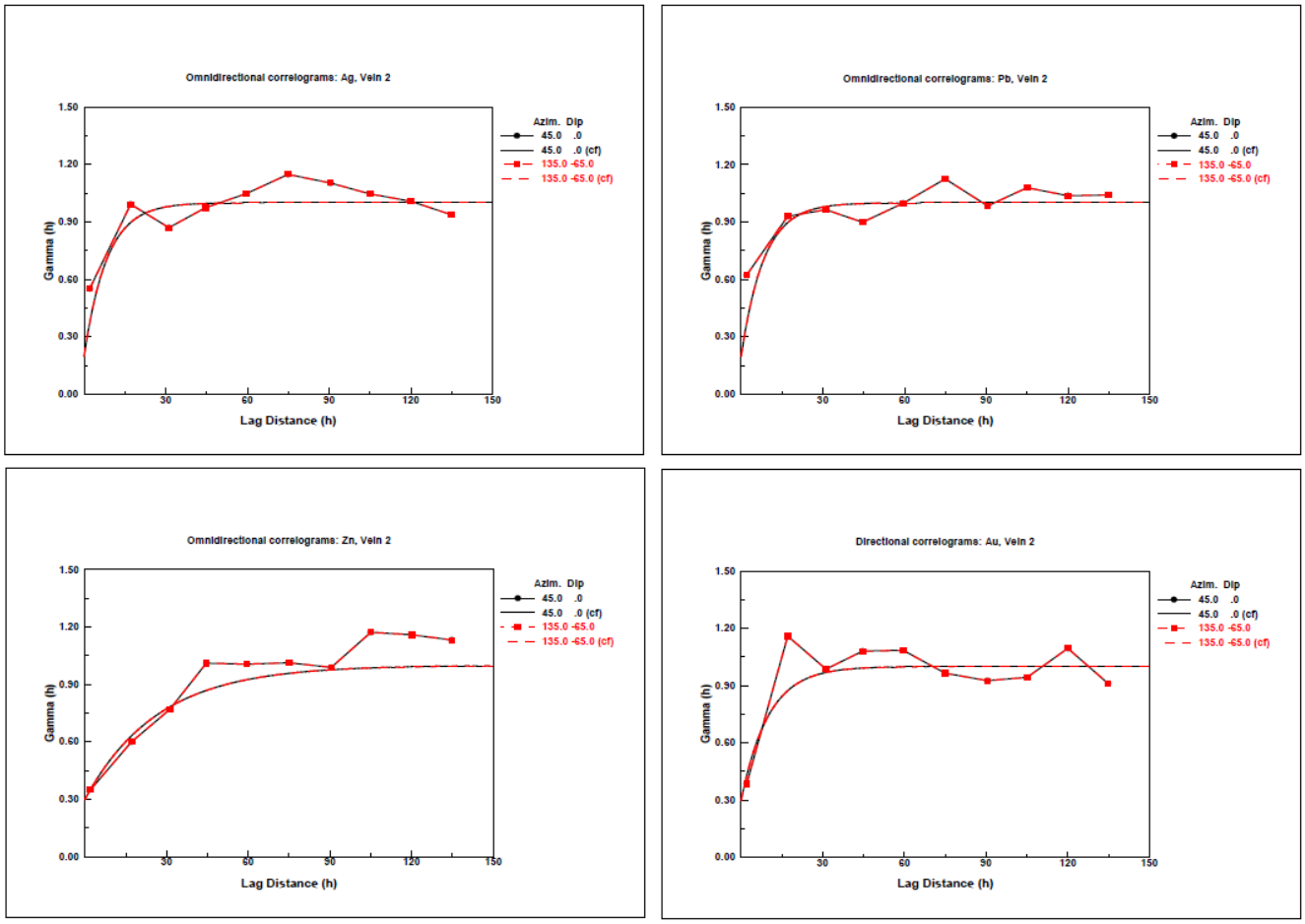
Type	Statistic	Ag g/t	Ag Cap g/t	Au g/t	Au Cap g/t	Pb %	Pb Cap %	Zn %	Zn Cap %
Total Composites	No of Samples	514	514	514	514	514	514	514	514
	Average	181	175	0.51	0.49	1.4	1.26	9.5	8.93
	Minimum	0.64	0.64	0	0	0	0	0	0
	Maximum	3,410	3,000	7.68	4.89	46.13	27.94	50	35
	St Dev.	408	369	0.7	0.58	4.26	3.42	10.94	9.59
	CV	2.25	2.11	1.37	1.18	3.04	2.71	1.15	1.07
Vein 1 Composites	No of Samples	351	351	351	351	351	351	351	351
	Average	166	165	0.6	0.58	1.11	1.08	12.18	11.41
	Minimum	0	0	0	0	0	0	0	0
	Maximum	2,776	2,428	7.68	4.89	26.96	21.35	50	35
	St Dev.	309	299	0.77	0.63	2.92	2.75	11.92	10.36
	CV	1.86	1.81	1.28	1.09	2.63	2.55	0.98	0.91
Vein 1FW Composites	No of Samples	16	16	16	16	16	16	16	16
	Average	135	135	0.3	0.3	2.32	2.32	4.11	3.78
	Minimum	0.64	0	0	0	0	0	0	0
	Maximum	1,400	1,400	1.91	1.91	27.94	27.94	28.66	23.46
	St Dev.	364	364	0.59	0.59	7.15	7.15	7.29	6.14
	CV	2.70	2.70	1.97	1.97	3.08	3.08	1.77	1.62
Vein 2 Composites	No of Samples	147	147	147	147	147	147	147	147
	Average	222	201	0.31	0.3	1.99	1.57	3.7	3.56
	Minimum	0	0	0	0	0	0	0	0
	Maximum	3,410	3,000	1.77	1.65	46.13	25	30.14	24.1
	St Dev.	583	499	0.41	0.39	6.12	4.16	4.51	3.93
	CV	2.63	2.48	1.32	1.30	3.08	2.65	1.22	1.10

Experimental correlograms and correlogram models were generated for silver, lead, zinc, and gold from combined composite grade data for Vein 1 and Vein 1FW and from composite grade data for Vein 2. The nugget effect was established from downhole correlograms. Directional and downhole correlograms were examined for silver, lead, zinc, and gold. Apart from zinc, modeled directions of spatial continuity were aligned with strike and dip directions of modeled vein orientations. For zinc, the major direction of continuity was modelled as a shallow dipping south-west trending structure. Nugget effect and across-structure continuity was established from downhole correlograms. Rotation was defined by the GEMS ZYZ convention within the rotated block model coordinate space. The continuity ellipsoids for silver, lead, zinc, and gold were displayed as search ellipsoids in GEMS to validate the ellipsoid orientations. The correlogram models used for grade estimation within Vein1 and Vein 1FW (Figure 14-31), and Vein 2 (Figure 14-32) are summarized in Table 14-30.



Source: RPA 2017

Figure 14-31 Modelled Directional and Downhole Correlograms for Vein 1 and Vein 1FW



Source: RPA 2017

Figure 14-32 Modelled Omnidirectional Correlograms for Vein 2

Table 14-30 Modelled Correlograms for Onek Veins

Metal	Zone	Nugget C_0	Sill C	Gemcom Rotations (RRR rule)			Range a		
				around Z	around Y	around Z	X-Rot	Y-Rot	Z-Rot
Silver	Vein 1 and Vein 1FW	0.20	0.80	-45	65	0	60	30	11
	Vein 2	0.20	0.80	-45	65	0	25	25	10
Lead	Vein 1 and Vein 1FW	0.20	0.80	-45	65	0	60	40	8
	Vein 2	0.20	0.80	-45	65	0	25	25	10
Zinc	Vein 1 and Vein 1FW	0.15	0.85	-45	65	-70	60	40	8
	Vein 2	0.30	0.70	-45	65	0	80	80	7
Gold	Vein 1 and Vein 1F	0.30	0.70	-45	65	0	70	50	10
	Vein 2	0.30	0.70	-45	65	0	30	30	10

14.8.5 STATISTICAL ANALYSIS AND VARIOGRAPHY FOR THE BERMINGHAM DEPOSIT

Summary statistics compiled for the composite data for the Bermingham veins are provided in Table 14-31.

Due to limited composites within most individual veins, variogram analysis was conducted on the larger vein system (i.e., Bermingham Main, Bear and Footwall vein system) and then applied to each individual vein within the larger system. Directional variograms for silver, gold, lead, and zinc were produced for the three dominant vein systems. Variogram ellipse orientations generated for the vein systems were slightly adjusted to better align with individual vein orientations as detailed in Table 14-32.

Variograms for the West Dipper vein system could not be generated due to limited data. As well, variograms for specific gravity data were also not generated due to data limitations.

Table 14-31 Summary Statistics for Composited Assay Data Grouped by Vein System for Bermingham

METAL	STATISTIC	BERMINGHAM MAIN				BEAR				FOOTWALL			WEST DIPPER	
		Arctic	Bear	Etta	North East	Arctic	Bear	Bear South	North East	Arctic	Bear	Etta	WD2	Bear
Ag (ppm)	**Sample Numbers**	**119**	**33**	**46**	**12**	**44**	**152**	**32**	**18**	**87**	**78**	**53**	**19**	**53**
	Mean	766	1,305	769	474	424	3,128	2,098	1,399	1,204	1,168	514	1,008	1,073
	Std Dev	1,094	2,538	1,087	894	576	5,138	2,712	2,560	1,697	2,109	582	738	1,730
	CV	143	194	141	189	136	164	129	183	141	181	113	73	161
	25th Percentile	131	164	114	42	75	122	427	135	176	90	88	492	67
	Median	316	387	387	207	221	1,129	1,146	437	531	498	347	829	306
	75th Percentile	984	987	1,086	516	446	3,346	3,197	2,086	1,502	1,153	602	1,344	1,211
Au (ppm)	Mean	0.17	0.24	0.09	0.09	0.06	0.27	0.35	0.20	0.18	0.14	0.07	0.12	0.14
	Std Dev	0.25	0.30	0.11	0.09	0.05	0.39	0.46	0.23	0.18	0.18	0.07	0.08	0.18
	CV	148	126	133	97	76	144	133	115	100	127	87	66	131
	25th Percentile	0.05	0.09	0.02	0.03	0.03	0.04	0.08	0.06	0.05	0.03	0.03	0.06	0.02
	Median	0.09	0.15	0.05	0.06	0.04	0.12	0.17	0.11	0.12	0.09	0.06	0.12	0.07
	75th Percentile	0.19	0.28	0.11	0.16	0.09	0.34	0.42	0.31	0.23	0.20	0.10	0.14	0.18
Pb (%)	Mean	1.65	2.08	3.05	1.61	1.15	6.77	6.24	2.86	4.61	2.34	1.29	4.68	3.28
	Std Dev	2.70	3.24	3.80	1.88	1.83	9.61	9.05	4.06	10.03	3.93	2.15	4.03	8.34
	CV	164	156	125	117	159	142	145	142	218	168	167	86	254
	25th Percentile	0.19	0.36	0.45	0.40	0.10	0.22	0.82	0.43	0.31	0.22	0.24	2.24	0.09
	Median	0.54	0.79	1.31	0.74	0.35	2.72	1.72	1.47	1.40	0.86	0.64	4.28	0.34
	75th Percentile	1.87	2.58	4.94	2.38	1.59	10.22	10.11	3.16	3.98	2.78	1.46	5.36	2.19
Zn (%)	Mean	1.94	1.70	2.68	1.12	0.76	2.38	1.89	2.79	1.69	1.90	1.97	2.33	2.10
	Std Dev	2.67	1.90	2.29	0.89	1.00	3.54	2.68	2.78	2.57	3.04	2.34	1.91	3.71
	CV	138	112	85	79	132	149	141	100	152	160	119	82	177
	25th Percentile	0.30	0.44	1.10	0.61	0.16	0.22	0.57	0.32	0.17	0.18	0.39	0.79	0.33
	Median	1.11	0.75	1.75	0.82	0.29	1.09	1.08	2.17	0.85	0.65	0.97	1.87	0.67
	75th Percentile	2.48	2.71	3.27	1.52	0.96	3.05	1.89	4.26	1.67	2.50	2.74	3.11	1.82

Note: The Bear and Bear South data sets within the West Dipper vein system have been grouped in the following summary

Table 14-32 Variogram Details for the Bermingham Main, Bear and Footwall Vein Systems

Vein System	Zone	Metal	Bearing (Rot. about Z)	Plunge (Rot. about Y)	Dip (Rot. about X)	Nugget	Sill	Major Axis	Semi-Major	Minor
Bermingham Main	Arctic	Ag	310°	58°	0°	0.2	S1 = 0.8	S1 = 45	S1 = 35	S1 = 3
	North East		310°							
	Bear		295°							
	Etta		300°							
	Arctic	Au	310°			0.36	S1 = 0.64	S1 = 55	S1 = 45	S1 = 4
	North East		310°							
	Bear		295°							
	Etta		300°							
	Arctic	Pb	310°			0.18	S1 = 0.22 S2 = 0.60	S1 = 20 S2 = 60	S1 = 7.5 S2 = 50	S1 = 1 S2 = 3
	North East		310°							
	Bear		295°							
	Etta		300°							
	Arctic	Zn	310°			0.12	S1 = 0.15 S2 = 0.73	S1 = 13 S2 = 75	S1 = 13 S2 = 60	S1 = 1 S2 = 3
	North East		310°							
	Bear		295°							
	Etta		300°							
Bear	Arctic	Ag	307°	62°	0°	0.2	S1 = 0.13 S2 = 0.67	S1 = 10 S2 = 45	S1 = 20 S2 = 40	S1 = 4 S2 = 6
	Bear		307°							
	Bear South		307°							
	North East		300°							
	Arctic	Au	307°			0.2	S1 = 0.16 S2 = 0.46 S3 = 0.18	S1 = 3.2 S2 = 13.6 S3 = 40	S1 = 5.5 S2 = 17.6 S3 = 40	S1 = 2.3 S2 = 6 S3 = 6
	Bear		307°							
	Bear South		307°							
	North East		300°							
	Arctic	Pb	307°			0.23	S1 = 0.19 S2 = 0.58	S1 = 23 S2 = 50	S1 = 18 S2 = 40	S1 = 3 S2 = 6
	Bear		307°							
	Bear South		307°							
	North East		300°							
	Arctic	Zn	307°			0.23	S1 = 0.2 S2 = 0.57	S1 = 30 S2 = 60	S1 = 15 S2 = 50	S1 = 5 S2 = 7
	Bear		307°							
	Bear South		307°							
	North East		300°							
Footwall	Arctic	Ag	312°	76°	0°	0.2	S1 = 0.36 S2 = 0.44	S1 = 15 S2 = 40	S1 = 8 S2 = 40	S1 = 1 S2 = 4
	Bear	Au				0.15	S1 = 0.39 S2 = 0.46	S1 = 3 S2 = 40	S1 = 8 S2 = 35	S1 = 2 S2 = 5
	Etta	Pb				0.2	S1 = 0.6 S2 = 0.2	S1 = 11 S2 = 35	S1 = 6 S2 = 30	S1 = 1 S2 = 4
		Zn				0.12	S1 = 0.4 S2 = 0.48	S1 = 17 S2 = 50	S1 = 10 S2 = 50	S1 = 2 S2 = 3.5

14.9 BLOCK MODEL AND GRADE ESTIMATION

14.9.1 BLOCK MODEL AND GRADE ESTIMATION FOR THE BELLEKENO MINE

A rotated block model was constructed to cover the entire extent of the mineralized veins. The block model includes separate sub models for silver, lead, and zinc grade estimates, as well as bulk density, classification criteria, validation estimates, and a calculated block value. A sub-block model was used to calculate volume and tonnage values based on the vein wireframes, classification criteria, and mined out shapes. The geometrical parameters of the block model are summarized in Table 14-33.

Table 14-33 Block Model Location and Setup (MinePlan convention)

Description	Easting (X)	Northing (Y)	Elevation (Z)
Block model origin (NAD 83 Zone 8N)	486,200	7,085,400	600
Block dimensions (metres)	5	3	5
Number of blocks	400	100	160
Rotation (degree)	307.50° (clockwise)		

Grades were interpolated into blocks using an ordinary kriging estimation method. Search ellipses were set up to parallel the strike and dip of the veins. For silver, lead, and zinc, a two-pass series of expanding search ellipsoids was used for sample selection and estimation.

Weighted capped composite data used for the estimation was restricted to samples located in the respective veins. Additional zinc threshold search restrictions were applied to all three vein zones. Individual block grades were used to calculate a NSR block model. Estimation criteria for each vein zone are summarized in Table 14-34. Blocks were classified as Indicated Mineral Resources if at least four drill holes within 50m, and a kriging variance less than 0.5 was obtained. Blocks were classified as Inferred Mineral Resources if at least two drill holes within 100 m, and a kriging variance less than 0.85 was obtained. All other blocks remained unclassified.

It should be noted that due to the limited data in the East Vein that no Indicated Mineral Resource exist for the East Vein.

Table 14-34 Search Ellipse Parameters for the Bellekeno Mine

Vein	Metal	Search Pass	MinePlan Rotations			Range			Number of Composites		Max. Samples per hole	High Grade Restriction	
			Principal Azimuth	Principal Dip	Intermed Azimuth	X-Rot	Y-Rot	Z-Rot	Min.	Max.		Grade	3D search
SW	Ag	1	-164°	-33°	66°	45	30	10	4	6	2	-	-
		2				113	75	25	2	6	2	-	-
	Pb	1				40	25	10	4	6	2	-	-
		2				100	63	25	2	6	2	-	-
	Zn	1				60	40	10	4	6	2	10.00%	30m
		2				150	75	25	2	6	2	10.00%	30m
99	Ag	1	-155°	-44°	76°	30	25	10	4	6	2	-	-
		2				75	63	25	2	6	2	-	-
	Pb	1				30	25	10	4	6	2	-	-
		2				75	63	25	2	6	2	-	-
	Zn	1				100	30	10	4	6	2	10.50%	50m
		2				250	75	25	2	6	2	10.50%	50m
East	Ag	1	-172°	-46°	61°	45	30	10	4	6	2	-	-
		2				113	75	25	2	6	2	-	-
	Pb	1				45	25	10	4	6	2	-	-
		2				100	63	25	2	6	2	-	-
	Zn	1				60	40	10	4	6	2	10.50%	60m
		2				150	100	25	2	6	2	10.50%	60m

14.9.2 BLOCK MODEL AND GRADE ESTIMATION FOR THE LUCKY QUEEN MINE

A rotated block model was constructed to cover the entire extent of the mineralized veins as defined by Alexco. The block model includes separate sub models for silver, lead, zinc, and gold grade estimates, as well as estimated bulk density, classification criteria, validation estimates, and a calculated block value. A block percentage model was used to accurately determine volume and tonnage values based on the reviewed and validated vein wireframes supplied by Alexco. The geometrical parameters of the block model are summarized in Table 14-35.

Table 14-35 Block Model Location and Setup for the Lucky Queen Mine

Description	Easting (X)	Northing (Y)	Elevation (Z)
Block model origin (NAD 83 Zone 8N)	486,900	7,091,300	1,200
Block dimensions (metres)	10	10	10
Number of blocks	70	100	50
Rotation (degree)	-50° counter-clockwise		

An inverse distance estimator (power of two) was used for the estimation of block grades. A two-pass series of expanding search ellipsoids with varying minimum sample requirements was used for sample selection and estimation, with the primary and secondary axes of the search ellipsoid defined by the silver semi-variogram range. Composite data used during estimation were restricted to samples located in their respective domain. Individual block grades were then used to calculate a block model. For the second pass, estimation results were also iteratively queried to ensure that all potential Mineral Resources within the defined domains were estimated. Estimation criteria are summarized in Table 14-36.

During the first pass, four to 12 composites from two or more drill holes within a search ellipsoid corresponding to 50% of the semi-variogram range were required for the estimation. All blocks estimated during the first pass were classified as Indicated (Table 14-36).

During the second pass, the search ellipse was expanded to ensure that all blocks within the defined vein and splay models were estimated. Between four to 12 composites from one or more drill holes were used for estimation. All blocks estimated during the second pass were classified as Inferred. All splay resources were also classified as Inferred due to the small number of total samples for this domain.

Table 14-36 Search Ellipse Parameters for the Lucky Queen Mine

Estimator	Search Pass	Search Type	Rotation		Search Ellipse Size			Number of Composites		Max. Samples per hole
			Z	Y	X (m)	Y (m)	Z (m)	Min.	Max.	
ID^2	1	Ellipse	0°	50°	50	50	10	4	12	3
ID^2	2	Ellipse	0°	50°	300	300	60	4	12	0

14.9.3 BLOCK MODEL AND GRADE ESTIMATION FOR THE FLAME & MOTH DEPOSIT

A rotated block model was constructed to cover the entire extent of the mineralized veins as defined by Alexco. The block model includes separate sub models for silver, lead, zinc, and gold grade estimates, as well as estimated bulk density, classification criteria, validation estimates, and a calculated block value. A block percentage model was used to accurately determine volume and tonnage values based on the reviewed and validated vein wireframes supplied by Alexco. The geometrical parameters of the block model are summarized in Table 14-37.

Table 14-37 Block Model Location and Setup for the Flame & Moth Deposit

Description	Easting	Northing	Elevation
	(X)	(Y)	(Z)
Block Model Origin (Lower left corner)	483395.115	7086090.000	420.000
Block Dimension (m)	3	5	5
Number of Blocks	130	215	100
AZ Rotation	30° clockwise		

A total of seven metals were estimated, four of which are included as part of the current resource (Au, Ag, Pb, Zn). Estimates of grades from Cu, As, Cd, and Mn will be used for internal studies by Alexco. As discussed in other sections, the resource estimation methodology was based on the following:

- The assays were composited to 1 m intervals. Two Ag and two Zn extremely high assays were capped before compositing;
- Ten missing assays (no recoveries) were excluded from compositing;
- The compositing was done within two sets of wireframes: original with some narrow mineralized intersections and modified with a minimum of 1.5 m mining width;
- All short composites (< 0.5 m) were combined with previous composite data;
- Ag, Zn, and Pb were estimated by kriging. Au, Cu, As, Cd, and Mn were estimated by Inverse distance squared (ID^2);
- A minimum of two and a maximum sixteen composite assays were used in the estimation process;
- The composite assay grades from high-grade populations were used in the estimation process with limited influence; and
- SG was estimated by ID^2. All unestimated blocks were assigned an average SG within each mineralized zone.

The selection of the search radii and rotations of search ellipsoids were guided by variogram models. In addition, the search radii were established to estimate a large portion of the blocks within the modelled area with limited extrapolation. The parameters were established by conducting repeated test resource estimates and reviewing the results as a series of plan views and sections.

In the Lightning and Christal zones the Ag, Au, Pb, Zn, and Cu metal grade estimation involved two successive steps. The first step considered a relatively small search ellipsoid, which was doubled in size for the second step (Table 14-38 and Table 14-39). Smaller search radii were used to restrict high grade assays (Table 14-19). In the V2 zone the estimates were done in one step. The first step in the estimation process ensured that the blocks were estimated from at least two drill holes.

Table 14-38 Search Ellipse Parameters for the Flame & Moth Deposit in the Lightning Zone

Metal	Step	Gemcom Rotations (RRR rule)			Radii		
		around Z	around Y	around Z	X-Rot	Y-Rot	Z-Rot
Au	1	-30	60	17	60	60	20
	2	-30	60	17	120	120	40
Ag	1	-30	60	17	60	40	20
	2	-30	60	17	120	80	40
Pb	1	-30	60	17	60	60	20
	2	-30	60	17	120	120	40
Zn	1	-30	60	17	40	60	20
	2	-30	60	17	80	120	40

Table 14-39 Search Ellipse Parameters for the Flame & Moth Deposit in the Christal Zone

Metal	Step	Gemcom Rotations (RRR rule)			Radii		
		around Z	around Y	around Z	X-Rot	Y-Rot	Z-Rot
Au	1	-25	60	0	60	60	20
	2	-25	60	0	120	120	40
Ag	1	-25	60	0	40	40	20
	2	-25	60	0	80	80	40
Pb	1	-25	60	0	60	60	20
	2	-25	60	0	120	120	40
Zn	1	-25	60	0	40	40	20
	2	-25	60	0	80	80	40

14.9.4 BLOCK MODEL AND GRADE ESTIMATION FOR THE ONEK DEPOSIT

A rotated block model was constructed to cover the entire extent of the mineralized veins as defined by Alexco. The block model includes separate sub-models for silver, lead, zinc and gold grade estimates, as well as estimated specific gravity, classification criteria, validation estimates and a calculated block dollar value. A block percentage model was used to accurately determine volume and tonnage values based on the supplied Alexco vein wireframes and the percentage contained within the underground workings removed from the vein percentage to account for the mined out volume. The geometrical parameters of the block model are summarized in Table 14-40.

Table 14-40 Onek Block Model Location and Setup

Description	Easting (X)	Northing (Y)	Elevation (Z)
Block Model Origin NAD 83	485350	7087200	1120
Block Dimensions (metres)	3	5	5
Number of Blocks	80	150	80
Rotation (degree)	50° clockwise		

Ordinary Kriging (OK) of capped composite values was used for the estimation of block grades. Because of the strong correlation between density and contained metal, all grades were weighted against density and a grade times density model was prepared for silver, lead, zinc, and gold. Interpolation was carried out in two passes with expanding search ellipsoids with the primary and secondary axes of the search ellipsoid defined by the correlogram ranges. For Vein 1 and Vein 1F a third pass was used for sample selection and estimation of silver. Correlogram and search parameters derived for Vein 1 were applied to Vein 1 FW with varying minimum and maximum number of samples required for estimation.

Composite data used for estimation was restricted to samples located in the respective veins. Individual block grades were used to calculate a dollar equivalent value for each block. Estimation criteria for Vein 1, Vein 1F, and Vein 2 are summarized in Table 14-41, Table 14-42, and Table 14-43, respectively. Blocks were classified as Indicated Mineral Resources if at least two drill holes and five composites were found within a 60 m by 30 m search ellipse. All other interpolated blocks were classified as Inferred Mineral Resource.

Table 14-41 Search Ellipse Parameters for Onek Vein 1

Commodity	Estimator	Search Pass	Search Type	Rotation			Search Ellipse Size			Number of Composites		Max. Samples per DDH
				Z	Y	Z	X (m)	Y (m)	Z (m)	Min.	Max.	
Ag	OK	1	Ellipsoidal	5°	65°	90°	60	30	11	5	10	3
	OK	2	Ellipsoidal	5°	65°	90°	90	45	33	5	10	3
	OK	3	Ellipsoidal	5°	65°	90°	30	30	33	1	10	-
Pb	OK	1	Ellipsoidal	5°	65°	0°	60	40	8	4	10	3
	OK	2	Ellipsoidal	5°	65°	0°	90	60	32	4	10	3
Zn	OK	1	Ellipsoidal	5°	65°	0°	60	40	8	4	10	3
	OK	2	Ellipsoidal	5°	65°	0°	90	60	32	4	10	3
Au	OK	1	Ellipsoidal	5°	65°	0°	70	50	10	5	10	3
	OK	2	Ellipsoidal	5°	65°	0°	105	75	30	5	10	3

Table 14-42 Search Ellipse Parameters for Onek Vein 1F

Commodity	Estimator	Search Pass	Search Type	Rotation			Search Ellipse Size			Number of Composites		Max. Samples per DDH
				Z	Y	Z	X (m)	Y (m)	Z (m)	Min.	Max.	
Ag	OK	1	Ellipsoidal	5°	65°	90°	60	30	11	3	10	2
	OK	2	Ellipsoidal	5°	65°	90°	90	45	33	3	10	2
	OK	3	Ellipsoidal	5°	65°	90°	30	30	33	1	10	-
Pb	OK	1	Ellipsoidal	5°	65°	0°	60	40	8	3	10	2
	OK	2	Ellipsoidal	5°	65°	0°	90	60	32	3	10	2
Zn	OK	1	Ellipsoidal	5°	65°	0°	60	40	8	3	10	2
	OK	2	Ellipsoidal	5°	65°	0°	90	60	32	3	10	2
Au	OK	1	Ellipsoidal	5°	65°	0°	70	50	10	3	10	2
	OK	2	Ellipsoidal	5°	65°	0°	105	75	30	3	10	2

Table 14-43 Search Ellipse Parameters for Onek Vein 2

Commodity	Estimator	Search Pass	Search Type	Rotation			Search Ellipse Size			Number of Composites		Max. Samples per DDH
				Z	Y	Z	X (m)	Y (m)	Z (m)	Min.	Max.	
Ag	OK	1	Ellipsoidal	5°	65°	0°	25	25	10	4	10	3
	OK	2	Ellipsoidal	5°	65°	0°	75	75	30	4	10	3
Pb	OK	1	Ellipsoidal	5°	65°	0°	25	25	10	4	10	3
	OK	2	Ellipsoidal	5°	65°	0°	75	75	30	4	10	3
Zn	OK	1	Ellipsoidal	5°	65°	0°	80	80	7	4	10	3
	OK	2	Ellipsoidal	5°	65°	0°	120	120	21	4	10	3
Au	OK	1	Ellipsoidal	5°	65°	0°	30	30	10	4	10	3
	OK	2	Ellipsoidal	5°	65°	0°	75	75	30	4	10	3

14.9.5 BLOCK MODEL AND GRADE ESTIMATION FOR THE BERMINGHAM DEPOSIT

A block model was constructed to cover the entire extent of the mineralized veins as defined by Alexco. The block model includes separate sub-models' attributes for silver, lead, zinc, and gold grade estimates, as well as estimated specific gravity, classification criteria, validation estimates, and a calculated block dollar value. A sub-block model (1 m x 1 m x 1 m sub-block size) was used to accurately determine volume and tonnage values based on the reviewed and validated vein wireframes supplied by Alexco. The geometrical parameters of the block model are summarized in Table 14-44.

Table 14-44 Bermingham Block Model Location and Setup Table

Description	Easting (X)	Northing (Y)	Elevation (Z)
Block Model Origin NAD 83	478910	7086330	710
Block Model Rotation	Bearing of 45°		
Block Dimensions (m)	9	3	6
Block Model Dimensions	1,008 m	624 m	690 m

Summaries of estimation parameters used for the estimation of silver, gold, lead, zinc and specific gravity are provided in Table 14-45 to Table 14-49. Grades were interpolated using a 3-pass estimation approach for sample selection, with the 3rd pass generally being used to interpolate grades into a low number of peripheral blocks along the vein margins. Ordinary Kriging (OK) was used for estimating silver, gold, lead and zinc grades into all mineralized veins except for the West Dipper vein system. ID^2 was the alternative technique used for interpolating metal grades within the West Dipper vein system, as well for specific gravity for all mineralized veins. Composite selection during estimation was generally restricted to only those composites located within the mineralized vein. The one exception to this was for the Bear and Bear South veins which were treated as one continuous vein due to the limited structural offset between these veins.

Table 14-45 Estimation Parameters for Silver

Vein System	Zone	Metal	Estimation Technique	Search Pass	Search Ellipse Size (m)			Number of Composites			High Grade Restriction			
					Major	Semi-Major	Minor	Min	Max	Max Per DDH	High Grade Threshold	Search Ellipse Size (m)		
												Major	Semi-Major	Minor
Bermingham Main	Arctic Bear Etta North East	Ag	Ok	1	50	40	10	5	15	3	n/a	n/a	n/a	n/a
	Arctic Bear Etta North East			2	100	80	15	5	10	3	n/a 2,000 g/t 1,500 g/t n/a	n/a 50 50 n/a	n/a 40 40 n/a	n/a 10 10 n/a
	Arctic Etta Bear North East			3	100 100 120 125	80 80 100 100	15 15 15 15	1	6	3	n/a 1,500 g/t 2,000 g/t n/a	n/a 50 50 n/a	n/a 40 40 n/a	n/a 10 10 n/a
Bear	Arctic Bear Bear South North East	Ag	Ok	1	50	45	10	5	15	3	n/a	n/a	n/a	n/a
	Arctic Bear Bear South North East			2	100	90	15	5	10	3				
	Arctic Bear South Bear North East			3	100 100 125 130	90 90 125 130	15 15 15 15	1	6	3				
Footwall	Arctic Bear Etta	Ag	Ok	1	45	45	10	5	15	3	n/a	n/a	n/a	n/a
	Arctic Bear Etta			2	90	90	15	5	10	3	n/a 2,500 g/t n/a	n/a 45 n/a	n/a 45 n/a	n/a 10 n/a
	Arctic Bear Etta			3	110 125 90	110 125 90	15 15 15	1	6	3	n/a 2,500 g/t n/a	n/a 45 n/a	n/a 45 n/a	n/a 10 n/a
West Dipper	Bear South Bear WD2	Ag	ID2	1	25	18	10	5	15	3	n/a	n/a	n/a	n/a
	Bear South Bear WD2			2	50	36	15	5	10	3	n/a n/a 1,500 g/t	n/a n/a 25	n/a n/a 18	n/a n/a 10
	Bear South Bear WD2			3	75	54	15	1	6	3	n/a n/a 1,500 g/t	n/a n/a 25	n/a n/a 18	n/a n/a 10

Table 14-46 Estimation Parameters for Gold

Vein System	Zone	Metal	Estimation Technique	Search Pass	Search Ellipse Size (m)			Number of Composites			High Grade Restriction			
					Major	Semi-Major	Minor	Min	Max	Max Per DDH	High Grade Threshold	Search Ellipse Size (m)		
												Major	Semi-Major	Minor
Bermingham Main	Arctic Bear Etta North East	Au	Ok	1	75	60	5	5	15	3	n/a	n/a	n/a	n/a
	Arctic Bear Etta North East			2	100	80	10	5	10	3	n/a	n/a	n/a	n/a
	Arctic Bear Etta North East			3	100	80	15	1	6	3	n/a	n/a	n/a	n/a
Bear	Arctic Bear Bear South North East	Au	Ok	1	60	50	10	5	15	3	n/a	n/a	n/a	n/a
	Arctic Bear Bear South North East			2	100	100	15	5	10	3				
	Arctic Bear Bear South North East			3	100	100	15	1	6	3				
Footwall	Arctic Bear Etta	Au	Ok	1	50	50	5	5	15	3	n/a	n/a	n/a	n/a
	Arctic Bear Etta			2	100	100	10	5	10	3	n/a	n/a	n/a	n/a
	Arctic Bear Etta			3	100	100	15	1	6	3	n/a	n/a	n/a	n/a
West Dipper	Bear South Bear WD2	Au	ID2	1	25	18	10	5	15	3	n/a	n/a	n/a	n/a
	Bear South Bear WD2			2	50	36	15	5	10	3	n/a	n/a	n/a	n/a
	Bear South Bear WD2			3	75	54	15	1	6	3	n/a	n/a	n/a	n/a

Table 14-47 Estimation Parameters for Lead

Vein System	Zone	Metal	Estimation Technique	Search Pass	Search Ellipse Size (m)			Number of Composites			High Grade Restriction			
					Major	Semi-Major	Minor	Min	Max	Max Per DDH	High Grade Threshold	Search Ellipse Size (m)		
												Major	Semi-Major	Minor
Bermingham Main	Arctic Bear Etta North East	Pb	Ok	1	60	50	10	5	15	3	n/a 5% 6% n/a	n/a 50 50 n/a	n/a 50 50 n/a	n/a 5 5 n/a
	Arctic Bear Etta North East			2	100	80	15	5	10	3	n/a 5% 6% n/a	n/a 50 50 n/a	n/a 50 50 n/a	n/a 5 5 n/a
	Arctic Etta Bear North East			3	100 100 120 125	80 80 100 100	15 15 15 15	1	6	3	n/a 5% 6% n/a	n/a 50 50 n/a	n/a 50 50 n/a	n/a 5 5 n/a
Bear	Arctic Bear South Bear North East	Pb	Ok	1	50	45	10	5	15	3	n/a 17% 21% n/a	n/a 50 25 n/a	n/a 40 20 n/a	n/a 10 6 n/a
	Arctic Bear South Bear North East			2	100 100 80 100	90 90 65 90	15	5	10	3	n/a 17% 21% n/a	n/a 50 25 n/a	n/a 40 20 n/a	n/a 10 6 n/a
	Arctic Bear South Bear North East			3	100 100 125 130	90 90 125 130	15	1	6	3	n/a 17% 21% n/a	n/a 50 25 n/a	n/a 40 20 n/a	n/a 10 6 n/a
Footwall	Arctic Bear Etta	Pb	Ok	1	40	35	10	5	15	3	n/a 5% n/a	n/a 35 n/a	n/a 30 n/a	n/a 4 n/a
	Arctic Bear Etta			2	80	70	15	5	10	3	n/a 5% n/a	n/a 35 n/a	n/a 30 n/a	n/a 4 n/a
	Arctic Bear Etta			3	100	90	15	1	6	3	n/a 5% n/a	Na 35 n/a	n/a 30 n/a	n/a 4 n/a
West Dipper	Bear South Bear WD2	Pb	ID2	1	25	18	10	5	15	3	n/a	n/a	n/a	n/a
	Bear South Bear WD2			2	50	36	15	5	10	3	n/a n/a 5%	n/a n/a 25	n/a n/a 18	n/a n/a 10
	Bear South Bear WD2			3	75	54	15	1	6	3	n/a n/a 5%	n/a n/a 25	n/a n/a 18	n/a n/a 10

Table 14-48 Estimation Parameters for Zinc

Vein System	Zone	Metal	Estimation Technique	Search Pass	Search Ellipse Size (m)			Number of Composites			High Grade Restriction			
					Major	Semi-Major	Minor	Min	Max	Max Per DDH	High Grade Threshold	Search Ellipse Size (m)		
												Major	Semi-Major	Minor
Bermingham Main	Arctic Bear Etta North East	Zn	Ok	1	75	60	5	5	15	3	n/a	n/a	n/a	n/a
	Arctic Bear Etta North East			2	100	80	10	5	10	3	n/a 4% n/a n/a	n/a 75 n/a n/a	n/a 60 n/a n/a	n/a 3 n/a n/a
	Arctic Bear Etta North East			3	100 120 100 125	80 100 80 100	15	1	6	3	n/a 4% n/a n/a	n/a 75 n/a n/a	n/a 60 n/a n/a	n/a 3 n/a n/a
Bear	Arctic Bear South Bear North East	Zn	Ok	1	60	50	10 10 7 10	5	15	3	n/a n/a 8% n/a	n/a n/a 30 n/a	n/a n/a 25 n/a	n/a n/a 3.5 n/a
	Arctic Bear South Bear North East			2	100 100 80 100	100 100 65 100	15 15 10 15	5	10	3	n/a n/a 8% n/a	n/a n/a 30 n/a	n/a n/a 25 n/a	n/a n/a 3.5 n/a
	Arctic Bear South Bear North East			3	100 100 125 100	100 100 125 100	15	1	6	3	n/a n/a 8% n/a	n/a n/a 30 n/a	n/a n/a 25 n/a	n/a n/a 3.5 n/a
Footwall	Arctic Bear Etta	Zn	Ok	1	50	50	5	5	15	3	6% 5% n/a	50 30 n/a	50 30 n/a	5 3.5 n/a
	Arctic Bear Etta			2	100 75 100	100 75 100	10	5	10	3	6% 5% n/a	50 30 n/a	50 30 n/a	5 3.5 n/a
	Arctic Bear Etta			3	100	100	15 10 15	1	6	3	6% 5% n/a	50 30 n/a	50 30 n/a	5 3.5 n/a
West Dipper	Bear South Bear WD2	Zn	ID2	1	25	18	10	5	15	3	4% 4% 2.50%	20 20 25	15 15 18	5 5 10
	Bear South Bear WD2			2	50	36	15	5	10	3	4% 4% 2.50%	20 20 25	15 15 18	5 5 10
	Bear South Bear WD2			3	75	54	15	1	6	3	4% 4% 2.50%	20 20 25	15 15 18	5 5 10

Table 14-49 Estimation Parameters for Specific Gravity

Vein System	Zone	Variable	Estimation Technique	Search Pass	Search Ellipse Size (m)			Number of Composites			High Grade Restriction			
					Major	Semi-Major	Minor	Min	Max	Max Per DDH	High Grade Threshold	Search Ellipse Size (m)		
												Major	Semi-Major	Minor
Bermingham Main	Arctic Bear Etta North East	SG	ID2	1	50	50	6	5	15	3	n/a	n/a	n/a	n/a
	Arctic Bear Etta North East			2	100	100	12	5	12	3	n/a	n/a	n/a	n/a
	Arctic Bear Etta North East			3	150	150	15	1	6	3	n/a	n/a	n/a	n/a
Bear	Arctic Bear South Bear North East	SG	ID2	1	45	45	6	5	15	3	n/a	n/a	n/a	n/a
	Arctic Bear South Bear North East			2	90	90	12	5	12	3	n/a	n/a	n/a	n/a
	Arctic Bear South Bear North East			3	125	125	15	1	6	3	n/a	n/a	n/a	n/a
Footwall	Arctic Bear Etta	SG	ID2	1	45	45	6	5	15	3	n/a	n/a	n/a	n/a
	Arctic Bear Etta			2	90	90	12	5	12	3	n/a	n/a	n/a	n/a
	Arctic Bear Etta			3	125	125	15	1	6	3	n/a	n/a	n/a	n/a
West Dipper	Bear South Bear WD2	SG	ID2	1	25	18	6	5	15	3	n/a	n/a	n/a	n/a
	Bear South Bear WD2			2	50	36	12	5	12	3	n/a	n/a	n/a	n/a
	Bear South Bear WD2			3	75	55	15	1	6	3	n/a	n/a	n/a	n/a

14.10 MODEL VALIDATION AND SENSITIVITY

14.10.1 MODEL VALIDATION AND SENSITIVITY FOR THE BELLEKENO MINE

Multiple model validation techniques run on the Bellekeno resource model included running an Inverse Distance Squared (ID^2) and Nearest Neighbour (NN) estimate on the same block size and parameters as the Ordinary Kriging

(OK) estimate. The difference in estimation results between the OK versus ID², and OK versus NN techniques was largely with ±5 to 10%, as shown in Table 14-50 and Table 14-51, respectively.

Table 14-50 Comparison Statistics for Ordinary Kriging Estimate versus Inverse Distance Squared Estimate

Vein	Commodity	OK Mean *	ID² Mean *	% Difference*
SW	Silver (g/t)	333	323	3%
	Lead (%)	3.71	3.50	6%
	Zinc (%)	3.64	4.06	-12%
99	Silver (g/t)	662	643	3%
	Lead (%)	4.16	4.06	2%
	Zinc (%)	2.72	2.63	3%
East	Silver (g/t)	190	233	-22%
	Lead (%)	1.26	1.33	-6%
	Zinc (%)	2.74	3.48	-27%

Note.

* Mean values for this comparison were generated using Snowden Supervisor software. Values are compared by number of blocks populated, not volume estimated.
** % Difference is (Ordinary Kriging Mean – Inverse Distance Squared Mean)/ Ordinary Kriging Mean * 100.

Table 14-51 Comparison Statistics for Ordinary Kriging Estimate versus Nearest Neighbour Estimate

Vein	Commodity	OK Mean *	NN Mean *	% Difference**
SW	Silver (g/t)	333	307	8%
	Lead (%)	3.71	3.53	5%
	Zinc (%)	3.64	3.26	10%
99	Silver (g/t)	662	658	0%
	Lead (%)	4.16	4.10	1%
	Zinc (%)	2.72	2.69	1%
East	Silver (g/t)	190	193	-1%
	Lead (%)	1.26	1.44	-14%
	Zinc (%)	2.74	2.69	2%

Note.

* Mean values for this comparison were generated using Snowden Supervisor software. Values are compared by number of blocks populated, not volume estimated.
** % Difference is (Ordinary Kriging Mean – Nearest Neighbour Mean)/ Ordinary Kriging Mean * 100.

A second declustered nearest neighbour block model, with a block size of 1.5 m x 1.5 m x 1.5 m, was generated for each vein and commodity using the same search orientation as the ordinary kriging model. Visual and numerical comparisons were run for each vein and each of silver, lead, and zinc, and results comparing the mean values are displayed in Table 14-52.

Table 14-52 Comparison Statistics for Ordinary Kriging Estimate versus Declustered Nearest Neighbour Estimate

Vein	Commodity	OK Mean *	NN Mean *	% Difference**
SW	Silver (g/t)	350	365	-4%
	Lead (%)	3.99	4.18	-5%
	Zinc (%)	4.06	4.11	-1%
99	Silver (g/t)	689	717	-4%
	Lead (%)	4.50	4.80	-7%
	Zinc (%)	3.42	3.55	-4%
East	Silver (g/t)	205	206	0%
	Lead (%)	1.46	1.54	-5%
	Zinc (%)	3.83	3.59	6%

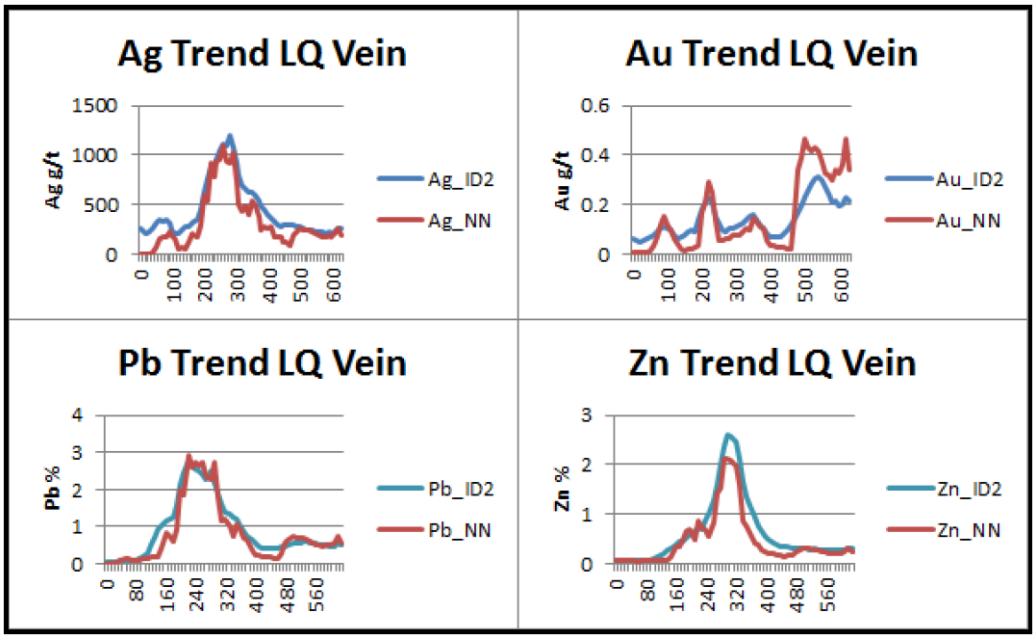
Note.

* Means for this comparison were generated using Hexagon Mining's Reserves tool and differ slightly from the mean values generated using Snowden Supervisor software. Mean values displayed here are compared on a volumetric basis between each other, and with the vein solids used to generate each estimate. These values are a better representation of the final grades.
** % Difference is (Ordinary Kriging Mean – Declustered Nearest Neighbour Mean)/ Ordinary Kriging Mean * 100.

14.10.2 MODEL VALIDATION AND SENSITIVITY FOR THE LUCKY QUEEN MINE

The block model was validated visually by the inspection of successive section lines in order to confirm that the block model correctly reflects the distribution of high-grade and low-grade samples.

Trend analysis for the Lucky Queen Mineral Resource estimate demonstrates a minimal global bias and slight smoothing of the inverse distance estimates as compared to a nearest neighbor (NN) estimates, and correctly reflects grade trends along the strike of the deposit (Figure 14-33). An additional validation check was completed by comparing the undiluted inverse distance estimates to undiluted nearest neighbour estimates generated using the same search criteria and tabulated at a zero cut-off (Table 14-53). The observed difference between two models average block estimates are a function of the sharp grade drop immediately adjacent to the high-grade core of the vein.



Source: SRK 2011a

Figure 14-33 Swath Comparison of ID^2 and NN Estimation

Table 14-53 Nearest Neighbor Block Model Validation

Variable	Inverse Distance Block Average	Nearest Neighbor Block Average
Ag (g/t)	545	452
Au (g/t)	0.14	0.15
Pb (%)	1.22	1.14
Zn (%)	0.82	0.70

The Lucky Queen Mineral Resources are not sensitive to the selection of a cut-off grade. Table 14-54 shows the global quantities and grade estimates at different cut-off grades for the Lucky Queen vein. The reader is cautioned that these figures should not be misconstrued as a Mineral Resource. The reported quantities and grades are only presented as a sensitivity of the resource model to the selection of cut-off grades.

Table 14-54 Lucky Queen Mine Indicated and Inferred Block Model Quantity and Grade Estimates at Various Cut-off Values

Cut-Off (CA$)	Indicated tonnes	Ag (g/t)	Inferred tonnes	Ag (g/t)
$230	128,400	1,195	201,900	537
$215	129,800	1,185	221,600	512
$200	130,800	1,178	242,200	489
$185	**132,300**	**1,167**	**257,900**	**473**
$170	134,000	1,154	269,400	462
$160	135,700	1,142	275,000	456
$140	137,000	1,130	290,000	441

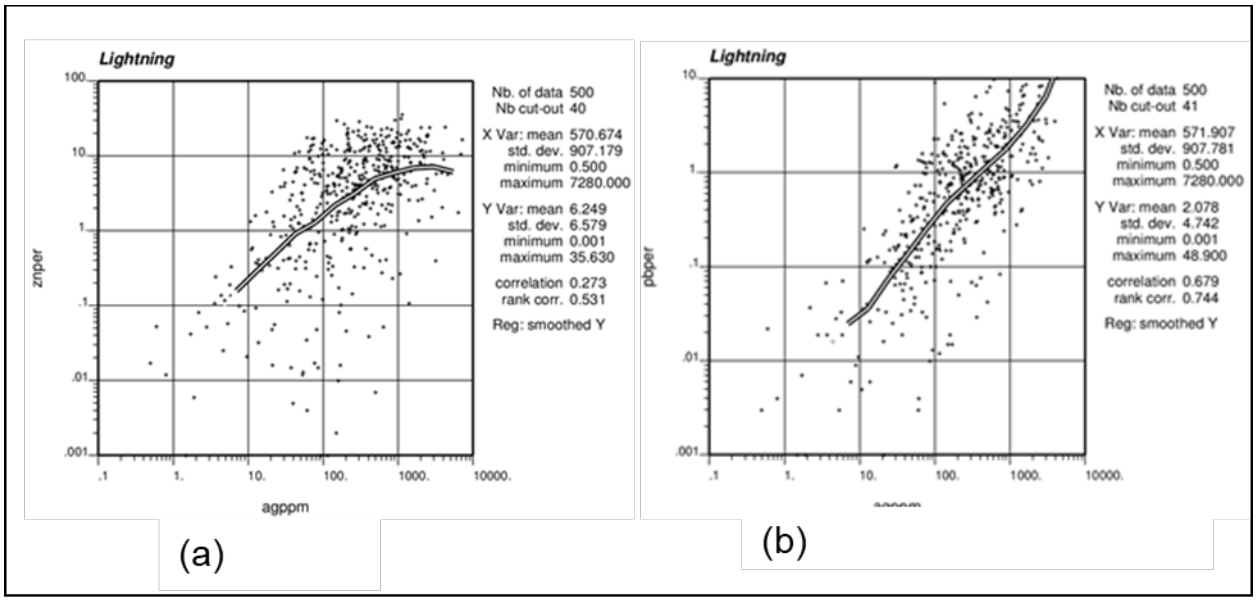
Note. The reader is cautioned that the figures presented in this table should not be misconstrued as a Mineral Resource Statement. The reported quantities and grades are only presented to show the sensitivity of the resource model to the selection of a cut-off grade.

14.10.3 MODEL VALIDATION AND SENSITIVITY FOR THE FLAME & MOTH DEPOSIT

All estimated zones were validated by completing a series of visual inspections and by:

- Comparison of local "well-informed" block grades with composites contained within those blocks; and
- Comparison of average assay grades with average block estimates along different directions – swath plots.

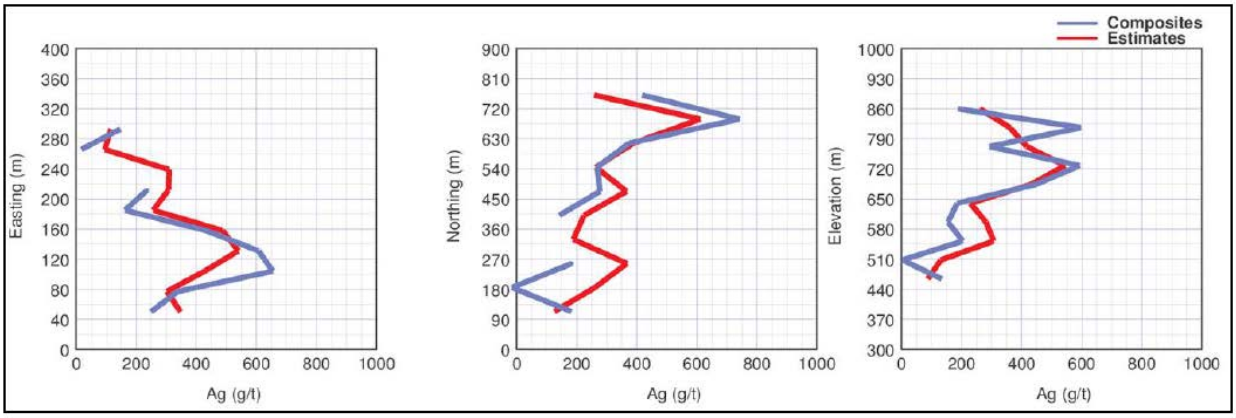
Figure 14-34 shows a comparison of estimated silver and zinc block grades with drill hole assay composite data contained within those blocks in the Lightning zone. On average, the estimated Zn blocks are slightly lower than the composite data, and the estimated Pb block grades are very similar to the composite data with very little scatter around the x = y line. This indicates that estimated block grades, at least those close to the data, are quite variable and not over smoothed. Similar results were noted in other estimation domains.



Source: SRK 2014

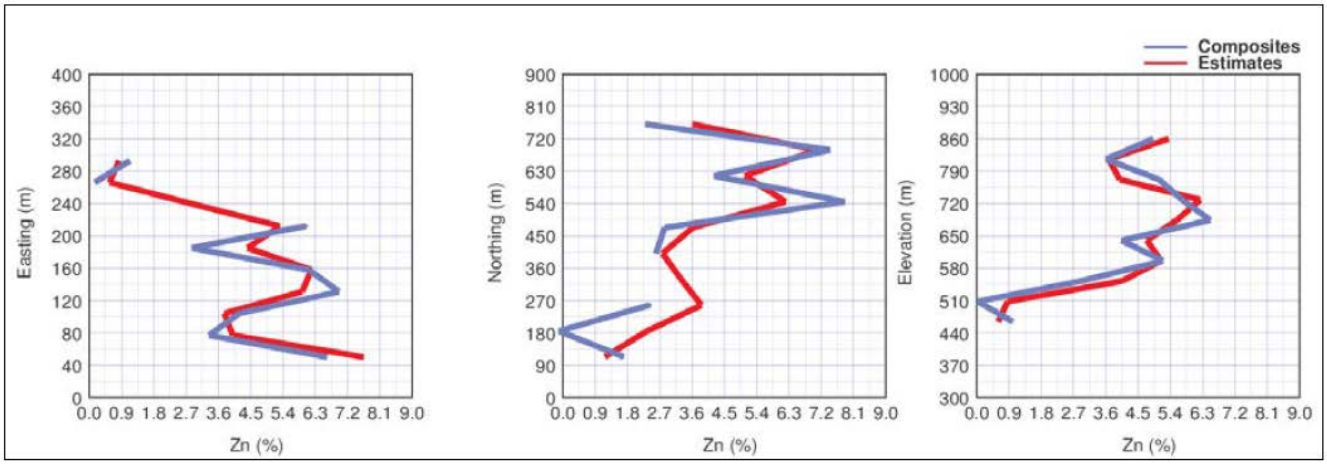
Figure 14-34 Comparison of (a) Silver and (b) Zinc Block Estimates with Borehole Assay Data Contained Within Blocks in the Lightning Zone

As a final check, average composite grades and average block estimates were compared along different directions. This involved calculating de-clustered average composite grades and comparison with average block estimates along east-west, north-south, and horizontal swaths. Figure 14-35 shows the swath plots for silver in the Lightning zone. Note good similarity between the estimates and data at higher elevations and somewhat higher estimated block grades at lower elevations where fewer data are available. This area has been assigned to the Inferred category. Figure 14-36 shows the swath plots for zinc in the Lightning zone. Note good similarity between the estimates and data. A similar relationship can be shown for all other estimation domains. Overall, the validation shows that current resource estimates are a good reflection of drill hole assay data.



Source: RPA 2017

Figure 14-35 Lightning Zone Declustered Average Silver Composite Grades Compared to Silver Block Estimates



Source: RPA 2017

Figure 14-36 Lightning Zone Declustered Average Zinc Composite Grades Compared to Zinc Block Estimates

Table 14-55 tabulates Indicated and Inferred global quantities and grade estimates at different cut-off values for the Flame & Moth deposit.

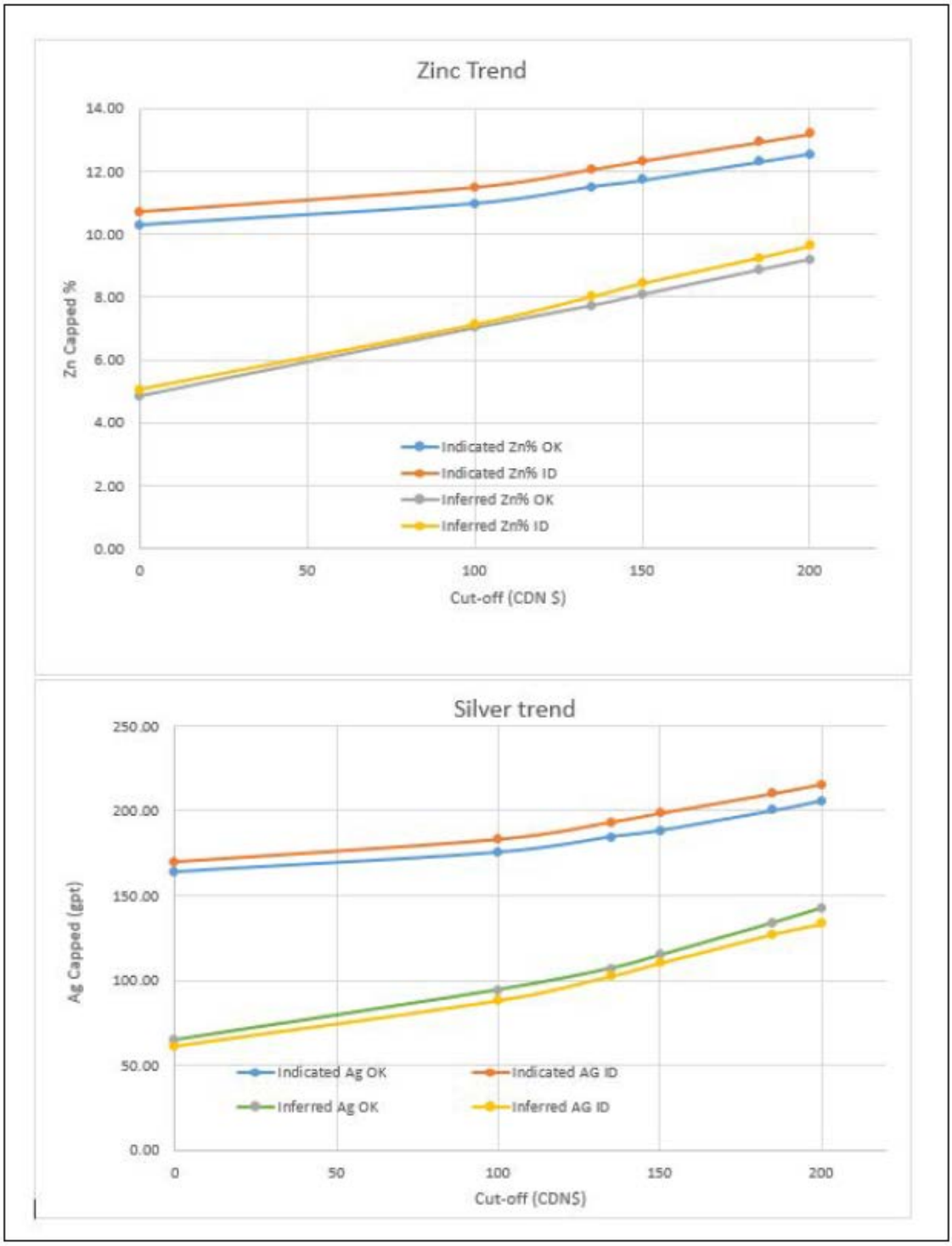
Table 14-55 Flame & Moth Indicated and Inferred Block Model Quantity and Grade Estimates at Various Cut-off Values

Cut-Off (CA$)	Indicated tonnes	Ag (g/t)	Inferred tonnes	Ag (g/t)
$230	1,537,000	528	297,000	399
$215	1,582,000	518	317,000	385
$200	1,626,000	509	342,000	369
$185	**1,679,000**	**498**	**365,000**	**356**
$170	1,727,300	487	383,000	346
$160	1,759,200	481	396,000	339
$140	1,805,000	472	428,000	324

Note. The reader is cautioned that the figures presented in this table should not be misconstrued as a Mineral Resource Statement. The reported quantities and grades are only presented to show the sensitivity of the resource model to the selection of a cut-off grade.

14.10.4 MODEL VALIDATION AND SENSITIVITY FOR THE ONEK DEPOSIT

The block model was validated visually by the inspection of successive section lines in order to confirm that the block model correctly reflects the distribution of high-grade and low-grade samples. An ID^2 estimate was prepared for the blocks using the same search criteria and compared against the OK estimate. Analysis of OK versus ID^2 estimates at various cut-off values for the Onek deposit demonstrate a slight smoothing of the OK estimate compared to the ID^2 estimate for the indicated resource (Figure 14-37). For the inferred resource, OK estimate for silver show less smoothing than the ID^2 estimate. Average grades of the OK and ID^2 estimates for silver, lead, zinc, and gold at a $185 NSR cut-off are compared in Table 14-56.



Source: RPA 2017

Figure 14-37 Comparison of OK and ID^2 Estimation for Onek

Table 14-56 OK and ID2 Estimate at $185 Dollar Value cut-off

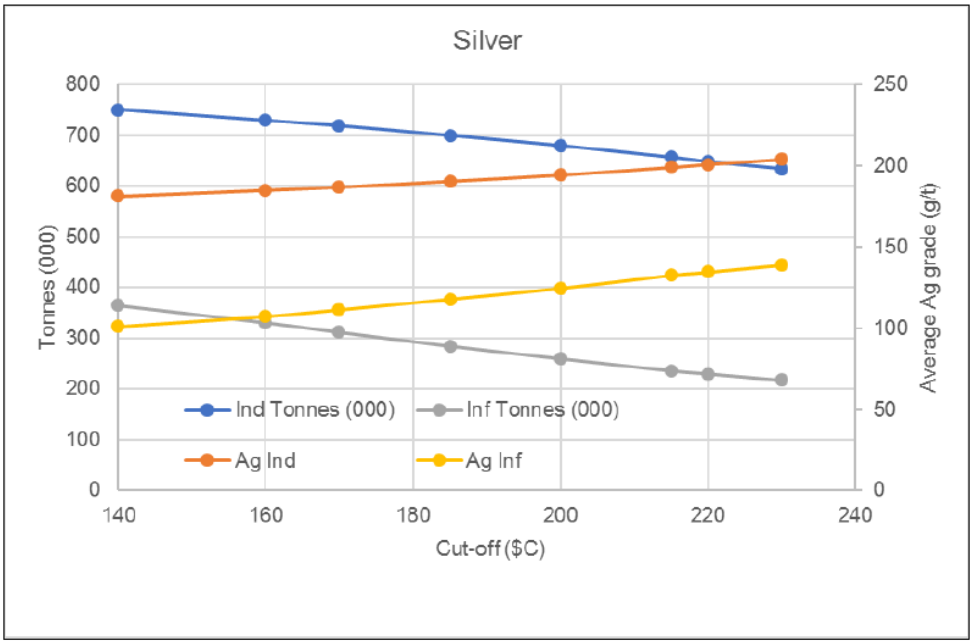
	Indicated		Inferred	
	OK	ID^2	OK	ID^2
Ag (g/t)	200	198	134	126
Pb (%)	1.29	1.31	1.24	1.26
Zn (%)	12.30	12.93	8.86	9.26
Au (g/t)	0.62	0.62	0.44	0.44

Table 14-56 Table 14-57 tabulates global Indicated and Inferred quantities and grade estimates at different cut-off grades for the Onek deposit. Figure 14-38 represents the effects of increasing cut-offs on the tonnage and silver grade of the deposit and Figure 14-39 demonstrates the same for the zinc grade. The reader is cautioned that these figures should not be misconstrued as a Mineral Resource. The reported quantities and grades are only presented as a sensitivity of the resource model to the selection of the cut-off grades.

Table 14-57 Onek Global Block Model Quantity and Grade Estimates at Various Dollar Cut-Off Values

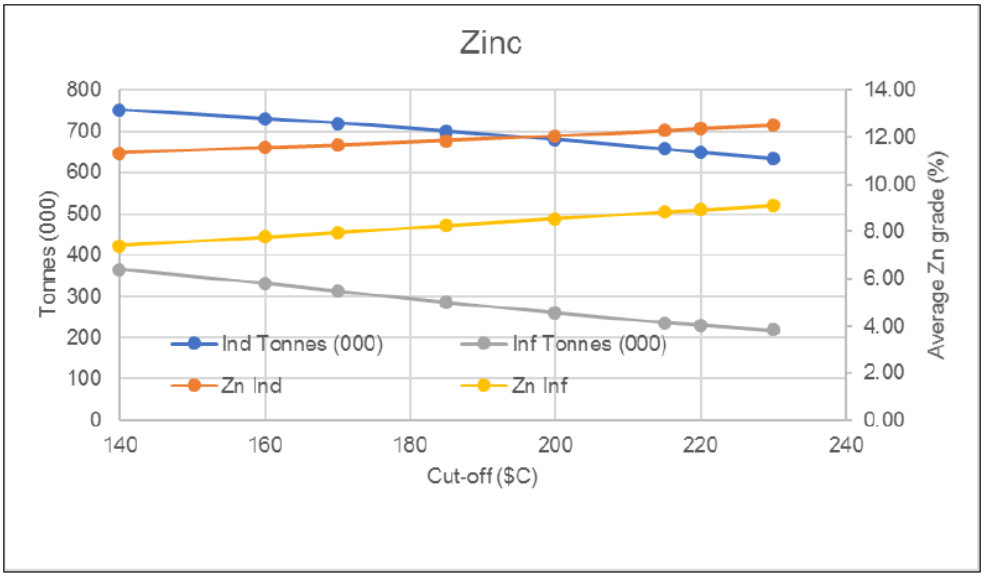
Class	Cut-off ($)	Tons (000)	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)
Indicated	$230	634,500	204	0.62	1.32	12.50
	$215	657,300	199	0.62	1.29	12.28
	$200	680,100	195	0.61	1.26	12.05
	$185	**700,200**	**191**	**0.60**	**1.24**	**11.85**
	$170	719,400	187	0.60	1.21	11.66
	$160	730,000	185	0.60	1.20	11.55
	$140	751,300	181	0.59	1.8	11.32
Inferred	$230	217,900	139	0.45	1.26	9.11
	$215	236,600	133	0.44	1.23	8.84
	$200	260,400	125	0.43	1.19	8.56
	$185	**285,100**	**118**	**0.42**	**1.15**	**8.26**
	$170	312,400	112	0.41	1.11	7.96
	$160	331,000	107	0.40	1.08	7.76
	$140	365,000	101	0.40	1.03	7.41

Notes:
1. The reader is cautioned that the figures presented in this table should not be misconstrued as a mineral statement. The reported quantities and grades are only presented to show the sensitivity of the resource model at various cut-offs.
2. CA$=US$ x 0.80.



Source: RPA 2017

Figure 14-38 Silver Grade Tonnage Curve for Onek



Source: RPA 2017

Figure 14-39 Zinc Grade Tonnage Curve for Onek

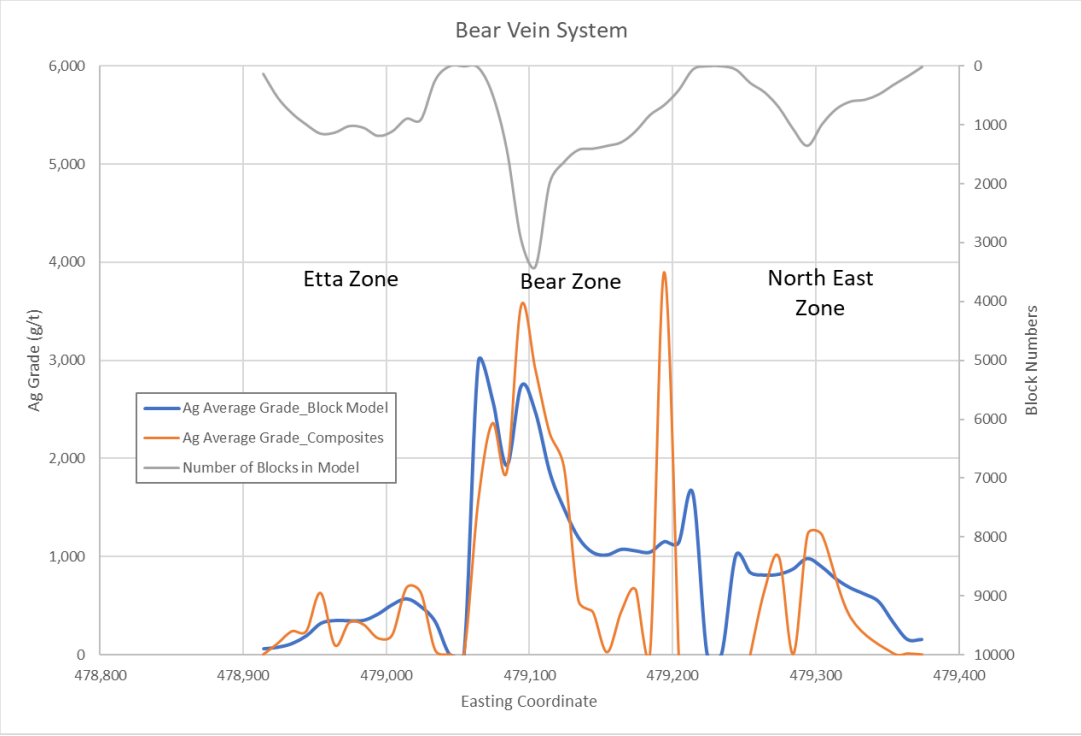
14.10.5 MODEL VALIDATION FOR THE BERMINGHAM DEPOSIT

Block model validation for Bermingham was conducted using multiple techniques including:

1. Swath plot analysis of grade profiles between the block model and assay composites;
2. Comparison of block model mean grades to a nearest neighbour model produced on a 1 m by 1 m by 1 m grid; and
3. Visual inspection of estimated block grades relative to assay composites.

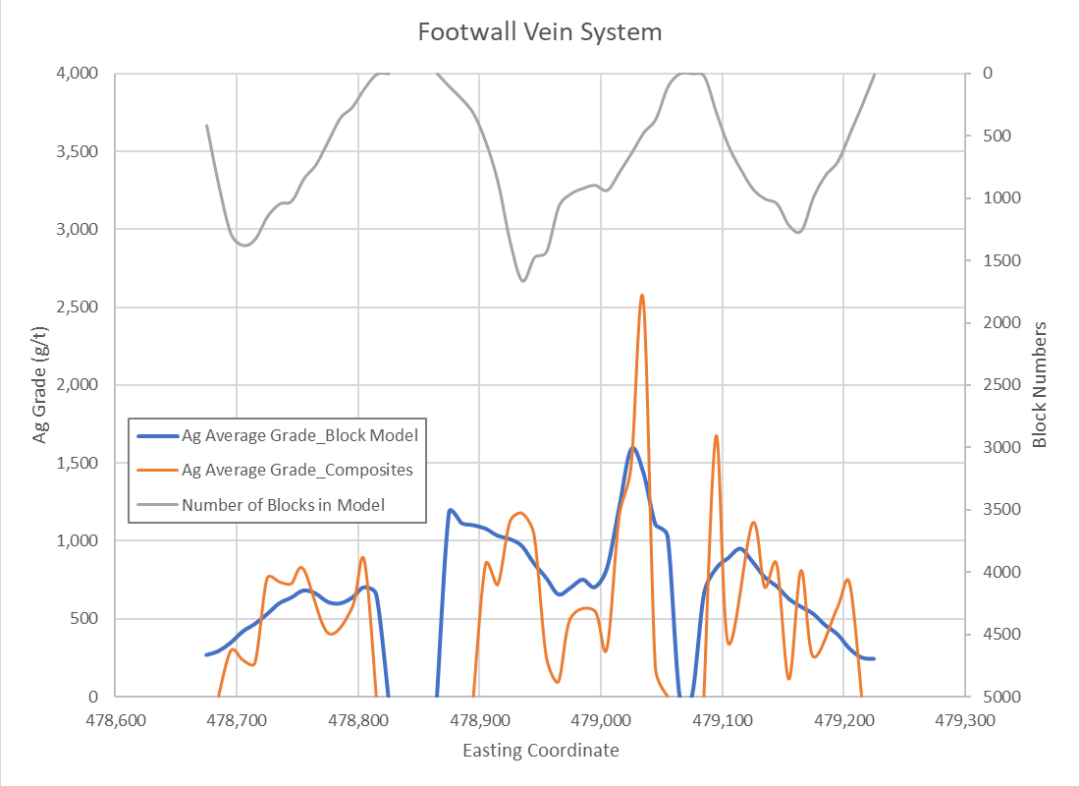
Swath plots of silver grade (generated along the easting coordinate) for the Bermingham Main, Bear and Footwall vein systems are provided in Figure 14-40 and Figure 14-41.

In general, the grade profiles are comparable between the block model and assay composites with an expected smoothed profile generated from the block model. This smoothing effect is a function of the estimation process and sample selection criteria defined within the estimation algorithm. Some discrepancy between block grades and assay composites can be observed along the margins of zones; however, this is reflective of decreased numbers of assay composites along the periphery of the interpreted mineralized veins. These peripheral areas account for significantly reduced tonnages within the block model as reflected in the block number profile plotted along the top of each figure (in grey).



Source: SRK 2018

Figure 14-40 Swath Plot of Silver Grade for the Bear Vein System

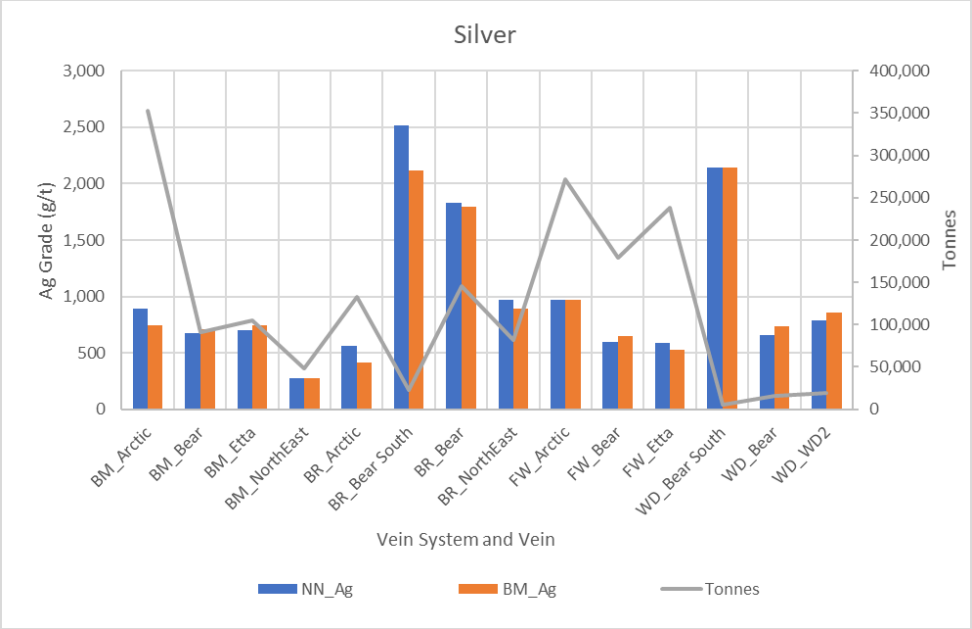


Source: SRK 2018

Figure 14-41 Swath Plot of Silver Grade for the Footwall Vein System

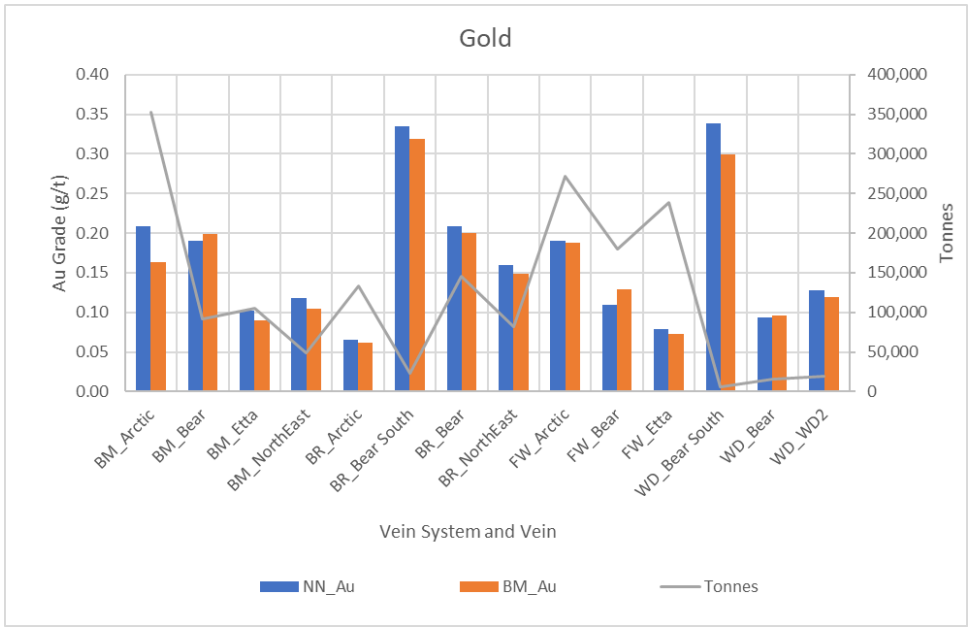
Comparisons of estimated mean grades for silver, gold, lead and zinc relative to a nearest neighbour model produced on a 1 m by 1 m by 1 m grid are provided in Figures 14-55 to 14-58. The abbreviation of the vein system along x-axis is denoted by "BM" for Bermingham Main, "BR" for Bear, "FW" for Footwall and "WD" for West Dipper. A tonnage profile is plotted on each graph and represents the total tonnes contained within each vein.

In general, the mean block grade and nearest neighbour mean grade for each vein are comparable.



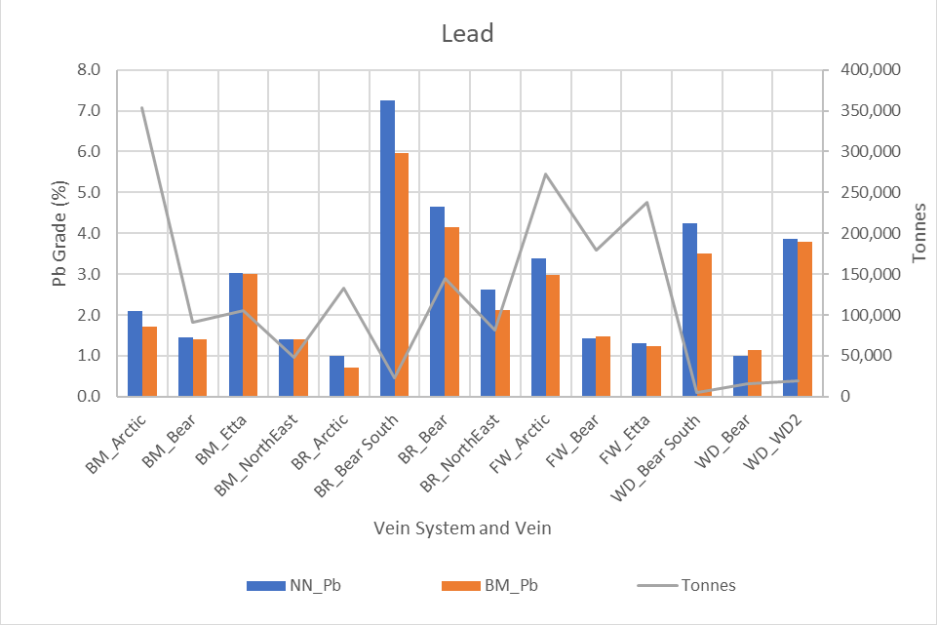
Source: SRK 2018

Figure 14-42 Comparison of Block Model Silver Grades to Nearest Neighbor Model



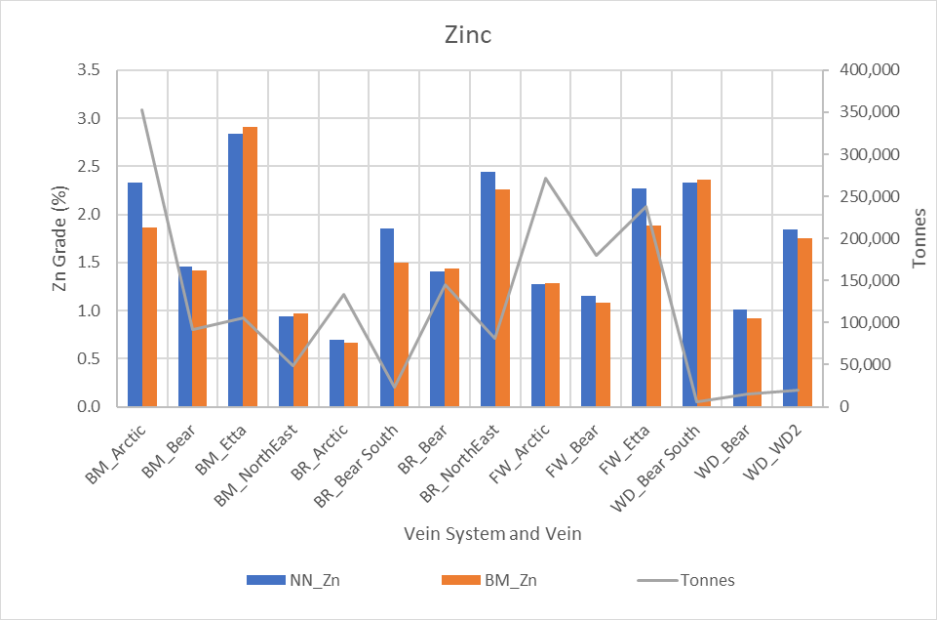
Source: SRK 2018

Figure 14-43 Comparison of Block Model Gold Grades to Nearest Neighbor Model



Source: SRK 2018

Figure 14-44 Comparison of Block Model Lead Grades to Nearest Neighbor Model



Source: SRK 2018

Figure 14-45 Comparison of Block Model Zinc Grades to Nearest Neighbor Model

Visual inspection of the estimated block grades relative to the assay composites through cross-sectional interrogation again showed general agreement. As noted above, block grades demonstrate a typical smoothing effect produced from the estimation process and sample selection criteria within the estimation algorithm. However, the block model adequately reflects the distribution of grades observed within the composited assay data.

14.11 MINERAL RESOURCE CLASSIFICATION

Mineral Resource classification is typically a subjective concept. Industry best practices suggest that resource classification should consider both the confidence in the geological continuity of the mineralized structures, the quality and quantity of exploration data supporting the estimates, and the geostatistical confidence in the tonnage and grade estimates. Appropriate classification criteria should aim at integrating these concepts to delineate regular areas at similar resource classification.

The QP is satisfied that the geological modelling honours the current geological information and knowledge. The location of the samples and the assay data are sufficiently reliable to support resource evaluation.

Generally, for mineralization exhibiting good geological continuity investigated at an adequate spacing with reliable sampling information accurately located, the QP considers that blocks estimated during the first estimation run considering full variogram ranges can be classified in the Indicated category within the meaning of the CIM definitions. For those blocks, the QP considers that the level of confidence is sufficient to allow appropriate application of technical and economic parameters to support mine planning and to allow evaluation of the economic viability of the deposit.

Conversely, blocks estimated during the second and third passes considering search neighbourhoods set larger than the variogram ranges should be appropriately classified in the Inferred category because the confidence in the estimate is insufficient to allow for the meaningful application of technical and economic parameters or to enable an evaluation of economic viability.

All Mineral Resource estimates presented in this updated technical report have been classified within the meaning of the CIM definitions by independent QPs as defined by NI 43-101.

The Mineral Resources were estimated in conformity with the generally accepted CIM *Estimation of Mineral Resources and Mineral Reserves Best Practices Guidelines* (CIM, 2003). Mineral Resources may be affected by further infill and exploration drilling that may result in increases or decreases in subsequent resource estimates. Mineral Resources may also be affected by subsequent assessments of mining, environmental, processing, permitting, taxation, socio-economic, and other factors.

14.11.1 MINERAL RESOURCE CLASSIFICATION FOR THE BELLEKENO MINE

Block model quantity estimates, grade estimates, and resource classification for the Bellekeno deposit were prepared by Alexco Resource Corp. Three factors that were considered to define the boundaries of Indicated and Inferred include the kriging variance (KVAR), distance to closest composite (DCC) and number of drillholes (NDDH). Blocks that reside within the vein but did not fall within the indicated or inferred polygon were coded as unclassified. Table 14-58 outlines the parameters chosen for the indicated, inferred, and unclassified zones.

Due to limited data within the East Vein, the Mineral Resource estimate has been classified entirely as inferred.

Table 14-58 Criteria used to Define Indicated and Inferred Mineral Resource Categories

	KVAR	NDDH	DCC
Indicated	< 0.50	>= 4	<= 50m
Inferred	< 0.85	>= 2	<= 100m
Unclassified	> 0.85	-	-

14.11.2 MINERAL RESOURCE CLASSIFICATION FOR THE LUCKY QUEEN MINE

Block model quantity estimates, grade estimates, and resource classification for the Lucky Queen deposit were prepared by F. H. Brown, CPG, PrSciNat, under the supervision of Dr. Gilles Arseneau, P.Geo; both independent QPs.

The QP considers that the quality of the exploration data (confidence in the location and reliability of assaying results) acquired by Alexco is good and, therefore, is not a factor that would impact resource classification. The confidence in the underlying data sets supports classification of Indicated and Inferred Mineral Resources. There is insufficient information to confirm both the geological and grade continuity with the current level of sampling to support a Measured Mineral Resource classification.

All blocks estimated in the first estimation run were classified as Indicated Mineral Resources and all blocks estimated using the second estimation run were classified as Inferred Mineral Resources.

14.11.3 MINERAL RESOURCE CLASSIFICATION FOR THE FLAME & MOTH DEPOSIT

Block model quantity estimates, grade estimates, and resource classification for the Flame & Moth deposit were prepared by Marek Nowak, P.Eng, of SRK who is an independent QP.

The confidence in the underlying datasets supports classification of Indicated and Inferred Mineral Resources within the meaning of the CIM definitions. There is insufficient information to confirm both the geological and grade continuity with the current level of sampling to support a Measured Mineral Resource classification within the meaning of the CIM Definition Standards.

Block classification was applied to the resource model based on a combination of average distances to composites from a local estimate, the number of drill holes contributing to the local estimate, and minimum number of samples used. Blocks were assigned to an Indicated category if they were estimated in step 1 of the estimation process from at least two drill holes, from the data with average distance to the estimated blocks less than 40 m and at least six samples. All other estimated block grades were assigned to an Inferred category.

14.11.4 MINERAL RESOURCE CLASSIFICATION FOR THE ONEK DEPOSIT

Block model quantity estimates, grade estimates, and resource classification for the Onek project were prepared by Dr. Gilles Arseneau P.Geo., who is an Independent QP.

The QP considers that the quality of the exploration data (confidence in the location and reliability of assaying results) acquired by Alexco is good and therefore is not a factor that would impact resource classification. The confidence in the underlying datasets supports classification of Indicated and Inferred Mineral Resources within the meaning of the

CIM definitions. There is insufficient information to confirm both the geological and grade continuity with the current level of sampling to support a Measured Mineral Resource classification within the meaning of the CIM definitions.

Blocks were classified as Indicated Mineral Resources if at least two drill holes and five composites were found within a 60 m by 30 m search ellipse. All other interpolated blocks were classified as Inferred Mineral Resource.

14.11.5 MINERAL RESOURCE CLASSIFICATION FOR THE BERMINGHAM DEPOSIT

Block model quantity estimates, grade estimates, and resource classification for the Bermingham deposit were prepared by Cliff Revering P.Eng., an Independent QP.

Mineral Resource classification is typically a subjective concept, industry best practices suggest that resource classification should consider both the confidence in the geological continuity of the mineralized structures, the quality and quantity of exploration data supporting the estimates and the geostatistical confidence in the tonnage and grade estimates. Appropriate classification criteria should aim at integrating both concepts to delineate regular areas at similar resource classification.

The QP is satisfied that the geological modelling honours the current geological information and knowledge. The location of the samples and the assay data are sufficiently reliable to support resource evaluation. The confidence in the underlying datasets supports the classification of Indicated and Inferred Mineral Resources within the meaning of the CIM definitions. There is insufficient information to confirm both the geological and grade continuity with the current level of sampling to support a Measured Mineral Resource classification within the meaning of the CIM definitions.

Blocks were classified as Indicated Mineral Resources provided that they were estimated within the first pass of the estimation algorithm for silver and met the CA$185/t dollar equivalent cut-off value criteria. All other interpolated blocks were classified as Inferred Mineral Resources provided that they met the same CA$185/t dollar equivalent cut-off value criteria.

14.12 MINERAL RESOURCE STATEMENTS

CIM (2014) defines a Mineral Resource as:

> *"A Mineral Resource is a concentration or occurrence of solid material of economic interest in or on the Earth's crust in such form, grade or quality and quantity that there are reasonable prospects for eventual economic extraction. The location, quantity, grade or quality, continuity and other geological characteristics of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge, including sampling."*

The "reasonable prospects for eventual economic extraction" requirement generally implies that the quantity and grade estimates meet certain economic thresholds and that the Mineral Resources are reported at an appropriate cut-off grade that takes into account extraction scenarios and processing recoveries.

The Mineral Resource for the Bellekeno deposit was updated in 2021, based on drill hole and chip data collected up to September 30, 2013, when the mine production ceased. Subsequent mining in 2020 resulted in additional mined out volumes to be removed from the Resource as of January 1, 2021. The assumptions applied in the updated 2021 model and are summarized in Table 14-59.

Table 14-59 Assumptions Considered for Preparing the Bellekeno Mineral Resource Statement

Parameter	Value	Unit
Silver price	22.09	US$ per oz
Lead price	0.92	US$ per lb
Zinc price	1.10	US$ per lb
Exchange rate	0.78	US$/CA$
NSR cut-off value	185	CA$ per tonne mined
Process recovery silver	96	%
Process recovery gold	72	%
Process recovery lead	97	%
Process recovery zinc	88	%

The Mineral Resources for the Lucky Queen, Flame & Moth, and Onek deposits were estimated in 2011, 2015, and 2011, respectively. The Lucky Queen, Flame & Moth, and Onek models were reviewed and updated by SRK in 2017. In the QP's opinion, the Mineral Resources for the three deposits satisfy the CIM definitions for Mineral Resources and Mineral Reserves. There has been no additional drilling or exploration work completed on the Lucky Queen, Flame & Moth, and Onek deposits since the previous Mineral Resource estimates. For this Study, the Mineral Resources for the three deposits were estimated and reported at a CA$185 NSR cut-off value using updated metal prices and are considered current to January 3, 2017. The block model quantities and grade estimates were assessed to identify the portions of the Lucky Queen, Flame & Moth, and Onek deposits having "reasonable prospects for eventual economic extraction" considering underground mining based on parameters summarized in Table 14-60.

Table 14-60 Assumptions Considered for Preparing the Lucky Queen, Flame & Moth, and Onek Mineral Resource Statement (SRK, 2013)

Parameter	Value	Unit
Silver price	20.00	US$ per oz
Gold price	1,300	US$ per oz
Lead price	0.95	US$ per lb
Zinc price	1.00	US$ per lb
Exchange rate	0.80	US$/CA$
NSR cut-off value	185	CA$ per tonne mined
Process recovery silver	96	%
Process recovery gold	72	%
Process recovery lead	97	%
Process recovery zinc	88	%

The Bermingham model was re-estimated in 2018 to include new drilling in 2017 and 2018. In the QP's opinion, the Mineral Resources for this deposit satisfy the 2014 CIM definitions for Mineral Resources and Mineral Reserves. The Mineral Resources for the Bermingham deposit were estimated and reported at a CA$185/t dollar equivalent cut-off value using updated metal prices and are considered current to September 26, 2018. The block model quantities and

grade estimates were assessed to identify the portions of the Bermingham deposit having "reasonable prospects for eventual economic extraction" considering underground mining based on parameters summarized in Table 14-61.

Table 14-61 Assumptions Considered for Preparing the Bermingham Mineral Resource Statement

Parameter	Value	Unit
Silver price	20.80	US$ per oz
Gold price	1,450	US$ per oz
Lead price	1.05	US$ per lb
Zinc price	1.20	US$ per lb
Exchange rate	0.80	US$/CA$
NSR cut-off value	185	CA$ per tonne mined
Process recovery silver	96	%
Process recovery gold	72	%
Process recovery lead	97	%
Process recovery zinc	88	%

14.12.1 MINERAL RESOURCE STATEMENT FOR THE BELLEKENO MINE

An update was done to the Bellekeno Mineral Resource by Alexco personnel in 2021. The commodity prices and metallurgical recoveries used in previous Mineral Resource Estimates for the Bellekeno mine were also used in this update (see Table 14-59). These metal prices and metallurgical recoveries were used to estimate values (CA$/t) for blocks in the resource block model. Mineral Resources for the Bellekeno deposit, updated for depletion from mining to January 1, 2021, are tabulated in Table 14-62 and have been reported relative to a cut-off value of CA$185.00/t.

It is the opinion of the QP that the Mineral Resource Estimate presented herein for the Bellekeno deposit meets the current (CIM, 2014) definition for Indicated and Inferred Mineral Resources.

Table 14-62 Mineral Resource Statement, Bellekeno Deposit. January 1, 2021

Vein	Class	Tonnes (t)	Ag (g/t)	Pb (%)	Zn (%)	Au (g/t)
Total	Indicated	213,000	620	5.53	5.52	n/a
	Inferred	302,000	359	2.46	5.43	n/a

Notes:
1. The Mineral Resource estimate has an effective date of January 1, 2021 and has been depleted to reflect all mine production from the Bellekeno mine to that date.
2. 2014 CIM definitions followed for Mineral Resources.
3. Reported at a cut-off value of CAD185.00/t considering metal prices of US$22.09/oz for Ag, US$0.92/lb for Pb, and US$1.10/lb for Zn; and recovery of 96% for Ag, 97% for Pb, and 88% for Zn.
4. All numbers have been rounded to reflect the relative accuracy of the estimates.
5. Mineral Resources are not Mineral Reserves and have not demonstrated economic viability.

14.12.2 MINERAL RESOURCE STATEMENT FOR THE LUCKY QUEEN MINE

The QP considers that the mineralization evaluated in the Lucky Queen deposit is amenable to underground extraction. Approximately 20% of the Lucky Queen vein as modelled by Alexco has a horizontal width of less than 1.20 m. In order to determine the quantities of material offering reasonable prospects for economic extraction from an underground mining operation, grades for blocks with a horizontal width of less than 1.20 m were adjusted (diluted) to a minimum thickness of 1.20 m assuming zero grade internal dilution.

Commodity prices were provided to SRK by Alexco as representative of its long-term strategic forecast. Metallurgical recoveries were from a previous PEA for the Bellekeno project at the Keno Hill Silver District (Wardrop, 2009) (see Table 14-62 above).

These metal prices and metallurgical recoveries were used to estimate values (CA$/t) for blocks in the resource block model.

Mineral Resources for the Lucky Queen deposit are shown in Table 14-63 and have been reported relative to a cut-off value of CA$185.00/t.

Table 14-63 Mineral Resource Statement, Lucky Queen Deposit, SRK Consulting (Canada) Inc., January 3, 2017

Vein	Class	Tonnes	Ag (g/t)	Pb (%)	Zn (%)	Au (g/t)
Main Lucky Queen	Indicated	132,300	1,167	2.43	1.63	0.16
Vein	Inferred	235,800	465	1.00	0.77	0.14
Splay	Inferred	22,100	564	1.51	1.10	0.04
Total	**Indicated**	**132,300**	**1,167**	**2.43**	**1.63**	**0.16**
	Inferred	**257,900**	**473**	**1.04**	**0.80**	**0.13**

Notes:
1. 2014 CIM definitions followed for Mineral Resources.
2. Reported at a cut-off value of CA$185.00/t considering US$/CA$ exchange of US$0.80=CA$1.00.
3. Metal prices of US$20.00/oz for Ag, US$0.95/lb for Pb, US$1.00/lb for Zn, and US$1,300/oz for Au; and recovery of 96% for Ag, 97% for Pb, 88% for Zn and 72% for Au.
4. All numbers have been rounded to reflect the relative accuracy of the estimates.
5. Mineral Resources are not Mineral Reserves and do not have demonstrated economic viability.

14.12.3 MINERAL RESOURCE STATEMENT FOR THE FLAME & MOTH DEPOSIT

Commodity prices were provided to SRK by Alexco as representative of a consensus long-term strategic forecast. Metallurgical recoveries were from a previous PEA for the Bellekeno project at the Keno Hill Silver District (Wardrop, 2009) (Table 14-62 above).

These metal prices and metallurgical recoveries were used to estimate values (CA$/t) for blocks in the resource block model.

Mineral Resources for the Flame & Moth deposit are shown in Table 14-64 and have been reported relative to a cut-off value of $185.00/t.

Table 14-64 Mineral Resource Statement, Flame & Moth Deposit, SRK Consulting (Canada) Inc., January 3, 2017

Zone	Class	Tonnes	Ag (g/t)	Pb (%)	Zn (%)	Au (g/t)
Christal	Indicated	571,900	530	2.33	3.65	0.50
	Inferred	70,600	207	0.91	2.38	0.22
Lightning	Indicated	997,900	489	1.63	6.34	0.40
	Inferred	292,600	392	0.37	4.69	0.27
Lightning V2	Indicated	109,200	406	1.31	4.80	0.23
	Inferred	2,000	367	0.87	5.50	0.27
Total	**Indicated**	**1,679,000**	**498**	**1.85**	**5.33**	**0.42**
	Inferred	**365,200**	**356**	**0.47**	**4.25**	**0.26**

Notes:
1. 2014 CIM definitions followed for Mineral Resources.
2. Reported at a cut-off value of CA$185.00/t considering US$/CA$ exchange of US$0.80=CA$1.00.
3. Metal prices of US$20.00/oz for Ag, US$0.95/lb for Pb, US$1.00/lb for Zn, and US$1,300/oz for Au; and recovery of 96% for Ag, 97% for Pb, 88% for Zn and 72% for Au.
4. All numbers have been rounded to reflect the relative accuracy of the estimates.
5. Mineral Resources are not Mineral Reserves and have not demonstrated economic viability.

14.12.4 MINERAL RESOURCE STATEMENT FOR THE ONEK DEPOSIT

The QP considers that the mineralization evaluated in the Onek deposit is amenable for underground extraction.

Commodity prices were provided to SRK by Alexco as representative of their long term strategic forecast. Economic parameters are summarized in Table 14-64 above.

Mineral Resources for the Onek deposit defined relative to a dollar equivalent cut-off of $185/tonne, using metallurgical recoveries as proposed in the recent PEA for the Bellekeno project at Keno Hill (Wardrop, 2009), are listed in Table 14-65 below.

Table 14-65 Mineral Resource Statement, Onek Deposit, SRK Consulting (Canada) Inc., January 3, 2017

Zone	Class	Tonnes	Ag	Pb	Zn	Au
			g/t	%	%	g/t
Vein 1	Indicated	614,200	175	1.03	12.66	0.63
	Inferred	234,500	114	0.98	8.94	0.45
Vein 1 FW	Indicated	8,800	325	5.10	3.71	0.57
	Inferred	5,500	141	4.86	4.20	0.44
Vein 2	Indicated	77,100	302	2.42	6.31	0.45
	Inferred	45,100	136	1.63	5.27	0.27
Total	**Indicated**	**700,200**	**191**	**1.24**	**11.85**	**0.60**
	Inferred	**285,100**	**118**	**1.15**	**8.26**	**0.42**

Notes:
1. 2014 CIM definitions followed for Mineral Resources.
2. Reported at a cut-off value of CA$185.00/t considering US$/CA$ exchange of US$0.80=CA$1.00.
3. Metal prices of US$20.00/oz for Ag, US$0.95/lb for Pb, US$1.00/lb for Zn, and US$1,300/oz for Au; and recovery of 96% for Ag, 97% for Pb, 88% for Zn and 72% for Au.
4. All numbers have been rounded to reflect the relative accuracy of the estimates.
5. Mineral Resources are not Mineral Reserves and do not have demonstrated economic viability.

14.12.5 MINERAL RESOURCE STATEMENT FOR THE BERMINGHAM DEPOSIT

The QP considers that the mineralization evaluated in the Bermingham deposit is amenable for underground extraction.

Commodity prices were provided to SRK by Alexco as representative of their long-term strategic forecast. Economic parameters are summarized in Table 14-66.

Mineral Resources for the Bermingham deposit defined relative to a dollar equivalent cut-off of $185/t, using metallurgical recoveries as proposed in the PEA for the Bellekeno project at Keno Hill (Wardrop, 2009) are listed in Table 14-66 below.

Table 14-66 Mineral Resource Statement, Bermingham Deposit, SRK Consulting (Canada) Inc. March 28, 2019

Zone	Class	Vein	Tonnes	Silver (g/t)	Gold (g/t)	Lead (%)	Zinc (%)
Arctic	Indicated	Bermingham Main	267,900	750	0.14	1.7	1.7
		Bear	74,100	550	0.07	0.9	0.8
		Footwall	203,250	1,000	0.17	3.2	1.4
Bear	Indicated	Bermingham Main	42,950	1,100	0.24	1.8	1.9
		Bear	93,000	2,020	0.21	5.1	1.8
		Bear South	16,700	2,310	0.35	7.7	1.7
		Footwall	137,950	770	0.14	1.7	1.3
Etta	Indicated	Bermingham Main	98,150	760	0.09	3.1	3.0
		Footwall	91,800	640	0.08	1.5	1.7
North East	Indicated	Bermingham Main	24,700	330	0.10	1.6	1.0
		Bear	36,300	1,120	0.19	2.4	3.0
West Dipper	Indicated	Bear	11,800	770	0.11	1.2	1.0
		Bear South	3,700	2,090	0.30	3.0	2.5
TOTAL INDICATED			**1,102,300**	**930**	**0.14**	**2.4**	**1.7**

Zone	Class	Vein	Tonnes	Silver (g/t)	Gold (g/t)	Lead (%)	Zinc (%)
Arctic	Inferred	Bermingham Main	82,100	740	0.25	1.8	2.3
		Bear	25,750	480	0.06	0.9	0.6
		Footwall	68,100	860	0.24	2.4	0.9
Bear	Inferred	Bermingham Main	26,900	560	0.22	1.3	1.5
		Bear	48,500	1,470	0.16	2.6	0.8
		Bear South	6,100	1,590	0.24	1.1	1.0
		Footwall	19,700	390	0.09	1.2	0.6
Etta	Inferred	Bermingham Main	7,000	520	0.09	2.0	2.0
		Footwall	138,500	480	0.07	1.1	2.1
North East	Inferred	Bermingham Main	18,200	250	0.12	1.3	1.0
		Bear	43,400	730	0.12	2.0	1.7
West Dipper	Inferred	Bear	3,650	680	0.08	0.9	0.6
		Bear South	1,900	2,240	0.33	4.5	2.1
		WD2	19,600	850	0.12	3.8	1.8
TOTAL INFERRED			**509,400**	**717**	**0.15**	**1.7**	**1.5**

Notes:

1. 2014 CIM definitions followed for Mineral Resources.
2. Reported at a cut-off value of CA$185.00/t considering US$/CA$ exchange of US$0.80=CA$1.00.
3. Metal prices of US$20.80/oz for Ag, US$1.05/lb for Pb, US$1.20/lb for Zn, and US$1,450/oz for Au; and recovery of 96% for Ag, 97% for Pb, 88% for Zn and 72% for Au.
4. All numbers have been rounded to reflect the relative accuracy of the estimates, numbers may differ slightly due to rounding.
5. Mineral Resources are not Mineral Reserves and do not have demonstrated economic viability.

14.13 PREVIOUS MINERAL RESOURCE ESTIMATES

14.13.1 BELLEKENO PREVIOUS RESOURCE ESTIMATES

In its initial exploration efforts on the KHSD, Alexco targeted the historical resources documented at the Bellekeno deposit by validating and confirming the existence of the polymetallic silver mineralization. The QP, in conjunction with Alexco, produced an initial Mineral Resource Statement for the Bellekeno deposit on November 10, 2007, which was subsequently updated on January 28, 2008. During 2008, Alexco constructed a new 633-metre decline designed to access the historical Bellekeno workings. This allowed for tight-spaced underground core drilling and updated geologic mapping within all three Bellekeno resource zones (Southwest, 99, and East) during 2009, which was incorporated into a Mineral Resource Statement dated November 9, 2009 (Wardrop, 2009). In 2012, GeoStrat updated the Bellekeno Mineral Resource estimate as summarized in Table 14-67. In 2013, GeoStrat updated the Resource Estimate to remove additional material collected up to September 30, 2013, but no new assay data was added to the Resource.

Table 14-67 Consolidated Mineral Resource Statement for the Bellekeno Deposit, GeoStrat Consulting Services Inc. September 30, 2013

Vein	Class	Tonnes (t)	Ag (g/t)	Pb (%)	Zn (%)	Au (g/t)
Total	Indicated	262,000	585	3.5	5.3	n/a
	Inferred	243,000	428	4.1	5.1	n/a

Notes:
1. The Mineral Resource estimate is based on a geologic resource estimate having an effective date of September 30, 2012. The indicated Mineral Resources are as at September 30, 2013 and reflect the geologic resource less estimated subsequent depletion from mine production.
2. 2014 CIM definitions followed for Mineral Resources.
3. Reported at a cut-off value of CAD185.00/t considering metal prices of US$22.50/oz for Ag, US$0.85/lb for Pb, and US$0.95/lb for Zn; and recovery of 96% for Ag, 97% for Pb, and 88% for Zn.
4. All numbers have been rounded to reflect the relative accuracy of the estimates.
5. Mineral Resources are not Mineral Reserves and have not demonstrated economic viability.

14.13.2 FLAME & MOTH PREVIOUS RESOURCE ESTIMATES

A previous Mineral Resource Statement was produced by Alexco in 2013. The results were detailed in the Updated Technical Report on the Flame & Moth Deposit (Alexco, 2013), and are summarized in Table 14-68.

Table 14-68 Mineral Resource Statement for the Flame & Moth Deposit, April 28, 2015

Class	Tonnes	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)
Indicated	1,638,000	506	0.4	1.9	5.4
Inferred	348,000	366	0.3	0.5	4.4

Notes:
1. Mineral Resources are not Mineral Reserves and do not have demonstrated economic viability.
2. All figures have been rounded to reflect the relative accuracy of the estimates.
3. Reported at an NSR cut-off of $185 (US$0.96 = CA$1.00)/tonne using consensus long term metal prices (US$) and recoveries developed for the nearby Bellekeno deposit (Ag US$20.00/oz, recovery 96%; Pb US$0.94/lb, recovery 97%; Zn US$1.00/lb, recovery 88%; Au US$1,300/oz, recovery 72%). For all veins, Ag grades capped at 3,000 g/t; Pb and Zn capped at 15% and 20% respectively; Au grades not capped.

14.13.3 ONEK PREVIOUS RESOURCE ESTIMATES

A previous Mineral Resource Statement was produced by SRK in 2011. The results were detailed in the previous technical report (SRK, 2011b) and are summarized in Table 14-69.

Table 14-69 Mineral Resource Statement for the Onek Deposit, SRK Consulting (Canada) Inc., October 15, 2014

Class	Tonnes	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)
Indicated	654,000	200	0.6	1.3	12.3
Inferred	234,000	134	0.4	1.2	8.9

Notes:
1. Mineral Resources are not Mineral Reserves and do not have demonstrated economic viability.
2. All figures have been rounded to reflect the relative accuracy of the estimates.
3. Reported at an NSR cut-off of $185 considering metal prices of US$20.00/oz for Ag, US$0.90.lb for Pb, US$0.95/lb for Zn, and US$1,250/oz Au; and recovery of 96% for Ag; 97% for Pb; 88% for Zn; 72% for Au.

14.13.4 BERMINGHAM PREVIOUS RESOURCE ESTIMATES

A previous Mineral Resource Statement was produced by SRK with an effective date of January 3, 2017 and is summarized in Table 14-70.

Table 14-70 Mineral Resource Statement for the Bermingham Deposit, SRK Consulting (Canada) Inc., January 3, 2017

Class	Tonnes	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)
Indicated	858,000	628	0.13	2.40	1.65
Inferred	221,000	770	0.15	2.13	2.21

Notes:
1. Mineral Resources are not Mineral Reserves and do not have demonstrated economic viability.
2. All figures have been rounded to reflect the relative accuracy of the estimates.
3. Reported at a value per tonne cut-off of $185 (US$0.80 = CA$1.00) using consensus long term metal prices (US$) and recoveries developed for the nearby Bellekeno deposit (Ag US$20.00/oz, recovery 96%; Pb US$0.95/lb, recovery 97%; Zn US$1.00/lb, recovery 88%; Au US$1,300/oz, recovery 72%).

15. MINERAL RESERVE ESTIMATE

This section describes the methodology and parameters used to estimate the Mineral Reserves for the KHSD. The estimate is effective as at April 1, 2021 and considers all information used in the Mineral Resources estimate presented in Section 14 of this Technical Report.

The Probable Mineral Reserves are those Indicated Mineral Resources (there are no Measured Resources in the current estimate) that have been identified as being economically extractable and which incorporate mining losses and the addition of mining dilution. The Probable Mineral Reserves form the basis for the mine plan presented in Section 16.0. The Mineral Resource is inclusive of the Probable Mineral Reserve.

Mineral Reserves are those parts of Mineral Resources, which, after the application of all mining factors, result in an estimated tonnage and grade that is the basis of an economically viable project. Mineral Reserves are inclusive of diluting material that will be mined in conjunction with the economic mineralized rock and delivered to the treatment plant or equivalent facility. The term "Mineral Reserve" need not necessarily signify that extraction facilities are in place or operative, or that all governmental approvals have been received. It does signify that there are reasonable expectations of such approvals.

The reserve classifications used in this report conform to the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Definition Standards. Mineral Reserves are sub-divided in increasing confidence into Probable and Proven Mineral Reserves. They are described below:

- A Probable Mineral Reserve is the economically mineable part of an Indicated, and in some circumstances, a Measured Mineral Resource. The confidence in the Modifying Factors applying to a Probable Mineral Reserve is lower than that applying to a Proven Mineral Reserve. Probable Mineral Reserve estimates must be demonstrated to be economic, at the time of reporting, by at least a Pre-Feasibility Study; and
- A Proven Mineral Reserve is the economically mineable part of a Measured Mineral Resource. A Proven Mineral Reserve implies a high degree of confidence in the Modifying Factors. Proven Mineral Reserve estimates must be demonstrated to be economic, at the time of reporting, by at least a Pre-Feasibility Study (CIM, 2014)

15.1 MINERAL RESERVE BLOCK MODEL PREPARATION

The Probable Mineral Reserve estimate is based on the Indicated Mineral Resource block models provided by Alexco Resource Corp. for the Bellekeno, Flame & Moth, Lucky Queen, and Bermingham deposits.

The files were provided in different formats. Comma Separated Value (.csv), Vulcan and Datamine formats and were imported and validated in Deswik CAD to ensure the validity and integrity of the model, and the transfer process.

All models have similar attributed fields and properties. These models required a sub-celling process to be conducted and the addition of an NSR field in order to be utilized for mine planning. According to CIM standards, material classified as inferred may not be used to create a Reserve. All blocks classified as inferred were assigned zero grades. No other modifications were made.

The following mine planning block models were created:

- FM_20210126_NSRUPDATED_IND.dm;

- LQBM_20210127_NSRUPDATE_CLASS0_UPD_.dm; and
- BRMBM_20210122_NSRUPDATE.dm.

15.2 CUTOFF GRADE AND NSR CALCULATION

Mineral Reserves and revenue attributable to the Project were calculated by coding a Net Smelter Return (NSR) to the block model. NSR takes into account the multiple by-products available as well as the sliding streaming agreement with Wheaton Precious Metals (previously Silver Wheaton). The parameters used to calculate the NSR are available in Tables 16-7 and 16-8 under Net Smelter Return.

15.3 MINERAL RESERVE ESTIMATE

Mineable shapes were created that meet the planning cut off value using the NSR values coded into the block model. The results were used as guidance to generate detailed development layouts and crosscut designs. The economic viability of all stope blocks and levels were tested to ensure that all ore are economically viable.

The Mineral Reserves (Table 15-1) reflect the total Mineral Reserves for the Keno Hill Silver District. External dilution and mineable recovery has been applied to the Mineral Reserves. These Probable Mineral Reserves are included in the Mineral Resources shown in Table 14-1. Please note that rounding of tonnes, average grades, and contained metal may result in apparent discrepancies with totals rounded.

Table 15-1 Mineral Reserves, Alexco Resource Corp. – Keno Hill Silver District Project

Deposit[3]	Category	Tonnes	Ag (g/t)	Pb (%)	Zn (%)	Au (g/t)	Contained Metal			
							Ag (000 oz)	Au (000 oz)	Pb (MIbs)	Zn (MIbs)
Bellekeno	Proven	-	-	-	-	-				
	Probable	12,809	936	13.00	7.30	0	385	0	4	2
Bellekeno Surface Stockpile	Proven									
	Probable	3,397	1150	21.70	4.50	0	126	0	2	0
Lucky Queen	Proven	-	-	-	-	-	-		-	-
	Probable	70,648	1,269	2.71	1.56	0.13	2,883	0	4	2
Flame and Moth	Proven	-	-	-	-	-	-		-	-
	Probable	721,322	672	2.69	6.21	0.49	15,590	11	43	99
Bermingham	Proven	-	-	-	-	-	-		-	-
	Probable	630,173	899	2.26	1.30	0.13	18,209	3	31	18
Total	Proven	-	-	-	-	-	-		-	-
	Probable	1,438,349	804	2.64	3.84	0.31	37,193	14	84	122

Notes:
1. Probable Mineral Reserves are reported herein based on an NSR cutoff value using estimated metallurgical recoveries, assumed metal prices and smelter terms, which include payable factors, treatment charges, penalties, and refining charges
2. Tonnage and grade measurements are in metric units. Contained gold and silver ounces are reported as troy ounce
3. The Bellekeno, Lucky Queen, Flame & Moth and Bermingham deposits are incorporated into the current mine plan supported by disclosure in the news release dated May 26, 2021"Alexco Announces 22% Increase to Silver Reserves; Updated Technical Report Demonstrates Robust Economics at Keno Hill".
4. Rounding as required by reporting guidelines may result in apparent summation differences between tonnes, grade and contained metal content

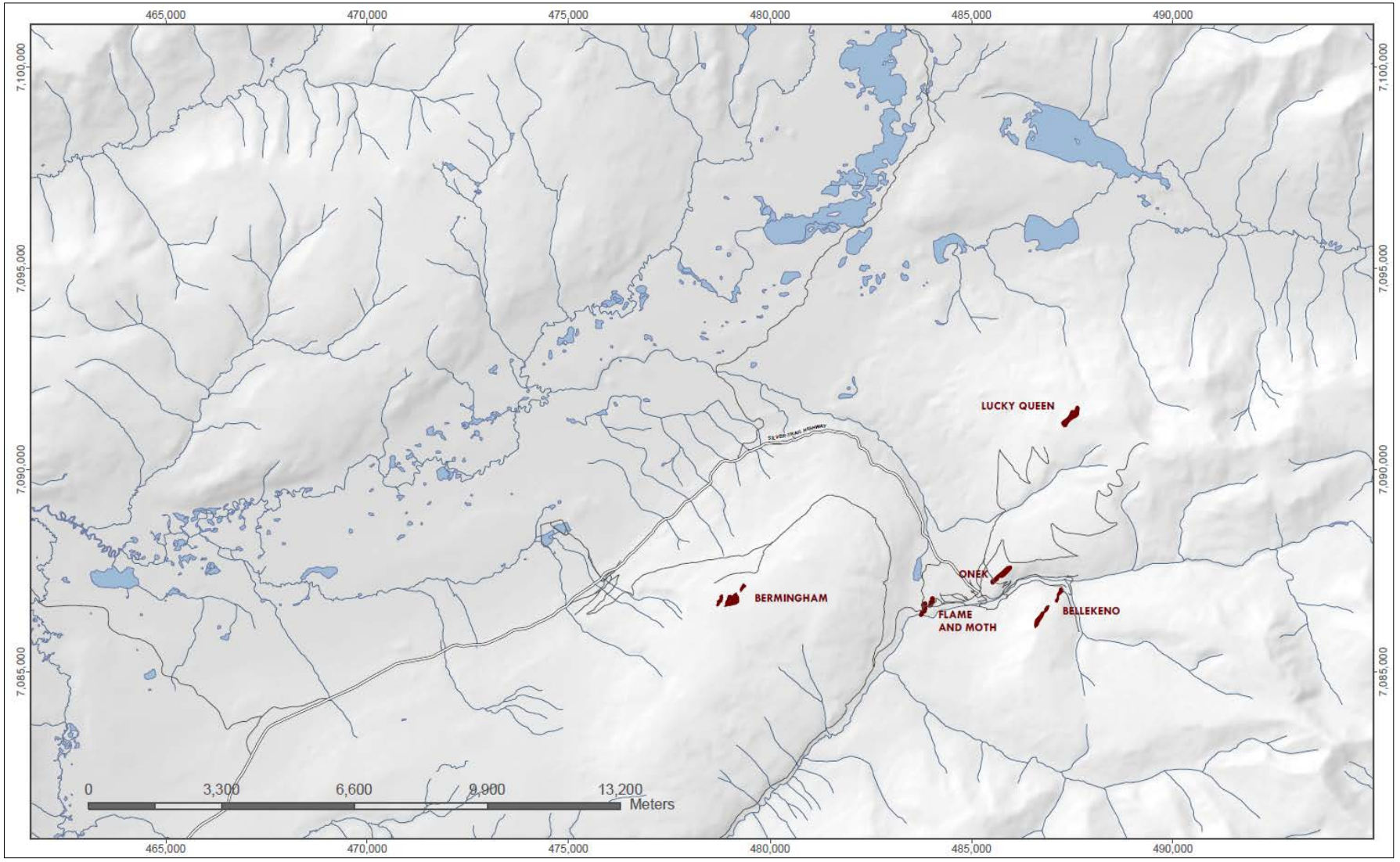
The Mineral Reserves identified in Table 15-1 comply with CIM definitions and standards for a NI 43-101 technical report. Detailed information on mining, processing and other relevant factors are contained in the following sections and combined demonstrate that the Keno Hill Silver District Project is an economically viable project.

16. MINING METHODS

16.1 INTRODUCTION

The Keno Hill Silver District (KHSD) project contains four separate deposits: Bellekeno, Bermingham, Flame & Moth, and Lucky Queen. All are characterized by high-grades, narrow vein widths, and challenging ground conditions. Historical mining methods used in the KHSD have included cut and fill, small scale longhole stoping, shrinkage stoping, and square set stoping.

This technical report proposes that all four deposits will be mined by mechanized underground mining methods of cut and fill (MCF) and longhole open stoping (LHOS) with both methods utilizing cemented rock fill and unconsolidated rock fill as required. The location of all four deposits is shown in Figure 16-1; the mill, administration, and shop complexes are located near the Flame & Moth Deposit.



Source: Alexco 2020

Figure 16-1 Deposit Location

16.2 GEOTECHNICAL ANALYSIS

The KHSD Project is composed of four silver / lead / zinc narrow-vein hosted deposits located throughout the district; Bellekeno Deposit (BK); Lucky Queen Deposit (LQ); Flame & Moth Deposit (FM); and Bermingham Deposit (BM). It is noted that the Flame & Moth and Bermingham deposits are comprised of several zones. All deposits will be extracted using overhand mechanized cut and fill (MCF) and longhole open stoping (LHOS) underground mining methods with cemented rock fill (CRF) and unconsolidated rock fill (URF) backfill types. Extraction will be bottom up within panels however, temporary sills will be utilized to allow extraction to proceed as ore is accessed via the decline.

Production mining has previously been undertaken at the Bellekeno deposit by Alexco. However, the Bermingham and Flame & Moth deposits are 'greenfield', with decline development being completed at both deposits to enable underground resource definition and geotechnical drilling to be undertaken. Numerous geotechnical studies have been carried out on the KHSD most recently by Jacobs Engineering (Jacobs, 2019).

16.2.1 GEOTECHNICAL DATABASE

Geotechnical data for this study was only available for the Flame & Moth and Bermingham deposits. Based on discussions with Alexco personnel and advice from independent geotechnical experts, it is reasonable to assume that ground conditions previously encountered at the Lucky Queen and Bellekeno deposits will be comparable with those expected at the Bermingham and Flame & Moth deposits based on this geotechnical study. Therefore, operational experience gained during previous production mining at the Bellekeno deposit has been used to guide (but not directly influence) the development of geotechnical mine design parameters for this report. Prior to the execution stage, the geotechnical conditions of the Lucky Queen and Bellekeno will need to be verified.

16.2.2 GEOTECHNICAL DOMAINS

To understand the ground conditions at the KHSD Project, geotechnical domains were created for the Bermingham and Flame & Moth deposits. Preliminary geotechnical parameters were assessed using major lithology types as identified by Alexco geology personnel. The geotechnical domains are outlined below on which ground support designs have been based:

- Domain 1: Quartzite (waste development);
- Domain 2: Schist (waste development);
- Domain 3: Faults (waste and production development); and
- Domain 4: Mineralization (production development).

16.2.3 MINING METHODS AND LOCATIONS

While production mining at KHSD project will predominantly use MCF mining method, several zones of the Bermingham and Flame & Moth deposits will be extracted using LHOS. In these areas, all available geotechnical drill hole data proximal to the planned stope hanging wall was used for stability analysis. Within the MCF mining method production areas, there will also be short uphole stopes used to extract the temporary sill during retreat. The primary LHOS zones include the following:

- Bermingham Deposit planned LHOS zones:
  - NE Zone; and
  - Arctic Zone (Lower).

- Flame & Moth Deposit planned LHOS zones:
  - Christal Zone (Lower); and
  - Lightning Zone (West).

Figure 16-2 and Figure 16-3 show the Flame & Moth and Bermingham mines with the associated zones and mining methods.

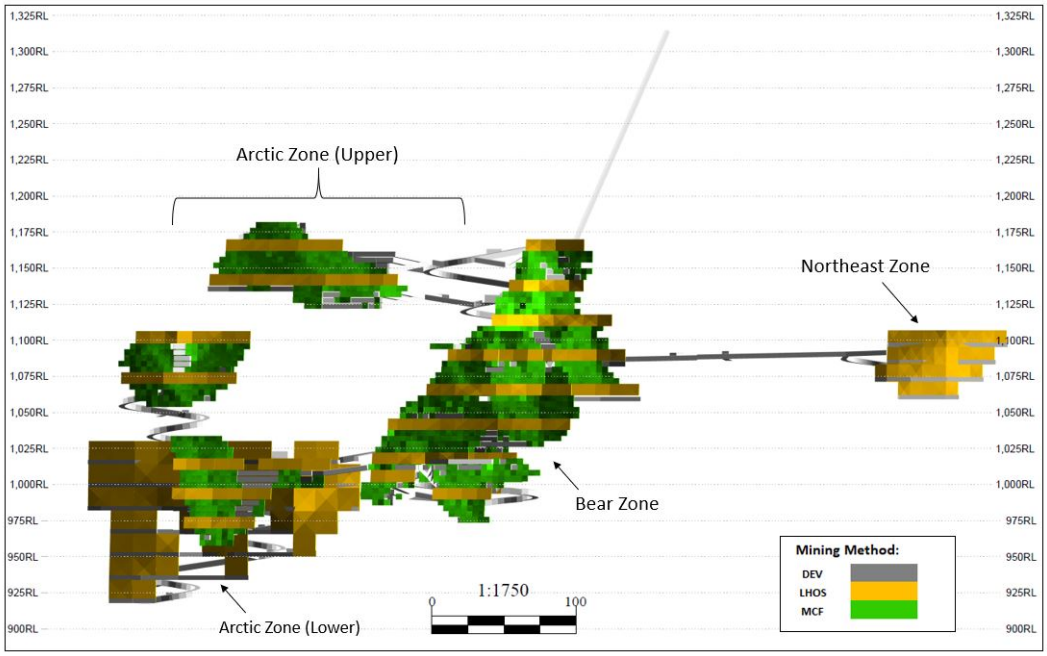


Figure 16-2 Bermingham Zone and Mining Method Domains (Looking NW)

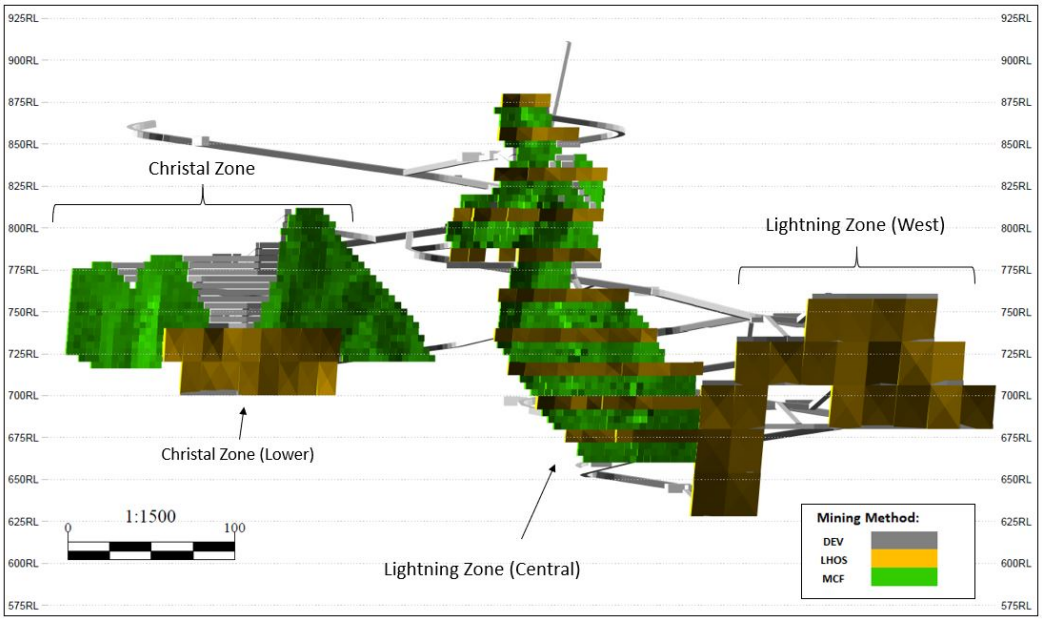


Figure 16-3 Flame & Moth Mine Zone and Mining Method Domains (Looking SW)

16.2.4 GROUND WATER

The Bellekeno, Lucky Queen, and Bermingham mining zones are located above the valley floor. Consequently, this tends to limit the occurrence and effect of adverse hydrogeological conditions. However, the Flame & Moth deposit is located in a valley floor such that there is a possibility of higher water inflow to the planned workings. Preliminary investigations suggest that ground water may be structurally compartmentalized in the deposit-scale Mill Fault.

16.2.5 ROCK QUALITY DESIGNATION (RQD)

A first pass assessment of the rock mass in geotechnical domains was completed by considering the Rock Quality Designation (RQD) (after Deere, 1964). RQD is a fundamental input into several rock mass characterization schemes, and is generally regarded as a reliable, basic indicator of ground conditions. The RQD is calculated as the ratio of the sum of the lengths of all core sticks greater than 4 inches / 10 cm in length, to the total length of the drill core run, expressed as a percentage.

A summary of RQD values for the Bermingham and Flame & Moth deposits and geotechnical domains are presented in Table 16-1. The descriptive statistics for each domain are described as 'Poor', except for the Fault domain of the Bermingham deposit ('Very Poor') and the Mineralization Domain of the Flame & Moth deposit ('Fair').

Table 16-1 Summary of RQD Values for Flame & Moth and Bermingham deposits by Geotechnical Domain

Deposit	Descriptive Statistics	Domain 1	Domain 2	Domain 3	Domain 4
Flame & Moth	Mean	49%	43%	27%	51%
	Median	49%	42%	24%	57%
	Std. Deviation	25%	25%	22%	26%
	Coefficient of Variation	51%	58%	80%	51%
Bermingham	Mean	36%	30%	22%	35%
	Median	33%	25%	17%	34%
	Std. Deviation	25%	23%	21%	22%
	Coefficient of Variation	69%	79%	94%	64%

It should be noted that over 90% of bore holes in the geotechnical database were developed using conventional, double tube drilling equipment. This approach can often lead to excessive disturbance of core ('mechanical' or handling breaks) which can be difficult to distinguish from naturally occurring joints when logging RQD. This can typically result in artificially low RQD values. Based on review of in-situ rock mass exposed in underground excavations, an under representation of RQD values in double-tube core drilling is likely to be the case at the KHSD Project. As such, the summary values in Table 16-1 may be 'worst case', however it is problematic to estimate likely upper bound values with confidence. Prior to execution, it is recommended that all geotechnical holes are drilled with the triple-tube system.

16.2.6 NGI Q VALUES

Rock mass classification was conducted using the Norwegian Geotechnical Institute's tunneling quality index (the Q-system), as proposed by Barton et al. (1974), where Q is obtained from the following relationship: RQD (as described above), Joint Set Number (Jn), Joint roughness (Jr), Joint Alteration (Ja), Joint Water Factor (Jw), and the Stress Reduction Factor (SRF):

$$Q = \frac{RQD}{J_n} \cdot \frac{J_r}{J_a} \cdot \frac{J_w}{SRF} \quad (1)$$

Q values have been estimated using the methods outlined by Barton and Grimstad (1994), whereby:

- Use representative Q input values for each geotechnical domain; and
- Where logged recorded RQD values are ≤ 10% (including 0%), use a nominal value of 10% to evaluate Q.

To better understand the statistical variability and character within each data set, basic descriptive statistics and histograms were generated for each input value, within each geotechnical domain for the Bermingham and Flame & Moth deposits. This information was used to identify representative values for each Q input values. In the case of Jw and SRF, site experience, assumed far-field stress conditions, and typical depth of mining were applied, along with engineering judgment to derive input values. The Q estimates for the Bermingham and Flame & Moth deposits and geotechnical domains are presented in Table 16-2. The general summary of rock mass for Keno Hill outlined in Table 16-3.

Table 16-2 Summary of NGI Q Values for Flame & Moth and Bermingham Deposits by Geotechnical Domain

Deposit		Domain 1	Domain 2	Domain 3	Domain 4
Flame & Moth	Min.	0.3	0.2	0.2	0.7
	Average	2.7	1.1	0.9	3.3
	Max	40	21.1	18.5	48.0
Bermingham	Min.	0.6	0.2	0.2	0.4
	Average	7	1.3	0.7	2.3
	Max	36	10.6	4.0	27.0

Table 16-3 General Summary of Rock Mass for Keno Hill

Rock Mass Quality	Domain	GSI			Q Value
		Structure	Surface	Value	
Fair to Good	Domain 1 - Quartzite	Block Very Blocky	Rough Smooth	45 - 60	2.0 - 6.0
Poor to Fair	Domain 2 - Schist	Very Blocky Seamy	Smooth Weathered	30 - 45	0.3 - 2.0
Poor to Fair	Domain 3 - Mineralization	Very Blocky Seamy	Smooth Weathered	30 - 45	0.3 - 2.0
Extremely Poor to Poor	Domain 4 - Faults	Disintegrated Foliated	Slickensided	20 - 30	0.05 - 0.3

16.2.7 EMPIRICAL GROUND SUPPORT DESIGN

Preliminary ground support requirements have been estimated using the updated rock reinforcement design chart (after Grimstad and Barton, 1993). The Q-System rock reinforcement design chart relates anticipated rock quality, excavation span, and service life to support requirements. The method converts the width (span) of the excavation to an equivalent dimension (De), which considers the function of the excavation.

Equivalent Dimension (De);

$$De = \frac{Span}{ESR} \quad (2)$$

Where;

- ESR = Excavation Support Ratio

For Flame & Moth and Bermingham mine, two broad categories of excavation are supported: a) Long term infrastructure, such as the main ramps, for which the ESR values is 1.6, and b) short term mining excavations for which the ESR value is 3.

Based on the estimated rock mass classification Q values (Table 16-4) ground support classes have been developed for the costing model based on standard lateral development and production drifts for the Flame & Moth and Bermingham deposits. A ground control management plan has been developed for each mine that governs the ground support methodology. For the recommended support designs to work as a system, it is good practice to install rock bolts through surface support, such as mesh and shotcrete (where recommended by the ground support design). It is expected that final ground support design may require modification to reflect actual ground conditions upon development.

Mining of the Lucky Queen and Bellekeno deposits is expected to exploit existing underground development. Therefore, it is suggested that previously used ground support or those outlined for the Flame & Moth and Bermingham deposits (whichever provides greater capacity) be used in the limited additional development that is planned. Note - remediation of existing excavations in the Lucky Queen and Bellekeno deposits is beyond the scope of this study and requires separate and detailed geotechnical assessment.

To confirm and refine assumptions applied in these preliminary ground support designs, it is recommended that geotechnical mapping and assessment of Q values, geotechnical discontinuity sets, and monitoring and assessing excavation performance should commence once development begins.

16.2.8 STOPE STABILITY ANALYSIS – EMPIRICAL ASSESSMENT

As previously outlined, LHOS is only planned for specific locations: Arctic Zone (Lower) and NE Zone of the BM deposit, and Christal Zone (Lower) and Lightning Zone (West) of the FM deposit. In these areas, all available geotechnical drill hole data located within 20 m of the planned stope hanging walls was used for stope stability analysis (refer to Table 16-4 and Table 16-5).

Modified Stability Graph Method (after Mathews et al., 1981; Potvin, 1988; and Mawdesley and Trueman, 2003), as described in Hutchinson and Diederichs (1996). This empirical approach is widely used throughout the North American and Australian mining industries to obtain first pass estimates of possible stope spans in mining studies where no or little prior stoping experience is available under local conditions. It should be noted that the method is approximate only, and early stoping should be carefully monitored and designs adjusted in response to actual performance. It should also be noted that the presence of faults in stope walls is not considered when assessing stope stability and can adversely and significantly affect these results.

In the Modified Stability Graph Method, the stability number N' is calculated from the following expression, using the modified Tunneling Quality Index (Q') (after Barton eta al., 1974); rock stress factor (A); joint orientation adjustment factor (B), and the gravity adjustment factor (C):

$$N' = Q'.A.B.C \quad (3)$$

N' values have been plotted against the hydraulic radius (HR) of the stope face being assessed. The HR is calculated by dividing the area of a stope face by the perimeter of that face. Analyses considered the maximum stable HR value for stope hanging walls, as permitted by the N' values. The stope stability analysis followed a design criterion whereby data points plotted either within the 'stable' zone or on the 'stable' / 'transition' divide. Initial recommended stope design parameters for the Flame & Moth and Bermingham deposits are presented in Table 16-4 and Table 16-5, respectively. Based on discussion with Alexco personnel, similar LHOS stope design parameters have been successfully achieved at the Bellekeno deposit under operational conditions.

Given the sensitivity to dilution, refinement to the stope shapes will be performed during operations with the intent to maximize ore recovery.

Table 16-4 Stope Design Parameters-Flame & Moth Deposit

Deposit	Design	Anticipated Q' Ratings	Standard Long Hole				Short Uphole Retreat			
			Height (m)	Length (m)	HR	Width (m)	Height (m)	Length (m)	HR	Width (m)
Flame & Moth	Christal Zone	2.9	24	12	4.2	4	12	10	2.7	3.5
	Lightning Zone	7.5	30	20	6.3		12	10	2.7	

Table 16-5 Stope Design Parameters-Bermingham Deposit

Deposit	Design	Anticipated Q' Ratings	Standard Long Hole				Short Uphole Retreat			
			Height (m)	Length (m)	HR	Width (m)	Height (m)	Length (m)	HR	Width (m)
Bermingham	Arctic Zone	2.8	20	16	4.5	4	12	10	2.7	3.5
	NE Zone	2.1	16	8	2.7		12	10	2.7	

16.2.9 STOPE OVER-BREAK

An assessment of stope over-break in zones where LHOS is planned has been estimated by reviewing the Equivalent Linear Over-break / Slough (ELOS) number, as first described by Pakalnis et al. (1996). The assessment suggests that HR and N' value of stope hanging walls plot in the 'minor sloughing' to 'moderate sloughing' zones. Based on industry experience (see Oddie and Pascoe, 2005), over-break on walls and backs of around <0.5 m should be expected. As with stope stability analysis, the presence of faults is not considered when estimating ELOS which can adversely and significantly affect these results. Results of 2D numerical simulations (discussed later) of hanging wall stability (discussed below) broadly support this factor.

16.2.10 STOPE STABILITY ANALYSIS – NUMERICAL ASSESSMENT

An assessment of stope over-break in zones where LHOS is planned has been estimated by reviewing the Equivalent Linear Over-break / Slough (ELOS) number, as first described by Pakalnis et al. (1996). The assessment suggests that HR and N' value of stope hanging walls plot in the 'minor sloughing' to 'moderate sloughing' zones. Empirical evidence (Oddie and Pascoe, 2005; Clark, L. and Pakalnis, R. (1997); and Capes and Milne, (2008), over-break per wall of <0.5 m should be expected based on the design Hydraulic Radius and anticipated rock mass conditions. The mine is to ensure that during operations that the targeted external dilution is being achieved, and make required modifications to stope sizes to minimize dilution. As with stope stability analysis, the presence of faults is not considered when estimating ELOS which can adversely and significantly affect these results.

Caution has been advised when applying the Modified Stability Graph Method empirical design chart to narrow vein orebodies (Suorineni, 2012). This is due to various factors, including the limited number of narrow-vein case histories used to generate the empirical design chart. Consequently, high level 2D numerical assessments have been used to review results derived from the empirical approach. Unlike empirical approaches, numerical methods do not rely on a database of case studies, nor implicitly assume that the problem at hand is represented by this database. Rather, site specific conditions can be applied (such as ground conditions and geological / mining geometries), along with inputs that can change with time or mining schedules (such as localized stress states).

Finite element method (FEM) numerical software has been applied to assess hanging wall stability suggested by the empirical analysis. Given the linear nature of deposit geometries (i.e., plane strain) it is thought appropriate to use 2D FEM numerical software (Phase2, after RocScience, 2012).

2D model simulations have several inherent limitations – particularly when compared to 3D modeling assessments. Consequently, 2D models can return unreliable results when used in this application, as compared to 3D simulations of the same geometry. Therefore, 3D inelastic modeling, or discrete element modelling should be considered at the feasibility design stage to confirm stope geometry stability and extraction sequence.

To complete a 2D FEM numerical assessment, rock mass strength criteria and material properties were estimated for each domain using geotechnical data located within 20 m of the hanging walls. The Hoek-Brown failure criterion was applied, which requires the Geological Strength Index (GSI) rock mass classification scheme to be initially assessed. It is recommended that further refinement of input values be performed at the feasibility stage.

Hoek and Brown (1980a, 1980b) proposed a method for obtaining estimates of the strength of jointed rock masses, based upon an assessment of the interlocking of rock blocks and the condition of the surfaces between these blocks. The method has developed since its publication and is referred to as the Generalized Hoek-Brown failure criterion:

$$\sigma'_1 = \sigma'_3 + \sigma_{ci}\left(m_b \frac{\sigma'_3}{\sigma_{ci}} + s\right)^a \quad (4)$$

Where;

- σ'1 and σ'3 are the maximum and minimum effective stresses at failure;
- mb is the value of the Hoek-Brown constant m for the rock mass;
- s and a are constants which depend upon the rock mass characteristics; and
- σci is the uniaxial compressive strength of the intact rock pieces.

The Hoek-Brown criterion was developed for all geotechnical domains using the approach outlined by Hoek et al (2013) and RocLab software (RocScience, 2013).

High level 2D FEM numerical modeling results suggest the following:

- Stope hanging walls are likely to be stable when using <22m sub-levels in weak rock masses (stope floor to backs); and
- Failure zone around stopes is likely to be around <0.25 m.

16.2.11 PILLAR SIZING

Based on previous production experience at the KHSD Project, it is understood that Alexco intends to form stable rib and sill pillars using the following approaches:

- Rib Pillars: lateral extent of production development will be controlled by; deposit geometries; the placement of central access development; and the positioning of rib-pillars in uneconomic material throughout the deposits. Conversations with Alexco personnel indicate this to be achievable based on previous production experience at the KHSD Project; and
- Sill pillars: the use of a top-down extraction approach will result in sill pillars being formed. Sill pillar stability will be controlled by; the construction of sill matts (based on previous experience), timely emplacement of cementitious backfill, and careful mining practices.

16.3 MINING METHODS

The Mining Methods selected and applied are:

- Overhand Mechanized Cut and Fill (MCF):
  - Drift and Fill (D&F) method in the wider areas of the orebody with cemented rock fill (CRF).
- Longhole open stoping (LHOS):
  - LHOS will be standard longitudinal retreat with CRF;
  - Downhole LHOS method will be used where the ground conditions and ore body dip allow; and
  - Uphole LHOS method with no backfill where permitted.

Mining sequences for downhole LHOS stopes are bottom-up with 3% cement binder content of CRF (7 days of cure time). As for the MCF method – mining sequences are bottom up, using temporary sills with CRF backfill containing 8% cement binder content used only for sill levels. The use of temporary sills will allow the extraction individual MCF panels to proceed as they are accessed and allow multiple active production fronts. The CRF backfill used for the sill levels will require a 28 day cure period before the *in situ* material below can be recovered. The remainder of the MCF lifts will utilize rock fill for bottom-up mining sequences. Uphole LHOS stopes will be mined with no backfill using a longitudinal retreat sequence.

These mining methods were chosen due to the narrow steeply dipping nature of the orebodies and to maximize safety and productivity. The various deposits require the use of mining methods that can adequately support the vein and that are flexible and selective while minimizing the direct mining costs.

The main factors driving the mining method selection process are:

- Proven mining methods used at the Bellekeno mine;
- Ground conditions in the vein and along the vein contacts range from good to very poor;
- Ground conditions can vary substantially over short distances (five metres);
- Vein continuity is good; however, the vein geometries vary greatly between deposits;
- Metal content and distribution varies significantly between deposits and varies over the stope mining scale;
- The footwall is often characterized by competent quartzite but can be weak in some areas;
- The hangingwall varies from competent quartzite to weak layers of quartz breccia with clay filled shear bands, graphitic schists, or sericite schists;
- Geological contacts at the hangingwall and footwall can often be visually identified but can be faulted or fractured contacts with gouge and breccias;
- Mineralization contacts are less clearly defined and are based on a combination of structure, vein mineralogy, and metal grades;
- Vein systems can be locally water bearing and required time to drain when they are first crosscut by development; and
- Vein depths are shallow with a low-stress regime, high-stress issues are not a factor in mine planning, but lack of clamping forces contributes to the poor ground conditions.

The mine design strategy was to design as many areas as practical using small scale longhole mining methods while planning mechanized overhand cut and fill for areas where ground conditions were poor, or where the combination of vein dip and true width was not compatible with longhole stoping methods.

16.3.1 MECHANIZED CUT AND FILL (MCF)

MCF will be the dominant mining method for the Flame & Moth, Bermingham, and the principal mining method for the Lucky Queen deposit. In MCF method, an attack ramp is developed from the main ramp at a gradient of -15%. Upon reaching the orebody, an intersection is developed and a lift is developed in both directions along strike, following the geological contact of the orebody. At the end of the lens, the void is backfilled using either unconsolidated rock fill or cemented rockfill (CRF) with a Load Haul Dump (LHD) machine. The LHD utilizes a rammer-jammer plate (a dozer plate modified to be attached to a scoop to push waste tight to the back) to ensure that the backfill is placed tight to the back of the drift.

Once the level has been completely backfilled, the next lift above the previously mined lift is accessed by slashing down the back of the attack ramp and working off the muck pile/horizon. Figure 16-4 illustrates the sequence of activities with MCF mining.

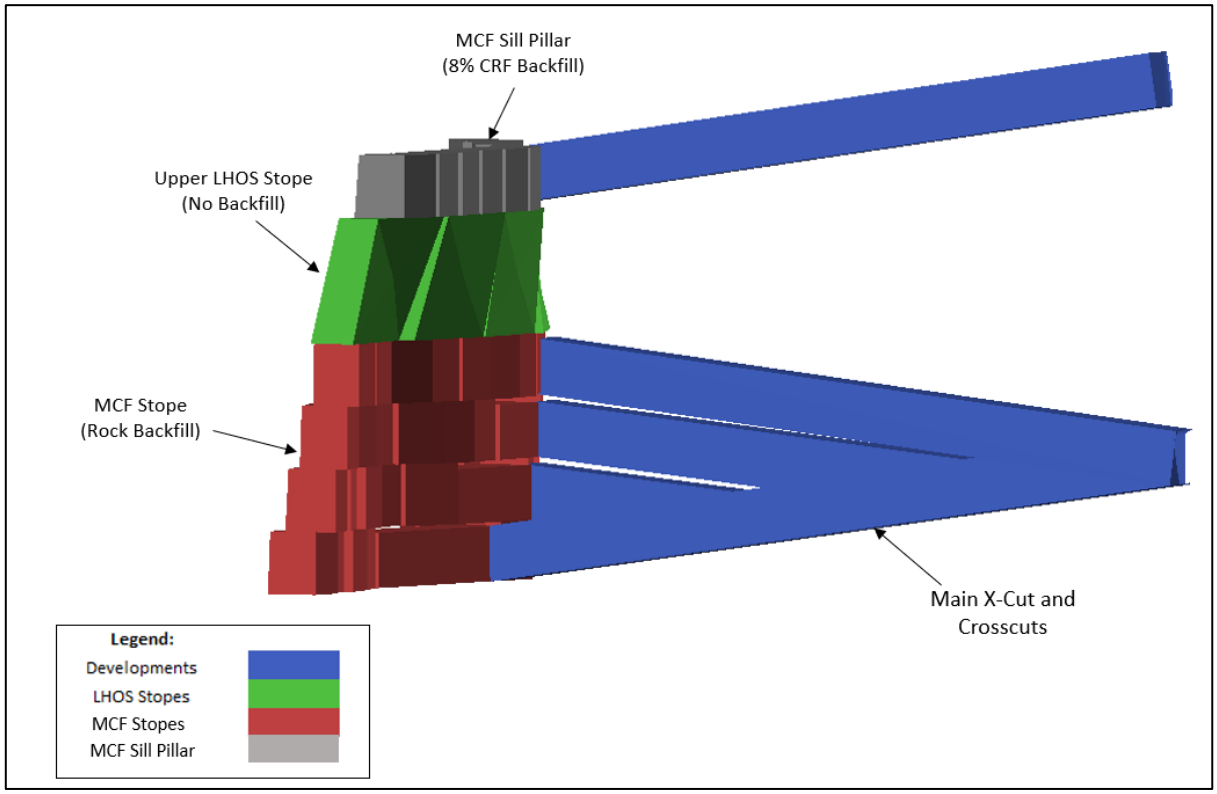


Figure 16-4 MCF lifts with Uphole Stopes Section

MCF drift sizes for Flame & Moth and Bermingham deposits are on average 4.0m H x 4.0m W. MCF drift sizes for Lucky Queen mine are on average 4.0m H x 3.0m W. For areas wider than development equipment is capable of mining or supporting, a second parallel drift will be mined beside the backfilled drift to fully extract the orebody width prior to accessing the lift above. In this situation, the first drift will be completely backfilled with cemented rock fill to ensure a stable wall to allow adjacent mining activity.

For the Bermingham and Flame & Moth deposits, the lifts are sequenced bottom up within each panel; however, to maximize productivity the panels are mined from the top down as they are accessed by the ramp spiraling down. As such, a pillar will remain between the top lift of one panel and the bottom lift of the panel above. These pillars will be extracted using an uphole drill and blast method discussed in Section 16.3.2.

A variable width shanty-back drift profile has been used to create the MCF method minable shapes for the KHSD mines. The primary reason for implementing a shanty MCF profile is to potentially reduce dilution, however, the development and blasting practices will require strong quality control in order to ensure that additional waste is not mined. The hanging wall (HW) and footwall (FW) are restricted to the following stope dip angle parameters, 90 degrees for FW and minimum 60 degrees minimum/90 maximum degrees for HW. Figure 16-5 depicts a section view of an example shanty back MCF profile versus standard vertically aligned hanging walls.

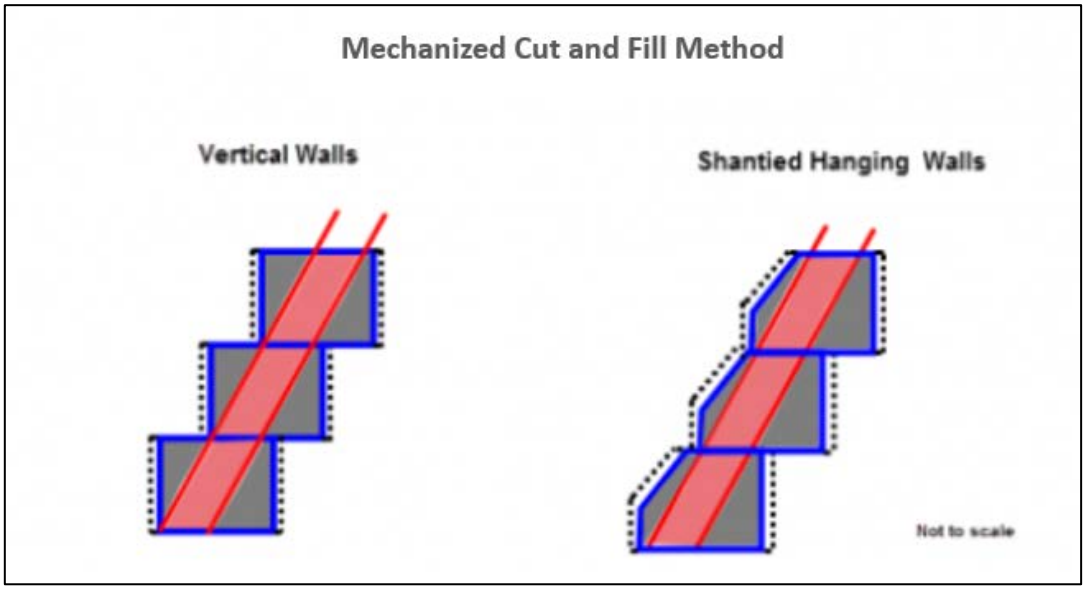


Figure 16-5 Shanty MCF Development Shapes Example

16.3.2 LONGHOLE OPEN STOPING (LHOS)

Longhole Open Stoping (LHOS) will be the preferred mining method when the ground conditions and the lens geometry allow. In LHOS, two drifts are developed along the strike of the orebody at a vertical spacing selected based on geotechnical constraints for that zone. After development is completed, blasting rings are drilled in parallel from the top level to the bottom level. These holes are planned to be 64 mm in diameter and spaced every 1.2 m. These drill holes will be immediately cased with 50 mm ID plastic pipe to prevent the drill holes from collapsing or plugging.

Blast holes will be double primed and loaded with packaged emulsion immediately prior to blasting. Several rows will also typically be pre-loaded to minimize the loading crew's exposure to the open stope brow.

An initial slot is developed by drilling and blasting a drop raise made up of multiple holes in close spacing. The slot design will be 1.8 m L x 1.8 m W pattern utilizing 11 drill holes and 4 reamer holes to provide relief. Once this initial slot has been blasted (retaining a minimum pillar below the top drift) the entire stope is blasted and mucked using a LHD. All remote mucking will be carried out using a 2.2 yd^3 LHD equipped with a remote package, while manual mucking will be done with either a 2.2 yd^3 LHD or a 3.5 yd^3 LHD.

Stope strike lengths are based on the geotechnical analysis that has been performed and is set at:

- Flame & Moth, Christal Zone – 12 m;
- Flame & Moth, Lightning Zone – 20 m;
- Bermingham, Arctic Zone – 16 m; and
- Bermingham, NE Zone – 8 m.

Once the stope is empty, the stope is backfilled with Cemented Rock Fill (CRF) containing 3% cement binder and will need 7 days to cure before extracting the adjacent stope along strike. Figure 16-6 illustrates the LHOS Method. LHOS will be used in the Flame & Moth deposit at Christal and Lightning zones, as well as NE and Arctic zones of the Bermingham deposit.

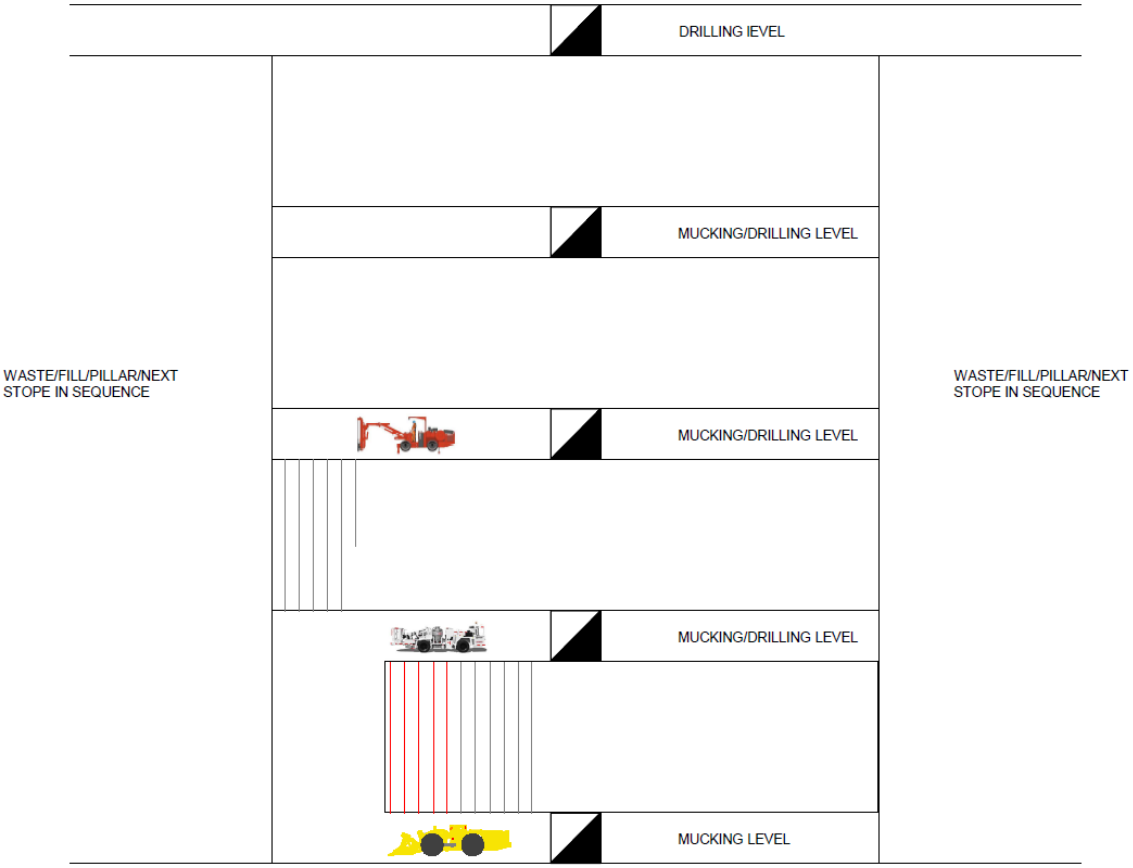


Figure 16-6 (Downhole) Longhole Stoping

A modified version of LHOS will be used at the top of a MCF level to extract the sill pillar between MCF panel and the panel above, or in areas where there is no access for a top drift. The cure time for the CRF sill pillar above the uphole stope is 28 days. In uphole stoping, a series of parallel rings are drilled from the bottom drift into the back, to the limit of the lens. An inverse raise is drilled on the extremity of the stope and then blasted in one shot. The longhole rings are then blasted into the void and mucked using a remote-operated LHD. No backfill is necessary in this method. Figure 16-7 illustrates the uphole stoping method.

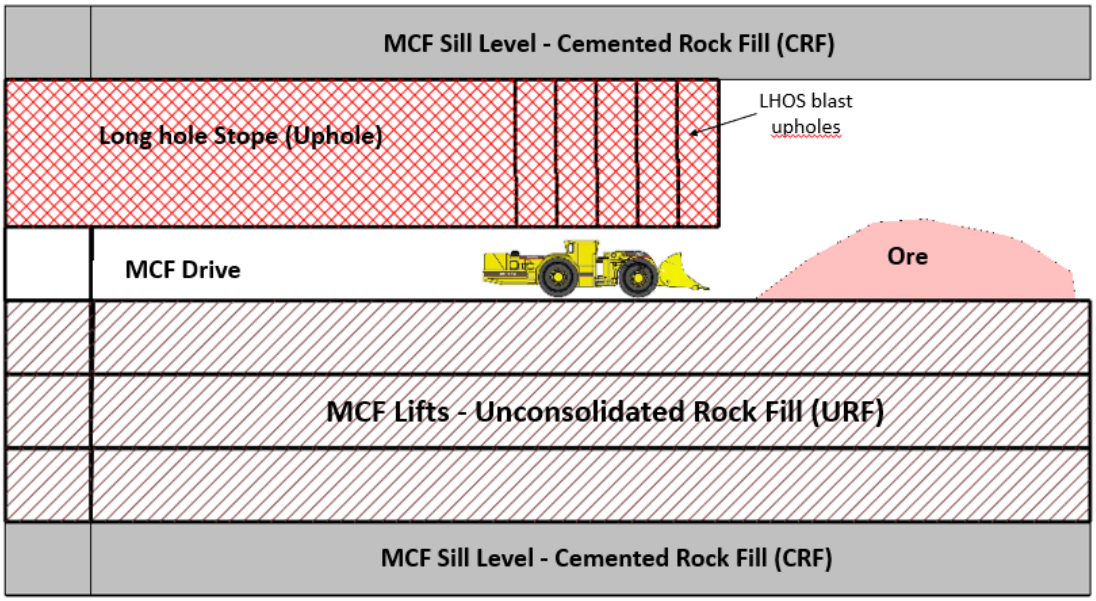


Figure 16-7 Uphole Longhole Stoping

The only mining method used at Bellekeno Mine will be uphole LHOS to extract a mostly developed panel at the beginning of mine production. Uphole LHOS will also be used to extract sill pillars in the Bermingham and Flame & Moth mines. LHOS method will not be used at Lucky Queen Mine.

16.4 DILUTION AND RECOVERY

16.4.1 DEVELOPMENT DILUTION

Due to the challenging ground conditions in the KHSD the expected dilution for capital lateral development is 10%. This is comparable to what was achieved during the excavation of the Flame & Moth and Bermingham exploration declines.

16.4.2 STOPING AND MCF DILUTION

Dilution refers to material below cutoff grade or value which must be mined because it cannot be selectively excluded from within the planned mining shapes at the time of excavation. This low-grade material is also typically referred to as internal dilution. Dilution is impossible to avoid due to the narrow geometry of the orebody.

In the stope design stage, in many cases the shapes of the planned excavation cannot be perfectly matched to the mineralized outlines. Areas outside of the mineralized outline, but inside the planned stope are typically referred to as planned dilution and must be excavated for technical, and operational reasons. In addition to the above planned dilution, dilution can result from additional material that is mined as a result of uncontrolled, unplanned, or unforeseen reasons. This material is often referred to as overbreak, unplanned dilution, or external dilution.

Accurate reconciliation studies are required to estimate the tonnage and grade of the planned and unplanned dilution in an underground mine. The tonnage of the unplanned dilution can be measured by comparing the excavated volume of a given stope to the planned or designed volume. The grade of the planned and unplanned diluting materials can be estimated from the available sample information. The volume of the secondary dilution can be estimated by comparing the surveyed excavation shape of the backfilled stope with the surveyed excavation shape of the newly blasted stope. Internal dilution (planned dilution) is primarily a function of the width of the

orebody and the minimum mining width. Minimum mining width for cut and fill method in both Bermingham and Flame & Moth deposits is 3.5 m and for the Lucky Queen deposit is 2.5 m which is driven by the size of the equipment selected. For the LHOS, the minimum mining width is 1.8 m. Dilution (counting both internal and external dilution) is presented in Table 16-6.

In operating underground mines, an additional type of dilution can occur. This dilution occurs when blasting of new stope panels takes place adjacent to a previously excavated stope containing backfill material. In these situations, a portion of the backfilled volume can become entrained with the newly blasted material. The grades of the backfill material are typically far below the breakeven cut-off grade or value, and this material contributes to the total dilution of the newly blasted material. Furthermore, the backfill can have very different chemical characteristics to the mineralized material and its inclusion in the process plant feed can have serious adverse consequences for the process plant. This dilution is referred to as secondary dilution.

To give consideration to unplanned dilution outside the LHOS stope shapes boundaries, an Equivalent Linear Over-break Slough (ELOS) of 0.5 m was applied to both the HW and FW during the MSO process. This dilution was taken into account when evaluating whether or not shapes are economic to ensure only diluted economic stope shapes are included in the mine plan Reserves.

Table 16-6 Total Dilution by Mine

Deposit Name	Average Dilution (%)
Flame & Moth	11
Bermingham	33
Lucky Queen	33

The dilution percentage is defined as tonnes of dilution material (W) divided by tonnes of mineralized material (O)(Dilution % = W/O x 100).

As described above, Bermingham and Lucky Queen deposits are narrower than Flame & Moth, and in some places shallower dipping which will cause an increase in dilution. Also, at both Bermingham and Lucky Queen, the focus on higher-grade mineralization results in narrower high grade vein's being extracted with a resulting increase in internal dilution.

16.4.3 RECOVERY

Mining recovery is the difference between the planned amount of ore and the actual amount of ore that is mucked and sent to the mill. The primary sources of a reduction in mined recovery are:

- Pillars: ore left unmined to ensure geotechnical stability;
- Drill and blast underbreak: blasts do not always break loose the entire stope and the remaining ore becomes unrecoverable. This is primarily in longhole stopes blasting because the entire area of the blast does not always break, and the remaining ore is unrecoverable; and
- Mucking: unrecovered broken ore either on the floor of development or in corners that are unreachable.

Due to the high-grade nature of the mineralization, all efforts will be made to ensure that recovery is maximized. Mining Recovery of 95% has been applied to all production blocks and is based on previous Bellekeno mine operation data, for all stopes except stopes located near fault zones where recovery has been reduced to 85% to take into account the need for additional pillars and the higher risks of mining in these areas.

16.4.4 MINIMUM MINING WIDTH

Minimum mining width for MCF method in both Bermingham and Flame & Moth deposits is 3.5 m and for the Lucky Queen deposit is 2.5 m; for LHOS methods the minimum width is 1.8 m. The LHOS minimum mining width was based on how tight the production drilling could be executed and still expect the stope to break reliably. The MCF stope minimum mining width is based on the equipment available.

16.5 NET SMELTER RETURN (NSR)

Revenue comes from selling four metals (silver as main product and lead, zinc and gold as by-products), reporting to two concentrates. NSR takes into account the multiple by-products available as well as the sliding streaming agreement with Wheaton Precious Metals. The parameters used to calculate the NSR are available in the following tables. The NSR value in the resource block models and the economic cut off values were used to outline areas to be included in the mine plan, referred to as mining shapes. The impact of mining dilution was accounted for in the stope shapes. Table 16-7 shows the commodity prices and exchange rate used in NSR value calculation, and Table 16-8 outlines recoveries and grade units used.

Table 16-7 NSR Commodity and Exchange Price

Metal	Unit	Price
Ag	US$/oz	21.35
Effective Silver Price*	US$/oz	17.25
Au	US$/oz	1,603
Pb	US$/lb	0.92
Zn	US$/lb	1.08
Exchange Rate	US$:CA$	0.775

* The effective silver price in the table above takes into account the effects of the Wheaton Precious Metals stream.

Table 16-8 NSR Parameters*

NSR Assumptions	Unit	Ag-Pb Concentrate	Zn Concentrate
Recovery			
Ag	%	91.06%	4.55%
Au	%	49%	0%
Zn	%	8.32%	73.68%
Pb	%	88.31%	6.53%
Concentrate Grade			
Ag	g/t	16,725	612
Au	g/t	3.75	0
Zn	%	8.2	53
Pb	%	54	2.92
Moisture Content	%	6.0	6.0
Payability			
Minimum Deductible Ag	grams/DMT of concentrate	50	93
Minimum Deductible Au	grams/DMT of concentrate	1	NA
Minimum Deductible Pb/Zn	%	3	8
Payable Ag after Deductions	%	95	70
Payable Au after Deductions	%	95	NA
Payable Pb/Zn after Deductions	%	95	85
Charges			
Total charge (concentrate treatment, freight, refining)	US$/DMT of Concentrate	960	513

*Preliminary recoveries, concentrate grades, payment terms and charges available at the time of mine planning, used for the design only.

LHOS mining shapes and MCF mining shapes were created based upon an NSR cut-off value that was specific to the mine and mining method. This NSR cut-off value was calculated by using the initial operating cost estimate for each mine. A breakdown of the individual mine operating cost estimate can be seen in Table 16-9. Mining recovery was applied at 95% for Bellekeno, Flame & Moth, Bermingham and Lucky Queen which is in line with Alexco's historic operational experience. All LHOS stope shapes and MCF mining areas were reviewed to remove any uneconomic areas. A distribution of total ore tonnes by mining method is 51% MCF and 49% LHOS.

Table 16-9 Initial Operating Cost Estimate by Mine

Area/Mine	Bermingham, $/Tonne*	Flame and Moth, $/Tonne*	Lucky Queen, $/Tonne*
Mine General	19	19	19
Mine Operations	176	173	326
Milling	58	58	58
G&A	59	59	59
Total	**312**	**309**	**462**

*Tonnages are diluted and recovered

To maximize project value and mineable inventory, the operating cost was further refined by mine to determine the operating cost estimate by mining method. This enabled the mine plan to utilize multiple NSR cut off values where practical and the calculated values are shown in Table 16-10.

Table 16-10 NSR Cut off Values

Mine	Cutoff Value - MCF* ($/t)	Cutoff Value - LHOS* ($/t)
Bellekeno		365
Lucky Queen	460	-
Bermingham	350	275
Flame & Moth	350	275

*The NSR value was based on estimated metallurgical recoveries, assumed metal prices and smelter terms, which include payable factors, treatment charges, penalties, and refining charges

16.6 MINE DESIGN

16.6.1 BELLEKENO MINE PLAN

The Bellekeno Mine was in production from 2011 to 2013 when it was placed on care and maintenance. There is no significant new development required to extract the Probable Mineral Reserves in Bellekeno. The current workings in the mine are sized at 3.7 m W x 4.0 m H (average dimension). Access to the mine is via an existing portal and ramp system, emergency egress and ventilation through the 625 level fresh air drift. Table 16-11 shows the production schedule for the Bellekeno mine. The planned production tonnages from Bellekeno are limited and represent a fraction of the overall project production. There are also 3,397 t of Ore on the surface stockpile which will be milled as part of the planned production from Bellekeno.

Table 16-11 Bellekeno Mine Production Quantities

Bellekeno	Total		Year 1					
		Stockpile	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6
Mill Feed Tonnes	**16,206**	3,397	2,137	5,336	5,336	-	-	-
Waste Tonnes	**-**	-	-	-	-	-	-	-
Total Tonnes	**16,206**	3,397	2,137	5,336	5,336	-	-	-
MCF (Tonnes)	-	-	-	-	-	-	-	-
LHOS (Tonnes)	**12,809**	-	2,137	5,336	5,336	-	-	-
MCF Backfill Tonnes	**-**	-	-	-	-	-	-	-
LHOS Backfill Tonnes	**-**	-	-	-	-	-	-	-
Total Backfill Tonnes	**-**	-	-	-	-	-	-	-
Ag(g/t)	**981**	1150	717	980	980	-	-	-
Au(g/t)	**-**	-	-	-	-	-	-	-
Pb (%)	**14.82**	21.70	4.6	14.7	14.7	-	-	-
Zn (%)	**6.72**	4.50	0.3	8.7	8.7	-	-	-
Ag (Oz)	**511,294**	125,598	49,294	168,201	168,201	-	-	-
Au(Oz)	**0**	-	-	-	-	-	-	-
Pb (lbs)	**5,294,732**	1,625,119	218,130	1,725,741	1,725,741	-	-	-
Zn (lbs)	**2,399,442**	337,006	13,191	1,024,622	1,024,622	-	-	-
Development (m)	**-**		-	-	-	-	-	-

Notes:

1. Development (m) are lateral and vertical metres
2. Mill feed tonnes are all Probable Mineral Reserves as shown in Section 15 of this report (inclusive of Stockpile Ore).
3. Rounding as required by reporting guidelines may result in apparent summation differences between tonnes, grade and contained metal content;
4. Tonnages are diluted and recovered
5. Tonnage and grade measurements are in metric units. Contained gold and silver ounces are reported as troy ounce

Figure 16-8 shows a long section of the existing and planned workings. Figure 16-9 shows a plan view of the Bellekeno Mine and surface area.

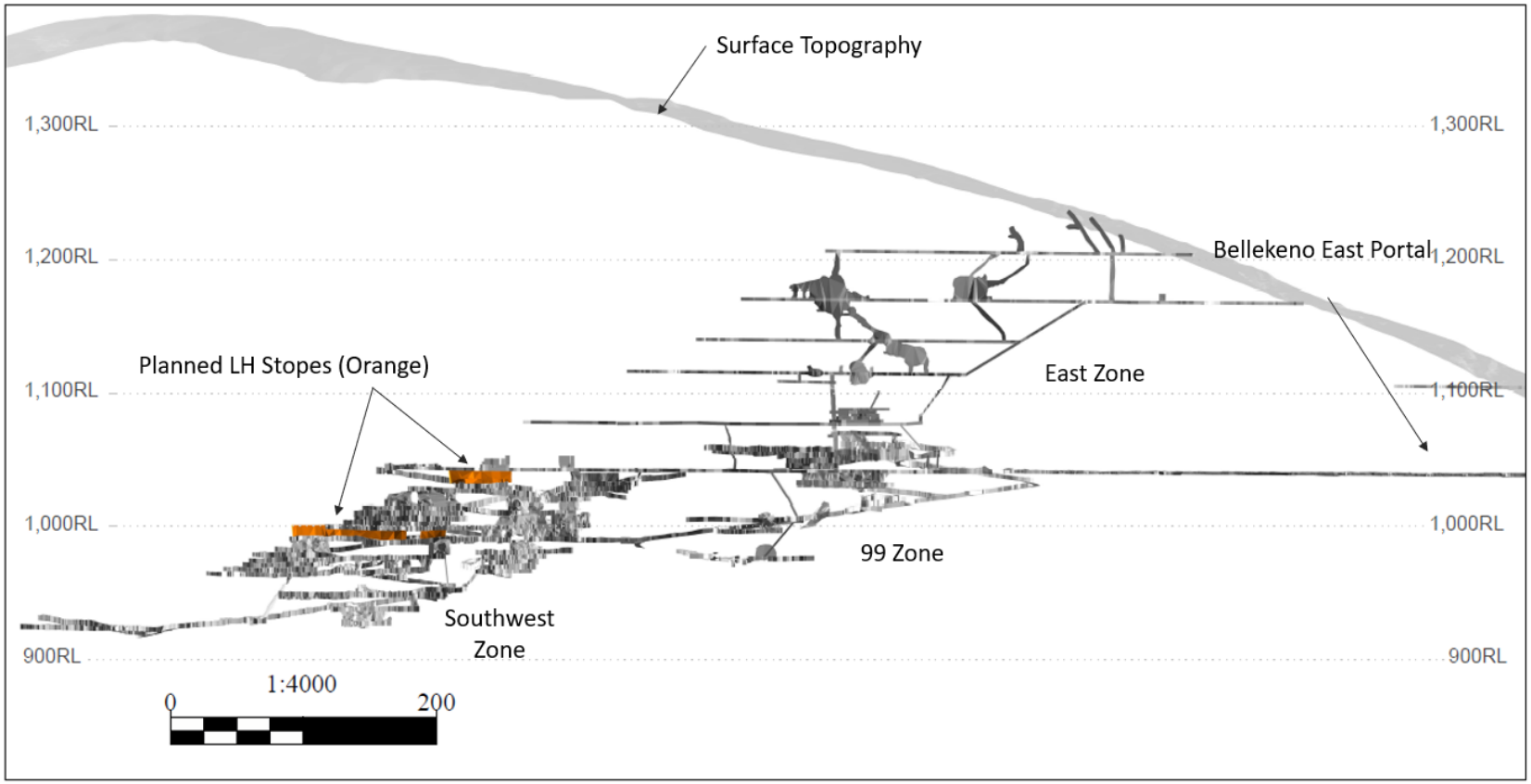


Figure 16-8 Bellekeno Long Section (Looking NW)

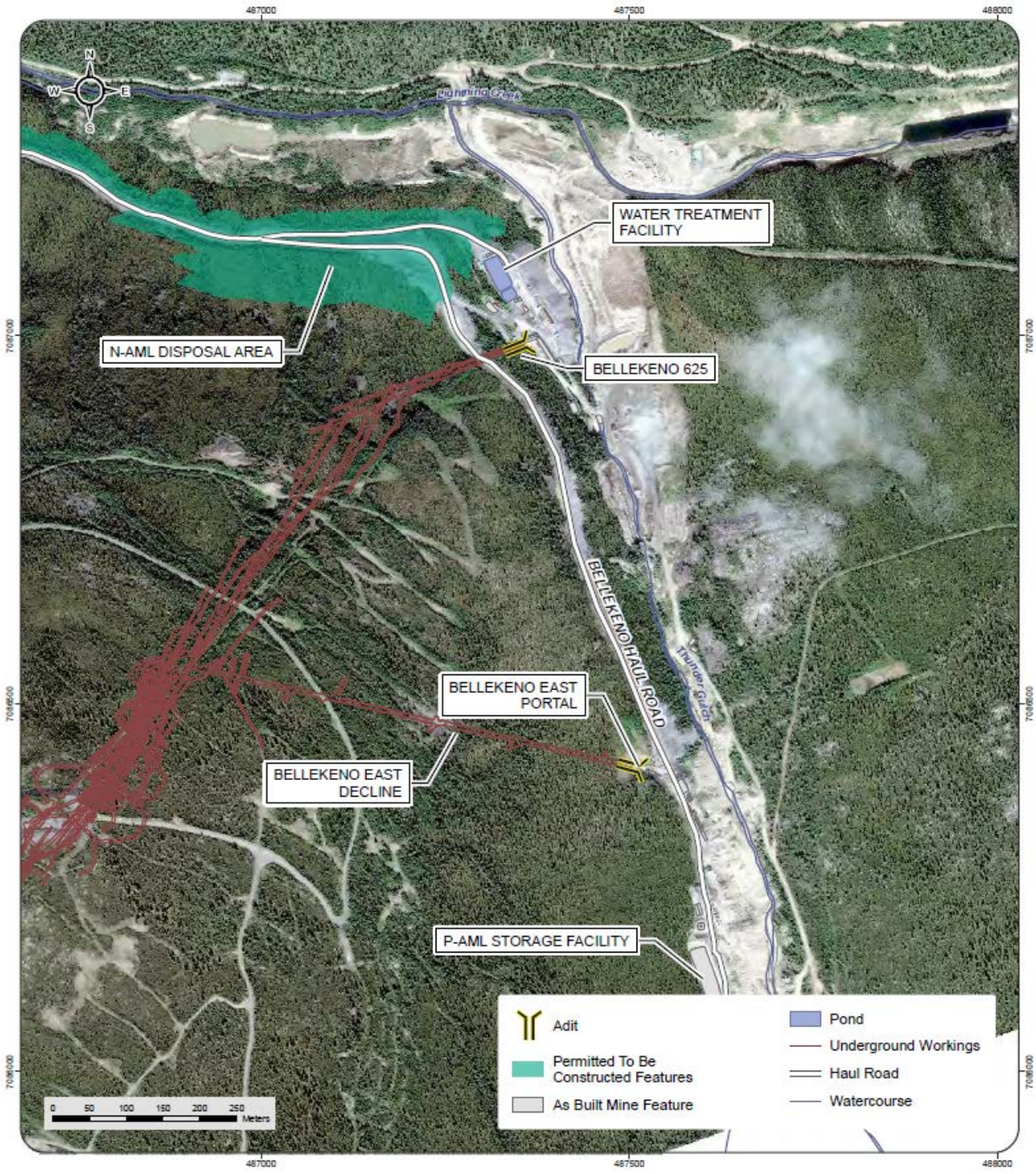


Figure 16-9 Bellekeno Area Plan View

16.6.2 FLAME & MOTH DEPOSIT

Flame & Moth mine is located adjacent to the existing mill and administration facilities. Access to the mine will be through an already developed portal and 460 m long ramp. Ore from the Flame & Moth mine will be sourced from the Lightning and the Christal zones, which contains approximately 68% and 32% of total ore tonnes, respectively. Development in the Flame & Moth mine will be sized 4.2m W x 4.2m H for the ramp and 4.0m W x 4.0m H for the operating development and cut and fill stopes. Approximately 32% of the total capital and operating development is completed within the first 24 months of the Flame and Moth mine life.

Emergency egress and ventilation for the Flame & Moth Mine will be provided through a vent raise driven to surface. Figure 16-10 shows a long section of the existing and planned workings. Figure 16-11 shows a typical ramp development section profile with auxiliary services installed. Figure 16-12 shows an isometric view of the Flame & Moth workings as well as the adjacent Mill infrastructure.

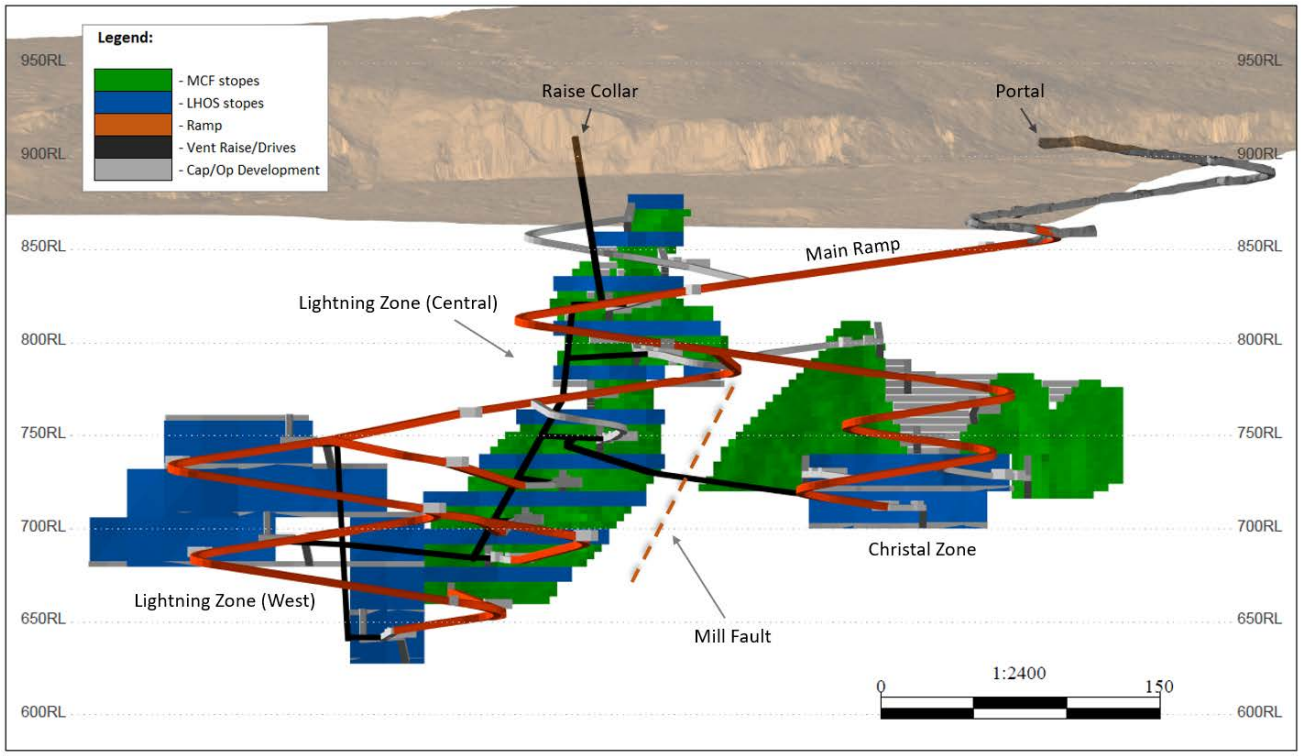


Figure 16-10 Flame & Moth Isometric View (Looking NW)

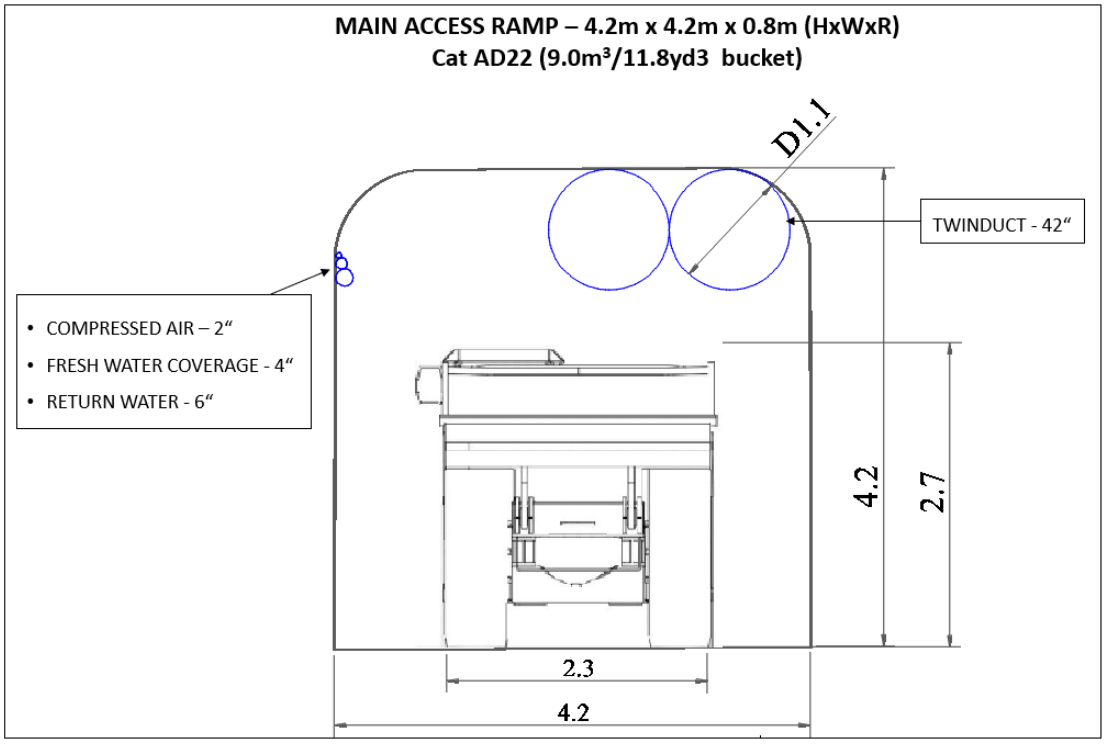


Figure 16-11 Main Access Ramp Development Section Profile

Table 16-12 shows the annual production schedule for the Flame & Moth mine. A distribution of total ore tonnes by mining method for the Flame & Moth mine is 49% MCF and 51% LHOS.

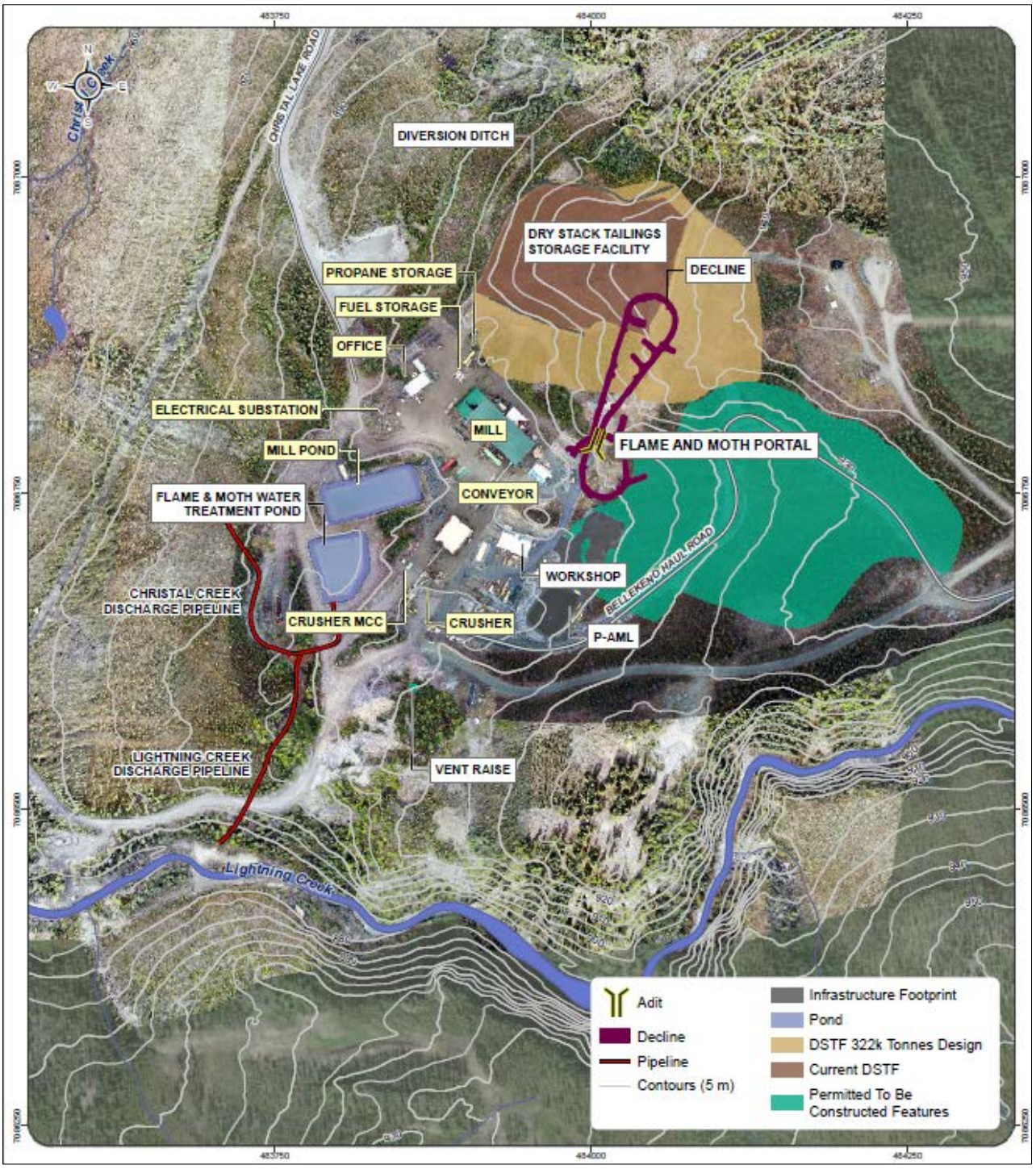


Figure 16-12 Flame & Moth and Mill Area Surface Layout

Table 16-12 Flame & Moth Production Quantities

Flame & Moth	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9
Mill Feed Tonnes	**721,322**	25,684	64,406	76,761	82,458	82,038	82,308	114,704	158,646	34,315
Waste Tonnes	**385,709**	47,779	81,247	93,359	102,387	45,943	8,957	6,037	-	-
Total Tonnes	**1,107,031**	73,463	145,653	170,120	184,846	127,981	91,266	120,741	158,646	34,315
MCF Tonnes	**356,198**	25,684	42,101	42,438	81,299	69,646	45,050	34,158	15,821	-
LHOS Tonnes	**365,124**	-	22,306	34,323	1,159	12,391	37,258	80,546	142,826	34,315
MCF Backfill Tonnes	**239,514**	20,352	29,915	28,812	52,472	51,722	24,103	16,873	15,265	-
LHOS Backfill Tonnes	**153,116**	-	-	-	-	-	-	42,996	79,989	30,131
Total Backfill Tonnes	**392,630**	20,352	29,915	28,812	52,472	51,722	24,103	59,868	95,254	30,131
Ag (g/t)	**672**	648	698	751	961	802	674	550	537	489
Au (g/t)	**0.49**	0.34	0.43	0.44	0.66	0.64	0.59	0.46	0.38	0.38
Pb (%)	**2.69**	2.60	2.80	3.13	5.84	3.85	2.09	1.79	1.53	1.09
Zn (%)	**6.21**	6.72	7.98	5.93	5.05	7.27	5.95	5.80	5.96	6.64
Ag (Oz)	**15,590,371**	535,432	1,444,769	1,852,558	2,548,967	2,116,083	1,784,214	2,028,692	2,740,173	539,482
Au (Oz)	**11,284**	279	894	1,075	1,760	1,687	1,555	1,680	1,929	425
Pb (lbs)	**42,796,111**	1,470,316	3,970,042	5,290,545	10,607,930	6,955,586	3,799,287	4,519,278	5,359,236	823,891
Zn (lb)	**98,812,459**	3,805,943	11,327,902	10,032,737	9,184,196	13,140,030	10,800,289	14,665,205	20,830,765	5,025,392
Development (m)	**8,939**	1,127.76	1,740.53	2,228.38	2,333.22	1,099.23	245.62	163.88		-

Notes:
1. Development (m) are lateral and vertical metres
2. Mill feed tonnes are all Probable Mineral Reserves as shown in Section 15 of this report.
3. Rounding as required by reporting guidelines may result in apparent summation differences between tonnes, grade and contained metal content;
4. Tonnages are diluted and recovered
5. Tonnage and grade measurements are in metric units. Contained gold and silver ounces are reported as troy ounce

16.6.3 BERMINGHAM MINE

The Bermingham Mine is located approximately 4 km from the mill underneath the historical Bermingham Pit. Access to the mine will be through an already developed portal and 600 m long ramp. Ore from the Bermingham Mine will be sourced from the Footwall, Bear and North East zones as shown in Figure 16-13. Development in the Bermingham mine will be sized 4.2 m W x 4.2 m H for the ramp and average 4.0 m W by 4.0 m H for the operating development and MCF development. The primary mining method is MCF method except NE and Arctic zones which is LHOS method.

The production schedule is based on the assumption that 85% of the geotechnical pillars will be mined as the pillars are located within high grade areas of the deposit and will pay for the additional costs associated with their extraction in challenging ground conditions. Emergency Egress and ventilation for the Bermingham Mine will be provided through a vent raise driven to surface.

Ore and waste will be handled by 22 tonne capacity haulage trucks underground and backfill will primarily be handled by smaller 16 tonne capacity haulage trucks. Trucks will be loaded at remuck bays on the ramp systems and will be hauled directly to the surface ore pad. From the surface ore pad all ore will be loaded on 30 tonne articulated trucks to be transported to the mill.

Life of Mine development waste rock broken underground is estimated at 410 kt. Approximately 190 kt of this waste rock is needed for backfill as rockfill and an additional 185kt will be required as CRF backfill. Approximately 32% of the total capital and operating development is completed within the first 24 months of the Bermingham mine life.

Surface handling and backfill of Bermingham waste rock is based on geochemical characterization and an approved waste rock characterization and management as required by the Water Licence. Figure 16-13 and Figure 16-14 show an isometric view of the existing and planned workings of Bermingham mine. Figure 16-15 shows the surface layout as well as a plan view of the underground development projected to surface.

Table 16-shows the production quantities and table for the Bermingham Mine. A distribution of total ore tonnes by mining method for the Bermingham mine is 48% (MCF) and 52% (LH).

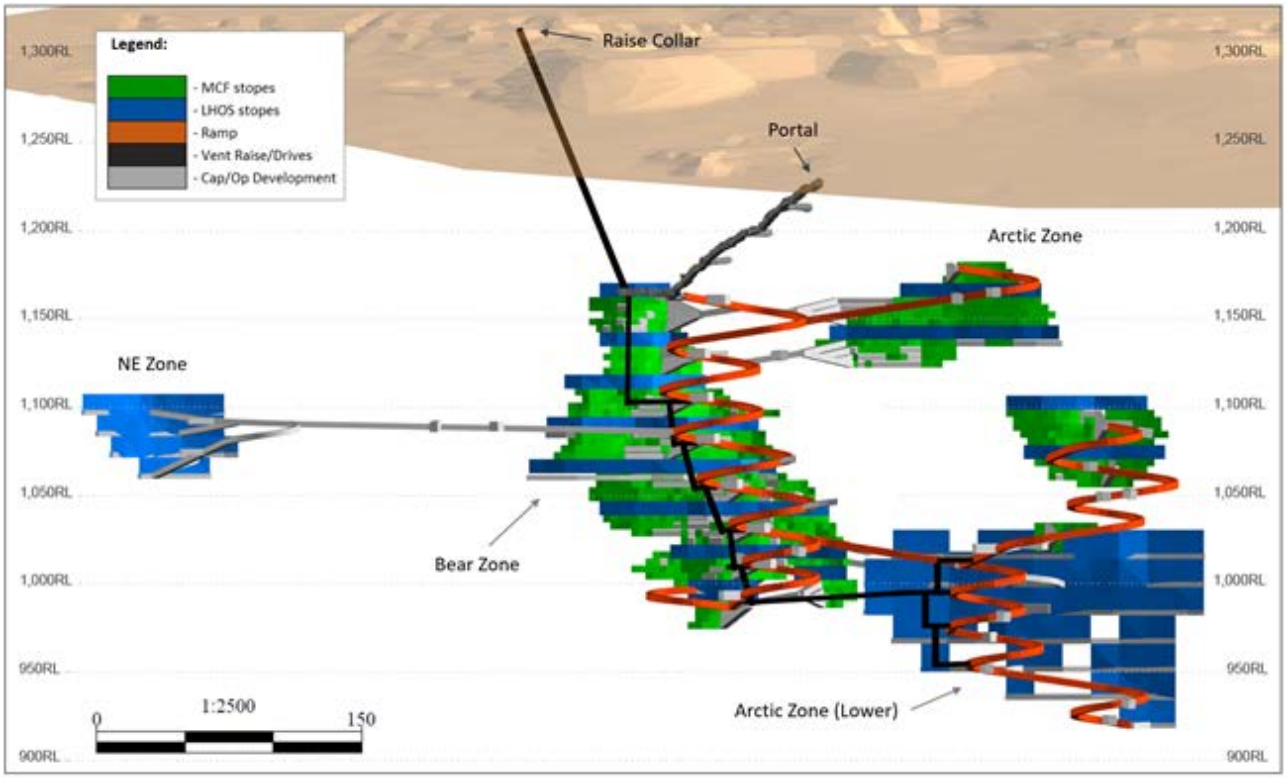


Figure 16-13 Bermingham Mine Isometric View (Looking SE)

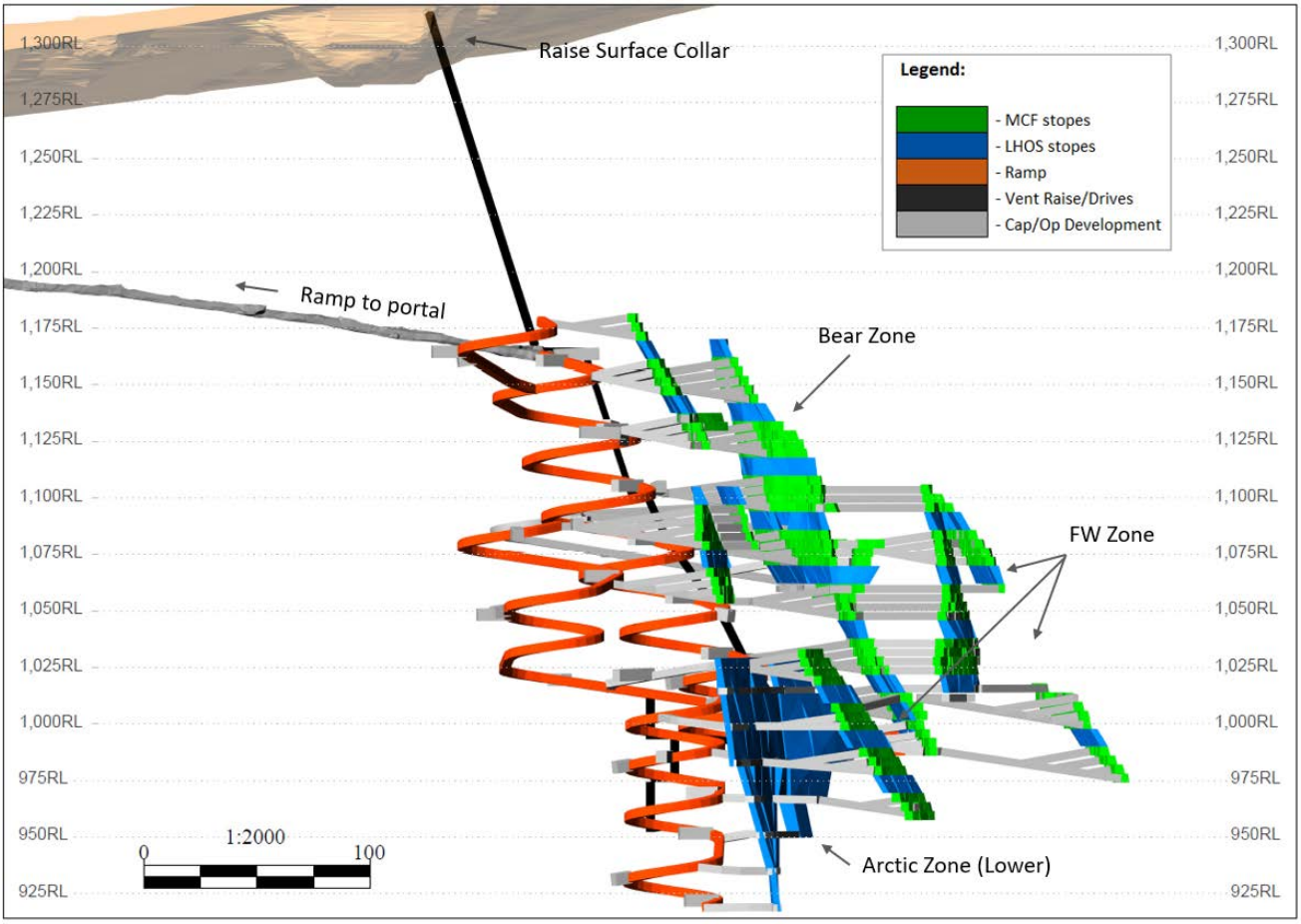


Figure 16-14 Bermingham Mine Isometric View Showing FW Zone (Looking NE)

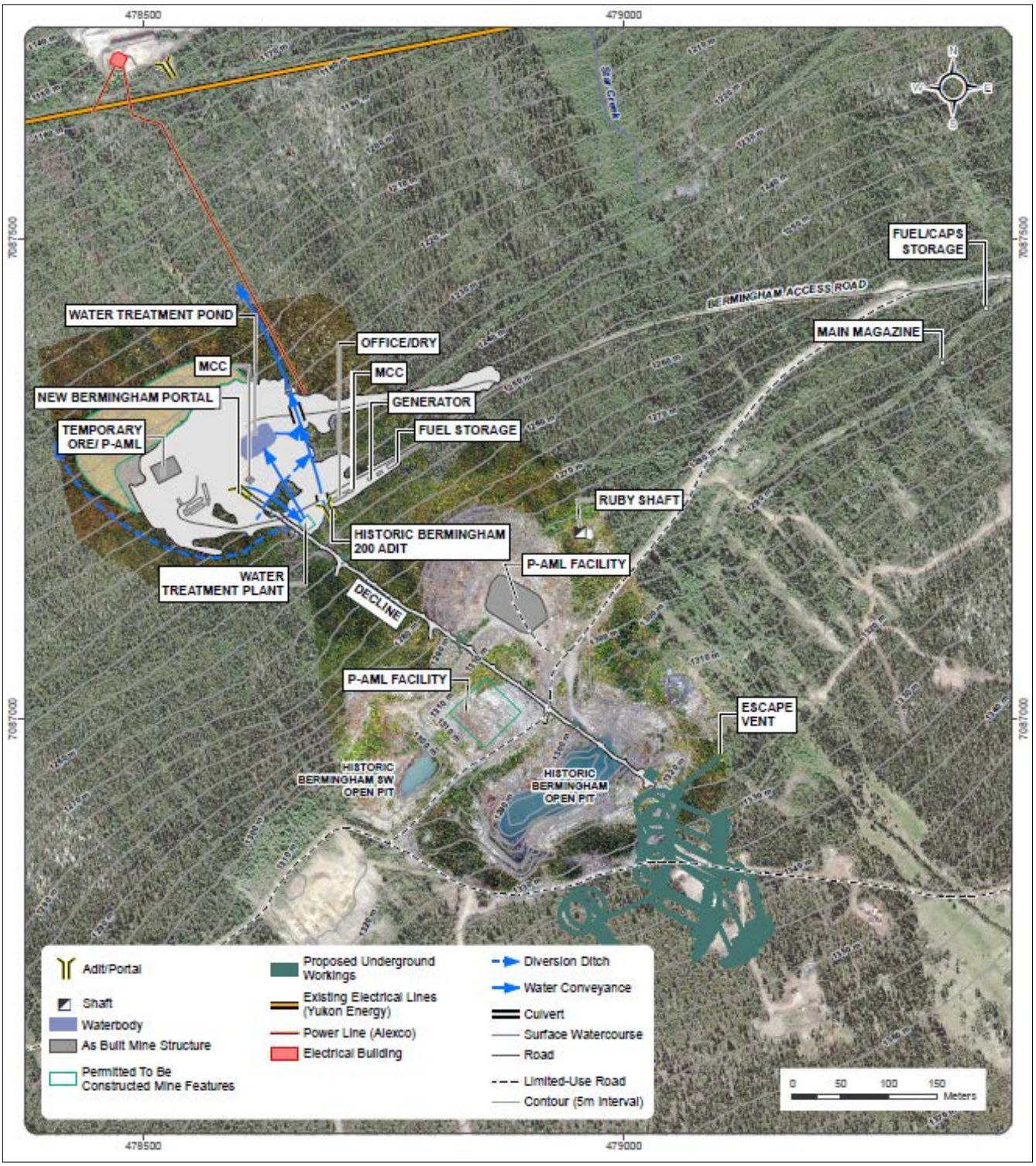


Figure 16-15 Bermingham Mine As-Built and Surface Layout

Table 16-13 Bermingham Production Quantities

Bermingham	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Mill Feed Tonnes	**630,173**	25,220	67,984	103,692	118,977	119,965	119,849	74,487
Waste Tonnes	**410,652**	51,676	78,945	94,268	91,132	52,921	35,626	6,083
Total Tonnes	**1,040,825**	76,896	146,929	197,960	210,109	172,886	155,475	80,570
MCF Tonnes	**300,344**	25,220	58,645	79,528	57,253	49,274	15,280	15,144
LHOS Tonnes	**329,829**	0	9339	24164	61723	70690	104570	59343
MCF Backfill Tonnes	**233,934**	18,166	51,590	54,544	67,827	14,451	13,708	13,648
LHOS Backfill Tonnes	**141,768**	0	0	0	0	33825	70162	37781
Total Backfill Tonnes	**375,702**	18,166	51,590	54,544	67,827	48,276	83,870	51,429
Ag (g/t)	**899**	1,218	1,450	1,011	806	645	844	775
Au (g/t)	**0.13**	0.10	0.16	0.14	0.13	0.12	0.13	0.11
Pb (%)	**2.26**	3.02	3.05	2.69	1.78	1.54	2.37	2.47
Zn (%)	**1.30**	1.74	1.44	1.20	1.27	1.08	1.49	1.24
Ag (Oz)	**18,208,749**	987,745	3,170,200	3,369,385	3,084,887	2,489,370	3,250,464	1,856,697
Au (Oz)	**2,626**	82	359	470	486	474	499	256
Pb (lbs)	**31,448,248**	1,678,736	4,565,451	6,149,704	4,667,661	4,082,547	6,255,292	4,048,857
Zn (lbs)	**18,022,151**	967,463	2,162,914	2,745,546	3,331,304	2,845,857	3,928,589	2,040,478
Development (m)	**9,707**	1,247	1,846	2,200	2,257	1,251	741	166

Notes:

1. Development (m) are lateral and vertical metres
2. Mill feed tonnes are all Probable Mineral Reserves as shown in Section 15 of this report.
3. Rounding as required by reporting guidelines may result in apparent summation differences between tonnes, grade and contained metal content;
4. Tonnages are diluted and recovered
5. Tonnage and grade measurements are in metric units. Contained gold and silver ounces are reported as troy ounce

16.6.4 LUCKY QUEEN MINE

The Lucky Queen Mine is located approximately 10 km from the mill and has previously been the site of underground production by a previous operator. Alexco has rehabilitated approximately 1 km of underground drift from the portal. The access drift is 3.0 m W x 3.6 m H and production drifts will be sized at minimum of 2.5 m W x 4.0 m H. These drifts are too small for some of the production and development mining fleet used at the other mines. As such, a special fleet of smaller scale units will be required to extract the Lucky Queen deposit. In 2012, Alexco purchased a Young's 470 TZ underground haul truck rated at 6.4-tonne capacity. One truck is capable of hauling 100 tpd of ore to the portal, while a second, additional truck will be required to haul the development waste rock to the portal or to the production area to make cemented rock fill. Emergency egress and ventilation for the Lucky Queen will be provided through a vent raise driven to the surface. The total life of mine production for the underground operations is shown in Table 16-14. Approximately 60% of the total capital and operating development is completed within the first 12 months of the Lucky Queen mine life.

Table 16-14 Lucky Queen Production Schedule

Lucky Queen	Total	Year 6	Year 7	Year 8	Year 9
Mill Feed Tonnes	70,648	-	14,743	42,543	13,363
Waste Tonnes	77,463	4,401	42,756	26,337	3,969
Total Tonnes	71,316	4,401	41,535	12,690	12,690
Total Backfill Tonnes	125,001	-	4,401	56,399	64,201
Ag (g/t)	1,269	-	1,330	1,337	989
Au (g/t)	0.13	-	0.11	0.13	0.13
Pb (%)	2.71	-	2.21	2.92	2.59
Zn (%)	1.56	-	2.94	1.26	0.98
Ag (Oz)	2,883,180	-	630,272	1,828,019	424,889
Au (Oz)	293	-	54	184	55
Pb (lbs)	4,224,176	-	717,898	2,742,547	763,731
Zn (lbs)	2,426,039	-	956,847	1,180,103	289,088
Development (m)	2,905	122	1,596	1,024	163

Notes:

1. Development (m) are lateral and vertical metres
2. Mill feed tonnes are all Probable Mineral Reserves as shown in Section 15 of this report.
3. Rounding as required by reporting guidelines may result in apparent summation differences between tonnes, grade and contained metal content;
4. Tonnages are diluted and recovered
5. Tonnage and grade measurements are in metric units. Contained gold and silver ounces are reported as troy ounce

Figure 16-16 shows an isometric view of the existing and planned workings, while Figure 16-17 shows a plan view of the Lucky Queen Mine and associated surface infrastructure.

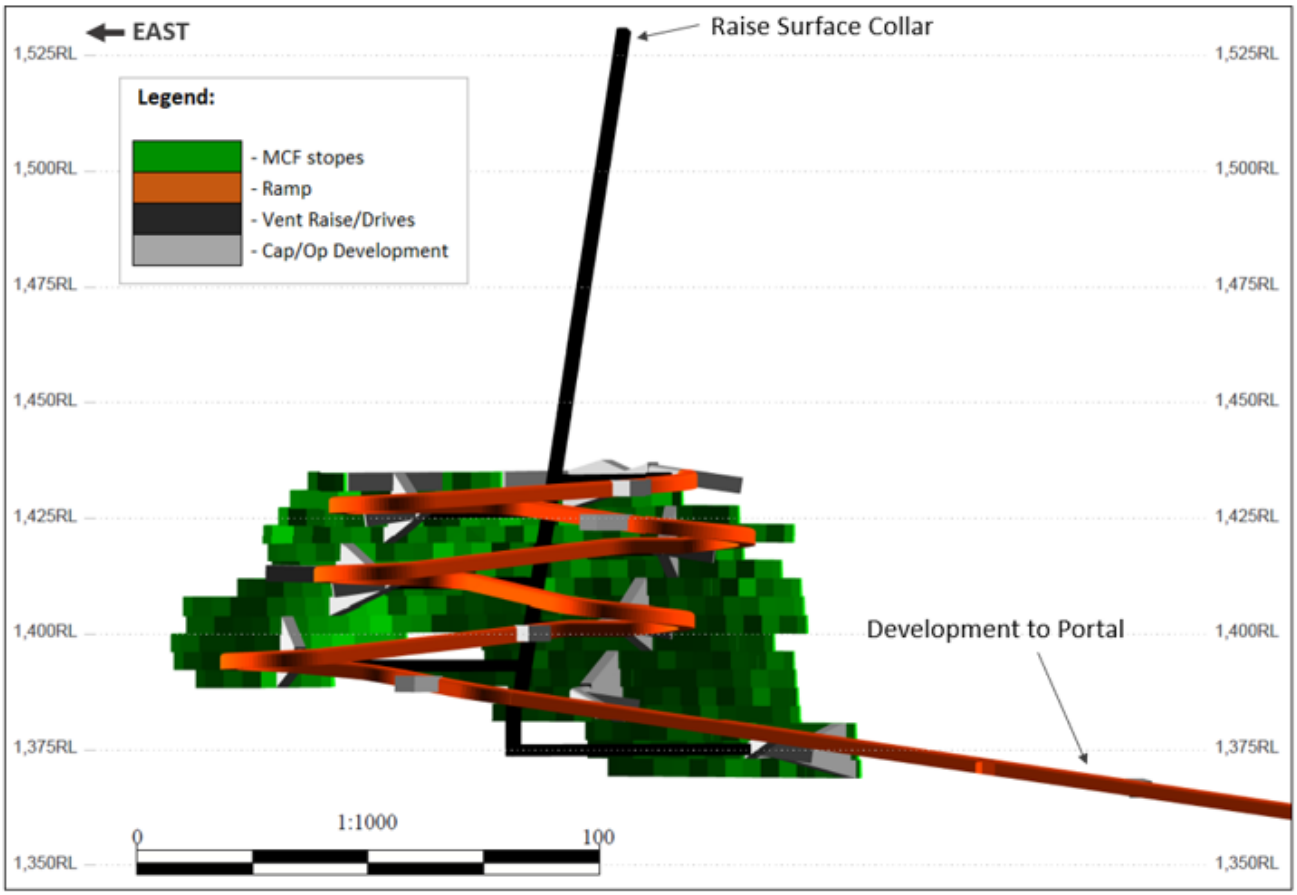


Figure 16-16 Lucky Queen Isometric View (Looking South)

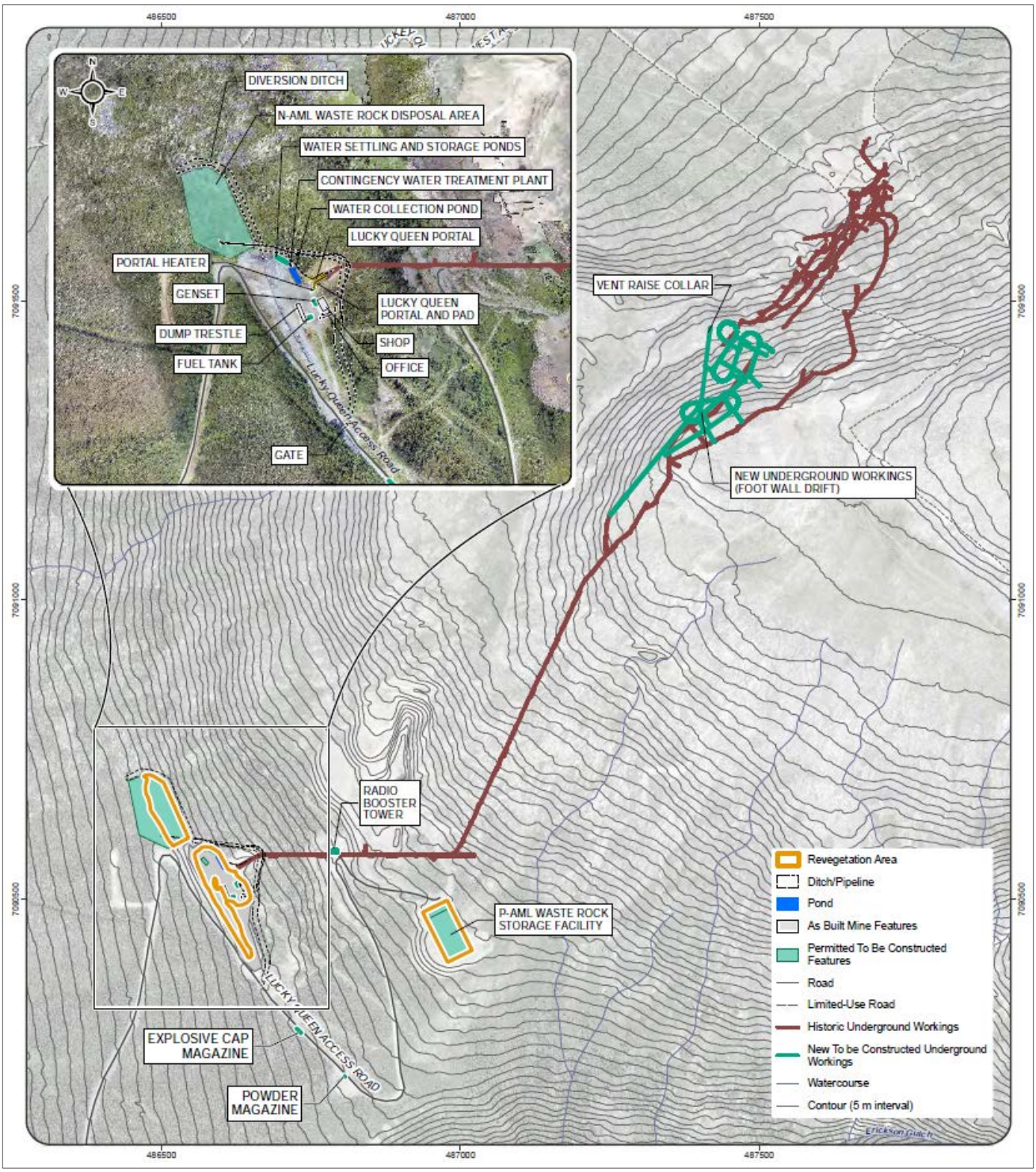


Figure 16-17 Lucky Queen Mine Plan View

16.7 PRODUCTION SCHEDULE

The overall production schedule is based on feeding a consistent 400 to 550 tpd to the centrally located mill. The mill upgrade is planned to be completed by the end of Q3 of 2023. The mine production schedule effective start date is April 1, 2021 and includes concurrent operation of two mines with occasionally a third in development phase. The operations were sequenced in an effort to maximize Net Present Value and to minimize the number of operations concurrently active whilst satisfying the mill throughput targets. All references to Ore in this section are exclusively the Probable Mineral Reserves outlined in Chapter 15.

While Bellekeno will be mined out in the first three months of the total project life, development will be advanced in the Bermingham and Flame & Moth deposits to prepare them for production in the first year. The capital development rates and capacities at Bermingham and Flame & Moth have been ramped up progressively over the first 24 months of the project. Over the project life, Bermingham and Flame & Moth will be the two main ore sources to the mill. Ore production at Flame & Moth mine will occur over 8.0 years at an average rate of 245 tpd. Bermingham will produce ore for 7.0 years at an average rate of 270 tpd. As the Bermingham mine ramps down, the Lucky Queen mine will begin development to supplement ore feed to the mill. The Lucky Queen mine will produce ore for 1.7 years at an average rate of 115 tpd.

Table 16-15 shows the total life of mine mill feed for the underground operations.

Table 16-15 Plant Feed

Mine	Diluted Tonnes	Ag (g/t)	Au (g/t)	Pb (%)	Zn (%)
Bellekeno	16,206	981	-	14.82	6.72
Lucky Queen	70,648	1269	0.13	2.71	1.56
Bermingham	630,173	899	0.13	2.26	1.30
Flame & Moth	721,322	672	0.49	2.69	6.21
Total Plant Feed	1,438,349	804	0.31	2.64	3.84

Notes:
1. Rounding as required by reporting guidelines may result in apparent summation differences between tonnes, grade and contained metal content;
2. All Diluted tonnes are probable Mineral Reserves as shown in Section 15 of this report.
3. Tonnages are diluted and recovered
4. Tonnage and grade measurements are in metric units.

Figure 16-18 shows the overall silver ounces recovered by each of the two different mining methods (LHOS category includes uphole stopes). Figure 16-20 shows the production quantities of ore and waste by year for each mine. Figure 16-21 and Figure 16-22 show the tonnage and grade relation over the life of the mines.

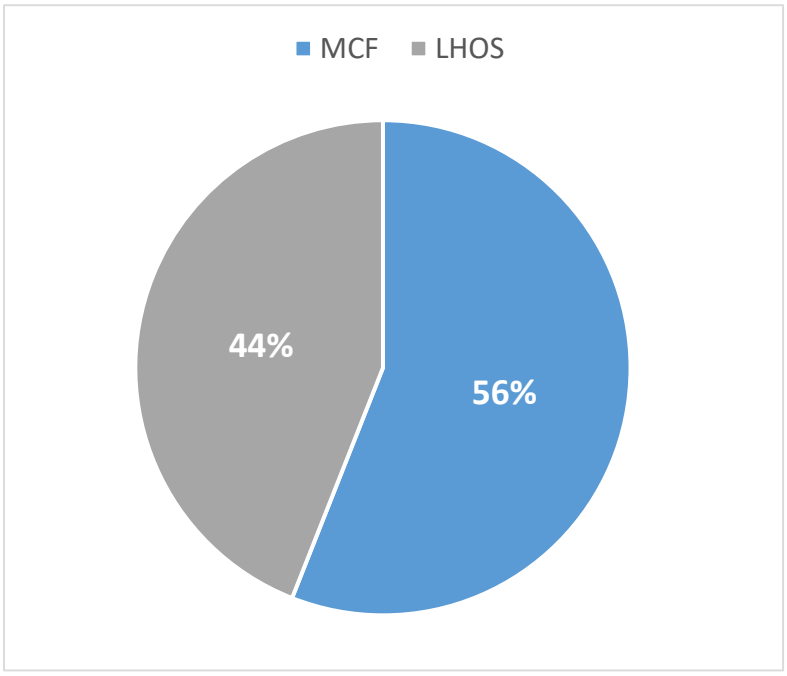


Figure 16-18 Mined and Recovered Silver Oz Distribution by Mining Method

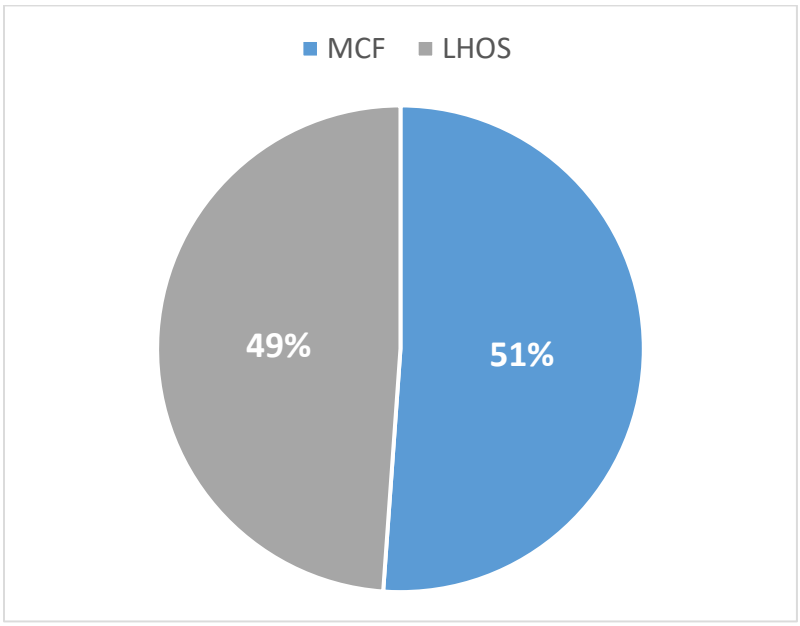


Figure 16-19 Ore Tonnes Mined Distribution by Mining Method

Figure 16-20 and show the combined mine ore and waste tonnage profile over the project life. Figure 16-21 and Figure 16-22 show the LOM ore production by mine along with the metal grade.

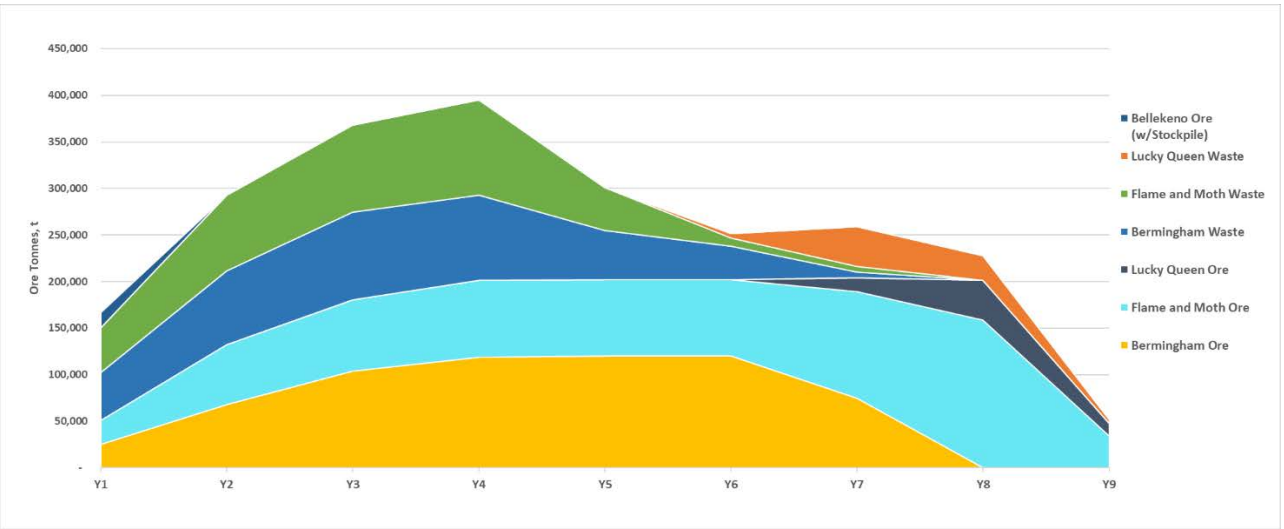


Figure 16-20 Ore and Waste Tonnes – Combined Mines

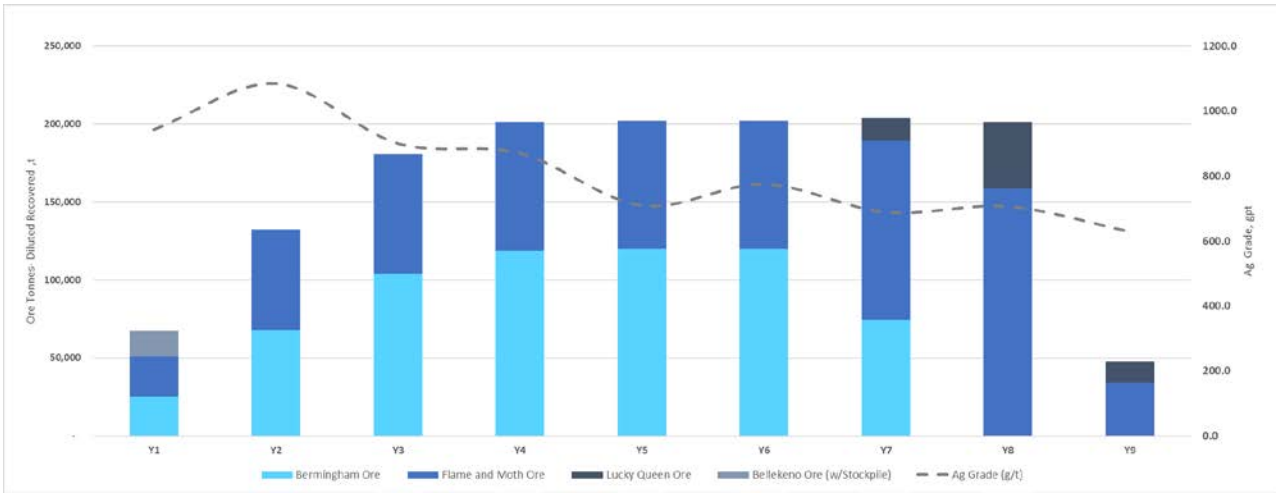


Figure 16-21 Ore Tonnes vs Ag Grade

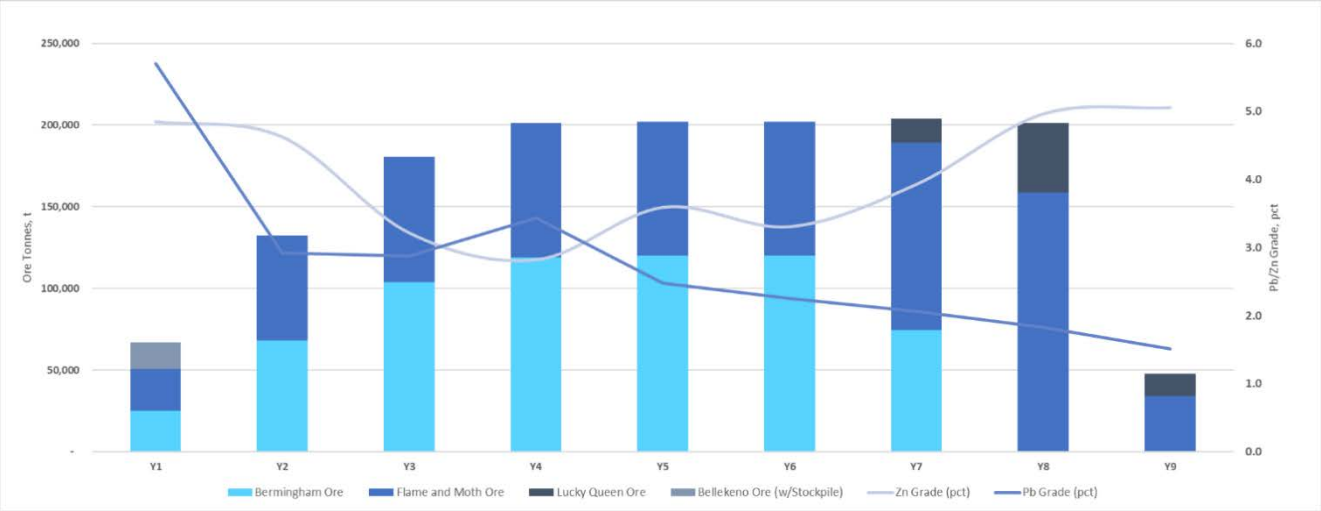


Figure 16-22 Ore Tonnes vs Base Metal Grade

16.8 MINE EQUIPMENT

All mobile equipment will be diesel-powered rubber-tired equipment owned by Alexco. Alexco currently owns or leases the majority of the underground equipment with the rest to be purchased over the mine life to supplement the fleet. Bellekeno, Bermingham, and Flame & Moth mine will all use similar size equipment while the Lucky Queen mine will use smaller scale units.

Table 16-16 shows the underground equipment build-up by period and Table 16- shows the currently owned surface mobile equipment fleet which includes pickups and light equipment such as pumps, light plants, and miscellaneous equipment at the site.

Table 16-16 Underground Equipment Fleet

Type	Category	Status	Size	Units	Required Units								
					Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9
Sandvik Secoma Bolter	Bolter	Existing		1						1	1	1	1
Maclean SSB Bolter	Bolter	Existing		2	2	2	2	2	2	2	2	2	2
Tamrock HS105D Jumbo	Jumbo	Existing		2	2	2	2	2	2	2	2	2	2
Secoma Quaser Mini Jumbo	Jumbo	Existing		1						1	1	1	1
RDH 100 DEH Drillmaster Jumbo	Jumbo	Existing		1						1	1	1	1
Epiroc 282 Jumbo	Jumbo	Existing		2	2	2	2	2	2	2	1	1	1
Epiroc T1D Jumbo	Jumbo	Existing		1	1	1	1	1	1	1	1	1	1
Scooptram JS-125 - Loader	LHD	Existing	1.25 yd	1						1	1	1	1
JS-220 - Scoop Remote - Loader	LHD	Existing	2.2 yd	1	1	1	1	1	1	1	1	1	1
Scooptram JS-220 - Loader	LHD	Existing	2.2 yd	2	2	2	2	2	2	2	2	2	2
Scooptram JS-350 - Loader	LHD	Existing	3.5 yd	1	1	1	1	1	1	1	1	1	1
Atlas Copco ST 3.5 Loader	LHD	Existing	3.5 yd	2	2	2	2	2	2	2	2	2	2
CAT R1300G Loader - Standard Bucket	LHD	Existing	4.1 yd	3	3	3	3	3	3	3	3	3	3
CAT R1300G Loader - Large Bucket	LHD	Existing	4.4 yd	2	2	2	2	2	2	2	2	2	2
Kubota Mine Tractors	Mine Tractor	Existing		3	3	3	3	3	3	3	3	3	3
Reinert Concrete pump XR536	Other	Existing		1	1	1	1	1	1	1	1	1	1
Reimer R400 Mobile mixing plant	Other	Existing		2	2	2	2	2	2	2	2	2	2
CMAC DHS - Bolting Platform: FM	Other	Existing		2	2	2	2	2	2	2	2	2	2
JCC-8 Scissor Lift	Scissor Lift	Existing		1	1	1	1	1	1	1	1	1	1
JUT 41 Scissor Lift	Scissor Lift	Existing		1	1	1	1	1	1	1	1	1	1
Getman A64 Scissor Deck	Scissor Lift	Existing		2	2	2	2	2	2	2	2	2	2
Maclean SS2 Shotcrete Sprayer	Shotcrete Sprayer	Existing		1	1	1	1	1	1	1	1	1	1
EJC-416D Truck	Truck	Existing	15 short ton	2	2	2	2	2	2	2	2	2	2
Youngs Machine YMC 470 T7	Truck	Existing	7 short ton	1						1	1	1	1
CAT AD22 Haul Truck	Truck	Existing	22 t	2	2	2	2	2	2	2	2	2	2
Youngs Machine YMC 470 T7	Truck	New	7 short ton	1						1	1	1	1
Total Units				**41**	**35**	**35**	**35**	**35**	**35**	**41**	**40**	**40**	**40**

Table 16-17 Surface Equipment Fleet

Type	Units
Light Vehicle	26
Heavy Highway Truck	6
Medium Highway Truck	4
Cat 930 G Loader 3	3
Cat 966 G Loader	1
Cat D8K Dozer	1
Cat D7R Dozer	1
Cat D-3C Dozer	1
Cat CS 56E Packer Drum	1
Champion 780A Grader	1
Hitachi Zaxis 270LC Excavator	1
KX 161 Excavator	1
CAT 375L Excavator	1
CASE 580 Super M Loader	1
Kubota KX 161-3 Excavator	1
Skidsteer/Forklift	4
Cat generators (350-450 kW)	2
Generators (<100kW)	4
IR lightplant	2
Cat generators (100 kW)	1
Services equipment (Pump, crane, Welder)	3
Diesel Compressor 750 cfm	1
Diesel Compressor 800 cfm	1
Compressor electric (750 cfm)	2
Air Compressor	2
Snowmobiles	4
Trailers	4

16.9 MANPOWER

Alexco will operate the mill as well as provide the technical services, management, and administration staff. All underground development and production will be performed by Alexco. Table 16-18 shows the total estimated annual manpower for the KHSD mines.

Table 16-18 Annual Manpower Estimate

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9
	2021	2022	2023	2024	2025	2026	2027	2028	2029
Management/Admin	10	13	13	13	13	13	13	13	12
Mine General	15	20	20	20	20	20	20	20	20
Bellekeno	5	0	0	0	0	0	0	0	0
Flame & Moth	32	56	59	60	60	60	57	56	56
Lucky Queen	0	0	0	0	0	2	32	34	31
Bermingham	38	54	59	60	57	55	43	0	0
Mill Operations	29	38	38	38	38	38	38	38	38
Site Services	10	13	13	13	13	13	13	13	13
Site Environmental	3	4	4	4	4	4	4	4	4
Health and Safety	4	5	5	5	5	5	5	5	5
Total	**144**	**203**	**211**	**213**	**210**	**209**	**225**	**182**	**179**

16.10 MINE OPERATIONS

All mine operations will be performed by Alexco personnel using the company's owned equipment. Mine Operations will proceed 24 hours per day, 7 days per week with 4 crews rotating to site and staying at the Alexco campsite. All mining will be performed using mechanized methods; with the exception of bolting in small section headings where bolting will be performed off of scissor lifts with stoper drills and jacklegs or using dedicated bolting platforms. All mucking will be performed by diesel-powered load-haul dump units (LHDs) mucking to diesel-powered underground haul trucks. For the Bermingham, Bellekeno and Lucky Queen mines, ore will be hauled to the portal and stockpiled on surface where it will be rehandled by Alexco's surface truck fleet and loaders. Due to the proximity of the mill to the Flame & Moth mine, the underground fleet will haul the ore directly to the ore pad. Waste will be hauled to the nearest backfill site underground or, if there are none available, hauled to surface and stockpiled.

16.11 BACKFILLING

Backfilling will be either unconsolidated waste rock fill (URF) or cemented rock fill (CRF). All backfill material will be hauled by the underground haul trucks and placed using LHDs. In areas where a tight seal between the backfill and the back is required the LHD will be equipped with a rammer-jammer plate to push the backfill tight to the back. CRF will be mixed in the nearest remuck bay to the backfill area, which will be driven at a slight negative grade (e.g., -2%). Cement will be provided by a mobile cement batch plant and mixed with the waste rock by the LHD. The cement content in the CRF will be 3% - 8% in areas where required, which is based on recommendations from laboratory testing results completed by an external consultant.

16.12 VENTILATION

A ventilation model was designed based on the mine plan for the Bermingham, Flame & Moth, and Lucky Queen mines. Primary fans, auxiliary fans, and heating units will be reused from the Bellekeno mine as well as shared between other operations to reduce total capital expenditure.

16.12.1 MINE AIR HEATING

Alexco will need to heat the ambient air to +2°C in all three mines. This will require approximately 1.9 MW for Flame & Moth mine; 1.8 MW for Bermingham mine and 1.0 MW for Lucky Queen Mine in the coldest month of January. Direct fire propane heaters have been purchased for Flame & Moth and Bermingham mines. Lucky Queen will utilize the propane heater and fan inventory from Bermingham once mining has finished. Figure 16-23 displays the average temperature at the nearest weather station of Mayo, Yukon Territory, Canada.

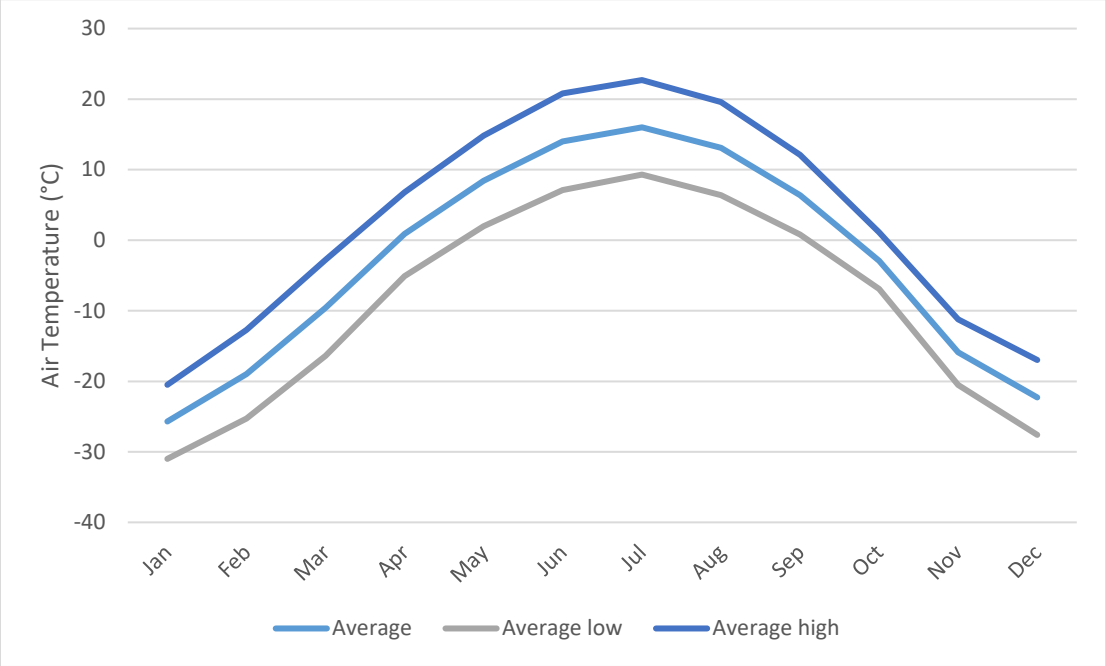


Figure 16-23 Mayo, YT Monthly Average Temperature

16.12.2 VENTILATION MODELLING

A ventilation model for each mine was developed based on the proposed designs for the three new mines using Ventsim® software. No model was created for the Bellekeno mine because the primary ventilation circuit is already in place and only auxiliary ventilation will be required. This was used to determine operability and estimate the required primary fan duties required at different stages of the mine life. Key modelling considerations include:

- Expected diesel equipment fleets for each mine are based on the mine plan;
- Utilization of availability for equipment is based on the mine plan;
- Associated friction factors and resistances are based on excavation methodology and accepted industry design values;
- A leakage allowance of 20% of total airflow demand;
- Early development work in both the main and ventilation declines will have fans located well outside each portal, a minimum of 50 m away, to limit the possibility of recirculation;

- Airways will maintain an air velocity of at least 0.5 m/s to remove contaminants and maintain an appropriate temperature in the mine; and
- Working areas will be limited to an air velocity of 4 m/s and travel ways to a maximum of 6 m/s to maintain a safe and healthy environment.

16.12.3 FLAME & MOTH MINE

The proposed layout for the Flame & Moth underground project will support a relatively simple positive pressure ventilation circuit. A primary fan located on the surface will force the heated air down the intake raises to each respective ventilation drives that intercept the intake raise on the working levels. Each production level will be ventilated using an auxiliary fan that draws fresh air from the intake raise and directs the air through ducting to the working area before it returns to the main ramp to exhaust out the portal. Each of these ventilation drive connections must be regulated to ensure only the desired volume is permitted to flow.

One primary surface intake raise is planned to support the Lightning and Christal zones and the Christal Zone will utilize a dedicated ventilation drive to connect to the fresh air system. Figure 16-24 shows the basic primary airflow through the fully developed mine.

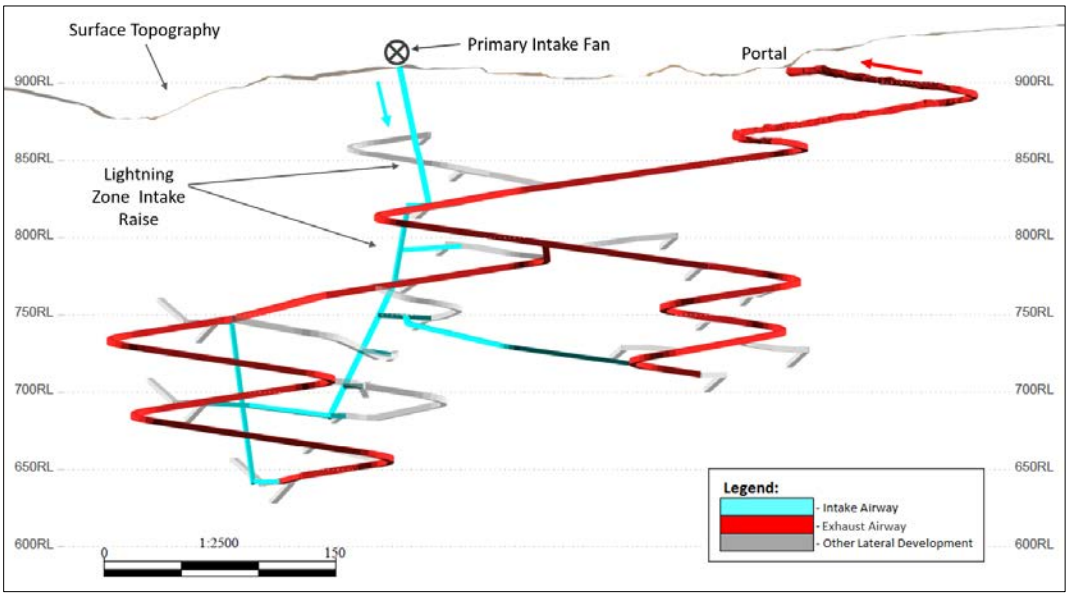


Figure 16-24 Flame & Moth Primary Airflow Schematic

Peak fan power for the Lightning intake surface raise estimated to be 52.1 kW. Peak airflow requirements reach 75 m^3/s in year 2 of project schedule. Figure 16-25 shows airflow demand over the main milestones of the project – from development to a full production stage. The system limit line refers to the capacity of the system where airflows are below recommended air velocity for both travel ways and raises.

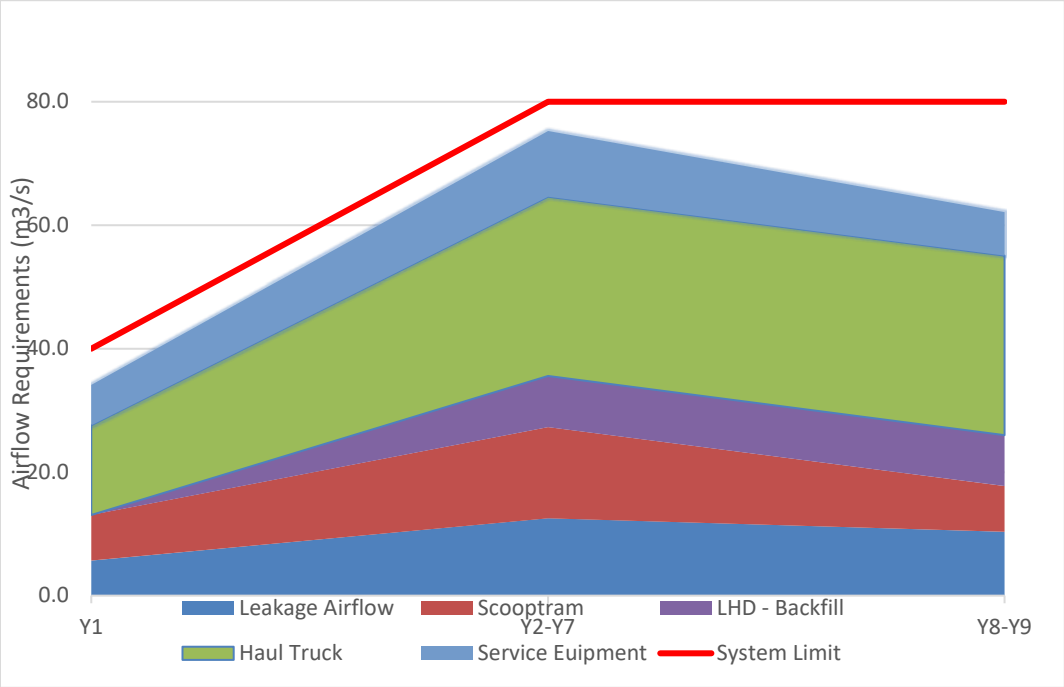


Figure 16-25 Flame & Moth Project Ventilation Demand

16.12.4 BERMINGHAM MINE

The proposed layout for the Bermingham underground project will support a relatively simple positive pressure ventilation circuit. A primary fan located on the surface will force the heated air down the intake raises to each respective ventilation drives that intercept the intake raise on the working levels. Each production level will be ventilated using an auxiliary fan that draws fresh air from the intake raise and directs the air through ducting to the working area before if returns to the main ramp to exhaust out the portal. Each of these ventilation drive connections must be regulated to ensure only the desired volume is permitted to flow. Figure 16-26 shows the basic primary airflow through the Bermingham mine.

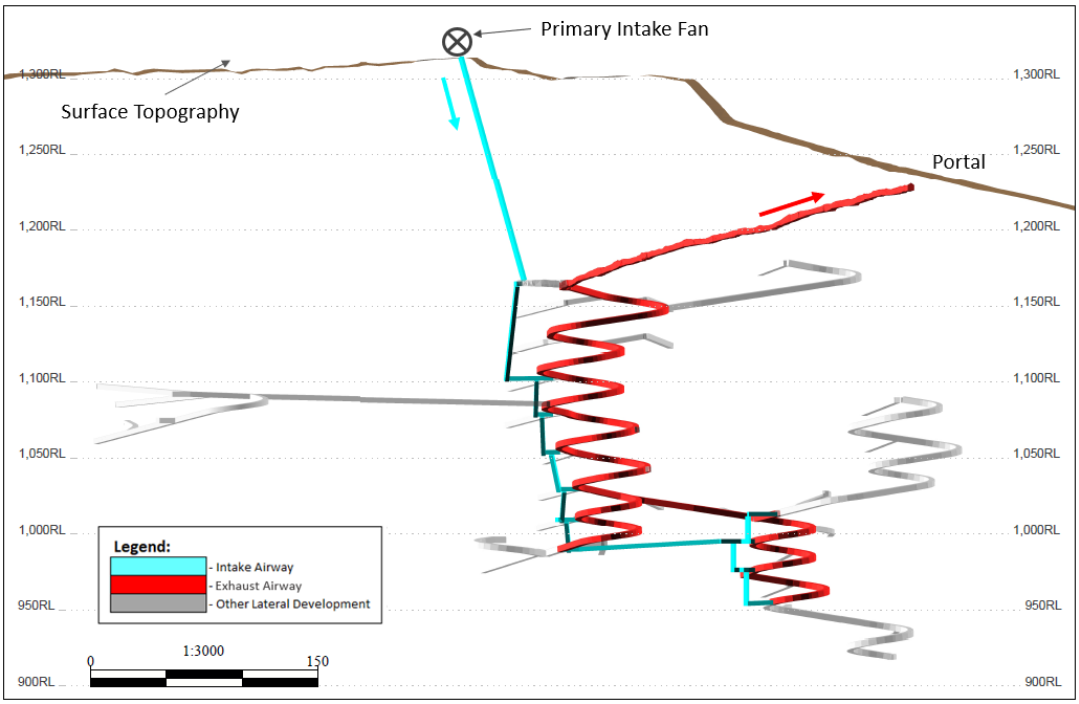


Figure 16-26 Bermingham Mine Primary Airflow Schematic

Peak fan power for the Bermingham mine estimated to be 84.1 kW. Peak airflow requirements reach 76 m^3/s in year 2 of project schedule and remains constant for the entire mine life.

Figure 16-27 shows airflow demand over the life of project.

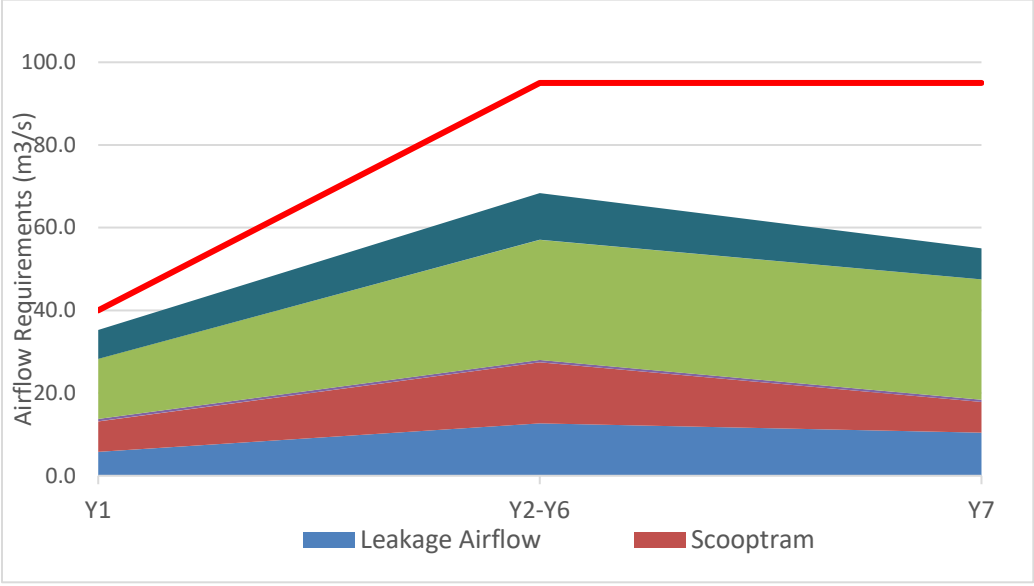


Figure 16-27 Bermingham Project Ventilation Demand

16.12.5 LUCKY QUEEN MINE

The proposed layout for the Lucky Queen underground project will support a simple positive pressure ventilation circuit. The primary fan located at the collar of a dedicated intake raise will cause air that has passed through a heating system to enter the mine. The air will then flow onto the ramp at the first available opportunity where it will be forced onto each level by an auxiliary fan, sweeping the face and returning to the ramp to repeat the process at the next working area. Ultimately, the air will exhaust from the main portal. Figure 16-28 shows an isometric view of the ventilation circuit.

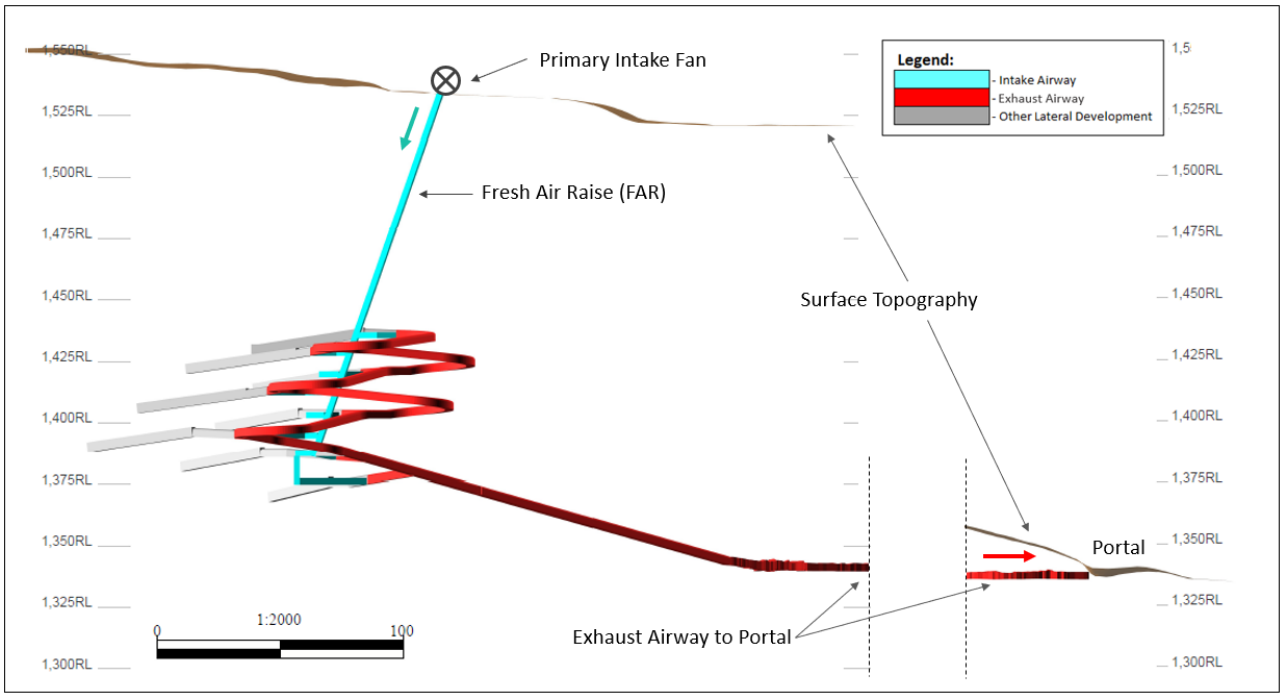


Figure 16-28 Lucky Queen Primary Airflow Schematic

Peak fan power for the Lucky Queen mine is estimated to be 34.0 kW. Peak airflow requirements reach 41 m^3/s in year 7 of project schedule and remain constant for the life of mine. Figure 16-29 shows the airflow demand over the life of Lucky Queen project.

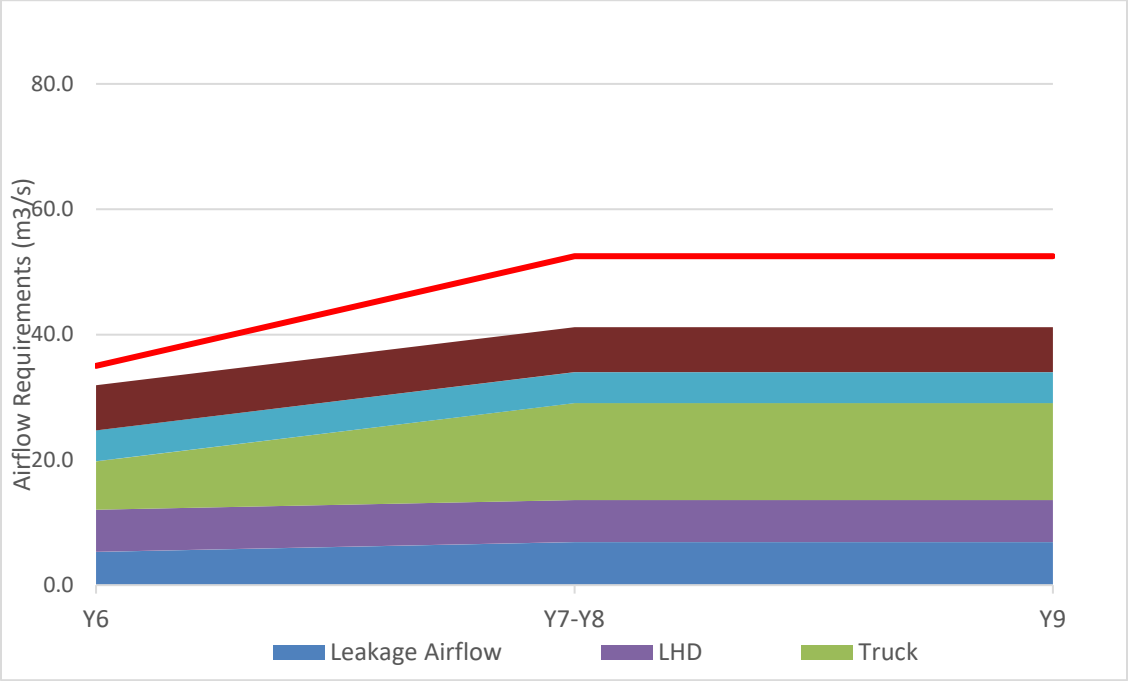


Figure 16-29 Lucky Queen Project Ventilation Demand

During initial development, low-friction twin ducts will be used to push the air the distance to the face. The number of concurrent activities underground will be restricted until the ventilation raise has broken through to surface and the main fans have been commissioned.

16.13 MINE SERVICES

16.13.1 COMPRESSED AIR

Compressed air will be supplied underground through 2" diameter HDPE pipes. In the case of the Flame & Moth mine, the compressed air will be supplied by a fixed air compressor associated with the mill. In the case of the other three mines, compressed air will be supplied by an air compressor located at the portal.

16.13.2 DEWATERING

The Bellekeno and Lucky Queen mines are located above the valley floor so total groundwater inflow is expected to be limited. Dewatering will still be required to remove service water from the mine. Bermingham and Flame & Moth are both expected to have higher groundwater flows. For the Flame & Moth mine, the maximum groundwater flow is expected to be 33 L/s. For Bermingham mine, the maximum inflow is expected to reach 3.25 L/s; however, a value of 11 L/s has been used for engineering purposes.

For all the mines, the dewatering strategy is to use electric submersible pumps to collect water from sumps near the active mining areas and pump it in stages to the dirty water sump located on the ramp. The dirty water will decant to a clean water sump where a clean water pump will pump the water to the surface for recycling or treatment and eventual discharge.

16.13.3 ELECTRICAL

All the mines will be connected to the site and provincial power grid. Primary power transmission underground will be 4,160 V to mobile power centres located in strategic locations underground where voltages will be stepped down to 600V for final distribution. Bermingham mine will use a generator to provide power to the mine for the first 3 months of the project schedule.

16.13.4 MAINTENANCE FACILITIES

For both Flame & Moth and Bermingham mines, the maintenance department will have a fuel/lube truck, a mechanic's service truck, a tractor, and access to a scissor lift and a boom truck.

In addition to the mobile equipment, the mine maintenance department will be responsible for the stationary equipment consisting of air compressors, main ventilation fans, propane air heaters, underground electrical distribution system, and main dewatering pumps.

Most of the mobile equipment maintenance will be performed in a surface shop, which will be constructed near each of the mine portals.

17. RECOVERY METHODS

17.1 INTRODUCTION

The Keno Hill Silver District Property (the Property) is of a polymetallic silver-lead-zinc vein type mineralization. Silver predominantly occurs in argentiferous galena and argentiferous tetrahedrite, and to a lesser content, as native silver and the silver-bearing minerals polybasite, stephanite, and pyrargyrite. Lead occurs in galena and zinc in sphalerite in either an iron-rich or iron-poor variety. Other sulphides identified at the Property include pyrite, pyrrhotite, arsenopyrite, and chalcopyrite. Common gangue minerals include siderite, quartz and calcite in decreasing order of abundance (RPA, 2017).

The Keno Hill District Mill was constructed in 2010 with a nameplate processing capacity of 408 tpd. The commercial operations started on January 1, 2011 at a nominal processing rate of 250 tpd with ore materials from the Bellekeno Mine. Operation of this plant was discontinued in the end of August 2013 due to low silver prices and other economic factors. The original process flowsheet of the mill was mainly developed from the metallurgical testwork conducted on Bellekeno samples from 1996 to 2009 (Wardrop, 2009).

The Keno Hill District Mill is currently being recommissioned for operation with a LOM average throughput of 483 tpd according to the ~8-year mine plan for this technical report. The initial mill throughput will be 275 tpd and ramp up to 400 tpd with the average peak throughput of 550 tpd in year 3. The existing District Mill feed will first be produced from Bellekeno Mine, after which the mill will be continuously supplied by blended ores from the Bermingham and Flame & Moth mines during most of the LOM, followed by processing of Lucky Queen ore near the end of the project life. Details on the mine plan and production schedule are found in Section 16.

The original process flowsheet has been modified accordingly to allow the increased feed capacity. The process modifications were based on additional metallurgical testwork described in Section 13, the experience from previous operations, as well as mill modifications and upgrades. This section (Section 17.0) describes the major processing design criteria, the modified flowsheet including recent modifications and upgrades, a general process description, process unit operation description, and annual production estimates.

17.2 PROCESS DESIGN CRITERIA

The District Mill was designed for 400 tpd mill throughput, and the plant will be operated at 400 tpd for the first two years before ramping up to 550 tpd. The mill complex will process ore at a 75% availability for the crushing plant on the basis of one 12-hour shift per day, and 92% availability for the grinding and flotation plant operating 24-hours per day.

The primary grinding will be conducted in two stages with a target grind size P_{80} of 100 to 120 µm. Concentrate regrind mills will be added to each of the lead and zinc flotation circuits to further liberate lead and zinc minerals. The regrinding particle size P_{80} was designed as 30 µm for the lead rougher concentrates and 30 µm for the zinc concentrates.

The key design criteria are shown in Table 17-1.

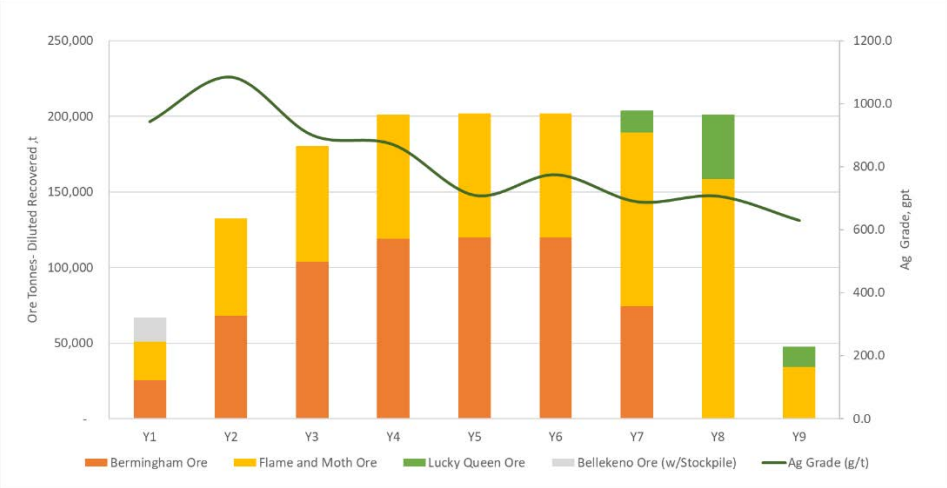
Table 17-1 Modified Mill Design Criteria

Descriptions	Unit	Values
Daily Processing Rate	tpd	400 (ramping up to 550 tpd in year 3)
Annual Operating Days	d/y	365
Operating Schedule – Crushing		1 shift per day (12 h/shift)
Operating Schedule – Grinding/Flotation		2 shifts per day (12 h/shift)
Crushing Availability	%	75
Grinding/Flotation Availability	%	92
Head Grades, LOM Average		
Ag Grade	g/t	805
Au Grade	g/t	0.34
Pb Grade	%	2.98
Zn Grade	%	4.13
Bond Ball Mill Work Index	kWh/t	10.5
Grinding		
Feed Particle Size P80	µm	12,000
Product Particle Size P80	µm	100 to 120
Regrinding		
Lead Rougher Concentrate Particle Size P80	µm	30
Zinc Rougher Concentrate Particle Size P80	µm	30
Flotation Stages		Pb Ro/3-stage Cleaner flotation followed by Zn Ro/3-stage Cleaner flotation
Tailings Management:		
Tailings		Surface Dry Stack, with portion of F&M tailings used for underground backfill

17.3 LOM PREDICTED MILL FEED

The following summarizes the LOM mill feed based on the mine plans presented in Section 16 of this report. Ore will be produced from Bellekeno, Bermingham, Flame & Moth and Lucky Queen, with typically two mines in production at any time. The annual mill feed schedule is shown graphically in Figure 17-1.

Table 17-2 provides more details of the mill feed from each deposit and the average head grades. The majority of the mill feed will come from the Flame & Moth deposit and Bermingham deposit, providing more than 90% of the total mill feed materials. The remaining mill feed material will come from the Lucky Queen deposit for about 5% of the total, and the Bellekeno deposit for about 1% of the total. The average lead and zinc grades of the three major deposits (Flame & Moth, Bermingham, and Lucky Queen) are in the range of 2.26% to 2.71% Pb and 1.30% to 6.21% Zn, which is significantly lower than the feed grades of the Bellekeno deposit.



Source: Mining Plus 2021

Figure 17-1 Source of Mill Feed in Tonnes per Year

Table 17-2 Summary of LOM Mill Feed By Deposit

LOM Average	Flame & Moth	Bermingham	Lucky Queen	Bellekeno	Total
Proportion of Mill Feed	50%	44%	5%	1%	100%
Tonnage (kt)	721	630	71	16	1,438
Lead grade (% Pb)	2.69	2.26	2.71	14.82	2.64
Zinc grade (% Zn)	6.21	1.30	1.56	6.72	3.84
Gold grade (g/t Au)	0.49	0.13	0.13	-	0.31
Silver grade (g/t Ag)	672	899	1269	981	804

17.4 PROCESS FLOWSHEET MODIFICATIONS

The mill process flowsheet has been modified from the original design based on previous operation experience, mill modifications, mill capacity reviews, as well as the additional metallurgical testwork.

17.4.1 PREVIOUS OPERATION

The Keno Hill District Mill was operated by Alexco between 2011 and 2013, and processed ore at an average rate of 250 tpd via a two-stage crushing, one-stage grinding, and sequential lead and zinc flotation process. No regrinding stage was employed in the existing mill complex, which, had been proposed in the 2009 design by Wardrop to further grind the lead rougher and second cleaner tailings. The mill operating data for this period was reviewed by SRK and RPA and presented in their 2014 and 2017 PEA Technical Reports. The 2012 operating data is quoted as follows from the SRK report:

- The mill processed 92,000 t of Bellekeno vein material generating 12,000 t of silver lead concentrate and 6,000 t of zinc concentrate. The year average monthly throughput was 252 tpd at 89% availability. The maximum monthly throughput for the year was 305 tpd, with peak production in September and October;

- Head grades averaged 654 g/t silver, 9% lead and 4% zinc. The head grades ranged from 620 g/t to 1,075 g/t silver; 8% to 16% lead; and 4% to 9% zinc;
- The lead recoveries in 2012 ranged from 84% to 98% with a concentrate lead grade of 55% to 68%. The silver recoveries to silver-lead concentrate ranged from 83% to 97% with silver grades from 4,231 g/t to 5,270 g/t. Zinc grade in the silver-lead concentrate ranged from 4% to 9% with recovery as high as 26%; and
- The zinc recovery to zinc concentrate ranged from 46% to 64% with a final zinc grade of 40% to 49% zinc. The silver recoveries to zinc concentrate ranged from 2% to 6% and the maximum lead recovery to zinc concentrate was 6% with a maximum grade of 7% lead.

The head grades for the original design were based on Bellekeno ore at 871 g/t silver, 9.5% lead, and 5.6% zinc, which corresponded to the mill feed grades during operation. Satisfactory lead and zinc concentrate products were produced during production. However, where concentrates grades and recoveries were lower than the predicted values, it appears related to insufficient liberation and/or reagent schemes in operation.

17.4.2 MILL MODIFICATIONS AND UPGRADES

During the previous operation, there were only minor changes to the mill complex as built in 2010. Since the temporary shutdown in 2013, maintenance projects have been completed in preparation for restarting the mill for the project described herein. The major maintenance works already completed include rebuilding all flotation cells and pumps, removal of the Derrick screen, installation of the cyclone cluster for both the grinding circuits and concentrate regrind circuits, and removal and replacement of the smaller tailings filter press with a larger one. The new ball mill has been installed, and tie in with the new grinding circuit configuration will be completed when the higher throughput is required. A water treatment circuit to treat water from the Flame & Moth mine was installed in 2018 consisting of a clarifier and reagent addition (lime and flocculant) for treating water from underground, prior to discharge or recycle into the mill. The water treatment plant for the underground mine water was constructed inside the existing mill building.

In this study, capacity and process review were conducted mainly in the three areas based on the previous mill performance; grinding circuit, flotation circuit, and dewatering circuit to ensure the mill complex throughput capacity and the mill metallurgical performance based on the additional test results. The required modifications or upgrades of these areas and other proposed upgrades in the overall mill complex are summarized in Table 17-3. During the initial years of operation, campaigns will be run to test higher throughput rates and identify any bottlenecks or additional projects required to achieve the higher throughput. An allowance of $1.1M has been included in costing for these additional modifications.

Table 17-3 Summary of Plant Modifications to Achieve LOM Planned Throughput

Process Area	Equipment Changes
ROM Ore Crushing Circuit	• Install a baghouse filter for crusher ventilation • Install enclosed building around secondary crusher and screen (complete)
Fine Ore Storage and Reclaim Systems	• Install fine ore apron feeders (complete)
Primary Grinding Circuit	• Convert ball mill No 1 to overflow discharge open circuit (complete) • Install ball mill No 2, pumpbox and pumps (closed with hydrocyclones)
Classification	• Replace Derrick screen with two hydrocyclones (complete)
Lead Flotation Circuit	• Install a concentrate regrind mill, pumpbox, pumps, and a hydrocyclone (closed circuit) • Lead 1st cleaner tailings combined with lead rougher scavenger tailings to feed zinc circuit (complete)
Zinc Flotation Circuit	• Install rougher concentrate regrind mill, pumpbox, pumps and a hydrocyclone (closed circuit)
Lead and Zinc Concentrate Dewatering and Loadout	• No changes required
Tailings Dewatering and Handling	• Replace one of the existing filters (the smaller) with a larger filter (23 plates) (complete)
Reagent Handling and Storage	• Replace process water line loop (complete)
Slurry Handling	• Modifications as indicated from test campaigns e.g., replace undersized pumps, possibly tailings thickener, possibly additional zinc third cleaner retention time

17.4.2.1 Grinding Circuit

Three specific modifications have been completed to assure mill throughput including:

- replacing the existing ball mill separation screen to classifying cyclones;
- modifying the existing ball mill discharge type from grate discharge to overflow type; and
- adding one additional ball mill to the grinding circuit in series with the existing ball mill which was in open circuit.

These modifications are based on both grinding testwork and review of the planned mill feed/throughput for the LOM. Starkey & Associates (S&A) of Oakville, Ontario, performed a grinding circuit throughput analysis in 2013. In the investigation, the Bond rod mill work index was found to be 12.4 kWh/t; while the Bond ball mill work index was measured as 10.20 kWh/t. Both the working indices are noticeably higher than the 2009 design as of 8.7 kWh/r (RWi) and 9.5 kWh/t (BWi).

The S&A assessment was expanded on by International Metallurgical in 2018 and forms the basis for the changes to mill equipment. International Metallurgical evaluated the conversion of the existing grate discharge on the primary ball mill into an overflow discharge to supplement the second ball mill installation. The assessment also included the replacement of the vibrating Derrick screen with two cyclones. Based on an overall Bond Work index of 11.0 kWh/t from previous operations and grindability testing (Starkey & Associates, 2013), the two-stage ball mill grinding

performance was estimated to reduce the feed size F80 of 6 mm to 80% passing 120 µm in the cyclone overflow. This arrangement would allow the mills to process 811 tpd.

The QP reviewed the planned grinding circuit which is composed of two identical overflow ball mills, each with a dimension of 1.8 m diameter x 3.6 m, and an installed power of 150 kW. It was estimated that at a feed size F80 of 10 mm and an overall BWi of 10.5 kWh/t, the two-stage ball mill grinding circuit could achieve 600 tpd. The particle size of the ground product will be 80% passing 100 to 120 µm which is considered appropriate for this mill feed. As noted, the second ball mill has been installed and final tie in with the new circuit will be completed once the additional grinding capacity is required.

17.4.2.2 Flotation Circuit

Two major modifications were completed in the flotation circuit based on the recent test results. The first modification is to divert the lead 1st cleaner scavenger tailings to feed the zinc rougher flotation circuit. This can give a better control of zinc reporting to the lead concentrates particularly for samples from the F&M zone which has a high ratio of Zn:Pb.

The second modification is to add two regrind ball mills to the current lead and zinc flotation circuit, one for each of the lead and zinc concentrates prior to the cleaning stage. This is based on analysis of the metallurgical testwork conducted from 2016 to 2019 on representative samples of both the F&M and Bermingham deposits, and composites thereof (see Section 13.0). Regrinding of each of the lead and zinc rougher concentrates improves the grade of the final zinc concentrate and lowers the zinc reporting to lead concentrate. This is particularly beneficial for the F&M ore. Both concentrate regrind mills have installed.

17.4.2.3 Dewatering Circuit

Plate and frame pressure filters will continue to be used for dewatering of both the lead and zinc concentrates, and for the tailings products. The circuit has been modified to replace the smaller of the two existing filter presses (1,000 x 1,000 mm, 9 plates) and replace it with a larger filter press (1,250 x 1,250 mm, 23 plates) which is the same size and brand as the existing filter press.

17.5 PROCESS UNIT OPERATION DESCRIPTION

The Keno Hill District Mill is based on a conventional sequential flotation process producing lead and zinc concentrates. The lead concentrates are high in silver which typically account for approximately 90 to 95 percent of the mill feed silver values since silver is strongly associated with lead minerals. Overall, silver represents 70 to 80 percent of the value of the ores in the district.

Ore will be crushed and then processed in a conventional flotation mill producing two concentrates; a silver/lead concentrate and a zinc concentrate. Concentrates are thickened, filtered, and trucked off site for sale. Tailings are also thickened, filtered, and stored in a dry stack tailing facility (DSTF) adjacent to the mill.

Process water will be stored in the mill pond adjacent to the mill complex and recycled to the plant for varied applications. The primary makeup water source is from the Flame & Moth underground mine which will be treated within the existing water treatment plant. This can be supplemented by fresh water from the Mill Well if required in the initial years of operation. Excess water can be discharged to either of two nearby drainage basins, Christal Creek or Lightning Creek, once the permitted water quality is achieved. The environmental permits, water management and water treatment are discussed in Section 20.

17.5.1 SIMPLIFIED PROCESS FLOWSHEET

The simplified process flowsheet of the mill complex is shown in Figure 17-2. The mill complex consists of the following process sections and unit operations:

- primary and secondary crushing circuits with a radial stacker belt conveyor to transport the crushed ore to the covered fine ore stockpile;
- draw down pocket reclaiming the crushed ore from the covered fine ore stockpile;
- two-stage grinding in a closed circuit with hydro-cyclones to produce a grinding product P_{80} size of 120 µm;
- a grinding classification circuit to produce a cyclone overflow to feed the lead rougher and rougher scavenger flotation circuit to recover lead and silver minerals; the process to produce lead rougher and lead rougher scavenger flotation concentrates which will be reground to a P_{80} size of 30 µm;
- the reground lead rougher and lead rougher scavenger flotation concentrates to be upgraded in three stages of cleaner flotation producing the final silver-bearing lead concentrate;
- the zinc rougher and the zinc rougher scavenger flotation circuit to be fed by the lead rougher scavenger tailings and the lead 1st cleaner tailings to produce the zinc rougher concentrates and the final zinc rougher scavenger tailings;
- the zinc rougher concentrate to be reground to a P80 size of 30 µm followed by upgrading in three stages of cleaner flotation; the cleaner circuit to generate the final zinc concentrate and the zinc 1st cleaner scavenger tailings;
- thickening and pressure filtration of the lead concentrate and the zinc concentrate;
- thickening and pressure filtration of each of the zinc rougher scavenger and zinc 1st cleaner scavenger tailings, which will then be disposed of either underground as cemented backfill, or on surface as dry stack tailings;
- a reagent preparation section; and,
- utilities distribution for compressed air and water distribution.

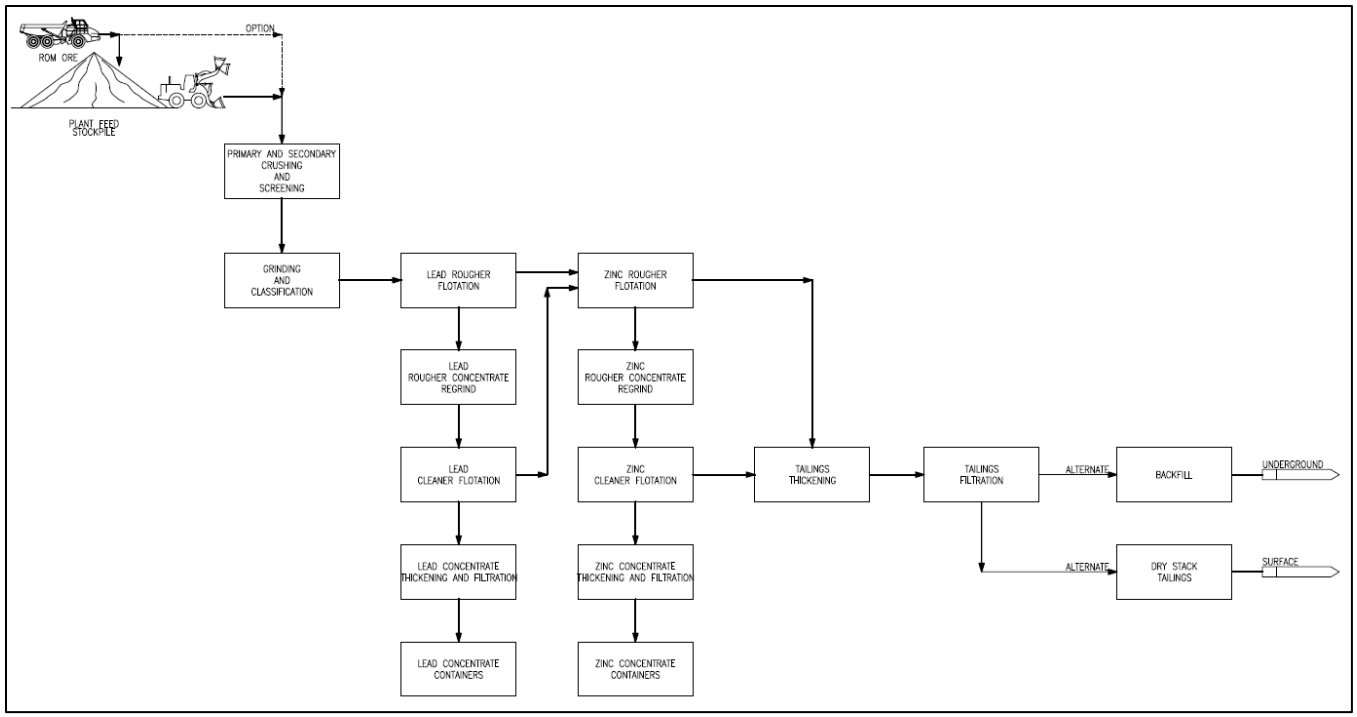


Figure 17-2 Simplified Process Flow Diagram of the Mill Complex

17.5.2 ROM ORE CRUSHING, ORE STORAGE, AND RECLAIM

The crushing system will be operated up to 12 h/d at a process rate of 50 t/h. The ROM ore will be crushed in a two-stage crushing circuit closed with a vibrating screen. The final crushed product size P_{80} will be 12 mm. ROM ore from Bermingham and Bellekeno will be dumped onto a ROM ore stockpile and then into the primary jaw crusher. The hopper is equipped with a stationary grizzly with a 450 mm aperture opening to prevent oversize ore entering the downstream jaw crusher.

The primary crushing products, joined by the secondary crushing discharge, will feed the sizing screen to produce the final crushed product. The oversize product from the sizing screen will feed the secondary cone crusher. The crushed material will be conveyed to a fine ore stockpile with 550 t live capacity. Crushed ore reclaim will be achieved via a draw down pockets located beneath the fine ore stockpile.

17.5.3 PRIMARY GRINDING CIRCUIT

Crushed ore will be reclaimed from the stockpile onto the ball mill feed conveyor belt at a nominal rate of 18.1 t per operating hour (434 tpd). The primary grinding circuit is a two-stage ball milling process producing a ground material with a P_{80} size of 100 to 120 µm. Ore from the ball mill will discharge into the feed chute of the primary No.1 ball grinding mill which will be a heavy-duty tyre driven type grinding mill 1,800 mm in diameter and 3,600 mm long, with an installed power of 150 kW. The primary mill slurry will discharge into a pumpbox and will then be pumped to join the secondary No.2 ball mill discharge.

The combined streams will be pumped to the classifying cyclones. The cyclone underflow will return as feed to the secondary ball mill, while the cyclone overflow will report to flotation circuit. Reagents (3418A and zinc sulphate) will be added to the ball mill feed to suppress zinc minerals during the lead mineral flotation stage.

The ball mill feed conveyor belt will be sampled every shift to provide a head assay of the feed to the plant.

17.5.4 CLASSIFICATION

The primary and secondary ball mill discharges will be combined in a common pumpbox and will then feed a hydro-cyclone pack. Two cyclones will be installed each with a diameter of 250 mm. Operating in a mode of one running and one standby, the cyclone undersize material will return to the secondary grind ball mill by gravity, while the cyclone overflow with a P_{80} size between 100 and 120 µm will gravity flow to the flotation circuit.

17.5.5 LEAD FLOTATION CIRCUIT

The lead flotation circuit will produce a final silver-lead concentrate through the stages of rougher flotation, rougher scavenger flotation, rougher scavenger concentrates regrinding, followed by three-stages of cleaner flotation. Blower air will be injected into each flotation cell mechanism. The reagents zinc sulphate, 3418A, SIPX and MIBC will be added to the circuit as required.

The flotation cells are existing units which were sized for the maximum laboratory-scale retention time for Bellekeno samples. Based on the locked cycle flotation testwork completed by SGS discussed in Section 13, these cells are slightly oversized for the planned LOM mill feed which will have lower lead head grades than the Bellekeno ore.

17.5.5.1 Lead Rougher and Rougher Scavenger Flotation

The cyclone overflow fraction from the primary grinding circuit will be conditioned with the reagents 3418A and zinc sulphate in two agitated tanks. The pulp density is approximately 33% solids by weight. The residence time in the conditioning tanks is 5 minutes at the design volumetric flow rate.

The conditioned slurry will then flow into the first of five 8 m^3 lead flotation tank cells with a total maximum residence time of 25 minutes based on testwork. Should a shorter residence time be required, some of the cells can be taken off-line. Low pressure blower air will be injected into each cell mechanism to generate the froth for the flotation of lead and silver sulphide minerals.

The lead rougher concentrate from all the rougher cells and the lead rougher scavenger concentrate will flow by gravity to a pumpbox and will then feed the regrinding circuit. The lead rougher tailings will report to the rougher scavenger flotation stage consisting of two 8 m^3 tank cells with a total maximum residence time of 10 minutes. The rougher scavenger flotation tailings will flow into a standpipe and will be pumped to the zinc flotation circuit.

17.5.5.2 LEAD ROUGHER CONCENTRATE REGRIND

The regrinding step prior to the lead 1st cleaner flotation will further liberate silver and lead minerals from the gangue and other sulphide minerals to improve product quality and metal recovery. The lead rougher scavenger concentrates will be pumped to a regrind ball mill which will be 1,050 mm in diameter and 1,400 mm long powered by an 18-kW motor and which will be operated in a closed circuit with two 100 mm cyclones. One cyclone will be in operation at any time and will classify the reground slurry. The regrind cyclone overflow will flow to the lead 1st cleaner flotation cells

while the cyclone underflow will return to the regrind ball mill for further grinding. The particle size target of the regrinding circuit will be a P_{80} size of about 30 µm.

17.5.5.3 Lead 1st Cleaner Flotation

The reground lead rougher scavenger concentrates, and the lead 2nd cleaner flotation tailings will be upgraded in the 1st cleaner flotation stage. The cleaner flotation feed will gravitate from the lead regrind cyclone overflow into the feed box of the first of three 3 m^3 1st cleaner flotation cells where it will be joined by the 2nd cleaner flotation tailings pumped from a standpipe. The 1st cleaner tailings will report to the first conditioning tank of the zinc rougher flotation circuit, while the concentrate from the 1st cleaner stage will feed the 2nd cleaner flotation stage.

The major equipment used in the 1st lead cleaner flotation circuit include the following:

- three 3 m^3 conventional flotation cells; and
- one 1,050 mm diameter and 1,400 mm long tyre-driven regrind ball mill with 18 kW installed power.

The 1st cleaner flotation train has a total maximum residence time of 18 minutes. This residence time has been deemed adequate but can be reduced, if required, by taking flotation cells off-line.

17.5.5.4 LEAD 2ND CLEANER FLOTATION

The lead 1st cleaner concentrates and the lead 3rd cleaner flotation tailings will be upgraded in the 2nd cleaner flotation stage. The 2nd cleaner tailings will be recycled back to the 1st cleaner, while the 2nd cleaner flotation concentrate will feed the lead 3rd cleaner stage. The feed to the 2nd cleaner flotation circuit will be the tailings from the 3rd cleaner flotation cell and the 1st cleaner concentrate. These cells are two 3 m^3 cells. Blower air will be injected into each cell mechanism. The 2nd cleaner flotation train has a total maximum residence time of 15 minutes. This residence time has been deemed adequate but can be reduced, if required, by taking a flotation cell offline. The 2nd cleaner flotation concentrate will flow into a standpipe which will transfer the slurry to the 3rd cleaner flotation circuit.

17.5.5.5 LEAD 3RD CLEANER FLOTATION

The lead 2nd cleaner concentrate will be upgraded in the 3rd cleaner flotation stage. The 3rd cleaner tailings will return by gravity to the 2nd lead cleaner flotation stage, while the concentrate will be pumped to the lead concentrate thickener for dewatering.

The cleaner flotation feed will be pumped from the 2nd cleaner circuit into the feed box of the 3 m^3 cleaner flotation cell. The 3rd cleaner flotation cell has a residence time of 12 minutes. The 3rd cleaner flotation concentrate will flow into a standpipe, which will transfer the slurry to the lead concentrate dewatering circuit. The 3rd cleaner flotation tailings will be recycled by gravity flow to the 2nd cleaner flotation circuit.

17.5.6 ZINC FLOTATION CIRCUIT

The zinc flotation circuit will process the tailings generated from lead flotation circuit through the stages of rougher flotation, rougher scavenger flotation, rougher concentrate regrinding, followed by three stages of zinc cleaner flotation. Three products will be produced, namely the final zinc concentrate and the zinc rougher scavenger tailings and zinc 1st cleaner scavenger tailings which will be filtered and either stored in the dry stack tailings facility or used as backfill. Blower air will be injected into each cell mechanism.

Reagents copper sulphate, SIPX, lime and MIBC will be added to the circuit as required. The flotation area is equipped with a dedicated spillage sump and pump for clean-up purposes. The flotation cells are existing units sized on the maximum laboratory-scale retention time for Bellekeno samples, which is more than the required residence time based on the locked cycle flotation tests by SGS discussed in Section 13.0.

17.5.6.1 Zinc Rougher Flotation

Prior to zinc flotation, the zinc rougher flotation feed materials, consisting of lead rougher scavenger tailings, lead 1st cleaner tailings, and the returned zinc rougher scavenger tailings, will be conditioned with copper sulphate to activate the depressed zinc minerals, and lime to suppress pyrite if required. The zinc rougher flotation stage will generate a zinc rougher concentrate, and rougher scavenger flotation tailings which will be low in pyrite and feed the corresponding dewatering circuit.

Two zinc flotation conditioning tanks are used in operation. The conditioned slurry at a solids density of 29% will flow into the feed box of the first of four 8 m^3 rougher flotation tank cells with a total residence time of 40 minutes. Testwork has indicated that a maximum residence time of 30 minutes will be adequate for the flotation of the zinc sulphide minerals. However, should a shorter residence time be required, some of the cells can be taken off-line.

The zinc rougher flotation concentrate will be transferred to a pumpbox by gravity to feed the zinc rougher concentrate regrinding circuit. The zinc rougher flotation tailings will flow by gravity into the zinc rougher scavenger flotation cell.

17.5.6.2 Zinc Rougher Concentrate Regrind

As for the lead concentrate regrinding, the zinc rougher regrinding will further liberate lead and zinc minerals from gangue and other sulphide minerals to improve concentrate product quality and metal recovery. The zinc rougher concentrates will be pumped to a regrind ball mill of 1,050 mm in diameter and 1,400 mm long powered by an 18-kW motor, which will be operated in a closed circuit with two 100 mm cyclones in the classification circuit. In operation, one cyclone will classify the reground slurries. The regrind cyclone overflow will flow to the zinc 1st cleaner flotation cells while the cyclone underflow will return to the zinc regrind ball mill. The P_{80} particle size target of the regrinding circuit will be around 30 µm.

17.5.6.3 Zinc 1st Cleaner Flotation and Zinc 1st Cleaner Scavenger Flotation

The zinc rougher flotation concentrate will be further upgraded by three stages of cleaner flotation in a total of seven 3 m^3 conventional flotation cells. The 1st cleaner scavenger flotation tailings will have a high pyrite content, which will be pumped to the No.2 dewatering circuit. The 2nd and 3rd cleaner tailings will be recycled to the respective preceding cleaning stages by gravity flow. The zinc 3rd cleaner concentrate will be the final product zinc concentrate which will be dewatered prior to shipping.

The feed box of the zinc 1st cleaner flotation feed will receive three streams, namely 1) the zinc regrinding cyclone overflow by gravity flow; 2) the zinc 1st cleaner scavenger flotation concentrates by pumping, and 3) the zinc 2nd cleaner flotation tailings by gravity flow. The 1st cleaner flotation train has three 3 m^3 cells, which gives a total maximum residence time of 15 minutes. This residence time has been deemed adequate, but can be reduced, if required, by taking flotation cells off-line. The 1st cleaner flotation concentrate will flow into a standpipe, which will transfer the slurry to the zinc 2nd cleaner flotation circuit.

The zinc 1st cleaner tailings will report to a cleaner scavenger flotation cell which will be one 3 m^3 tank with a total maximum residence time of 9 minutes. The cleaner scavenger flotation tailings will flow into a standpipe and will be pumped to the feed box of the zinc 1st zinc flotation circuit.

17.5.6.4 Zinc 2nd Cleaner Flotation

The zinc 1st cleaner flotation concentrate will be further upgraded in the second cleaner flotation stage consisting of two 3 m^3 conventional flotation cells.

The 2nd cleaner flotation feed will be pumped from the zinc 1st cleaner flotation standpipe into the feed box of the first of two zinc 2nd cleaner stage flotation cells. The zinc 2nd cleaner flotation train has a total maximum residence time of 15 minutes. This residence time has been deemed adequate but can be reduced, if required, by taking a flotation cell off-line. The 2nd cleaner flotation concentrate will flow into a standpipe which will transfer the slurry to the 3rd cleaner flotation circuit.

17.5.6.5 Zinc 3rd Cleaner Flotation

The 3rd cleaner flotation feed will be pumped from the zinc 2nd cleaner flotation concentrate standpipe into the feed box of the 3 m^3 zinc 3rd cleaner flotation cell. Blower air will be injected into the cell mechanism. The 3rd cleaner flotation cell has a residence time of 12 minutes. The 3rd cleaner concentrate will be the final grade zinc concentrate which will be dewatered prior to shipping.

17.5.7 LEAD AND ZINC CONCENTRATES DEWATERING AND LOADOUT

17.5.7.1 Lead Concentrate

The final lead flotation concentrate will be discharged to the lead 3rd cleaner concentrate standpipe and will then be pumped to the lead concentrate thickener. Flocculant will be added as an aid in settling the solids. The thickener is a 3.05 m diameter high-rate unit fitted with an automated rake lifting mechanism and an auto-dilution system. It will produce a thickener underflow density of 60% solids which will be pumped to the lead concentrate filter feed stock tank. Thickener overflow solution will flow into a lead process water collection tank and will be pumped to the lead flotation circuit for re-use.

A 25 m^3 holding tank will hold the thickener underflow lead concentrate prior to dewatering by using a pressure filter. The concentrate filter feed tank has a residence time of 10 hours in order to provide sufficient time for regular maintenance on the lead concentrate filter. The filter is a 1,000 mm by 1,000 mm pressure filter unit with 9 plates. Slurry will be pumped into the filter chambers on a batch basis, and solution will be squeezed out by high pressure air. Then air will be blown through to dry the cake to attain the required moisture level of 8%.

The filter cake will be discharged periodically onto a stockpile. Samples will be tested to determine the moisture content of the filter cake for metallurgical mass balance purposes. Filtrate from the filter will be returned to the concentrate thickener. The dewatered lead concentrate will be discharged to the covered lead concentrate stockpile, which will have a storage capacity of 7 days of lead concentrate production.

Filtrate from the pressure filter will be pumped back to thickener feed well as dilution water. The concentrate thickener overflow will be distributed to the lead flotation circuit as process water. The lead concentrate dewatering area will be equipped with a spillage sump for clean-up and recycle. Spillage will be returned to the lead concentrate thickener.

17.5.7.2 Zinc Concentrate

The final zinc flotation concentrate will be discharged to the zinc 3rd cleaner concentrate standpipe and will then be pumped to the zinc concentrate thickener. Flocculant will be added as an aid in settling the solids. The thickener is a 3.05 m diameter high-rate unit fitted with an automated rake lifting mechanism and an auto-dilution system. It will produce a thickener underflow density of 60% solids, which will be pumped to the zinc concentrate filter feed stock tank. Thickener overflow solution will flow into a process water collection tank and will be pumped to the zinc flotation circuit for re-use.

A 25 m^3 holding tank will hold the thickener underflow zinc concentrate prior to dewatering by a pressure filter. The concentrate filter feed tank has a residence time of 10 hours in order to provide sufficient time for regular maintenance on the zinc concentrate filter. The filter is a 1,000 mm by 1,000 mm pressure filter unit with 9 plates. Slurry will be pumped into the filter chambers on a batch basis, and solution will be squeezed out by high pressure air. Then air will be blown through to dry the cake to attain the required moisture level of 8%.

Filter cake will be discharged periodically onto a concentrate stockpile. Samples will be tested for the moisture content of the filter cake and to determine the concentrate grade used for metallurgical mass balance. Filtrate from the filter will be returned to the zinc concentrate thickener. The dewatered zinc concentrate will discharge to the covered zinc concentrate stockpile which will have a storage capacity of approximately seven days of zinc concentrate production.

Filtrate from the pressure filter will be pumped back to thickener feed well as dilution water. The concentrate thickener overflow will be distributed to the zinc flotation circuit as process water. The zinc concentrate dewatering area will be equipped with dedicated spillage sump and pump for clean-up purposes. Spillage will be returned to the zinc concentrate thickener.

17.5.8 TAILINGS DEWATERING AND HANDLING

The tailings thickening area is equipped with one dedicated spillage sump and pump for clean-up purposes. The spillage will be returned to one of the two tailings thickeners.

The zinc 1st cleaner scavenger tailings will feed the No.2 tailings thickener where it will be combined with flocculant solution to aid the settling. The thickener is a 3.05 m in diameter high-rate type, allowing for the thickener underflow density of 58% solids to be produced ahead of filtration stage. Thickener overflow solution will flow via gravity into the water polishing/settling pond. Thickener underflow slurry will be pumped to a tailings storage tank and will then be pumped to No.2 tailings filter presses for dewatering. Filtrate solution from the filter press will be collected in a filtrate standpipe and will be returned to No.2 tailings thickener as dilution water.

Similarly, zinc rougher scavenger tailings standpipe will feed the No. 1 tailings thickener, where it will be combined with flocculant to aid settling. The thickener is 6.1 m diameter, and high-rate type, allowing for a thickener underflow density of 58% solids to be produced ahead of the filtration stage. Thickener overflow solution will flow via gravity into the water polishing/settling pond. Thickener underflow slurry will be pumped to a tailings storage tank and will then be pumped to the No. 1 tailings filter press for dewatering. Filtrate solution from the filter will be collected into a filtrate standpipe and will be returned to the No. 1 thickener as dilution water.

Both tailings filters will discharge onto the filtered tailings belt conveyer. The tailings filter products will have >88% solids content, which will be suitable for disposal by truck from the stockpile to either the underground as cemented tails backfill or the dry stack tailings facility.

The major equipment for tailings management includes:

- One 3,050 mm diameter tailings thickener (No.2 Tailings Thickener);
- One 6,100 mm diameter tailings thickener (No. 1 Tailings Thickener);
- One 1,250 mm by 1,250 mm pressure filter with 23 plates (No. 2 Tailings Filter Press); and
- One 1,250 mm by 1,250 mm pressure filter with 23 plates (No. 1 Tailings Filter Press).

17.5.9 REAGENT HANDLING AND STORAGE

Most reagents will be received in bulk in palletized bags, chemical containers, drums, or bulk bags.

The covered and curbed reagent storage and preparation area is located adjacent to the flotation area. A forklift with a drum handler attachment will be used for reagent handling, while the electric hoist servicing the reagent area will lift the reagents to the respective reagent mixing area located above the mixed reagent storage area. The reagent system includes unloading and storage facilities, mixing tanks, transfer pumps, and feeding equipment. Table 17-4 shows the reagents currently being specified for use in the process plant.

Table 17-4 Summary of Reagents

Reagent	Preparation Method	Use
Flocculant	Received as powder in 25 kg bags; mixed to 0.3% storing strength; transferred to a storage tank and dosed directly to thickeners following further dilution to 0.03% dosing strength.	Flocculation of flotation tailings, and flotation lead and zinc concentrates, in thickeners.
Copper Sulphate	Received as powder in 25 kg bags; mixed to 10% strength; transferred to a storage tank. Dosed to the zinc flotation circuit.	Regulator for zinc sulphide minerals in flotation process.
MIBC	Received as liquid in 200 L drums; dosed undiluted to lead and zinc flotation circuits.	Promotion and stabilization of froth bubbles in flotation cells.
SIBX	Received as powder in 25 kg bags; mixed to 10% strength; transferred to a storage tank. Dosed to both lead and zinc flotation circuits.	Collector reagent for sulphide minerals into the froth phase of the flotation cells.
3418A	Received as liquid in 200 L drums; dosed undiluted to lead flotation circuit.	Additional collector reagent for lead and silver sulphide minerals into the froth phase of the flotation cells.
Zinc Sulphate	Received as powder in 25 kg bags; mixed to 10% solution strength; transferred to a storage tank. Dosed to the primary grinding and lead flotation circuit, if required.	Regulator of lead sulphide minerals in flotation process.
Lime	Received as powder in 1 t bags, mixed to 20% storing strength; transferred to a storage tank and dosed directly to the lead regrind and zinc flotation circuits.	pH control and pyrite depressant; added as required
Carbon Dioxide	Received in 240 L compressed gas cylinders. Dosed to lead process water.	pH control to prevent sphalerite activation in the lead flotation circuit.

Anti-scaling chemicals may be required to minimize scale build up in the reclaim or recycle water lines. This reagent will be delivered in liquid form and metered directly into the reclaim water tank.

17.6 PLANT SERVICES

17.6.1 WATER SUPPLY

Fresh water and process water supply systems are installed for the process plant operations. Fresh water will be used primarily for reagent preparation, gland seal water, and general mill make-up water supply. The fresh water will be

delivered on demand to a 4 m diameter by 4 m high storage tank, where fresh water is further pumped to various application points.

Process water will be supplied to the plant via centrifugal pumps, one operating and one stand-by unit, which will provide water supply for process stream dilution and for use by the plant clean-up hosing stations. Process makeup water will primarily be treated water from the Flame & Moth water treatment plant discharge. The reclaimed water will be directed to a storage tank prior to distribution throughout the process plant.

17.6.2 AIR SUPPLY

The air service systems will supply the required air in the following areas:

- flotation: low pressure air for flotation cells will be provided by air blowers;
- filtering: high pressure air for filter pressing and drying of concentrates and tailings will be provided by a dedicated air compressor;
- crushing: high pressure air will be provided for the baghouse filters in the crushing facility; and,
- instrumentation: dried and oil-free instrument air will come from the plant air compressors and stored in a dedicated air receiver.

Two 365 cfm compressors, each with 75 kW motors, will supply the high-pressure air used in plant operations and the instrumentation. The compressed air will be filtered and then stored in dedicated air receivers. For instrumentation air, an additional drying stage will be required. A low-pressure centrifugal blower will be used to supply low-pressure air to the various flotation circuits.

17.6.3 INSTRUMENTATION AND PROCESS CONTROL

The plant process control system consists of individual locally mounted control panels located near the main equipment. The mill control system includes an Allen Bradley PLC that provides local and centralized start/stop control. Major process performance including throughput, mill power draw and motor variable speeds are displayed on the centralized computer within the mill operator control room. Alarm annunciation will be local to the major equipment or located on the local control panel. The local control panels will act as a marshalling point for monitoring and control of the nearby equipment and instrumentation. It will also act as a distribution point of power for instrumentation.

17.6.4 QUALITY CONTROL

A metallurgical and assay laboratory will conduct daily quality control and optimize process performance. The assay laboratory is equipped with the necessary analytical instruments to provide all the routine assays for the mine samples, the geological samples, the process plant samples, and samples taken for environmental monitoring. The metallurgical laboratory will undertake all basic testwork to monitor metallurgical performance and to improve the process flowsheet and efficiencies.

17.7 ANNUAL PRODUCTION ESTIMATE

According to the current LOM plan, four deposits are considered to provide the future mill feed, namely, the Flame & Moth (50% of the total mill feed), Bermingham (44%), Lucky Queen (5%), and Bellekeno (1%).

The concentrate grades and recoveries are based on the testwork and recovery relationships presented in Section 13. As shown in Table 17-5, the overall LOM Ag-Pb concentrate would have an expected grade of 18,186 g/t Ag and 54% Pb. The Zn concentrate is expected to contain a grade of 53% Zn and 750 g/t Ag. Based on this distribution and metal projections given in Section 13.0, the LOM concentrate production is provided in Table 17-6.

Previous Bellekeno operations were not required to pay any penalties on concentrate produced. The locked cycle testing completed in 2017 and 2018 were analyzed for penalty elements including: As, Bi, Sb, Hg, F, SiO_2, Mn, Fe, Cd and Zn (in Pb). Based on initial smelter terms discussions, the Ag-Pb concentrate only showed slightly elevated As, Bi and Sb, while the Zn concentrate only showed slightly elevated As and Cd. No penalties were applied to the payable metals in this technical report based on the predicted metallurgical performance. Details of the annual and LOM total concentrate production and metal recoveries to concentrates are shown in Table 17-6 and Table 17-7.

Table 17-5 LOM Projected Concentrate Grades

	LOM
Ag-Pb Concentrate	
Dry tonnes	62,053
Ag g/t[3]	18,186
Pb %[3]	54.0
Au g/t	3.9
Zn Concentrate	
Dry tonnes	76,398
Ag g/t	750
Zn %	52.8
Notes: 1. Based on the Probable Mineral Reserves presented in Section 15 and mine plan presented in Section 16, metallurgical testing presented in Section 13. 2. Grades are calculated weighted averages	

Table 17-6 LOM Projected Concentrate Production

Products	Unit	Total or Average	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9
Mill Feed (total)	t	1,438,349	62,057	137,120	166,380	199,980	199,980	199,980	199,980	199,980	72,892
Mill Feed Head Grades											
Au	g/t	0.31	0.16	0.29	0.27	0.34	0.33	0.32	0.31	0.33	0.28
Ag	g/t	804	947	1,077	909	863	721	777	678	730	623
Pb	%	2.64	5.93	2.93	2.92	3.41	2.55	2.23	2.08	1.93	1.41
Zn	%	3.84	4.85	4.63	3.24	2.85	3.52	3.35	3.46	5.02	5.52
Recoveries to Ag Pb Concentrates											
Au	%	49%	49%	49%	49%	49%	49%	49%	49%	49%	49%
Ag	%	91.0%	90%	92%	91%	91%	91%	91%	90%	91%	90%
Pb	%	88.2%	88%	89%	89%	90%	88%	87%	87%	86%	84%
Zn	%	8.6%	7%	7%	10%	11%	10%	10%	10%	7%	6%
Recoveries to Zn Concentrates											
Ag	%	4.6%	4.1%	3.8%	4.2%	4.4%	4.9%	4.7%	5.1%	4.9%	5.3%
Pb	%	4.0%	1.5%	4.1%	4.2%	3.1%	4.2%	4.7%	5.0%	5.0%	5.0%
Zn	%	73.4%	74.3%	74.8%	71.8%	70.9%	72.5%	72.1%	72.5%	75.5%	76.0%

Notes:

1. Based on the Probable Mineral Reserves presented in Section 15 and mine plan presented in Section 16, metallurgical testing presented in Section 13.

2. Partial years of production (Year 1 is 9 months, and Year 9 is 2 months)

3. A Zn to Pb concentrate recovery formula was not generated; instead, an overall recovery of 82% Zn was applied and the quantity in the Pb concentrate is the difference between the 82% recovery and the calculated Zn to Zn concentrate recovery using the formula presented in Section 13.

Table 17-7 LOM Projected Concentrate Production - Metal Quantities

Products	Unit	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9
Metals Contained in Ag Pb Concentrate											
Au	oz	6,956	154	632	707	1,056	1,048	1,019	974	1,042	324
Ag	M oz	33.84	1.71	4.38	4.45	5.07	4.20	4.54	3.94	4.25	1.31
Pb	tonnes	33,508	3,253	3,569	4,317	6,138	4,509	3,895	3,617	3,341	869
Zn[2]	tonnes	4,736	208	458	547	632	670	666	659	656	241
Payable Metals Contained in Ag Pb Concentrate											
Au	oz	5,082	81	419	450	691	779	787	758	844	273
Ag	M oz	32.48	1.64	4.20	4.27	4.86	4.03	4.36	3.78	4.08	1.26
Pb	tonnes	31,646	3,072	3,370	4,077	5,797	4,258	3,679	3,416	3,156	821
Metals Contained in Zn Concentrate											
Ag	M oz	1.70	0.08	0.18	0.21	0.24	0.23	0.23	0.22	0.23	0.08
Pb	tonnes	1,512	55	163	204	214	213	210	208	193	51
Zn	tonnes	40,491	2,237	4,748	3,869	4,042	5,109	4,835	5,013	7,578	3,061
Payable Metals Contained in Zn Concentrate											
Ag	M oz	1.03	0.05	0.11	0.13	0.16	0.14	0.14	0.14	0.13	0.04
Zn	tonnes	34,378	1,899	4,031	3,285	3,432	4,338	4,105	4,256	6,434	2,599

Notes:

1. Based on the Probable Mineral Reserves presented in Section 15 and mine plan presented in Section 16, metallurgical testing presented in Section 13.

2. Partial years of production (Year 1 is 9 months, and Year 9 is 2 months.

3. A Zn to Pb concentrate recovery formula was not generated; instead, an overall recovery of 82% Zn was applied and the quantity in the Pb concentrate is the difference between the 82% recovery and the calculated Zn to Zn concentrate recovery using the formula presented in Section 13.

18. PROJECT INFRASTRUCTURE

18.1 OFF-SITE FACILITIES

The Project is located in central Yukon, near the community of Keno City. Keno Hill is approximately 460 highway kilometers or approximately 5 hours by road north of Whitehorse via Yukon Highway 2 and Highway 11. Road access to the project is maintained year round by the Yukon Government, Department of Highways. The site operations are supported from an existing office and administrative building located in Whitehorse.

The nearest airport with scheduled service is the Mayo Airport, located approximately 55 kilometers south of the Project. Charter flights between Whitehorse and Mayo also utilize this airport.

The Project is supplied with electrical power from a hydroelectric plant near Mayo and is connected to the Yukon wide electrical grid. Recently, the power distribution line from Mayo to McQuesten was completed in early 2021 to replace the 65 year old transmission line and to add system protection equipment. There is ample power supply on the grid for the Keno Hill District to operate in the future at 550 tpd.

18.2 CONCENTRATE SHIPMENT INFRASTRUCTURE

All infrastructure and services are in place for concentrate shipment. Lead and zinc concentrates are loaded into aluminum concentrate pots (owned by the trucking company) at the District mill site. Each pot is individually weighed and numbered, and the pots are re-used. The concentrate leaves the District mill by truck and is delivered to Skagway, Alaska and stored on post platforms. On a weekly basis a barge will arrive in Skagway. The post platforms with the concentrate pots are loaded onto the barge, and post platforms with empty pots will be offloaded for return to the District mill site. Barges depart Skagway once per week. Ocean transport time from Skagway to Seattle on the barge is approximately 5 days. When the barge arrives in Seattle, the loaded concentrate pots will be offloaded and transported via truck to a North American smelter.

18.3 SUPPORT FACILITIES

The administrative offices and first aid facilities are currently based in a complex located adjacent to the District mill. A mobile equipment maintenance facility is located near the District mill and a new warehouse will be constructed in Q2 2021, adjacent to the District mill complex.

18.4 FLAT CREEK CAMP FACILITIES

The currently licensed Flat Creek camp facilities include a trailer camp, kitchen facility, site sign-in/reception, and a dry. The Flat Creek camp has a total capacity of 123 permanent beds. There are four refurbished houses located nearby the townsite of Elsa with a total of 28 rooms, and an additional 20 rooms available in a bunkhouse next to the houses, which is used primarily for seasonal surface exploration programs. Two of the three bunkhouse complexes at Flat Creek camp were replaced with new units in Q4 2020. The entire capacity of the camp facilities is 171rooms.

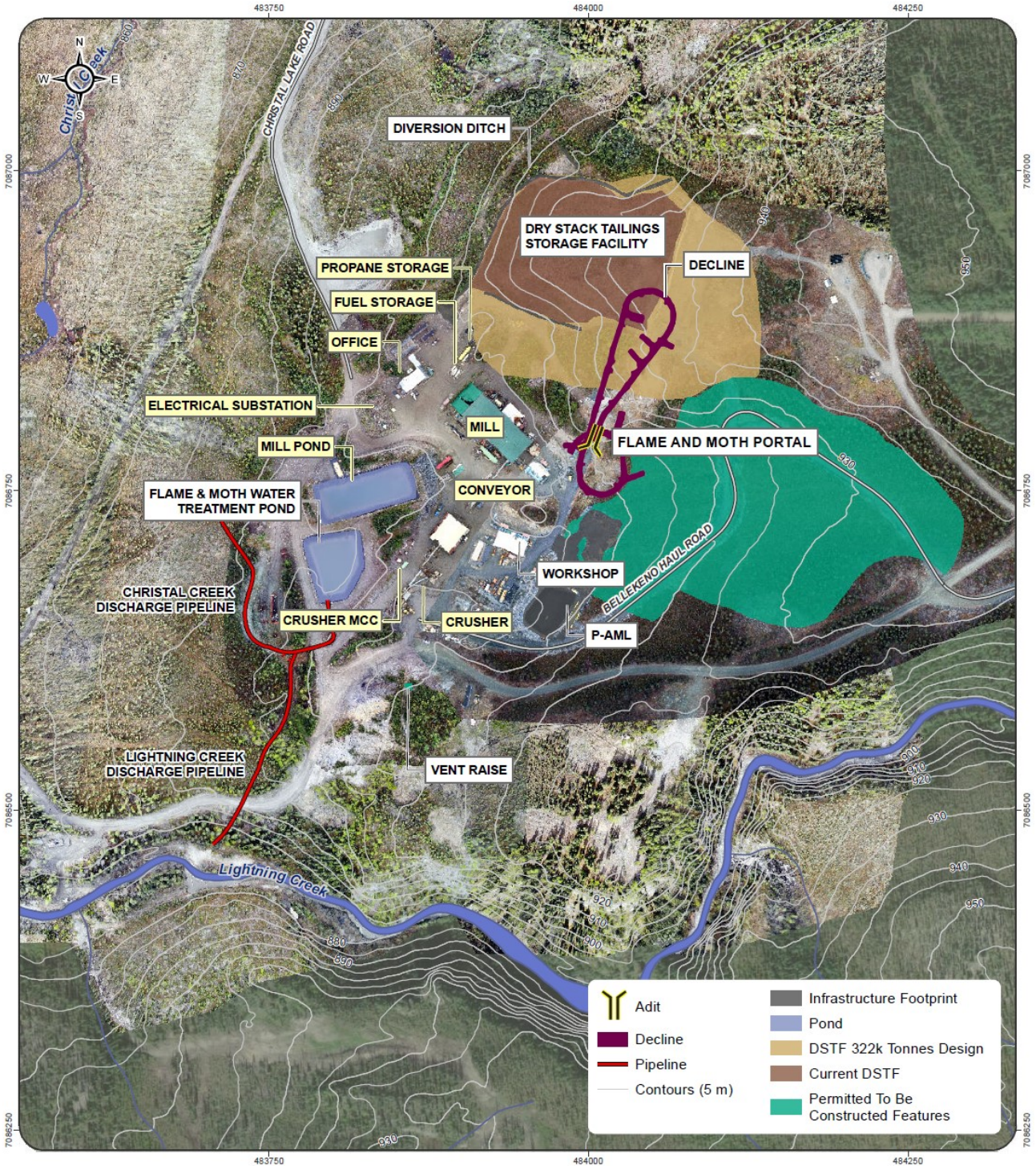
Alexco is licensed to withdraw water from Flat Creek and an existing groundwater well for domestic use. A water treatment facility located within the Flat Creek camp consists of 5,000 L of storage, a water softener, UV treatment, and chlorination. Alexco has two sewage disposal permits at Elsa; one for the Flat Creek camp and one for the houses. Waste water is treated in septic tanks and released via drain fields.

Commercial Dump Permits # 81-012 and #81-067 are currently held from YG Environment in accordance with the *Environment Act* Solid Waste Regulations as well as the *Public Health and Safety Act*. The permits were renewed effective January 1, 2017 and will continue to be used in support of mine operations. In compliance with this permit, upgrades to the location of solid waste disposal included upgrades to the electric bear fence and the addition of a cattle guard to prevent animals from entering the facility. Kitchen refuse is incinerated in a diesel incinerator located in Elsa.

18.5 MILL FACILITY

The current facilities at the District mill facility include mine and mill offices, male and female dry facilities, an assay lab, first aid facilities, and the mill and DSTF complex, as seen on Figure 18-1. The mine geology and engineering office buildings from Bellekeno were moved to the mill area to serve as a central office and dry facility for all future mining operations.

A metallurgical and assay laboratory conducts all basic testwork to monitor and improve the process flowsheet metallurgy and efficiency, and to support environmental monitoring. The assay laboratory was constructed as a pre-packaged unit consisting of two retrofitted 40 ft shipping containers converted into laboratory modules, which are located adjacent to the mill building. The laboratory is equipped with the necessary analytical instruments to provide all routine assays for the mine, plant, and environmental quality control monitoring. The equipment included allows for the preparation and analysis of approximately 80 samples per 12-hour shift. Standard analysis includes acid digestion of samples followed by analysis on an atomic absorption spectrometer.



Source: 2020 photo from Alexco files

Figure 18-1 Site Layout - Keno District Mill and Flame & Moth

18.6 AREA HAUL ROAD SYSTEM

Alexco has constructed a series of access and haul roads to route mine traffic around the Keno City community. All traffic between Elsa and the mill facility and/or the Bellekeno mine is routed along the Christal Lake Road and subsequently the Bellekeno haul road. The Bermingham mine traffic will use the Bermingham access road, Calumet Road and a short section of the Duncan Creek Road (~3 km) between the mill and the Bermingham mine.

Heavy truck traffic from Lucky Queen will be routed along the Keno City bypass road to/from the Bellekeno haul road. The bypass road is approximately 2.1 km long and six to nine meters wide as per Yukon Workers' Compensation Health and Safety Board regulations and the identified haul road type.

18.7 BELLEKENO MINE SURFACE INFRASTRUCTURE

The Bellekeno East portal is fully equipped with all infrastructure needed to operate the underground mine including miners' office buildings with septic storage, miners' dry area, warehouse containers, and surface layout area. The existing infrastructure is shown in Figure 18-2 and Figure 18-3.

Water from the Bellekeno mine is treated at the Bellekeno 625 adit water treatment facility. Service water for Bellekeno is supplied from the clean sump in the underground workings. Water is distributed to the underground workings through a 2 or 4 inch HDPE pipe. Mine water use is expected to be <3 L/s at Bellekeno during production.

All waste rock material generated from mining operations at Bellekeno will be backfilled underground in previously mined out areas. There is a temporary storage pad for potential acid metal leaching rock (P-AML) located near the Bellekeno East portal.

Power is supplied to the mine through an existing transmission line that connects the Bellekeno 625 portal substation to 69 kV/4.16 kV 3 MVA substation. Explosives will be stored in separate powder and detonator magazines located underground off the main decline.

Source: 2018 photo from Alexco files

Figure 18-2 Existing Infrastructure at the Bellekeno East Portal (note shop was removed in 2020)

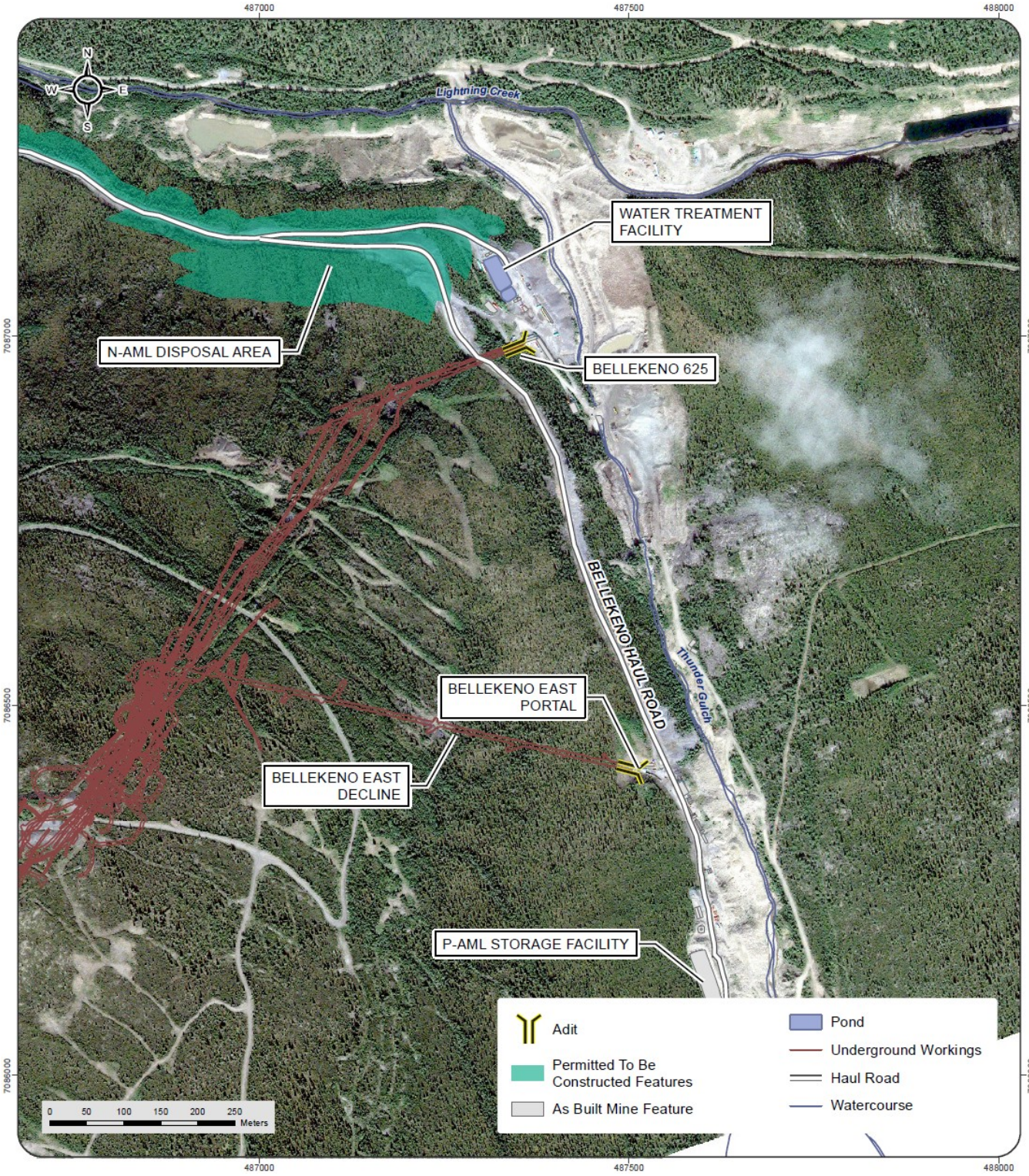


Figure 18-3 Site Layout at Bellekeno

18.8 LUCKY QUEEN MINE SURFACE INFRASTRUCTURE

The existing Lucky Queen portal pad, developed on a historic waste dump, will be used to support mining operations at Lucky Queen. The existing site infrastructure is shown in Figure 18-4 and planned site layout is shown on Figure 18-5.

Mine support facilities, such as the miners' dry area, equipment and supplies laydown area, offices, and trailers, will be required to be installed on the Lucky Queen portal pad. Additional mine infrastructure planned at Lucky Queen includes mine air heaters, ventilation compressed air and power. The plan is to replace the diesel compressor with an electrical compressor once the planned power line extension is completed.

A planned return air ventilation raise will provide additional ventilation to the underground workings and function as an emergency escapeway to surface. A small building will be constructed over the ventilation raise surface break through and signage will be installed warning of the open hole hazard.

Non-acid metal leaching (N-AML) waste rock generated from development and mining at Lucky Queen will be deposited in a new N-AML waste rock disposal area, which will be built as an extension to the historic waste rock storage area at Lucky Queen. P-AML waste rock is expected to be deposited in a P-AML waste rock storage facility constructed nearby.

A settling pond is located on top of the historic waste rock disposal area near the Lucky Queen portal and is used to settle suspended solids from adit water prior to discharge. A diversion ditch is proposed above the Lucky Queen portal and the N-AML waste rock storage facility. Fuel and petroleum products will be held in two Envirotanks to supply fuel for mine development and production operations: one 28,500 L main tank and a 2,100 L "day tank" for the diesel generator.

At Lucky Queen, up to 4,500 kg of explosives will be stored in an appropriate location on the portal bench.

Source: 2018 photo from Alexco files

Figure 18-4 Existing Infrastructure at Lucky Queen Mine Portal

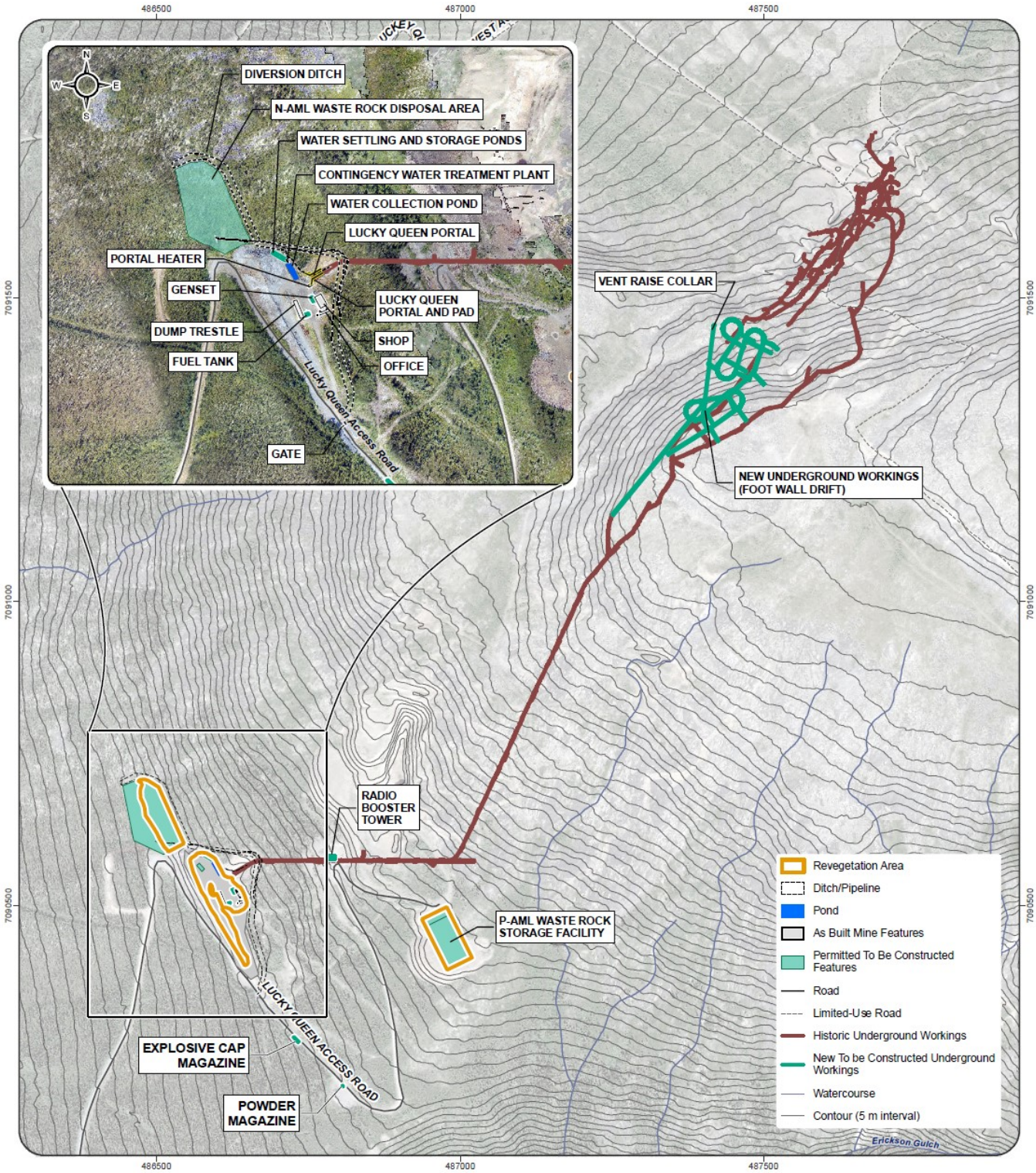


Figure 18-5 Site Layout at Lucky Queen

18.9 FLAME & MOTH MINE SURFACE INFRASTRUCTURE

The Flame & Moth mine uses existing infrastructure at the District mill site. Existing infrastructure consists of geology and engineering office trailers, maintenance shop and fuel storage facility as can be seen on Figure 18-1.

Additional infrastructure in the area of the Flame & Moth mine portal, northeast of the mill building, consists of:

1. a miners' office trailer and miners' dry facility;
2. cold storage structure;
3. portal ventilation fan and heater;
4. air compressors; and
5. settling pond for mine water discharge, with clarified water supplying the underground mine.

The fresh air raise collar location is planned south of the crusher and coarse vein material stockpile. The main ventilation fans and mine air heater will be located at the raise collar.

N-AML waste rock generated from development and mining at Flame & Moth will be deposited around the mill area to create extensions to laydown and storage areas. P-AML waste rock will be deposited in a temporary P-AML waste rock storage facility constructed nearby before being backfilled underground.

The site receives explosives deliveries by truck and the explosives will initially be stored in licensed and permitted surface magazines. A second powder and detonator magazine will be constructed underground during pre-production using existing remucks off the main decline.

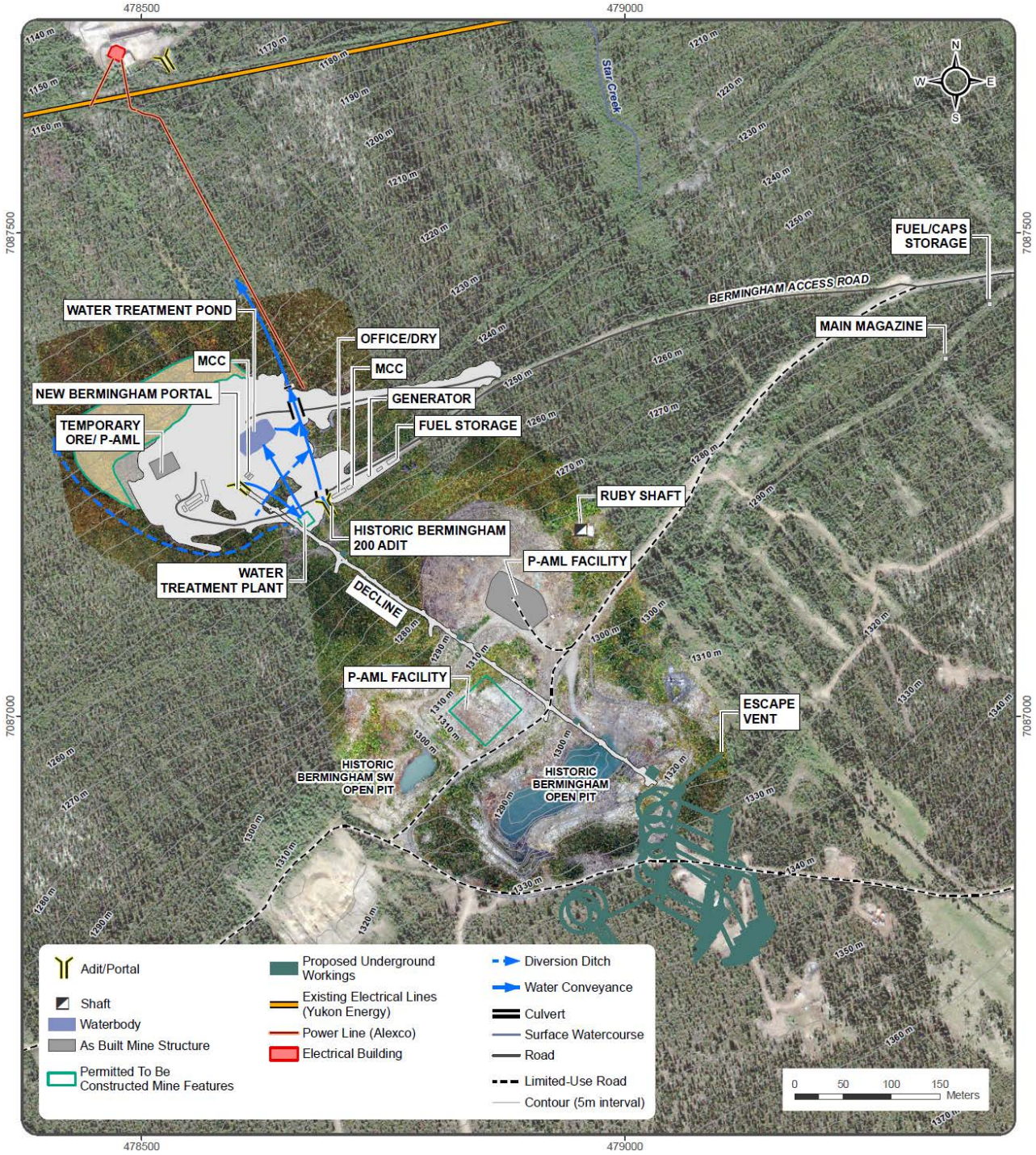
18.10 BERMINGHAM MINE SURFACE INFRASTRUCTURE

Various surface facilities and infrastructure were constructed in 2017 and 2020 to support the new Bermingham underground exploration decline including include a dedicated mine office, dry/lunch room, maintenance shop, water treatment plant, diesel power generation, fuel storage tanks and laydown yard. The surface infrastructure that was constructed for the advanced exploration decline will remain in place and be expanded to facilitate development and production at the new Bermingham mine. A lined water management pond already constructed will be used as part of the water treatment system required during active mine operations.

An aerial photo with Bermingham infrastructure and portal location is provided in Figure 18-6.

Non-acid metal leaching (N-AML) waste rock generated from development and mining at Bermingham will be deposited in a new N-AML waste rock disposal area, which will be built as an extension to the current waste rock disposal area at Bermingham. P-AML waste rock is expected to be deposited in a P-AML waste rock storage facility constructed nearby.

The site receives explosives deliveries by truck and the explosives will initially be stored in licensed and permitted surface magazines. A second powder and detonator magazine will be constructed underground during pre-production using existing remucks off the main decline.



Source: 2020 photo from Alexco files

Figure 18-6 Site Layout at the Bermingham Portal

18.11 ELECTRICAL POWER

The Project is supplied with electrical power from a hydroelectric plant near Mayo and connection to the Yukon wide electrical grid.

The Mayo hydro facility was expanded in 2011 which increased generation capacity from 5 megawatts to 15 megawatts. The power distribution grid was also upgraded from Pelly Crossing to Stewart Crossing during the same time. Recently the power distribution line from Mayo to McQuesten was completed in early 2021 to replace the 65 year old transmission line and to add system protection equipment. There is ample power supply on the grid for the District to operate in the future at 550 tpd.

A new 69 kV/4.16 kV 3 MVA substation was installed to deliver power to the mill facility, Flame & Moth, and associated infrastructure.

Alexco owns several substations in the area, including the Elsa substation, the Onek substation, and the Bellekeno 625 portal substation. Alexco also owns the transmission line connecting the latter two. Power for the Bellekeno and Flame & Moth mines is now provided exclusively by the YEC electrical distribution system.

Power for the camp is supplied from the local grid that runs through Elsa to Keno City.

Electrical power for Bermingham was initially provided by diesel-powered generators and will be transferred over to grid power in Q2 2021. Under full operating conditions, Bermingham is expected to require 1MVA which is available. A transmission line (via surface teck cable) will be established from Calumet Road to the site.

19. MARKET STUDIES AND CONTRACTS

19.1 MARKETS

The principal commodities of the KHSD are freely traded, at prices that are widely known, so that prospects for sale of any production are virtually assured. Mining Plus used metal prices as shown in Table 19-1.

Table 19-1 Metal Prices by Year for LOM

	Units	2021	2022	2023	2024	2025 through 2030	Average LOM
Ag	US$/oz Ag	$ 25.50	$24.10	$22.60	$21.80	$21.00	$22.11
Au	US$/oz Au	$1,910	$1,870	$1,760	$1,710	$1,600	$1,694
Pb	US$/lb Pb	$0.91	$0.92	$0.93	$0.92	$0.93	$0.92
Zn	US$/lb Zn	$1.17	$1.10	$1.10	$1.12	$1.09	$1.10
CA$/US$	US$:CA$	0.781	0.787	0.781	0.775	0.775	0.778

For the purposes of determining appropriate pricing to use in this analysis, pricing was obtained from S&P Global Market Intelligence, Factset, and CIBC Global Mining Group analyst consensus price forecasts, and Bloomberg median price forecasts.

19.2 CONTRACTS

19.2.1 CONCENTRATE SALES

Previously both the silver-lead concentrate and the zinc concentrate from the mill facility were sold under contract under an offtake agreement with an international trading house.

Alexco has entered into a new offtake agreement for future production and will continue to be sold in concentrate form and revenue will be based on terms provided by traders or smelters to which the concentrate is sold. The sales terms used in herein are based on offtake agreement terms with an international metals trading firm that were settled after a marketing process was completed in 2020.

The concentrate sales terms are shown in Table 19-2 and Table 19-3. While gold content is expected to be payable in the zinc concentrate, for the purposes of economic modelling it has been conservatively assumed that Alexco will not receive value for the contained gold content in the zinc concentrate.

Table 19-2 Assumed Lead Concentrate Sales Terms

Metallic Payables for Each Dry Metric Tonne		
Metal	**Payables**	**Subject to Minimum Deduction**
Silver	96%	50 g/mt
Gold	95%	1 g/mt
Lead	95%	3 units
Zinc	Not Payable	
TC, RC, Costs for Freight		
Silver RC	US$0.95/oz	
Gold RC	US$15.00/oz	
Concentrate TC	US$165per mt	
Freight	US$195.80 plus CA$104.30 per mt	

Table 19-3 Assumed Zinc Concentrate Sales Terms

Metallic Payables for Each Dry Metric Tonne		
Metal	**Payables**	**Subject to Minimum Deduction**
Silver	70% after a 3oz deduction	
Lead	Not Payable	
Zinc	85%	8 units
TC, RC, Costs for Freight		
Silver RC	not applicable	
Concentrate TC	US$220 per mt	
Freight	US$195.80 plus CA$104.30 per mt	

19.2.2 WHEATON PRECIOUS METALS AGREEMENT

Alexco and Wheaton Precious Metals Corp. (Wheaton or WPM) entered into an agreement on October 2, 2008 (the SPA) whereby 25% of all future silver production from the KHSD properties owned or controlled by Alexco at the time of the consummation of the SPA will be delivered to Wheaton in exchange for a payment of US$3.90/oz as well as a payment by Wheaton of US$50 M for use in the development and construction of the Bellekeno silver mine.

Subsequently, on March 29, 2017 and August 5, 2020, Alexco and Wheaton amended the SPA (the Amended SPA), which ultimately culminated in Wheaton continuing to receive 25% of the life of mine payable Ag from the Keno Hill with a new production payment to be based on a new payment formula (the Amended Production Payment) as outlined below:

1. During the earlier of the initial two years ending August 4, 2022, or eight million ounces of payable Ag production (the Initial Period), the Amended Production Payment from Wheaton to Alexco will be adjusted on a curve. The Amended Production Payment formula during the Initial Period is a linear equation that pays 90% of spot price at US$15 per ounce Ag (and below) and 10% of spot price at US$23 per ounce Ag (and above); and

2. Following the Initial Period, the Amended Production Payment formula remains a linear equation and will pay 90% of spot price at US$13 per ounce Ag (and below) and 10% of spot price at US$23 per ounce Ag (and above).

For clarification, the percentage of the market price which comprises production payment will be determined as shown in Table 19-4.

Table 19-4 Production Payment

Time Period	Calculation of Percentage
Until the earlier of: (i) two years from first shipment of concentrate; and (ii) delivery of 2 million silver ounces to Wheaton	90 – ((Market Price – 15) * 10); and
Thereafter:	90 – ((Market Price – 13) * 8)
In both cases, subject to a maximum of 90% and a minimum of 10% .	

19.2.3 OTHER AGREEMENTS

As a condition of the commercial agreement with the Government of Canada under which Alexco acquired the property, future production from the Project is subject to a 1.5% NSR royalty, capped at $4.0 million, payable to the GoC. This royalty is a condition of the Subsidiary Agreement. Payment of the royalty does not begin until all pre-production capital has been recouped plus an additional allowance for the Project exploration of approximately $6.2 million.

19.2.4 OTHER CONTRACTS

Alexco has entered into a number of contracts to support the operations of the Project including:

- Transportation of lead and zinc concentrates to a smelter in North America and to back haul supplies to the site;
- Yukon Energy Corp. provides power under contract to various substations and to the Keno Hill;
- Consumables such as propane, fuel, and reagents; and,
- Services including camp and catering services, drilling (exploration) and mine development.

Alexco has provided Mining Plus with information on all outstanding contracts as well as the discussions of indicative pricing terms with smelters.

20. ENVIRONMENTAL STUDIES, PERMITTING, AND SOCIAL OR COMMUNITY IMPACT

20.1 SITE CONTEXT

The historical operations in the district commenced in the early 1900s. These historical mines are spread out over approximately 200 km^2, and comprise upwards of 50 mine sites, three tailings disposal areas, and dozens of different shafts, adits and open pits. Due to the long history of mining, the KHSD is known as a brownfield site. The current environmental conditions reflect the brownfield conditions and as well as the site Care and Maintenance activities to maintain licence compliance. Environmental monitoring data and site characterization studies date back to the 1990s.

The Bellekeno, Lucky Queen, Flame & Moth, and Bermingham deposits are all part of the former UKHM claims, which included several historical mines and processing facilities within the KHSD. The Bellekeno, Lucky Queen and Bermingham sites have historical mine workings, waste rock storage areas, and mine water discharges, whereas the Flame & Moth site only has minor historical surface mine workings and a waste rock storage area that were reclaimed during the construction of the Keno Hill District Mill.

Alexco and its subsidiary, ERDC, have a commercial agreement with the Government of Canada in which Alexco is responsible for the care, maintenance, and closure of the historical mines, with funding from the government and the company to address the historical liabilities. The commercial agreement also allows Alexco to undertake exploration of the UKHM site and undertake active mining. Under this agreement, Alexco is responsible for environmental assessment, permitting, compliance, and costs associated with its ongoing exploration and new mine development activities. Additionally, if a new mine is brought into production including the use of infrastructure associated with a historic mine, terrestrial liabilities (i.e., waste rock storage areas and roads) and water related liabilities located within a designated "Production Unit" become the responsibility of Alexco. At this time, Bellekeno is the only area that has been defined as an active Production Unit. However, once in commercial operation, the Lucky Queen, Flame & Moth and Bermingham mining areas would be classified as Production Units for which Alexco would be responsible for historic terrestrial and water related liabilities that are contained within the new active mining footprint.

Alexco, along with territorial, federal, and First Nation governments, is also responsible for developing a district-wide reclamation plan that addresses these historic environmental liabilities arising from past mining activities. Under the agreement, Alexco is indemnified from the historic environmental liabilities. The reclamation plan was submitted to YESAB for assessment in September 2018, and the Decision Document was received in July 2020. The reclamation plan will be implemented once the Water Licence is obtained. Currently, active care and maintenance water treatment is carried out at five locations in the Keno Hill Silver District (Galkeno 300, Galkeno 900, Silver King, Onek 400 and Valley Tailings), as required by the ERDC's Care and Maintenance Water Licence QZ17-076.

20.2 ENVIRONMENTAL AND SOCIO-ECONOMIC SETTING

The property is located within the Yukon Plateau (North) Ecoregion and is characterized by rolling upland areas and wide open valleys. Vegetation communities include Northern boreal forests along the lower slopes and valley bottoms, and open scree slopes above treeline. Many of the valley bottoms include open peatlands, fens, and meadows. A variety of wildlife, birds, and fish species are present in the area.

The KHSD falls in the subarctic clime of the Koppen climate classification. The closest current long-term climate record is at the Mayo Airport, which had an average daily temperature of -2.4°C and average annual precipitation of 313.5 mm, with 203.8 mm falling as rain for the 1981 to 2010 period (the public record is updated every 10 years). The wet season occurs in summer/fall with drier winters. Meteorological data have been collected in the KHSD for three locations:

since 2007 at the Calumet weather station as part of the development of the reclamation studies for historic liabilities; since 2011 at the Keno Hill District Mill meteorological station as part of Bellekeno mining operations; and, since 2012 at the Valley Tailings Facility meteorological station. The monthly and annual temperatures are on average colder at the three KHSD stations than at Mayo A, which is expected given the higher site elevation.

The environmental setting of the site is summarized in Table 20-1. The KHSD has a long mining history and is a brownfields site. The current environmental conditions reflect the brownfield conditions and recent improvements as a result of Care and Maintenance water treatment upgrades and interim reclamation undertaken by ERDC for the historic liabilities.

Table 20-1 Keno Hill Silver District Environmental Setting Summary

Drainage Region	Stewart River drainage region
Local Catchments	No Cash Creek, Flat Creek, Christal Creek, Lightning Creek
Ecoregion	Yukon Plateau (North)
Study Area Elevation	900-1,350 masl
Vegetation Communities	Northern boreal forests occupy lower slopes and valley bottom; spruce, pine and alder; grasses and sedges, mosses occupy forest floor; heavy moss and lichen growth resident as ground cover; understory of shrub willow; open and forest fringe areas of willow and scrub birch, and various flowering plant species.
Wildlife Species	Moose, grizzly and black bear, caribou, beaver, wolf, lynx, marten, wolverine, western tanager, magnolia warbler, white-throated sparrow, bald eagle, furbearers and small animals. Committee on the Status of Endangered Wildlife in Canada (COSEWIC) listed species include: Common Nighthawk (Threatened); Rusty Blackbird and Olive-Sided Flycatcher (Special Concern).
Fish Species	Bering and Beaufort Sea salmonids and freshwater species, including: Arctic grayling, Arctic char, lake trout, trout perch, lake whitefish, broad whitefish, burbot, inconnu, Arctic Cisco, Northern pike, slimy sculpin

The KHSD is situated in the traditional territory of the FNNND. The deposits are located within 5 km of Keno City, which has population of 20 as of June 2016, and 50 km from the community of Mayo, which has a population of 458 residents as of September 2020. The area has been shaped by mineral development over the past hundred years. Silver and lead ore deposits were discovered on Keno Hill in the early 1900s and the area has since seen fluctuating levels of ongoing quartz and placer mining and exploration. Today the area supports not only mineral development, but also tourism, recreational and traditional land uses.

The KHSD is supplied with electrical power by Yukon Energy Corporation from two hydroelectric plants near Mayo. The Silver Trail Highway runs through the KHSD, en route to Keno City, and is the primary access route for the site. This road is a public highway that is maintained by Government of Yukon.

20.3 PERMITS AND REGULATORY CONTEXT

Quartz mining projects in Yukon requires assessment under YESAA, as well as Quartz Mining Licence under the *Quartz Mining Act* and Water Use Licence under the *Waters Act*.

The existing approvals and assessments currently underway for both exploration and mine development activities are summarized in Table 20-2. The table also includes existing approvals under ERDC for the historic liabilities care and maintenance, and reclamation plan. A number of environmental and socio-economic studies have been completed for the KHSD since 2006 in support of the mining permit applications, as well as in support of the reclamation planning being completed by ERDC.

Table 20-2 Relevant Assessment and Regulatory Approvals

Purpose	YESAA Approval	Quartz Mining Act Approval	Water Use Licence
Alexco Keno Hill Mining Permits			
Bellekeno Advanced Exploration	Project # 2008-0039 Decision Document	Class 4 Mining Land Use Approval (LQ00476, expires 2028)	Type B Water Use Licence QZ07-078/Amendment 1 QZ10-060, licence cancelled in 2015 as authorizations moved to amended type A Water Licence in 2015[2]
Bermingham Advanced Exploration	Project#2017-0086 Decision Document	Class 4 Mining Land Use Approval (LQ00476, expires 2028)	Schedule 3 Notice of Water Use/Deposit of a Waste without a Licence
Bellekeno Mine Production	Project # 2009-0030 Decision Document	Quartz Mining Licence (QML-0009, Amendment 2, expires 2037)[1]	Type A Water Use Licence QZ18-044 issued, , Expires 2037[2]
Onek and Lucky Queen Mine Production	Project#2011-0315 Decision Document	Quartz Mining Licence (QML-0009, amendment 2, expires 2037)[1]	Type A Water Use Licence QZ09-092, amendment 2 expires 2020[2]
Flame & Moth Mine Production	Project # 2013-0161 Decision Document	Quartz Mining Licence (QML-0009, Amendment 2, expires 2037)[1]	Type A Water Use Licence QZ18-044 issued, Expires 2037[2]
Bermingham Mine Production	Project#2017-0176 Decision Document	Quartz Mining Licence (QML-0009, Amendment 2, expires 2037)[1]	Type A Water Use Licence QZ18-044 issued, Expires 2037[2]
Elsa Reclamation and Development Company Permits			
Care and Maintenance	Project # 2006-0293 and 2012-0141	N/A	Type B Water Use Licence QZ17-076 expires 2022[2]
Reclamation Plan	Project #2011-0187 Decision Document (construction and operation of land treatment facility) Project #2012-0077 Decision Document (building demolition) Project #2018-0169 Decision Document (Reclamation Plan implementation)	N/A	Submitted application QZ21-012 to Water Board following issuance of YESAB Decision Document for Project #2018-0169

Notes:
1. https://emr-ftp.gov.yk.ca/emrweb/COMM/major-mines/keno-hill/mml-keno-qml-0009-nov2019.pdf
2. http://www.yukonwaterboard.ca/waterline/

The Bellekeno, Bermingham, and Flame & Moth mines have all permits and authorizations in place to commence full scale mine production. Water Licence Application QZ18-044 was submitted to the Yukon Water Board in August 2018 to renew existing Water Use Licence QZ09-92 to include Bermingham deposit and extend the licence term for a further 17 years to 2037 including the currently permitted deposits including Bellekeno and Flame & Moth. The new Water Licence QZ18-044 was issued in July 2020.

Although the QML authorization is also in place for Onek and Lucky Queen, there are currently no plans to bring the Onek mine into production. A minor amendment to the Water Licence would be required to bring Lucky Queen into production. The existing approvals are for the mill throughput of 400 tpd (based upon a 12-month average) and will require additional amendment to the QML to increase mine throughput to 550 tpd.

20.4 WATER MANAGEMENT

20.4.1 MINE WATER

At Bellekeno, the current average daily dewatering rate of 2-4 L/s is expected during operations and is within the licenced rate of up to 10 L/s (864 m^3/day). All water collected in the active mining areas is settled in the underground sumps and then pumped out the 625 level portal to the existing water treatment facility at Bellekeno.

Water use requirements for the Bellekeno Mine are supplied from the recharge to the underground mine water. Makeup water is also available and permitted for withdrawal from Lightning Creek and Thunder Gulch as well as Bellekeno 625 treatment facility decant water at a rate of up to 245.5 m^3/day.

The new underground workings at Bermingham will not be connected to the historical underground workings. At present there is approximately 3 L/s of drainage from the advanced exploration Bermingham adit. A comprehensive hydrogeological investigation was completed at the Bermingham deposit to assess the hydrological conditions associated with development of the deposit. The hydrogeological investigation estimates that up to 960 m^3/d or 11.1 L/s of groundwater inflow could be expected to be encountered during the operation of the Bermingham mine. Water Licence QZ18-044 authorises the Bermingham mine to discharge up 1,200 m^3/d, which incorporates 25% contingency from the groundwater inflow estimate.

Bermingham mine water chemistry will be similar to that observed at the historical Bermingham 200 adit. Management of mine inflows at Bermingham is via underground sumps and pumps, similar to the water management program at the Bellekeno Mine. Water that is dewatered from the workings is pumped to surface and directed to the water treatment plant (a clarifier and mix tank and ammonia treatment) installed near the portal.

Water is treated to meet the effluent quality standards before being discharged to ground. If excess water accumulates in either of the reactive rock storage areas (P-AML WRSF or the temporary ore/P-AML pad), the water will be collected and transported to the water treatment plant as done at the Bellekeno mine.

The majority of the Flame & Moth mine workings are expected to be below the water table; however, the portal has been developed approximately 20 m above the water table so that there will be no long-term discharge from the site. A review of the existing groundwater data in the mill area and a drilling program to characterize the potential mine inflow rates and water quality associated with the Flame & Moth deposit. Hydrogeologic studies and water balance estimates indicate a potential adit discharge during production of 2,912 m^3/day (33 L/s), when the mine reaches its deepest levels. Water Licence QZ18-044 authorises the Flame & Moth mine to discharge up 3,024 m^3/d (35 L/s),

Water encountered in the underground workings is anticipated to be similar to or better than that observed at the Bellekeno 625 adit. Water that is dewatered from the proposed workings will be pumped to surface and directed to the water treatment circuit in the mill. There are two water management ponds at the mill, one for water treatment effluent and the other for process water.

The new workings at Lucky Queen will not intersect the historical workings and will be above the current groundwater table, as understood at present. However, the new workings will connect with the 500 level adit, and, therefore, any water from this new area will be allowed to mix with water from the historical area. The Water Licence will require an amendment to commence mining at Lucky Queen.

20.4.2 WATER TREATMENT

Adit drainages from Bellekeno have neutral pH levels but elevated total zinc concentrations. Conventional water treatment is in operation and is effective in treating Bellekeno mine water to remove metals and ammonia prior to discharge. Treatment for metals is likely to continue over the long-term, and these costs are included in the approved Reclamation and Closure Plan (RCP) for the Bellekeno mine. The current approved RCP indicates that the Bellekeno 625 water treatment ponds will be converted to a passive treatment system (bioreactor) for treatment of long-term adit drainage and the mine pool will be treated in situ.

The Flame & Moth mine will require continual dewatering, with discharge flows dependent on mine depth. It is estimated that flow rates may reach a maximum of 33 L/s with incoming water quality generally compliant except for some metals (current groundwater wells show some iron and zinc), and with elevated levels of ammonia and total suspended solids from underground mining activities. The treatment facility is located within the District mill.

The Bermingham mine requires continual dewatering, with discharge flows dependent on mine depth. The Bermingham mine has been licenced to discharge a maximum of 1,200 m^3/d or 13.9 L/s. A conventional water treatment plant using lime addition for metals removal and break point chlorination for ammonia treatment is located adjacent to the Bermingham portal.

The water treatment at both Flame & Moth also uses conventional water treatment processes comprising metals removal as needed with the addition of alkali (lime) for pH adjustment, and a polymer for flocculation and removal of suspended solids. The treatment is done in a conventional clarifier with a mix tank and reagent addition tank. If required, the site is also permitted to treat ammonia.

20.4.3 MILL WATER SUPPLY

The majority of the water used in the mill is recycled from one of two water management ponds at the mill. One pond is typically used for water treatment plant effluent (which can treat all the water pumped from the Flame & Moth underground portal adjacent to the mill). The second pond is used to collect the seepage and drainage from around the mill, the mill dewatering circuits, and the DSTF. The two water management ponds at the mill can both be used for water recycle. Both are also permitted to discharge and have appropriate environmental monitoring points.

There is also a groundwater well adjacent to the mill and the Flame & Moth portal that can provide freshwater makeup. The mill requires less than one litre per second of make up for 400 tonne/day production rate.

20.4.4 RECEIVING ENVIRONMENT

The site is permitted to discharge water from both the mill pond and from the different mines. The Water Licence has varying standards for discharge water chemistry depending on the receiving environment. There is a substantial network of environmental monitoring stations, combined with many years of data and water modelling that shows that operations are not constrained by the net positive water balance, although water must be carefully managed across the site. Details are documented in the issued Water Licence QZ18-044. An adaptive management plan has also been designed to guide responses to unforeseen or contingency events with respect to water quality in the receiving environment.

20.5 WASTE MANAGEMENT

20.5.1 WASTE ROCK

Studies conducted throughout the KHSD provide a detailed foundation for understanding the weathering behavior or 'geoenvironmental' characterization of rock in the KHSD. These studies were used to derive a classicisation system for waste rock management and inform the waste rock management plan required by licence. Rock is classified as to the potential for acid generation and/or metal leaching (P-AML or N-AML). Geochemical screening criteria are defined for each deposit, and proportions of P-AML and N-AML material by rock type estimated to plan materials handling and meet licence conditions for the proposed development activities. The AKHM Waste Rock Management Plan methodology is used to classify waste rock as P-AML or N-AML during active mining, and each round is managed accordingly.

The majority of the waste rock excavated is expected to be N-AML. Waste rock field classified as N-AML will be stored in designated locations at each of the mine sites. P-AML waste rock is categorized as waste rock and mineralized waste rock of no economic interest with increased likelihood for acidic or metal leaching. Rock field-classified as P-AML (mainly pyrite rich graphitic schist) will be stored in designated P-AML waste rock storage facilities or permanently stored underground as cemented back fill within excavated stopes. Any water that enters a P-AML waste rock storage facility will be collected and treated. Additionally, monitoring upgradient and downgradient of each P-AML facility is done as part of ongoing site monitoring.

The projected waste rock amounts for each of the mine sites is presented in Table 20-3.

Table 20-3 Waste Rock Storage

	Bellekeno	Bermingham	Flame & Moth	Lucky Queen
Permitted (Water Licence QZ18-044)				
Backfill[a]	21,900	147,100	422,600	N/A
Max N-AML on surface (tonnes)[a]	0	190,000	125,000	N/A
Max P-AML on surface (tonnes)[a]	2,073	16,000	12,000	N/A
LOM Planned				
Total Waste Rock to be produced (tonnes)	0	409,518	392,630	65,799
Total Waste Rock to Backfill (tonnes)	0	381,652	210,859	53,000
Remaining Waste Rock on Surface (tonnes)	0	27,867	118,033	11,644

20.5.2 TAILINGS

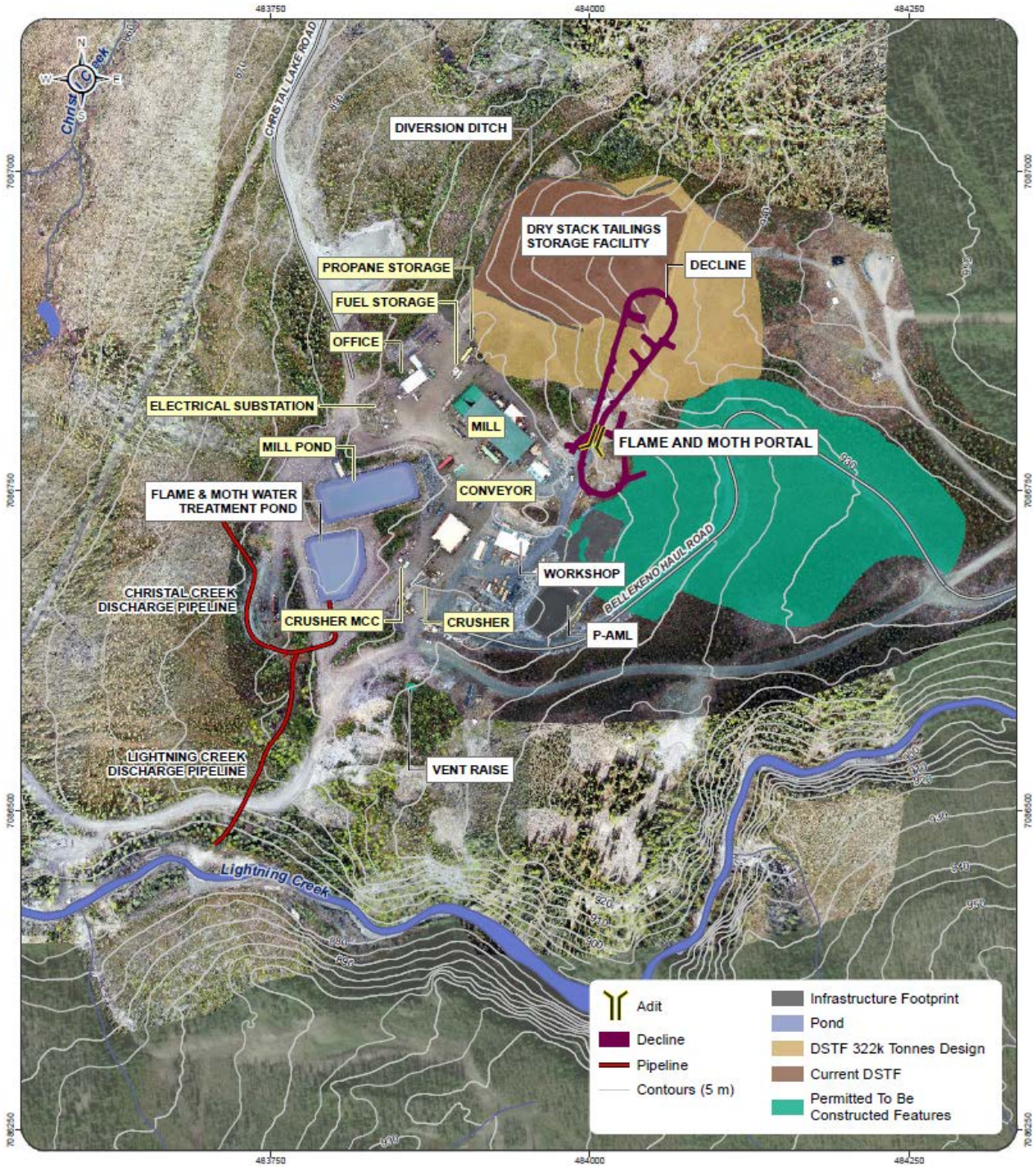
Alexco uses Dry Stack Tailings technology for management and long-term storage of tailings. Tailings will continue to be deposited in the licensed Dry Stack Tailings Facility (DSTF) located near the mill or used as backfill in the operating mines. The facility is designed and managed to meet both operational and closure requirements, with a minimum long term liability and no long-term water treatment requirement. The experience on the existing DSTF supports that with the following performance indicators:

1. The moisture content of the filtered and stacked tailings is lower than design, resulting in lower makeup water requirements and no discharge of mill water;

2. The metals content of the pore water lower than initially estimated (~ 2 mg/L vs. 20 mg/L);
3. Humidity cell tests on Bellekeno tailings in the DSTF confirm there is no concern for acid or metals generation;
4. Progressive reclamation has been successfully implemented to date;
5. No pore water has been measured or observed in the DSTF monitoring well installed within the DSTF;
6. Compaction results have met design specifications;
7. No surface subsidence has been observed; and
8. Ground temperature and slope indicator readings indicate no thawing of underlying permafrost or movement has occurred to date.

Geochemical characterization has been completed on tailings samples to date and continues during operation, according to the site Tailings Management Plan. Both laboratory and field testing show work that the tailings from Bellekeno are non-acid generating. Geochemical testing on tailings from Bermingham and Flame & moth show that they will be geochemically similar to the already licensed tailings and that no additional measures will be required to control metal leaching.

The DSTF is adjacent to the mill, as can be seen in Figure 20-1. It is lined and any drainage is to the mill pond where any water would be used in the mill or treated to the effluent quality standards prior to discharge. It should be noted that to date no seepage has been observed from the existing DSTF. Given that no seepage has been recorded from the DSTF in over ten years of operation, and a piezometer installed in the DSTF has found no free water within the tailings (EBA, 2013), the tailings are unlikely to be a significant source of metal loading to the surrounding environment during operations or during closure. Progressive reclamation has already begun on the DSTF with final slopes being re-contoured and revegetated with a soil cover.



Source: 2018 photo from Alexco files

Figure 20-1 Aerial View of DSTF at Keno Hill

The DTSF footprint is shown in Figure 18-1 in Section 18. Phase 1of the DSTF is permitted and particularly constructed. The DSTF Phase 2 expansion is approved and included in the amended QML and Water Licence.

The design capacity of DSTF Phase 1 is 322,000 t, of which approximately half has been filled in the previous mine operations, leaving a remaining capacity of 142,190 t. The current material balance for the project indicates that a total of 1,301,400 t of tailings will be generated. Of this, the DSTF is currently permitted to store 907,000 t. Although a relatively low quantity of tailings (<10% of total) has been used as backfill to date as a consequence of using more waste rock for backfill than originally predicted, current projections indicate that approximately 120,000 t of the total tailings produced could be backfilled into the underground workings. The potential for additional tailings storage capacity in this, or a later phase, will also be evaluated during detailed design of the DSTF Phase 2 expansion and submitted for permit modification when required.

The DSTF Phase 2 is located immediately adjacent to the current Phase 1 DSTF and has a design capacity of 585,000 t. It is expected that DSTF will be expanded to Phase 2 in year 1 of the project. The Phase 2 expansion would be constructed using the same foundation system, tailings placement techniques, and geometry (side slopes and bench elevations) as the current DSTF design. All other conditions regarding placement and compaction of the tailings as detailed in the DSTF Operation, Maintenance, and Surveillance Manual (EBA, 2010) are assumed to remain the same as those used in the current facility. The subsurface conditions within the footprint of the expansion are assumed to be generally similar to those under the existing approved footprint but will be investigated as part of the detailed design.

20.6 COMMUNITY AND FIRST NATION RELATIONS

Alexco meets regularly with stakeholders and First Nations regarding their ongoing operations as well as the new development plans for Flame & Moth and Bermingham, presenting detailed information about the Project and seeking expression of concerns. Additional consultation facilitated by the regulators is also part of the formal YESAA and licencing processes. Key socio-economic risks identified for the project include relying on all employee workforce and not contractor for development, including availability of skilled workforce locally and retainment of the workforce.

20.6.1 FIRST NATIONS RELATIONS

Alexco has signed a Comprehensive Cooperation and Benefits Agreement (CCBA) with the FNNND that recognizes the rights, obligations, and opportunities of the two parties. Individual chapters in the CCBA include human resources (employment and training), contracting, a formal drug and alcohol policy, business contracting and business partnering opportunities, environmental issues, and financial resourcing for the CCBA including legacy funding contributions.

Since environmental matters occupy prime importance with FNNND, the CCBA includes detailed discussion about respecting and protecting the environment, including enhanced opportunities for FNNND to be involved in environmental management of all operations, from mining through to closure and reclamation. The CCBA also describes a “Cooperative Engagement Process” that provides for early engagement of FNNND in the mine permitting process.

20.6.2 COMMUNITY RELATIONS

Due to the close proximity of this site to the community of Keno City, noise, dust, and traffic have been high profile issues at this site and several permit conditions address these concerns.. Several specific issues were raised during the YESAA process and have been included in the decision document and Quartz Mining Licence. Mitigation measures that have already been implemented or that are proposed by the company include limiting certain activities (e.g., crusher operations) and types of traffic to the hours of 7 am – 7 pm, constructing a building around the crusher and installation of a sound dampening enclosure around the Flame & Moth ventilation fan.

Dust is closely managed and monitored at the site. The dust monitoring data are compared to the Yukon ambient air quality standards.

There is a network of access roads and haul roads throughout the district. Haul roads have been upgraded between Bermingham and the mill, and a bypass constructed around Keno City to reduce traffic and noise for the residents. Required roads upgrades to access the Bermingham portal location were completed between 2018 and 2020 mainly widening, surfacing, and installing berms along Calumet Road.

The local community and First Nations have expressed interest in continued access for recreation and tourism in the area, subsistence harvesting and traditional use, sport and commercial hunting, fishing and trapping, mineral development, and preservation of historical resources. A Heritage Resource Overview Assessment was completed in 2018, in which no areas of overlapping high heritage values were identified for the project area (Ecofor, 2018). There are processes for communication of issues and grievances in place.

20.7 CLOSURE PLAN AND SECURITY

An updated Reclamation and Closure Plan was approved by the Yukon Government (YG) in 2019 that encompasses all of the active mining and processing activities in the KHSD (Alexco, 2018). Some key aspects of the closure plan are listed as below:

- Waste rock storage facilities will be regraded and then scarified. Organic materials may be blended into the surface to promote growth of vegetation. P-AML waste rock will mainly be placed as backfill in the mine or sloped to shed water and then covered with a 0.5 m layer of low permeability borrow material;
- Adits and raises will be sealed to prevent access. Bulkheads will be constructed in some areas to enhance water management activities;
- At the Flame & Moth, Bermingham and Bellekeno mines, *in situ* treatment measures will be implemented to reduce metal loadings if required. The active treatment systems will be replaced with passive bioreactor systems;
- All buildings and equipment that are not needed for the treatment activities will be removed from the portal areas. Any additional debris will be transferred to the Elsa solid waste disposal facility. The portal areas will be re-contoured and scarified to facilitate re-vegetation;
- Linear disturbances (roads) will be subject to standard decommissioning measures such as removal of culverts, scarification, re-vegetation, and removal of safety berms;
- The Flat Creek camp will be downsized as needed to support ongoing care and maintenance activities in the KHSD;
- Buildings and other infrastructure in the mill area will be dismantled and sold for salvage or demolished on site and disposed of in an approved landfill. Concrete footings will be covered with overburden, scarified, and re-vegetated;
- The DSTF will continue to be progressively reclaimed over the life of the facility with recontouring the side slopes to the final design slope angle (3:1) and placing of cover. If monitoring indicates that it is necessary, meteoric water will be directed to a passive biological treatment system for polishing prior to discharge; and
- Various monitoring activities will continue until the performance of the closure measures has been verified.

Alexco will have a site presence for many years while reclamation of the historical liabilities occurs. Therefore, monitoring of the Bellekeno, Lucky Queen, Flame & Moth, and Bermingham mine areas can be integrated with KHSD monitoring programs over the long term. This is expected to improve the efficiency of these ongoing water treatment and monitoring activities.

The Yukon Government requires financial security in the form of a letter of credit to cover potential liabilities associated with the cost of reclamation and closure. As part of QML-0009, YG currently holds $7,871,492 in security for the Bellekeno, Bermingham, Lucky Queen, Flame & Moth, and Onek mine operations, the mill area, and the DSTF. This amount was set in 2019, following a third-party review of Alexco's costs. Additional security of $2,361,463 was posted to Yukon Government in 2020 as a requirement of Water Licence QZ18-044.

Additional closure costs may be incurred if the effectiveness of the current closure concepts cannot be demonstrated. For example, active water treatment may be required at Bellekeno if passive bioreactors are not capable of meeting the discharge criteria. A full-scale pilot bioreactor has operated successfully at Galkeno 900 to support the long-term water management and treatment assumptions in the closure plan. The ongoing monitoring programs will be critical for ensuring that there is sufficient information available to support final closure plans for these production areas. A pilot scale *in situ* treatment process has been successfully demonstrated at the Silver King mine.

The reclamation and closure plan must be updated every two years to incorporate any changes to site conditions and the next update will be submitted prior to November 27, 2021.

21. CAPITAL AND OPERATING COSTS

This section describes:

- Capital cost estimates, also referred to as Capital Expenditure or CapEx estimates; and
- Operating cost estimates, also referred to as Operating Expenditure or OpEx estimates.

The forecasted Project capital and operating cost presented in this Technical Report is estimated to an overall accuracy of +/-25% accuracy which is aligned with the requirements for a Preliminary Feasibility Study in accordance with the Toronto Stock Exchange and Ontario Securities Commission's interpretation of NI 43-101 guideline.

The cost estimate is developed by mine area and includes the completion of the Bellekeno mine, development of the Flame & Moth deposit, development of the Bermingham deposit, and the re-opening of the Lucky Queen mine plus the necessary mill upgrades and site wide infrastructure for increasing the scale of operations at Keno Hill Silver Project.

All costs are in Canadian dollars (CA$) unless otherwise specified.

21.1 CAPITAL & SUSTAINING CAPITAL COST ESTIMATE

21.1.1 CAPITAL COST ASSUMPTIONS AND BASIS OF ESTIMATE

The capital cost estimates were generated by Alexco and reviewed in detail and modified where necessary by the respective QPs from Mining Plus (for all components except the process plant), and by Tetra Tech (process plant only). The QPs considers the accuracy of the components of the capital cost estimate to be at a PFS study level. Alexco is referred to as "Owner" in the following text.

The mining capital cost estimate is based on the following information:

- Equipment costs based on vendor quotations, validated owner cost sheets and estimates in accordance with equipment specifications and/or datasheets developed for the PFS;
- Quantity takes-offs from underground development and production designs with a monthly mining schedule;
- Quantity take-offs for materials provided by engineering drawings from capital projects;
- Labour rates provided by Alexco currently in effect at Keno Hill, and updated based on current local market conditions assuming owner operated and,
- Productivities for mobile equipment, mining processes, and labour based on first principles cost estimates, and correlation with similar projects in the region, elsewhere in North America and performance estimates provided by experienced mining contractors who are familiar with the location and conditions.

The Keno Hill District Mill restart cost estimation is based on the following information:

- Schedule and costing for the mill upgrades and modifications based on contractor estimates and a detailed work plan to restart the mill;
- Equipment prices for materials based on vendor quotations, current market conditions, and historical data from Alexco. Note that where vendor quotations were received in US$, an exchange rate of between 0.76 and 0.78 US$ per CA$ was used to convert the currency (dependent on the date the quote was received);
- Labour rates provided by local and regional construction contractors and current labour rates in effect at the Keno Hill Silver Project;

- Productivity of installed equipment based on historical operational performance and data and supplier specifications for new equipment installation; and,
- DSTF expansion cost based upon the previous cost per area, engineered design, and the tonnage capacity per unit area of DSTF constructed.

The underground mining equipment fleet required for mine development and operations in the capital plan has been purchased through a capital lease arrangement as shown in Section 16, Table 16-16, and will be subsequently moved from mine to mine as needed as part of the production schedule. All future equipment deployment will also be attained and purchased through a capital lease arrangement.

Exclusions from the working capital cost estimate include, but are not limited to, the following:

- Study costs to advance the project engineering;
- Fluctuations in exchange rates;
- All sunk costs prior to the prior to the end of March 2021;
- Project financing and interest charges; and
- Escalation during construction and operation.

A contingency of 12.5% has been included in the capital cost estimate to account for uncertain elements of cost within the Project scope. The contingency was set to capture the "known-unknown" costs associated with potential variances in quantities due to uncertainty of conditions or of assumptions made in the design basis.

21.1.2 CAPITAL COST SUMMARY

The working capital (pre positive monthly cash flow) cost of $10.0 M comprises the following cost components: mine development, PP&E (property, plant and equipment), mill upgrades, site wide infrastructure modifications and contingency costs totalling $13.0 M, plus an additional $19.3 M of capitalized operating costs. The costs incurred during the working capital period are offset by the $22.3 M in revenue generated to produce a net working capital of $10.0 M prior to reaching positive cash flow in month six. This net working capital covers the first five month period of mine development and mill ramp up. The working capital costs are summarized in Table 21-1.

Table 21-1 Working Capital Costs

Working Capital Costs ($ M)	
Mine Development/PP&E	9.9
Mill Refurbishment	0.7
Site Infrastructure/PP&E	1.0
Owners Costs, Contingency	1.4
Capitalized Operating Costs	19.3
Revenue Offset	-22.3
Total Working Capital Cost	10.0

The LOM sustaining capital cost, following the working capital expenditure period, is $95.6 M. This includes ongoing mine development and PP&E, mill modifications to reach 550 tpd in Year 3, and project contingency. A summary of the sustaining capital cost estimate is shown in Table 21-2.

Table 21-2 Sustaining Capital Cost Summary

		Total	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9
Mine Operation	$ M	83.6	6.0	16.7	15.1	12.8	8.6	7.9	10.8	4.3	1.5
District Mill	$ M	1.4	0.3	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0
Project Contingency	$ M	10.6	0.8	2.1	2.0	1.6	1.1	1.0	1.4	0.5	0.2
Total Sustaining Capital Cost	**$ M**	95.6	7.0	18.7	18.2	14.4	9.7	8.9	12.2	4.8	1.7

The details of the components of this capital cost summary are discussed in the following sections.

21.1.3 MINE CAPITAL COST ESTIMATE

The details of the estimated mining capital cost (inclusive of working capital cost) for each mine are shown in Table 21-3.

Table 21-3 Mine Capital Cost Summary (Inclusive of Working Capital Cost)

($ '000)		Total	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9
BELLEKENO	Surface and Underground PP&E Capital	-	-	-	-	-	-	-	-	-	-
	Capitalized Operating Cost	$2,346	$2,346	-	-	-	-	-	-	-	-
LUCKY QUEEN	Lateral and Vertical Development	$9,624	-	-	-	-	-	$362	$5,394	$3,200	$668
	Surface and Underground PP&E Capital	$1,091	-	-	-	-	-	$787	$305	-	-
	Capitalized Operating Cost	-	-	-	-	-	-	-	-	-	-
FLAME & MOTH	Lateral and Vertical Development	$37,251	$4,953	$5,876	$7,436	$6,999	$4,253	$2,428	$2,284	$2,145	$878
	Surface and Underground PP&E Capital	$562	$562	-	-	-	-	-	-	-	-
	Capitalized Operating Cost	$2,712	$2,712	-	-	-	-	-	-	-	-
BERMINGHAM	Lateral and Vertical Development	$35,934	$6,669	$8,299	$6,194	$5,413	$4,385	$3,396	$1,578	-	-
	Surface and Underground PP&E Capital	$875	$875	-	-	-	-	-	-	-	-
	Capitalized Operating Cost	$4,943	$4,943	-	-	-	-	-	-	-	-
Mine General + Equipment Fleet Capital		$9,598	$4,207	$2,483	$1,440	$363	-	$918	$187	-	-
Total		**$104,937**	**$27,268**	**$16,657**	**$15,070**	**$12,775**	**$8,638**	**$7,890**	**$9,747**	**$5,345**	**$1,546**

The surface infrastructure costs are also included in the mine capital cost estimate; additional capital cost for camp and office expansion is compiled in G&A cost. The additional water treatment required at Bermingham is included in the Bermingham mine capital costs (Table 21-3). The mining fleet is detailed in Section 16, showing the equipment currently owned by Alexco, as well as additional equipment required for this mine plan. The basis of estimate for this

mine plan is that the additional equipment will be leased. The total capital requirement for the equipment fleet which includes capital for initial rebuilds is $8.2 M. The details of the mining capital costs (inclusive of working capital cost) are shown graphically for each mine operation in Figure 21-1. The capital costs for each mine are summarized in Figure 21-2.

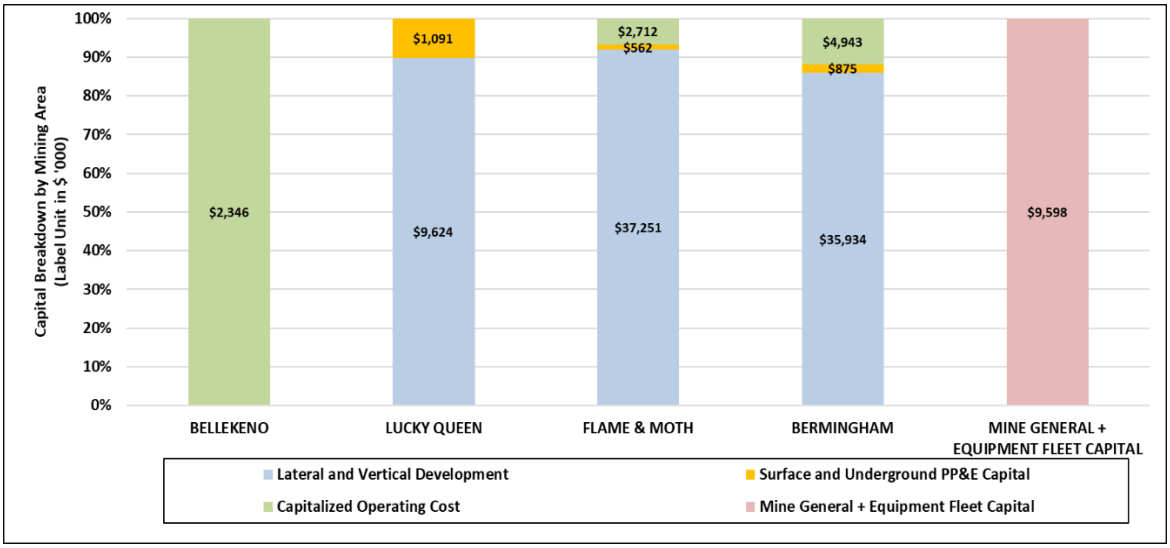


Figure 21-1 Mine Capital Cost Breakdown by Mine Operations

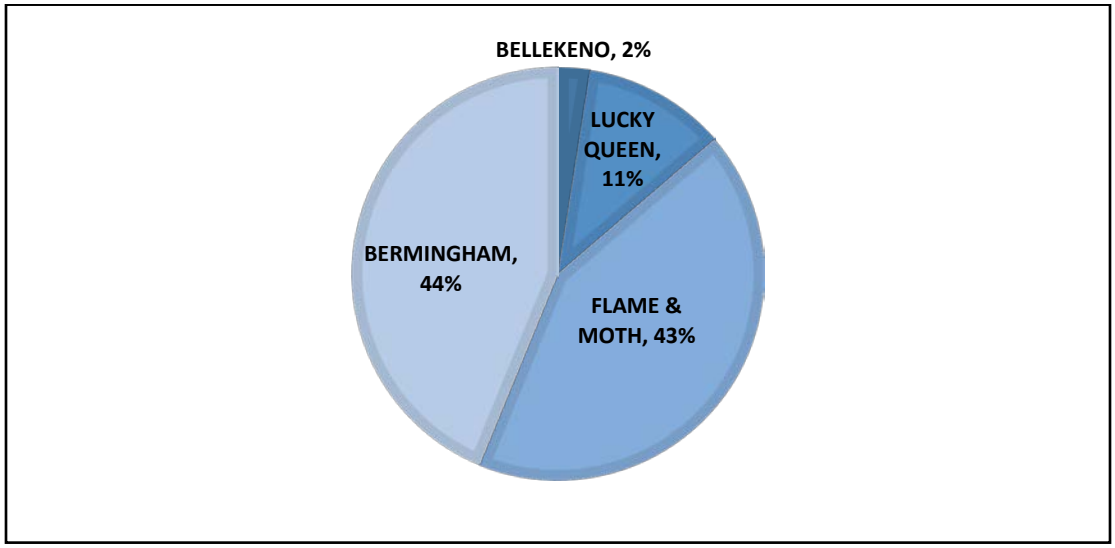


Figure 21-2 LOM Capital Cost Summary by Mine

21.1.4 MILL CAPITAL COST ESTIMATE

The remaining capital cost for mill modifications to increase throughput is minor, estimated to be less than $1.1 M, and as discussed in Section 17. These cost estimates are based on consultation with an experienced contractor, Alexco's experience with construction in the District, and vendor quotations.

21.2 OPERATING COST ESTIMATE

21.2.1 OPERATING COST ASSUMPTIONS AND BASIS OF ESTIMATE

Operating costs have been estimated in detail by Alexco and Mining Plus in a collaborative process. The information was reviewed and modified as required by the QP.

The operating cost estimate is based on following information:

- Labour rates provided by Alexco currently in effect at Keno Hill, and updated based on current local market conditions assuming owner perform;
- Operating cost category is applied once production of concentrate has commenced and positive cash flow for the project is achieved. Prior to this, the operating costs are included under working capital; and,
- Productivities for mobile equipment, mining processes and labour based on first principles cost estimates, and correlation with similar projects in the region, elsewhere in North America and performance estimates provided by experienced mining contractors or Alexco active operations personnel who are familiar with the location and conditions.

All mill related infrastructure with the exception of the crusher is planned to operate 24 hours per day, 365 days per year, less planned maintenance downtime of 8%. The crusher will operate 10 – 12 hours per day during the day shift only. The mine will operate two 12 hour shifts per day. Allowing for "non-productive" work time such as shift change, equipment inspection and reporting, this results in an effective production time per shift in the mine of 8.4 hours or 70%. During the ramp up period in year 1, the mill may operate at less than 400 tpd and/or in campaigns. This is based on the mine schedule and mine planning, and considered in the concentrate production and revenue calculations.

Wages and salaries were built up from base salaries or hourly rates depending on the role and included provision for bonuses where applicable. The technical report labour cost build up represents a combination of first principle estimation and actual remuneration packages for project labour. A calculated burden averaging 22% was applied to the base hourly labour rates. Burden includes Canada Pension Plan and Employment Insurance contributions, Worker's Compensation, retirement plan (RRSP) contributions, group benefits, and other minor items. The workforce varies throughout the years, depending on the production and development schedules. The peak workforce is 230 people, comprising 12 site management roles, 20 mine general roles, 38 mill roles, and 22 in site services, environment, and health & safety. The majority of employees will work a 2 week on, 2 week off rotating schedule.

Electrical power is supplied by Yukon Electric Corporation. Operating costs are based on existing costs at site, long-term contracts, and the calculated power requirements for the Project presented herein. The overall average monthly power cost ranges from $0.17/kWh to $0.23/kWh. Fuel used on site includes diesel, propane, gasoline and heating oil. The diesel for underground equipment is the most significant operating cost for site fuel consumption. The study uses $1.00/L for diesel. Additional diesel cost has been allowed for at Bermingham and Bellekeno during the initial 3 month period when power will be supplied to the mines using generators. Following this period Bermingham will be connected to permanent electrical power.

The category of "G&A" or "General and Administration" includes the areas of Financial Administration, Site Environmental, Health & Safety, Camp Operations, Site Services, and Mine General. G&A costs are estimated based on various fixed monthly costs as well as variable costs such as camp, equipment operations and employee travel.

Contingency has been applied only to the capital cost estimate. The contingency was based on experience and consultation with the engineering leads, considering the level of engineering complete on major fixed infrastructure as well as the source of unit cost information.

21.2.2 OPERATING COST SUMMARY

The total operating costs are $436 M over the LOM. This is net of capitalized underground development and mill upgrades. Mine, Mill and Site G&A costs (excluding Corporate G&A), are as summarized in Table 21-4 and discussed in more detail in the following sections.

Table 21-4 Life of Mine Direct Operating Cost Summary

Area	LOM Site Opex ($M)	Unit Cost ($/tonne milled)
Mine	$277	$196
Mill	$80	$57
G&A	$79	$56
LOM Total Site	$436	$310

Notes:
1. Summary excludes the capitalized operating cost from Apr 2021 to August 2021
2. Excludes tonnes milled during the working capital period

A more detailed breakdown of the operating costs per area is shown in Table 21-5. This does not include the milled tonnage or costs for the working capital period. Mine general cost is reported as a separate line item and contains the labour and various fixed costs associated with the mine management and engineering.

Table 21-5 Project Operating Cost by Area (not including working capital production or costs)

		Total	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9
Mined Tonnage ('000 t)	Bellekeno	-	-	-	-	-	-	-	-		
	Lucky Queen	71	-	-	-	-	-	-	22	36	13
	Flame & Moth	720	24	64	77	82	82	82	142	131	34
	Bermingham	618	13	68	104	119	120	120	74	-	-
	Total	1,409	38	132	180	201	202	202	239	167	48
Mine Operating Costs ($ '000)	Bellekeno	-	-	-	-	-	-	-	-	-	-
	Lucky Queen	23,054	-	-	-	-	-	493	9,662	9,119	3,779
	Flame & Moth	122,182	5,438	14,090	14,813	15,394	15,155	14,646	20,577	15,815	6,254
	Bermingham	106,072	4,981	17,415	18,217	19,528	17,701	16,884	11,347	-	-
	Mine General	25,318	1,089	3,267	3,267	3,267	3,267	3,267	3,811	2,722	1,361
Mine Unit Cost ($/t mined)	Bellekeno	-	-	-	-	-	-	-	-	-	-
	Lucky Queen	326	-	-	-	-	-	-	444	257	283
	Flame & Moth	170	224	219	193	187	185	178	145	121	182
	Bermingham	172	370	256	176	164	148	141	152	-	-
	Mine General	18	29	25	18	16	16	16	16	16	29
Processed Tonnage	('000 t)	1,409	33	137	166	200	200	200	233	167	73
Mill Cost	($'000)	80,279	3,066	9,808	10,181	10,806	10,808	10,819	12,643	8,509	3,639
Site G&A Cost	($'000)	79,468	3,453	10,298	10,318	10,328	10,311	10,312	12,110	8,366	3,972
Total Cost	($'000)	436,372	18,026	54,878	56,796	59,323	57,241	56,421	70,150	44,531	19,006
Mill Unit Cost	($/t milled)	57	93	72	61	54	54	54	54	51	50
Site G&A Unit Cost	($/t milled)	57	105	75	62	52	52	52	52	50	54
Total Unit Cost	($/t milled)	310	546	400	341	297	286	282	301	267	261

21.2.3 MINING OPERATING COST ESTIMATE

The mine operating cost estimate includes equipment operation and maintenance, labour and supervision, new materials, explosives, ground support, electrical power, ventilation, underground air heating, fuel, mine water pumping and treatment, parts, underground definition drilling and supplies within the following major categories:

- Lateral and vertical development, including ground control;
- Underground services development;
- Production drilling, blasting, load/haul; and
- Backfilling.

The largest component of operating cost is labour, representing approximately 51% of the total mine operating cost overall. Direct mining production costs represent about 18% of the total cost.

Operating costs for the mine were developed from first principles and calibrated with current site based operating costs. The following three tables (Table 21-6, Table 21-7 and Table 21-8) show more details of the costs by area, for Flame & Moth and Bermingham, which represent about 94% of the total mined production as well as Lucky Queen.

Table 21-6 Flame and Moth Mine Operating Cost by Activity

Area	LOM Total Cost ($M)	Unit Cost - MCF ($/tonne mined)	Unit Cost - LHOS ($/tonne mined)
Mine Labour	$51.8	$103.0	$41.5
Maintenance Labour	$11.8	$17.5	$15.1
Mining Direct	$23.0	$30.0	$33.6
Ore Access	$3.6	$5.5	$4.4
Backfill & Waste	$5.4	$6.7	$8.2
Materials & Supplies	$3.5	$5.2	$4.4
Contractor & Services	$1.9	$2.8	$2.4
Communication & Travel	$3.5	$5.3	$4.5
Fuel	$9.7	$14.4	$12.5
Power	$10.8	$15.8	$14.1
Total	**$124.9**	**$206.2**	**$140.9**

Table 21-7 Bermingham Mine Operating Cost by Activity

Area	LOM Total Cost ($M)	Unit Cost - MCF ($/tonne mined)	Unit Cost - LHOS ($/tonne mined)
Mine Labour	$45.8	$101.3	$46.5
Maintenance Labour	$8.6	$15.4	$11.9
Mining Direct	$23.7	$42.1	$33.6
Ore Access	$5.0	$10.8	$5.5
Backfill & Waste	$4.8	$8.8	$6.6
Materials & Supplies	$2.8	$5.1	$3.8
Contractor & Services	$1.5	$2.7	$2.0
Communication & Travel	$2.5	$4.3	$3.8
Fuel	$8.4	$15.2	$11.5
Power	$7.9	$14.5	$10.8
Total	**$111.0**	**$220.2**	**$136.0**

Table 21-8 Lucky Queen Mine Operating Cost by Activity

Area	LOM Total Cost ($M)	Unit Cost ($/tonne mined)
Mine Labour	$8.5	$120
Maintenance Labour	$1.1	$16
Mining Direct	$4.0	$56
Ore Access	$0.9	$13
Backfill & Waste	$1.4	$19
Materials & Supplies	$1.1	$15
Contractor & Services	$0.6	$8
Communication & Travel	$0.5	$7
Fuel	$2.4	$34
Power	$2.6	$37
Total	**$23.1**	**$326**

21.2.4 MILL OPERATING COST ESTIMATE

The mill operating costs were developed by Alexco and reviewed and modified by the QP for the process plant (Tetra Tech). The quantities and cost data that form the basis for the mill operating costs include the following sources:

- Metallurgical testwork;
- Supplier quotations; and
- Previous experience with operating the existing mill.

The annual mill operating cost is estimated at $10.3 M per year or $58.2 per milled tonne of ore. The process operating costs commence at the ore stockpile located beside the primary crusher building. A breakdown of the operating costs is summarized in Table 21-9.

Table 21-9 Summary of Mill Operating Costs

Area	Total Cost	Average Annual Operating Cost	Cost per Tonne Milled
	($M)	($M)	($ / tonne)
Crushing	$2.1	$0.3	$1.47
Grinding	$2.2	$0.3	$1.53
Flotation	$9.6	$1.2	$6.68
Dewatering	$2.6	$0.3	$1.81
DSTF	$2.6	$0.3	$1.81
Assay Lab	$0.8	$0.1	$0.54
Labour	$39.9	$4.9	$27.75
Power	$13.3	$1.6	$9.28
Fuel	$2.5	$0.3	$1.77
Equipment	$0.1	$0.0	$0.10
Materials/Supplies/Other	$7.9	$01.0	$5.48
Total	**$83.7**	**$10.3**	**$58.2**

The reagent costs are shown in Table 21-10. Metallurgical test work was used to determine the consumption rates and were benchmarked against current consumption rates experienced from the operating mill. In the cases where the reagent vendor quotes used in this cost estimate were in US$, a 0.78 US$ per CA$ exchange rate was used to convert the currency.

Table 21-10 Reagent Costs (based on LOM average 480 tonnes per day operation)

Consumables	Consumption	Unit Cost	Annual Consumption	Cost/Year	Source
	(g/tonne milled)	($/kg reagent)	(kg)	($ '000's)	
Flocculant	45	6.80	7,926	$53.9	Testing/Vendor Quote
Copper Sulfate	350	4.55	61,644	$280.5	Testing/Vendor Quote
Zinc Sulfate	1000	2.65	176,124	$466.7	Testing/Vendor Quote
MIBC	60	4.54	10,567	$48.0	Testing/Vendor Quote
3418A	55	14.79	9,687	$143.3	Testing/Vendor Quote
SIPX (Xanthate)	60	2.31	10,567	$24.5	Testing/Vendor Quote
Other	-	-	-	$3.5	Alexco Resource Corp.
Total Annual Reagent Cost, $	1,020.3				
Reagent Unit Cost, $/tonne	5.79				

Non-reagent consumables include, but are not limited to: liners, drive belts, screens, pumps, cyclones, grinding media, filter cloth, electrical supplies, pipes, hoses, fittings, valves, motors, lubricants, fuel, lumber and steel. The grinding media assumed forged balls and consumption was based on the previous mill operation that was increased to account for the higher throughput in the current mine plan.

The mill operating costs include the on-site assay lab located in the mill for regular operational samples. An allowance has been included for external assays on mill concentrates.

21.3 ALL-IN SUSTAINING COST ESTIMATE

An estimate of AISC per contained silver ounce on a by-product basis was calculated and is summarized below. AISC is a non-GAAP financial measure and does not have any standardized meaning prescribed by IFRS and is therefore unlikely to be comparable to similar measures presented by other companies. Alexco has adopted the practice of calculating this performance measure as the net cost of producing an ounce of silver (primary payable metal) after deducting revenues gained from incidental by-product production as well including the royalty cost paid to the Government of Canada.

This performance measurement has been commonly used in the mining industry as a relatively simple way of comparing the net production costs of the primary metal for a specific period against the prevailing market price of that metal. The Wheaton stream has not been included in the AISC build up as it is already accounted for in the revenue calculation. In order to interpret the Alexco AISC metric, the effective Ag price realized should be used which accounts for the adjusted effect of the Wheaton Ag payment instead of the prevailing market Ag price. AISC are based on total silver ounces contained in delivered concentrate and calculated on a per ounce basis net of credits for realized revenues from all metals other than silver.

Corporate G&A during mine operation is included in the cost, as is working capital. Corporate G&A after mine closure is not considered in the project economic evaluation. All costs below are calculated in United States Dollars (US$). Metal price and foreign exchange assumptions are presented in Section 22.1. The AISC is US$ 11.59/contained Ag oz. Table 21-11 shows the cost build-up of the AISC.

Table 21-11 Cost Component Summary with Study Metal Prices

Cost Components	Unit Cost (US$ / Ag oz)	Total (US$M)	Cost Summary Components	Unit Cost (US$/ Ag oz)	Total (US$M)
Direct Mining Costs	$6.30	$224			
Direct Milling Costs	$1.83	$65	Operating Costs	$8.14	$289
Transportation	$1.14	$41			
TC/RC	$1.63	$58	Cash Costs	$10.91	$388
By-Product Credit	-$4.40	-$156	Net Cash Costs	$6.52	-$156
Government of Canada Royalty	$0.09	$3	Adjusted Cash Costs	$6.60	$235
Site G&A	$1.84	$65			
Corp. G&A	$0.77	$27			
Sustaining Capital	$2.38	$85	All In Sustaining Costs	$11.59	$412

22. ECONOMIC ANALYSIS

The results of the economic analysis discussed in this section represent forward-looking information as defined under Canadian securities law. Actual results may differ materially from those expressed or implied by forward-looking information. The reader should refer to Section 3 of this Report for more information regarding forward looking statements, including material assumptions (in addition to those discussed in this section and elsewhere in this Report) and risks, uncertainties and other factors that could cause actual results to differ materially from those expressed or implied in this section and elsewhere in this Technical Report.

22.1 METHODOLOGY USED

The financial analysis was carried out using a discounted cash flow ("DCF") model. The net cash flow for each period is discounted at an annual rate of 5% (unless stated otherwise) to a present value and are then added to yield a net present value ("NPV").

The DCF model for the Project assumes that all figures are expressed in constant dollars or real terms. No inflation or real cost escalation was assumed. All monetary figures are expressed in Canadian dollars unless otherwise specified.

The QP has reviewed the LOM cost estimates and DCF model in sufficient detail to be satisfied that economic extraction of these Probable Mineral Reserves is justified.

Cost estimates are presented in Canadian currency unless otherwise noted and, where applicable, US foreign exchange rates were applied based on average LOM price projections in U.S. currency.

The economic parameters are based on a metal price forecast provided by Alexco as per analyst consensus and carried forward in the financial evaluation after validation by the QP. Price summary is shown in Figure 22-1 below:

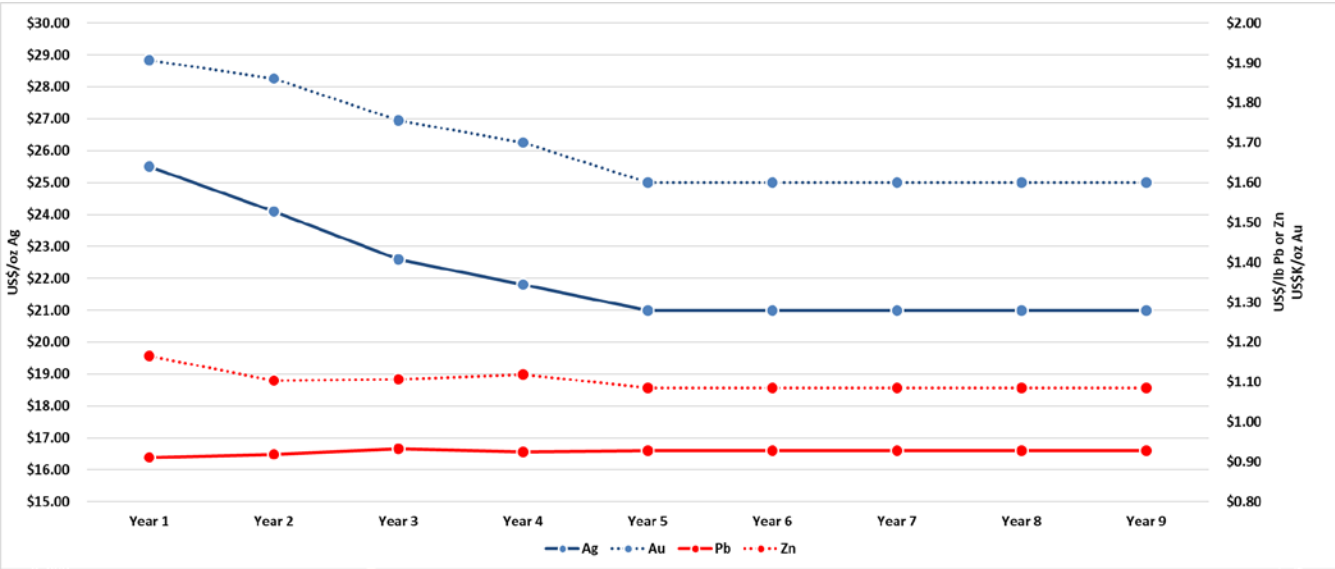


Figure 22-1 Metal Price Projection

An exchange rate of $0.781 US$/CDN$ in Year 1, increasing to $0.787 US$/CDN in Year 2, decreasing to $0.781 US$/CDN in Year 3 and then holding steady at $0.775 US$/CDN from Year 4 for long-term was assumed to convert US$ market price projections and particular components of the initial capital cost estimates into CA$. No provision was made for the effects of inflation. Current Canadian tax regulations were applied within the financial model by Alexco Management with support from Alexco's tax advisors.

22.2 ECONOMIC CRITERIA

The project value is determined on a pre-tax and after-tax basis at a 5% discount rate with the following economic criteria:

- Mine life of eight years and two months (approx.) over nine calendar years;
- Processing approximately 483 tonnes per day of mill feed (175,000 tonnes per year) for a total of 1.44 M tonnes LOM;
- Mill recovery for payable metals based on operations experience and as indicated by test work, averaging 95.5% Ag, 82.0% Zn, 88.2 % Pb, and 49% Au recovered in two concentrates;
- LOM production plan as summarized in Tables 16-11, 16-12, 16-13, and 16-14;
- Total Probable Mineral Reserves is shown in Table 15-1;
- Silver -lead concentrate and zinc-silver concentrate shipped to smelter for treatment;
- 25% of Ag is sold to Wheaton Precious Metals under a streaming agreement at a price ranging from US$2.41/oz Ag to US$5.46/oz Ag;
- NSR includes shipping, treatment, and refining costs;
- There is a NSR royalty of 1.5% (to a maximum of $4 M) to the Government of Canada.;
- Revenue is recognized at the time of production;
- Revenue is generated in Month 1 and a further 5 month Working Capital period (Apr 2021 – Aug 2021) will be required until the operation is cash-flow positive; and
- Average operating cost after the initial 5 month working capital period is $310 per tonne milled.

22.2.1 WHEATON PRECIOUS METALS CORP STREAMING AGREEMENT

As per the financing agreement with Wheaton, 25% of the payable Ag ounces are scheduled to be sold to Wheaton Precious Metals at a modified Ag price. Refer to Section 19.2.2 for details on this agreement.

22.2.2 OPERATING COSTS

The LOM operating costs are shown in Table 22-1 and are inclusive of the working capital period costs and milled tonnes and will be higher than the unit cost shown in Table 21-5Table 19-1. The mining cost per tonne of ore milled is $200 per tonne and processing costs are estimated at $58 per tonne of ore milled. General and administration costs are estimated at $58 per tonne of ore milled for a total operating cost of $317 per tonne of ore.

Table 22-1 Summary of LOM Operating Costs (unit costs averaged over LOM)

Operating Cost	LOM Total Cost ($ M)	LOM $/Tonne Milled	LOM $/oz Ag Mill Feed
Mining	$288	$200	$7.74
Processing	$84	$58	$2.25
General and Administration	$84	$58	$2.26

Notes:

1. Rounding of cost estimates may result in apparent summation differences when compared to overall unit costs.

22.2.3 TREATMENT, REFINING AND TRANSPORT

The total treatment and refining costs equate to an average of $40 per tonne of ore milled for the life of mine. Transport costs equate to an average of $28 per tonne of ore milled for the life of mine. These are summarized in Table 22-2.

Table 22-2 Treatment, Refining and Transport Cost Statistics (unit costs averaged over mine life)

Cost	LOM Total Cost ($ M)	LOM $/tonne Milled	LOM $/oz Ag Mill Feed
Treatment and Refinement	$58	$40	$1.56
Transport	$41	$28	$1.09

22.2.4 CAPITAL COSTS

Total LOM capital requirements have been estimated as $108.7 M and are described in detail in Section 21. The working capital cost is estimated to be $10.0 M. The subsequent sustaining capital over the LOM is $95.6 M.

This financial analysis does not include any sunk costs for exploration and project advancement prior to the completion of this study. Table 22-3 provides a LOM summary of metal prices, foreign exchange rates, treatment, refining and freight (transport) economic inputs considered in this financial evaluation.

Table 22-3 Inputs to the Economic Model

	Units	Avg.	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9
Metal Prices											
Ag	US$/oz Ag	22.11	25.50	24.10	22.60	21.80	21.00				
Ag (WPM)	US$/oz Ag	4.72	2.55	2.41	3.16	4.80	6.30				
Au	US$/oz Au	1694	1,910	1,870	1,760	1,710	1,600				
Pb	US$/lb Pb	0.92	0.91	0.92	0.93	0.92	0.93				
Zn	US$/lb Zn	1.10	1.17	1.10	1.10	1.12	1.09				
Exchange Rate	US$:CA$	0.778	0.781	0.787	0.781	0.775					
Treatment, Refining and Freight Charge											
Total charge (concentrate treatment, freight, refining)	US$/DMT of Ag-Pb Concentrate	960	960								
Total charge (concentrate treatment, freight, refining)	US$/DMT of Zn Concentrate	513	513								

22.2.5 CLOSURE COST AND SALVAGE VALUE

For contemporary mining operations, the Government of Yukon requires financial security in an acceptable form (i.e., letter of credit or surety bond) to cover potential liabilities associated with the cost of reclamation and closure. As part of QML-0009, YG currently holds $7,871,492 in security for the Bellekeno, Bermingham, Lucky Queen, Flame & Moth, and Onek mine operations, the mill area, and the DSTF. This amount was set in 2019, following a third-party review of Alexco's estimate of closure costs. As part of Water Licence QZ18-044 YG currently holds an additional $2,361,463 in security for Bermingham, Bellekeno, and Flame and Moth mining operations, the mill area and DSTF, for a total of $10,232,955 of security held by YG. YG has estimated that the costs for reclaiming this area could be on the order of $7.9 M.

22.2.6 TAXATION AND ROYALTIES

There is a NSR royalty of 1.5% payable to the Government of Canada. The NSR is capped at $4.0 M and commences when net revenue exceeds $3.06 M.

Taxes include Quartz Mining Tax, Federal, and Yukon Taxes. It is assumed that the four operating deposits will be treated as 'one mine' for income tax and royalty tax purposes.

The QP has relied upon Alexco and its tax advisors for the calculation of the taxes in the economic model.

22.3 CASH FLOW ANALYSIS

Considering the Project on a stand-alone basis, the undiscounted after-tax cash flow totals $189.7 M over the mine life. Simple payback occurs approximately 15 months from start of production, approximately 10 months after the end of the working capital period.

Figure 22-2 provides a summary of LOM annual cumulative after tax cashflow.

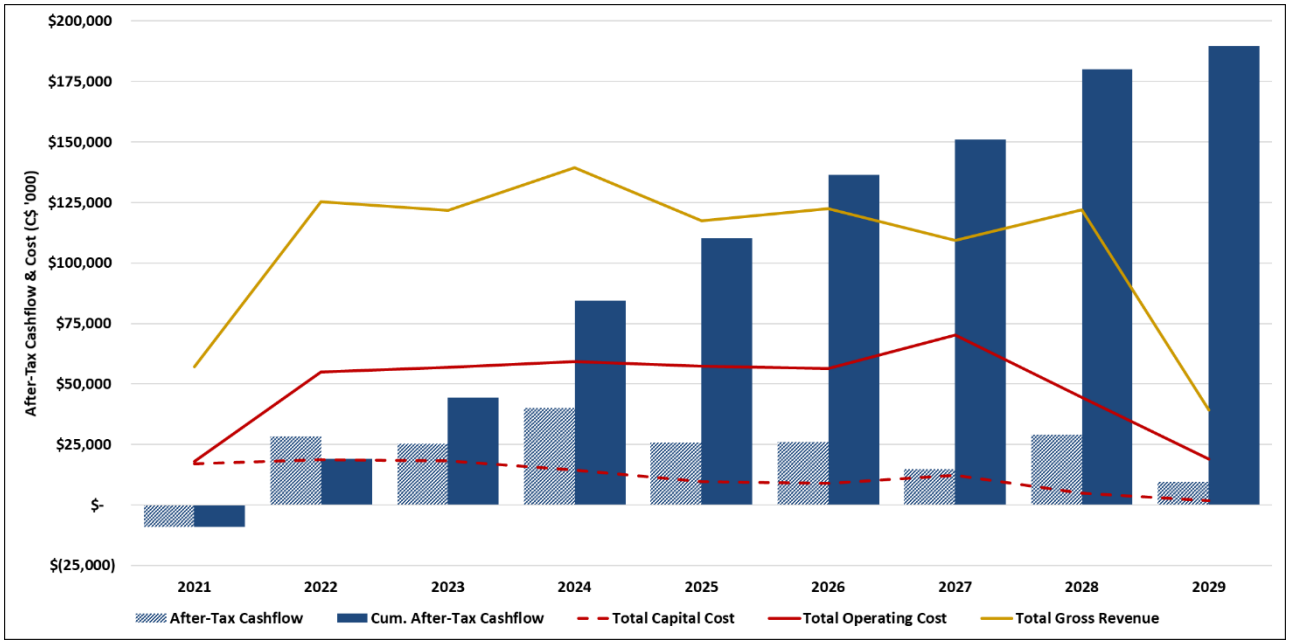


Figure 22-2 Cumulative Cash Flow After Tax ($ '000)

Figure 22-3 provides a breakdown of gross revenue distribution by metal over project LOM.

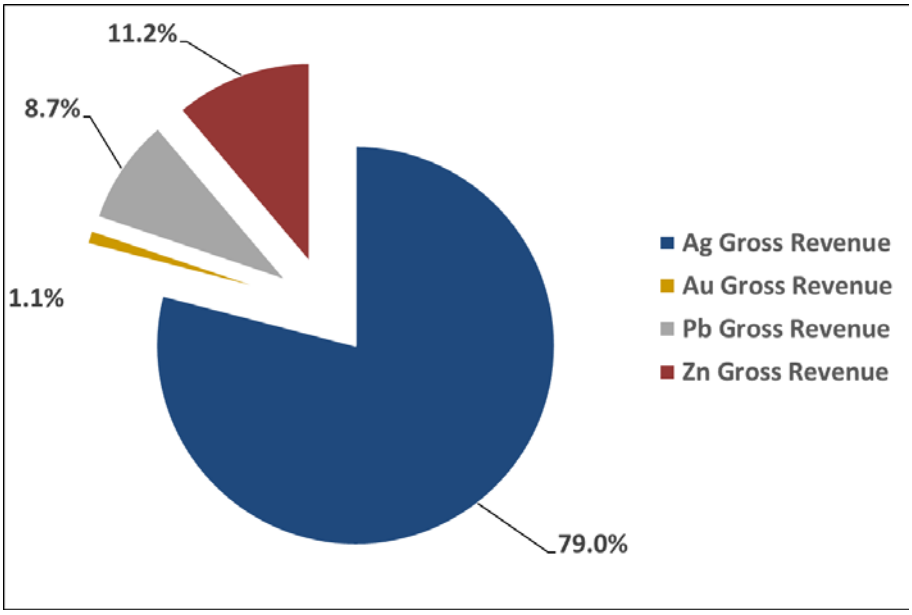


Figure 22-3 Revenue Distribution of Metals

22.4 FINANCIAL RESULTS

The after-tax Net Present Value (NPV_5) at a 5% discount rate is $154.3 M, and the annual after-tax Internal Rate of Return (IRR) is 295%. The pre-tax and after-tax results are summarized in Table 22-4. LOM production is summarized in Table 22-5.

Table 22-4 Valuation Metrics

5% Discount Rate	Unit	Pre-Tax	After-Tax
Net Present Value (NPV_5)	CA$M	$210.4	$154.3
IRR	%	326%	295%
Payback Period	Months	14.0	15.0

Table 22-5 LOM Production Summary

Item	Unit	LOM Total	Annual LOM Average
Life of Mine	years	8.2	
Production			
Ore Milled	'000 tonnes	1,438	176
Waste Mined	'000 tonnes	874	107
Silver Grade	g/t	804	804
Gold Grade	g/t	0.31	0.31
Lead Grade	%	2.64	2.64
Zinc Grade	%	3.84	3.84
Contained Metal in Mine Production			
Silver	koz	37,194	4,554
Gold	oz	14,196	1,738
Lead	Mlbs	83,764	10,257
Zinc	Mlbs	121,661	14,897
Process Recoveries (Payable Metals)			
Silver	%	96%	96%
Gold	%	49%	49%
Lead	%	88%	88%
Zinc	%	82%	82%
Metal Recovered			
Silver	koz	35,533	4,351
Gold	oz	6,956	852
Lead	Mlbs	77,206	9,454
Zinc	Mlbs	99,709	12,209

An after-tax NPV projection model (base case) was generated from the LOM production schedule, capital cost estimates, and operating cost estimates. The key financial results are presented in the Table 22-6.

Table 22-6 Financial Result Summary

Description	Units	Total
Tonnes Milled Per Day	tonnes / day	483
Mill Feed Ag Grade	g/t	804
Payable Ag	oz	33,510
Payable Au	oz	5,082
Payable Pb	Mlbs	69,769
Payable Zn	Mlbs	75,792
Total Gross Revenue	$M	$957.9
Net Revenue	$M	$831.1
Total Operating Cost	$M	$455.6
Total Capital Cost (includes contingency)	$M	$108.7
Taxes	$M	$73.1
After-Tax Cashflow	$M	$189.7
After Tax IRR	%	295%
After Tax NPV 5%	$M	$154.3

The DCF model for the project is summarized in Table 22-7.

Table 22-7 Discounted Cash Flow Model (Includes Working Capital Period)

	Units	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9
MINING											
Underground											
Production	'000 tonnes	**1,435**	64	132	180	201	202	202	204	201	48
Waste	'000 tonnes	**874**	99	160	188	194	99	49	55	26	4
PROCESSING											
Mill Feed	'000 tonnes	**1,438**	62	137	166	200	200	200	200	200	73
Ag Grade	g/t	**804**	947	1,077	909	863	721	777	678	730	623
Au Grade	g/t	**0.31**	0.16	0.29	0.27	0.34	0.33	0.32	0.31	0.33	0.28
Pb Grade	%	**2.64**	5.93	2.93	2.92	3.41	2.55	2.23	2.08	1.93	1.41
Zn Grade	%	**3.84**	4.85	4.63	3.24	2.85	3.52	3.35	3.46	5.02	5.52
REVENUE											
Pb Concentrate											
Payable Ag	oz	**32,482,775**	1,640,887	4,202,770	4,269,955	4,863,533	4,029,727	4,356,933	3,779,419	4,079,526	1,260,025
Payable Au	oz	**5,082**	81	419	450	691	779	787	758	844	273
Payable Pb	M lbs	**69.8**	6.8	7.4	9.0	12.8	9.4	8.1	7.5	7.0	1.8
Zn Concentrate											
Payable Ag	oz	**1,027,578**	45,876	106,037	128,958	155,183	139,077	144,727	135,228	130,095	42,398
Payable Zn	M lbs	**75.8**	4.2	8.9	7.2	7.6	9.6	9.1	9.4	14.2	5.7
Net Revenue	CA$ '000	**831,060**	48,733	109,586	106,967	122,770	102,020	107,754	95,295	104,748	33,188
Unit NSR	CA$/t milled	**578**	785	799	643	614	510	539	477	524	455
OPERATING COST											
Mining (Underground)	CA$ '000	**287,987**	22,870	34,772	36,296	38,188	36,123	35,290	45,397	27,656	11,395
Processing	CA$ '000	**83,735**	6,522	9,808	10,181	10,806	10,808	10,819	12,643	8,509	3,639
G&A	CA$ '000	**83,922**	7,906	10,298	10,318	10,328	10,311	10,312	12,110	8,366	3,972
Total Operating Cost	CA$ '000	**455,644**	37,298	54,878	56,796	59,323	57,241	56,421	70,150	44,531	19,006

	Units	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9
CAPITAL COST											
Mining	CA$ '000	**93,575**	15,905	16,657	15,070	12,775	8,638	7,890	10,806	4,287	1,546
Processing	CA$ '000	**2,000**	900	-	1,100	-	-	-	-	-	-
Compiled G&A	CA$ '000	**1,018**	1,018	-	-	-	-	-	-	-	-
Initial Capital	CA$ '000	-	-	-	-	-	-	-	-	-	-
Contingency	CA$ '000	**12,074**	2,228	2,082	2,021	1,597	1,080	986	1,351	536	193
Total Capital Cost	CA$ '000	**108,667**	20,051	18,739	18,191	14,372	9,718	8,876	12,156	4,823	1,740
CASH FLOW											
Taxes	CA$ '000	**73,087**	245	6,016	5,199	8,489	9,297	16,376	8,809	15,841	2,815
After-Tax Cashflow	CA$ '000	**189,662**	-9,139	28,307	25,176	40,113	25,765	26,081	14,737	28,995	9,627
PROJECT ECONOMICS											
After Tax IRR	%	**295%**									
After Tax NPV 5%	CA$ '000	**154,280**									

22.5 SENSITIVITY ANALYSIS

Project risks can be identified in both economic and non-economic terms. Key economic risks were examined by assessing cash flow sensitivities, compared to the base case considering:

- Ag price;
- Ag head grade;
- Ag recovery;
- Operating costs; and
- Capital costs.

Exchange rate and commodity price are acknowledged to be synchronized in terms of impact, hence only the Ag price is discussed and can be considered a proxy for exchange rate in terms of financial sensitivity. The revenue stream of Ag is approximately 80% of the total revenue stream. IRR and NPV sensitivity over the base case has been calculated for a range of variations. The after-tax sensitivities are shown in Table 22-8.

Table 22-8 After-Tax NPV and IRR Sensitivity Analysis Result Table

Project Variables	Factors (%)	5% NPV ($M)	IRR (%)
Silver Price (US$/oz)	-30%	$27	29%
	-20%	$77	83%
	-10%	$117	164%
	0%	$154	295%
	10%	$191	509%
	20%	$228	879%
	30%	$265	1549%
Silver Recovery (%)	-30%	$25	28%
	-20%	$75	85%
	-10%	$116	168%
	0%	$154	295%
	10%	$192	489%
	20%	$230	792%
	30%	$267	1281%
Silver Head Grade (g/t)	-30%	$18	22%
	-20%	$72	78%
	-10%	$114	160%
	0%	$154	295%
	10%	$194	519%
	20%	$234	912%
	30%	$273	1646%
Operating Cost ($'000)	-30%	$225	720%
	-20%	$202	525%
	-10%	$178	391%
	0%	$154	295%
	10%	$131	221%
	20%	$107	165%
	30%	$83	122%
Capital Cost ($'000)	-30%	$182	661%
	-20%	$173	488%
	-10%	$164	374%
	0%	$154	295%
	10%	$145	237%
	20%	$135	194%
	30%	$126	160%

Both the NPV and the IRR analysis indicate that the project value is most sensitive to Ag head grade. For a ±10% variance in Ag head grade, the project NPV can vary by ±26%.

In addtion, the project value is also highly sensitive to Ag recovery. For a ±10% variance in Ag recovery, the project NPV can vary by ±25%. However, with the historical data from Alexco on mill performance, there is sufficient confidence in the recovery estimation. It is recognized that the various ore sources considered in this evaluation (from different properties) represent slight variances in mineral composition; however, this does not constitute major risk in terms of Ag recovery of project cashflows. Project value is also sensitive to silver price, a ±10% variance in silver price resulted in a ±24% variation in NPV.

Amongst the selected parameters, project value is least sensitive to capital cost. The result is reflective of the low project capital requirements, leveraging the existing development and infrastructure (sunk cost).

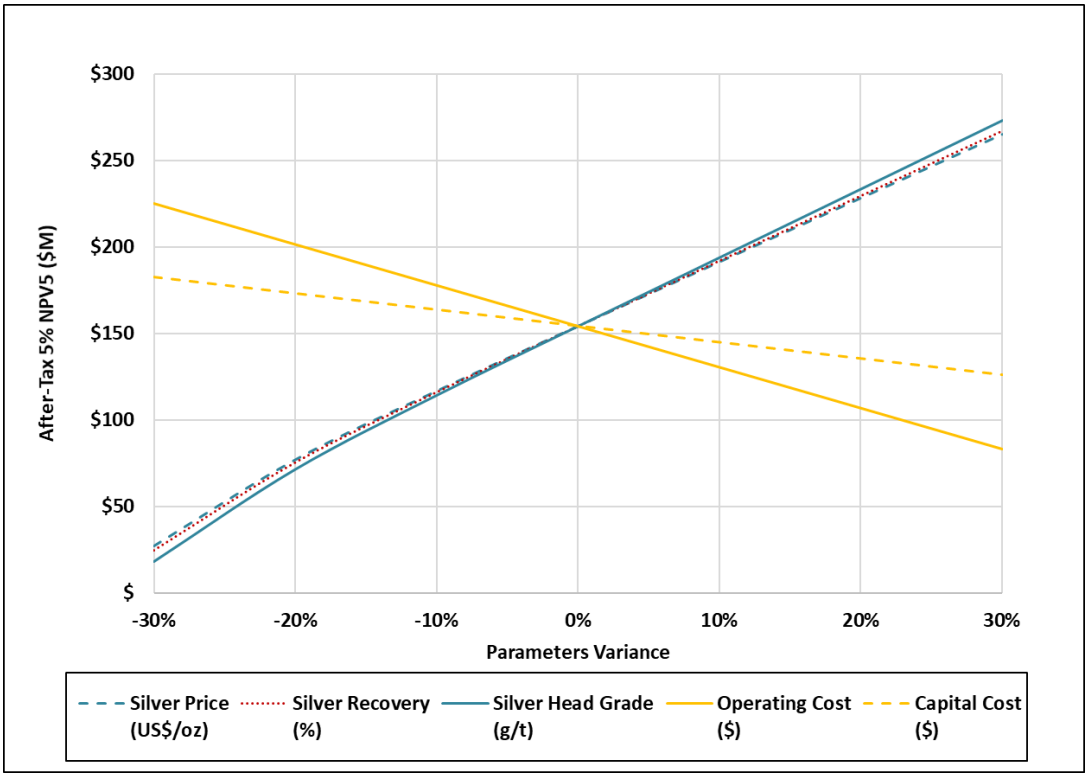


Figure 22-4 After-Tax 5% NPV Sensitivity (±30% project variables)

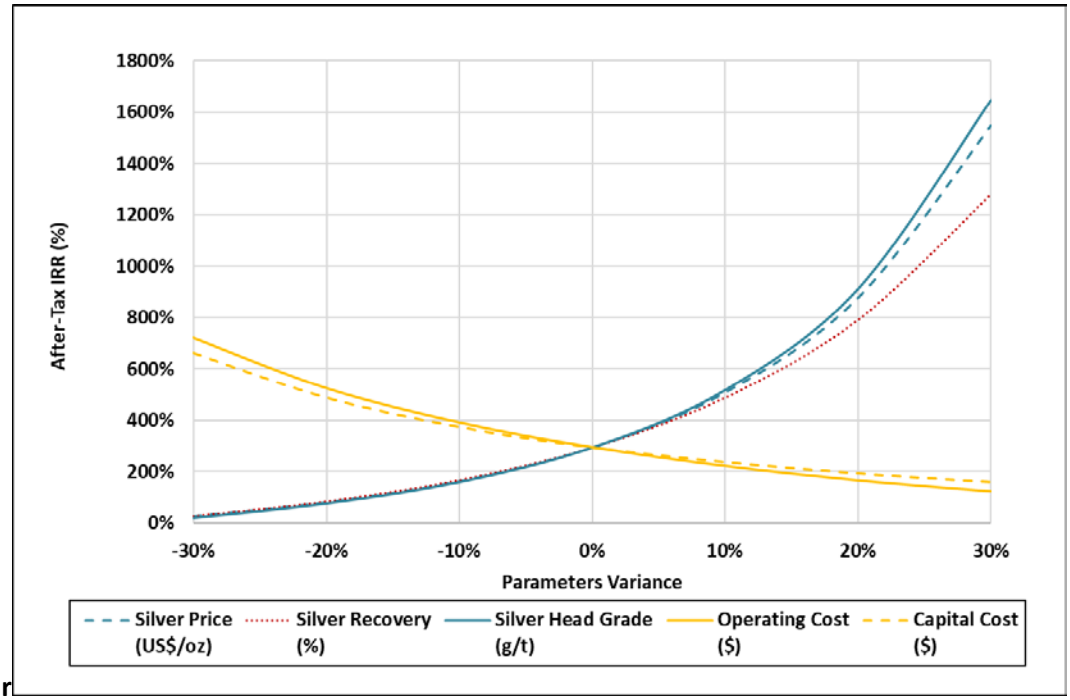


Figure 22-5 After-Tax IRR Sensitivity (±30% project variables)

23. ADJACENT PROPERTIES

The Project is located within the KHSD which has a long history of mining, as discussed previously in this report in Section 6. There are numerous historic and abandoned workings associated with this history. None are relevant to this project as they are included in the ERDC Reclamation Project as described in Section 6 and Section 20 herein.

There are current and historic placer gold mining operations to the east and north of the property; however, this mineralization is not considered indicative of the mineralization of the Project. Victoria Gold Corp.'s Eagle Gold Mine is located 35 km west of the Project along the Silver Trail Highway and adjacent to Alexco' s claims. The mineralization is not considered indicative of this Project. However, the construction and operation of the mine may provide both benefits and challenges in terms of available resources for this project.

24. OTHER RELEVANT DATA AND INFORMATION

No additional information or explanation is necessary to make this Technical Report understandable and not misleading.

25. INTERPRETATION AND CONCLUSIONS

The author considers that the study reported herein has been completed to a prefeasibility level of study as defined Canadian Institute of Mining, Metallurgy and Petroleum Standard Definitions for Mineral Resources and Mineral Reserves dated May 10, 2014 (CIM definitions) as well as industry best practices.

25.1 PROPERTY DESCRIPTION AND OWNERSHIP

The KHSD quartz mining claims and quartz mining leases are held by Alexco through its wholly-owned subsidiaries ERDC and AKHM. The current property ownership, access and licences cover the areas included in the geological model, Mineral Resources and Mineral Reserves in this study.

The potential liabilities associated with the historic operations in the KHSD are indemnified by the Government of Canada under the terms and conditions of the commercial agreement, subject to the requirement for ERDC to develop, permit and implement the site Reclamation Plan for the historic mining activities.

25.2 EXPLORATION AND MINERAL RESOURCES

Since the previous technical report (RPA, 2017), Alexco has completed additional resource diamond drilling at Bermingham from both surface and underground to expand the geologic database and density of sampling, and at Flame & Moth to provide additional samples for metallurgical testing.

The Mineral Resources at the KHSD have been estimated in accordance with the CIM Definitions. In the opinion of the QP, the resource evaluations reported herein are a reasonable representation of the global polymetallic Mineral Resources for the Bellekeno, Lucky Queen, Flame & Moth, Onek and Bermingham deposits given the current level of sampling.

25.3 MINERAL RESERVES, MINE PLANNING AND MINE DEVELOPMENT

The QP was responsible for the mine design, mine planning, and reserve calculations and considers the level of information and work appropriate for a PFS level Technical Report.

Since the PEA (RPA, 2017), Alexco has advanced underground development at both the Flame & Moth and Bermingham mines. The 600 m of ramp development at Bermingham provided additional resource information through underground exploration drilling, as well as geotechnical and hydrogeologic information related to the deposit. The 460 m of ramp development at Flame & Moth also provided additional geotechnical and hydrologic information for mine planning purposes.

The historic geotechnical database for Bermingham and Flame & Moth was reviewed and all data reclassified to provide a lithologic basis for developing geotechnical domains. Four domains were defined for the underground workings with ground support designs determined for each domain. This data along with past mining experience from the Bellekeno Mine were used to select the mining methods for this study, considering both mechanized cut and fill and longhole.

A NSR approach based on Ag, Pb, Zn, and Au was used for mine planning and mineral reserve estimates. The value of each stope (considering metal price, recovery, smelter charges and transportation) was compared to economic cutoff values, as well as development costs and was used to determine the Probable Mineral Reserve. A monthly mine production schedule was developed for each deposit using Deswik software for both development and mine production.

The schedule for all deposits was then combined to create a master milling schedule to calculate feed grades as well as for economic modelling.

The mine designs and mining plans are based upon engineering studies and design appropriate for a PFS level study. The LOM schedule is based on the specific strategy selected; however, there are other possible scenarios for defining an overall production schedule that may warrant further study, particularly if changing metal prices or exploration results alter the mine planning context.

Total Probable Mineral Reserves are 1.44 Mt @ 804 g/t Ag, 2.64% Pb, 3.84% Zn and 0.31 g/t Au. Total Contained ounces are 37.2 M oz Ag. Mining production occurs over an 8 year and 2 month period with an average production rate of 483 tonnes per day.

The key risks to achieving the design basis include:

1. Slower excavation rates, increased dilution, and increased ground support costs due to the relatively poor nature of the rock mass;
2. Stope by stope variation in grade typical of a high grade narrow vein deposit;
3. Localized conditions of higher water flow (e.g., around Mill Fault); and
4. Due to the relatively small nature of the operation, any unplanned breakdowns may have a potentially large effect.

The QP considers that the mine plan is sound, as it is based on conventional mining techniques, reasonable production assumptions, and due consideration of potential risks to achieving the mine plan. The level of work is considered appropriate for a PFS.

25.4 METALLURGICAL TESTING AND MINERAL PROCESSING

Since the PEA Technical Report (RPA, 2017), Alexco has completed additional open circuit (batch) and locked cycle testing. Additional composites have been prepared from exploration drill core, as well as composites blended from the different mines. The focus of the recent metallurgical testing (2017 to 2019) has been on the Bermingham and Flame & Moth deposits which represent 94% of the total mill feed in this study. Locked cycle testing on the composites which represent the high grade domains and on the blended composites are included in the existing metallurgical database. The testwork and database were reviewed in detail to identify both the tests and samples that would be representative of the range of mill feed, and of the mill process flowsheet, in order to estimate concentrate production.

The key conclusions from this review are that the existing processing plant with the planned upgrades can achieve the LOM average and the peak 550 tpd throughput design basis, and that the metallurgical testwork combined with operational data provide a sound basis for the metallurgical performance predictions. Metallurgical testwork has been completed to confirm the expected good performance of a blended mill feed. Based on the LOM mill head grades, the LOM average metallurgical recoveries to concentrates are estimated for the silver-lead concentrate at 91.0% Ag, 88.2% Pb and 49.0% Au, and for zinc -silver concentrate at 4.6% Ag and 73.4% Zn.

Over the life of the mine, the mill will produce two concentrates, totaling 62,053 tonnes of silver-lead concentrate averaging 18,186 g/t Ag, 54.0% Pb and 3.9 g/t Au and 76,398 tonnes of a zinc-silver concentrate averaging 750 g/t Ag and 52.8% Zn (grades reported for payable metals on in each concentrate under assumed Project economic basis).

The QP concludes that the level of work is sufficient for a prefeasibility study for an existing mill facility. The remaining risks or opportunities are:

- Zinc losses in the lead circuit are expected to be the only significant metallurgical shortfall however there is opportunity to optimize this with further testing either before operation or during;
- There is an opportunity to reduce the amount of lead that is calculated as reporting to the zinc concentrate, by capping the lower head grade concentrations at a constant recovery (as discussed in Section 13), as this lower cap was not applied in the economic model; and
- The construction of the DSTF expansion will be required for the Project.

25.5 ENVIRONMENT, COMMUNITY, PERMITTING AND CLOSURE

Alexco has been actively developing the KHSD since 2006 under a unique contractual arrangement with the Government of Canada whereby it can enter into production at historic and newly discovered deposits within the district while it undertakes reclamation activities to remediate historic environmental impacts. Thus, the risk of additional liabilities from historic operations is mitigated. Further, this contractual arrangement has meant there is a long and substantial background of environmental monitoring and impact assessment, as well as permitting experience and relationships with communities.

All of the permits and authorizations are in place for the Bellekeno, Bermingham, and Flame & Moth mines, and for the associated District Mill and infrastructure for mining and for processing at 400 tpd. An amendment to the Water Licence will be required to include the Lucky Queen mine (the quartz mining authorization is in place). An amendment to the Quartz Mining Licence would be required to expand mill throughout.

Mine reclamation and closure is included in the regulatory processes. External project reviews from previous permitting activities, regulatory inspections, and correspondence with communities indicated a reasonably productive and active working relationship. However, it is recognized that future conditions and relationships can change.

As of the date of this report, the QP considers it reasonable to expect that the relatively minor additional permitting requirements can be obtained within the time frames allowed within this Project schedule.

25.6 CAPITAL AND OPERATING COSTS AND ECONOMIC EVALUATION

Capital and operating costs have been estimated at a level of detail and information appropriate for a PFS level study. The overall accuracy is estimated at +/- 25% for both capital and operating costs.

The risks to both capital and operating costs are mitigated by several factors: the relatively low capital required for this project, the established site infrastructure including a mill which operated for three years, and existing access to all four mines including underground development completed from 2018-2021 in Bermingham and Flame & Moth mines. The majority of the operating costs are built up from first principles and calibrated by both previous experience and other projects in the Yukon.

The initial working capital cost for the project is CA$10.0 M with sustaining capital of CA$95.6 M. Operating costs average $310/t of ore over the life of mine excluding the initial 5 month working capital period.

25.7 ECONOMIC ANALYSIS

The economic model for the project was developed by Alexco and reviewed in detail and modified by the QP. The Project benefits from the operational history, the safe jurisdiction and existing permits, as well as the existing infrastructure. Although a brownfields project, the limitation of liabilities for the historic impacts of mining provides mitigation to that risk of liability and higher than expected closure costs.

Total cumulative after-tax cash flow to the project is CA$189.7 M. The before and after-tax Net Present Value (NPV_5) of the project are CA$210.4 M and CA$154.3 M respectively at a 5% annual discount rate. The before and after-tax Internal Rate of Return (IRR) is 326% and 295% respectively.

Based on the assumptions in the model, the conclusions are that this Project provides a robust cashflow over the eight year mine life, producing high value lead-silver and zinc concentrates. The Project LOM revenue is sensitive to a combination of foreign exchange and silver prices (which are not completely independent parameters) as well as silver recovery.

26. RECOMMENDATIONS

26.1 MINERAL RESOURCES

The authors consider that there is an opportunity to extend the mine life by additional drilling and sampling, targeting Inferred Resources and lower grade material at each of the deposits. This opportunity and recommendation for further consideration is based on the information reviewed by the qualified person(s), the planned and ongoing exploration activity, and the known Mineral Resources that are not included in the mine plan for Bermingham, Flame & Moth, and Lucky Queen deposits.

26.2 PROCESSING AND METALLURGY

The QP considers that there is an opportunity to improve the level of detail of the metallurgical predictions and particularly the concentrate production at a month-to-month operational level. Further locked cycle tests at the next stage of study is recommended for samples representing the Flame & Moth deposit and different blends according to the LOM production plan. There may be an opportunity to improve concentrate grades with further testing, particularly of the zinc concentrate. Additional metallurgical testing at different head grades would also support the approach to capping recoveries, particularly for the comportment of Pb to concentrates at lower head grade mill feed.

In addition, further hardness tests are recommended on these samples to verify potential grindability variations for future mill feeds. It is also recommended that testing of increased plant throughout above the 400 tpd be done in the first year of operation to identify potential bottlenecks and confirm requirements for mill modifications to achieve the 550 tpd throughput.

26.3 MINING AND GEOMECHANICS

It should be noted that over 90% of bore holes in the geotechnical database were developed using conventional, double tube drilling equipment. This approach can often lead to excessive disturbance of core ('mechanical' or handling breaks) which can be difficult to distinguish from naturally occurring joints when logging RQD. This can typically result in artificially low RQD values. For future geotechnical holes, it is recommended that they be drilled with the triple-tube system.

To confirm and refine assumptions applied in these preliminary ground support designs, it is recommended that geotechnical mapping and estimation of Q values, along with collection of excavation performance should commence once development enters mineralized and faulted zones.

Geotechnical data for this study was only available for the FM and BM deposits. Based on discussions with Alexco personnel, it is reasonable to assume that ground conditions previously encountered at the LQ and BK deposits will be comparable with those expected at the BM and FM deposits based on this geotechnical study. Therefore, operational experience gained during previous production mining at the LQ and BK deposits has been used to guide (but not directly influence) the development of geotechnical mine design parameters for the technical report. However, in future stages the geotechnical conditions of the LQ and BK will need to be verified. As mining progresses these geotechnical conditions and evaluations should be constantly reviewed and updated as further data is collected.

It should be noted that 2D model simulations have several inherent limitations – particularly when compared to 3D modeling assessments. Consequently, 2D models can return unreliable results when used in this application, as

compared to 3D simulations of the same geometry. Therefore, 3D inelastic modeling should be considered at the execution stage to confirm stope geometry stability, dilution estimates and extraction sequence.

A detailed study on the hangingwall competency and the impact on dilution is to be performed that included detailed geotechnical logging in the proximal and distal hangingwall. Detailed discrete element modeling is to be performed to better understand the impacts of hangingwall stability on dilution estimates and stope stability.

Due to the multiple orebodies to be mined, along with their varying grade a comprehensive global optimization process should occur. This should consider timing of Lucky Queen orebody development as well as the timing of increasing the mill capacity.

26.4 ENVIRONMENT AND PERMITTING

It is recommended that the Project advance the permitting required for the increased throughput in a timely manner, in order to meet the approximately 24 month permitting timeline assumed herein. Continued geochemical characterization of metallurgical products, particularly of tailings, is prudent for both operations and assurance of post-closure environmental performance.

26.5 DELIVERY ON COST ASSUMPTIONS AND PROJECT ECONOMICS

The QP considers that cost model and the productivity assumptions therein are reasonable for a pre-feasibility level study. It is recommended that the next stage of work should consider in more detail the link between mining activities and address cycle times, on a stope by stope analysis, and the dependencies to achieve those. It is recommended that work continue on optimization of the mine design and scheduling, as part of continued optimization of the project economics.

It is also recommended that Alexco continue with their evaluation of potentially contracting for mining development or production, as part of the risk mitigation strategies to current market limitations of skilled employees, and particularly maintenance and mechanics.

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28. CERTIFICATE OF QUALIFIED PERSON

Certificate of Qualified Person

Kourosh Tarighi, P.Eng.

I, Kourosh Tarighi, P.Eng., as an author of this report entitled "NI 43-101 Technical Report on Updated Mineral Resource and Reserve Estimate of the Keno Hill Silver District" prepared for Alexco Resource Corp. (the "Issuer") with an effective date of April 1, 2021 and dated May 26, 2021 (the "Technical Report"), do hereby certify that:

1. I am a Principal Mining Consultant with Mining Plus Canada Consulting Ltd. of Suite 504, 999 Canada Place, Vancouver, BC, V6C 3T4.
2. I am a graduate of Tehran Azad University in Tehran/Iran in 1998 with a Master of Science degree in Mining Engineering.
3. I am a Registered Professional Engineer in the Province of British Columbia (Reg #155915) and a Registered Professional Engineer in the Yukon Territory (Reg # 2684). I have worked as an engineer continuously for 20 years in the areas of open pit and underground mining and consulting.
4. I have read the definition of "qualified person" set out in 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.
5. I visited the project on February 13th, 2019.
6. I am responsible for the preparation of Sections 1-5, 15-16 (with the exception of 16.2), 18-20 and 23-27 (with the exception of 26.3) of the Technical Report.
7. I am independent of the Issuer according to Section 1.5 of NI 43-101.
8. I worked for Alexco Resource Corp. from 2015 to 2018 as a senior mining engineer with the property that is the subject of the Technical Report.
9. I have read NI 43-101 and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.
10. At the effective date of the Technical Report, to the best of my knowledge, information and belief, the portions of the Technical Report for which I am responsible contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated at Vancouver, British Columbia this 26th day of May, 2021.

(Signed & Sealed) "Kourosh Tarighi"

Kourosh Tarighi, P.Eng.
Principal Mining Consultant
Mining Plus Canada Consulting Ltd.

Certificate of Qualified Person

Zach Allwright, P.Eng

I, Zach Allwright, P. Eng., as an author of this report entitled "NI 43-101 Technical Report on Updated Mineral Resource and Reserve Estimate of the Keno Hill Silver District" prepared for Alexco Resource Corp. (the "Issuer") with an effective date of April 1, 2021 and dated May 26, 2021, (the "Technical Report"), do hereby certify that:

1. I am a professional engineer, employed as Director – North America of Mining Plus Canada Consulting Ltd. (Mining Plus), located at Suite 504, 999 Canada Place, Vancouver, BC, Canada, V6C3T4.
2. I am a graduate of the Western Australian School of Mines (Curtin University, Australia) in 2009 with a Bachelor of Engineering (Mining, Honours). In 2011 I completed a Graduate Certificate of Business majoring in Project Management (APM Certified) at Edith Cowan University (Australia). In 2017 I completed a Masters of Business Administration (MBA) from Curtin Graduate School of Business (Curtin University, Australia).
3. I am a member in good standing of the Engineers & Geoscientists of British Columbia (licence No . 45024).
4. I have over 13 continuous years of industry experience in the areas of underground mine planning, consulting and project evaluations. During this time I have been directly involved in over 60 international mining projects. My experience comprises of global technical involvement and site operations level engagements within North America, Australia, South America, SE.Asia and Europe.
5. I have read the definition of "qualified person" set out in 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.
6. I am the author of the Technical Report and responsible for the preparation of Section 21 pertaining to Mining Capital and Operating Costs and Section 22 of the Technical Report.
7. I am independent of the Issuer according to Section 1.5 of NI 43-101.
8. I have prior involvement with the property that is the subject of the Technical Report in the form of previous "qualified person" responsibilities for the 2019 technical report entitled "Pre-Feasibility Study on the Keno Hill Silver District Project, Yukon, Canada".
9. I have read NI 43-101 and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.
10. At the effective date of the Technical Report, to the best of my knowledge, information and belief, the portions of the Technical Report for which I am responsible contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated at Vancouver, British Columbia this 26th day of May, 2021.

(Signed & Sealed) "Zach Allwright"

Zach Allwright, P.Eng.
Director – North America
Mining Plus Canada Consulting Ltd.

Certificate of Qualified Person

Paul Hughes, P.Eng.

I, Paul Hughes, P. Eng., as a supervisor of this report entitled "NI 43-101 Technical Report on Updated Mineral Resource and Reserve Estimate of the Keno Hill Silver District" prepared for Alexco Resource Corp. (the "Issuer") with an effective date of April 1, 2021 and dated May 26, 2021 (the "Technical Report"), do hereby certify that:

1. I am a Rock Mechanics Consultant with Mining Plus Canada Consulting Ltd. of Suite 504, 999 Canada Place, Vancouver, BC, V6C 3T4.
2. I am a graduate of the University of British Columbia in Vancouver, British Columbia having have been conferred the degree Bachelor of Applied Science degree in Geological Engineering in 2004, Masters of Applied Science degree in Mining Engineering in 2008, and a Doctor of Philosophy in Mining Engineering in 2014.
3. I am a Registered Professional Engineer in good standing with the Province of British Columbia (Reg #36997) and a Registered Professional Engineer in good standing with the Yukon Territory (Reg # 2657). I have worked as an engineer continuously for 15 years in the areas of underground mining, rock mechanics, geotechnical engineering and consulting.
4. I have read the definition of "qualified person" set out in 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.
5. I am responsible for the preparation of Sections 16.2 and 26.3 of the Technical Report.
6. I am independent of the Issuer according to Section 1.5 of NI 43-101.
7. I have had prior involvement with the subject property, in that I am an author of a previous technical report on the property dated March 28, 2019, as amended February 13, 2020.
8. I have read NI 43-101 and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.
9. At the effective date of the Technical Report, to the best of my knowledge, information and belief, the portions of the Technical Report for which I am responsible contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated at Vancouver, British Columbia this 26th day of May, 2021.

(Signed & Sealed) "Paul Hughes"

Paul Hughes, P.Eng.
Rock Mechanics Consultant
Mining Plus Canada Consulting Ltd.

Certificate of Qualified Person

Dr. Gilles Arseneau, P.Geo.

I, Dr. Gilles Arseneau, P. Geo., as an author of this report entitled "NI 43-101 Technical Report on Updated Mineral Resource and Reserve Estimate of the Keno Hill Silver District" prepared for Alexco Resource Corp. (the "Issuer") with an effective date of April 1, 2021 and dated May 26th, 2021 (the "Technical Report"), do hereby certify that:

1. I am an Associate Consultant with the firm of SRK Consulting (Canada) Inc. ("SRK") with an office at Suite 2200-1066 West Hastings Street, Vancouver, BC, Canada.
2. I am a graduate of the University of New Brunswick with a B.Sc. (Geology) degree obtained in 1979, the University of Western Ontario with an M.Sc. (Geology) degree obtained in 1984 and the Colorado School of Mines with a Ph.D. (Geology) obtained in 1995. I have practiced my profession continuously since 1995. I have worked in exploration in North and South America and have extensive experience modelling precious metal mineralization similar to that at the Keno Hill Project.
3. I am a Professional Geoscientist registered with the Association of Professional Engineers & Geoscientists of British Columbia (no. 23474).
4. I have personally inspected the subject project on September 12 to 14, 2016.
5. I have read the definition of "qualified person" set out in 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.
6. I am independent of the Issuer according to Section 1.5 of NI 43-101.
7. I am a co-author of the Technical Report and was responsible for Sections 6 through 12, and the portions of Sections 14 of the Technical Report related to the Flame & Moth, Lucky Queen, and Onek deposits and relevant portions of Section 26.
8. I have had prior involvement with the subject property, in that I am the co-author of the previous technical reports on the property dated March 29, 2017, as amended September 14, 2018 and March 28, 2019, as amended February 13, 2020.
9. I have read NI 43-101 and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.
10. At the effective date of the Technical Report, to the best of my knowledge, information and belief, the portions of the technical Report for which I am responsible contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated at Vancouver, British Columbia this 26th day of May, 2021.

(Signed & Sealed) "Gilles Arseneau"

Dr. Gilles Arseneau, P. Geo.
Associate Consultant
SRK Consulting (Canada) Inc.

Certificate of Qualified Person

Cliff Revering, P.Eng.

I, Cliff Revering, P. Eng., as an author of this report entitled "NI 43-101 Technical Report on Updated Mineral Resource and Reserve Estimate of the Keno Hill Silver District" prepared for Alexco Resource Corp. (the "Issuer") with an effective date of April 1, 2021 and dated May 26, 2021 (the "Technical Report"), do hereby certify that:

1. I am a Principal Consultant (Geological Engineering) with the firm of SRK Consulting (Canada) Inc. (SRK) with a business address at Suite 600, 350 3rd Ave. North, S7K 6G7, Saskatoon, Saskatchewan, Canada.
2. I am a graduate of the University of Saskatchewan in 1995 with a B.E. in Geological Engineering and completed a Citation in Applied Geostatistics from the University of Alberta. My relevant experience includes more than 23 years employment in the mining industry, related to exploration, mine operations and project evaluations, with a specialization in geological modelling, mineral resource and reserve estimation, production reconciliation, grade control, exploration and production geology and mine planning.
3. I am a professional engineer registered with the Association of Professional Engineers and Geoscientists of Saskatchewan (APEGS#9764).
4. I have read the definition of "qualified person" set out in 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.
5. I am independent of the Issuer according to Section 1.5 of NI 43-101.
6. I am a co-author of the Technical Report and was responsible for the Bermingham Deposit mineral resource estimate as detailed within Section 14.0 and the portion of Section 26 pertaining to the Bermingham Deposit, and was responsible for the updated mineral resource estimate for the Bellekeno deposit as detailed in Section 14 of the Technical Report.
7. SRK Consulting (Canada) Inc. was retained by the Issuer to conduct a mineral resource update for the Bermingham deposit, and to conduct an audit of an internal mineral resource update for the Bellekeno Deposit. These mineral resource estimates were completed using CIM Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines and reported according to NI 43-101 guidelines.
8. I have visited the project site once, from July 24 to July 27, 2018.
9. I have had prior involvement with the subject property, I am the co-author of the previous technical report on the property dated March 28, 2019, as amended February 13, 2020.
10. I have read NI 43-101 and confirm that the Technical Report has been prepared in compliance with NI 43-101 and form 43-101F1.
11. As at the effective date of the Technical Report, to the best of my knowledge, information and belief, the portions of the Technical Report for which I am responsible contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated at Saskatoon, Saskatchewan this 26th day of May, 2021.

(Signed & Sealed) "Cliff Revering"

Cliff Revering, P.Eng., CPAG, BE.
Principal Consultant (Geological Engineering)
SRK Consulting (Canada) Inc.

Certificate of Qualified Person

Hassan Ghaffari, M. A. SC., P.Eng.

I, Hassan Ghaffari, M. A. Sc., P.Eng., as an author of this report entitled "NI 43-101 Technical Report on Updated Mineral Resource and Reserve Estimate of the Keno Hill Silver District" prepared for Alexco Resource Corp. (the "Issuer") with an effective date of April 1, 2021 and dated May 26, 2021 (the "Technical Report"), do hereby certify that:

1. I am a Director of Metallurgy with Tetra Tech Canada Inc. with a business address at Suite 1000 – 10th Floor, 885 Dunsmuir Street, Vancouver, British Columbia, V6C 1N5.
2. I am a graduate of the University of Tehran (M.A.Sc. Mining Engineering, 1990) and the University of British Columbia (M.A.Sc., Mineral Process Engineering, 2004). I am a member in good standing of the Association of Professional Engineers and Geoscientists of the Province of British Columbia (#30408). My relevant experience with respect to mineral engineering includes 27 years of experience in mining and plant operation, project studies, management, and engineering . As the lead metallurgist for the Pebble Copper-Gold Moly Project in Alaska, I was coordinating all metallurgical test work and preparing and peer reviewing the technical report and the operating and capital costs of the plant and infrastructure for both the scoping and prefeasibility studies. For the Ajax Copper-Gold Project in British Columbia, I was the project manager responsible for process, infrastructure, and overall management of the 60,000 t/d mill. As well, I was the project manager responsible for ongoing metallurgical test work and technical assistance for the La Joya Copper-Silver-Gold Project in Durango, Mexico.
3. I have read the definition of "qualified person" set out in 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.
4. I visited the property that is the subject of the Technical Report from March 31st to April 2nd of 2008.
5. I am independent of the Issuer according to Section 1.5 of NI 43-101.
6. I have had prior involvement with the subject property, in that I am a co-author of the previous technical report on the property dated March 28, 2019, as amended February 13, 2020.
7. I am responsible for Sections 13 and 17, and the portions of Sections 1, 21, 22, 25, and 26 related to the metallurgy and mill performance of this Technical Report.
8. I have read NI 43-101 and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.
9. As at the effective date of the Technical Report, to the best of my knowledge, information and belief, the portions of the Technical Report for which I am responsible for contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

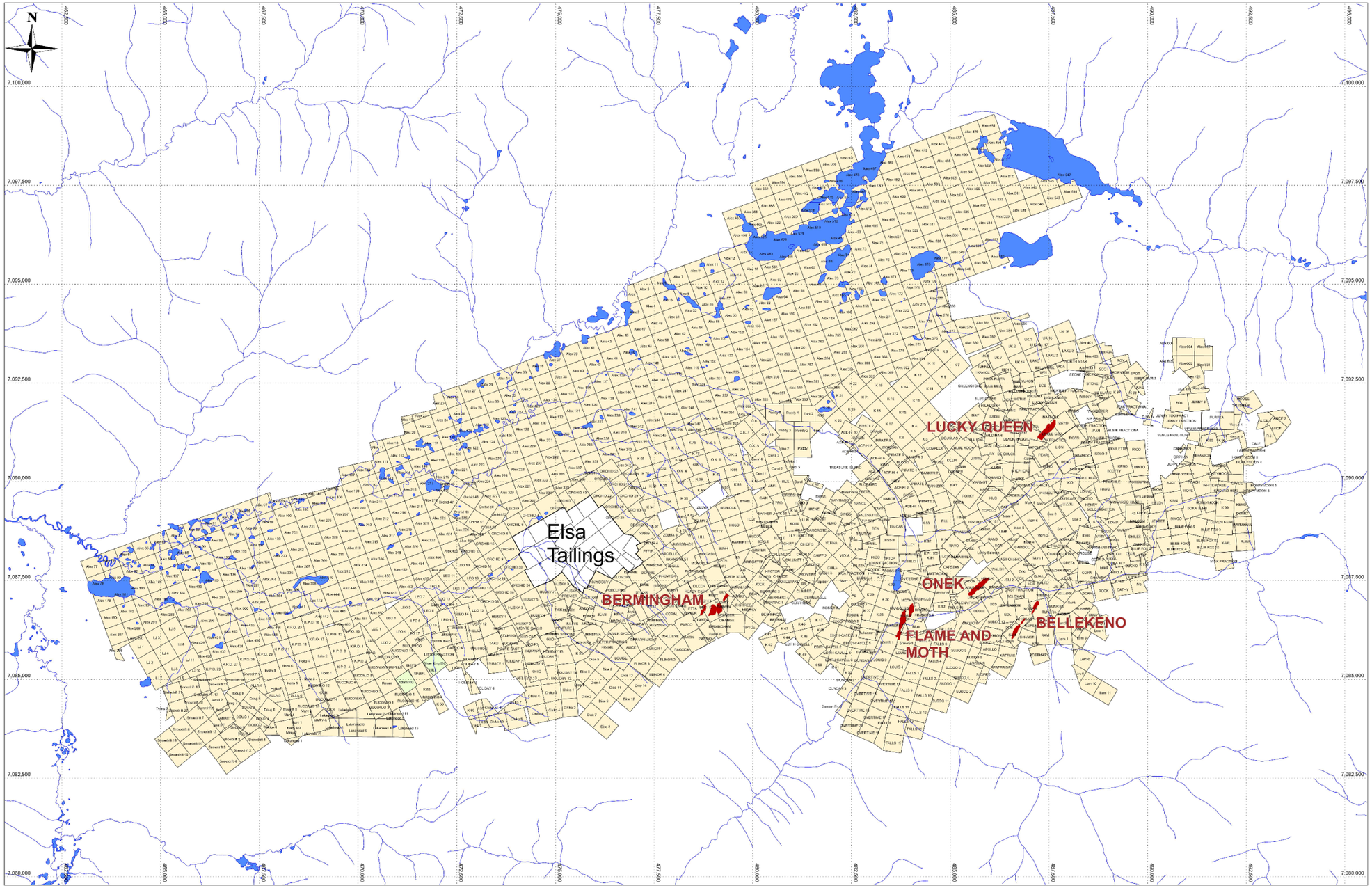
Dated at Vancouver, British Columbia this 26th day of May, 2021.

(Signed & Sealed) "Hassan Ghaffari"

Hassan Ghaffari, M. A. Sc., P.Eng.
Director of Metallurgy
Tetra Tech Canada Inc.

APPENDIX A.

Alexco Quartz Mining Claim and Lease Holdings in the Keno Hill Silver District Excluding the Tailings Property


N
LUCKY QUEEN
Elsa
Tailings
BERMINGHAM
ONEK
BELLEKENO
FLAME AND
MOTH

Grant	Lease	Status	Claim Name	Owner	Staked	Recorded	Expiry	Comment
YC32217		Active	43	Alexco Keno Hill Mining Corp. - 100%	2004/08/21	2004/08/23	2023/12/31	
56501	NM00059	Active	83	Elsa Reclamation & Development Company Ltd. - 100%	1947/09/17	1947/09/24	2021/07/24	
15331	NM00244	Active	"X"	Elsa Reclamation & Development Company Ltd. - 100%	1929/05/09	1929/05/30	2024/02/28	
56502	NM00060	Active	A.A.	Elsa Reclamation & Development Company Ltd. - 100%	1947/09/17	1947/09/24	2021/07/24	
55590	NM00297	Active	ABEL	Alexco Keno Hill Mining Corp. - 100%	1946/10/08	1947/03/28	2025/02/23	
55548	NM00322	Active	ACE-HI	Elsa Reclamation & Development Company Ltd. - 100%	1946/10/17	1947/02/13	2025/02/08	
55549	NM00323	Active	ACE-HI 1	Elsa Reclamation & Development Company Ltd. - 100%	1946/10/17	1947/02/13	2025/02/08	
55559	NM00331	Active	ACE-HI 10	Elsa Reclamation & Development Company Ltd. - 100%	1946/10/17	1947/02/14	2025/02/08	
55560	NM00332	Active	ACE-HI 11	Elsa Reclamation & Development Company Ltd. - 100%	1946/10/17	1947/02/14	2025/02/08	
55550	NM00324	Active	ACE-HI 2	Elsa Reclamation & Development Company Ltd. - 100%	1946/10/17	1947/02/13	2025/02/08	
55552	NM00325	Active	ACE-HI 4	Elsa Reclamation & Development Company Ltd. - 100%	1946/10/17	1947/02/14	2025/02/08	
55553	NM00326	Active	ACE-HI 5	Elsa Reclamation & Development Company Ltd. - 100%	1946/10/17	1947/02/14	2025/02/08	
55555	NM00327	Active	ACE-HI 6	Elsa Reclamation & Development Company Ltd. - 100%	1946/10/17	1947/02/14	2025/02/08	
55556	NM00328	Active	ACE-HI 7	Elsa Reclamation & Development Company Ltd. - 100%	1946/10/17	1947/02/14	2025/02/08	
55557	NM00329	Active	ACE-HI 8	Elsa Reclamation & Development Company Ltd. - 100%	1946/10/17	1947/02/14	2025/02/08	
55558	NM00330	Active	ACE-HI 9	Elsa Reclamation & Development Company Ltd. - 100%	1946/10/17	1947/02/14	2025/02/08	
56575	NM00170	Active	ACRE FRACTION	Elsa Reclamation & Development Company Ltd. - 100%	1948/07/14	1948/07/21	2022/06/12	
14858		Active	ADA	Elsa Reclamation & Development Company Ltd. - 100%	1923/07/30	1923/08/30	2022/12/31	
83011	NM00593	Active	ADAM FRACTION	Elsa Reclamation & Development Company Ltd. - 100%	1963/06/29	1963/07/09	2027/11/02	
55477	NM00809	Active	ADONAIS	Elsa Reclamation & Development Company Ltd. - 100%	1946/08/31	1947/01/24	2038/12/15	
YC02775		Active	Ag	Alexco Keno Hill Mining Corp. - 100%	2001/07/09	2001/07/10	2030/12/31	
62132	NM00555	Active	AGRAM	Alexco Keno Hill Mining Corp. - 100%	1952/06/03	1952/06/17	2027/11/02	
12840	NM00361	Active	AJAX	Elsa Reclamation & Development Company Ltd. - 100%	1919/09/09	1919/10/28	2025/04/30	
14466	NM00827	Active	AJAX	Elsa Reclamation & Development Company Ltd. - 100%	1921/09/30	1921/12/07	2039/08/18	
80178	NM00499	Active	ALBERTA L	Elsa Reclamation & Development Company Ltd. - 100%	1956/12/07	1956/12/13	2025/11/26	
YC48132		Active	Alex 1	Alexco Keno Hill Mining Corp. - 100%	2006/05/26	2006/06/02	2035/12/31	
YC48141		Active	Alex 10	Alexco Keno Hill Mining Corp. - 100%	2006/05/20	2006/06/02	2035/12/31	
YC48231		Active	Alex 100	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48232		Active	Alex 101	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48233		Active	Alex 102	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48234		Active	Alex 103	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48235		Active	Alex 104	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48236		Active	Alex 105	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48237		Active	Alex 106	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48238		Active	Alex 107	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48239		Active	Alex 108	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48240		Active	Alex 109	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48142		Active	Alex 11	Alexco Keno Hill Mining Corp. - 100%	2006/05/20	2006/06/02	2035/12/31	
YC48241		Active	Alex 110	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48242		Active	Alex 111	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48243		Active	Alex 112	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48244		Active	Alex 113	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48245		Active	Alex 114	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	

Grant	Lease	Status	Claim Name	Owner	Staked	Recorded	Expiry	Comment
YC48246		Active	Alex 115	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48247		Active	Alex 116	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48248		Active	Alex 117	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48249		Active	Alex 118	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48250		Active	Alex 119	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48143		Active	Alex 12	Alexco Keno Hill Mining Corp. - 100%	2006/05/20	2006/06/02	2035/12/31	
YC48251		Active	Alex 120	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48252		Active	Alex 121	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48253		Active	Alex 122	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48254		Active	Alex 123	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48255		Active	Alex 124	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48256		Active	Alex 125	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48257		Active	Alex 126	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48258		Active	Alex 127	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48259		Active	Alex 128	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48260		Active	Alex 129	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48144		Active	Alex 13	Alexco Keno Hill Mining Corp. - 100%	2006/05/20	2006/06/02	2035/12/31	
YC48261		Active	Alex 130	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48262		Active	Alex 131	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2035/12/31	
YC48263		Active	Alex 132	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2035/12/31	
YC48264		Active	Alex 133	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2035/12/31	
YC48265		Active	Alex 134	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2035/12/31	
YC48266		Active	Alex 135	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2035/12/31	
YC48267		Active	Alex 136	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2035/12/31	
YC48268		Active	Alex 137	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2035/12/31	
YC48269		Active	Alex 138	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2035/12/31	
YC48270		Active	Alex 139	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2035/12/31	
YC48145		Active	Alex 14	Alexco Keno Hill Mining Corp. - 100%	2006/05/20	2006/06/02	2035/12/31	
YC48271		Active	Alex 140	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2035/12/31	
YC48272		Active	Alex 141	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2035/12/31	
YC48273		Active	Alex 142	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2035/12/31	
YC48274		Active	Alex 143	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2035/12/31	
YC48275		Active	Alex 144	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2035/12/31	
YC48276		Active	Alex 145	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2035/12/31	
YC48277		Active	Alex 146	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2035/12/31	
YC48278		Active	Alex 147	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2035/12/31	
YC48279		Active	Alex 148	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2035/12/31	
YC48280		Active	Alex 149	Alexco Keno Hill Mining Corp. - 100%	2006/05/15	2006/06/02	2035/12/31	
YC48146		Active	Alex 15	Alexco Keno Hill Mining Corp. - 100%	2006/05/20	2006/06/02	2035/12/31	
YC48281		Active	Alex 150	Alexco Keno Hill Mining Corp. - 100%	2006/05/15	2006/06/02	2035/12/31	
YC48282		Active	Alex 151	Alexco Keno Hill Mining Corp. - 100%	2006/05/15	2006/06/02	2035/12/31	
YC48283		Active	Alex 152	Alexco Keno Hill Mining Corp. - 100%	2006/05/15	2006/06/02	2035/12/31	
YC48284		Active	Alex 153	Alexco Keno Hill Mining Corp. - 100%	2006/05/15	2006/06/02	2035/12/31	

Grant	Lease	Status	Claim Name	Owner	Staked	Recorded	Expiry	Comment
YC48285		Active	Alex 154	Alexco Keno Hill Mining Corp. - 100%	2006/05/15	2006/06/02	2035/12/31	
YC48286		Active	Alex 155	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2035/12/31	
YC48287		Active	Alex 156	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2035/12/31	
YC48288		Active	Alex 157	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2035/12/31	
YC48289		Active	Alex 158	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2035/12/31	
YC48290		Active	Alex 159	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2035/12/31	
YC48147		Active	Alex 16	Alexco Keno Hill Mining Corp. - 100%	2006/05/20	2006/06/02	2035/12/31	
YC48291		Active	Alex 160	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2035/12/31	
YC48292		Active	Alex 161	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2035/12/31	
YC48293		Active	Alex 162	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2035/12/31	
YC48294		Active	Alex 163	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2035/12/31	
YC48295		Active	Alex 164	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2034/12/31	
YC48296		Active	Alex 165	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2034/12/31	
YC48297		Active	Alex 166	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2034/12/31	
YC48298		Active	Alex 167	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2034/12/31	
YC48299		Active	Alex 168	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2034/12/31	
YC48300		Active	Alex 169	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2034/12/31	
YC48148		Active	Alex 17	Alexco Keno Hill Mining Corp. - 100%	2006/05/26	2006/06/02	2035/12/31	
YC48301		Active	Alex 170	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2034/12/31	
YC48302		Active	Alex 171	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2034/12/31	
YC48303		Active	Alex 172	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2034/12/31	
YC48304		Active	Alex 173	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2034/12/31	
YC48305		Active	Alex 174	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2034/12/31	
YC48306		Active	Alex 175	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2038/12/31	
YC48307		Active	Alex 176	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2038/12/31	
YC48308		Active	Alex 177	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2034/12/31	
YC48309		Active	Alex 178	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2034/12/31	
YC48310		Active	Alex 179	Alexco Keno Hill Mining Corp. - 100%	2006/05/21	2006/06/02	2035/12/31	
YC48149		Active	Alex 18	Alexco Keno Hill Mining Corp. - 100%	2006/05/21	2006/06/02	2035/12/31	
YC48311		Active	Alex 180	Alexco Keno Hill Mining Corp. - 100%	2006/05/21	2006/06/02	2035/12/31	
YC48312		Active	Alex 181	Alexco Keno Hill Mining Corp. - 100%	2006/05/21	2006/06/02	2035/12/31	
YC48313		Active	Alex 182	Alexco Keno Hill Mining Corp. - 100%	2006/05/21	2006/06/02	2035/12/31	
YC48314		Active	Alex 183	Alexco Keno Hill Mining Corp. - 100%	2006/05/21	2006/06/02	2035/12/31	
YC48315		Active	Alex 184	Alexco Keno Hill Mining Corp. - 100%	2006/05/21	2006/06/02	2035/12/31	
YC48316		Active	Alex 185	Alexco Keno Hill Mining Corp. - 100%	2006/05/21	2006/06/02	2035/12/31	
YC48317		Active	Alex 186	Alexco Keno Hill Mining Corp. - 100%	2006/05/21	2006/06/02	2035/12/31	
YC48318		Active	Alex 187	Alexco Keno Hill Mining Corp. - 100%	2006/05/16	2006/06/02	2035/12/31	
YC48319		Active	Alex 188	Alexco Keno Hill Mining Corp. - 100%	2006/05/16	2006/06/02	2035/12/31	
YC48320		Active	Alex 189	Alexco Keno Hill Mining Corp. - 100%	2006/05/16	2006/06/02	2035/12/31	
YC48150		Active	Alex 19	Alexco Keno Hill Mining Corp. - 100%	2006/05/21	2006/06/02	2035/12/31	
YC48321		Active	Alex 190	Alexco Keno Hill Mining Corp. - 100%	2006/05/16	2006/06/02	2035/12/31	
YC48322		Active	Alex 191	Alexco Keno Hill Mining Corp. - 100%	2006/05/16	2006/06/02	2035/12/31	
YC48323		Active	Alex 192	Alexco Keno Hill Mining Corp. - 100%	2006/05/16	2006/06/02	2035/12/31	

Grant	Lease	Status	Claim Name	Owner	Staked	Recorded	Expiry	Comment
YC48324		Active	Alex 193	Alexco Keno Hill Mining Corp. - 100%	2006/05/16	2006/06/02	2035/12/31	
YC48325		Active	Alex 194	Alexco Keno Hill Mining Corp. - 100%	2006/05/16	2006/06/02	2035/12/31	
YC48326		Active	Alex 195	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2035/12/31	
YC48327		Active	Alex 196	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2035/12/31	
YC48328		Active	Alex 197	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2035/12/31	
YC48329		Active	Alex 198	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2035/12/31	
YC48330		Active	Alex 199	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2035/12/31	
YC48133		Active	Alex 2	Alexco Keno Hill Mining Corp. - 100%	2006/05/26	2006/06/02	2035/12/31	
YC48151		Active	Alex 20	Alexco Keno Hill Mining Corp. - 100%	2006/05/21	2006/06/02	2035/12/31	
YC48331		Active	Alex 200	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2035/12/31	
YC48332		Active	Alex 201	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2035/12/31	
YC48333		Active	Alex 202	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2035/12/31	
YC48334		Active	Alex 203	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2035/12/31	
YC48335		Active	Alex 204	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2035/12/31	
YC48336		Active	Alex 205	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2035/12/31	
YC48337		Active	Alex 206	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2035/12/31	
YC48338		Active	Alex 207	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2035/12/31	
YC48548		Active	Alex 208	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2035/12/31	
YC48339		Active	Alex 209	Alexco Keno Hill Mining Corp. - 100%	2006/05/18	2006/06/02	2035/12/31	
YC48152		Active	Alex 21	Alexco Keno Hill Mining Corp. - 100%	2006/05/21	2006/06/02	2035/12/31	
YC48340		Active	Alex 210	Alexco Keno Hill Mining Corp. - 100%	2006/05/18	2006/06/02	2035/12/31	
YC48341		Active	Alex 211	Alexco Keno Hill Mining Corp. - 100%	2006/05/18	2006/06/02	2035/12/31	
YC48342		Active	Alex 212	Alexco Keno Hill Mining Corp. - 100%	2006/05/18	2006/06/02	2035/12/31	
YC48343		Active	Alex 213	Alexco Keno Hill Mining Corp. - 100%	2006/05/18	2006/06/02	2035/12/31	
YC48344		Active	Alex 214	Alexco Keno Hill Mining Corp. - 100%	2006/05/18	2006/06/02	2035/12/31	
YC48345		Active	Alex 215	Alexco Keno Hill Mining Corp. - 100%	2006/05/18	2006/06/02	2035/12/31	
YC48346		Active	Alex 216	Alexco Keno Hill Mining Corp. - 100%	2006/05/18	2006/06/02	2035/12/31	
YC48347		Active	Alex 217	Alexco Keno Hill Mining Corp. - 100%	2006/05/18	2006/06/02	2035/12/31	
YC48348		Active	Alex 218	Alexco Keno Hill Mining Corp. - 100%	2006/05/18	2006/06/02	2035/12/31	
YC48349		Active	Alex 219	Alexco Keno Hill Mining Corp. - 100%	2006/05/18	2006/06/02	2035/12/31	
YC48153		Active	Alex 22	Alexco Keno Hill Mining Corp. - 100%	2006/05/21	2006/06/02	2035/12/31	
YC48350		Active	Alex 220	Alexco Keno Hill Mining Corp. - 100%	2006/05/18	2006/06/02	2035/12/31	
YC48351		Active	Alex 221	Alexco Keno Hill Mining Corp. - 100%	2006/05/24	2006/06/02	2035/12/31	
YC48352		Active	Alex 222	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2035/12/31	
YC48353		Active	Alex 223	Alexco Keno Hill Mining Corp. - 100%	2006/05/24	2006/06/02	2035/12/31	
YC48354		Active	Alex 224	Alexco Keno Hill Mining Corp. - 100%	2006/05/24	2006/06/02	2035/12/31	
YC48355		Active	Alex 225	Alexco Keno Hill Mining Corp. - 100%	2006/05/24	2006/06/02	2035/12/31	
YC48356		Active	Alex 226	Alexco Keno Hill Mining Corp. - 100%	2006/05/24	2006/06/02	2035/12/31	
YC48357		Active	Alex 227	Alexco Keno Hill Mining Corp. - 100%	2006/05/18	2006/06/02	2035/12/31	
YC48358		Active	Alex 228	Alexco Keno Hill Mining Corp. - 100%	2006/05/18	2006/06/02	2035/12/31	
YC48359		Active	Alex 229	Alexco Keno Hill Mining Corp. - 100%	2006/05/18	2006/06/02	2034/12/31	
YC48154		Active	Alex 23	Alexco Keno Hill Mining Corp. - 100%	2006/05/21	2006/06/02	2035/12/31	
YC48360		Active	Alex 230	Alexco Keno Hill Mining Corp. - 100%	2006/05/18	2006/06/02	2034/12/31	

Grant	Lease	Status	Claim Name	Owner	Staked	Recorded	Expiry	Comment
YC48361		Active	Alex 231	Alexco Keno Hill Mining Corp. - 100%	2006/05/18	2006/06/02	2034/12/31	
YC48362		Active	Alex 232	Alexco Keno Hill Mining Corp. - 100%	2006/05/18	2006/06/02	2034/12/31	
YC48363		Active	Alex 233	Alexco Keno Hill Mining Corp. - 100%	2006/05/18	2006/06/02	2034/12/31	
YC48364		Active	Alex 234	Alexco Keno Hill Mining Corp. - 100%	2006/05/18	2006/06/02	2034/12/31	
YC48365		Active	Alex 235	Alexco Keno Hill Mining Corp. - 100%	2006/05/18	2006/06/02	2034/12/31	
YC48366		Active	Alex 236	Alexco Keno Hill Mining Corp. - 100%	2006/05/18	2006/06/02	2034/12/31	
YC48367		Active	Alex 237	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2034/12/31	
YC48368		Active	Alex 238	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2034/12/31	
YC48369		Active	Alex 239	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2034/12/31	
YC48155		Active	Alex 24	Alexco Keno Hill Mining Corp. - 100%	2006/05/21	2006/06/02	2035/12/31	
YC48370		Active	Alex 240	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2034/12/31	
YC48371		Active	Alex 241	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2034/12/31	
YC48372		Active	Alex 242	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2034/12/31	
YC48373		Active	Alex 243	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2034/12/31	
YC48374		Active	Alex 244	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2034/12/31	
YC48375		Active	Alex 245	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2034/12/31	
YC48376		Active	Alex 246	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2034/12/31	
YC48377		Active	Alex 247	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2034/12/31	
YC48378		Active	Alex 248	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2034/12/31	
YC48379		Active	Alex 249	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2034/12/31	
YC48156		Active	Alex 25	Alexco Keno Hill Mining Corp. - 100%	2006/05/21	2006/06/02	2035/12/31	
YC48380		Active	Alex 250	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2034/12/31	
YC48381		Active	Alex 251	Alexco Keno Hill Mining Corp. - 100%	2006/05/20	2006/06/02	2034/12/31	
YC48382		Active	Alex 252	Alexco Keno Hill Mining Corp. - 100%	2006/05/20	2006/06/02	2034/12/31	
YC48383		Active	Alex 253	Alexco Keno Hill Mining Corp. - 100%	2006/05/20	2006/06/02	2034/12/31	
YC48384		Active	Alex 254	Alexco Keno Hill Mining Corp. - 100%	2006/05/20	2006/06/02	2034/12/31	
YC48385		Active	Alex 255	Alexco Keno Hill Mining Corp. - 100%	2006/05/20	2006/06/02	2034/12/31	
YC48386		Active	Alex 256	Alexco Keno Hill Mining Corp. - 100%	2006/05/20	2006/06/02	2034/12/31	
YC48387		Active	Alex 257	Alexco Keno Hill Mining Corp. - 100%	2006/05/20	2006/06/02	2034/12/31	
YC48388		Active	Alex 258	Alexco Keno Hill Mining Corp. - 100%	2006/05/20	2006/06/02	2034/12/31	
YC48389		Active	Alex 259	Alexco Keno Hill Mining Corp. - 100%	2006/05/21	2006/06/02	2034/12/31	
YC48157		Active	Alex 26	Alexco Keno Hill Mining Corp. - 100%	2006/05/21	2006/06/02	2035/12/31	
YC48390		Active	Alex 260	Alexco Keno Hill Mining Corp. - 100%	2006/05/21	2006/06/02	2034/12/31	
YC48391		Active	Alex 261	Alexco Keno Hill Mining Corp. - 100%	2006/05/21	2006/06/02	2034/12/31	
YC48392		Active	Alex 262	Alexco Keno Hill Mining Corp. - 100%	2006/05/21	2006/06/02	2034/12/31	
YC48393		Active	Alex 263	Alexco Keno Hill Mining Corp. - 100%	2006/05/21	2006/06/02	2034/12/31	
YC48549		Active	Alex 264	Alexco Keno Hill Mining Corp. - 100%	2006/05/21	2006/06/02	2034/12/31	
YC48394		Active	Alex 265	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2034/12/31	
YC48395		Active	Alex 266	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2034/12/31	
YC48396		Active	Alex 267	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2034/12/31	
YC48397		Active	Alex 268	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2034/12/31	
YC48398		Active	Alex 269	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2034/12/31	
YC48158		Active	Alex 27	Alexco Keno Hill Mining Corp. - 100%	2006/05/21	2006/06/02	2035/12/31	

Grant	Lease	Status	Claim Name	Owner	Staked	Recorded	Expiry	Comment
YC48399		Active	Alex 270	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2034/12/31	
YC48400		Active	Alex 271	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2034/12/31	
YC48401		Active	Alex 272	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2034/12/31	
YC48402		Active	Alex 273	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2034/12/31	
YC48403		Active	Alex 274	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2034/12/31	
YC48404		Active	Alex 275	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2034/12/31	
YC48405		Active	Alex 276	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2034/12/31	
YC48406		Active	Alex 277	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2038/12/31	
YC48407		Active	Alex 278	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2038/12/31	
YC48408		Active	Alex 279	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2038/12/31	
YC48159		Active	Alex 28	Alexco Keno Hill Mining Corp. - 100%	2006/05/21	2006/06/02	2035/12/31	
YC48409		Active	Alex 280	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2038/12/31	
YC48410		Active	Alex 287	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2035/12/31	
YC48411		Active	Alex 288	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2035/12/31	
YC48412		Active	Alex 289	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2035/12/31	
YC48160		Active	Alex 29	Alexco Keno Hill Mining Corp. - 100%	2006/05/21	2006/06/02	2035/12/31	
YC48413		Active	Alex 290	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2035/12/31	
YC48414		Active	Alex 291	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2035/12/31	
YC48415		Active	Alex 292	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2035/12/31	
YC48416		Active	Alex 293	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2035/12/31	
YC48417		Active	Alex 294	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2035/12/31	
YC48418		Active	Alex 295	Alexco Keno Hill Mining Corp. - 100%	2006/05/16	2006/06/02	2035/12/31	
YC48419		Active	Alex 296	Alexco Keno Hill Mining Corp. - 100%	2006/05/16	2006/06/02	2035/12/31	
YC48420		Active	Alex 297	Alexco Keno Hill Mining Corp. - 100%	2006/05/16	2006/06/02	2035/12/31	
YC48421		Active	Alex 298	Alexco Keno Hill Mining Corp. - 100%	2006/05/16	2006/06/02	2035/12/31	
YC48422		Active	Alex 299	Alexco Keno Hill Mining Corp. - 100%	2006/05/16	2006/06/02	2035/12/31	
YC48134		Active	Alex 3	Alexco Keno Hill Mining Corp. - 100%	2006/05/26	2006/06/02	2035/12/31	
YC48161		Active	Alex 30	Alexco Keno Hill Mining Corp. - 100%	2006/05/21	2006/06/02	2035/12/31	
YC48423		Active	Alex 300	Alexco Keno Hill Mining Corp. - 100%	2006/05/16	2006/06/02	2035/12/31	
YC48424		Active	Alex 301	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2035/12/31	
YC48425		Active	Alex 302	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2035/12/31	
YC48426		Active	Alex 303	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2035/12/31	
YC48427		Active	Alex 304	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2035/12/31	
YC48428		Active	Alex 305	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2035/12/31	
YC48429		Active	Alex 306	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2035/12/31	
YC48430		Active	Alex 307	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2035/12/31	
YC48431		Active	Alex 308	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2035/12/31	
YC48432		Active	Alex 309	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2035/12/31	
YC48162		Active	Alex 31	Alexco Keno Hill Mining Corp. - 100%	2006/05/21	2006/06/02	2035/12/31	
YC48433		Active	Alex 310	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2035/12/31	
YC48434		Active	Alex 311	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2035/12/31	
YC48435		Active	Alex 312	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2035/12/31	
YC48436		Active	Alex 313	Alexco Keno Hill Mining Corp. - 100%	2006/05/16	2006/06/02	2035/12/31	

Grant	Lease	Status	Claim Name	Owner	Staked	Recorded	Expiry	Comment
YC48437		Active	Alex 314	Alexco Keno Hill Mining Corp. - 100%	2006/05/16	2006/06/02	2035/12/31	
YC48438		Active	Alex 315	Alexco Keno Hill Mining Corp. - 100%	2006/05/16	2006/06/02	2035/12/31	
YC48439		Active	Alex 316	Alexco Keno Hill Mining Corp. - 100%	2006/05/16	2006/06/02	2035/12/31	
YC48440		Active	Alex 317	Alexco Keno Hill Mining Corp. - 100%	2006/05/16	2006/06/02	2035/12/31	
YC48441		Active	Alex 318	Alexco Keno Hill Mining Corp. - 100%	2006/05/16	2006/06/02	2035/12/31	
YC48442		Active	Alex 319	Alexco Keno Hill Mining Corp. - 100%	2006/05/16	2006/06/02	2035/12/31	
YC48163		Active	Alex 32	Alexco Keno Hill Mining Corp. - 100%	2006/05/21	2006/06/02	2035/12/31	
YC48443		Active	Alex 320	Alexco Keno Hill Mining Corp. - 100%	2006/05/16	2006/06/02	2035/12/31	
YC48444		Active	Alex 321	Alexco Keno Hill Mining Corp. - 100%	2006/05/16	2006/06/02	2035/12/31	
YC48445		Active	Alex 322	Alexco Keno Hill Mining Corp. - 100%	2006/05/16	2006/06/02	2035/12/31	
YC48446		Active	Alex 323	Alexco Keno Hill Mining Corp. - 100%	2006/05/16	2006/06/02	2035/12/31	
YC48447		Active	Alex 324	Alexco Keno Hill Mining Corp. - 100%	2006/05/16	2006/06/02	2035/12/31	
YC48448		Active	Alex 325	Alexco Keno Hill Mining Corp. - 100%	2006/05/16	2006/06/02	2035/12/31	
YC48449		Active	Alex 326	Alexco Keno Hill Mining Corp. - 100%	2006/05/16	2006/06/02	2035/12/31	
YC48450		Active	Alex 327	Alexco Keno Hill Mining Corp. - 100%	2006/05/19	2006/06/02	2035/12/31	
YC48451		Active	Alex 328	Alexco Keno Hill Mining Corp. - 100%	2006/05/16	2006/06/02	2035/12/31	
YC48452		Active	Alex 329	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2035/12/31	
YC48164		Active	Alex 33	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2035/12/31	
YC48453		Active	Alex 330	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2035/12/31	
YC48454		Active	Alex 331	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2035/12/31	
YC48455		Active	Alex 332	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2035/12/31	
YC48456		Active	Alex 333	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2034/12/31	
YC48457		Active	Alex 334	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2034/12/31	
YC48458		Active	Alex 335	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2034/12/31	
YC48459		Active	Alex 336	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2034/12/31	
YC48460		Active	Alex 337	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2034/12/31	
YC48461		Active	Alex 338	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2034/12/31	
YC48462		Active	Alex 339	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2034/12/31	
YC48165		Active	Alex 34	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2035/12/31	
YC48463		Active	Alex 340	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2034/12/31	
YC48464		Active	Alex 341	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2034/12/31	
YC48465		Active	Alex 342	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2034/12/31	
YC48466		Active	Alex 343	Alexco Keno Hill Mining Corp. - 100%	2006/05/21	2006/06/02	2034/12/31	
YC48467		Active	Alex 344	Alexco Keno Hill Mining Corp. - 100%	2006/05/21	2006/06/02	2034/12/31	
YC48468		Active	Alex 345	Alexco Keno Hill Mining Corp. - 100%	2006/05/21	2006/06/02	2034/12/31	
YC48469		Active	Alex 346	Alexco Keno Hill Mining Corp. - 100%	2006/05/21	2006/06/02	2034/12/31	
YC48470		Active	Alex 347	Alexco Keno Hill Mining Corp. - 100%	2006/05/21	2006/06/02	2034/12/31	
YC48471		Active	Alex 348	Alexco Keno Hill Mining Corp. - 100%	2006/05/15	2006/06/02	2034/12/31	
YC48472		Active	Alex 349	Alexco Keno Hill Mining Corp. - 100%	2006/05/15	2006/06/02	2034/12/31	
YC48166		Active	Alex 35	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2035/12/31	
YC48473		Active	Alex 350	Alexco Keno Hill Mining Corp. - 100%	2006/05/15	2006/06/02	2034/12/31	
YC48474		Active	Alex 351	Alexco Keno Hill Mining Corp. - 100%	2006/05/15	2006/06/02	2034/12/31	
YC48475		Active	Alex 352	Alexco Keno Hill Mining Corp. - 100%	2006/05/15	2006/06/02	2034/12/31	

Grant	Lease	Status	Claim Name	Owner	Staked	Recorded	Expiry	Comment
YC48476		Active	Alex 353	Alexco Keno Hill Mining Corp. - 100%	2006/05/20	2006/06/02	2034/12/31	
YC48477		Active	Alex 354	Alexco Keno Hill Mining Corp. - 100%	2006/05/15	2006/06/02	2034/12/31	
YC48478		Active	Alex 355	Alexco Keno Hill Mining Corp. - 100%	2006/05/20	2006/06/02	2034/12/31	
YC48479		Active	Alex 356	Alexco Keno Hill Mining Corp. - 100%	2006/05/15	2006/06/02	2034/12/31	
YC48480		Active	Alex 357	Alexco Keno Hill Mining Corp. - 100%	2006/05/20	2006/06/02	2034/12/31	
YC48481		Active	Alex 358	Alexco Keno Hill Mining Corp. - 100%	2006/05/20	2006/06/02	2034/12/31	
YC48482		Active	Alex 359	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2034/12/31	
YC48167		Active	Alex 36	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2035/12/31	
YC48483		Active	Alex 360	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2034/12/31	
YC48484		Active	Alex 361	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2034/12/31	
YC48485		Active	Alex 362	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2034/12/31	
YC48486		Active	Alex 363	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2034/12/31	
YC48487		Active	Alex 364	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2034/12/31	
YC48488		Active	Alex 365	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2034/12/31	
YC48489		Active	Alex 366	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2034/12/31	
YC48490		Active	Alex 367	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2034/12/31	
YC48491		Active	Alex 368	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2034/12/31	
YC48492		Active	Alex 369	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2034/12/31	
YC48168		Active	Alex 37	Alexco Keno Hill Mining Corp. - 100%	2006/05/15	2006/06/02	2035/12/31	
YC48493		Active	Alex 371	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2034/12/31	
YC48494		Active	Alex 372	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2034/12/31	
YC48495		Active	Alex 373	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2034/12/31	
YC48496		Active	Alex 374	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2034/12/31	
YC48497		Active	Alex 375	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2034/12/31	
YC48498		Active	Alex 376	Alexco Keno Hill Mining Corp. - 100%	2006/06/02	2006/06/02	2034/12/31	
YC48499		Active	Alex 377	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2038/12/31	
YC48500		Active	Alex 379	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2034/12/31	
YC48169		Active	Alex 38	Alexco Keno Hill Mining Corp. - 100%	2006/05/15	2006/06/02	2035/12/31	
YC48501		Active	Alex 380	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2034/12/31	
YC48502		Active	Alex 381	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2034/12/31	
YC48503		Active	Alex 382	Alexco Keno Hill Mining Corp. - 100%	2006/05/23	2006/06/02	2034/12/31	
YC48504		Active	Alex 383	Alexco Keno Hill Mining Corp. - 100%	2006/05/24	2006/06/02	2034/12/31	
YC48505		Active	Alex 384	Alexco Keno Hill Mining Corp. - 100%	2006/05/24	2006/06/02	2034/12/31	
YC48506		Active	Alex 386	Alexco Keno Hill Mining Corp. - 100%	2006/05/24	2006/06/02	2034/12/31	
YC48170		Active	Alex 39	Alexco Keno Hill Mining Corp. - 100%	2006/05/15	2006/06/02	2035/12/31	
YC48135		Active	Alex 4	Alexco Keno Hill Mining Corp. - 100%	2006/05/26	2006/06/02	2035/12/31	
YC48171		Active	Alex 40	Alexco Keno Hill Mining Corp. - 100%	2006/05/15	2006/06/02	2035/12/31	
YC48507		Active	Alex 400	Alexco Keno Hill Mining Corp. - 100%	2006/05/24	2006/06/02	2021/12/31	
YC48508		Active	Alex 401	Alexco Keno Hill Mining Corp. - 100%	2006/05/24	2006/06/02	2021/12/31	
YC48509		Active	Alex 403	Alexco Keno Hill Mining Corp. - 100%	2006/05/24	2006/06/02	2021/12/31	
YC48510		Active	Alex 404	Alexco Keno Hill Mining Corp. - 100%	2006/05/24	2006/06/02	2021/12/31	
YC48172		Active	Alex 41	Alexco Keno Hill Mining Corp. - 100%	2006/05/15	2006/06/02	2035/12/31	
YC48173		Active	Alex 42	Alexco Keno Hill Mining Corp. - 100%	2006/05/15	2006/06/02	2035/12/31	

Grant	Lease	Status	Claim Name	Owner	Staked	Recorded	Expiry	Comment
YC48511		Active	Alex 423	Alexco Keno Hill Mining Corp. - 100%	2006/05/24	2006/06/02	2021/12/31	
YC48512		Active	Alex 424	Alexco Keno Hill Mining Corp. - 100%	2006/05/24	2006/06/02	2021/12/31	
YC48513		Active	Alex 425	Alexco Keno Hill Mining Corp. - 100%	2006/05/24	2006/06/02	2021/12/31	
YC48514		Active	Alex 429	Alexco Keno Hill Mining Corp. - 100%	2006/05/18	2006/06/02	2035/12/31	
YC48174		Active	Alex 43	Alexco Keno Hill Mining Corp. - 100%	2006/05/15	2006/06/02	2035/12/31	
YC48515		Active	Alex 430	Alexco Keno Hill Mining Corp. - 100%	2006/05/18	2006/06/02	2035/12/31	
YC48516		Active	Alex 431	Alexco Keno Hill Mining Corp. - 100%	2006/05/18	2006/06/02	2035/12/31	
YC48517		Active	Alex 432	Alexco Keno Hill Mining Corp. - 100%	2006/05/18	2006/06/02	2035/12/31	
YC48518		Active	Alex 433	Alexco Keno Hill Mining Corp. - 100%	2006/05/18	2006/06/02	2035/12/31	
YC48519		Active	Alex 434	Alexco Keno Hill Mining Corp. - 100%	2006/05/18	2006/06/02	2035/12/31	
YC48520		Active	Alex 435	Alexco Keno Hill Mining Corp. - 100%	2006/05/18	2006/06/02	2035/12/31	
YC48521		Active	Alex 436	Alexco Keno Hill Mining Corp. - 100%	2006/05/18	2006/06/02	2035/12/31	
YC48522		Active	Alex 437	Alexco Keno Hill Mining Corp. - 100%	2006/05/18	2006/06/02	2035/12/31	
YC48523		Active	Alex 438	Alexco Keno Hill Mining Corp. - 100%	2006/05/18	2006/06/02	2035/12/31	
YC48524		Active	Alex 439	Alexco Keno Hill Mining Corp. - 100%	2006/05/18	2006/06/02	2035/12/31	
YC48175		Active	Alex 44	Alexco Keno Hill Mining Corp. - 100%	2006/05/15	2006/06/02	2035/12/31	
YC48525		Active	Alex 440	Alexco Keno Hill Mining Corp. - 100%	2006/05/18	2006/06/02	2035/12/31	
YC48526		Active	Alex 441	Alexco Keno Hill Mining Corp. - 100%	2006/05/18	2006/06/02	2035/12/31	
YC48527		Active	Alex 442	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2035/12/31	
YC48528		Active	Alex 443	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2035/12/31	
YC48529		Active	Alex 444	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2035/12/31	
YC48530		Active	Alex 445	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2035/12/31	
YC48531		Active	Alex 446	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2035/12/31	
YC48532		Active	Alex 447	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2035/12/31	
YC48533		Active	Alex 448	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2035/12/31	
YC48534		Active	Alex 449	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2035/12/31	
YC48176		Active	Alex 45	Alexco Keno Hill Mining Corp. - 100%	2006/05/21	2006/06/02	2035/12/31	
YC48535		Active	Alex 450	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2035/12/31	
YC48536		Active	Alex 451	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2035/12/31	
YC48537		Active	Alex 452	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2035/12/31	
YC48538		Active	Alex 453	Alexco Keno Hill Mining Corp. - 100%	2006/05/17	2006/06/02	2035/12/31	
YC48539		Active	Alex 454	Alexco Keno Hill Mining Corp. - 100%	2006/05/16	2006/06/02	2035/12/31	
YC48540		Active	Alex 455	Alexco Keno Hill Mining Corp. - 100%	2006/05/16	2006/06/02	2035/12/31	
YC48541		Active	Alex 456	Alexco Keno Hill Mining Corp. - 100%	2006/05/16	2006/06/02	2035/12/31	
YC48542		Active	Alex 457	Alexco Keno Hill Mining Corp. - 100%	2006/05/16	2006/06/02	2035/12/31	
YC48543		Active	Alex 458	Alexco Keno Hill Mining Corp. - 100%	2006/05/16	2006/06/02	2035/12/31	
YC48544		Active	Alex 459	Alexco Keno Hill Mining Corp. - 100%	2006/05/16	2006/06/02	2035/12/31	
YC48177		Active	Alex 46	Alexco Keno Hill Mining Corp. - 100%	2006/05/21	2006/06/02	2035/12/31	
YC48545		Active	Alex 460	Alexco Keno Hill Mining Corp. - 100%	2006/05/18	2006/06/02	2035/12/31	
YC48546		Active	Alex 461	Alexco Keno Hill Mining Corp. - 100%	2006/05/18	2006/06/02	2035/12/31	
YC48547		Active	Alex 462	Alexco Keno Hill Mining Corp. - 100%	2006/05/18	2006/06/02	2035/12/31	
YC56176		Active	Alex 463	Alexco Keno Hill Mining Corp. - 100%	2007/06/12	2007/06/12	2034/12/12	
YC56177		Active	Alex 464	Alexco Keno Hill Mining Corp. - 100%	2007/06/12	2007/06/12	2034/12/12	

Grant	Lease	Status	Claim Name	Owner	Staked	Recorded	Expiry	Comment
YC56178		Active	Alex 465	Alexco Keno Hill Mining Corp. - 100%	2007/06/12	2007/06/22	2034/12/22	
YC56179		Active	Alex 466	Alexco Keno Hill Mining Corp. - 100%	2007/06/12	2007/06/22	2034/12/22	
YC56180		Active	Alex 467	Alexco Keno Hill Mining Corp. - 100%	2007/06/09	2007/06/22	2034/12/22	
YC56181		Active	Alex 468	Alexco Keno Hill Mining Corp. - 100%	2007/06/12	2007/06/22	2034/12/22	
YC56182		Active	Alex 469	Alexco Keno Hill Mining Corp. - 100%	2007/06/09	2007/06/22	2034/12/22	
YC48178		Active	Alex 47	Alexco Keno Hill Mining Corp. - 100%	2006/05/21	2006/06/02	2035/12/31	
YC56183		Active	Alex 470	Alexco Keno Hill Mining Corp. - 100%	2007/06/12	2007/06/22	2034/12/22	
YC56184		Active	Alex 471	Alexco Keno Hill Mining Corp. - 100%	2007/06/09	2007/06/22	2034/12/22	
YC56185		Active	Alex 472	Alexco Keno Hill Mining Corp. - 100%	2007/06/12	2007/06/22	2034/12/22	
YC56186		Active	Alex 473	Alexco Keno Hill Mining Corp. - 100%	2007/06/09	2007/06/22	2034/12/22	
YC56187		Active	Alex 474	Alexco Keno Hill Mining Corp. - 100%	2007/06/12	2007/06/22	2034/12/22	
YC56188		Active	Alex 475	Alexco Keno Hill Mining Corp. - 100%	2007/06/09	2007/06/22	2034/12/22	
YC56189		Active	Alex 476	Alexco Keno Hill Mining Corp. - 100%	2007/06/12	2007/06/22	2034/12/22	
YC56190		Active	Alex 477	Alexco Keno Hill Mining Corp. - 100%	2007/06/09	2007/06/22	2034/12/22	
YC56191		Active	Alex 478	Alexco Keno Hill Mining Corp. - 100%	2007/06/12	2007/06/22	2034/12/22	
YC56192		Active	Alex 479	Alexco Keno Hill Mining Corp. - 100%	2007/06/09	2007/06/22	2034/12/22	
YC48179		Active	Alex 48	Alexco Keno Hill Mining Corp. - 100%	2006/05/21	2006/06/02	2035/12/31	
YC56193		Active	Alex 480	Alexco Keno Hill Mining Corp. - 100%	2007/06/09	2007/06/22	2034/12/22	
YC56194		Active	Alex 481	Alexco Keno Hill Mining Corp. - 100%	2007/06/09	2007/06/22	2034/12/22	
YC56195		Active	Alex 482	Alexco Keno Hill Mining Corp. - 100%	2007/06/09	2007/06/22	2034/12/22	
YC56196		Active	Alex 483	Alexco Keno Hill Mining Corp. - 100%	2007/06/10	2007/06/22	2034/12/22	
YC56197		Active	Alex 484	Alexco Keno Hill Mining Corp. - 100%	2007/06/09	2007/06/22	2034/12/22	
YC56198		Active	Alex 485	Alexco Keno Hill Mining Corp. - 100%	2007/06/10	2007/06/22	2034/12/22	
YC56199		Active	Alex 486	Alexco Keno Hill Mining Corp. - 100%	2007/06/09	2007/06/22	2038/12/22	
YC56200		Active	Alex 487	Alexco Keno Hill Mining Corp. - 100%	2007/06/10	2007/06/22	2034/12/22	
YC56201		Active	Alex 488	Alexco Keno Hill Mining Corp. - 100%	2007/06/09	2007/06/22	2034/12/22	
YC56202		Active	Alex 489	Alexco Keno Hill Mining Corp. - 100%	2007/06/10	2007/06/22	2034/12/22	
YC48180		Active	Alex 49	Alexco Keno Hill Mining Corp. - 100%	2006/05/21	2006/06/02	2035/12/31	
YC56203		Active	Alex 490	Alexco Keno Hill Mining Corp. - 100%	2007/06/09	2007/06/22	2034/12/22	
YC56204		Active	Alex 491	Alexco Keno Hill Mining Corp. - 100%	2007/06/10	2007/06/22	2034/12/22	
YC56205		Active	Alex 492	Alexco Keno Hill Mining Corp. - 100%	2007/06/09	2007/06/22	2034/12/22	
YC56206		Active	Alex 493	Alexco Keno Hill Mining Corp. - 100%	2007/06/10	2007/06/22	2034/12/22	
YC56207		Active	Alex 494	Alexco Keno Hill Mining Corp. - 100%	2007/06/09	2007/06/22	2034/12/22	
YC56208		Active	Alex 495	Alexco Keno Hill Mining Corp. - 100%	2007/06/10	2007/06/22	2034/12/22	
YC56209		Active	Alex 496	Alexco Keno Hill Mining Corp. - 100%	2007/06/10	2007/06/22	2034/12/22	
YC56210		Active	Alex 497	Alexco Keno Hill Mining Corp. - 100%	2007/06/10	2007/06/22	2038/12/22	
YC56211		Active	Alex 498	Alexco Keno Hill Mining Corp. - 100%	2007/06/10	2007/06/22	2038/12/22	
YC56212		Active	Alex 499	Alexco Keno Hill Mining Corp. - 100%	2007/06/10	2007/06/22	2038/12/22	
YC48136		Active	Alex 5	Alexco Keno Hill Mining Corp. - 100%	2006/05/20	2006/06/02	2035/12/31	
YC48181		Active	Alex 50	Alexco Keno Hill Mining Corp. - 100%	2006/05/21	2006/06/02	2035/12/31	
YC56213		Active	Alex 500	Alexco Keno Hill Mining Corp. - 100%	2007/06/10	2007/06/22	2038/12/22	
YC56214		Active	Alex 501	Alexco Keno Hill Mining Corp. - 100%	2007/06/10	2007/06/22	2038/12/22	
YC56215		Active	Alex 502	Alexco Keno Hill Mining Corp. - 100%	2007/06/11	2007/06/22	2034/12/22	

Grant	Lease	Status	Claim Name	Owner	Staked	Recorded	Expiry	Comment
YC56216		Active	Alex 503	Alexco Keno Hill Mining Corp. - 100%	2007/06/11	2007/06/22	2038/12/22	
YC56217		Active	Alex 504	Alexco Keno Hill Mining Corp. - 100%	2007/06/11	2007/06/22	2034/12/22	
YC56218		Active	Alex 505	Alexco Keno Hill Mining Corp. - 100%	2007/06/11	2007/06/22	2034/12/22	
YC56219		Active	Alex 506	Alexco Keno Hill Mining Corp. - 100%	2007/06/11	2007/06/22	2034/12/22	
YC56220		Active	Alex 507	Alexco Keno Hill Mining Corp. - 100%	2007/06/11	2007/06/22	2034/12/22	
YC56221		Active	Alex 508	Alexco Keno Hill Mining Corp. - 100%	2007/06/11	2007/06/22	2034/12/22	
YC56222		Active	Alex 509	Alexco Keno Hill Mining Corp. - 100%	2007/06/11	2007/06/22	2034/12/22	
YC48182		Active	Alex 51	Alexco Keno Hill Mining Corp. - 100%	2006/05/21	2006/06/02	2035/12/31	
YC56223		Active	Alex 510	Alexco Keno Hill Mining Corp. - 100%	2007/06/11	2007/06/22	2034/12/22	
YC56224		Active	Alex 511	Alexco Keno Hill Mining Corp. - 100%	2007/06/09	2007/06/22	2034/12/22	
YC56225		Active	Alex 512	Alexco Keno Hill Mining Corp. - 100%	2007/06/10	2007/06/22	2034/12/22	
YC56226		Active	Alex 513	Alexco Keno Hill Mining Corp. - 100%	2007/06/10	2007/06/22	2034/12/22	
YC56227		Active	Alex 514	Alexco Keno Hill Mining Corp. - 100%	2007/06/12	2007/06/22	2034/12/22	
YC56228		Active	Alex 515	Alexco Keno Hill Mining Corp. - 100%	2007/06/12	2007/06/22	2034/12/22	
YC56229		Active	Alex 516	Alexco Keno Hill Mining Corp. - 100%	2007/06/12	2007/06/22	2034/12/22	
YC56230		Active	Alex 517	Alexco Keno Hill Mining Corp. - 100%	2007/06/12	2007/06/22	2034/12/22	
YC56231		Active	Alex 518	Alexco Keno Hill Mining Corp. - 100%	2007/06/12	2007/06/22	2034/12/22	
YC56232		Active	Alex 519	Alexco Keno Hill Mining Corp. - 100%	2007/06/12	2007/06/22	2034/12/22	
YC48183		Active	Alex 52	Alexco Keno Hill Mining Corp. - 100%	2006/05/21	2006/06/02	2035/12/31	
YC56233		Active	Alex 520	Alexco Keno Hill Mining Corp. - 100%	2007/06/12	2007/06/22	2034/12/22	
YC56234		Active	Alex 521	Alexco Keno Hill Mining Corp. - 100%	2007/06/12	2007/06/22	2034/12/22	
YC56235		Active	Alex 522	Alexco Keno Hill Mining Corp. - 100%	2007/06/12	2007/06/22	2034/12/22	
YC56236		Active	Alex 523	Alexco Keno Hill Mining Corp. - 100%	2007/06/12	2007/06/22	2034/12/22	
YC56237		Active	Alex 524	Alexco Keno Hill Mining Corp. - 100%	2007/06/11	2007/06/22	2034/12/22	
YC56238		Active	Alex 525	Alexco Keno Hill Mining Corp. - 100%	2007/06/12	2007/06/22	2034/12/22	
YC56239		Active	Alex 526	Alexco Keno Hill Mining Corp. - 100%	2007/06/11	2007/06/22	2034/12/22	
YC56240		Active	Alex 527	Alexco Keno Hill Mining Corp. - 100%	2007/06/11	2007/06/22	2034/12/22	
YC56241		Active	Alex 528	Alexco Keno Hill Mining Corp. - 100%	2007/06/11	2007/06/22	2034/12/22	
YC56242		Active	Alex 529	Alexco Keno Hill Mining Corp. - 100%	2007/06/11	2007/06/22	2038/12/22	
YC48184		Active	Alex 53	Alexco Keno Hill Mining Corp. - 100%	2006/05/20	2006/06/02	2035/12/31	
YC56243		Active	Alex 530	Alexco Keno Hill Mining Corp. - 100%	2007/06/11	2007/06/22	2034/12/22	
YC56244		Active	Alex 531	Alexco Keno Hill Mining Corp. - 100%	2007/06/11	2007/06/22	2034/12/22	
YC56245		Active	Alex 532	Alexco Keno Hill Mining Corp. - 100%	2007/06/11	2007/06/22	2034/12/22	
YC56246		Active	Alex 533	Alexco Keno Hill Mining Corp. - 100%	2007/06/11	2007/06/22	2034/12/22	
YC56247		Active	Alex 534	Alexco Keno Hill Mining Corp. - 100%	2007/06/11	2007/06/22	2034/12/22	
YC56248		Active	Alex 535	Alexco Keno Hill Mining Corp. - 100%	2007/06/11	2007/06/22	2034/12/22	
YC56249		Active	Alex 536	Alexco Keno Hill Mining Corp. - 100%	2007/06/11	2007/06/22	2034/12/22	
YC56250		Active	Alex 537	Alexco Keno Hill Mining Corp. - 100%	2007/06/11	2007/06/22	2034/12/22	
YC56251		Active	Alex 538	Alexco Keno Hill Mining Corp. - 100%	2007/06/11	2007/06/22	2034/12/22	
YC56252		Active	Alex 539	Alexco Keno Hill Mining Corp. - 100%	2007/06/11	2007/06/22	2034/12/22	
YC48185		Active	Alex 54	Alexco Keno Hill Mining Corp. - 100%	2006/05/20	2006/06/02	2035/12/31	
YC56253		Active	Alex 540	Alexco Keno Hill Mining Corp. - 100%	2007/06/11	2007/06/22	2034/12/22	
YC56254		Active	Alex 541	Alexco Keno Hill Mining Corp. - 100%	2007/06/11	2007/06/22	2034/12/22	

Grant	Lease	Status	Claim Name	Owner	Staked	Recorded	Expiry	Comment
YC56255		Active	Alex 542	Alexco Keno Hill Mining Corp. - 100%	2007/06/11	2007/06/22	2034/12/22	
YC56256		Active	Alex 543	Alexco Keno Hill Mining Corp. - 100%	2007/06/11	2007/06/22	2034/12/22	
YC56257		Active	Alex 544	Alexco Keno Hill Mining Corp. - 100%	2007/06/11	2007/06/22	2034/12/22	
YC56258		Active	Alex 545	Alexco Keno Hill Mining Corp. - 100%	2007/06/11	2007/06/22	2034/12/22	
YC56259		Active	Alex 546	Alexco Keno Hill Mining Corp. - 100%	2007/06/11	2007/06/22	2034/12/22	
YC56260		Active	Alex 547	Alexco Keno Hill Mining Corp. - 100%	2007/06/11	2007/06/22	2034/12/22	
YC56261		Active	Alex 548	Alexco Keno Hill Mining Corp. - 100%	2007/06/11	2007/06/22	2034/12/22	
YC56262		Active	Alex 549	Alexco Keno Hill Mining Corp. - 100%	2007/06/11	2007/06/22	2034/12/22	
YC48186		Active	Alex 55	Alexco Keno Hill Mining Corp. - 100%	2006/05/20	2006/06/02	2035/12/31	
YC56263		Active	Alex 550	Alexco Keno Hill Mining Corp. - 100%	2007/06/11	2007/06/22	2034/12/22	
YC56264		Active	Alex 551	Alexco Keno Hill Mining Corp. - 100%	2007/06/11	2007/06/22	2034/12/22	
YC56265		Active	Alex 552	Alexco Keno Hill Mining Corp. - 100%	2007/06/12	2007/06/22	2034/12/22	
YC56266		Active	Alex 553	Alexco Keno Hill Mining Corp. - 100%	2007/06/11	2007/06/22	2034/12/22	
YC56267		Active	Alex 554	Alexco Keno Hill Mining Corp. - 100%	2007/06/12	2007/06/22	2034/12/22	
YC56268		Active	Alex 556	Alexco Keno Hill Mining Corp. - 100%	2007/06/12	2007/06/22	2034/12/22	
YC56269		Active	Alex 558	Alexco Keno Hill Mining Corp. - 100%	2007/06/12	2007/06/22	2034/12/22	
YC48187		Active	Alex 56	Alexco Keno Hill Mining Corp. - 100%	2006/05/20	2006/06/02	2035/12/31	
YC56270		Active	Alex 560	Alexco Keno Hill Mining Corp. - 100%	2007/06/22	2007/06/22	2034/12/22	
YC56271		Active	Alex 562	Alexco Keno Hill Mining Corp. - 100%	2007/06/12	2007/06/22	2034/12/22	
YC56272		Active	Alex 564	Alexco Keno Hill Mining Corp. - 100%	2007/06/10	2007/06/22	2034/12/22	
YC56273		Active	Alex 565	Alexco Keno Hill Mining Corp. - 100%	2007/06/10	2007/06/13	2034/12/13	
YC48188		Active	Alex 57	Alexco Keno Hill Mining Corp. - 100%	2006/05/20	2006/06/02	2035/12/31	
YC48189		Active	Alex 58	Alexco Keno Hill Mining Corp. - 100%	2006/05/20	2006/06/02	2035/12/31	
YC48190		Active	Alex 59	Alexco Keno Hill Mining Corp. - 100%	2006/05/20	2006/06/02	2035/12/31	
YC48137		Active	Alex 6	Alexco Keno Hill Mining Corp. - 100%	2006/05/20	2006/06/02	2035/12/31	
YC48191		Active	Alex 60	Alexco Keno Hill Mining Corp. - 100%	2006/05/20	2006/06/02	2035/12/31	
YC56874		Active	Alex 601	Alexco Keno Hill Mining Corp. - 100%	2007/07/14	2007/07/24	2021/12/31	
YC56875		Active	Alex 602	Alexco Keno Hill Mining Corp. - 100%	2007/07/14	2007/07/24	2021/12/31	
YC56876		Active	Alex 603	Alexco Keno Hill Mining Corp. - 100%	2007/07/14	2007/07/24	2021/12/31	
YC56877		Active	Alex 604	Alexco Keno Hill Mining Corp. - 100%	2007/07/14	2007/07/24	2021/12/31	
YC56878		Active	Alex 605	Alexco Keno Hill Mining Corp. - 100%	2007/07/14	2007/07/24	2021/12/31	
YC56879		Active	Alex 606	Alexco Keno Hill Mining Corp. - 100%	2007/07/14	2007/07/24	2021/12/31	
YC48192		Active	Alex 61	Alexco Keno Hill Mining Corp. - 100%	2006/05/20	2006/06/02	2035/12/31	
YC48193		Active	Alex 62	Alexco Keno Hill Mining Corp. - 100%	2006/05/20	2006/06/02	2035/12/31	
YC48194		Active	Alex 63	Alexco Keno Hill Mining Corp. - 100%	2006/05/20	2006/06/02	2035/12/31	
YC48195		Active	Alex 64	Alexco Keno Hill Mining Corp. - 100%	2006/05/20	2006/06/02	2035/12/31	
YC48196		Active	Alex 65	Alexco Keno Hill Mining Corp. - 100%	2006/05/20	2006/06/02	2035/12/31	
YC48197		Active	Alex 66	Alexco Keno Hill Mining Corp. - 100%	2006/05/20	2006/06/02	2035/12/31	
YC48198		Active	Alex 67	Alexco Keno Hill Mining Corp. - 100%	2006/05/20	2006/06/02	2035/12/31	
YC48199		Active	Alex 68	Alexco Keno Hill Mining Corp. - 100%	2006/05/20	2006/06/02	2035/12/31	
YC48200		Active	Alex 69	Alexco Keno Hill Mining Corp. - 100%	2006/05/20	2006/06/02	2035/12/31	
YC48138		Active	Alex 7	Alexco Keno Hill Mining Corp. - 100%	2006/05/20	2006/06/02	2035/12/31	
YC48201		Active	Alex 70	Alexco Keno Hill Mining Corp. - 100%	2006/05/20	2006/06/02	2035/12/31	

Grant	Lease	Status	Claim Name	Owner	Staked	Recorded	Expiry	Comment
YC48202		Active	Alex 71	Alexco Keno Hill Mining Corp. - 100%	2006/05/20	2006/06/02	2035/12/31	
YC48203		Active	Alex 72	Alexco Keno Hill Mining Corp. - 100%	2006/05/20	2006/06/02	2035/12/31	
YC48204		Active	Alex 73	Alexco Keno Hill Mining Corp. - 100%	2006/05/20	2006/06/02	2035/12/31	
YC48205		Active	Alex 74	Alexco Keno Hill Mining Corp. - 100%	2006/05/20	2006/06/02	2035/12/31	
YC48206		Active	Alex 75	Alexco Keno Hill Mining Corp. - 100%	2006/05/20	2006/06/02	2035/12/31	
YC48207		Active	Alex 76	Alexco Keno Hill Mining Corp. - 100%	2006/05/20	2006/06/02	2035/12/31	
YC48208		Active	Alex 77	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48209		Active	Alex 78	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48210		Active	Alex 79	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48139		Active	Alex 8	Alexco Keno Hill Mining Corp. - 100%	2006/05/20	2006/06/02	2035/12/31	
YC48211		Active	Alex 80	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48212		Active	Alex 81	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48213		Active	Alex 82	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48214		Active	Alex 83	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48215		Active	Alex 84	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48216		Active	Alex 85	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48217		Active	Alex 86	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48218		Active	Alex 87	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48219		Active	Alex 88	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48220		Active	Alex 89	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48140		Active	Alex 9	Alexco Keno Hill Mining Corp. - 100%	2006/05/20	2006/06/02	2035/12/31	
YC48221		Active	Alex 90	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48222		Active	Alex 91	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48223		Active	Alex 92	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48224		Active	Alex 93	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48225		Active	Alex 94	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48226		Active	Alex 95	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48227		Active	Alex 96	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48228		Active	Alex 97	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48229		Active	Alex 98	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
YC48230		Active	Alex 99	Alexco Keno Hill Mining Corp. - 100%	2006/05/22	2006/05/22	2035/12/31	
59013	NM00070	Active	ALICE	Elsa Reclamation & Development Company Ltd. - 100%	1948/08/28	1948/09/01	2021/08/08	
55573	NM00276	Active	ALICE	Elsa Reclamation & Development Company Ltd. - 100%	1946/10/25	1947/02/17	2024/04/18	
62317	NM00470	Active	ALICE 1	Elsa Reclamation & Development Company Ltd. - 100%	1953/07/25	1953/08/05	2025/11/26	
62318	NM00471	Active	ALICE 2	Elsa Reclamation & Development Company Ltd. - 100%	1953/07/25	1953/08/05	2025/11/26	
YB29727		Active	ALLA 4	Elsa Reclamation & Development Company Ltd. - 100%	1993/03/15	1993/03/19	2036/12/31	
YB29728		Active	ALLA 5	Elsa Reclamation & Development Company Ltd. - 100%	1993/03/16	1993/03/19	2036/12/31	
YB29729		Active	ALLA 6	Elsa Reclamation & Development Company Ltd. - 100%	1993/03/16	1993/03/19	2036/12/31	
81223	NM00651	Active	ANDY	Elsa Reclamation & Development Company Ltd. - 100%	1962/06/21	1962/06/26	2031/03/12	
13108	NM00058	Active	ANEROID	Elsa Reclamation & Development Company Ltd. - 100%	1920/04/27	1920/06/10	2021/07/18	
12909	NM00642	Active	ANTHONY	Elsa Reclamation & Development Company Ltd. - 100%	1919/10/13	1919/12/17	2030/03/24	
56443	NM00811	Active	APEX FR.	Elsa Reclamation & Development Company Ltd. - 100%	1947/07/11	1947/07/15	2038/12/15	
55476	NM00808	Active	APOLLO	Elsa Reclamation & Development Company Ltd. - 100%	1946/08/31	1947/01/23	2038/12/15	

Grant	Lease	Status	Claim Name	Owner	Staked	Recorded	Expiry	Comment
14089	NM00692	Active	ARCTIC	Elsa Reclamation & Development Company Ltd. - 100%	1921/05/03	1921/07/26	2035/12/19	
16589	NM00351	Active	ARDELLE	Elsa Reclamation & Development Company Ltd. - 100%	1925/06/12	1925/07/23	2025/03/30	
55474	NM00806	Active	ARETHUSA	Elsa Reclamation & Development Company Ltd. - 100%	1946/08/31	1947/01/23	2038/12/15	
16393	NM00174	Active	ARGENTUM	Nora Ethel Swenson - 50%, Elsa Reclamation & Development C	1928/02/02	1928/02/25	2022/11/16	
16561	NM00753	Active	ARIZONA	Elsa Reclamation & Development Company Ltd. - 100%	1925/06/02	1925/06/30	2037/01/27	
14225	NM00134	Active	ARNOLD	Elsa Reclamation & Development Company Ltd. - 100%	1921/07/18	1921/09/24	2022/05/07	
55475	NM00807	Active	ARTEMIS	Elsa Reclamation & Development Company Ltd. - 100%	1946/08/31	1947/01/23	2038/12/15	
38819	NM00163	Active	ASTORIA	Elsa Reclamation & Development Company Ltd. - 100%	1934/10/28	1934/11/19	2022/06/12	
14998	NM00701	Active	ATLANTIC	Elsa Reclamation & Development Company Ltd. - 100%	1924/06/18	1924/07/14	2036/01/29	
38687	NM00829	Active	AUGUST	Elsa Reclamation & Development Company Ltd. - 100%	1930/08/13	1930/09/16	2039/08/18	
62200	NM00370	Active	B & H	Elsa Reclamation & Development Company Ltd. - 100%	1952/07/25	1952/08/04	2025/04/30	
55429	NM00533	Active	BALTO	Alexco Keno Hill Mining Corp. - 100%	1946/05/25	1946/06/06	2027/11/02	
59373	NM00195	Active	BANKER	Elsa Reclamation & Development Company Ltd. - 100%	1949/07/28	1949/07/29	2023/06/16	
59374	NM00196	Active	BANKER 1	Elsa Reclamation & Development Company Ltd. - 100%	1949/07/28	1949/07/29	2023/06/16	
59375	NM00197	Active	BANKER 2	Elsa Reclamation & Development Company Ltd. - 100%	1949/07/28	1949/07/29	2023/06/16	
59376	NM00198	Active	BANKER 3	Elsa Reclamation & Development Company Ltd. - 100%	1949/07/28	1949/07/29	2023/06/16	
YB43712		Active	Barb One	Elsa Reclamation & Development Company Ltd. - 100%	1994/10/12	1994/10/12	2024/12/31	
14446	NM00061	Active	BARKER Jr	Elsa Reclamation & Development Company Ltd. - 100%	1921/10/13	1921/12/01	2021/07/24	
55569	NM00840	Active	BARKY	Elsa Reclamation & Development Company Ltd. - 100%	1946/10/24	1947/02/17	2040/07/27	
15306	NM00097	Active	BEAR	Elsa Reclamation & Development Company Ltd. - 100%	1928/10/27	1928/11/29	2021/08/26	
55048	NM00109	Active	BEE	Elsa Reclamation & Development Company Ltd. - 100%	1937/10/01	1937/10/29	2021/08/28	
14826		Active	BELL YORK	Elsa Reclamation & Development Company Ltd. - 100%	1923/06/04	1923/07/09	2022/12/31	
59518	NM00846	Active	BEN	Elsa Reclamation & Development Company Ltd. - 100%	1949/11/01	1949/11/01	2040/07/27	
59474	NM00098	Active	BERRHOME	Elsa Reclamation & Development Company Ltd. - 100%	1949/08/31	1949/09/03	2021/08/26	
59121	NM00138	Active	BERRMAC 1	Elsa Reclamation & Development Company Ltd. - 100%	1948/11/04	1948/11/10	2022/05/07	
59122	NM00139	Active	BERRMAC 2	Elsa Reclamation & Development Company Ltd. - 100%	1948/11/04	1948/11/10	2022/05/07	
59123	NM00140	Active	BERRMAC 3	Elsa Reclamation & Development Company Ltd. - 100%	1948/11/04	1948/11/10	2022/05/07	
59124	NM00141	Active	BERRMAC 4	Elsa Reclamation & Development Company Ltd. - 100%	1948/11/04	1948/11/10	2022/05/07	
59476	NM00143	Active	BERRNAT	Elsa Reclamation & Development Company Ltd. - 100%	1949/08/31	1949/09/03	2022/05/07	
56533	NM00436	Active	BES	Elsa Reclamation & Development Company Ltd. - 100%	1948/06/09	1948/06/23	2025/11/26	
59342	NM00845	Active	BETS	Elsa Reclamation & Development Company Ltd. - 100%	1949/07/14	1949/07/19	2040/07/27	
56524	NM00062	Active	BETTY	Elsa Reclamation & Development Company Ltd. - 100%	1948/06/05	1948/06/11	2021/07/24	
38831	NM00164	Active	BILLYS	Elsa Reclamation & Development Company Ltd. - 100%	1935/04/25	1935/05/15	2022/06/12	
55371	NM00365	Active	BINGO	Elsa Reclamation & Development Company Ltd. - 100%	1945/07/20	1945/10/25	2025/04/30	
14084	NM00695	Active	BIRMINGHAM	Elsa Reclamation & Development Company Ltd. - 100%	1921/05/03	1921/07/25	2036/01/15	
12869	NM00175	Active	BLACK CAP	Elsa Reclamation & Development Company Ltd. - 100%	1919/09/27	1919/11/12	2022/11/19	
13480	NM00763	Active	BLACK MAGGIE	Elsa Reclamation & Development Company Ltd. - 100%	1920/08/13	1920/10/13	2037/09/03	
62272	NM00344	Active	BLOOD	Elsa Reclamation & Development Company Ltd. - 100%	1952/09/13	1952/09/17	2025/02/15	
YC01993	NM00720	Active	Blue	Alexco Keno Hill Mining Corp. - 100%	1999/09/09	1999/09/10	2033/10/02	
13143	NM00617	Active	BLUE BELL	Elsa Reclamation & Development Company Ltd. - 100%	1920/05/07	1920/06/16	2030/01/31	
59160	NM00841	Active	BLUE BIRD	Elsa Reclamation & Development Company Ltd. - 100%	1948/11/11	1948/11/22	2040/07/27	
59366	NM00209	Active	BLUE FOX 10	Elsa Reclamation & Development Company Ltd. - 100%	1949/07/15	1949/07/19	2023/07/20	
59343	NM00202	Active	BLUE FOX 2	Elsa Reclamation & Development Company Ltd. - 100%	1949/07/15	1949/07/19	2023/07/27	

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59359	NM00201	Active	BLUE FOX 3	Elsa Reclamation & Development Company Ltd. - 100%	1949/07/15	1949/07/19	2023/07/27	
59360	NM00203	Active	BLUE FOX 4	Elsa Reclamation & Development Company Ltd. - 100%	1949/07/15	1949/07/19	2023/07/20	
59361	NM00204	Active	BLUE FOX 5	Elsa Reclamation & Development Company Ltd. - 100%	1949/07/15	1949/07/19	2023/07/20	
59362	NM00205	Active	BLUE FOX 6	Elsa Reclamation & Development Company Ltd. - 100%	1949/07/15	1949/07/19	2023/07/20	
59363	NM00206	Active	BLUE FOX 7	Elsa Reclamation & Development Company Ltd. - 100%	1949/07/15	1949/07/19	2023/07/20	
59364	NM00207	Active	BLUE FOX 8	Elsa Reclamation & Development Company Ltd. - 100%	1949/07/15	1949/07/19	2023/07/20	
59365	NM00208	Active	BLUE FOX 9	Elsa Reclamation & Development Company Ltd. - 100%	1949/07/15	1949/07/19	2023/07/20	
YC90545	NM00721	Active	Blue Fr. 2	Alexco Keno Hill Mining Corp. - 100%	2011/09/17	2011/09/20	2033/10/02	
YC90546	NM00722	Active	Blue Fr. 3	Alexco Keno Hill Mining Corp. - 100%	2011/09/17	2011/09/20	2033/10/02	
13122	NM00044	Active	BLUE ROCK	Elsa Reclamation & Development Company Ltd. - 100%	1920/04/28	1920/06/12	2020/11/14	Renewed
13151	NM00636	Active	BLUE STONE	Elsa Reclamation & Development Company Ltd. - 100%	1920/05/07	1920/06/16	2029/12/31	
59351	NM00210	Active	BLUE-FOX 1	Elsa Reclamation & Development Company Ltd. - 100%	1949/07/15	1949/07/19	2023/07/27	
55394		Active	BOB	Elsa Reclamation & Development Company Ltd. - 100%	1946/02/07	1946/03/05	2022/12/31	
59543	NM00189	Active	BOB	Elsa Reclamation & Development Company Ltd. - 100%	1950/04/14	1950/05/01	2023/02/09	
59494	NM00192	Active	BOBBIE 10	Elsa Reclamation & Development Company Ltd. - 100%	1949/09/03	1949/09/06	2023/02/12	
59486	NM00456	Active	BOBBIE 2	Elsa Reclamation & Development Company Ltd. - 100%	1949/09/03	1949/09/06	2025/11/26	
59487	NM00457	Active	BOBBIE 3	Elsa Reclamation & Development Company Ltd. - 100%	1949/09/03	1949/09/06	2025/11/26	
59488	NM00458	Active	BOBBIE 4	Elsa Reclamation & Development Company Ltd. - 100%	1949/09/03	1949/09/06	2025/11/26	
59491	NM00190	Active	BOBBIE 7	Elsa Reclamation & Development Company Ltd. - 100%	1949/09/03	1949/09/06	2023/02/12	
59493	NM00191	Active	BOBBIE 9	Elsa Reclamation & Development Company Ltd. - 100%	1949/09/03	1949/09/06	2023/02/12	
55365	NM00275	Active	BOKA	Elsa Reclamation & Development Company Ltd. - 100%	1945/07/08	1945/10/25	2024/04/18	
59026	NM00064	Active	BOYLE	Elsa Reclamation & Development Company Ltd. - 100%	1948/09/11	1948/09/13	2021/07/24	
15250	NM00063	Active	BOYLE	Elsa Reclamation & Development Company Ltd. - 100%	1928/07/15	1928/08/06	2021/07/24	
15249	NM00242	Active	BRIDGETTE	Elsa Reclamation & Development Company Ltd. - 100%	1928/07/15	1928/08/06	2024/02/28	
59316	NM00287	Active	BRISTOL	Elsa Reclamation & Development Company Ltd. - 100%	1949/07/11	1949/07/19	2024/06/27	
12988	NM00274	Active	BRITANNIA	Elsa Reclamation & Development Company Ltd. - 100%	1920/03/10	1920/04/09	2024/04/18	
62152	NM00319	Active	BUCK	Elsa Reclamation & Development Company Ltd. - 100%	1952/06/14	1952/07/02	2025/02/01	
59041	NM00171	Active	BUCKEYE	Elsa Reclamation & Development Company Ltd. - 100%	1948/09/20	1948/09/21	2022/06/12	
59795	NM00572	Active	BUCKO	Elsa Reclamation & Development Company Ltd. - 100%	1950/09/29	1950/10/02	2027/11/02	
55504	NM00302	Active	BUCONJO 1	Elsa Reclamation & Development Company Ltd. - 100%	1946/09/14	1947/02/01	2025/01/31	
55513	NM00311	Active	BUCONJO 10	Elsa Reclamation & Development Company Ltd. - 100%	1946/09/15	1947/02/03	2025/01/31	
55514	NM00312	Active	BUCONJO 11	Elsa Reclamation & Development Company Ltd. - 100%	1946/09/15	1947/02/03	2025/01/31	
55515	NM00313	Active	BUCONJO 12	Elsa Reclamation & Development Company Ltd. - 100%	1946/09/19	1947/02/03	2025/01/31	
55516	NM00314	Active	BUCONJO 13	Elsa Reclamation & Development Company Ltd. - 100%	1946/09/19	1947/02/03	2025/01/31	
55517	NM00315	Active	BUCONJO 14	Elsa Reclamation & Development Company Ltd. - 100%	1946/09/24	1947/02/03	2025/01/31	
55518	NM00316	Active	BUCONJO 15	Elsa Reclamation & Development Company Ltd. - 100%	1946/09/19	1947/02/03	2025/01/31	
62154	NM00317	Active	BUCONJO 16	Elsa Reclamation & Development Company Ltd. - 100%	1952/06/16	1952/07/02	2025/01/31	
55505	NM00303	Active	BUCONJO 2	Elsa Reclamation & Development Company Ltd. - 100%	1946/09/14	1947/02/01	2025/01/31	
55506	NM00304	Active	BUCONJO 3	Elsa Reclamation & Development Company Ltd. - 100%	1946/09/14	1947/02/01	2025/01/31	
55507	NM00305	Active	BUCONJO 4	Elsa Reclamation & Development Company Ltd. - 100%	1946/09/14	1947/02/01	2025/01/31	
55508	NM00306	Active	BUCONJO 5	Elsa Reclamation & Development Company Ltd. - 100%	1946/09/14	1947/02/01	2025/01/31	
55509	NM00307	Active	BUCONJO 6	Elsa Reclamation & Development Company Ltd. - 100%	1946/09/14	1947/02/01	2025/01/31	
55510	NM00308	Active	BUCONJO 7	Elsa Reclamation & Development Company Ltd. - 100%	1904/09/14	1947/02/01	2025/01/31	

Grant	Lease	Status	Claim Name	Owner	Staked	Recorded	Expiry	Comment
55511	NM00309	Active	BUCONJO 8	Elsa Reclamation & Development Company Ltd. - 100%	1946/09/15	1947/02/03	2025/01/31	
55512	NM00310	Active	BUCONJO 9	Elsa Reclamation & Development Company Ltd. - 100%	1946/09/15	1947/02/03	2025/01/31	
55503	NM00301	Active	BUCONJO FRACTIO	Elsa Reclamation & Development Company Ltd. - 100%	1946/09/14	1947/02/01	2025/01/31	
14884	NM00065	Active	BUDDY	Elsa Reclamation & Development Company Ltd. - 100%	1923/09/02	1923/10/22	2021/07/24	
13454	NM00772	Active	BULL FROG	Elsa Reclamation & Development Company Ltd. - 100%	1920/07/29	1920/10/02	2038/03/30	
YA39498		Active	Bulldozer 1	Elsa Reclamation & Development Company Ltd. - 100%	1979/04/03	1979/04/04	2021/12/31	
YC90503	NM00719	Active	BULLDOZER F 2	Alexco Keno Hill Mining Corp. - 100%	2012/08/26	2012/08/27	2033/10/02	
83133	NM00656	Active	Bunk	Elsa Reclamation & Development Company Ltd. - 100%	1963/08/12	1963/08/13	2031/03/12	
59534	NM00543	Active	BUNKER	Alexco Keno Hill Mining Corp. - 100%	1950/03/18	1950/04/01	2027/11/02	
59535	NM00544	Active	BUNKER NO. 1	Alexco Keno Hill Mining Corp. - 100%	1950/03/18	1950/04/01	2027/11/02	
16166	NM00084	Active	BUNNY	Elsa Reclamation & Development Company Ltd. - 100%	1926/06/08	1926/07/12	2021/08/20	
13058	NM00863	Active	BUNNY	Elsa Reclamation & Development Company Ltd. - 100%	1920/04/03	1920/05/11	2041/04/25	
59542	NM00186	Active	BUNT	Elsa Reclamation & Development Company Ltd. - 100%	1950/04/14	1950/05/01	2023/02/09	
14445	NM00099	Active	BUSH	Elsa Reclamation & Development Company Ltd. - 100%	1921/10/11	1921/12/01	2021/08/26	
59420	NM00100	Active	CACHI 1	Elsa Reclamation & Development Company Ltd. - 100%	1949/07/27	1949/08/10	2021/08/26	
59421	NM00101	Active	CACHI 2	Elsa Reclamation & Development Company Ltd. - 100%	1949/07/27	1949/08/10	2021/08/26	
59422	NM00102	Active	CACHI 3	Elsa Reclamation & Development Company Ltd. - 100%	1949/07/27	1949/08/10	2021/08/26	
55587	NM00294	Active	CAIN	Alexco Keno Hill Mining Corp. - 100%	1946/10/08	1947/03/28	2025/02/23	
62341	NM00288	Active	CAKE	Elsa Reclamation & Development Company Ltd. - 100%	1953/11/11	1953/11/20	2024/06/27	
62282	NM00280	Active	CALF	Elsa Reclamation & Development Company Ltd. - 100%	1952/09/21	1952/10/02	2024/04/18	
13114	NM00290	Active	CALUMET 1	Elsa Reclamation & Development Company Ltd. - 100%	1920/04/27	1920/06/11	2024/08/15	
15319	NM00243	Active	CALUMET 2	Elsa Reclamation & Development Company Ltd. - 100%	1929/03/01	1929/03/27	2024/02/28	
59249	NM00268	Active	CAMARRILA	Elsa Reclamation & Development Company Ltd. - 100%	1949/05/28	1949/05/31	2024/01/18	
59248	NM00267	Active	CAMEO	Elsa Reclamation & Development Company Ltd. - 100%	1949/05/28	1949/05/31	2024/01/18	
13175	NM00666	Active	CAMOROTE	Elsa Reclamation & Development Company Ltd. - 100%	1920/05/05	1920/06/19	2033/10/31	
55484	NM00135	Active	CANADA	Elsa Reclamation & Development Company Ltd. - 100%	1946/08/26	1947/01/24	2022/05/07	
12970	NM00041	Active	CANADIAN	Elsa Reclamation & Development Company Ltd. - 100%	1919/09/19	1920/03/04	2020/08/14	Renewed
59250	NM00269	Active	CAPSTAN	Elsa Reclamation & Development Company Ltd. - 100%	1949/05/28	1949/05/31	2024/01/18	
12878	NM00831	Active	CARIBOU	Elsa Reclamation & Development Company Ltd. - 100%	1919/09/06	1919/11/26	2040/09/14	
81152		Active	Carol	Alexco Keno Hill Mining Corp. - 100%	1962/05/29	1962/06/04	2035/12/31	
80239		Active	Carol 1	Alexco Keno Hill Mining Corp. - 100%	1957/10/08	1957/10/16	2035/12/31	
80240		Active	Carol 2	Alexco Keno Hill Mining Corp. - 100%	1957/10/08	1957/10/16	2035/12/31	
80241		Active	Carol 3	Alexco Keno Hill Mining Corp. - 100%	1957/10/08	1957/10/16	2035/12/31	
80242		Active	Carol 4	Alexco Keno Hill Mining Corp. - 100%	1957/10/08	1957/10/16	2035/12/31	
80348		Active	Carol 5	Alexco Keno Hill Mining Corp. - 100%	1959/06/26	1959/07/02	2035/12/31	
Y 68414		Active	Case 1	Elsa Reclamation & Development Company Ltd. - 100%	1972/08/03	1972/08/17	2035/12/31	
Y 68415		Active	Case 2	Elsa Reclamation & Development Company Ltd. - 100%	1972/08/03	1972/08/17	2035/12/31	
Y 68416		Active	Case 3	Elsa Reclamation & Development Company Ltd. - 100%	1972/08/07	1972/08/17	2035/12/31	
62236	NM00403	Active	CAT	Elsa Reclamation & Development Company Ltd. - 100%	1952/08/25	1952/08/27	2025/06/12	
81226	NM00653	Active	CATHY	Elsa Reclamation & Development Company Ltd. - 100%	1962/06/20	1962/06/26	2031/03/12	
83012	NM00594	Active	CATHY FRACTION	Elsa Reclamation & Development Company Ltd. - 100%	1963/06/29	1963/07/09	2027/11/02	
38779	NM00665	Active	CHANCE	Elsa Reclamation & Development Company Ltd. - 100%	1934/03/29	1934/04/18	2033/06/17	
55120	NM00802	Active	CHANCE	Elsa Reclamation & Development Company Ltd. - 100%	1938/11/05	1938/11/28	2038/12/15	

Grant	Lease	Status	Claim Name	Owner	Staked	Recorded	Expiry	Comment
59796	NM00573	Active	CHARITY	Elsa Reclamation & Development Company Ltd. - 100%	1950/09/29	1950/10/02	2027/11/02	
13089	NM00825	Active	CHIEF	Elsa Reclamation & Development Company Ltd. - 100%	1920/04/16	1920/06/08	2039/08/18	
13088	NM00824	Active	CHIEF 2	Elsa Reclamation & Development Company Ltd. - 100%	1920/04/16	1920/06/08	2039/08/18	
13092	NM00103	Active	CHIEF 3	Elsa Reclamation & Development Company Ltd. - 100%	1920/04/18	1920/06/08	2021/08/26	
13093	NM00627	Active	CHIEF 4	Elsa Reclamation & Development Company Ltd. - 100%	1920/04/18	1920/06/09	2029/12/06	
YC02670		Active	Chiko 1	Alexco Keno Hill Mining Corp. - 100%	2000/10/12	2000/10/27	2030/12/31	
YC02679		Active	Chiko 10	Alexco Keno Hill Mining Corp. - 100%	2000/10/14	2000/10/27	2029/12/31	
YC02671		Active	Chiko 2	Alexco Keno Hill Mining Corp. - 100%	2000/10/12	2000/10/27	2029/12/31	
YC02672		Active	Chiko 3	Alexco Keno Hill Mining Corp. - 100%	2000/10/12	2000/10/27	2029/12/31	
YC02673		Active	Chiko 4	Alexco Keno Hill Mining Corp. - 100%	2000/10/12	2000/10/27	2029/12/31	
YC02674		Active	Chiko 5	Alexco Keno Hill Mining Corp. - 100%	2000/10/12	2000/10/27	2029/12/31	
YC02675		Active	Chiko 6	Alexco Keno Hill Mining Corp. - 100%	2000/10/12	2000/10/27	2029/12/31	
YC02676		Active	Chiko 7	Alexco Keno Hill Mining Corp. - 100%	2000/10/14	2000/10/27	2029/12/31	
YC02677		Active	Chiko 8	Alexco Keno Hill Mining Corp. - 100%	2000/10/14	2000/10/27	2029/12/31	
YC02678		Active	Chiko Fr. 9	Alexco Keno Hill Mining Corp. - 100%	2000/10/14	2000/10/27	2029/12/31	
62284	NM00467	Active	CITY	Elsa Reclamation & Development Company Ltd. - 100%	1952/09/27	1952/10/02	2025/11/26	
59475	NM00104	Active	CLIMBEAGLE	Elsa Reclamation & Development Company Ltd. - 100%	1949/08/31	1949/09/03	2021/08/26	
59120	NM00105	Active	CLIMBER	Elsa Reclamation & Development Company Ltd. - 100%	1948/11/04	1948/11/10	2021/08/26	
80358	NM00580	Active	CLOSURE	Elsa Reclamation & Development Company Ltd. - 100%	1959/07/09	1959/07/21	2027/11/02	
55421	NM00849	Active	COMPLEX	Elsa Reclamation & Development Company Ltd. - 100%	1946/05/25	1946/08/16	2040/08/28	
62153	NM00320	Active	CON	Elsa Reclamation & Development Company Ltd. - 100%	1952/06/14	1952/07/02	2025/02/01	
56473	NM00601	Active	CORA	Elsa Reclamation & Development Company Ltd. - 100%	1947/08/11	1947/08/25	2028/07/22	
55480	NM00858	Active	CORA	Elsa Reclamation & Development Company Ltd. - 100%	1946/08/26	1947/01/24	2041/02/11	
56574	NM00162	Active	CORA 2	Elsa Reclamation & Development Company Ltd. - 100%	1948/07/09	1948/07/21	2022/06/02	
59765	NM00055	Active	CORA Fr 2	Elsa Reclamation & Development Company Ltd. - 100%	1950/09/23	1950/09/27	2021/06/17	Renewed
14094	NM00363	Active	CORAL	Elsa Reclamation & Development Company Ltd. - 100%	1921/05/04	1921/07/26	2025/04/30	
55420	NM00564	Active	CROESUS	Elsa Reclamation & Development Company Ltd. - 100%	1946/05/22	1946/05/27	2027/11/02	
13418	NM00372	Active	CUB	Elsa Reclamation & Development Company Ltd. - 100%	1920/07/26	1920/09/25	2025/05/10	
59005	NM00509	Active	D.C.	Elsa Reclamation & Development Company Ltd. - 100%	1948/08/11	1948/08/26	2026/11/01	
59645	NM00545	Active	DAISY FRACTION	Alexco Keno Hill Mining Corp. - 100%	1950/07/15	1950/07/22	2027/11/02	
14883	NM00699	Active	DARWIN	Elsa Reclamation & Development Company Ltd. - 100%	1923/09/16	1923/10/18	2036/01/28	
16097	NM00531	Active	DAVID	Alexco Keno Hill Mining Corp. - 100%	1925/11/14	1925/12/08	2027/11/02	
62367	NM00472	Active	DAWSON	Elsa Reclamation & Development Company Ltd. - 100%	1954/06/19	1954/06/21	2025/11/26	
59367	NM00176	Active	DE CHUCK	Elsa Reclamation & Development Company Ltd. - 100%	1949/07/21	1949/07/25	2022/11/19	
55315	NM00046	Active	DELIA	Elsa Reclamation & Development Company Ltd. - 100%	1944/09/22	1945/02/19	2020/11/14	Renewed
59253	NM00270	Active	DENTON	Elsa Reclamation & Development Company Ltd. - 100%	1949/06/01	1949/06/03	2024/01/18	
14846	NM00687	Active	DENVER	Elsa Reclamation & Development Company Ltd. - 100%	1923/07/17	1923/08/11	2035/10/14	
55577	NM00277	Active	DEVON	Elsa Reclamation & Development Company Ltd. - 100%	1946/09/19	1947/03/20	2024/04/18	
YA40163		Active	Dice 1	Elsa Reclamation & Development Company Ltd. - 100%	1979/06/14	1979/06/29	2029/12/29	
YA40173		Active	Dice 11	Elsa Reclamation & Development Company Ltd. - 100%	1979/06/15	1979/06/29	2029/12/29	
YA40174		Active	Dice 12	Elsa Reclamation & Development Company Ltd. - 100%	1979/06/15	1979/06/29	2029/12/29	
YA40175		Active	Dice 13	Elsa Reclamation & Development Company Ltd. - 100%	1979/06/15	1979/06/29	2029/12/29	
YA40176		Active	Dice 14	Elsa Reclamation & Development Company Ltd. - 100%	1979/06/15	1979/06/29	2029/12/29	

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YA40164		Active	Dice 2	Elsa Reclamation & Development Company Ltd. - 100%	1979/06/14	1979/06/29	2029/12/29	
YA40165		Active	Dice 3	Elsa Reclamation & Development Company Ltd. - 100%	1979/06/14	1979/06/29	2029/12/29	
YA40166		Active	Dice 4	Elsa Reclamation & Development Company Ltd. - 100%	1979/06/14	1979/06/29	2029/12/29	
YA40167		Active	Dice 5	Elsa Reclamation & Development Company Ltd. - 100%	1979/06/14	1979/06/29	2029/12/29	
YA40168		Active	Dice 6	Elsa Reclamation & Development Company Ltd. - 100%	1979/06/14	1979/06/29	2029/12/29	
YA40169		Active	Dice 7	Elsa Reclamation & Development Company Ltd. - 100%	1979/06/14	1979/06/29	2029/12/29	
YA40170		Active	Dice 8	Elsa Reclamation & Development Company Ltd. - 100%	1979/06/14	1979/06/29	2029/12/29	
YA40171		Active	Dice 9	Elsa Reclamation & Development Company Ltd. - 100%	1979/06/15	1979/06/29	2029/12/29	
55362	NM00430	Active	DIVIDE	Elsa Reclamation & Development Company Ltd. - 100%	1945/07/08	1945/10/25	2025/11/26	
62283	NM00466	Active	DIVORCE	Elsa Reclamation & Development Company Ltd. - 100%	1952/09/21	1952/10/02	2025/11/26	
55585	NM00567	Active	DIXIE	Elsa Reclamation & Development Company Ltd. - 100%	1946/11/10	1947/03/20	2027/11/02	
14903	NM00746	Active	DIXIE	Elsa Reclamation & Development Company Ltd. - 100%	1923/10/31	1923/11/21	2036/10/07	
55333	NM00804	Active	DOE	Elsa Reclamation & Development Company Ltd. - 100%	1945/05/23	1945/10/16	2038/12/15	
YC57134		Active	Doh Fr.	Alexco Keno Hill Mining Corp. - 100%	2007/08/04	2007/08/21	2023/12/31	
14228	NM00765	Active	Dolly Varden	Elsa Reclamation & Development Company Ltd. - 100%	1921/07/24	1921/09/24	2038/02/15	
61733	NM00397	Active	DON FRACTION	Elsa Reclamation & Development Company Ltd. - 100%	1951/07/07	1951/07/19	2025/06/12	
61599	NM00550	Active	DON FRACTION	Alexco Keno Hill Mining Corp. - 100%	1951/05/23	1951/05/25	2027/11/02	
15393	NM00559	Active	DONNIE	Elsa Reclamation & Development Company Ltd. - 100%	1929/07/17	1929/08/26	2027/11/02	
16497	NM00669	Active	DONNIE	Elsa Reclamation & Development Company Ltd. - 100%	1924/07/20	1924/08/28	2033/11/24	
59692	NM00200	Active	DORA	Alexco Keno Hill Mining Corp. - 100%	1950/09/11	1950/09/19	2023/07/29	
61021	NM00574	Active	DOT	Elsa Reclamation & Development Company Ltd. - 100%	1950/10/26	1950/10/27	2027/11/02	
62294	NM00404	Active	DOUBT	Elsa Reclamation & Development Company Ltd. - 100%	1952/10/04	1952/10/11	2025/06/12	
YB28942		Active	DOUG 1	Alexco Keno Hill Mining Corp. - 100%	1992/08/31	1992/09/04	2040/12/31	
YB28943		Active	DOUG 2	Alexco Keno Hill Mining Corp. - 100%	1992/08/31	1992/09/04	2040/12/31	
YB28944		Active	DOUG 3	Alexco Keno Hill Mining Corp. - 100%	1992/08/31	1992/09/04	2040/12/31	
YB28945		Active	DOUG 4	Alexco Keno Hill Mining Corp. - 100%	1992/08/31	1992/09/04	2040/12/31	
YB28998		Active	Doug 5	Alexco Keno Hill Mining Corp. - 100%	1992/09/10	1992/09/25	2040/12/31	
YB28999		Active	Doug 6	Alexco Keno Hill Mining Corp. - 100%	1992/09/10	1992/09/25	2040/12/31	
YB29000		Active	Doug 7	Alexco Keno Hill Mining Corp. - 100%	1992/09/10	1992/09/25	2040/12/31	
YB29001		Active	Doug 8	Alexco Keno Hill Mining Corp. - 100%	1992/09/10	1992/09/25	2040/12/31	
YB29395		Active	DOUG 9	Alexco Keno Hill Mining Corp. - 100%	1992/11/18	1992/11/18	2040/12/31	
55440	NM00431	Active	DOUGLAS	Elsa Reclamation & Development Company Ltd. - 100%	1946/07/01	1946/07/06	2025/11/26	
62268	NM00340	Active	DRAKE	Elsa Reclamation & Development Company Ltd. - 100%	1952/09/13	1952/09/17	2025/02/15	
14223	NM00071	Active	DREADNAUGHT	Elsa Reclamation & Development Company Ltd. - 100%	1921/07/17	1921/09/24	2021/08/08	
62271	NM00343	Active	DUCE	Elsa Reclamation & Development Company Ltd. - 100%	1952/09/13	1952/09/17	2025/02/15	
59932	NM00548	Active	DUDE	Alexco Keno Hill Mining Corp. - 100%	1950/10/05	1950/10/11	2027/11/02	
59468	NM00367	Active	DUNCAN 1	Elsa Reclamation & Development Company Ltd. - 100%	1949/08/17	1949/08/19	2025/04/30	
59469	NM00368	Active	DUNCAN 2	Elsa Reclamation & Development Company Ltd. - 100%	1949/08/17	1949/08/19	2025/04/30	
59470	NM00369	Active	DUNCAN 3	Elsa Reclamation & Development Company Ltd. - 100%	1949/08/17	1949/08/19	2025/04/30	
YC90504		Pending	Duncan Fr. 4	Alexco Keno Hill Mining Corp. - 100%	2013/09/13	2013/09/13	2028/09/13	
55499	NM00853	Active	DUPLEX	Elsa Reclamation & Development Company Ltd. - 100%	1946/09/12	1947/02/01	2040/10/12	
16588	NM00350	Active	EAGLE	Elsa Reclamation & Development Company Ltd. - 100%	1925/06/12	1925/07/23	2025/03/30	
61908	NM00462	Active	EDBO	Elsa Reclamation & Development Company Ltd. - 100%	1951/08/07	1951/08/22	2025/11/26	

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61909	NM00463	Active	EDBO 2	Elsa Reclamation & Development Company Ltd. - 100%	1951/08/07	1951/08/22	2025/11/26	
59478	NM00449	Active	EDITH-CAVELL 1	Elsa Reclamation & Development Company Ltd. - 100%	1949/09/03	1949/09/06	2025/11/26	
59479	NM00450	Active	EDITH-CAVELL 2	Elsa Reclamation & Development Company Ltd. - 100%	1949/09/03	1949/09/06	2025/11/26	
59480	NM00451	Active	EDITH-CAVELL 3	Elsa Reclamation & Development Company Ltd. - 100%	1949/09/03	1949/09/06	2025/11/26	
59481	NM00452	Active	EDITH-CAVELL 4	Elsa Reclamation & Development Company Ltd. - 100%	1949/09/03	1949/09/06	2025/11/26	
59482	NM00453	Active	EDITH-CAVELL 5	Elsa Reclamation & Development Company Ltd. - 100%	1949/09/03	1949/09/06	2025/11/26	
59483	NM00454	Active	EDITH-CAVELL 6	Elsa Reclamation & Development Company Ltd. - 100%	1949/09/03	1949/09/06	2025/11/26	
59484	NM00455	Active	EDITH-CAVELL 7	Elsa Reclamation & Development Company Ltd. - 100%	1949/09/03	1949/09/06	2025/11/26	
59485	NM00597	Active	EDITH-CAVELL 8	Elsa Reclamation & Development Company Ltd. - 100%	1949/09/03	1949/09/06	2027/11/26	
59670	NM00386	Active	EDITH-CAVELL 9	Elsa Reclamation & Development Company Ltd. - 100%	1950/08/05	1950/08/16	2025/05/22	
16496	NM00085	Active	EFFIE	Elsa Reclamation & Development Company Ltd. - 100%	1924/08/04	1924/08/28	2021/08/20	
56591	NM00355	Active	EILEEN	Elsa Reclamation & Development Company Ltd. - 100%	1948/08/19	1948/08/20	2025/03/30	
59754	NM00847	Active	EILEEN	Elsa Reclamation & Development Company Ltd. - 100%	1950/09/24	1950/09/26	2040/07/27	
55319	NM00563	Active	ELI	Elsa Reclamation & Development Company Ltd. - 100%	1944/10/12	1945/02/19	2027/11/02	
59419	NM00570	Active	ELI 2	Elsa Reclamation & Development Company Ltd. - 100%	1949/07/20	1949/08/08	2027/11/02	
59296	NM00072	Active	ELINOR 1	Elsa Reclamation & Development Company Ltd. - 100%	1949/06/20	1949/06/30	2021/08/08	
59302	NM00073	Active	ELINOR 2	Elsa Reclamation & Development Company Ltd. - 100%	1949/06/20	1949/06/30	2021/08/08	
59297	NM00074	Active	ELINOR 3	Elsa Reclamation & Development Company Ltd. - 100%	1949/06/20	1949/06/30	2021/08/08	
59298	NM00075	Active	ELINOR 4	Elsa Reclamation & Development Company Ltd. - 100%	1949/06/20	1949/06/30	2021/08/08	
16523	NM00773	Active	ELSA	Elsa Reclamation & Development Company Ltd. - 100%	1924/09/13	1924/10/11	2038/05/12	
13169	NM00814	Active	ELSIE FRACTIONA	Elsa Reclamation & Development Company Ltd. - 100%	1920/05/11	1920/06/18	2039/01/01	
55473	NM00805	Active	ENDYMION	Elsa Reclamation & Development Company Ltd. - 100%	1946/08/31	1947/01/23	2038/12/15	
62247	NM00465	Active	ERICA	Elsa Reclamation & Development Company Ltd. - 100%	1952/09/04	1952/09/05	2025/11/26	
38737	NM00066	Active	ETHEL	Elsa Reclamation & Development Company Ltd. - 100%	1932/03/22	1932/04/11	2021/07/24	
14169	NM00691	Active	ETTA	Elsa Reclamation & Development Company Ltd. - 100%	1921/07/10	1921/09/14	2035/12/19	
12877	NM00038	Active	EUREKA	Elsa Reclamation & Development Company Ltd. - 100%	1919/08/31	1919/11/26	2020/08/20	Renewed
14327	NM00798	Active	EUREKA	Elsa Reclamation & Development Company Ltd. - 100%	1921/08/21	1921/10/11	2038/12/15	
59519	NM00542	Active	EVY	Alexco Keno Hill Mining Corp. - 100%	1949/11/24	1949/11/30	2027/11/02	
61916	NM00554	Active	EVY	Alexco Keno Hill Mining Corp. - 100%	1951/08/16	1951/08/29	2027/11/02	
16026	NM00348	Active	EXTENSION	Elsa Reclamation & Development Company Ltd. - 100%	1925/07/29	1925/08/31	2025/03/30	
16087	NM00799	Active	EXTENSION	Elsa Reclamation & Development Company Ltd. - 100%	1925/10/19	1925/11/24	2038/12/15	
62944	NM00474	Active	FAIR FRACTION	Elsa Reclamation & Development Company Ltd. - 100%	1955/12/30	1956/01/06	2025/11/26	
61725	NM00525	Active	FALLOT	Elsa Reclamation & Development Company Ltd. - 100%	1951/07/09	1951/07/16	2026/11/01	
59437	NM00510	Active	FALLS 1	Elsa Reclamation & Development Company Ltd. - 100%	1949/08/16	1949/08/19	2026/11/01	
59446	NM00519	Active	FALLS 10	Elsa Reclamation & Development Company Ltd. - 100%	1949/08/16	1949/08/19	2026/11/01	
59447	NM00520	Active	FALLS 11	Elsa Reclamation & Development Company Ltd. - 100%	1949/08/17	1949/08/19	2026/11/01	
59448	NM00521	Active	FALLS 12	Elsa Reclamation & Development Company Ltd. - 100%	1949/08/17	1949/08/19	2026/11/01	
59449	NM00522	Active	FALLS 13	Elsa Reclamation & Development Company Ltd. - 100%	1949/08/17	1949/08/19	2026/11/01	
59450	NM00523	Active	FALLS 14	Elsa Reclamation & Development Company Ltd. - 100%	1949/08/17	1949/08/19	2026/11/01	
59451	NM00524	Active	FALLS 15	Elsa Reclamation & Development Company Ltd. - 100%	1949/08/17	1949/08/19	2026/11/01	
59452	NM00384	Active	FALLS 16	Elsa Reclamation & Development Company Ltd. - 100%	1949/08/16	1949/08/19	2025/05/22	
59438	NM00511	Active	FALLS 2	Elsa Reclamation & Development Company Ltd. - 100%	1949/08/16	1949/08/19	2026/11/01	
59439	NM00512	Active	FALLS 3	Elsa Reclamation & Development Company Ltd. - 100%	1949/08/16	1949/08/19	2026/11/01	

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59440	NM00513	Active	FALLS 4	Elsa Reclamation & Development Company Ltd. - 100%	1949/08/16	1949/08/19	2026/11/01	
59441	NM00514	Active	FALLS 5	Elsa Reclamation & Development Company Ltd. - 100%	1949/08/16	1949/08/19	2026/11/01	
59442	NM00515	Active	FALLS 6	Elsa Reclamation & Development Company Ltd. - 100%	1949/08/16	1949/08/19	2026/11/01	
59443	NM00516	Active	FALLS 7	Elsa Reclamation & Development Company Ltd. - 100%	1949/08/16	1949/08/19	2026/11/01	
59444	NM00517	Active	FALLS 8	Elsa Reclamation & Development Company Ltd. - 100%	1949/08/16	1949/08/19	2026/11/01	
59445	NM00518	Active	FALLS 9	Elsa Reclamation & Development Company Ltd. - 100%	1949/08/16	1949/08/19	2026/11/01	
14085	NM00694	Active	FIG TREE	Elsa Reclamation & Development Company Ltd. - 100%	1921/05/03	1921/07/25	2036/01/08	
80347	NM00578	Active	FILL	Elsa Reclamation & Development Company Ltd. - 100%	1959/06/03	1959/06/10	2027/11/02	
62826	NM00289	Active	FILTER FRACTION	Elsa Reclamation & Development Company Ltd. - 100%	1955/06/16	1955/06/23	2024/06/27	
80359	NM00581	Active	FINAL	Elsa Reclamation & Development Company Ltd. - 100%	1959/07/09	1959/07/21	2027/11/02	
12876	NM00850	Active	FISHER	Elsa Reclamation & Development Company Ltd. - 100%	1919/09/02	1919/11/26	2040/09/14	
38643	NM00762	Active	FLAME	Elsa Reclamation & Development Company Ltd. - 100%	1929/10/13	1929/11/13	2037/11/29	
55527	NM00377	Active	FLY FRACTION	Elsa Reclamation & Development Company Ltd. - 100%	1946/09/18	1947/02/04	2025/05/22	
12870	NM00812	Active	FORAKER FRACTIO	Elsa Reclamation & Development Company Ltd. - 100%	1919/10/01	1919/11/13	2038/12/27	
13412		Active	FOREST	Elsa Reclamation & Development Company Ltd. - 100%	1920/07/24	1920/09/24	2022/12/31	
12845	NM00056	Active	FOX	Elsa Reclamation & Development Company Ltd. - 100%	1919/09/04	1919/10/28	2021/03/11	Renewed
55592	NM00539	Active	FOX	Alexco Keno Hill Mining Corp. - 100%	1946/10/12	1947/03/28	2027/11/02	
61877	NM00553	Active	FOX	Alexco Keno Hill Mining Corp. - 100%	1951/08/13	1951/08/15	2027/11/02	
55599	NM00261	Active	FRANCES 3	Elsa Reclamation & Development Company Ltd. - 100%	1947/03/29	1947/04/18	2024/01/09	
55600	NM00262	Active	FRANCES 4	Elsa Reclamation & Development Company Ltd. - 100%	1947/03/29	1947/04/18	2024/01/09	
56401	NM00263	Active	FRANCES 5	Elsa Reclamation & Development Company Ltd. - 100%	1947/03/29	1947/04/18	2024/01/09	
56402	NM00264	Active	FRANCES 6	Elsa Reclamation & Development Company Ltd. - 100%	1947/03/29	1947/04/18	2024/01/09	
56403	NM00265	Active	FRANCES 7	Elsa Reclamation & Development Company Ltd. - 100%	1947/03/29	1947/04/18	2024/01/09	
56404	NM00266	Active	FRANCES 8	Elsa Reclamation & Development Company Ltd. - 100%	1947/03/29	1947/04/18	2024/01/09	
14220	NM00076	Active	FRANK	Elsa Reclamation & Development Company Ltd. - 100%	1921/07/17	1921/09/24	2021/08/08	
13152	NM00685	Active	FRIENDSHIP	Elsa Reclamation & Development Company Ltd. - 100%	1920/05/07	1920/06/16	2035/01/30	
55317	NM00132	Active	FROG	Elsa Reclamation & Development Company Ltd. - 100%	1944/10/11	1945/02/19	2022/02/03	
59125	NM00871	Active	FRONTIER	Elsa Reclamation & Development Company Ltd. - 100%	1948/11/11	1948/11/13	2040/01/06	
80517	NM00584	Active	GAIL FRACTION	Elsa Reclamation & Development Company Ltd. - 100%	1960/07/19	1960/08/04	2027/11/02	
Y 69403		Active	Galaxy	Elsa Reclamation & Development Company Ltd. - 100%	1973/05/22	1973/06/05	2026/12/31	
YA77506		Active	Galena	Elsa Reclamation & Development Company Ltd. - 100%	1984/06/06	1984/06/13	2023/12/31	
13032	NM00193	Active	GALENA FARM	Elsa Reclamation & Development Company Ltd. - 100%	1920/03/04	1920/05/06	2023/03/22	
38812	NM00682	Active	GALENA HILL	Elsa Reclamation & Development Company Ltd. - 100%	1934/10/03	1934/11/12	2035/04/14	
14816	NM00106	Active	GIBRALTAR	Elsa Reclamation & Development Company Ltd. - 100%	1923/02/28	1923/04/13	2021/08/26	
84616	NM00791	Active	GLORIA FRACTION	Elsa Reclamation & Development Company Ltd. - 100%	1965/08/06	1965/08/24	2038/10/17	
80361	NM00583	Active	GNAT	Elsa Reclamation & Development Company Ltd. - 100%	1959/07/15	1959/07/22	2027/11/02	
55386	NM00050	Active	GOPHER	Elsa Reclamation & Development Company Ltd. - 100%	1945/08/09	1945/10/26	2020/11/14	Renewed
59821	NM00460	Active	GRACE	Elsa Reclamation & Development Company Ltd. - 100%	1950/10/01	1950/10/02	2025/11/26	
15304	NM00767	Active	GREEN BACK	Elsa Reclamation & Development Company Ltd. - 100%	1928/10/04	1928/11/27	2038/03/13	
14336	NM00649	Active	GREENSTONE	Elsa Reclamation & Development Company Ltd. - 100%	1921/08/24	1921/10/19	2030/05/28	
55593	NM00540	Active	GRETA	Alexco Keno Hill Mining Corp. - 100%	1946/10/16	1947/03/28	2027/11/02	
12817	NM00273	Active	GROUND HOG	Elsa Reclamation & Development Company Ltd. - 100%	1919/09/04	1919/10/20	2024/04/18	
61600	NM00551	Active	GROUSE	Alexco Keno Hill Mining Corp. - 100%	1951/05/13	1951/05/25	2027/11/02	

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15305	NM00086	Active	GRUB STAKE	Elsa Reclamation & Development Company Ltd. - 100%	1928/10/10	1928/11/27	2021/08/20	
80357	NM00579	Active	HAP	Elsa Reclamation & Development Company Ltd. - 100%	1959/07/09	1959/07/21	2027/11/02	
10269	NM00833	Active	HAPPY	Elsa Reclamation & Development Company Ltd. - 100%	1936/07/05	1936/07/22	2040/07/27	
59315	NM00087	Active	HARDIX	Elsa Reclamation & Development Company Ltd. - 100%	1949/06/25	1949/07/13	2021/08/20	
55177	NM00364	Active	HARDWICK	Elsa Reclamation & Development Company Ltd. - 100%	1940/10/08	1940/12/19	2025/04/30	
56525	NM00353	Active	HARRIETT	Elsa Reclamation & Development Company Ltd. - 100%	1948/06/12	1948/06/14	2025/03/30	
59030	NM00137	Active	HAVLOCK	Elsa Reclamation & Development Company Ltd. - 100%	1948/09/13	1948/09/17	2022/05/07	
16025	NM00668	Active	HAWKS NEST	Elsa Reclamation & Development Company Ltd. - 100%	1925/07/28	1925/08/31	2033/11/24	
55428	NM00054	Active	HAY	Elsa Reclamation & Development Company Ltd. - 100%	1946/06/02	1946/08/19	2020/11/14	Renewed
55582	NM00565	Active	HECLA	Elsa Reclamation & Development Company Ltd. - 100%	1946/10/24	1947/03/20	2027/11/02	
16326	NM00663	Active	HECTOR	Elsa Reclamation & Development Company Ltd. - 100%	1927/05/09	1927/05/30	2033/06/17	
14908	NM00425	Active	HELEN	Elsa Reclamation & Development Company Ltd. - 100%	1923/11/01	1923/11/27	2025/11/26	
55364	NM00795	Active	HELEN	Elsa Reclamation & Development Company Ltd. - 100%	1945/07/08	1945/10/25	2038/11/01	
55318	NM00429	Active	HENRY	Elsa Reclamation & Development Company Ltd. - 100%	1944/10/11	1945/02/19	2025/11/26	
55478	NM00810	Active	HESPERIDES	Elsa Reclamation & Development Company Ltd. - 100%	1946/08/31	1947/01/24	2038/12/15	
13072	NM00862	Active	HIGHLANDER	Elsa Reclamation & Development Company Ltd. - 100%	1920/04/03	1920/06/04	2041/04/25	
56506	NM00758	Active	HILL	Elsa Reclamation & Development Company Ltd. - 100%	1947/11/21	1947/11/28	2037/05/23	
56577	NM00067	Active	HOBO	Elsa Reclamation & Development Company Ltd. - 100%	1948/07/19	1948/08/03	2021/07/24	
38720	NM00248	Active	HOBO	Elsa Reclamation & Development Company Ltd. - 100%	1931/07/04	1931/07/24	2024/02/28	
61209	NM00387	Active	HOBO 3	Elsa Reclamation & Development Company Ltd. - 100%	1950/12/04	1950/12/18	2025/05/22	
YC02323		Active	Hoito 1	Alexco Keno Hill Mining Corp. - 100%	1999/12/11	1999/12/29	2038/12/29	
YC02324		Active	Hoito 2	Alexco Keno Hill Mining Corp. - 100%	1999/12/11	1999/12/29	2038/12/29	
YC02325		Active	Hoito 3	Alexco Keno Hill Mining Corp. - 100%	1999/12/12	1999/12/29	2038/12/29	
YC02326		Active	Hoito 4	Alexco Keno Hill Mining Corp. - 100%	1999/12/12	1999/12/29	2038/12/29	
YC02327		Active	Hoito 5	Alexco Keno Hill Mining Corp. - 100%	1999/12/12	1999/12/29	2038/12/29	
YC02328		Active	Hoito 6	Alexco Keno Hill Mining Corp. - 100%	1999/12/12	1999/12/29	2038/12/29	
YC02329		Active	Hoito 7	Alexco Keno Hill Mining Corp. - 100%	1999/12/12	1999/12/29	2038/12/29	
YC02330		Active	Hoito 8	Alexco Keno Hill Mining Corp. - 100%	1999/12/12	1999/12/29	2038/12/29	
56592	NM00225	Active	HOLIDAY 1	Elsa Reclamation & Development Company Ltd. - 100%	1948/08/15	1948/08/23	2023/08/22	
56600	NM00232	Active	HOLIDAY 10	Elsa Reclamation & Development Company Ltd. - 100%	1948/08/14	1948/08/23	2023/08/22	
59001	NM00233	Active	HOLIDAY 11	Elsa Reclamation & Development Company Ltd. - 100%	1948/08/14	1948/08/23	2023/08/22	
59002	NM00234	Active	HOLIDAY 12	Elsa Reclamation & Development Company Ltd. - 100%	1948/08/14	1948/08/23	2023/08/22	
59003	NM00235	Active	HOLIDAY 13	Elsa Reclamation & Development Company Ltd. - 100%	1948/08/14	1948/08/23	2023/08/22	
59004	NM00236	Active	HOLIDAY 14	Elsa Reclamation & Development Company Ltd. - 100%	1948/08/14	1948/08/23	2023/08/22	
56593	NM00226	Active	HOLIDAY 2	Elsa Reclamation & Development Company Ltd. - 100%	1948/08/15	1948/08/23	2023/08/22	
56594	NM00227	Active	HOLIDAY 3	Elsa Reclamation & Development Company Ltd. - 100%	1948/08/12	1948/08/23	2023/08/22	
56595	NM00228	Active	HOLIDAY 4	Elsa Reclamation & Development Company Ltd. - 100%	1948/08/12	1948/08/23	2023/08/22	
56597	NM00229	Active	HOLIDAY 7	Elsa Reclamation & Development Company Ltd. - 100%	1948/08/12	1948/08/23	2023/08/22	
56598	NM00230	Active	HOLIDAY 8	Elsa Reclamation & Development Company Ltd. - 100%	1948/08/12	1948/08/23	2023/08/22	
56599	NM00231	Active	HOLIDAY 9	Elsa Reclamation & Development Company Ltd. - 100%	1948/08/14	1948/08/23	2023/08/22	
13133	NM00702	Active	HOMESTAKE	Elsa Reclamation & Development Company Ltd. - 100%	1920/04/29	1920/06/15	2036/02/27	
59171	NM00279	Active	HONEYMOON 1	Elsa Reclamation & Development Company Ltd. - 100%	1949/01/16	1949/01/25	2024/04/18	
59172	NM00379	Active	HONEYMOON 2	Elsa Reclamation & Development Company Ltd. - 100%	1949/01/16	1949/01/25	2025/05/22	

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59173	NM00380	Active	HONEYMOON 3	Elsa Reclamation & Development Company Ltd. - 100%	1949/01/16	1949/01/25	2025/05/22	
59174	NM00381	Active	HONEYMOON 4	Elsa Reclamation & Development Company Ltd. - 100%	1949/01/16	1949/01/25	2025/05/22	
59175	NM00382	Active	HONEYMOON 5	Elsa Reclamation & Development Company Ltd. - 100%	1949/01/16	1949/01/25	2025/05/22	
59176	NM00383	Active	HONEYMOON 6	Elsa Reclamation & Development Company Ltd. - 100%	1949/01/16	1949/01/25	2025/05/22	
55377	NM00366	Active	HOPE	Elsa Reclamation & Development Company Ltd. - 100%	1945/08/04	1945/10/26	2025/04/30	
55589	NM00296	Active	HORSESHOE	Alexco Keno Hill Mining Corp. - 100%	1946/10/08	1947/03/28	2025/02/23	
55273	NM00298	Active	HUB	Elsa Reclamation & Development Company Ltd. - 100%	1943/10/21	1944/05/27	2025/01/30	
55536	NM00212	Active	HUSKY	Elsa Reclamation & Development Company Ltd. - 100%	1946/10/15	1947/02/12	2023/08/10	
55537	NM00213	Active	HUSKY 1	Elsa Reclamation & Development Company Ltd. - 100%	1946/10/15	1947/02/12	2023/08/10	
56576	NM00224	Active	HUSKY 12	Elsa Reclamation & Development Company Ltd. - 100%	1948/07/19	1948/07/21	2023/08/10	
55538	NM00214	Active	HUSKY 2	Elsa Reclamation & Development Company Ltd. - 100%	1946/10/15	1947/02/12	2023/08/10	
55539	NM00215	Active	HUSKY 3	Elsa Reclamation & Development Company Ltd. - 100%	1946/10/15	1946/10/22	2023/08/10	
55540	NM00216	Active	HUSKY 4	Elsa Reclamation & Development Company Ltd. - 100%	1946/10/15	1946/10/22	2023/08/10	
55541	NM00217	Active	HUSKY 5	Elsa Reclamation & Development Company Ltd. - 100%	1946/10/15	1946/10/22	2023/08/10	
55542	NM00218	Active	HUSKY 6	Elsa Reclamation & Development Company Ltd. - 100%	1946/10/15	1946/10/22	2023/08/10	
55543	NM00219	Active	HUSKY 7	Elsa Reclamation & Development Company Ltd. - 100%	1946/10/15	1946/10/22	2023/08/10	
55544	NM00220	Active	HUSKY 8	Elsa Reclamation & Development Company Ltd. - 100%	1946/10/15	1947/02/12	2023/08/10	
55545	NM00221	Active	HUSKY 9	Elsa Reclamation & Development Company Ltd. - 100%	1946/10/15	1946/10/22	2023/08/10	
14087	NM00696	Active	HUXLEY	Elsa Reclamation & Development Company Ltd. - 100%	1921/05/03	1921/07/26	2036/01/20	
55479	NM00602	Active	IDOL	Elsa Reclamation & Development Company Ltd. - 100%	1946/08/26	1947/01/24	2029/07/22	
16554	NM00247	Active	IKWOGGY	Elsa Reclamation & Development Company Ltd. - 100%	1925/05/29	1925/06/15	2024/02/28	
59385	NM00272	Active	INCA	Elsa Reclamation & Development Company Ltd. - 100%	1949/07/23	1949/07/29	2024/01/18	
80346	NM00577	Active	INCA FRACTION	Elsa Reclamation & Development Company Ltd. - 100%	1959/04/23	1959/04/30	2027/11/02	
56567	NM00169	Active	INDIANA	Elsa Reclamation & Development Company Ltd. - 100%	1948/06/26	1948/06/28	2022/06/12	
55326	NM00373	Active	IRENE	Elsa Reclamation & Development Company Ltd. - 100%	1945/04/06	1945/10/16	2025/05/22	
13799		Active	IVAN	Elsa Reclamation & Development Company Ltd. - 100%	1921/05/12	1921/06/23	2022/12/31	
12810	NM00394	Active	IVY	Elsa Reclamation & Development Company Ltd. - 100%	1919/08/23	1919/10/14	2025/06/12	
61744	NM00398	Active	JACK	Elsa Reclamation & Development Company Ltd. - 100%	1951/07/14	1951/07/20	2025/06/12	
YB29440		Active	JARRET 1	Alexco Keno Hill Mining Corp. - 100%	1992/12/18	1992/12/18	2040/12/31	
YC01768		Active	Jarret 2	Alexco Keno Hill Mining Corp. - 100%	1999/04/24	1999/04/30	2036/12/31	
55427	NM00053	Active	JAY	Elsa Reclamation & Development Company Ltd. - 100%	1946/06/01	1946/08/19	2020/11/14	Renewed
12809	NM00393	Active	JEAN	Elsa Reclamation & Development Company Ltd. - 100%	1919/08/23	1919/10/10	2025/06/12	
16524	NM00774	Active	JEAN	Elsa Reclamation & Development Company Ltd. - 100%	1924/09/12	1924/10/11	2038/05/19	
84626	NM00793	Active	JEAN FRACTIONAL	Elsa Reclamation & Development Company Ltd. - 100%	1965/08/20	1965/08/26	2038/10/17	
15294	NM00180	Active	JEFFREY SPECIAL	Elsa Reclamation & Development Company Ltd. - 100%	1928/09/06	1928/09/28	2023/02/02	
81139	NM00587	Active	JEFFY FRACTION	Elsa Reclamation & Development Company Ltd. - 100%	1962/05/29	1962/05/31	2027/11/02	
55581	NM00133	Active	JENBET	Elsa Reclamation & Development Company Ltd. - 100%	1946/10/24	1947/03/20	2022/02/03	
83532	NM00624	Active	JENNY 3	Elsa Reclamation & Development Company Ltd. - 100%	1964/07/15	1964/07/17	2030/02/28	
81228	NM00588	Active	JENNY FRACTION	Elsa Reclamation & Development Company Ltd. - 100%	1962/06/13	1962/06/28	2027/11/02	
83003	NM00590	Active	JENNY TOO FRACT	Elsa Reclamation & Development Company Ltd. - 100%	1963/06/05	1963/06/12	2027/11/02	
38694	NM00679	Active	JESSIE	Elsa Reclamation & Development Company Ltd. - 100%	1930/10/26	1930/11/21	2035/04/14	
59178	NM00237	Active	JESSIE 1	Elsa Reclamation & Development Company Ltd. - 100%	1949/01/20	1949/01/25	2023/08/29	
59180	NM00238	Active	JESSIE 3	Elsa Reclamation & Development Company Ltd. - 100%	1949/01/20	1949/01/25	2023/08/29	

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38744	NM00681	Active	JEWEL	Elsa Reclamation & Development Company Ltd. - 100%	1932/06/20	1932/07/21	2035/04/14	
61598	NM00549	Active	JIB NO. 2	Alexco Keno Hill Mining Corp. - 100%	1951/05/16	1951/05/25	2027/11/02	
15366	NM00837	Active	JIGGYWIG	Elsa Reclamation & Development Company Ltd. - 100%	1929/06/09	1929/07/18	2040/07/27	
55330	NM00047	Active	JIMMIE	Elsa Reclamation & Development Company Ltd. - 100%	1945/05/01	1945/10/16	2020/11/14	Renewed
38715	NM00664	Active	JOCK	Elsa Reclamation & Development Company Ltd. - 100%	1931/05/03	1931/05/20	2033/06/17	
84489		Active	Joe 2	Alexco Keno Hill Mining Corp. - 100%	1965/05/28	1965/06/02	2035/12/31	
80453		Active	Joe No. 1	Alexco Keno Hill Mining Corp. - 100%	1960/07/18	1960/05/27	2035/12/31	
61919	NM00399	Active	JOY FRACTION	Elsa Reclamation & Development Company Ltd. - 100%	1951/08/30	1951/08/31	2025/06/12	
82531	NM00655	Active	Joyce	Elsa Reclamation & Development Company Ltd. - 100%	1963/03/05	1963/03/12	2031/03/12	
14880	NM00107	Active	JUMBO	Elsa Reclamation & Development Company Ltd. - 100%	1923/09/29	1923/10/17	2021/08/26	
62992	NM00614	Active	JUNE	Elsa Reclamation & Development Company Ltd. - 100%	1956/06/24	1956/07/11	2029/08/21	
59274	NM00796	Active	JUNE	Elsa Reclamation & Development Company Ltd. - 100%	1949/06/12	1949/06/22	2038/11/01	
YC42549		Active	K 1	Alexco Keno Hill Mining Corp. - 100%	2005/12/04	2005/12/15	2039/12/15	
YC42558		Active	K 10	Alexco Keno Hill Mining Corp. - 100%	2005/11/30	2005/12/15	2035/12/15	
YC56127		Active	K 100	Alexco Keno Hill Mining Corp. - 100%	2007/06/15	2007/06/15	2024/12/31	
YC56128		Active	K 101	Alexco Keno Hill Mining Corp. - 100%	2007/06/15	2007/06/15	2024/12/31	
YC56129		Active	K 102	Alexco Keno Hill Mining Corp. - 100%	2007/06/15	2007/06/15	2024/12/31	
YC56155		Active	K 103	Alexco Keno Hill Mining Corp. - 100%	2007/06/21	2007/06/22	2022/12/31	
YC56156		Active	K 104	Alexco Keno Hill Mining Corp. - 100%	2007/06/21	2007/06/22	2022/12/31	
YC56157		Active	K 105	Alexco Keno Hill Mining Corp. - 100%	2007/06/21	2007/06/22	2022/12/31	
YC56158		Active	K 106	Alexco Keno Hill Mining Corp. - 100%	2007/06/21	2007/06/22	2022/12/31	
YC56159		Active	K 107	Alexco Keno Hill Mining Corp. - 100%	2007/06/21	2007/06/22	2022/12/31	
YC42559		Active	K 11	Alexco Keno Hill Mining Corp. - 100%	2005/11/30	2005/12/15	2035/12/15	
YC42560		Active	K 12	Alexco Keno Hill Mining Corp. - 100%	2005/11/30	2005/12/15	2035/12/15	
YC42561		Active	K 13	Alexco Keno Hill Mining Corp. - 100%	2005/11/30	2005/12/15	2035/12/15	
YC42562		Active	K 14	Alexco Keno Hill Mining Corp. - 100%	2005/11/30	2005/12/15	2035/12/15	
YC42563		Active	K 15	Alexco Keno Hill Mining Corp. - 100%	2005/11/30	2005/12/15	2035/12/15	
YC42564		Active	K 16	Alexco Keno Hill Mining Corp. - 100%	2005/11/30	2005/12/15	2035/12/15	
YC42565		Active	K 17	Alexco Keno Hill Mining Corp. - 100%	2005/11/30	2005/12/15	2035/12/15	
YC42566		Active	K 18	Alexco Keno Hill Mining Corp. - 100%	2005/11/30	2005/12/15	2035/12/15	
YC42567		Active	K 19	Alexco Keno Hill Mining Corp. - 100%	2005/11/30	2005/12/15	2035/12/15	
YC42550		Active	K 2	Alexco Keno Hill Mining Corp. - 100%	2005/12/04	2005/12/15	2039/12/15	
YC42568		Active	K 20	Alexco Keno Hill Mining Corp. - 100%	2005/11/29	2005/12/15	2035/12/15	
YC42569		Active	K 21	Alexco Keno Hill Mining Corp. - 100%	2005/11/30	2005/12/15	2035/12/15	
YC42570		Active	K 22	Alexco Keno Hill Mining Corp. - 100%	2005/11/30	2005/12/15	2035/12/15	
YC42571		Active	K 23	Alexco Keno Hill Mining Corp. - 100%	2005/11/30	2005/12/15	2035/12/15	
YC42572		Active	K 24	Alexco Keno Hill Mining Corp. - 100%	2005/11/30	2005/12/15	2035/12/15	
YC42573		Active	K 25	Alexco Keno Hill Mining Corp. - 100%	2005/11/30	2005/12/15	2035/12/15	
YC42574		Active	K 26	Alexco Keno Hill Mining Corp. - 100%	2005/11/30	2005/12/15	2035/12/15	
YC42575		Active	K 27	Alexco Keno Hill Mining Corp. - 100%	2005/12/03	2005/12/15	2030/12/15	
YC42576	NM00715	Active	K 28	Alexco Keno Hill Mining Corp. - 100%	2005/12/03	2005/12/15	2033/10/02	
YC42577		Active	K 29	Alexco Keno Hill Mining Corp. - 100%	2005/12/03	2005/12/15	2030/12/15	
YC42551		Active	K 3	Alexco Keno Hill Mining Corp. - 100%	2005/12/04	2005/12/15	2039/12/15	

Grant	Lease	Status	Claim Name	Owner	Staked	Recorded	Expiry	Comment
YC42578	NM00716	Active	K 30	Alexco Keno Hill Mining Corp. - 100%	2005/12/03	2005/12/15	2033/10/02	
YC42579		Active	K 31	Alexco Keno Hill Mining Corp. - 100%	2005/12/03	2005/12/15	2030/12/15	
YC42580	NM00717	Active	K 32	Alexco Keno Hill Mining Corp. - 100%	2005/12/03	2005/12/15	2033/10/02	
YC42581		Active	K 33	Alexco Keno Hill Mining Corp. - 100%	2005/12/01	2005/12/15	2035/12/15	
YC42582		Active	K 34	Alexco Keno Hill Mining Corp. - 100%	2005/12/01	2005/12/15	2035/12/15	
YC42583		Active	K 35	Alexco Keno Hill Mining Corp. - 100%	2005/12/01	2005/12/01	2039/12/31	
YC42584		Active	K 36	Alexco Keno Hill Mining Corp. - 100%	2005/12/01	2005/12/01	2035/12/31	
YC42585		Active	K 37	Alexco Keno Hill Mining Corp. - 100%	2005/12/01	2005/12/01	2035/12/31	
YC42586		Active	K 38	Alexco Keno Hill Mining Corp. - 100%	2005/12/01	2005/12/01	2035/12/31	
YC42587		Active	K 39	Alexco Keno Hill Mining Corp. - 100%	2005/12/01	2005/12/15	2035/12/15	
YC42552		Active	K 4	Alexco Keno Hill Mining Corp. - 100%	2005/12/04	2005/12/15	2035/12/15	
YC42588		Active	K 40	Alexco Keno Hill Mining Corp. - 100%	2005/12/01	2005/12/15	2035/12/15	
YC42589		Active	K 41	Alexco Keno Hill Mining Corp. - 100%	2005/12/03	2005/12/15	2029/12/15	
YC42590		Active	K 42	Alexco Keno Hill Mining Corp. - 100%	2005/12/03	2005/12/15	2029/12/15	
YC42591		Active	K 43	Alexco Keno Hill Mining Corp. - 100%	2005/12/04	2005/12/15	2029/12/15	
YC42592		Active	K 44	Alexco Keno Hill Mining Corp. - 100%	2005/12/04	2005/12/15	2029/12/15	
YC42593		Active	K 45	Alexco Keno Hill Mining Corp. - 100%	2005/12/04	2005/12/15	2029/12/15	
YC42594		Active	K 46	Alexco Keno Hill Mining Corp. - 100%	2005/12/04	2005/12/15	2032/12/15	
YC42595		Active	K 47	Alexco Keno Hill Mining Corp. - 100%	2005/12/04	2005/12/15	2029/12/15	
YC42596		Active	K 48	Alexco Keno Hill Mining Corp. - 100%	2005/12/04	2005/12/15	2029/12/15	
YC42597		Active	K 49	Alexco Keno Hill Mining Corp. - 100%	2005/12/03	2005/12/03	2030/12/31	
YC42553		Active	K 5	Alexco Keno Hill Mining Corp. - 100%	2005/12/04	2005/12/15	2035/12/15	
YC42598		Active	K 50	Alexco Keno Hill Mining Corp. - 100%	2005/12/03	2005/12/15	2029/12/15	
YC42599		Active	K 51	Alexco Keno Hill Mining Corp. - 100%	2005/12/03	2005/12/15	2029/12/31	
YC42600		Active	K 52	Alexco Keno Hill Mining Corp. - 100%	2005/12/03	2005/12/03	2029/12/03	
YC42601		Active	K 53	Alexco Keno Hill Mining Corp. - 100%	2005/12/05	2005/12/05	2022/12/31	
YC42602		Active	K 54	Alexco Keno Hill Mining Corp. - 100%	2005/12/05	2005/12/15	2022/12/15	
YC42603		Active	K 55	Alexco Keno Hill Mining Corp. - 100%	2005/12/05	2005/12/15	2023/12/15	
YC42604		Active	K 56	Alexco Keno Hill Mining Corp. - 100%	2005/12/05	2005/12/15	2023/12/15	
YC42605		Active	K 57	Alexco Keno Hill Mining Corp. - 100%	2005/12/05	2005/12/15	2030/12/15	
YC42606		Active	K 58	Alexco Keno Hill Mining Corp. - 100%	2005/12/05	2005/12/15	2029/12/15	
YC42607		Active	K 59	Alexco Keno Hill Mining Corp. - 100%	2005/12/05	2005/12/15	2029/12/15	
YC42554		Active	K 6	Alexco Keno Hill Mining Corp. - 100%	2005/12/04	2005/12/15	2035/12/15	
YC42608		Active	K 60	Alexco Keno Hill Mining Corp. - 100%	2005/12/05	2005/12/15	2030/12/15	
YC42609		Active	K 61	Alexco Keno Hill Mining Corp. - 100%	2005/12/05	2005/12/15	2035/12/15	
YC42610		Active	K 62	Alexco Keno Hill Mining Corp. - 100%	2005/12/05	2005/12/15	2035/12/15	
YC42611		Active	K 63	Alexco Keno Hill Mining Corp. - 100%	2005/12/01	2005/12/15	2035/12/15	
YC42612		Active	K 64	Alexco Keno Hill Mining Corp. - 100%	2005/12/01	2005/12/15	2035/12/15	
YC42613		Active	K 65	Alexco Keno Hill Mining Corp. - 100%	2005/12/01	2005/12/15	2035/12/15	
YC42614		Active	K 66	Alexco Keno Hill Mining Corp. - 100%	2005/12/01	2005/12/15	2035/12/15	
YC42615		Active	K 67	Alexco Keno Hill Mining Corp. - 100%	2005/12/01	2005/12/15	2035/12/15	
YC42616		Active	K 68	Alexco Keno Hill Mining Corp. - 100%	2005/12/01	2005/12/15	2035/12/15	
YC42617		Active	K 69	Alexco Keno Hill Mining Corp. - 100%	2005/12/02	2005/12/15	2039/12/15	

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YC42555		Active	K 7	Alexco Keno Hill Mining Corp. - 100%	2005/11/30	2005/12/15	2035/12/15	
YC42618		Active	K 70	Alexco Keno Hill Mining Corp. - 100%	2005/12/02	2005/12/15	2039/12/15	
YC42619		Active	K 71	Alexco Keno Hill Mining Corp. - 100%	2005/12/02	2005/12/15	2035/12/15	
YC42620		Active	K 72	Alexco Keno Hill Mining Corp. - 100%	2005/12/02	2005/12/15	2035/12/15	
YC42621		Active	K 73	Alexco Keno Hill Mining Corp. - 100%	2005/12/02	2005/12/15	2035/12/15	
YC42622		Active	K 74	Alexco Keno Hill Mining Corp. - 100%	2005/12/02	2005/12/15	2035/12/15	
YC42623		Active	K 75	Alexco Keno Hill Mining Corp. - 100%	2005/12/02	2005/12/15	2035/12/15	
YC42624		Active	K 76	Alexco Keno Hill Mining Corp. - 100%	2005/12/02	2005/12/15	2035/12/15	
YC42625		Active	k 77	Alexco Keno Hill Mining Corp. - 100%	2005/12/05	2005/12/15	2035/12/15	
YC42626		Active	k 78	Alexco Keno Hill Mining Corp. - 100%	2005/12/05	2005/12/15	2035/12/15	
YC42627		Active	K 79	Alexco Keno Hill Mining Corp. - 100%	2005/12/02	2005/12/15	2022/12/15	
YC42556		Active	K 8	Alexco Keno Hill Mining Corp. - 100%	2005/11/30	2005/12/15	2035/12/15	
YC42628	NM00718	Active	K 80	Alexco Keno Hill Mining Corp. - 100%	2005/12/05	2005/12/15	2033/10/02	
YC42629		Active	K 81	Alexco Keno Hill Mining Corp. - 100%	2005/12/02	2005/12/15	2022/12/15	
YC42630		Active	K 82	Alexco Keno Hill Mining Corp. - 100%	2005/12/02	2005/12/15	2022/12/15	
YC42631		Active	K 83	Alexco Keno Hill Mining Corp. - 100%	2005/12/02	2005/12/15	2022/12/15	
YC42632		Active	K 84	Alexco Keno Hill Mining Corp. - 100%	2005/12/02	2005/12/15	2022/12/15	
YC42633		Active	K 85	Alexco Keno Hill Mining Corp. - 100%	2005/12/05	2005/12/15	2029/12/15	
YC55953		Active	K 87	Alexco Keno Hill Mining Corp. - 100%	2007/05/26	2007/05/28	2035/12/31	
YC56115		Active	K 88	Alexco Keno Hill Mining Corp. - 100%	2007/06/13	2007/06/13	2022/12/31	
YC56116		Active	K 89	Alexco Keno Hill Mining Corp. - 100%	2007/06/12	2007/06/13	2035/12/31	
YC42557		Active	K 9	Alexco Keno Hill Mining Corp. - 100%	2005/11/30	2005/12/15	2035/12/15	
YC56117		Active	K 90	Alexco Keno Hill Mining Corp. - 100%	2007/06/12	2007/06/13	2034/12/31	
YC56118		Active	K 91	Alexco Keno Hill Mining Corp. - 100%	2007/06/11	2007/06/13	2023/12/31	
YC56119		Active	K 92	Alexco Keno Hill Mining Corp. - 100%	2007/06/11	2007/06/13	2023/12/31	
YC56120		Active	K 93	Alexco Keno Hill Mining Corp. - 100%	2007/06/13	2007/06/13	2023/12/31	
YC56121		Active	K 94	Alexco Keno Hill Mining Corp. - 100%	2007/06/13	2007/06/13	2023/12/31	
YC56122		Active	K 95	Alexco Keno Hill Mining Corp. - 100%	2007/06/14	2007/06/15	2023/12/31	
YC56123		Active	K 96	Alexco Keno Hill Mining Corp. - 100%	2007/06/14	2007/06/15	2023/12/31	
YC56124		Active	K 97	Alexco Keno Hill Mining Corp. - 100%	2007/06/14	2007/06/15	2023/12/15	
YC56125		Active	K 98	Alexco Keno Hill Mining Corp. - 100%	2007/06/14	2007/06/15	2023/12/15	
YC56126		Active	K 99	Alexco Keno Hill Mining Corp. - 100%	2007/06/14	2007/06/15	2023/12/15	
YC90502		Active	K Fr. 109	Alexco Keno Hill Mining Corp. - 100%	2012/08/19	2012/09/10	2023/09/10	
YC90501		Active	K Fr. 110	Alexco Keno Hill Mining Corp. - 100%	2012/08/19	2012/09/10	2023/09/10	
80345		Active	K.P.O.	Elsa Reclamation & Development Company Ltd. - 100%	1958/10/07	1958/10/14	2035/12/31	
80082		Active	K.P.O. 1	Elsa Reclamation & Development Company Ltd. - 100%	1956/10/05	1956/10/05	2035/12/31	
80362		Active	K.P.O. 13	Elsa Reclamation & Development Company Ltd. - 100%	1959/07/15	1959/07/24	2035/12/31	
80364		Active	K.P.O. 15	Elsa Reclamation & Development Company Ltd. - 100%	1959/07/15	1959/07/24	2035/12/31	
80366		Active	K.P.O. 17	Elsa Reclamation & Development Company Ltd. - 100%	1959/07/15	1959/07/24	2035/12/31	
80367		Active	K.P.O. 18	Elsa Reclamation & Development Company Ltd. - 100%	1959/07/15	1959/07/24	2035/12/31	
80368		Active	K.P.O. 19	Elsa Reclamation & Development Company Ltd. - 100%	1959/07/15	1959/07/24	2035/12/31	
80083		Active	K.P.O. 2	Elsa Reclamation & Development Company Ltd. - 100%	1956/10/05	1956/10/05	2035/12/31	
80369		Active	K.P.O. 20	Elsa Reclamation & Development Company Ltd. - 100%	1959/07/15	1959/07/24	2035/12/31	

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80370		Active	K.P.O. 21	Elsa Reclamation & Development Company Ltd. - 100%	1959/07/16	1959/07/24	2035/12/31	
80372		Active	K.P.O. 23	Elsa Reclamation & Development Company Ltd. - 100%	1959/07/16	1959/07/24	2035/12/31	
80374		Active	K.P.O. 25	Elsa Reclamation & Development Company Ltd. - 100%	1959/07/17	1959/07/24	2035/12/31	
80376		Active	K.P.O. 27	Elsa Reclamation & Development Company Ltd. - 100%	1959/07/18	1959/07/24	2035/12/31	
80378		Active	K.P.O. 29	Elsa Reclamation & Development Company Ltd. - 100%	1959/07/19	1959/07/28	2035/12/31	
80084		Active	K.P.O. 3	Elsa Reclamation & Development Company Ltd. - 100%	1956/10/05	1956/10/05	2035/12/31	
80085		Active	K.P.O. 4	Elsa Reclamation & Development Company Ltd. - 100%	1956/10/05	1956/10/05	2035/12/31	
YC69940	NM00641	Active	K108F	Alexco Keno Hill Mining Corp. - 100%	2008/09/02	2008/09/10	2030/02/23	
80561	NM00586	Active	KANGAROO FRACTI	Elsa Reclamation & Development Company Ltd. - 100%	1960/10/18	1960/10/25	2027/11/02	
62248	NM00526	Active	KARIN	Elsa Reclamation & Development Company Ltd. - 100%	1952/09/04	1952/09/05	2026/11/01	
62198	NM00401	Active	KARL	Elsa Reclamation & Development Company Ltd. - 100%	1952/07/21	1952/08/04	2025/06/12	
59177	NM00286	Active	KAY R.	Elsa Reclamation & Development Company Ltd. - 100%	1949/01/19	1949/01/25	2024/06/27	
59336	NM00843	Active	KAYE	Elsa Reclamation & Development Company Ltd. - 100%	1949/07/14	1949/07/19	2040/07/27	
55579	NM00278	Active	KENO	Elsa Reclamation & Development Company Ltd. - 100%	1946/09/19	1947/03/20	2024/04/18	
12784	NM00622	Active	KENO	Elsa Reclamation & Development Company Ltd. - 100%	1919/07/29	1919/09/10	2030/02/23	
16556	NM00768	Active	KENO	Elsa Reclamation & Development Company Ltd. - 100%	1925/05/29	1925/06/18	2038/03/21	
55024	NM00830	Active	KENO	Elsa Reclamation & Development Company Ltd. - 100%	1936/10/14	1936/10/30	2039/08/18	
62295	NM00468	Active	KENT	Elsa Reclamation & Development Company Ltd. - 100%	1952/10/04	1952/10/11	2025/11/26	
62310	NM00469	Active	KID	Elsa Reclamation & Development Company Ltd. - 100%	1953/07/02	1953/07/15	2025/11/26	
12812	NM00748	Active	KID	Elsa Reclamation & Development Company Ltd. - 100%	1919/08/17	1919/10/16	2036/10/19	
13060	NM00832	Active	KIDDO	John Hawthorne - 50%, Elsa Reclamation & Development Com	1920/04/03	1920/05/11	2040/11/11	
56419	NM00088	Active	KIJO	Elsa Reclamation & Development Company Ltd. - 100%	1947/05/31	1947/06/10	2021/08/20	
15264	NM00346	Active	KIM	Elsa Reclamation & Development Company Ltd. - 100%	1928/07/28	1928/08/10	2025/03/30	
62270	NM00342	Active	KING	Elsa Reclamation & Development Company Ltd. - 100%	1952/09/13	1952/09/17	2025/02/15	
12818	NM00660	Active	KING	Elsa Reclamation & Development Company Ltd. - 100%	1919/09/04	1919/10/20	2031/09/27	
15323	NM00181	Active	KLONDIKE	Elsa Reclamation & Development Company Ltd. - 100%	1929/03/07	1929/04/25	2023/02/02	
13558	NM00603	Active	LADUE	Elsa Reclamation & Development Company Ltd. - 100%	1920/09/11	1920/11/05	2029/07/07	
13225	NM00645	Active	LAKE 1	Elsa Reclamation & Development Company Ltd. - 100%	1920/06/08	1920/07/13	2030/04/27	
13276	NM00646	Active	LAKE 2	Elsa Reclamation & Development Company Ltd. - 100%	1920/06/08	1920/08/25	2030/04/27	
13277	NM00647	Active	LAKE 3	Elsa Reclamation & Development Company Ltd. - 100%	1920/06/08	1920/08/25	2030/04/27	
YB64184		Active	Lakehead 1	Alexco Keno Hill Mining Corp. - 100%	1995/06/27	1995/06/28	2034/12/31	
YB64191		Active	Lakehead 10	Alexco Keno Hill Mining Corp. - 100%	1995/06/27	1995/06/28	2039/12/31	
YB64194		Active	Lakehead 11	Alexco Keno Hill Mining Corp. - 100%	1995/06/29	1995/06/30	2039/12/31	
YB64195		Active	Lakehead 12	Alexco Keno Hill Mining Corp. - 100%	1995/06/29	1995/06/30	2039/12/31	
YB64196		Active	Lakehead 13	Alexco Keno Hill Mining Corp. - 100%	1995/06/29	1995/06/30	2039/12/31	
YB64185		Active	Lakehead 2	Alexco Keno Hill Mining Corp. - 100%	1995/06/27	1995/06/28	2034/12/31	
YB64192		Active	Lakehead 3	Alexco Keno Hill Mining Corp. - 100%	1995/06/29	1995/06/30	2039/12/31	
YB64193		Active	Lakehead 4	Alexco Keno Hill Mining Corp. - 100%	1995/06/29	1995/06/30	2039/12/31	
YB64186		Active	Lakehead 5	Alexco Keno Hill Mining Corp. - 100%	1995/06/27	1995/06/28	2039/12/31	
YB64187		Active	Lakehead 6	Alexco Keno Hill Mining Corp. - 100%	1995/06/27	1995/06/28	2039/12/31	
YB64188		Active	Lakehead 7	Alexco Keno Hill Mining Corp. - 100%	1995/06/27	1995/06/28	2039/12/31	
YB64189		Active	Lakehead 8	Alexco Keno Hill Mining Corp. - 100%	1995/06/27	1995/06/28	2039/12/31	
YB64190		Active	Lakehead 9	Alexco Keno Hill Mining Corp. - 100%	1995/06/27	1995/06/28	2039/12/31	

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13222	NM00635	Active	LAKOTA	Elsa Reclamation & Development Company Ltd. - 100%	1920/06/07	1920/07/09	2029/12/31	
62051	NM00400	Active	LAMB FRACTION	Elsa Reclamation & Development Company Ltd. - 100%	1951/10/26	1951/11/07	2025/06/12	
12961	NM00857	Active	LAST CHANCE	Elsa Reclamation & Development Company Ltd. - 100%	1919/09/06	1920/02/26	2041/02/05	
62977	NM00650	Active	LE BLANC	Elsa Reclamation & Development Company Ltd. - 100%	1956/06/10	1956/06/21	2031/03/12	
YA17395	NM00638	Active	Lem 1	Alexco Keno Hill Mining Corp. - 100%	1977/11/04	1977/11/14	2030/02/23	
YA17404		Active	Lem 10	Alexco Keno Hill Mining Corp. - 100%	1977/11/10	1977/11/14	2026/12/31	
YA17405		Active	Lem 11	Alexco Keno Hill Mining Corp. - 100%	1977/11/10	1977/11/14	2026/12/31	
YA17396	NM00639	Active	Lem 2	Alexco Keno Hill Mining Corp. - 100%	1977/11/04	1977/11/14	2030/02/23	
YA17397	NM00640	Active	Lem 3	Alexco Keno Hill Mining Corp. - 100%	1977/11/04	1977/11/14	2030/02/23	
YA17398		Active	Lem 4	Alexco Keno Hill Mining Corp. - 100%	1977/11/04	1977/11/14	2026/12/31	
YA17399		Active	Lem 5	Alexco Keno Hill Mining Corp. - 100%	1977/11/10	1977/11/14	2026/12/31	
YA17400		Active	Lem 6	Alexco Keno Hill Mining Corp. - 100%	1977/11/10	1977/11/14	2026/12/31	
YA17401		Active	Lem 7	Alexco Keno Hill Mining Corp. - 100%	1977/11/10	1977/11/14	2026/12/31	
YA17402		Active	Lem 8	Alexco Keno Hill Mining Corp. - 100%	1977/11/10	1977/11/14	2026/12/31	
YA17403		Active	Lem 9	Alexco Keno Hill Mining Corp. - 100%	1977/11/10	1977/11/14	2026/12/31	
61635		Active	LEO	Elsa Reclamation & Development Company Ltd. - 100%	1951/06/10	1951/06/11	2035/12/31	
59710		Active	LEO 1	Elsa Reclamation & Development Company Ltd. - 100%	1950/09/23	1950/09/26	2035/12/31	
59850		Active	LEO 10	Elsa Reclamation & Development Company Ltd. - 100%	1950/09/27	1950/10/02	2035/12/31	
59851		Active	LEO 11	Elsa Reclamation & Development Company Ltd. - 100%	1950/09/27	1950/10/02	2035/12/31	
59852		Active	LEO 12	Elsa Reclamation & Development Company Ltd. - 100%	1950/09/27	1950/10/02	2035/12/31	
59853		Active	LEO 13	Elsa Reclamation & Development Company Ltd. - 100%	1950/09/27	1950/10/02	2035/12/31	
59854		Active	LEO 14	Elsa Reclamation & Development Company Ltd. - 100%	1950/09/27	1950/10/02	2035/12/31	
59855		Active	LEO 15	Elsa Reclamation & Development Company Ltd. - 100%	1950/09/27	1950/10/02	2035/12/31	
59856		Active	LEO 16	Elsa Reclamation & Development Company Ltd. - 100%	1950/09/27	1950/10/02	2035/12/31	
59857		Active	LEO 17	Elsa Reclamation & Development Company Ltd. - 100%	1950/09/27	1950/10/02	2035/12/31	
59941		Active	LEO 18	Elsa Reclamation & Development Company Ltd. - 100%	1950/10/09	1950/10/12	2035/12/31	
59942		Active	LEO 19	Elsa Reclamation & Development Company Ltd. - 100%	1950/10/09	1950/10/12	2035/12/31	
59711		Active	LEO 2	Elsa Reclamation & Development Company Ltd. - 100%	1950/09/23	1950/09/26	2035/12/31	
59712		Active	LEO 3	Elsa Reclamation & Development Company Ltd. - 100%	1950/09/23	1950/09/26	2035/12/31	
59714		Active	LEO 4	Elsa Reclamation & Development Company Ltd. - 100%	1950/09/23	1950/09/26	2035/12/31	
59715		Active	LEO 5	Elsa Reclamation & Development Company Ltd. - 100%	1950/09/23	1950/09/26	2035/12/31	
59716		Active	LEO 6	Elsa Reclamation & Development Company Ltd. - 100%	1950/09/23	1950/09/26	2035/12/31	
59717		Active	LEO 7	Elsa Reclamation & Development Company Ltd. - 100%	1950/09/23	1950/09/26	2035/12/31	
59718		Active	LEO 8	Elsa Reclamation & Development Company Ltd. - 100%	1950/09/23	1950/09/26	2035/12/31	
59849		Active	LEO 9	Elsa Reclamation & Development Company Ltd. - 100%	1950/09/27	1950/10/02	2035/12/31	
16512	NM00671	Active	LILL	Elsa Reclamation & Development Company Ltd. - 100%	1924/08/14	1924/09/09	2033/11/24	
14222	NM00501	Active	LILY	Elsa Reclamation & Development Company Ltd. - 100%	1921/07/17	1921/09/24	2026/03/31	
55442	NM00284	Active	LIME	Elsa Reclamation & Development Company Ltd. - 100%	1946/07/21	1946/07/30	2024/06/27	
15364	NM00769	Active	LINK	Elsa Reclamation & Development Company Ltd. - 100%	1929/06/07	1929/07/16	2038/03/22	
12830	NM00750	Active	LION	Elsa Reclamation & Development Company Ltd. - 100%	1919/08/27	1919/10/23	2036/10/24	
82289	NM00589	Active	LITE FRACTION	Elsa Reclamation & Development Company Ltd. - 100%	1962/08/01	1962/08/07	2027/11/02	
14229	NM00077	Active	LITTLE CHARLIE	Elsa Reclamation & Development Company Ltd. - 100%	1921/08/18	1921/09/24	2021/08/08	
15329	NM00766	Active	LITTLE FRACTION	Elsa Reclamation & Development Company Ltd. - 100%	1929/04/07	1929/05/16	2038/03/08	

Grant	Lease	Status	Claim Name	Owner	Staked	Recorded	Expiry	Comment
55269	NM00045	Active	LITTLE GIRL	Elsa Reclamation & Development Company Ltd. - 100%	1943/06/28	1943/11/09	2020/11/14	Renewed
12821	NM00423	Active	LIZZIE	Elsa Reclamation & Development Company Ltd. - 100%	1919/09/07	1919/10/20	2025/11/26	
YD63291		Active	LJ 1	Alexco Keno Hill Mining Corp. - 100%	2010/12/20	2010/12/22	2035/12/22	
YD63300		Active	LJ 10	Alexco Keno Hill Mining Corp. - 100%	2010/12/20	2010/12/22	2035/12/22	
YC90548		Active	LJ 11	Alexco Keno Hill Mining Corp. - 100%	2011/08/31	2011/09/02	2035/12/31	
YD63292		Active	LJ 2	Alexco Keno Hill Mining Corp. - 100%	2010/12/20	2010/12/22	2035/12/22	
YD63293		Active	LJ 3	Alexco Keno Hill Mining Corp. - 100%	2010/12/20	2010/12/22	2035/12/22	
YD63294		Active	LJ 4	Alexco Keno Hill Mining Corp. - 100%	2010/12/20	2010/12/22	2035/12/22	
YD63295		Active	LJ 5	Alexco Keno Hill Mining Corp. - 100%	2010/12/20	2010/12/22	2035/12/22	
YD63296		Active	LJ 6	Alexco Keno Hill Mining Corp. - 100%	2010/12/20	2010/12/22	2035/12/22	
YD63297		Active	LJ 7	Alexco Keno Hill Mining Corp. - 100%	2010/12/20	2010/12/22	2035/12/22	
YD63298		Active	LJ 8	Alexco Keno Hill Mining Corp. - 100%	2010/12/20	2010/12/22	2035/12/22	
YD63299		Active	LJ 9	Alexco Keno Hill Mining Corp. - 100%	2010/12/20	2010/12/22	2035/12/22	
12965	NM00859	Active	LONE STAR	Elsa Reclamation & Development Company Ltd. - 100%	1919/09/02	1920/03/01	2041/02/20	
59673	NM00396	Active	LOON	Elsa Reclamation & Development Company Ltd. - 100%	1950/09/07	1950/09/08	2025/06/12	
56516	NM00321	Active	LOOS	Elsa Reclamation & Development Company Ltd. - 100%	1948/04/18	1948/04/21	2025/02/02	
55495	NM00851	Active	LORNE	Elsa Reclamation & Development Company Ltd. - 100%	1946/09/14	1947/02/01	2040/10/12	
13019	NM00625	Active	LOTUS	Elsa Reclamation & Development Company Ltd. - 100%	1920/02/22	1920/05/04	2029/11/25	
56405	NM00433	Active	LOUIS 1	Elsa Reclamation & Development Company Ltd. - 100%	1947/03/29	1947/04/18	2025/11/26	
56406	NM00596	Active	LOUIS 2	Elsa Reclamation & Development Company Ltd. - 100%	1947/03/22	1947/04/18	2027/11/26	
56407	NM00434	Active	LOUIS 3	Elsa Reclamation & Development Company Ltd. - 100%	1947/03/22	1947/04/18	2025/11/26	
56408	NM00435	Active	LOUIS 4	Elsa Reclamation & Development Company Ltd. - 100%	1947/03/22	1947/04/18	2025/11/26	
14219	NM00078	Active	LOUISE	Elsa Reclamation & Development Company Ltd. - 100%	1921/07/17	1921/09/24	2021/08/08	
55501	NM00300	Active	LOVIE	Elsa Reclamation & Development Company Ltd. - 100%	1946/09/15	1947/02/01	2025/01/30	
16585	NM00771	Active	LUCKY	Elsa Reclamation & Development Company Ltd. - 100%	1925/06/09	1925/06/11	2038/03/29	
YC90544		Pending	Lucky Baldwin	Alexco Keno Hill Mining Corp. - 100%	2016/10/21	2016/10/25	2022/10/25	
13021	NM00674	Active	LUCKY QUEEN	Elsa Reclamation & Development Company Ltd. - 100%	1920/02/18	1920/05/04	2035/02/17	
16552	NM00775	Active	LUCKY STRIKE	Elsa Reclamation & Development Company Ltd. - 100%	1925/05/22	1925/06/15	2038/06/14	
13586	NM00637	Active	LUNA	Elsa Reclamation & Development Company Ltd. - 100%	1920/09/09	1920/11/12	2029/12/31	
38857	NM00632	Active	M.T.	Elsa Reclamation & Development Company Ltd. - 100%	1935/08/22	1935/10/01	2029/12/06	
2201	NM00816	Active	MABEL	Elsa Reclamation & Development Company Ltd. - 100%	1913/02/23	1913/03/17	2039/02/15	
62202	NM00464	Active	MAGGIE	Elsa Reclamation & Development Company Ltd. - 100%	1952/07/31	1952/08/05	2025/11/26	
14233	NM00659	Active	MAGGIE	Elsa Reclamation & Development Company Ltd. - 100%	1921/06/28	1921/09/24	2031/09/24	
56529	NM00502	Active	MALCOM	Alexco Keno Hill Mining Corp. - 100%	1948/06/12	1948/06/14	2025/11/28	
YC02774		Active	Man	Alexco Keno Hill Mining Corp. - 100%	2001/07/09	2001/07/10	2030/12/31	
12829	NM00747	Active	MAPLE LEAF	Elsa Reclamation & Development Company Ltd. - 100%	1919/08/27	1919/10/23	2036/10/15	
59520	NM00385	Active	MARG	Elsa Reclamation & Development Company Ltd. - 100%	1949/12/10	1949/12/14	2025/05/22	
56530	NM00508	Active	MARIE ELENA	Elsa Reclamation & Development Company Ltd. - 100%	1948/06/11	1948/06/17	2026/11/01	
55385	NM00049	Active	MARMOT	Elsa Reclamation & Development Company Ltd. - 100%	1945/08/09	1945/10/26	2020/11/14	Renewed
13787	NM00618	Active	MARY	Elsa Reclamation & Development Company Ltd. - 100%	1921/05/09	1921/06/21	2030/01/31	
YB29002		Active	Mary 1	Alexco Keno Hill Mining Corp. - 100%	1902/09/10	1992/09/25	2038/12/31	
YB29003		Active	Mary 2	Alexco Keno Hill Mining Corp. - 100%	1992/09/10	1992/09/25	2038/12/31	
YB29004		Active	Mary 3	Alexco Keno Hill Mining Corp. - 100%	1902/09/10	1992/09/25	2042/12/31	

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YB29005		Active	Mary 4	Alexco Keno Hill Mining Corp. - 100%	1902/09/10	1992/09/25	2042/12/31	
YB29394		Active	MARY 6	Alexco Keno Hill Mining Corp. - 100%	1992/11/18	1992/11/18	2038/12/31	
YC10995		Active	Mary A 0	Alexco Keno Hill Mining Corp. - 100%	2003/08/19	2003/09/02	2035/12/31	
YC10996		Active	Mary B 0	Alexco Keno Hill Mining Corp. - 100%	2003/08/19	2003/09/02	2035/12/31	
59014	NM00136	Active	MARY L.	Elsa Reclamation & Development Company Ltd. - 100%	1948/08/28	1948/09/01	2022/05/07	
14168	NM00690	Active	MASTIFF	Elsa Reclamation & Development Company Ltd. - 100%	1921/07/10	1921/09/14	2035/11/14	
12937	NM00764	Active	MATHOLE	Elsa Reclamation & Development Company Ltd. - 100%	1919/10/12	1920/01/03	2037/09/07	
59255	NM00271	Active	MATTAGAMI	Elsa Reclamation & Development Company Ltd. - 100%	1949/06/01	1949/06/03	2024/01/18	
38748	NM00759	Active	MAY	Elsa Reclamation & Development Company Ltd. - 100%	1932/07/25	1932/08/15	2037/09/03	
56573	NM00438	Active	MAYO	Elsa Reclamation & Development Company Ltd. - 100%	1948/06/22	1948/07/12	2025/11/26	
12919	NM00752	Active	MAYO	Elsa Reclamation & Development Company Ltd. - 100%	1919/09/09	1919/12/22	2036/12/21	
55497	NM00852	Active	MAYO	Elsa Reclamation & Development Company Ltd. - 100%	1946/09/12	1947/02/01	2040/10/12	
38619	NM00815	Active	McCARTHY FRACTI	Elsa Reclamation & Development Company Ltd. - 100%	1929/08/15	1929/09/19	2039/01/01	
62131	NM00848	Active	METEOR	Elsa Reclamation & Development Company Ltd. - 100%	1952/06/15	1952/06/16	2040/07/27	
14088	NM00693	Active	MIDWAY	Elsa Reclamation & Development Company Ltd. - 100%	1921/05/03	1921/07/26	2035/12/30	
59764	NM00571	Active	MIKE	Elsa Reclamation & Development Company Ltd. - 100%	1950/09/21	1950/09/26	2027/11/02	
56590	NM00568	Active	MIKE	Elsa Reclamation & Development Company Ltd. - 100%	1948/08/12	1948/08/18	2027/11/02	
16571	NM00755	Active	MINERVA	Elsa Reclamation & Development Company Ltd. - 100%	1925/05/29	1925/07/07	2037/03/22	
16040	NM00756	Active	MINERVA JR.	Elsa Reclamation & Development Company Ltd. - 100%	1925/08/17	1925/09/23	2037/04/14	
62837	NM00406	Active	MINK FRACTION	Elsa Reclamation & Development Company Ltd. - 100%	1955/07/26	1955/08/03	2025/06/12	
12814	NM00633	Active	MINTO	Elsa Reclamation & Development Company Ltd. - 100%	1919/08/16	1919/08/17	2029/12/16	
12920	NM00424	Active	MINTO 2	Elsa Reclamation & Development Company Ltd. - 100%	1919/09/10	1919/12/22	2025/11/26	
12879	NM00039	Active	MIRAMICHI	Elsa Reclamation & Development Company Ltd. - 100%	1919/08/30	1919/09/26	2020/09/16	Renewed
81227	NM00654	Active	Mo	Elsa Reclamation & Development Company Ltd. - 100%	1962/06/20	1962/06/26	2031/03/12	
15236	NM00757	Active	MOHAWK	Elsa Reclamation & Development Company Ltd. - 100%	1928/05/16	1928/06/13	2037/04/20	
YC32221		Active	Mom 1	Alexco Keno Hill Mining Corp. - 100%	2004/08/19	2004/08/23	2025/12/31	
YC32222		Active	Mom 2	Alexco Keno Hill Mining Corp. - 100%	2004/08/19	2004/08/23	2025/12/31	
YC32223		Active	Mom 3	Alexco Keno Hill Mining Corp. - 100%	2004/08/19	2004/08/23	2025/12/31	
YC32224		Active	Mom 4	Alexco Keno Hill Mining Corp. - 100%	2004/08/19	2004/08/23	2025/12/31	
YC32225		Active	Mom 5	Alexco Keno Hill Mining Corp. - 100%	2004/08/17	2004/08/23	2025/12/31	
YC32226		Active	Mom 6	Alexco Keno Hill Mining Corp. - 100%	2004/08/17	2004/08/23	2025/12/31	
YC32227		Active	Mom 7	Alexco Keno Hill Mining Corp. - 100%	2004/08/18	2004/08/23	2025/12/31	
YC32228		Active	Mom 8	Alexco Keno Hill Mining Corp. - 100%	2004/08/18	2004/08/23	2025/12/31	
55443	NM00432	Active	MONARCH	Elsa Reclamation & Development Company Ltd. - 100%	1946/07/22	1946/08/26	2025/11/26	
16568	NM00672	Active	MONOPLY	Elsa Reclamation & Development Company Ltd. - 100%	1925/05/28	1925/07/07	2033/11/24	
16569	NM00673	Active	MONTE CARLO	Elsa Reclamation & Development Company Ltd. - 100%	1925/06/05	1925/07/07	2033/11/24	
55312	NM00165	Active	MONTY	Elsa Reclamation & Development Company Ltd. - 100%	1944/07/24	1945/02/13	2022/06/12	
12819	NM00037	Active	MOOSE	Elsa Reclamation & Development Company Ltd. - 100%	1919/09/02	1919/10/20	2020/08/21	Renewed
62267	NM00339	Active	MORGAN	Elsa Reclamation & Development Company Ltd. - 100%	1952/09/13	1952/09/17	2025/02/15	
55332	NM00374	Active	MOSS	Elsa Reclamation & Development Company Ltd. - 100%	1945/05/22	1945/10/16	2025/05/22	
62366	NM00358	Active	MOSSBACK	Elsa Reclamation & Development Company Ltd. - 100%	1954/05/30	1954/06/08	2025/03/30	
38642	NM00760	Active	MOTH	Elsa Reclamation & Development Company Ltd. - 100%	1929/10/10	1929/11/13	2037/12/08	
13025	NM00834	Active	NABOB	Elsa Reclamation & Development Company Ltd. - 100%	1920/03/07	1920/05/05	2040/07/27	

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14990	NM00359	Active	NAETHING	Elsa Reclamation & Development Company Ltd. - 100%	1924/06/10	1924/07/09	2025/04/12	
59341	NM00844	Active	NANCE	Elsa Reclamation & Development Company Ltd. - 100%	1949/07/14	1949/07/19	2040/07/27	
15374	NM00427	Active	NANCY	Elsa Reclamation & Development Company Ltd. - 100%	1929/06/21	1929/07/24	2025/11/26	
12880	NM00861	Active	NAPOLEON	Elsa Reclamation & Development Company Ltd. - 100%	1919/09/16	1919/11/28	2041/03/13	
38873	NM00630	Active	NEIN	Elsa Reclamation & Development Company Ltd. - 100%	1935/10/31	1935/12/04	2029/12/06	
59169	NM00443	Active	NEWLYWED 1	Elsa Reclamation & Development Company Ltd. - 100%	1949/01/16	1949/01/25	2025/11/26	
59170	NM00444	Active	NEWLYWED 2	Elsa Reclamation & Development Company Ltd. - 100%	1949/01/16	1949/01/25	2025/11/26	
YC90541		Active	Nifty Fourteen	Alexco Keno Hill Mining Corp. - 100%	2017/08/12	2017/08/15	2023/08/15	
55583	NM00566	Active	NIKKA	Elsa Reclamation & Development Company Ltd. - 100%	1946/10/23	1947/03/20	2027/11/02	
83004	NM00591	Active	NIP FRACTION	Elsa Reclamation & Development Company Ltd. - 100%	1963/06/10	1963/06/12	2027/11/02	
62235	NM00576	Active	NM	Elsa Reclamation & Development Company Ltd. - 100%	1952/08/26	1952/08/27	2027/11/02	
16511	NM00670	Active	NO CASH	Elsa Reclamation & Development Company Ltd. - 100%	1924/08/09	1924/09/09	2033/11/24	
YC39585		Active	No name	Alexco Keno Hill Mining Corp. - 100%	2005/08/24	2005/09/01	2024/12/31	
16170	NM00800	Active	NOD FR.	Elsa Reclamation & Development Company Ltd. - 100%	1926/06/13	1926/07/13	2038/12/15	
38658	NM00504	Active	NOIDER	Elsa Reclamation & Development Company Ltd. - 100%	1930/01/07	1930/01/27	2026/11/01	
YC10897		Active	North F.	Alexco Keno Hill Mining Corp. - 100%	2003/08/07	2003/08/08	2035/12/31	
83010	NM00592	Active	NORTH FRACTION	Elsa Reclamation & Development Company Ltd. - 100%	1963/06/24	1963/06/25	2027/11/02	
13415	NM00173	Active	NORTH STAR	Elsa Reclamation & Development Company Ltd. - 100%	1920/07/24	1920/09/25	2022/11/13	
16012	NM00347	Active	NORTH STAR	Elsa Reclamation & Development Company Ltd. - 100%	1925/07/08	1925/08/14	2025/03/30	
YC57135		Active	O No Fr.	Alexco Keno Hill Mining Corp. - 100%	2007/08/22	2007/08/22	2023/12/31	
Y 33741		Active	O.K. 1	Alexco Keno Hill Mining Corp. - 100%	1970/12/10	1970/12/11	2034/12/31	
Y 85968		Active	O.K. 10	Alexco Keno Hill Mining Corp. - 100%	1973/10/02	1973/10/10	2034/12/31	
Y 33742		Active	O.K. 2	Alexco Keno Hill Mining Corp. - 100%	1970/12/10	1970/12/11	2034/12/31	
Y 56174		Active	O.K. 3	Alexco Keno Hill Mining Corp. - 100%	1971/09/11	1971/09/15	2034/12/31	
Y 56175		Active	O.K. 4	Alexco Keno Hill Mining Corp. - 100%	1971/09/11	1971/09/15	2034/12/31	
Y 85963		Active	O.K. 5	Alexco Keno Hill Mining Corp. - 100%	1973/10/02	1973/10/10	2034/12/31	
Y 85964		Active	O.K. 6	Alexco Keno Hill Mining Corp. - 100%	1973/10/02	1973/10/10	2034/12/31	
Y 85965		Active	O.K. 7	Alexco Keno Hill Mining Corp. - 100%	1973/10/02	1973/10/10	2034/12/31	
Y 85966		Active	O.K. 8	Alexco Keno Hill Mining Corp. - 100%	1973/10/02	1973/10/10	2034/12/31	
Y 85967		Active	O.K. 9	Alexco Keno Hill Mining Corp. - 100%	1973/10/02	1973/10/10	2034/12/31	
80360	NM00582	Active	OBOE	Elsa Reclamation & Development Company Ltd. - 100%	1959/07/15	1959/07/22	2027/11/02	
56566	NM00168	Active	OHIO	Elsa Reclamation & Development Company Ltd. - 100%	1948/06/26	1948/06/28	2022/06/12	
13094	NM00556	Active	OK FRACTION	Elsa Reclamation & Development Company Ltd. - 100%	1920/04/18	1920/06/09	2027/11/02	
YC01994		Active	One	Alexco Keno Hill Mining Corp. - 100%	1999/09/23	1999/09/28	2023/09/09	
61596	NM00461	Active	ONEK	Elsa Reclamation & Development Company Ltd. - 100%	1951/05/15	1951/05/21	2025/11/26	
14086	NM00697	Active	ORANGE	Elsa Reclamation & Development Company Ltd. - 100%	1921/05/03	1921/07/25	2036/01/21	
62959		Active	ORCHID 10	Elsa Reclamation & Development Company Ltd. - 100%	1956/05/18	1956/05/30	2034/12/31	
62960		Active	ORCHID 11	Elsa Reclamation & Development Company Ltd. - 100%	1956/05/18	1956/05/30	2034/12/31	
62961		Active	ORCHID 12	Elsa Reclamation & Development Company Ltd. - 100%	1956/05/18	1956/05/30	2034/12/31	
80123	NM00490	Active	ORCHID 13	Elsa Reclamation & Development Company Ltd. - 100%	1956/12/07	1956/12/13	2025/11/26	
80124	NM00491	Active	ORCHID 14	Elsa Reclamation & Development Company Ltd. - 100%	1956/12/07	1956/12/13	2025/11/26	
62964		Active	ORCHID 17	Elsa Reclamation & Development Company Ltd. - 100%	1956/05/18	1956/05/30	2034/12/31	
62966		Active	ORCHID 19	Elsa Reclamation & Development Company Ltd. - 100%	1956/05/18	1956/05/30	2034/12/31	

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62951		Active	ORCHID 2	Elsa Reclamation & Development Company Ltd. - 100%	1956/05/16	1956/05/30	2034/12/31	
62968		Active	ORCHID 21	Elsa Reclamation & Development Company Ltd. - 100%	1956/05/18	1956/05/30	2035/12/31	
62969		Active	ORCHID 22	Elsa Reclamation & Development Company Ltd. - 100%	1956/05/18	1956/05/30	2035/12/31	
62970		Active	ORCHID 23	Elsa Reclamation & Development Company Ltd. - 100%	1956/05/18	1956/05/30	2035/12/31	
62971		Active	ORCHID 24	Elsa Reclamation & Development Company Ltd. - 100%	1956/05/18	1956/05/30	2035/12/31	
62975	NM00482	Active	ORCHID 28	Elsa Reclamation & Development Company Ltd. - 100%	1956/05/19	1956/05/30	2025/11/26	
62976	NM00483	Active	ORCHID 29	Elsa Reclamation & Development Company Ltd. - 100%	1956/05/19	1956/05/30	2025/11/26	
80179	NM00500	Active	ORCHID 30	Elsa Reclamation & Development Company Ltd. - 100%	1957/05/07	1957/05/10	2025/11/26	
80120	NM00487	Active	ORCHID 34	Elsa Reclamation & Development Company Ltd. - 100%	1956/12/04	1956/12/13	2025/11/26	
80121	NM00488	Active	ORCHID 35	Elsa Reclamation & Development Company Ltd. - 100%	1956/12/07	1956/12/13	2025/11/26	
80122	NM00489	Active	ORCHID 36	Elsa Reclamation & Development Company Ltd. - 100%	1956/12/07	1956/12/13	2025/11/26	
80164	NM00494	Active	ORCHID 39	Elsa Reclamation & Development Company Ltd. - 100%	1957/03/27	1957/04/03	2025/11/26	
62953		Active	ORCHID 4	Elsa Reclamation & Development Company Ltd. - 100%	1956/05/16	1956/05/30	2034/12/31	
80165	NM00495	Active	ORCHID 40	Elsa Reclamation & Development Company Ltd. - 100%	1957/03/27	1957/04/03	2025/11/26	
80168	NM00498	Active	ORCHID 43	Elsa Reclamation & Development Company Ltd. - 100%	1957/03/27	1957/04/03	2025/11/26	
80169		Active	ORCHID 44	Elsa Reclamation & Development Company Ltd. - 100%	1957/03/27	1957/04/03	2035/12/31	
80170		Active	ORCHID 45	Elsa Reclamation & Development Company Ltd. - 100%	1957/03/27	1957/04/03	2035/12/31	
Y 68364		Active	Orchid 46	Elsa Reclamation & Development Company Ltd. - 100%	1972/07/12	1972/07/19	2035/12/31	
Y 68365		Active	Orchid 47	Elsa Reclamation & Development Company Ltd. - 100%	1972/07/12	1972/07/19	2035/12/31	
Y 68366		Active	Orchid 48	Elsa Reclamation & Development Company Ltd. - 100%	1972/07/12	1972/07/19	2035/12/31	
Y 68367		Active	Orchid 49	Elsa Reclamation & Development Company Ltd. - 100%	1972/07/12	1972/07/19	2035/12/31	
Y 68368		Active	Orchid 50	Elsa Reclamation & Development Company Ltd. - 100%	1972/07/12	1972/07/19	2035/12/31	
Y 68369		Active	Orchid 51	Elsa Reclamation & Development Company Ltd. - 100%	1972/07/12	1972/07/19	2035/12/31	
Y 68370		Active	Orchid 52	Elsa Reclamation & Development Company Ltd. - 100%	1972/07/12	1972/07/19	2035/12/31	
Y 68371		Active	Orchid 53	Elsa Reclamation & Development Company Ltd. - 100%	1972/07/12	1972/07/19	2035/12/31	
62955		Active	ORCHID 6	Elsa Reclamation & Development Company Ltd. - 100%	1956/05/16	1956/05/30	2034/12/31	
62956		Active	ORCHID 7	Elsa Reclamation & Development Company Ltd. - 100%	1956/05/16	1956/05/30	2034/12/31	
62957		Active	ORCHID 8	Elsa Reclamation & Development Company Ltd. - 100%	1956/05/16	1956/05/30	2034/12/31	
62958		Active	ORCHID 9	Elsa Reclamation & Development Company Ltd. - 100%	1956/05/16	1956/05/30	2034/12/31	
12852	NM00179	Active	ORPHAN	Elsa Reclamation & Development Company Ltd. - 100%	1919/09/15	1919/10/31	2023/01/18	
13542	NM00530	Active	OUTCAST FRACTIO	Elsa Reclamation & Development Company Ltd. - 100%	1920/10/01	1920/10/25	2026/11/18	
56581	NM00187	Active	OVERTIME 1	Elsa Reclamation & Development Company Ltd. - 100%	1948/08/07	1948/08/13	2023/02/09	
56583	NM00439	Active	OVERTIME 13	Elsa Reclamation & Development Company Ltd. - 100%	1948/08/07	1948/08/13	2025/11/26	
56584	NM00440	Active	OVERTIME 14	Elsa Reclamation & Development Company Ltd. - 100%	1948/08/07	1948/08/13	2025/11/26	
56585	NM00441	Active	OVERTIME 15	Elsa Reclamation & Development Company Ltd. - 100%	1948/08/09	1948/08/13	2025/11/26	
56586	NM00442	Active	OVERTIME 16	Elsa Reclamation & Development Company Ltd. - 100%	1948/08/09	1948/08/13	2025/11/26	
59453	NM00445	Active	OVERTIME 17	Elsa Reclamation & Development Company Ltd. - 100%	1949/08/17	1949/08/19	2025/11/26	
59454	NM00446	Active	OVERTIME 18	Elsa Reclamation & Development Company Ltd. - 100%	1949/08/17	1949/08/19	2025/11/26	
59455	NM00447	Active	OVERTIME 19	Elsa Reclamation & Development Company Ltd. - 100%	1949/08/17	1949/08/19	2025/11/26	
56582	NM00188	Active	OVERTIME 2	Elsa Reclamation & Development Company Ltd. - 100%	1948/08/07	1948/08/13	2023/02/09	
59456	NM00448	Active	OVERTIME 20	Elsa Reclamation & Development Company Ltd. - 100%	1949/08/17	1949/08/19	2025/11/26	
59040	NM00285	Active	OXO	Elsa Reclamation & Development Company Ltd. - 100%	1948/09/18	1948/09/21	2024/06/27	
14999	NM00700	Active	PACIFIC	Elsa Reclamation & Development Company Ltd. - 100%	1924/06/18	1924/07/14	2036/01/29	

Grant	Lease	Status	Claim Name	Owner	Staked	Recorded	Expiry	Comment
59294	NM00178	Active	PACSAX	Elsa Reclamation & Development Company Ltd. - 100%	1949/06/20	1949/06/30	2022/12/29	
59313		Active	Paddy	Alexco Keno Hill Mining Corp. - 100%	1949/06/29	1949/07/08	2035/12/31	
83253		Active	Paddy 2	Alexco Keno Hill Mining Corp. - 100%	1963/10/09	1963/10/16	2035/12/31	
83254		Active	Paddy 3	Alexco Keno Hill Mining Corp. - 100%	1963/10/09	1963/10/16	2035/12/31	
83721		Active	Paddy 4	Alexco Keno Hill Mining Corp. - 100%	1964/10/25	1964/10/26	2035/12/31	
83722		Active	Paddy 5	Alexco Keno Hill Mining Corp. - 100%	1964/10/25	1964/10/26	2035/12/31	
14093	NM00089	Active	PAGODA	Elsa Reclamation & Development Company Ltd. - 100%	1921/05/04	1921/07/26	2021/08/20	
16564	NM00817	Active	PAL OF MINE	Elsa Reclamation & Development Company Ltd. - 100%	1925/05/18	1925/06/30	2039/05/28	
14091	NM00362	Active	PASCO	Elsa Reclamation & Development Company Ltd. - 100%	1921/05/04	1921/07/26	2025/04/30	
2203	NM00318	Active	PATRICIA	Elsa Reclamation & Development Company Ltd. - 100%	1913/03/25	1913/04/08	2025/02/01	
12820	NM00360	Active	PEACH	Elsa Reclamation & Development Company Ltd. - 100%	1919/09/04	1919/10/20	2025/04/30	
55206	NM00562	Active	PEARL	Elsa Reclamation & Development Company Ltd. - 100%	1941/08/14	1941/10/30	2027/11/02	
12873	NM00813	Active	PERRY FRACTIONA	Elsa Reclamation & Development Company Ltd. - 100%	1919/10/01	1919/11/14	2038/12/28	
13158	NM00684	Active	PHOENIX	Elsa Reclamation & Development Company Ltd. - 100%	1920/05/01	1920/06/17	2034/02/27	
55500	NM00299	Active	PIL	Elsa Reclamation & Development Company Ltd. - 100%	1946/09/14	1947/02/01	2025/01/30	
12785	NM00688	Active	PINOCHLE	Elsa Reclamation & Development Company Ltd. - 100%	1919/07/30	1919/09/11	2035/10/29	
55561	NM00166	Active	PIRATE	Elsa Reclamation & Development Company Ltd. - 100%	1946/10/31	1947/02/17	2022/06/12	
55562	NM00167	Active	PIRATE 1	Elsa Reclamation & Development Company Ltd. - 100%	1946/10/31	1947/02/17	2022/06/12	
55563	NM00333	Active	PIRATE 2	Elsa Reclamation & Development Company Ltd. - 100%	1946/10/31	1947/02/17	2025/02/08	
55564	NM00334	Active	PIRATE 3	Elsa Reclamation & Development Company Ltd. - 100%	1946/10/31	1947/02/17	2025/02/15	
55565	NM00335	Active	PIRATE 4	Elsa Reclamation & Development Company Ltd. - 100%	1946/10/31	1947/02/17	2025/02/15	
55566	NM00336	Active	PIRATE 5	Elsa Reclamation & Development Company Ltd. - 100%	1946/10/31	1947/02/17	2025/02/15	
55567	NM00337	Active	PIRATE 6	Elsa Reclamation & Development Company Ltd. - 100%	1946/10/31	1947/02/17	2025/02/15	
55568	NM00338	Active	PIRATE 7	Elsa Reclamation & Development Company Ltd. - 100%	1946/10/31	1947/02/17	2025/02/15	
59299	NM00172	Active	PIRATE EAST	Elsa Reclamation & Development Company Ltd. - 100%	1949/06/22	1949/06/30	2022/06/12	
16499	NM00349	Active	PLATA	Elsa Reclamation & Development Company Ltd. - 100%	1924/08/07	1924/08/28	2025/03/30	
13182	NM00615	Active	POCA PLATA	Elsa Reclamation & Development Company Ltd. - 100%	1920/05/07	1920/06/21	2029/09/30	
56559	NM00239	Active	POO FRACTION	Elsa Reclamation & Development Company Ltd. - 100%	1948/06/23	1948/06/25	2023/08/29	
12875	NM00686	Active	PORCUPINE	Elsa Reclamation & Development Company Ltd. - 100%	1919/10/03	1919/11/15	2035/01/21	
16553	NM00776	Active	PORCUPINE	Elsa Reclamation & Development Company Ltd. - 100%	1925/05/28	1925/06/15	2038/06/20	
55389	NM00052	Active	PORKY	Elsa Reclamation & Development Company Ltd. - 100%	1945/08/12	1945/10/26	2020/11/14	Renewed
55029	NM00183	Active	PREMIER	Elsa Reclamation & Development Company Ltd. - 100%	1937/01/19	1937/02/15	2023/02/02	
55308	NM00506	Active	PRINCE	Elsa Reclamation & Development Company Ltd. - 100%	1944/06/18	1945/02/12	2026/11/01	
62558	NM00473	Active	PRINCESS FRACTI	Elsa Reclamation & Development Company Ltd. - 100%	1954/10/10	1954/10/27	2025/11/26	
55588	NM00295	Active	PRO	Alexco Keno Hill Mining Corp. - 100%	1946/10/08	1947/03/28	2025/02/23	
59387	NM00569	Active	PUEBLO	Elsa Reclamation & Development Company Ltd. - 100%	1949/07/21	1949/07/29	2027/11/02	
16558	NM00855	Active	PUNCH	Elsa Reclamation & Development Company Ltd. - 100%	1925/05/28	1925/06/18	2040/12/29	
59275	NM00541	Active	QUAIL	Alexco Keno Hill Mining Corp. - 100%	1949/06/13	1949/06/22	2027/11/02	
59824	NM00547	Active	QUAIL FRACTION	Alexco Keno Hill Mining Corp. - 100%	1950/09/22	1950/10/02	2027/11/02	
62269	NM00341	Active	QUEEN	Elsa Reclamation & Development Company Ltd. - 100%	1952/09/13	1952/09/17	2025/02/15	
56522	NM00111	Active	QUEST	Alexco Keno Hill Mining Corp. - 100%	1948/06/05	1948/06/08	2021/06/19	Renewed
59273	NM00112	Active	QUILL	Alexco Keno Hill Mining Corp. - 100%	1949/06/12	1949/06/21	2021/06/19	Renewed
81721	NM00658	Active	R.J.	Elsa Reclamation & Development Company Ltd. - 100%	1962/07/02	1962/07/10	2031/07/10	

Grant	Lease	Status	Claim Name	Owner	Staked	Recorded	Expiry	Comment
13073	NM00042	Active	RAM	Elsa Reclamation & Development Company Ltd. - 100%	1920/04/10	1920/06/04	2020/10/17	Renewed
55436	NM00283	Active	RAND	Elsa Reclamation & Development Company Ltd. - 100%	1946/06/10	1946/06/24	2024/06/27	
55022	NM00561	Active	RANDO	Elsa Reclamation & Development Company Ltd. - 100%	1936/10/01	1936/10/28	2027/11/02	
YB43729		Active	Raven	Elsa Reclamation & Development Company Ltd. - 100%	1994/10/18	1994/10/18	2023/12/31	
14227	NM00090	Active	READY CASH	Elsa Reclamation & Development Company Ltd. - 100%	1921/07/17	1921/09/24	2021/08/20	
62309	NM00405	Active	RENO	Elsa Reclamation & Development Company Ltd. - 100%	1952/07/02	1952/07/15	2025/06/12	
12800	NM00749	Active	RENO	Elsa Reclamation & Development Company Ltd. - 100%	1919/08/05	1919/10/01	2036/10/19	
84617	NM00792	Active	REVENGE FRACTIO	Elsa Reclamation & Development Company Ltd. - 100%	1965/08/06	1965/08/24	2038/10/17	
55387	NM00051	Active	REX	Elsa Reclamation & Development Company Ltd. - 100%	1945/08/10	1945/10/26	2020/11/14	Renewed
55586	NM00293	Active	REX	Alexco Keno Hill Mining Corp. - 100%	1946/10/08	1947/03/28	2025/02/23	
56578	NM00354	Active	REX (F)	Elsa Reclamation & Development Company Ltd. - 100%	1948/07/25	1948/08/03	2025/03/30	
12780	NM00619	Active	RICO	Elsa Reclamation & Development Company Ltd. - 100%	1919/07/21	1919/08/27	2030/02/18	
13452	NM00643	Active	RICO	Evelyn Crandall Exec Est.Bessie E.Stewart - 50%, Elsa Reclamation & Development Company Ltd. - 50%	1920/08/02	1920/10/02	2030/03/28	
16350	NM00036	Active	RING	Alexco Keno Hill Mining Corp. - 100%	1927/07/31	1927/08/27	2020/08/19	Renewed
14898	NM00677	Active	RIO	Elsa Reclamation & Development Company Ltd. - 100%	1923/10/12	1923/11/15	2035/04/14	
55384	NM00507	Active	ROAD	Elsa Reclamation & Development Company Ltd. - 100%	1945/08/06	1945/10/26	2026/11/01	
55341	NM00048	Active	ROBIN	Elsa Reclamation & Development Company Ltd. - 100%	1945/06/09	1945/10/17	2020/11/14	Renewed
59683	NM00546	Active	ROCK	Alexco Keno Hill Mining Corp. - 100%	1950/09/11	1950/09/19	2027/11/02	
62339	NM00291	Active	ROCKET FRACTION	Elsa Reclamation & Development Company Ltd. - 100%	1953/10/01	1953/10/02	2024/07/13	
55526	NM00376	Active	ROSE	Elsa Reclamation & Development Company Ltd. - 100%	1946/09/18	1947/02/04	2025/05/22	
55271	NM00529	Active	ROSEMARY	Elsa Reclamation & Development Company Ltd. - 100%	1943/07/01	1943/11/09	2026/11/09	
12779	NM00616	Active	ROULETTE	Elsa Reclamation & Development Company Ltd. - 100%	1919/07/10	1919/08/27	2030/01/26	
13709	NM00558	Active	ROY	Elsa Reclamation & Development Company Ltd. - 100%	1921/04/12	1921/05/28	2027/11/02	
61976	NM00575	Active	ROZ FRACTION	Elsa Reclamation & Development Company Ltd. - 100%	1951/09/19	1951/09/19	2027/11/02	
62199	NM00402	Active	RUBE	Elsa Reclamation & Development Company Ltd. - 100%	1952/07/21	1952/08/04	2025/06/12	
14989	NM00667	Active	RUBY	Elsa Reclamation & Development Company Ltd. - 100%	1924/06/09	1924/07/09	2033/11/24	
13038	NM00634	Active	SADIE	Elsa Reclamation & Development Company Ltd. - 100%	1920/03/18	1920/05/06	2029/12/17	
55327	NM00803	Active	SAM	Elsa Reclamation & Development Company Ltd. - 100%	1945/04/10	1945/10/16	2038/12/15	
55214	NM00839	Active	SANTIAGO	Elsa Reclamation & Development Company Ltd. - 100%	1941/11/06	1942/02/23	2040/07/27	
14090	NM00091	Active	SAXON	Elsa Reclamation & Development Company Ltd. - 100%	1921/05/03	1921/07/26	2021/08/20	
13591	NM00557	Active	SCOT	Elsa Reclamation & Development Company Ltd. - 100%	1921/01/06	1921/02/18	2027/11/02	
12783	NM00621	Active	SCOTTY	Elsa Reclamation & Development Company Ltd. - 100%	1919/07/29	1919/09/10	2030/01/24	
56534	NM00437	Active	SEGLE	Elsa Reclamation & Development Company Ltd. - 100%	1948/06/09	1948/06/23	2025/11/26	
14288	NM00648	Active	SEXTANT	Elsa Reclamation & Development Company Ltd. - 100%	1921/08/08	1921/10/04	2030/05/15	
55309	NM00428	Active	SHAMROCK	Elsa Reclamation & Development Company Ltd. - 100%	1944/06/27	1945/02/12	2025/11/26	
12803	NM00704	Active	SHAMROCK	Elsa Reclamation & Development Company Ltd. - 100%	1919/08/04	1919/10/08	2036/04/28	
12931	NM00177	Active	SHEPHERD	Elsa Reclamation & Development Company Ltd. - 100%	1919/10/15	1919/12/31	2022/11/19	
12990	NM00661	Active	SILVER BELL	Elsa Reclamation & Development Company Ltd. - 100%	1920/02/20	1920/04/15	2031/09/28	
38730	NM00801	Active	SILVER FR.	Elsa Reclamation & Development Company Ltd. - 100%	1931/08/20	1931/09/16	2038/12/15	
13069	NM00836	Active	SILVER HOARD	Elsa Reclamation & Development Company Ltd. - 100%	1920/03/07	1920/05/31	2040/07/27	
14216	NM00079	Active	SILVER SPOON	Elsa Reclamation & Development Company Ltd. - 100%	1921/07/17	1921/09/24	2021/08/08	
55039	NM00631	Active	SIS	Elsa Reclamation & Development Company Ltd. - 100%	1937/08/13	1937/09/03	2029/12/06	

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59027	NM00068	Active	SISTER	Elsa Reclamation & Development Company Ltd. - 100%	1948/09/11	1948/09/13	2021/07/24	
12915	NM00040	Active	SIWASH	Elsa Reclamation & Development Company Ltd. - 100%	1919/09/22	1919/12/19	2020/08/13	Renewed
38882	NM00629	Active	SLIVER	Elsa Reclamation & Development Company Ltd. - 100%	1936/03/16	1936/03/31	2029/12/06	
59436	NM00249	Active	SLOPE 2	Elsa Reclamation & Development Company Ltd. - 100%	1949/08/16	1949/08/19	2023/12/19	
13009	NM00199	Active	SMILES	Alexco Keno Hill Mining Corp. - 100%	1920/02/13	1920/04/28	2023/07/29	
62946	NM00476	Active	SNOW	Elsa Reclamation & Development Company Ltd. - 100%	1956/02/08	1956/02/10	2025/11/26	
Y 88686		Active	Snowdrift	Elsa Reclamation & Development Company Ltd. - 100%	1974/05/31	1974/06/05	2036/12/31	
Y 87462		Active	Snowdrift 1	Elsa Reclamation & Development Company Ltd. - 100%	1974/03/15	1974/03/21	2036/12/31	
Y 87471		Active	Snowdrift 10	Elsa Reclamation & Development Company Ltd. - 100%	1974/03/18	1974/03/21	2036/12/31	
Y 87472		Active	Snowdrift 11	Elsa Reclamation & Development Company Ltd. - 100%	1974/03/18	1974/03/21	2036/12/31	
Y 97219		Active	Snowdrift 12	Elsa Reclamation & Development Company Ltd. - 100%	1974/12/18	1974/12/23	2036/12/31	
Y 97220		Active	Snowdrift 13	Elsa Reclamation & Development Company Ltd. - 100%	1974/12/18	1974/12/23	2035/12/31	
Y 97221		Active	Snowdrift 14	Elsa Reclamation & Development Company Ltd. - 100%	1974/12/18	1974/12/23	2035/12/31	
Y 97222		Active	Snowdrift 15	Elsa Reclamation & Development Company Ltd. - 100%	1974/12/18	1974/12/23	2035/12/31	
Y 97223		Active	Snowdrift 16	Elsa Reclamation & Development Company Ltd. - 100%	1974/12/18	1974/12/23	2035/12/31	
YA01412		Active	Snowdrift 17	Elsa Reclamation & Development Company Ltd. - 100%	1975/09/22	1975/10/08	2036/12/31	
YA01413		Active	Snowdrift 18	Elsa Reclamation & Development Company Ltd. - 100%	1975/09/22	1975/10/08	2035/12/31	
YA01414		Active	Snowdrift 19	Elsa Reclamation & Development Company Ltd. - 100%	1975/09/22	1975/10/08	2035/12/31	
Y 87463		Active	Snowdrift 2	Elsa Reclamation & Development Company Ltd. - 100%	1974/03/15	1974/03/21	2035/12/31	
YA01415		Active	Snowdrift 20	Elsa Reclamation & Development Company Ltd. - 100%	1975/09/22	1975/10/08	2034/12/31	
YA01416		Active	Snowdrift 21	Elsa Reclamation & Development Company Ltd. - 100%	1975/09/22	1975/10/08	2035/12/31	
Y 87464		Active	Snowdrift 3	Elsa Reclamation & Development Company Ltd. - 100%	1974/03/15	1974/03/21	2035/12/31	
Y 87465		Active	Snowdrift 4	Elsa Reclamation & Development Company Ltd. - 100%	1974/03/18	1974/03/21	2034/12/31	
Y 87466		Active	Snowdrift 5	Elsa Reclamation & Development Company Ltd. - 100%	1974/03/18	1974/03/21	2034/12/31	
Y 87467		Active	Snowdrift 6	Elsa Reclamation & Development Company Ltd. - 100%	1974/03/18	1974/03/21	2034/12/31	
Y 87468		Active	Snowdrift 7	Elsa Reclamation & Development Company Ltd. - 100%	1974/03/18	1974/03/21	2034/12/31	
Y 87469		Active	Snowdrift 8	Elsa Reclamation & Development Company Ltd. - 100%	1974/03/18	1974/03/21	2034/12/31	
Y 87470		Active	Snowdrift 9	Elsa Reclamation & Development Company Ltd. - 100%	1974/03/18	1974/03/21	2035/12/31	
YC90547		Active	Snowdrift Fr. 17	Alexco Keno Hill Mining Corp. - 100%	2011/08/31	2011/09/02	2033/12/31	
55446	NM00536	Active	SOL	Alexco Keno Hill Mining Corp. - 100%	1946/08/20	1946/08/21	2027/11/02	
12816	NM00620	Active	SOLO 2	Elsa Reclamation & Development Company Ltd. - 100%	1919/08/15	1919/10/18	2030/02/18	
59630	NM00459	Active	SOLO FRACTION	Elsa Reclamation & Development Company Ltd. - 100%	1950/07/18	1950/07/21	2025/11/26	
55445	NM00535	Active	SOLOMAN	Alexco Keno Hill Mining Corp. - 100%	1946/08/16	1946/08/16	2027/11/02	
YC32218		Active	Son 1	Alexco Keno Hill Mining Corp. - 100%	2004/08/17	2004/08/23	2025/12/31	
YC32219		Active	Son 2	Alexco Keno Hill Mining Corp. - 100%	2004/08/17	2004/08/23	2025/12/31	
YC32220		Active	Son 3	Alexco Keno Hill Mining Corp. - 100%	2004/08/17	2004/08/23	2025/12/31	
YC39676		Active	Son 4	Alexco Keno Hill Mining Corp. - 100%	2005/08/26	2005/09/01	2024/12/31	
YC39586		Active	Son 5	Alexco Keno Hill Mining Corp. - 100%	2005/09/08	2005/09/12	2024/12/31	
YC39587		Active	Son 6	Alexco Keno Hill Mining Corp. - 100%	2005/09/08	2005/09/12	2024/12/31	
YC01212		Active	South F	Alexco Keno Hill Mining Corp. - 100%	1998/07/04	1998/07/06	2034/12/31	
14893	NM00698	Active	SPENCER	Elsa Reclamation & Development Company Ltd. - 100%	1923/10/01	1923/11/14	2036/01/27	
YC02773		Active	Spider	Alexco Keno Hill Mining Corp. - 100%	2001/07/06	2001/07/10	2030/12/31	
38813	NM00160	Active	SPOT	Elsa Reclamation & Development Company Ltd. - 100%	1934/10/08	1934/11/12	2022/06/02	

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55307	NM00184	Active	STANWIX	Elsa Reclamation & Development Company Ltd. - 100%	1944/06/06	1945/02/12	2023/02/02	
13721	NM00108	Active	STAURT	Elsa Reclamation & Development Company Ltd. - 100%	1921/04/26	1921/06/07	2021/08/26	
13035	NM00503	Active	STONE	Elsa Reclamation & Development Company Ltd. - 100%	1920/03/18	1920/05/06	2026/11/01	
83023	NM00595	Active	STONE FRACTION	Elsa Reclamation & Development Company Ltd. - 100%	1963/07/15	1963/07/16	2027/11/02	
59457	NM00250	Active	SUDDO 1	Elsa Reclamation & Development Company Ltd. - 100%	1949/08/16	1949/08/19	2023/12/19	
59466	NM00259	Active	SUDDO 10	Elsa Reclamation & Development Company Ltd. - 100%	1949/08/16	1949/08/19	2023/12/19	
59467	NM00260	Active	SUDDO 11	Elsa Reclamation & Development Company Ltd. - 100%	1949/08/16	1949/08/19	2023/12/19	
59458	NM00251	Active	SUDDO 2	Elsa Reclamation & Development Company Ltd. - 100%	1949/08/16	1949/08/18	2023/12/19	
59459	NM00252	Active	SUDDO 3	Elsa Reclamation & Development Company Ltd. - 100%	1949/08/16	1949/08/19	2023/12/19	
59460	NM00253	Active	SUDDO 4	Elsa Reclamation & Development Company Ltd. - 100%	1949/08/16	1949/08/19	2023/12/19	
59461	NM00254	Active	SUDDO 5	Elsa Reclamation & Development Company Ltd. - 100%	1949/08/16	1949/08/19	2023/12/19	
59462	NM00255	Active	SUDDO 6	Elsa Reclamation & Development Company Ltd. - 100%	1949/08/16	1949/08/19	2023/12/19	
59463	NM00256	Active	SUDDO 7	Elsa Reclamation & Development Company Ltd. - 100%	1949/08/16	1949/08/19	2023/12/19	
59464	NM00257	Active	SUDDO 8	Elsa Reclamation & Development Company Ltd. - 100%	1949/08/16	1949/08/19	2023/12/19	
59465	NM00258	Active	SUDDO 9	Elsa Reclamation & Development Company Ltd. - 100%	1949/08/16	1949/08/19	2023/12/19	
55433	NM00534	Active	SUNRISE	Alexco Keno Hill Mining Corp. - 100%	1946/06/15	1946/06/20	2027/11/02	
84580	NM00789	Active	SURPLOMB 2	Elsa Reclamation & Development Company Ltd. - 100%	1965/07/07	1965/07/14	2038/10/17	
84581	NM00790	Active	SURPLOMB 3	Elsa Reclamation & Development Company Ltd. - 100%	1965/07/10	1965/07/14	2038/10/17	
81225	NM00652	Active	SUSY Q.	Elsa Reclamation & Development Company Ltd. - 100%	1962/06/15	1962/06/26	2031/03/12	
15303	NM00828	Active	SWISS	Elsa Reclamation & Development Company Ltd. - 100%	1928/09/29	1928/10/26	2039/08/18	
59293	NM00080	Active	SYLDIX	Elsa Reclamation & Development Company Ltd. - 100%	1949/06/17	1949/06/30	2021/08/08	
14307	NM00241	Active	SYLVIA	Elsa Reclamation & Development Company Ltd. - 100%	1921/07/20	1921/10/06	2024/02/28	
55334	NM00240	Active	TAKU	Elsa Reclamation & Development Company Ltd. - 100%	1945/05/23	1945/10/16	2023/09/07	
59327	NM00407	Active	TALISMAN	Elsa Reclamation & Development Company Ltd. - 100%	1949/07/13	1949/07/19	2025/06/19	
61601	NM00552	Active	TARM	Alexco Keno Hill Mining Corp. - 100%	1951/05/13	1951/05/25	2027/11/02	
83132	NM00623	Active	TECH	Elsa Reclamation & Development Company Ltd. - 100%	1963/08/06	1963/08/13	2030/02/28	
84628	NM00794	Active	TESS	Elsa Reclamation & Development Company Ltd. - 100%	1965/08/27	1965/09/09	2038/10/17	
16313	NM00182	Active	THELMA	Elsa Reclamation & Development Company Ltd. - 100%	1927/03/14	1927/04/07	2023/02/02	
16204	NM00626	Active	THISTLE	Elsa Reclamation & Development Company Ltd. - 100%	1926/07/16	1926/08/12	2029/12/03	
55520	NM00538	Active	THUNDER BIRD	Alexco Keno Hill Mining Corp. - 100%	1946/09/15	1947/02/04	2027/11/02	
15207	NM00281	Active	TICK	Elsa Reclamation & Development Company Ltd. - 100%	1928/03/31	1928/04/28	2024/06/27	
12807	NM00751	Active	TIGER	Elsa Reclamation & Development Company Ltd. - 100%	1919/08/27	1919/10/10	2036/10/27	
14885	NM00069	Active	TILLY	Elsa Reclamation & Development Company Ltd. - 100%	1923/09/02	1923/10/22	2021/07/24	
13027	NM00835	Active	TIN CAN	Elsa Reclamation & Development Company Ltd. - 100%	1920/03/07	1920/05/05	2040/07/27	
59335	NM00864	Active	TIP TOP	Elsa Reclamation & Development Company Ltd. - 100%	1949/07/15	1949/07/19	2041/05/15	
16253	NM00678	Active	TIPPY	Elsa Reclamation & Development Company Ltd. - 100%	1926/09/20	1926/10/06	2035/04/14	
59295	NM00110	Active	TIPTOE	Elsa Reclamation & Development Company Ltd. - 100%	1949/06/20	1949/06/30	2021/08/29	
55065	NM00838	Active	TIPTOP	Elsa Reclamation & Development Company Ltd. - 100%	1938/03/04	1938/03/28	2040/07/27	
56505	NM00092	Active	TOM BOY	Elsa Reclamation & Development Company Ltd. - 100%	1947/10/06	1947/10/10	2021/08/22	
38741	NM00680	Active	TOMTOM	Elsa Reclamation & Development Company Ltd. - 100%	1932/05/30	1932/06/20	2035/04/14	
Y 31586		Active	Toni 1	Alexco Keno Hill Mining Corp. - 100%	1968/11/29	1968/12/02	2034/12/31	
Y 31587		Active	Toni 2	Alexco Keno Hill Mining Corp. - 100%	1968/11/29	1968/12/02	2034/12/31	
16079	NM00683	Active	TOO GOOD	Elsa Reclamation & Development Company Ltd. - 100%	1925/09/12	1925/11/29	2035/06/14	

Grant	Lease	Status	Claim Name	Owner	Staked	Recorded	Expiry	Comment
56504	NM00093	Active	TOPOLO	Elsa Reclamation & Development Company Ltd. - 100%	1947/09/15	1947/09/26	2021/08/22	
13622	NM00644	Active	TRAVICE	Elsa Reclamation & Development Company Ltd. - 100%	1921/03/12	1921/04/23	2030/04/22	
59161	NM00842	Active	TREASURE ISLAND	Elsa Reclamation & Development Company Ltd. - 100%	1948/11/18	1948/11/22	2040/07/27	
62281	NM00345	Active	TREY	Elsa Reclamation & Development Company Ltd. - 100%	1952/09/27	1952/10/02	2025/02/15	
14332	NM00604	Active	TRIANGLE	Elsa Reclamation & Development Company Ltd. - 100%	1921/08/24	1921/10/18	2029/07/11	
12838	NM00043	Active	TUNDRA	Elsa Reclamation & Development Company Ltd. - 100%	1919/09/06	1919/10/27	2020/11/01	Renewed
14833	NM00662	Active	TUNNEL	Elsa Reclamation & Development Company Ltd. - 100%	1923/06/04	1923/07/19	2031/09/30	
YC02322		Active	Twins 7	Alexco Keno Hill Mining Corp. - 100%	1999/12/14	1999/12/29	2035/12/29	
55525	NM00375	Active	U. N.	Elsa Reclamation & Development Company Ltd. - 100%	1946/09/18	1947/02/04	2025/05/22	
83533	NM00657	Active	U.K. No. 17	Elsa Reclamation & Development Company Ltd. - 100%	1964/07/14	1964/07/17	2031/03/12	
62723	NM00606	Active	UK 1	Elsa Reclamation & Development Company Ltd. - 100%	1955/03/22	1955/03/29	2029/04/30	
62735	NM00610	Active	UK 13	Elsa Reclamation & Development Company Ltd. - 100%	1955/03/22	1955/03/29	2029/04/30	
62736	NM00611	Active	UK 14	Elsa Reclamation & Development Company Ltd. - 100%	1955/03/22	1955/03/29	2029/04/30	
62835	NM00612	Active	UK 15	Elsa Reclamation & Development Company Ltd. - 100%	1955/07/06	1955/07/08	2029/04/30	
62836	NM00613	Active	UK 16	Elsa Reclamation & Development Company Ltd. - 100%	1955/07/06	1955/07/08	2029/04/30	
62724	NM00607	Active	UK 2	Elsa Reclamation & Development Company Ltd. - 100%	1955/03/22	1955/03/29	2029/04/30	
62729	NM00608	Active	UK 7	Elsa Reclamation & Development Company Ltd. - 100%	1955/03/22	1955/03/29	2029/04/30	
62730	NM00609	Active	UK 8	Elsa Reclamation & Development Company Ltd. - 100%	1955/03/22	1955/03/29	2029/04/30	
12923	NM00675	Active	UNCLE SAM	Elsa Reclamation & Development Company Ltd. - 100%	1919/10/12	1919/12/26	2035/03/12	
14002	NM00856	Active	UPTON	Elsa Reclamation & Development Company Ltd. - 100%	1921/05/07	1921/06/25	2041/02/05	
55270	NM00505	Active	V.D.	Elsa Reclamation & Development Company Ltd. - 100%	1943/06/29	1943/11/09	2026/11/01	
56503	NM00352	Active	V.O.	Elsa Reclamation & Development Company Ltd. - 100%	1947/09/17	1947/09/24	2025/03/30	
59338	NM00142	Active	VALLEY	Elsa Reclamation & Development Company Ltd. - 100%	1949/07/15	1949/07/19	2022/05/07	
16271	NM00194	Active	VAN KEUREN	Elsa Reclamation & Development Company Ltd. - 100%	1926/09/01	1926/10/23	2023/02/22	
13258	NM00211	Active	VANGUARD FRAC.	Alexco Keno Hill Mining Corp. - 100%	1920/06/19	1920/07/28	2023/09/13	
16375	NM00282	Active	VENTURE	Elsa Reclamation & Development Company Ltd. - 100%	1927/09/04	1927/10/18	2024/06/27	
Y 33308		Active	Venus 3	Elsa Reclamation & Development Company Ltd. - 100%	1970/04/05	1970/04/06	2023/12/31	
Y 97333		Active	Venus 4	Elsa Reclamation & Development Company Ltd. - 100%	1975/05/08	1975/05/09	2023/12/31	
80227	NM00527	Active	VENUS FRACTION 1	Elsa Reclamation & Development Company Ltd. - 100%	1957/06/20	1957/07/03	2026/11/07	
80228	NM00528	Active	VENUS FRACTION 2	Elsa Reclamation & Development Company Ltd. - 100%	1957/06/20	1957/07/03	2026/11/07	
13156	NM00826	Active	VERNA	Elsa Reclamation & Development Company Ltd. - 100%	1920/05/05	1920/06/17	2039/08/18	
15346	NM00426	Active	VIMY	Elsa Reclamation & Development Company Ltd. - 100%	1929/05/31	1929/06/21	2025/11/26	
38723	NM00560	Active	VIOLA	Elsa Reclamation & Development Company Ltd. - 100%	1931/07/27	1931/08/14	2027/11/02	
13153	NM00676	Active	VIOLA	Elsa Reclamation & Development Company Ltd. - 100%	1920/05/18	1920/06/16	2035/03/14	
14092	NM00081	Active	WALL EYE	Elsa Reclamation & Development Company Ltd. - 100%	1921/05/04	1921/07/26	2021/08/08	
12998	NM00860	Active	WALSH	Elsa Reclamation & Development Company Ltd. - 100%	1920/02/28	1920/04/17	2041/02/28	
55361	NM00161	Active	WANDERER	Elsa Reclamation & Development Company Ltd. - 100%	1945/07/04	1945/10/25	2022/06/02	
55496	NM00131	Active	WARREN	Elsa Reclamation & Development Company Ltd. - 100%	1946/09/15	1947/02/01	2022/02/03	
13367	NM00703	Active	WARRIOR	Elsa Reclamation & Development Company Ltd. - 100%	1920/08/12	1920/10/12	2036/02/27	
15365	NM00770	Active	WASP	Elsa Reclamation & Development Company Ltd. - 100%	1929/06/11	1929/07/11	2038/03/27	
13109	NM00130	Active	WATCH	Elsa Reclamation & Development Company Ltd. - 100%	1920/04/27	1920/06/10	2021/07/18	
62945	NM00475	Active	WEATHER FRACTIO	Elsa Reclamation & Development Company Ltd. - 100%	1955/12/30	1956/01/06	2025/11/26	
YB65005		Active	Webfoot	Elsa Reclamation & Development Company Ltd. - 100%	1995/09/28	1995/09/29	2022/12/31	

Grant	Lease	Status	Claim Name	Owner	Staked	Recorded	Expiry	Comment
YC10946		Active	Wedge 1	Alexco Keno Hill Mining Corp. - 100%	2003/09/09	2003/09/09	2034/12/31	
YC10993		Active	Wedge 2	Alexco Keno Hill Mining Corp. - 100%	2003/09/10	2003/09/18	2035/12/31	
YC10994		Active	Wedge 3	Alexco Keno Hill Mining Corp. - 100%	2003/09/10	2003/09/18	2035/12/31	
16557	NM00754	Active	WESTON	Elsa Reclamation & Development Company Ltd. - 100%	1925/05/30	1925/06/18	2037/03/07	
14231	NM00094	Active	WETT	Elsa Reclamation & Development Company Ltd. - 100%	1921/07/18	1921/09/24	2021/08/20	
14081	NM00797	Active	WHIPSAW	Elsa Reclamation & Development Company Ltd. - 100%	1921/06/11	1921/07/23	2038/12/15	
13110	NM00823	Active	WHITEHORSE	Elsa Reclamation & Development Company Ltd. - 100%	1920/04/27	1920/06/10	2039/08/05	
14095	NM00082	Active	WIGWAM	Elsa Reclamation & Development Company Ltd. - 100%	1921/05/04	1921/07/26	2021/08/08	
56500	NM00185	Active	WILD CAT	Elsa Reclamation & Development Company Ltd. - 100%	1947/09/18	1947/09/22	2023/02/02	
56417	NM00378	Active	WILD MAN	Elsa Reclamation & Development Company Ltd. - 100%	1947/06/05	1947/06/10	2025/05/22	
55426	NM00532	Active	WILDCAT	Alexco Keno Hill Mining Corp. - 100%	1946/05/25	1946/06/03	2027/11/02	
14404	NM00605	Active	WILLIAM FOURTH	Elsa Reclamation & Development Company Ltd. - 100%	1921/09/20	1921/11/05	2029/07/11	
55519	NM00537	Active	WILLOW	Alexco Keno Hill Mining Corp. - 100%	1946/09/05	1947/02/04	2027/11/02	
16083	NM00083	Active	WINFRED	Elsa Reclamation & Development Company Ltd. - 100%	1925/09/11	1925/11/20	2021/08/08	
16498	NM00095	Active	WINSOME	Elsa Reclamation & Development Company Ltd. - 100%	1924/08/04	1924/08/28	2021/08/20	
12871	NM00689	Active	WOLVERINE	Elsa Reclamation & Development Company Ltd. - 100%	1919/10/03	1919/11/13	2035/10/30	
80518	NM00585	Active	WREN FRACTION	Elsa Reclamation & Development Company Ltd. - 100%	1960/07/19	1960/08/04	2027/11/02	
56515	NM00096	Active	YUKON	Elsa Reclamation & Development Company Ltd. - 100%	1948/04/15	1948/04/19	2021/08/22	
55392		Active	YUKON	Elsa Reclamation & Development Company Ltd. - 100%	1945/11/03	1946/01/30	2022/12/31	
62312	NM00391	Active	ZELMA 1	Elsa Reclamation & Development Company Ltd. - 100%	1953/07/19	1953/07/31	2025/05/22	
62313	NM00392	Active	ZELMA 2	Elsa Reclamation & Development Company Ltd. - 100%	1953/07/19	1953/07/31	2025/05/22	
62314	NM00356	Active	ZELMA 3	Elsa Reclamation & Development Company Ltd. - 100%	1953/07/19	1953/07/31	2025/03/30	
62315	NM00357	Active	ZELMA 4	Elsa Reclamation & Development Company Ltd. - 100%	1953/07/19	1953/07/31	2025/03/30	

Crown Leases

Pin	Claimname	Claimtype	Planno	Remarks	Designator	Pcl_state
8060757	SILVER KING	Quartz Claim	FB15165 CLSR YT	LOT 13 GROUP 1054 ON GALENA CREEK	LOT 13 QUAD 105M/13	ACTIVE
8060755	ADAM	Quartz Claim	FB15165 CLSR YT	LOT 14 GROUP 1054 ON GALENA CREEK	LOT 14 QUAD 105M/13	ACTIVE